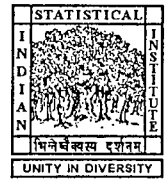
INDIAN STATISTICAL INSTITUTE

Annual Report

April 2009 – March 2010



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INDIAN STATISTICAL INSTITUTE
SEVENTY EIGHTH ANNUAL REPORT
April 2009 – March 2010

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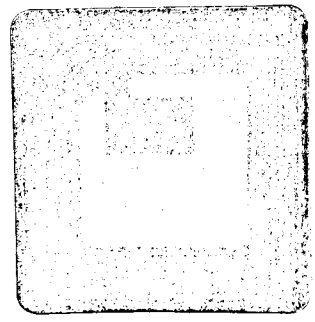
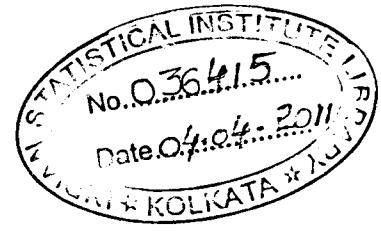
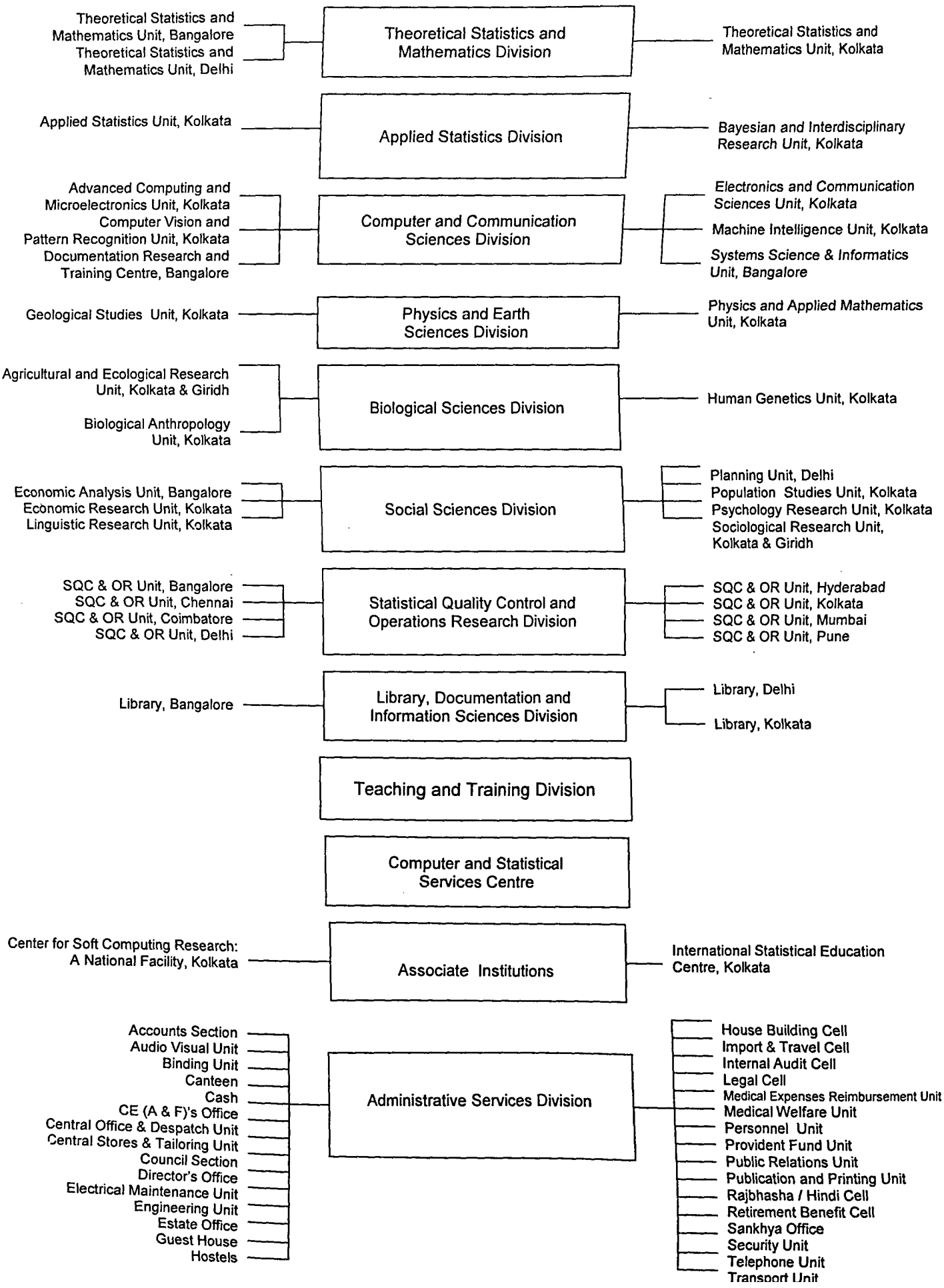




Organization of ISI by Divisions, Constituent Units and Associate Institutions



Director's Report

It is my proud privilege and pleasure to present the annual report of the Institute for the year 2009-10, which happens to be the fifth and last one after I assumed the post of the Director of the Institute on August 1, 2005. The Institute has its headquarters in Kolkata and three other centers at Delhi, Bangalore and Chennai besides a branch (field station) at Giridih and a network of service units under the Statistical Quality Control and Operations Research Division across the major cities in the country like Mumbai, Hyderabad, Pune and Vadodara.

True to the tradition of the Institute, a number of prestigious awards and honors have been received by some of my colleagues in the last year for significant contributions in their respective fields. I mention a few of them: Prof. Rajendra Bhatia of the Stat-Math Unit of the Delhi Center has been elected a Fellow of the Academy of Sciences for the Developing World (TWAS) in Mathematical Sciences and Prof. Partha Pratim Majumder of the Human Genetics Unit has received the TWAS prize in Biological Sciences. Prof. Atanu Biswas of the Applied Statistics Unit has received the CR Rao Award of the Government of India. Prof. TSSRK Rao of the Stat-Math Unit of the Bangalore Center has been elected a Fellow of the Indian Academy of Sciences, while Prof. Arup Bose of the Stat-Math Unit of Kolkata and Prof. Nikhil Ranjan Pal of the Electronics & Communication Sciences Unit have been elected Fellow of the National Academy of Sciences, India. Prof. Pal has also been elected a Fellow of the International Fuzzy Systems Association (IFSA). Prof. Ashis Sen Gupta of the Applied Statistics Unit has been elected a Fellow of the American Statistical Association, while Prof. Shibdas Bandopadhyay of the same Unit has been appointed a member of the National Statistical Commission, Government of India. Among younger colleagues, Dr. Debasish Goswami of the Stat-Math Unit of Kolkata has received the prestigious Swarnajayanti Fellowship in Mathematical Sciences of the Government of India. Dr. Anil Ghosh of the same unit has received the Young Scientist Award in Mathematical Sciences from the Indian National Science Academy. Dr. Pradipta Maji of the Machine Intelligence Unit has received the Platinum Jubilee Young Scientist Award in Engineering Sciences from the National Academy of Sciences, India. He has also become an Associate of the Indian Academy of Sciences. The Institute is proud of their achievements.

Apart from the high-quality research being conducted by its faculty, the Institute is renowned for a number of academic courses that are at par with the best in the world. These courses are updated from time to time along with introduction of new programs to cater to the needs of the students and the nation. In tune with this, a two-year Master's degree program in Quality Management Science, MS (QMS), is going to commence at the Bangalore Center from the academic session of 2011. This will widen the opportunities available to the graduating students with respect to job markets, as well as for pursuing higher studies. In line with the 15-year vision document, the Institute has started a new Ph.D. program in Quality, Reliability and Operations Research from the academic session of 2009. These two programs make the activity in

the discipline more academically oriented and focused. In this connection, we mention that the Institute has also decided to accommodate theses in Mathematical Physics for awarding PhD degree in Mathematics.

The Institute has a tradition of creating new units, whenever necessary, depending on the significance and evolution of new disciplines of research. In tune with this, a new unit called "Systems Science and Informatics Unit" (SSIU) has been formed in Bangalore Center under the Computer & Communication Sciences Division. I believe, this unit, in synergy with the strong mathematical sciences group in Bangalore Center and with many national Institutes of excellence, particularly in IT and computer science, located in Bangalore and around, will grow soon into a renowned school.

There are about 75 externally (both national and international, Government and Private) funded projects in the Institute. Funding agencies mainly include the DST, DBT, CSIR, MIT, ISRO, ICAR, ICMR, Ministry of Environment and Forests, Ministry of Tourism, Ministry of Defence, L&T, Infosys, NALCO, ICICI, HDFC, Reliance, US Army, East-West Center (USA), NIH (USA), NHF (Netherlands) and European Commission. Notable among these is one that was granted to the Institute last year, titled "International Passenger Survey" and funded by the Ministry of Tourism, Government of India. While externally funded projects are always encouraged, emphasis should be given, as I have been reiterating for the last four years, to having some big interdisciplinary projects of national importance, which cut across the different divisions of the Institute and exploit their respective expertise. This is also appropriate in view of the fact that the Institute has a unique multi-disciplinary character that is aptly described by its motto of "Unity in Diversity".

The "Center for Soft Computing Research: A National Facility" as funded by the Department of Science & Technology, Government of India, under its IRHPA program, has been accorded the status of an Affiliated Institution of ISI after completing all the formalities according to the provision of sub-clause 14.1 of the Memorandum of Association of ISI. With this addition, the number of Associated Institutes of ISI, at present, becomes two, the other being ISEC.

A yearlong celebration of the golden jubilee of our degree courses is currently going on. To commemorate this occasion, a prize called "Golden Jubilee Alumnus Award" has been instituted. This includes a gold medal to be conferred upon a distinguished alumnus of the Institute every year for his/her outstanding professional achievement. I am delighted to inform you that Prof. SRS Varadhan of New York University, USA, who received his PhD from our Institute in 1963, has been selected for the first Golden Jubilee Alumnus Award.

I am pleased to announce that the first issues of both series *Sankhya* A and *Sankhya* B, vol. 71, 2009 are available online. Next issues are also in the pipeline. A co-publishing agreement for this journal with Springer-Verlag, Heidelberg, is in place and the first issue under this agreement has come out.

In connection with the celebration of the Platinum Jubilee of the Institute, sixteen volumes and one special issue of a journal have been brought out. These include a series of thirteen volumes published by World Scientific Press, Singapore under the title "Statistical Science and Interdisciplinary Research".

Regarding the development of ISI Giridih, the Section 8(I) committee has been working to make it a full-fledged research and training centre. After examining the short-term and long-term proposals, the committee has decided in a recent meeting to explore the possibility of offering degrees in Agricultural Statistics, conducting faculty development programs around Jharkhand, and providing short term courses on Socio-Agricultural topics, apart from undertaking externally-funded research projects and conducting basic research activities.

Among other important things, implementation of the 6th Pay Commission report for the non-faculty employees, as well as faculty and faculty equivalents has been completed. Reappointment of the faculty and equivalents who retired after attaining the age of 62 years has been granted till they attain the age of 65 years, following the recommendation of the Governing Council. To promote excellence in research activity, members of the faculty, who are fellows of at least two of the four national academies, namely, Indian National Science Academy, Indian Academy of Sciences, National Academy of Science, India, and Indian National Academy of Engineering, excluding the SS Bhatnagar awardees, are being paid a special honorarium of Rs. 15000/- per month as per the decision of the nodal Ministry. Every faculty, including equivalents, has been given a laptop for facilitating their academic activities. Implementation of the Cumulative Professional Development Allowance scheme, that is, granting Rs. 3 lakhs for a block period of 3 years per faculty or equivalent of certain categories, as a part of the IISc pay scale package, is awaiting the approval of the nodal Ministry. Recruitment of new faculty continues to have high priority. The number of new appointments offered during my tenure till March 2010 is forty-six, though all of them have not joined.

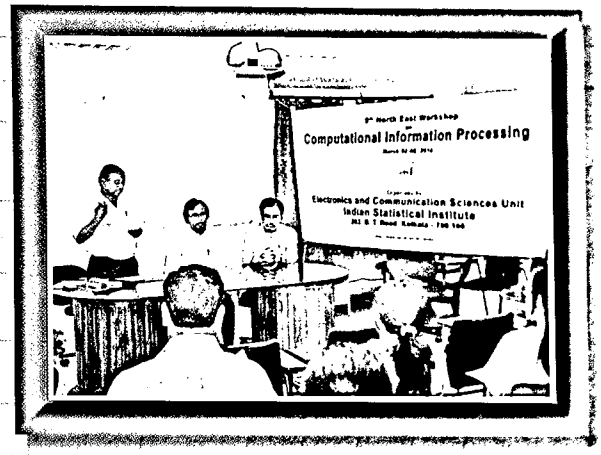
All the construction activities, which were started as a part of infrastructural development on Kolkata, Delhi and Bangalore campuses, under the Platinum Jubilee celebration program of the Institute, are complete, except that of the ISEC Center in Kolkata, work on which is in full swing.

As I approach the end of my tenure as the Director of this institute, I would like to put on record my gratitude and indebtedness to all those people, without whose cooperation it would have been difficult for

me to function as a responsible director. I am extremely grateful to Prof. M.G.K. Menon, President of the Institute, and to Shri Pranab Mukherjee, Chairman of the Institute and Hon'ble Minister of Finance, Government of India, for their valuable advice at various stages for the smooth functioning of the Institute during my entire tenure. I thank Dr. Pronab Sen, Chief Statistician of India; the officials of the Ministry of Statistics & Programme Implementation, Government of India; and the members of the Section 8(I) Committee for their support. Last, but not the least, my heartfelt thanks are due to all the workers of the Institute, particularly those colleagues who have actively co-operated to ensure smooth functioning of the Institute.

March 31, 2010 Sankar K. Pal

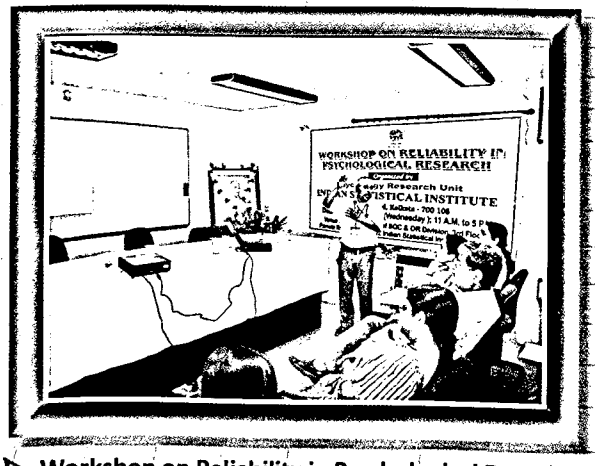
Workshop on Photography and Digital Technique, 15-17 February, 2010



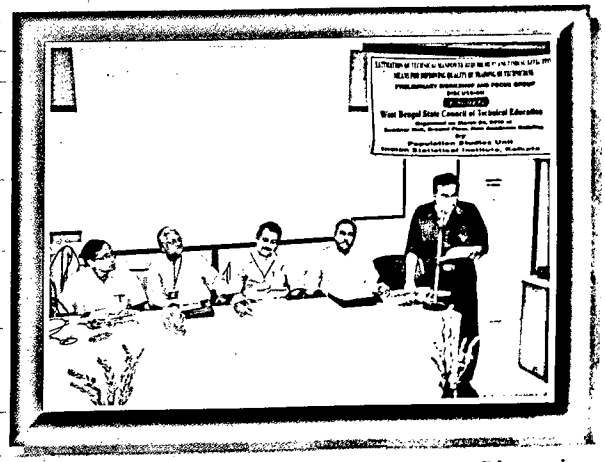
9th North East Workshop on Computational Information Processing, 2-5 March, 2010

Annual Sports Organised by ISI Club, 5 March, 2010

Refresher Course on Computer Applications in Statistics : Winter School, 8-26 March, 2010

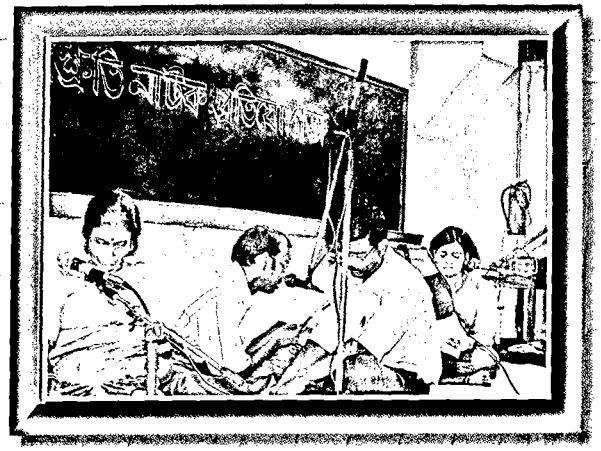


Workshop on Reliability in Psychological Research, 24 March, 2010



Preliminary Workshop and Focus Group Discussion, "Estimation of Technical Manpower Requirement and Finding Effective Means for Improving Quality of Training of Technicians", 24 March, 2010

Inter University Football Match at ISI, 16 April, 2009



Shruti Natak, Organised by ISI Club, 17 April, 2009

Retraining of Group-D Workers, 21 April, 2009

Blood Donation Camp Organised by ISI Club, 5 June, 2009

AILA Relief Camp by ISIWO at Chargheri, Lahiripur, South 24 Parganas, 13 June, 2009

Photography Exibition on 116th Birth Anniversary of Prof. P C Mahalanobis at Library, 29 June, 2009

A BRIEF HISTORY OF THE INSTITUTE

In the 1920's, Prasanta Chandra Mahalanobis, then a Professor at Presidency College, Calcutta conducted several studies employing statistical methods with results that vindicated his ideas about the efficacy and possibilities of the emerging science of Statistics. In a meeting on 17th December 1931 presided by Sir R. N. Mukherjee, the first President of the Institute, the Indian Statistical Institute (ISI) was formally established and Prasanta Chandra Mahalanobis was appointed the honorary Secretary. The Indian Statistical Institute was registered on 28th April, 1932, as a non-government and non-profit distributing learned society under the Societies' Registration Act No. XXI of 1860. The Institute is now registered under the West Bengal Societies Registration Act XXVI of 1961, amended in 1964. It has the following objectives:

(i) To promote the study and dissemination of knowledge of Statistics, to develop statistical theory and methods, and their use in research and practical applications generally, with special reference to problems of planning for national development and social welfare;

(ii) To undertake research in various fields of natural and social sciences with a view to the mutual development of Statistics and these sciences;

(iii) To provide for, and undertake, the collection of information, investigations, projects, and operational research for purposes of planning and the improvement of efficiency of management and production.

(iv) To undertake any other ancillary activities in fulfillment of the objectives (i), (ii) and (iii).

The Institute started functioning initially from a room of the Presidency College with enduring support from a number of distinguished personalities and devoted scholars in Kolkata. Over the first two decades, which turned out to be a glorious chapter in the annals of Indian science and institution building, the ISI embarked upon a series of pioneering programmes involving the application of Statistics in search of solution of the urgent and live problems of the country. Such programmes included innovative projects on sample surveys of yield and land utilisation of crops, socio-economic after-effects of Bengal famine and problems of flood research. These innovations and methodological research have since become classics in Statistics. At the same time, the training of scientific personnel began to grow. This also encouraged high level research and brought into focus the need for publication of the research results, for which *Sankhyā* , the first international journal of the country in Statistics, came into being in 1933.

Apart from the impact made in the world of Statistics, earning for the Institute the patronage of Sir Ronald A. Fisher, the brilliant choice of the area of surveys, their social and national relevance held secured the Institute to a pivotal place in the task of nation-building when India became independent. Led by Professor Mahalanobis and a very able group of younger statisticians including R.C. Bose, S. N. Roy and C. R. Rao, the Institute was poised to take on the larger role. The institute is proud to have C.R. Rao, who is among the world leaders in statistical science over the last six decades and still active at the age of 88 as the Director of the Center for Multivariate Analysis at Pennsylvania State University, USA, in its list of alumni.

The 1950s saw the Institute establishing (i) a full fledged research and training school in Statistics and Probability, with its application in natural and social sciences, (ii) a planning wing entrusted with the formulation of the Second Five-Year Plan of India, (iii) publication of Sankhya, (iv) the National Sample Survey wing engaging in comprehensive socio-economic data collection for the nation, (v) a string of Statistical Quality Control units for promoting the quality movement at various industrial centres in the country, (vi) a collaboration with the International Statistical Institute to train Government statisticians from Asia and Africa, and (vii) an Electronic Computer Laboratory that was responsible for developing (a) the 1st mechanical hand computing machine, (b) the 1st Analog computer, (c) the 1st Punched Card storing machine and (d) the 1st Solid State Computer in India, to name some of the

principal activities. In 1954 Pandit Jawaharlal Nehru, the then Prime Minister of India, entrusted Professor Mahalanobis and ISI with the responsibility of preparing the draft Second Five-Year Plan for the country. The draft submitted by Prasanta Chandra Mahalanobis and the planning models formulated by him and his colleagues have since been regarded as major contributions to economic planning in India. In 1956, the Institute installed the first electronic computer in the country. In 1961, the ISI, in collaboration with Jadavpur University, undertook the design, development and fabrication of a fully transistorized digital computer, called ISI-JU-1, which was commissioned in 1966. The Institute, from its formative period till present times, received as guests eminent scientists, some of whom were Nobel Laureates. Besides Ronald A. Fisher, J.B.S. Haldane and Walter A. Shewhart, the luminaries included Frederic and Irene Curie, Neils Bohr, A.N. Kolmogorov, P.M.S. Blackett, J.D. Bernal, Joan Robinson and Genedi Taguchi. In recent times, the visit of Amartya K. Sen, Robert Aumann, Lotfi A. Zadeh and S.R.S. Varadhan, 2007 Abel Prize winner for his contributions to probability theory and an alumnus of the institute, may be specially mentioned.

The formal recognition came in December 1959, when Pandit Jawaharlal Nehru piloted in the Parliament the enactment of the Indian Statistical Institute Act of 1959, which designated ISI as an 'Institution of national importance'. The activities steadily grew, existing interests became more broad-based and a number of science units were created in the interest of live interaction between Statistics and Natural and Social Sciences. Empowered by the Act to award degrees, the Institute started the B.Stat. and M.Stat. courses. An excellent library was founded at Kolkata and the Documentation Research and Training Centre began functioning in Bangalore. Other developments in infrastructure also began.

During 1971-72, two decisions of the Government of India produced serious repercussions on the functioning of the ISI. One was de-linking of the Institute from the Perspective Planning Division of the Planning Commission in 1971, while the other was the separation of National Sample Survey from the ISI and its take-over by the Central Government in 1972. Professor Mahalanobis passed away on 28th June, 1972. It was a critical period for the Institute. To overcome the problem, the ISI sought to strike a judicious balance between the individual academic work on truly fundamental problems and the work that called for a greater engagement with the social and economic problems of the country. The members of the Institute, under the Chairmanship of Shri P. N. Haksar, held a Special General Body Meeting on 26th July, 1974 and amended the Memorandum of Association and the Regulations of the Institute, encouraging more inter-disciplinary research and enhancing active participation of the scientists of the ISI in decision-making process of the Institute. The organisational amendments were implemented, with the concurrence of Government of India, in August, 1976. The various research units in natural, social and computer sciences were grouped under a number of scientific Divisions. The present structure of eight divisions has been arrived at through some further changes. Recently there have been some changes. Systems Science and Informatics Unit (SSIU) has been started as a part of the Computer and Communication Sciences Division (CCSD) at ISI Bangalore centre in August 2009. The Documentation Research and Training Centre (DRTC) has been made a part of CCSD. Over the next two decades diversity in research thrusts began to grow manifold, with emphasis on Computer Science and application of Statistics in the new areas of research in natural and social sciences and the creation of the two centres at Delhi and Bangalore with full-fledged research and teaching programmes. The newly created Chennai centre of the Institute, which came into being on 26th July, 2008, is also expected to focus on such diversity of research. The Indian Statistical Institute Act of 1959 was amended by the Parliament in 1995 to empower the Institute to award degrees/Diplomas not only in Statistics, but also in Mathematics, Quantitative Economics, Computer Science and such other subjects related to Statistics as may be determined by the Institute from time to time. Several new courses have also been added since: M. Tech. in Computer Science, M.Tech. in Quality, Reliability and Operations Research, M.S. in Quantitative Economics, B. Math. and M. Math.

In conclusion, a list of the distinguished scientists and statesmen who have served the Institute during the 78 years of its existence in the capacities of President, Chairman or Director is presented. A list of recipients of the honorary D.Sc. degree given by the Institute is also provided.

Presidents of the Institute

1	Sir Rajendra Nath Mookerjee	1932-35
2	Shri E. C. Benthall	1936-37
3	Shri James Reid-Kay	1938
4	Shri Badridas Goenka	1939-41
5	Dr. Nalini Ranjan Sarkar	1942-43
6	Dr. Chintaman D. Deshmukh	1944-1963
7	Shri Y. B. Chavan	1964-66
8	Prof. Satyendra Nath Bose	1967-75
9	Shri Subimal Dutt	1976-89
10	Prof. M.G.K. Menon	1990-till date

Chairmen of the Institute

1	Shri B. Rama Rao	1954
2	Shri D. N. Mitra	1955-63
3	Shri K. P. S. Menon	1964-70
4	Shri S. C. Roy	1971
5	Dr. Atma Ram	1972
6	Shri. P. N. Haksar	1973-97
7	Dr. Bimal Jalan	1998-2001
8	Dr. N. R. Madhava Menon	2002-03
9	Shri Pranab Mukherjee	2004-till date

Directors of the Institute

1	Prof. P. C. Mahalanobis	Dec	1931	-	June	1972
2	Prof. C. R. Rao	July	1972	-	June	1976
3	Prof. G. Kallianpur	July	1976	-	Sept	1978
4	Prof. B. P. Adhikari	Aug	1979	-	Oct	1983
5	Prof. Ashok Maitra	April	1984	-	Jan	1987
6	Prof. J. K. Ghosh	Jan	1987	-	Jan	1992
7	Prof. B. L. S. Prakasa Rao	Jun	1992	-	Feb	1995
8	Prof. S. B. Rao	July	1995	-	July	2000
9	Prof. K. B. Sinha	Aug	2000	-	July	2005
10	Prof. S. K. Pal	Aug	2005	-	July	2010

List of persons awarded the D.Sc. (Honoris Causa) by the Institute

February 1962	Prof. Satyendra Nath Bose, Prof. Ronald A. Fisher, Pandit Jawaharlal Nehru, Dr. Walter A. Shewhart
April 1962	Prof. A. N. Kolmogorov
May 1965	Dr. Chintaman Dwarkanath Deshmukh
December 1974	Prof. Raj Chandra Bose, Dr. M. V. Keldysh, Prof. Jerzy Neyman
February 1977	Prof. Harald Cramer
February 1978	Shri Morarji Desai, Prof. L. V. Kantorovich
December 1989	Prof. C. R. Rao
January 2001	Prof. Gopinath Kallianpur
February 2004	Prof. S. R. Srinivasa Varadhan
March 2006	Prof. L. A. Zadeh
December 2006	Dr. Manmohan Singh

1. TEACHING AND TRAINING

A brief account of teaching and training activities of the Teaching and Training Division during the academic session 2009-2010 is given below.

Degree, Associateship and Training Courses

During the academic session 2009-2010 a total of 8872 candidates applied for admission and were called for written selection tests for various courses offered by the Institute, viz., B. Stat. (Hons.), B. Math. (Hons.), M. Stat., M. Math., Master of Science (M.S.) in Quantitative Economics, M.S. in library and Information Science, M. Tech. in Computer Science, M. Tech. in Quality, Reliability and Operations Research, Research Fellowships in Statistics, Mathematics, Quantitative Economics, Computer Sciences, Quality, Reliability and Operations Research, Biological Anthropology, Physics and Applied Mathematics, Agriculture & Ecology, Sociology, Human Genetics, Psychology, Demography and Library and Information Science. Admission tests were conducted at 22 different centres all over the country. A total of 6749 candidates finally appeared for admission tests and a total of 747 candidates qualified in the written tests, and were called for interviews. Based on the performance in the written tests, interview and the academic records, 279 candidates were offered admission to various courses during the academic session under review.

The annual examinations for all the regular courses during 2008-2009 academic session were held during May 2009. The 2009-10 academic session commenced from July, 2009.

The number of candidates admitted to the different degree programmes and in Junior Research Fellowship during 2009-2010 and the number of students passed the annual examinations in 2009, are given in Table 1.

Till 31st March, 2010, 298 trainees of Engineering and Technology courses from various Universities/Institutions (Academy of Technology - Hooghly, Acharya Institute of Technology, Ajay Kumar Garg Engineering College - Gaziabad, Asansol Engineering College, B. P. Poddar Institute of Management and Technology, Banaras Hindu University, Banasthali Vidyapith – Rajasthan, Bankura Unnayani Institute of Engineering, Barrackpore Rastraguru Surendranath College, Bengal College of Engineering & Technology, Bengal Engineering & Science University- Shibpur, Bengal Institute of Technology & Management – Santiniketan, Birbhum Institute of Engineering & Technology, Birla Institute of Technology & Science – Pilani, Calcutta Institute of Technology, Camellia Institute of Technology, Chennai Mathematical Institute, College of Engineering & Management – Kolaghat, Department of Statistics – Calcutta University, Department of Botany – Calcutta University, Dr. B. C. Roy Engineering College – Durgapur, Dumkal Institute of Ingineering & Technology, Durgapur Government College, Durgapur Institute of Advanced Technology & Management, Future Institute of Engineering & Management – Kolkata, Globsyn Business School, Haldia Institute of Technology, Heritage Institute of Technology, Indian Institute of Technology – Guwahati, Indian Institute of Technology - Kharagpur, Indian Institute of Technology – Kanpur, Indian Institute of Technology – Madras, Indian Institute of Technology - Mumbai, Indian Institute of Technology – Roorkee, Indian School of Mines University - Dhanbad, Indian School of Mines - Dhanbad, Indira Gandhi Institute of Development Research – Mumbai, Indira Gandhi National Open University, Institute of Engineering & Management - Salt Lake, Institute of Engineering & Management Trust, Institute of Post-Graduate Medical Education and Research, Institute of Radio Physics & Electronics, Institute of Technology & Management – Gwalior, Jadavpur University, Jalpaiguri Govt. Engineering College, Kalinga Institute of Industrial Technology, Kalyani Government Engineering College, Kalyani University, Majhighariani Institute of Technology & Science – Orissa, Malaviya National Institute of Technology – Jaipur, Meghnad Saha Institute of Technology, Narula Institute of Technology, National Institute of Technical Teachers' & Research – Kolkata, National Institute of Technology – Calicut, National Institute of Technology - Durgapur, National Institute of Technology – Jamshedpur, NIT- Rourkela, National Institute of Technology- Tiruchirapalli, National Institute of Technology – Warangal, Netaji Subhas

Teaching and Training

Engineering College, Padmashree Dr. D.Y. Patil University – Mumbai, Presidency College – Kolkata, RCC Institute of Information Technology, Ramakrishna Misson Vidyamandir - Belur Math, Sastra University – Thanjavur, School of Materials Science & Engineering, Seacom Engineering College, Sikkim-Manipal Institute of Technology, Techno India, Techno India College of Technology, Utkal University, University of Burdwan, University of North Bengal, Vellore Institute of Technology, Vidyasagar University- Midnapore, Visva-Bharati – Santiniketan, West Bengal University of Technology – Salt Lake) received two weeks/six weeks/two months/three months/four months and six months Project training in different Units of the Institute, viz., ACMU, AERU, ASU, BAU, BIRU, CSSC, CVPRU, DEAN'S OFFICE, ECSU, ERU, GSU, LRU, MIU, PSU, PRU and SQC & OR under the guidance of different faculty of the Institute.

Convocation

The 44th Convocation of the Indian Statistical Institute was held on 30th March, 2010, at 4:00 p.m. It started with Vedic Hymn by ISI Club, followed by a welcome address by Prof. M.G.K. Menon, President, ISI, and annual review by Prof. Sankar K. Pal, Director, ISI. The degrees and associateships were awarded to students by Prof. M.G.K. Menon, President, ISI. This was followed by a Convocation Address by His Excellency Shri M. K. Narayanan, the Governor of West Bengal. The Convocation was closed by Prof. M.G.K. Menon, President, ISI, after a vote of thanks by Dr. Aditya Bagchi, Dean of Studies, ISI, and National Anthem by ISI Club.

The Gold Medal for ***Mahalanobis International Symposium on Statistics*** for ***M. Stat*** students was given to:

Sumit Mukherjee

ISI Alumni Association ***Mrs. M.R. Iyer Memorial Medals*** for outstanding performances were given to:

B. Stat. (Hons.):	Riddhipratim Basu	***M. Stat.***:	Anirban Basak
M. S. (QE):	Manisha Agarwal	***M. Tech. (QR & OR)***:	Satadal Ghosh

ISI Alumni Association ***Rashi Ray Memorial Medals*** for outstanding performance in ***M. Tech. (CS)*** was given to:

Chiranjit Chakraborty

ISI Alumni Association ***P.C. Panesar Gold Medal*** for outstanding performance in ***M. Math.*** was given to:

Arijit Sehanobish

Sunity Kumar Pal Gold Medal for best dissertation in ***M. Tech. (CS)*** was given to:

Santanu Bhowmick

S.H. Arvind Gold Medal for outstanding performance in ***B. Math. (Hons.)*** was given to:

Prateek Rajeeva Karandikar

Professor J.M. Sengupta Gold Medal for outstanding performance in ***B. Stat. (Hons.)*** was given to:

Riddhipratim Basu

Haldane Memorial Prize 2007-08 for outstanding research work done on ***Analysis of Protein Structures***:

Rahul Bhattacharya

Golden Jubilee Alumnus award to the ***Most Outstanding Alumnus*** of the Institute 2010:

S.R. Srinivasa Varadhan

Table 1

Number of students passed during 2009 and number of existing students/fellows during 2009-2010.

Sl. No.	Courses		Number of Students	
			Passed in the Annual Exam. in 2009	During the year 2009-10
01.	**B.Stat. (Hons.)**	1st year	43	32
		2nd year	09	43
		3rd year	26	09
02.	**B.Math. (Hons.)**	1st year	02	17
		2nd year	11	02
		3rd year	11	12
03.	**M.Math.**	1st year	06	10
		2nd year	06	06
04.	**M.Stat.**	1st year	55	44
		2nd year	35	55
05.	**M.Stat. (Applications)**	1st year	-	15
		2nd year	13	-
06.	**M.S. (QE)**	1st year	39*(22+17)	27*(13+14)
		2nd year	31*(17+14)	40*(23+17)
07.	**M.Tech. (CS)**	1st year	15	21
		2nd year	26	16
08.	**M.Tech. (QROR)**	1st year	04	12
		2nd year	09	04
09.	**M.S. (Library & Information Science)**	1st year	07	06
		2nd year	-	07
10.	**Junior & Senior Research fellows & Research Associates**		09	140
11.	**Associateship in Documentation & Information Science (Bangalore)**	1st year	-	-
		2nd year	05	-
Grand Total			**367**	**468**

* Total number, including Kolkata and Delhi.

Table 2

Ph.D. Degree awarded by the Institute in the 44th Convocation held on 30th March, 2010

Sl. No	Name of the Fellow	Title of the Thesis	Subject	University /Institute	Name of the Supervisor(s)
1.	Somitra Kumar Sanadhya, M. Tech. (CS) (J. N. University, Delhi)	A study of the SHA-2 cryptographic family.	Computer Science	ISI	Prof. P. Sarkar, ASU, ISI, Kolkata
2.	Narayan L. Bhamidipati, M. Stat. (Indian Statistical Institute)	Web Surfer Models: Preprocessing, Page Ranking and Quantitative Evaluation.	Computer Science	ISI	Prof. S. K. Pal, Director, ISI.

3.	Sanjoy Pusti, M. Sc. (Pure Mathematics) (University of Calcutta)	Spectral Analysis and synthesis for radial sections of homogeneous vector bundles on certain noncompact Riemannian symmetric spaces.	Mathematics	ISI	Dr. R. P. Sarkar, SMU, ISI, Kolkata.
4.	Sushmita Ruj, M. Tech. (CS) (Indian Statistical Institute)	Application of combinatorial structures to key predistribution in Sensor Networks and traitor tracing.	Computer Science	ISI	Prof. Bimal Roy, ASU, ISI, Kolkata.
5.	M. Prem Laxman Das, M. Stat. (Indian Statistical Institute)	Studies on Construction and List decoding of Codes on Some Towers of Function Fields.	Mathematics	ISI	Prof. K. Sikdar and Prof. Rana Barua, SMU, ISI, Kolkata.
6.	Tejas Deepak Kalelkar, M. Sc. (I.I.T., Bombay)	Normal Surfaces and Heegarrd splittings of 3-manifolds.	Mathematics	ISI	Prof. Siddartha Gadgil, IISc., Bangalore.
7.	Jyotishman Bhowmick, M. Sc. (I.I.T., Kanpur)	Quantum Isometry Groups.	Mathematics	ISI	Prof. Debashish Goswami, SMU, ISI, Kolkata.
8.	Kajal Dihidar, M. Stat. (Indian Statistical Institute)	Sampling 'Survey Populations'- Some Problems and Their Solutions.	Statistics	ISI	Prof. Mausumi Bose, ASU, ISI, Kolkata.
9.	Biswabrata Pradhan, M. Tech. (QROR) (Indian Statistical Institute)	Estimation of Quality Adjusted Lifetime Distribution	Statistics	ISI	Prof. Anup Dewanji, ASU, ISI, Kolkata.

Table 3

Research Fellows of ISI who have been awarded Ph.D. degree by Academic Bodies other than ISI during 2009- 10 for work done in the ISI

Sl. No	Name of the Fellow	Title of the Thesis	University	Name of the Supervisor
1.	Suman Chakraborty	A Biosocial study of Health Status among Shabar Tribe living in three different ecological settings in Orissa, India	University of Calcutta	Prof. P. Bharati, BAU, ISI

2.	S. Krithika	Population genetic prespective of Tibeto-Burman populations of India: Molecular genetic evidence on the origin and migration of Adi tribe of Arunachal Pradesh.	Jadavpur University	Dr. T. S. Vasulu, BAU, ISI
3.	Mousumi Majumder	Risk of oral leukoplakia and squamous cell caricinoma in Tobacco users: A molecular epidemiological study.	Jadavpur University	Prof. Bidyut Roy, HGU, ISI
4.	Sanjukta Mallik	Some contributions to the molecular genetics of coronary artery disease.	University of Calcutta	Prof. Partha P. Majumder, HGU, ISI
5.	Nandini Das	On Some characteristics of Univariate to Multivariate Control Charts.	Jadavpur University	Prof. Pradip Kr. Sen, (Dept. of Math., J. U.)
6.	Rajshree Bedamatta	A Study of Food Security in Rural Orissa.	University of Calcutta	Prof. Madhura Swaminathan, SRU, ISI
7.	V. Surjit	Farm Business Incomes in India: A Study of Two Rice-growing Villages of Thanjavur region, Tamil Nadu.	University of Calcutta	Prof. Madhura Swaminathan, SRU, ISI
8.	Amit K. Saw	Structural Setting and Petrogenesis of the Granulite-Granite-Migmatite Suite of Sunki, Koraput Dt., Orissa in the Eastern Ghats Granulite Belt.	University of Calcutta	Dr. S. Bhattacharya, GSU, ISI
9.	Amlan Chakraborty	On Architectural Synthesis of Quantum Computers.	University of Calcutta	Prof. Susmita Sur-Kolay, ACMU, ISI
10.	Subhendu Chakraborty	Nonlinear Dynamics of Nutrient-Phytoplankton-Zooplankton Systems in the presence of toxin producing plankton.	Jadavpur University	Prof. Joydev Chattopadhyay, AERU, ISI
11.	Goutam Kumar Paul	Analysis and Design of RC4 and Its Variants.	Jadavpur University	Prof. Subhamoy Maitra, ASU, ISI
12.	Amal Kumar Ghosh	Studies on Implementation of Multivalued Logic through Opto Electronic Systems & its Applications.	University of Calcutta	Prof. Pabitra Pal Choudhury, ASU, ISI & Amitabha Basuray
13.	Sungsu Kim	Inverse Circular Regression with Possibly Asymmetric Error Distributions.	University of California – Riverside, USA	Prof. Ashis Sengupta, ASU, ISI

Teaching and Training

14.	Hung-Jen Huang	Bayesian Analysis of Errors-in-Variables Growth Curve Models.	University of California – Riverside, USA	Prof. Ashis Sengupta, ASU, ISI
15.	Sattaprakash Ojha	Combined Wave Current Flow: An Experimental & Theoretical Study with its Implication on Sediment-Transport.	Jadavpur University	Prof. B. S. Mazumder, PAMU, ISI
16.	Dilip Das	On Water Wave Scattering by Floating and Submerged Bodies	University of Calcutta	Prof. B. N. Mandal, PAMU, ISI
17.	Soumen De	Some Problems on Water wave Scattering.	University of Calcutta	Prof. B. N. Mandal, PAMU, ISI

Number of candidates awarded degrees/ associatiships in the 44th Convocation of the Institute held on 30th March, 2010

	Degree / Associateship	Number of candidates
1.	Doctor of Philosophy (Ph. D)	09
2.	Master of Technology (M.Tech.) in Computer Science	26
3.	Master of Technology (M.Tech.) in Quality, Reliability and Operations Research	09
4.	Master of Statistics (M.Stat.)	48
5.	Master of Mathematics (M.Math.)	06
6.	Master of Science (M.S.) in Quantitative Economics	31
7.	Bachelor of Statistics (Honours) [B.Stat. (Hons.)]	26
8.	Bachelor of Mathematics (Honours) [B.Math. (Hons.)]	11
9.	Associateship in Documentation and Information Science	05
	Total	171

INTERNATIONAL STATISTICAL EDUCATION CENTRE (ISEC)

The International Statistical Education Centre (ISEC) was founded in 1950 at the initiative of Professor P. C. Mahalanobis. The centre opened at Kolkata through an agreement between the International Statistical Institute and the Indian Statistical Institute (ISI). At present, the Centre is run by the Indian Statistical Institute under the auspices of the Government of India. The Centre functions under a joint Board of Directors. In its 60 year history, the Board of Directors of ISEC has had only two chairmen. Prof. P. C. Mahalanobis was the Chairman since the inception of the Centre in 1950 until his death in 1972. Since then, Professor C. R. Rao has been the Chairman of the Board.

The Centre aims to provide training in theoretical and applied statistics at various levels to selected participants from countries of the Middle East, South and South-East Asia, the Far-East and the commonwealth countries of Africa. The primary training program is a 10-month regular course in Statistics leading to a Statistical Training Diploma. In addition, special course on different topics of varying duration are also organized.

This year 18 trainees from 7 different countries, namely (1) Afghanistan, (2) Mongolia, (3) Myanmar, (4) Nigeria, (5) Seychelles, (6) Sri Lanka and (7) Zambia attended the course. Of these 18 trainees 4 trainees from Afghanistan were supported by fellowships of the Asian Development Bank (ADB) while the other two Afghan trainees were supported by fellowships of the ITEC/SCAAP of Government of India. Two trainees of Mongolia were supported by fellowships of the ITEC/SCAAP of Government of India, while the other two were supported by fellowships of T. C. S. of Colombo Plan of Government of India; all other trainees were supported by fellowships of the ITEC/SCAAP of Government of India.

Besides the regular course, ISEC also conducted two special courses during the year. The first one was a course titled "Poverty, Inequality and Gender Bias: Concepts and Methods of Measurement" from March 16th 2009 to May 15, 2009 for participants from National Statistical Office of Mongolia. The second special course was titled "Sampling Theory of Design of Household Surveys" and was held between September 22 and October 21, 2009. This program was sponsored by the Asian Development Bank (ADB). There were two trainees each from Afghanistan, Cambodia, Lao PDR, Maldives, Mongolia, Nepal, and Timor Leste.

The trainees were provided with computer facilities and internet connections in the ISEC PC room and in the ISEC hostel. They had access to the books of our ISI library. Teachers of the headquarters of the Indian Statistical Institute and officers of the Government of India participated in teaching the Regular Course during the year. All the trainees in the 63rd term Regular Course have successfully completed the course and have been recommended for the award of Statistical Training Diploma by the Teacher's Committee. Till now, more than 1450 trainees from about 67 countries have received the Statistical Training Diploma.

Construction work has been ongoing for a new, modern, international building for ISEC at the 202 B. T. Road campus of the Institute, which will include the ISEC hostel, class rooms, offices, etc. Professor S. K. Pal, Director, ISI, has taken special interest in this project. We hope that the completion of this building will provide a major facelift to the Centre and enhance its international image.

ISEC will complete 60 years in 2010. The Institute and the Centre has tentatively planned several activities to celebrate this occasion. The approximate timeline is the last week of November, 2010. This will include national/international level seminars at Kolkata and Delhi. It is also planned that an exhibition on "Sixty years of ISEC" will be organized at Kolkata and Delhi at the time of the conferences.

2. RESEARCH AND OTHER SCIENTIFIC ACTIVITIES

The major thrust of the Institute is on research in various disciplines comprising Theoretical and Applied Statistics, Mathematics, Computer Sciences, Biological Sciences, Economics and other Social Sciences, Physics and Earth Sciences, Statistical Quality Control and Operations Research, and Library and Information Sciences Scientists of the Institute carry out independent research in their own basic discipline and also undertake interdisciplinary research in collaboration with other units within the Institute and also with outside organizations. The Institute also takes up various internally and externally funded projects in diverse fields on challenging live problems of national and international importance. As a part of research activities, scientists of the Institute are involved in consultancy work as well. This section gives a brief account of the principal areas of work over the past year of the scientific divisions of the Institute, namely, the Divisions of:

Theoretical Statistics and Mathematics

Applied Statistics

Computer and Communication Sciences

Physics and Earth Sciences

Biological Sciences

Social Sciences

Statistical Quality Control and Operations Research

Library, Documentation and information Sciences

In addition, there is a report each from the 'Center for Soft Computing Research: A National Facility' and the 'Computer and Statistical Services Centre'.

Theoretical Statistics and Mathematics Division

Stat-Math Unit, Kolkata

Research in Non-Commutative Geometry

The theory of quantum isometries has been extended to a compact metric space.

Quantum isometry group of real spectral triples has been investigated.

The existence of universal object in the category of compact quantum groups acting by orientation and real structure preserving isometries' on a given real spectral triple is proved.

Debashish Goswami

Quantum isometry groups of the free and half liberated spheres are computed and studied.

Debashish Goswami and T. Banica

Quantum Brownian motion on noncommutative manifolds: The notion of quantum Brownian motion on the noncommutative manifolds for which the quantum isometry groups act `transitively' in a suitable sense is formulated and such quantum processes are studied in details.

Biswarup Das and Debashish Goswami

Research in Commutative Algebra Area: Affine Fibrations

Detailed investigation of the structure, properties and examples of faithfully flat algebras over Noetherian normal domains, which are locally A^1 in codimension-one, have been completed.

S.M.Bhatwadekar, Amartya K. Dutta and Nobuharu Onoda

Results have been proved on the sufficiency of codimension-one fibre conditions for a flat algebra with a retraction to be an A^1 fibration.

An epimorphism theorem of David Wright on planes of the form $f(X,Y)Z^{n-g}$ (X,Y) has been extended to discrete valutation rings and to seminormal domains containing fields.

Prosenjit Das and Amartya K. Dutta

Some patching results have been obtained on algebras over two-dimensional factorial domains.

Amartya K. Dutta, Neena Gupta and Nobuharu Onoda

Research in Algebraic Topology

Algebraic deformation theory of Leibniz algebras over a commutative local base is studied. A construction of versal deformation for Leibniz algebras is given.

Goutam Mukherjee, Ashis Mandal, Alice Fialowski

Simplicial version of Bredon-Illman cohomology with local coefficients is introduced and its classification is obtained. A version of Eilenberg theorem in equivariant simplicial cohomology is proved.

Goutam Mukherjee, Debasis Sen

Research in Statistics

A method for classification of character sequences has been developed and studied. The method has useful application in natural as well as engineering sciences.

Extension of the concepts of quantiles for data and distributions in infinite dimensional spaces has been studied and some useful statistical techniques for analyzing infinite dimensional data have been developed.

Probal Chaudhuri

Research in Differential Toplogy

The space of maps on a foliated manifold into a symplectic manifold were studied using the h-principle theory.

Submersions of an open symplectic manifold with symplectic fibres are studied using h-principle theory.

Mahuya Datta and Rabiul Islam

Research in Harmonic Analysis

Mapping properties of Helgason Fourier transform on NA groups has been studied in detail.

Rudra P sarkar and Swagato Ray

Fourier restriction theorems in Harmonic analysis on harmonic NA groups have been proved. Connection between the restriction theorem and the Kunze–Stein phenomena on *NA* groups is studied.

Rudra P Sarkar, Pratyush Kumar and Swagato Ray

Research in Probability Theory

Tail Probabilities for Randomly Weighted Sums and an inverse problem

We considered a sequence of identically distributed and asymptotically independent regularly varying random variables and a sequence of non-negative random variables (weights) independent of the first sequence. We studied the tail probabilities and almost sure convergence of the randomly weighted series. We provided some sufficient conditions to weaken the assumptions on moments for the above convergence to hold. In particular we illustrated how conditions on the slowly varying function help to control the upper tail behavior of the randomly weighted series.Next we assumed that the randomly weighted series was finite and had a regularly varying tail and showed that under some condition on the weights the input sequence had to be necessarily regularly varying.

Products under Conditional Extreme Value Model

The joint distribution of two random variables is said to be asymptotically independent if the suitable centered and scaled coordinate wise maximum of n independent and identically distributed observations from the distribution has a non-degenerate limit which is a product measure. But this concept was too weak to conclude anything about product of random variables. So this concept was replaced by a stronger condition in Maulik and Resnick (2002). This stronger criterion was broadened to include limits which are not just product of measure in the conditional extreme value model. This model was introduced since the usual methods in multivariate extreme value theory suffer a lot either from the presence of asymptotic independence or the absence of one or more components in the domain of attraction of an univariate extreme value. The model was first proposed by Heffernan and Tawn (2004) and then further extended by Heffernan and Resnick (2007). We studied the product behaviour of two random variables when the joint distribution follows the conditional extreme value model.

Subexponentiality of free regularly varying random variables

We considered a sequence of free, identically distributed random variables affiliated to some non commutative probability space with law having a regularly varying tail. We studied the tail behaviour of the partial sums and showed that it was tail equivalent to its free maximum (in the sense of ben Arous and Voiculescu (2006)). In particular, we studied the behavior of the remainder term in the expansion of Cauchy transform and Voiculescu transform when the law had a regularly varying tail. The results also helped us to conclude that if additionally the law was infinitely divisible then its free Levy measure was regularly varying and the two laws were tail equivalent.

Rajat Subhra Hazra and Krishanu Maulik

Strong laws for balanced triangular urns with irreducible diagonal blocks

We considered an urn model whose replacement matrix was block upper triangular with irreducible diagonal blocks, had all entries negative and the row sums were all equal to one. We obtained strong laws for the counts of balls corresponding to each colour. The scalings for these laws were shown to depend on the Perron-Frobenius eigenvalues of the diagonal blocks.

Amites Dasgupta and Krishanu Maulik

Limit distributions for urn models with structured diagonal blocks

An urn model was considered whose replacement matrix was block upper triangular with irreducible diagonal blocks, had all entries negative and the row sums were all equal to one. It was further assumed that there were three diagonal blocks and the (2,3)-th block in the replacement matrix is a zero matrix. For such a replacement matrix it was known that the counts of balls corresponding to the colours in the last two blocks scaled like number of draws. The marginal distributions of the count vectors corresponding to each block were also known. The joint distribution of the vectors was studied.

Gourab Ray and Krishanu Maulik

Limiting distribution of the empirical distribution has been derived for different types of circulant matrices, some band matrices and some scaled Toeplitz and Hankel matrices. The limiting distribution of the spectral radius of certain types of k circulants has also been derived. The spectral norm of circulant type matrices with heavy tailed entries has been studied and Poisson convergence of eigenvalues of circulant type matrices have been established.

Results have been obtained in the problem of estimating bias, mean squared error, mean integrated square error of kernel density estimator by smooth bootstrap estimators. The issue of bandwidth selection has also been addressed using smoothed bootstrap.

Some asymptotic results have been obtained for Pfiefer records.

The class of linear contracts was investigated in relation to the optimal contract under a principal agent model. In a framework with two identical agents and one principal, it was shown how the agents may be treated in an asymmetric way.

Arup Bose

Research in History of Mathematics

The kuttaka, bhavana and cakravala have been revisited; the implicit occurrence of important concepts in modern algebra and number theory have been brought out.

Amartya K. Dutta

Stat-Math Unit, Delhi

Random graphs, probability on trees, processes on random networks. Percolation, interacting particle systems, random walks in random environment. Two sex brunching processes.

Antar Bandyopadhyay

The work on algebraic graph theory has been continued particularly distance matrices of graphs.

R. B. Bapat

Explicit solutions for generalised Sylvester Equation in operators were obtained. Higher order derivatives of the determinant function obtained. Inequalities for singular values of certain sums of operators were proved.

Rajendra Bhatia

Martingale problems and Markov Processes, Stochastic filtering theory, Stochastic control theory, Bioinformatics.

A.G. Bhatt

Work on competing risks and load sharing models has been continued.

Isha Dewan

Non-linear Regression, Survival analysis.

Swagata Nandi

Research Activities

Earlier work on noncommutative geometry have been continued, in particular on the geometry of quantum groups and their homogeneous spaces.

Arup Kumar Pal

Probability, Random graphs, Statistical analysis of whole genome

Rahul Roy

Probability, Random graphs, extreme value theory.

Anish Sarkar

Computational Biology, Statistical Computing

Deepayan Sarkar

The work on the "Tits-Weiss Conjecture" for groups of type F_4 arising from Albert division algebras has been continued. This conjecture for pure first construction Albert division algebras has been settled and also properties of automorphisms of Albert division algebras in general has been derived. This has been applied to prove R-triviality for the groups of type F_4 arising as above.

Maneesh Thakur

Stat-Math Unit, Bangalore

Main Effect Plans

Attention has been focused on main effect plans (MEP) for asymmetrical experiments. The concept of orthogonality through blocking factor has been introduced and has been utilized to obtain orthogonal MEPs on small-sized blocks.

Inter-class orthogonal MEP requiring considerably fewer runs than fully orthogonal plans have been constructed. In these plans, each factor is orthogonal to all except possibly the factors in its own class. Further, the concept of "partial orthogonality" is introduced and has been attained by some pair of factors in the same class.

The concept of orthogonality between (i) a main effect and a two-factor interaction and (ii) a pair of two-factor interactions through the block factor was defined. Plans satisfying this property have been constructed for factors with level two and three on blocks of size four each.

Sunanda Bagchi

Amalgamation of product systems.

We generalize the concept of Skeide product, introduced by Skeide, of two tensor product systems of Hilbert spaces via a pair of normalized units. This new notion is called amalgamated product of product systems, and now the amalgamation can be done using contractive morphisms. Index of amalgamation product (when done through units) adds up for normalized units but for non-normalized units, the index is one more than the sum. We define inclusion systems and use it as a tool for index computations. It is expected that this notion will have other uses. This is a joint work with M. Mukherjee (SRF).

B. V. Rajarama Bhat.

Sub-Fock product systems

We show that a product subsystem of a time ordered system (that is, a product system of time ordered Fock modules), though type I, need not be isomorphic to a time ordered product system. In that way, we answer an open problem in the classification of CP-semigroups by product systems. We define

spatial strongly continuous CP-semigroups on a unital C□–algebra and characterize them as those that have a Christensen-Evans generator. This is a joint work with V. Liebscher and M. Skeide.

B.V. Rajarama Bhat

Ergodicity and recurrence for random walks

The recurrence and ergodicity properties of random walks for large classes of locally compact groups and homogeneous spaces were studied. Using Markov process on G-spaces, it was shown that closed subgroups of groups admitting recurrent random walks are unimodular which in particular implies that totally disconnected groups of this type are uniscalar. An important consequence is that closed subgroups of a linear groups over local fields support a recurrent random walk if and only if it has at most quadratic growth. Also a detailed analysis of ergodicity properties for special classes of random walks on homogeneous spaces was given. This is a joint work with Prof. Y. Guivarch of Rennes, France.

C.R.E. Raja

Dynamic Random Walks on Algebraic Structures project

As a part of the IFIM project "Dynamic random walks on algebraic structures and applications in quantum computing", a limit theorem for dynamic random walks on motion groups was proved. A novelty of this results is that this is the first example of a dynamic random walk that is not supported on a discrete set.

C.R.E. Raja and R. Schott

Insurance models

Ongoing work on multidimensional insurance models, especially their connection with Skorokhod problem of probability theory, was continued. Models incorporating investment in risky assets, in addition to risk reducing treaty, were formulated in terms of SDE's in an orthant with jumps and with reflection.

S. Ramasubramanian

Geometry of Banach spaces

Work continued in various aspects of Geometry of Banach spaces. A long standing open problem was settled by exhibiting in every infinite dimensional Banach space a closed and bounded convex set without a vector of maximal length.

T.S.S.R.K. Rao and M Martin

Factorization theory

Work was going on `Factorization theory' with a Ph.D. student. As a preliminary, some new results on the related subject of zero-sum problems were established.

Some progress was made in the old, difficult problem of studying the unitary group of a division algebra with an involution of the second kind.

B. Sury

Applied Statistics Division

The Applied Statistics Division came into being in September 1996 in place of Applied Statistics, Surveys and Computing Division. The Computer Science Unit was renamed as the Applied Statistics Unit and the Biometry Unit was transferred to the Biological Sciences Division. Till 2005-2006, the Applied Statistics Division consisted solely of the Applied Statistics Unit. During the year 2006-2007, a new unit viz. Bayesian and Interdisciplinary Research Unit was created within this Division, which now comprises two units.

Applied Statistics Unit

Scientists of the Applied Statistics Unit (ASU) are involved in various teaching, training, research and development activities. This unit regularly conducts teaching/training programmes like winter/summer schools, workshops and Probationers' Training for Indian Statistical Service Trainees. The members of the faculty conduct research in various areas of statistics, mathematics and computer science, with special emphasis on applications. Some members collaborate with other units of ISI on joint projects and also with scientists from other Universities/Institutes. Currently, there are collaborative on-going projects with the Theoretical Statistics and Mathematics Division, Computer and Communication Sciences Division and the Biological Sciences Division.

Sample Surveys

From an ICMR-sponsored survey, data on prevalence of certain diseases in the Kolkata Municipal Corporation area was procured. A sophisticated model-based method, starting with Hartley and Ross' unbiased ratio estimator, has been developed. In addition, the Horvitz-Thomson estimator was worked out from survey data based on Rao-Hartley-Cochran sampling and its efficiency was examined.

Arijit Chaudhuri, Mausumi Bose and Kajal Dihidar

Randomized Response in Sensitive Surveys

Using distinct units from Simple Random Sampling with Replacement (SRSWR) as well as inverse SRSWR improved estimation was studied vis-à-vis the classical approach allowing repeated observations. Allowing a Direct or a Randomized Response (RR) without revealing the option explored was found to improve estimation procedure vis-à-vis compulsory RR.

Arijit Chaudhuri, Mausumi Bose and Kajal Dihidar

Design of Experiments, Combinatorial Methods and their Applications

Anti-collusion digital fingerprinting codes were studied and partially cover-free families of sets were used to construct such codes. Combinatorial designs and orthogonal arrays are also shown to be useful for this purpose. Compared to the existing methods of construction, our methods ensure gains in terms of accommodating more users and/or reducing the number of basis vectors.

Crossover designs were studied for situations where the planned experiment may have to be pre-maturely truncated. Efficient designs were obtained for such situations.

The problem of optimal allocation of units, with given prognostic variates or covariates, among different treatments is being studied.

Mausumi Bose and Anup Dewanji

Reliability and Survival Analysis

A framework for estimating the distribution of quality-adjusted lifetime under some illness-death models was provided through parametric, non-parametric and semi-parametric approaches. An improved calibration procedure for graphical comparison of two life distributions was proposed. The problem of

estimating regression parameters and baseline cause specific hazards in competing risks framework with general missing pattern has been investigated.

A discrete-time software reliability growth model for analyzing software testing data with periodic debugging schedule is being considered. A nonparametric method has been developed to estimate the number of superimposed renewal processes with application to software reliability.

New parametric models and tests for Accelerated Life Testing problems have been studied under conditional specifications. Change-point problems with multivariate non-normal observations on cancer patients were studied.

Anup Dewanji, Debasis Sengupta and Ashis SenGupta

Signal Processing

To select sample time points for the estimation of the power spectral density of a continuous-time stationary stochastic process, irregular sampling schemes like Poisson sampling are preferred over regular (uniform) sampling, since estimators based on the latter are inconsistent. Assuming the sampling rate to go to infinity along with the sample size, it was shown that the smoothed periodogram based on regularly-spaced data is a consistent estimator of the spectral density, even when the latter is not band-limited. Under similar assumptions, estimators based on uniformly sampled and Poisson-sampled data have about the same rate of convergence. Monte-Carlo simulations for small samples and theoretical calculations for large samples indicated that the smoothed periodogram based on regular sampling generally has less variance and more bias than one based on Poisson sampling.

Detection of change-points at low SNR in time-critical environment using two optimal rules were studied and illustrated by several real-life examples.

Debasis Sengupta and Ashis SenGupta

Multivariate analysis

Tests for multivariate Scatter or Overall Variability were constructed in a nonparametric framework. The scope for incorporating information from auxiliary data in nonparametric estimation of multivariate density was investigated, and a suitable method was developed for this purpose. Several applications of this technique were pointed out and a data analytic illustration was given. Several theoretical properties of multivariate zero-inflated probability models were studied, and. some real-life data was analyzed.

Ashis SenGupta, Debasis Sengupta and Atanu Biswas

Statistical Inference

Intersection-Union tests and their relations to P^3 tests in mixture models have been studied. Bayesian methods for growth curve analysis and change-point problems were extended.

Ashis Sengupta

Categorical Data Analysis

A general model was obtained for longitudinal categorical data set up. Some related inference was carried out. Some work on the measures of association for nominal categorical data was also carried out. Time series analysis of categorical data (both nominal and ordinal) was also performed. Some non-stationary processes have been developed. Time series of categorical data is studied with mutual information used in place of correlation.

Atanu Biswas

Research Activities

Directional Data Analysis

Constructions of and inference for axial distributions, asymmetric circular distributions and multivariate directional distributions have been given. Models and inference for directional inverse regression analysis have been extended. Generalized wrapped stable distributions, symmetric and asymmetric, have been derived and related inference procedures have been developed.

Ashis SenGupta

Cryptology

Research on several areas on cryptology has been carried out by faculty members and research scholars of ASU. Among these are theoretical aspects of hash functions, cryptanalysis of reduced round SHA-2 family, study of weak keys for RSA, correlation and biases in RC4, Boolean functions, digital finger printing codes, key pre-distribution in sensor networks and modes of operations. On September 14th, 2009, the Press Trust of India released a news item on the internationally fastest disk encryption method which has been developed at ASU. The faculty members also actively participated in the program committees and organizations of several international conferences.

Bimal K. Roy, Palash Sarkar and Subhamoy Maitra

Environmental and Health Statistics

Detection of hot spots in terms of arsenic concentration has been improved, using methods from circular data analysis and tests of isotropy.

Statistical methods have been employed to study severity of arsenic contamination in water in different parts of West Bengal. Also effectiveness of arsenic removal plants has been studied.

With the application of Geographic Information System (GIS) empirical studies of health status among the people in Darjeeling district in West Bengal were initiated. The effect of socio-economic background and incidence of diseases in different age groups and genders was investigated.

Ashis SenGupta, Atanu Biswas and Kasturi Basu

Objective Bayesian Analysis

It was shown that for a class of divergence measures between posterior and prior, including the Hellinger and L-1 divergence, maximization with respect to the prior leads to the Jeffreys prior. For multi-parameter cases with nuisance parameters, a step-by-step algorithm was used to obtain reference prior proposed earlier by us for some types of non-regular models, and which also maximizes this class of divergence measures.

Tapas Samanta

Clinical Trials

Some work related to response-adaptive designs (which are used in clinical trials to allocate a larger number of patients to the better treatment, resulting in ethical gain) was carried out. In particular, optimal response-adaptive designs, designs in the context of longitudinal responses, designs for survival responses, and designs for cross-over trials were theoretically and numerically studied. Various types of objective functions and constraints were explored, resulting in a variety of techniques and solutions.

Inference on treatment difference in clinical trials was studied in the presence of surrogate responses when not all true responses are available. Existing results in the case of binary treatment responses was improved upon. Distribution of log odds-ratio was studied for such surrogate-augmented data. It was observed that efficient use of surrogate data improves the inference.

A distribution-free approach for estimating Maximum Tolerated Dose (MTD) in the context of phase I clinical trials is being investigated. Adverse Drug Reaction (ADR) associated with a specific drug from the post-market spontaneous response database, is being studied.

Atanu Biswas and Anup Dewanji

Theory of 2D Cellular Automata, Fractals and Mathematical Morphology and its application in Computational Genomics

Genomic landscapes of olfactory receptors, which govern function of nose, are being studied. Results indicate that olfactory receptor micro genome structures can be designed by L-Systems. This study is being further extended for making a large genome like mitochondria, and is expected to be applied for the formation of a new database.

The official website of the 'Visible Human Project' at *http://www.nlm.nih.gov/research/visible/visible_human.html* houses plethora of information on the body cavities and organs which can be transplanted into patients and congenitally compromised patients. Fractals and other tools from mathematical morphology have been used to decipher such 3-D pictures to model the role of the fractals present on the surface of these structures as well as parts of body cavities where they are housed, using BENOIT™, which is a fractal analysis software for Windows. In addition, CA rules, L-systems, Integral Value Transformations (IVT), Tillings, etc. have also been considered for assessing their ability to understand these complex problems in a relatively simpler model.

Further, Fractal theory and its applications in various areas of science are being explored. For example, it has been shown that a DNA sequence is effectively a multifractal having statistical similarity. Also, some fractals have been formed using discrete functions, namely IVT, which are applied in Musical notes formation.

Pabitra Pal Choudhury, Amita Pal and Arunava Goswami

Bayesian & Interdisciplinary Research Unit

Scientists of Bayesian and Interdisciplinary Research Unit (BIRU) are involved in different kinds of research, training and development activities. The members of the faculty conduct research in various areas of applied and theoretical statistics. Some members collaborate with other units of ISI for interdisciplinary research and also with scientists from other Universities/Institutes. Currently, there are collaborative on-going projects with the Theoretical Statistics and Mathematics Division, Computer and Communication Sciences Division and the Biological Sciences Division.

Numerical Analysis

Newton's forward interpolation formula has been shown to be exactly identical with Newton's backward interpolation formula. When the values of the argument are equidistant, it has also been shown that Lagrange's interpolation formula coincides with Newton's forward interpolation formula. This work has been accepted for publication in the Journal of the Indian Society of Probability and Statistics.

Arun Kumar Adhikary

Sample Surveys

An attempt has been made to improve upon the Hansen-Hurwitz (1943) estimator based on PPSWR sampling scheme through Rao-Blackwellisation. In order to derive the sampling variance of the improved estimator obtained by Rao-Blackwellisation it is of interest to derive the probability distribution of the number of distinct units in the sample drawn according to PPSWR sampling scheme as the improved estimator is based solely on the distinct units in the sample. It has been possible to

write down the exact distribution of the number of distinct units in the sample drawn by PPSWR sampling scheme in a closed form.

Arun Kumar Adhikary

Contamination Envelopes for Statistical Distances

Minimum distance estimation is a thriving branch of parametric inference. The possible distortion in a statistical distance due to data contamination is a major robustness concern. Efficient estimates of the amount of this distortion, either way, due to data contamination can be immensely helpful in determining the reliability of these procedures. This research aims to determine sharp upper and lower bounds for the amount of distortion.

Ayanendranath Basu and Bruce Lindsay

Inlier Modified Minimum Distance Methods

In statistical inference, outliers have received a lot of attention, and many authors have attempted to generate statistical procedures which are stable under the presence of outliers. On the other hand inliers, observations having less data than expected under the model, have received less attention in practice, although it is now clear that they can also have significant impact on the inference process. In this research we aim to develop techniques which properly control the effect of inliers, while keep the inherent robustness properties of the minimum distance methods intact.

Ayanendranath Basu and Abhijit Mandal

Goodness-of-fit Testing for Growth Curve Models

Growth curves are useful models in many different branches of science, so tests for goodness-of-fit in the growth curve model are of immense practical value. In this study we consider the development of goodness-of-fit tests for many common growth curve models based on the finite difference approach.

Ayanendranath Basu, Sabyasachi Bhattacharya and Bratati Chakraborty

Study of combinatorial aspects of Statistical designs

A study of minimum critical set to retrieve the combinatorial structure uniquely has been carried out further in the context of Latin squares representing the elementary Abelian 2-group of order 8.

Algorithms have been developed to construct critical sets. In F-square F(2n; 2,2.....2)and the related work has been accepted for publication in *Ars Combinatorica*.

Rita SahaRay

Study of Optimal designs

In the context of two period crossover designs under self and mixed carryover effects universal optimal designs for estimating mixed carryover effects have been identified. In practice due to cost constraint, such designs are difficult to implement as it requires a large number of experimental units. With this view in mind, A-optimal designs for the above estimation problem have been characterized with the minimum number of observations (saturated designs) and also allowing one d.f for error.

Rita SahaRay

Study on Statistical Approach to Assessment of Agreement Involving Multiple Raters

Study of agreement between two or more comparable sets of measurements taken on each member of a population is needed in many areas. There is an impressive literature on the topic covering both the qualitative and quantitative features of study variables arising out of two or more 'raters'. In order to ascertain the extent of agreement between two competing raters providing quantitative measurements, the concept of Coverage Probability (CP) was introduced by Lin, Hedayat, Sinha and

Yang (Journal of American Statistical Association, 97, 257-270, 2002). CP is defined as the probability of bivariate random output falling into a strip along the direction of 'equiangular line' within a judiciously specified *width* symmetric with respect to the two random variables.

A study has been undertaken to assess the extent of agreement involving three or more comparable quantitative measurements taken on each member of a population. Necessary theory has been developed. Experimental data on two or more 'tests' and a reference 'gold standard' have been compared with respect to their performance as judged by the CP. The tests have also been compared in the absence of any prescribed gold standard.

Bikas K. Sinha

Study on Estimation of Mean Life and Reliability for Exponential Life Distribution Using Time Censored Sample Data

The Problems of unbiased estimation of the mean life and the reliability for an exponential life distribution using time censored sample data are considered. It is proved that there does not exist an unbiased estimator of the mean life based on a time censored sample. On the other hand, for reliability estimation at an arbitrarily specified time point, necessary and sufficient conditions are given for the existence of (i) an unbiased estimator (ii) the uniformly minimum variance unbiased estimator. Also provided in a characterization of the class of unbiased estimators of the reliability, based on a sufficient statistic in situations where unbiased estimators exist.

Bikas K. Sinha

Bayesian Approach to Reliability Estimation for the Exponential Distribution Using Order Statistics

The problems of computing the Bayes Estimators and studying their properties for the parameters of an exponential distribution and the associated reliability function. This is done with reference to different types of truncated data and using Gamma and Jeffrey's priors. The Bayes estimators are explicitly derived and their properties are studied analytically and numerically.

Bikas K. Sinha

Parameter Estimation in Linear and Quadratic Mixture Models

Mixture models have been extensively studied in the literature. However, more emphasis has been given on optimality aspects and a unified treatment of estimability issues involving the model parameters was lacking. This work fills up the gap and addresses such issues with reference to some standard mixture models.

Bikas K. Sinha

Block and Factorial Design

Construction, analysis, studies of properties and uses of various kinds of block designs and factorial designs in a variety of application areas have been considered.

G.M. Saha

On Bayesian "Central Clustering": Application to Landscape Classification of Western Ghats

In the area of cluster analysis, much work has been devoted to devising appropriate clustering algorithms, but the important aspect of obtaining probability distributions of clusterings seems to have been neglected so far. This issue has been addressed in this work, and a Bayesian analysis that quantifies uncertainty and provides summaries, such as modes, desired credible regions, etc. of (posterior) probability distributions of even the abstract concept, clustering, has been developed.

The fast and efficient Bayesian methodology proposed in earlier published work of these researchers, has being utilized to obtain samples from the posterior distribution of clusterings. The proposed

methodology has been applied to simulated data and a massive vegetation data set obtained from the Western Ghats. Its superior performance, used in conjunction with the simulation methods mentioned above, *vis-à-vis* other available clustering methods, has been demonstrated.

Sabyasachi Mukhopadhyay, Sourabh Bhattacharya and Kajal Dihidar

Fast and Efficient Bayesian Semi-Parametric Curve-Fitting and Clustering in Massive Data

A number of Bayesian methodologies are available for solving the problem of curve-fitting and clustering using Bayesian mixture models, treating the number of components as unknown. However, massive data sets pose substantial computational challenges, which seem to blur the attractive theoretical advantages of these pioneering Bayesian methodologies.

Based on a methodology introduced recently by one of the researchers (Bhattacharya (2008)), which has been shown to generalize one of the aforementioned approaches (Escobar and West (1995)), a very fast and efficient curve-fitting and clustering methodology has been proposed. It is based on a new approach to analysing non-parametric posterior distributions of clusterings. Significant advantages of this approach over the established approaches, particularly in the case of massive data, are demonstrated theoretically and with extensive simulation studies, and on a massive cosmological data set.

Sabyasachi Mukhopadhyay, Sisir Roy and Sourabh Bhattacharya

Non-stationary Nonparametric Bayesian Dynamic Modeling of Effective Connectivity in Functional Magnetic Resonance Imaging (fMRI) Experiments

Effective connectivity analysis provides an understanding of the functional organization of the brain by studying how activated regions influence one other. A nonparametric Bayesian approach to model effective connectivity assuming a dynamic nonstationary neuronal system has been proposed. This approach has used the Dirichlet process to specify an appropriate (most plausible according to prior beliefs) dynamic model as the ``expectation" of a set of plausible models upon which a probability distribution has been assigned. This addresses model uncertainty associated with dynamic effective connectivity. A Gibbs sampling approach has been derived to sample from the joint (and marginal) posterior distributions of the unknowns. Results on simulation experiments demonstrate this model to be flexible and a better candidate in many situations. This approach, when applied to the analysis of fMRI data, provided new insight into the mechanism by which the brain identifies and learns shapes of objects.

Sourabh Bhattacharya and Ranjan Maitra

MCMC Algorithms Based on Deterministic Transformations

A novel MCMC methodology has been developed based on deterministic transformations $T : X \times D \rightarrow X$, where X is the state-space and D is some set which may or may not be a subset of X . Although this method reduces to the Metropolis-Hastings(MH) algorithm with non-standard mixture proposals for some choices of the transformation, in general the corresponding MH proposal is singular. The proposed methodology, referred to as Transformation-based Markov chain Monte Carlo (TMCMC), has been shown to have superior mixing properties compared to standard MCMC methods and to be computationally much less expensive. The method is compared with the MH algorithms in a simulation study with a bimodal distribution and also the well-known Challenger data. The results establish the effectiveness of TMCMC over other standard methods.

Somak Dutta and Sourabh Bhattacharya

Bayesian Learning of Phase Space Distribution Function Using Matrix-Variate Gaussian Processes

The study of the dynamical behaviour of a galaxy involves an understanding of the phase space distribution function (DF), which gives the probability of finding a star in an infinitesimal element of the

phase space (six dimensional space defined by the three spatial coordinates and their conjugate momenta), at any given time. For this purpose, data from the RAdial Velocity Experiment (RAVE) survey (data on radial velocities and other properties, of about million stars) has been used, together with data on rate of transverse motion, from astrometric surveys. This 2-D velocity data has enabled the formulation of the local DF of the Galactic disk. In the Bayesian modelling, the 2-D velocity vector has been considered an unknown but deterministic function of the spatial coordinates and model parameters. Bayesian analysis has been carried out, treating the unknown function as a matrix-variate random Gaussian process. Experiments with simulated data have shown the effectiveness of the approach.

Munmun Biswas, Dalia Chakrabarty and Sourabh Bhattacharya

Bayesian Non-parametric State-Space Models

The time-varying regression structure and the flexibility inherent in the sequential nature of state-space models make them very suitable for analysis and prediction of financial data. Moreover, the Bayesian paradigm provides the much-needed flexibility to combine the data and expert opinion. However, till date, the state-space models have considered only known forms of the equations, typically linear. In this work, these have been modeled as independent Gaussian processes, and the consequent theory has been developed in the Bayesian framework. A novel MCMC-based method for simulating from the resulting posterior distribution has also been developed. Comparisons with existing parametric state-space models, based on both real and simulated data have been made and advantages of the proposed approach has been established. Multivariate and matrix-variate situations have also been considered in theoretical and simulation details and comparisons have been made with the existing models.

Soumalya Mukhopadhyay, Sandipan Roy and Sourabh Bhattacharya

Semiparametric Bayesian Palaeoclimate Reconstruction

Haslett *et al.* (2006) attempted to reconstruct past climate using pollen data and modern climate. Their model implicitly assumed past climates to be similar to the modern climate, leading to an interpolation problem. This assumption is questionable, and the modelling strategy adopted made the MCMC computation extremely slow. So Bhattacharya (2006), proposed a novel semi-parametric Bayesian model to relate species abundance to climate, and applied it to a chironomid data set, rather than the aforementioned pollen data set, showing climate prediction to be an extrapolation model, with the semi-parametric model better reflecting the uncertainty in the relationship between species and climate. The computational difficulties were taken care of in this approach. In the current work, the methodology of Bhattacharya (2006) has been applied to the pollen data set, replacing the multinomial model of Haslett *et al.* (2006) by a zero-inflated Poisson model, and has been shown to outperform earlier approaches.

Sabyasachi Mukhopadhyay and Sourabh Bhattacharya

Perfect Simulation from Posterior Distributions of Mixtures with Unknown Number of Components

Under mild regularity conditions MCMC theory assures "convergence" of the underlying Markov chain to the target stationary distribution, that is, the validity of the MCMC theory is only asymptotic, and MCMC samples are approximate at best. On the other hand, perfect simulation theory promises to reproduce the Markov chain of infinite length in finite time, and hence, one can obtain "exact" samples from the target stationary distribution. A very challenging problem in the Bayesian paradigm is the construction of efficient MCMC algorithms in the case of posteriors where the model is a mixture of normal distributions with unknown number of components. Although MCMC algorithms have been proposed for such problems, convergence cannot be assured. In this work, a novel perfect simulation

algorithm has been proposed, which completely solves the convergence problem, yielding "exact" samples from the posterior distribution, the likelihood being a mixture of unknown number of components (not necessarily normal).

Sabyasachi Mukhopadhyay and Sourabh Bhattacharya

Polya Tree Processes for Modeling Spatial Non-stationarity

When the underlying spatial data is on the borderline between stationarity and non-stationarity, the established models appropriate for either stationary or non-stationarity are likely to be inadequate. Bhattacharya and Maitra (2010) showed the usefulness of the Dirichlet process models in such situations, albeit in the case of temporal data, not spatial data. In this work, a non-parametric non-stationary model for spatial data, using the Polya tree process has been developed. Since Polya trees include Dirichlet processes as special cases, this model is expected to outperform models based on the Dirichlet process. This approach has also been compared with other approaches for inducing non-stationarity. Moreover, a perfect simulation algorithm has been obtained for sampling from the Polya tree-based posterior in simpler situations; this has been generalized to simulate from the posteriors corresponding to the non-stationary model based on Polya tree process.

Moumita Das and Sourabh Bhattacharya

Nested Mixture Models with Application to Genetics

An extension of the non-parametric mixture model of Bhattacharya (2008) that allows for mixtures within mixtures has been considered. This induces nested clustering with a random number of clusters, and, in turn, each cluster contains a clustering with random number of clusters.

This is being applied to multi-locus genotype data for inferring about population structure and assigning individuals to populations. A model in which there are K populations (K unknown), each of which is characterized by a set of allele frequencies at each locus, is assumed. Then, depending on whether the genotypes are admixed, individuals are (jointly) assigned to (more than one) populations.

Arunabha Majumdar and Sourabh Bhattacharya

Optimality of Multiple Testing and Model Selection Procedures under Sparsity

Asymptotic optimality in Bayesian decision theoretic sense of multiple testing procedures and model selection procedures in sparse high-dimensional models has been studied. In particular conditions have established for optimality of several well-known and newly introduced model selection criteria and the popular Benjamini-Hochberg and Bonferroni multiple testing procedure.

Malgorzata Bogdan, Arijit Chakrabarti, Florian Frommlet and Jayanta K. Ghosh

A Study on Divergence Measures Leading to Jeffreys and Other Reference Priors

Bernardo (1979) introduced the reference prior as one that maximizes the Kullback-Leibler divergence between the prior and posterior. In this work, the reference prior methodology based on general class of divergences has been studied. In particular a large class of divergence measures between the prior and posterior have been shown to lead to the Jeffreys prior as the reference prior when all the parameters are given equal importance.

Ruiato Liu, Arijit Chakrabarti, Malay Ghosh, Jayanta K.Ghosh and Tapas Samanta

Application of Mixture Models in Signal Segmentation

Finite mixture models are often used to study whether the data is generated from a homogeneous population. Problems of detection of discontinuity of signals and segmentation of speech signals at the pre-processing stage for speech analysis or speaker identification have been studied using local mixture likelihoods. In this context a notion of Projected Likelihood Contrasts (PLC) have been developed which can be easily adapted to situations where nuisance parameters are allowed in local

likelihoods. Theoretical results have been obtained establishing large sample properties of such statistics and power properties have been studied through simulations.

Debapriya Sengupta

Laws of Large Numbers

The utilities of "Uniform Integrability" type conditions as one of the ingredients of a set of sufficient conditions for the validity of various laws of large numbers have been studied. Extensions of the second Borel-Cantelli Lemma for dependent variables have been obtained. Possibility of relaxation of the sufficient conditions of the celebrated Kolmogorov-Etemadi SLLN are being investigated now.
Tapas K. Chandra

Classification with Support Vector Machines and Mahalanobis-Taguchi Systems

Generalization of support vector machine for a multiclass problem was successfully implemented. A study of self-training and co-training methods revealed that self-training is more practical and effective. It was also observed that the criterion for selection of patterns from the unlabelled set for augmenting the labeled set plays an important role in the performance of the algorithm.

Application of Mahalanobis-Taguchi systems in classification was successfully implemented. It led to a purely non-parametric classification technique based on the Mahalanobis distance with an inherent variable selection method. Initial experiments with real datasets revealed that the technique is very competitive with other more powerful yet complicated existing techniques such as SVM or Neural Networks.

Smarajit Bose

Content-based Image Retrieval

Different methods for relevance feedback were studied, and combinations of key ideas significantly improved the performance of the retrieval significantly. More features based on texture were derived and extracted from several databases. Novel ideas of feature selection were employed. Different similarity measures which take into account the correlations among the features were investigated.

Smarajit Bose

Speaker Identification

Various approaches have been experimented with, and different alternatives were tried to combine classifiers to improve accuracy in the noisy databases. Several transformations of the data were also explored in this connection. Significant improvement was achieved on some benchmark datasets.

Smarajit Bose and Amita Pal

Functional Analysis of Olfactory Receptor Genomic Clusters by Patten Recognition Tools

A preliminary study of the genomic landscapes of olfactory receptors has been initiated. Results indicate that olfactory receptor micro-genome structures can be generated by a Lindenmayer System (L-System), a variant of a formal grammar, which has been used to model the growth processes of plant development, but is also capable of modeling the morphology of a variety of organisms.

Amita Pal, Pabitra Pal Choudhury and Arunava Goswami

Adaptive Sequential Testing Problem

Adaptive sequential testing problem in connection to clinical trial has been studied. Bandit Problem in connection to optimizing values of two functions has been considered instead of considering the usual one-function optimization problem.

Subir K. Bhandari

Directional Majorization and Multivariate Majorization

Using computer simulation, a counter example has been constructed numerically to show that directional majorization and multivariate majorization are not equivalent.

Subir K. Bhandari

Bayesian Inference for Directional Data/Bayesian Clustering

Research has been going on in Bayesian inference for directional data and Bayesian clustering with applications to vegetation data obtained from the Western Ghats. New methodologies have emerged, with very useful applications.

Sourabh Bhattacharya

Complex Computer Models/Regenerative Simulation

Bayesian emulation of complex dynamic computer models, applications of regenerative simulation to Bayesian computation are being studied. New theories and applications have made appearances in these areas as well and have been well-received.

Sourabh Bhattacharya

Generalized Linear models for Study of Infant and Child Mortality

The effect of social and health care factors on infant and child mortality was investigated by means of generalized linear models based on the log-normal and gamma distributions.

Sankar Dihidar

Incomplete and Boundedly Complete Families of Discrete Distributions

A general result giving families of incomplete and boundedly complete families of discrete distributions has been obtained. For such families, the classes of unbiased estimators of zero with finite variance and of parametric functions which will have uniformly minimum variance unbiased estimators with finite variance have been explicitly characterized. The general result allows us to construct a large number of families of incomplete and boundedly complete families of discrete distributions. Several new examples of such families have been obtained. The example of Lehmann and Scheffe (1950) (available also in Lehmann and Casella (1998)) turns out to be a particular case of our general result.

Sumitra Purkayastha

A Review of Sequential Cramer-Rao and Bhattacharyya Bounds

A sequential version of Cramer-Rao inequality was obtained by Wolfowitz (1947). Bhattacharyya inequality (1946, 1947) can be seen as a refinement of Cramer-Rao inequality. Its sequential version as obtained by Seth (1949) has been reviewed extensively in this work. Results of Seth and others, notably Ghosh (1987), on the impossibility of attainment of equality in sequential Cramer-Rao inequality, where attainment means attainment for all values of the underlying parameter, have also been reviewed.

J.K. Ghosh and Sumitra Purkayastha

Simulation-based Study of Convergence of the EM and ECM Algorithms

Investigations have revealed the following: For finding the MLE of (a) the location parameter of a Cauchy distribution with known scale parameter, (1) the time taken (denoted by T) by the EM algorithm for convergence is less than the T corresponding to Fisher's scoring method for any sample size (n) and (2) T for Fisher's scoring method is a decreasing function of n; (b) the location parameter and scale matrix of p-variate ($p > 1$) t-distribution, (1) for any n, the number of iterations (denoted by I) for the EM algorithm to converge is a decreasing function of the degrees of freedom (df), (2) for any df, I

for the EM algorithm is a decreasing function of n, (3) for any n, T for the EM algorithm is a decreasing function of df, and (4) for any df, T for the EM algorithm is an increasing function of n; (c) the shape and scale parameters, denoted by α, β, of a gamma distribution, for every fixed value of β, for the ECM algorithm is a decreasing function of α.

Swarnali Banerjee and Sumitra Purkayastha

Computer and Communication Sciences Division

Advanced Computing and Microelectronics Unit

Energy-Efficient Routing in Mobile Ad-hoc Networks

Given a random distribution of ad hoc sensor nodes, a novel distributed algorithm has been proposed for load balanced routing in the wireless ad hoc sensor network for data gathering at the sink under uniform traffic model and 100% data aggregation. The algorithm requires just a one-time computation during initialization, and computes the paths based on very limited knowledge about its local neighbors only. Simulation studies showed that the algorithm results in around 85% load balanced nodes However proper scheduling is required for load balanced routing to minimize the end-to-end data latency. Hence a joint routing and scheduling algorithm has been proposed to ensure conflict-free communication in the network, with load balanced routing and TDMA scheduling for enhancing the network lifetime and minimizing the data latency.

Nabanita Das

Moving Guards in Polygonal Environment

An algorithm has been developed to locate a position of a guard on the convex hull of a simple polygon *P*, such that the distance of the farthest point on the boundary of *P* from the location of the guard avoiding the interior region of the polygon *P*, is minimum. An *O(n)* time algorithm has been designed for locating such guard on a simple polygon of *n* vertices. Two points *a* and *b* are said to be L-visible among a set of polygonal obstacles if the length of the shortest path from *a* to *b* avoiding these obstacles is no more than *L*. An algorithm has been developed to implement linear time algorithm for any arbitrary value of *L*. A path from *s* to *t* on a polyhedral terrain is descending if the height of a point *p* never increases while we move p along the path from *s* to *t*. Simple, robust approximation algorithms have been designed to find shortest descending paths.

Sandip Das

Geometric Covering Problems

The maximum independent set problem for unit disk graphs is known to be NP-hard. A 2-factor approximation algorithm has been proposed for finding the maximum independent set of an unit disk graph that runs in $O(n^4)$ time. In particular, for the coin graphs, the same algorithm runs in O(n log n) time. The minimum clique cover problem has been studied for squares of unit height, and a 4-factor algorithm that runs in $O(n^2)$ time has been proposed. The terrain guarding problem, where the objective is to cover a terrain in 2D with minimum number of guards, is being studied. The objective is to get an algorithm for the decision version of the problem (whether an n vertex terrain can be guarded with k guards) with worst case time complexity $O(c^k \text{ poly}(n))$, where c is a fixed constant and poly(n) is a polynomial function in n.

Subhas C. Nandy

Mine Telephony

The aim of this project was to build a mobile personal communication system which would be used by the miners and powered from the battery cell carried by each miner. Due to the energy constraints for

operation inside the mine, a prototype low energy wireless communication system has been built using hybrid FSK-ASK modulation with the CC1101RKTR transceiver chips, operating at 450 MHz. Using these transceiver sets, repeaters have been placed at strategic positions inside a mine in Jharia (near Dhanbad) at a depth of 8 seam. Required software components for building an ad hoc network have been developed. Real life testing of this ad hoc communication mentor inside the mine is underway.

Bhabani P. Sinha

Floorplan Optimization for Nanobiochips

In order to build nanobiochips (lab-on-a-chip) efficiently, several associated computer-aided-design (CAD) problems have been addressed:
1. Routing and functional testing of fluidic operations in digital microfluidic biochips.
2. Automating dilution/mixing of nanoliter-volume droplets for sample preparation and implementing the procedures with a lab-on-a-chip.

Combinatorial properties of these problems have been studied that led to design of algorithms for solving them. Their performances were observed via computer simulation. Several patents have been submitted for filing based on these inventions.

Bhargab B. Bhattacharyya

Localization in Wireless Sensor Networks

Energy aware localization schemes are one of the major issues involving sensor networks. The problem becomes more complicated if the sensors can move (as in Dynamic Sensor Networks). Dynamic Sensor Networks have immense applications in wild-life tracking and giving assistance to mobile soldiers in a battle field etc. A straight forward localization using Global Positioning System (GPS) is not appropriate due to low accuracy, higher energy consumption and higher cost. The size of a GPS hardware also may be too large to fit in a sensor. The goal of this project is to devise schemes for localization of sensors without using GPS or supplement partial GPS data with local observations to get more accurate locations.

Krishnendu Mukhopadhyaya

Techniques for Robust Physical Design of nanometer ICs

In robust and reliable design of integrated circuits using nanometer fabrication technology, intellectual property protection of the design has been addressed. Efficient methods to tackle the following problems have been designed: (i) a fast scheme using few additional buffers for watermark embedding and extraction; (ii) a method for signature insertion and extraction by modification of few buffers in the repeater system with negligible area and delay overhead; (iii) a leakage proof zero-knowledge protocol for public verification; (iv) algorithm for protection of hardware IP, and induction of area-fill geometries as part of the signature to obtain a unified solution for mechanical and IPP robustness of a design has been devised to minimize the overall area and performance overhead.

Synthesis of Quantum Computers

Quantum computing and quantum information science are emerging research areas. Design of efficient quantum computing hardware architectures is mandatory for building real quantum computing machines. New rule-based methods for synthesizing quantum computing circuits utilizing quantum gate operations have been proposed and various parameters which play an effective role in optimizing the cost of the synthesized circuits have been analyzed. A quantum hardware description language is defined and utilized in a simulator for quantum logic circuits. Preliminary fault models have also been investigated.

Susmita Sur-Kolay

Computer Vision and Pattern Recognition Unit

Bangla WordNet for NLP

WordNet is a graph-like network connecting words (acting like graph nodes) through semantic relations (acting like edges). For Bangla WordNet, Bangla nouns, adjectives, adverbs, verbs with their synonyms, antonyms, polysemous senses along with their sentential examples were stored in files in ISCII format. The present version contains around 4,000 synsets covering more than 2500 headwords (Currently, 9% words are polysemous). A GUI has been developed for accessing various information. The Network Structure has been generated by categorizing synsets, i.e., synonym sets according to their senses. Each sense class/subclass corresponds to one node in the network. These nodes are linked by hyponymy-hypernymy and meronymy-holonymy relations.

B.B. Chaudhuri, Mahua Bose, Debjani Sarkar and Rashmi Pradhan

Offline handwritten document processing

Hand-written Bangla text, containing all basic characters and vowel modifiers, were collected as sample data from different persons. For text line identification of handwritten Indian scripts, especially of Bangla, as well as English, Hindi, Malayalam, etc. a new dual method based on interdependency between text-line and inter-line gap has been implemented. The method draws curves simultaneously through the text and inter-line gap points found from strip-wise histogram peaks and inter-peak valleys. For word separation, gap bigger than the connected component height, is initially used as word gap. For smaller gaps, on Otsu-like threshold is computed and gaps above this value are considered word gap. Finally, character segmentation is done by choosing upper region of the connected component and the local y-peaks of the curve of the upper region.

B.B. Chaudhuri and Sumedha Bera

Development of robust document analysis and recognition systems for Indian printed scripts

Under an external project funded by DIT, Govt. of India, some language independent preprocessing software as well as OCR system have been developed for documents in Bangla and Devanagari scripts. Some new and interesting software for text orientation detection for eleven Indian scripts, binarization, morphological noise cleaning with guard zone, skew correction, text line detection, word detection and primitive extraction have been done. Bangla and Devnagari OCR Engine works on some shape based features and uses a classifier with hierarchical SVM. Both OCRs work reasonably well with multiple fonts.

B.B. Chaudhuri, Shamita Ghosh, Ranita Biswas, Tonmoy Koley and Avik Kundu

Multi-lingual document analysis

A convex hull-based recognition scheme was proposed for the recognition of printed multi-oriented characters. A two-stage word-wise script identification scheme was designed for multi-script document analysis. A database for Indian Tri-lingual (Bangla and Devnagari and English) city-code recognition has been developed and a system for script independent tri-lingual city-name recognition has been developed. Bangla OCR system has been modified to get better accuracy, and a bi-lingual system has been developed. A system for handwritten and machine print classification for sparse content and arbitrary oriented document fragments was developed. An automatic multi-script text extraction system from Video images has been proposed.

U. Pal, R. Mandal and S. Pal

Automatic reading of texts in camera captured images

A new local method for binarization of camera-based scene images was developed. This was found to be less susceptible to illumination variation as compared to the existing local binarization methods. A new method was also developed for perspective correction suitable for images containing texts of

Bangla or Devanagari. The algorithm for extraction of Bangla or Devanagari texts from natural scene images was further improved.

U. Bhattacharya, S.K. Parui, P. Samanta and S. Mondal

Online handwriting recognition – Bangla

A generic recognition engine was developed for handwritten Bangla. This can deal with a limited set of 72 characters consisting of basic characters, character modifiers and a few special symbols. These character symbols should be written following certain style, which was determined by listing an allowed set of strokes for each character according to the most common practice, as observed by analyzing handwriting styles of 100 native writers. These strokes have been decided by carefully observing the most popular relevant style among a large volume of writers from a wide section of the population. The advantage of the above approach is that it does not need a sophisticated segmentation module and it is computationally efficient. This recognition engine has been integrated into three different real life applications by the partners of OHWR consortium formed by the DIT, Govt. of India.

S.K. Parui, U. Bhattacharya, Sk. Mohiuddin and A. Roy

Online handwritten character recognition using character sub-strokes and discriminative HMM classifier

Under this project, funded by HP Research Lab., Bangalore, large databases of online handwritten isolated Bangla numeral and basic characters have been developed. These will be used for benchmarking purpose and have been hosted at the website of Lipi Toolkit (a generic toolkit for online handwriting recognition). A new sub-stroke based feature vector has been developed and a classifier implemented, with the whose source codes made available as components of OpenSource LipiTk version 3.0.

S.K. Parui, U. Bhattacharya, T Mondal and K. Das

Dependency parsing in Bangla

A constraint based Dependency Parsing has been attempted for Bangla, which is a free word order language The Paninian Grammatical model has been used for this purpose. The approach is to simplify complex and compound sentential structures first, then to parse the simple structures so obtained by satisfying the Karaka demands of the Demand Groups (Verb Groups) and to rejoin such parsed structures with appropriate links and Karaka labels. The parser has been trained with a Treebank of 1000 annotated sentences and then evaluated with un-annotated test data of 150 sentences. The evaluation shows that the proposed approach achieves 90.32% and 79.81% accuracies for unlabeled and labeled attachments, respectively.

Utpal Garain

Robust speech recognition for resource-scarce languages

Speech recognition systems that make use of statistical classifiers require a large number of training samples. However, collection of real samples has always been a difficult problem due to the involvement of substantial amount of human intervention and cost. Considering this problem, this research presents a novel method for generating synthetic samples from a handful of real samples, and investigates the role of these samples in designing a speech recognition system. Speaker dependent limited vocabulary isolated word recognition in an Indian language (i.e. Bangla) has been taken as a reference to demonstrate the potential of the proposed framework. The role of synthetic samples is demonstrated by showing a significant improvement in recognition accuracy. A maximum improvement of 10% is achieved using the proposed approach.

Utpal Garain

Multi-script multi-writer identification

The problem of writer identification in a multi-script multi-writer (more than one writer writing a sample) environment has been attempted using a two-dimensional (2D) autoregressive (AR) modeling technique. Each writer is represented by a set of 2D AR model coefficients. For a given sample (written by multiple writers in multiple scripts), AR coefficients are computed and its L2 distance with each of the stored (writer) prototypes identifies the writer for the sample. The method has been tested on datasets of two different scripts, namely RIMES containing 382 French writers and ISI consisting of samples from 40 Bengali writers. Modeling of writing styles using different context patterns at different image resolution has been investigated. Experimental results show that the technique achieves results comparable with that of the previous approaches.

Utpal Garain

Machine authentication of security documents

This study presents a pioneering effort towards machine authentication of security documents like bank cheques, legal deeds, certificates, etc. that fall under the same class as far as security is concerned. The proposed method first computationally extracts the security features from the document images and then the notion of 'genuine' vs. 'duplicate' is defined in the feature space. Bank cheques are taken as a reference for conducting the present experiment. Support Vector Machines (SVMs) and Neural Networks (NN) are involved to verify authenticity of these cheques. Results on a test dataset of 200 samples show that the proposed approach achieves about 98% accuracy for discriminating duplicate cheques from genuine ones. This strongly attests the viability of involving machine in authenticating security documents.

Utpal Garain

Improvement of algorithms for the analysis and correction of hearing disabilities

A hearing system has been proposed which consists of three major modules. The input to the system is a mixture of audio signals. The first module performs the separation of the input into the unmixed source signals such as speech and music, the second determines the nature of each signal i.e. whether it is speech or music and retains only that which is desired by the user. The third module performs filtering according to the hearing needs of the user. Real-time implementation of the entire system on the TI DSK6713 is being finalized.

Sarbani Palit, Koushik Roy and Prasenjit Patra

Information retrieval evaluation

An evaluation framework for Indian language IR consisting of benchmark datasets was created and used in the workshop FIRE 2010, to compare retrieval results submitted by participants. Two pilot tracks were also offered involving retrieval from mailing lists and forums, and named entity finding from Wikipedia. Work on retrieval from semi-structured data has been continuing. A comprehensive study of the evaluation framework used at INEX was completed.

Mandar Mitra, Sukomal Pal, Dipasree Pal, Samaresh Maiti, Ayan Bandyopadhyay, Deboshree Modak and Sucharita Sanyal

Documentation, Research and Training Centre (DRTC), Bangalore

Knowledge Organization

Knowledge organization, today, has to meet the twin objectives of facilitating organization of information resources for effective retrieval while at the same time look at ways and means of effective

tagging of the huge volume of digital resources to support retrieval at tolerable levels of precision. Research on the following issues is being carried out:

1. Ways to reshape and sharpen traditional knowledge organization tools such as classification schemes and thesauri to meet the changing and widening requirements of information representation and retrieval. The issues related to multilingual thesauri and lateral relations in the Humanities are also being studied.
2. Studies related to application of facet analysis in developing ontologies. A faceted ontology-based decision support system using Protégé – an open source *Ontology editor* - has been developed sourcing the domain concepts from a few hundred patient records from the Neurosurgery unit of a large hospital. The system has been shown to be capable of answering more complex user queries and has the potential to serve as the model for building an effective decision support system for use by health care personnel of the hospital.
3. Use of digital technologies to reduce the digital divide to the extent possible.

K S Raghavan, A.R.D Prasad and Devika P Madalli

Digital Libraries and Semantic Web

1. Research has been carried out in faceted ontologies in social and media research. Study of Wordnet for semantic compatibility as part of EU funded FET Living Knowledge Project, has been undertaken. The main objective of the above is to develop ontologies using faceted approach, in order to provide folksonomies which should facilitate visualizations to the end-user. Active research is being pursued in web ontologies using RDF (Resource Description Framework), OWL (Web Ontology Language) and SKOS (Simple Knowledge Organization system). The ultimate goal is to develop context based search mechanisms combined with inference engines
2. With the intention of systematic dissemination and easy retrieval DRTCU has decided to archive those old seminar volumes and conference proceedings. Now all the seminar volumes and conference proceedings are available at DRTCU, Digital Library of seminar and conference Proceedings. The work has been accomplished in steps as follows: identification of resources, scanning, cleaning, storing and retro-conversion of files, OCR (optical character recognition), and digital library implementation. For this project the Dspace software has been used. Three main communities under the names as Annual Seminars, International Seminars, Refresher Seminars have been created. Access was provided by standard interfaces through browse and search facilities, and metadata was entered for reach article following Dublin core standard.
3. The seminars and conferences provide very good platform for sharing research output in the field of LIS. With its teaching and research process DRTCU has been conducting various seminars and conferences every year to provide a platform to discuss new ideas in LIS profession and compiling those ideas in volumes and proceedings. In this background DRTCU has created a valuable online resource of the scientific communities of both library and science and information science domains.

A.R.D. Prasad and Devika P. Madalli

Library and Information technology

In the recent past, several technology applications to library and information work have been demonstrated. As a part of this kind of research, a LiveCD called Liblivecd had been released. It is preconfigured with Dspace digital library software + Koha, Library Management Software + PKP Harvester which collects metadata from various digital/institutional repositories to provide a single stop search engine + dbwiz, a federated search engine which facilitate searches across e-jounals and online databases. The Liblivecd is hosted on http://sourceforge.net/projects/liblivecd. As of May, 2010 more than 1300 downloads have taken place.

A.R.D. Prasad

Institutional repositories

The last decade witnessed the rapid evolution of these into increasingly important media for dissemination of research results in certain fields. In this context attempts have been made to:

- Study the Feasibility of designing and developing an appropriate prototype Institutional Repository (IRs) model using open source software that is easily implementable in all the universities in India.
- Study the adequacy of existing standards in this regard especially for scholarly material in Indian languages and scripts.
- Design an end user interface for browsing, navigating through and searching the Institutional Repository.

M. Krishnamurthy

Bibliometrics and Scientometrics

Attempts have been made to study the growth of literature and its impact on library collection development. Different scientometric measures such as h-index, g-index and impact factors were also studied. A project has also been undertaken to study the pattern of downloading of online literature.

I. K. Ravichandra Rao and Priyanki Sinha

Electronics and Communication Sciences Unit

An active membrane model for segmentation:

The application specific image segmentation problem has been explored from different perspective. An active membrane model was introduced to segment multiple objects of interest in a scene. The developed algorithm could segment conjoint or touching objects relevant for biomedical or industrial vision problems. In another perspective, the segmentation of meaningful components in an image was effected using gestalt's principle and it can be shown that shape specific segments could be extracted from an image based on Helmholtz perceptual analysis.

D.P. Mukherjee

DNA Computing Based Approximate Reasoning:

In the year 1971 Zadeh proposed fuzzy logic based approximate reasoning. Since then several potential extensions and applications on approximate reasoning have been developed, including one by Adelman in 1994. Recently an approximate reasoning using DNA computing has been proposed. Some inherent drawbacks of existing fuzzy logic has been replaced by DNA chemistry. The ultimate goal of this work is to develop computing with perception which would be quantified by membership function of DNA oligonucleotide sequences.

K.S. Ray

Machine Intelligence Unit

Bioinformatics

An algorithm called TargetMiner for the computational prediction of microRNA (miRNA) targets has been proposed. This involves systematic identification of tissue specific negative data which is used, along with biologically validated positive data, for training an SVM. The method outperforms 10 existing target prediction algorithms and provides a good balance between sensitivity and specificity. A novel integration of SVM based supervised learning with multiobjective clustering provides improved performance on several benchmark data sets. The problem of biclustering gene expression data has also been tackled using multiobjective genetic algorithm. A classifier has been developed for miRNA

based tumour classification. A miRNA-cancer network has been developed for the first time in humans that provides some interesting biological information, and also unanswered questions. A new algorithm for finding densely associated nodes in miRNA coexpression networks has been developed.

S. Bandyopadhyay

Among the large amount of genes presented in microarray gene expression data, only a small fraction of them is effective for performing a certain diagnostic test. In this regard, mutual information has been shown to be successful for selecting a set of relevant and non-redundant genes from microarray data. However, information theory offers many more measures such as the *f*-information measures that may be suitable for selection of genes from microarray gene expression data. This work presented different *f*-information measures as the evaluation criteria for gene selection problem. The performance of different *f*-information measures has been compared with that of mutual information based on the predictive accuracy of different classifiers. An important finding is that some *f*-information measures have been shown to be effective for selecting relevant and non-redundant genes from microarray data.

P. Maji

Two interval based fuzzy systems have been developed for identification of some possible genes mediating the carcinogenic development in various tissues. The methodology involves dimensionality reduction, classifying the genes through incorporation of the notion of linguistic fuzzy sets low, medium and high, and finally selection of some possible genes mediating a particular disease, obtained by a rule generation/grouping technique. The superior capability of the methodology in selecting important genes, over five other existing gene selection methods, viz., Significance Analysis of Microarrays (SAM), Signal-to-Noise Ratio (SNR), Neighborhood analysis (NA), Bayesian Regularization (BR) and Data-adaptive (DA) had been demonstrated, in terms of the enrichment of each GO category of the important genes based on p-values.

R.K. De

Image Processing

A simple relevance feedback mechanism for interactive image retrieval using MPEG-7 visual descriptors has been developed. The system learns user's interest and updates feature weights based on a fuzzy feature evaluation measure. A novel passive data-hiding scheme has been developed for quality access control of images in compressed domain. The original image is divided first into non-overlapping blocks. For each block, DCT coefficients are computed after using the standard quantization and normalization procedure of base line JPEG. If the number of nonzero AC coefficients of a block is greater than a predefined threshold (T), the coefficients are modulated. The coefficients found after modulation are Huffman coded for efficient storage and transmissions of DCT compressed image data. Only authorized persons having full knowledge of the secret key are able to restore the full quality of the image.

M.K. Kundu

A new image retrieval scheme has been developed using visually significant point features. The clusters of points around significant curvature regions (high, medium, and weak type) were extracted using a fuzzy set theoretic approach. Some invariant color features were computed from these points to evaluate the similarity between images. A set of relevant and non-redundant features was selected using the mutual information based minimum redundancy-maximum relevance framework. The relative importance of each feature was evaluated using a fuzzy entropy based measure, which was computed from the sets of retrieved images marked relevant and irrelevant by the users. The performance of the system has been evaluated using different sets of examples from a general-purpose image database. The robustness of the system was also shown when the images undergo different transformations.

P. Maji

A new algorithm has been designed to perform gray-level image enhancement using particle swarm optimization (PSO), in which a parameterized transformation function is used to produce the enhanced image and parameters in the transformation function are optimized by PSO based on an objective

function. Similar concept is used to perform the color image enhancement by scaling. In this case scaling factor is calculated from the enhanced intensity image. Gamut problem is removed with the help of HSI color space manipulating the saturation component.

A.Ghosh

In face recognition for color images, a new processing algorithm has been developed to detect parts of faces such as eyes, ears, nose and mouth from frontal face images. The complexity of this method is found to be smaller than the existing algorithms for segmenting face parts. The accuracy of this algorithm is same as the accuracy of the best algorithm for recognizing face parts. The method has been tested on Feret data set.

Additionally, an algorithm based on the principles of set estimation in statistics has been developed to obtain boundaries of face classes. These boundaries are found to be useful in the classification of face images. Experimental results on various data sets show that (i) the obtained thresholds provide better classification results than the existing methods, and (ii) the thresholds provide better results on video data sets too.

C.A. Murthy

Pattern Recognition

A new method of partitive clustering was developed in the framework of shadowed sets. The core and exclusion regions of the generated shadowed partitions resulted in a reduction in computations as compared to conventional fuzzy clustering. Unlike rough clustering, here the choice of threshold parameter was fully automated. The number of clusters was optimized in terms of various validity indices. It was observed that shadowed clustering could efficiently handle overlapping among clusters as well as model uncertainty in class boundaries. The algorithm was robust in the presence of outliers. A comparative study was made with related partitive approaches. Experimental results on synthetic as well as real data sets demonstrated the superiority of the approach.

S. Mitra

The problem of partitioning a given set of points, important in VLSI layout design, has been posed as one of multiobjective optimization and a technique based on genetic algorithm, with problem specific operators, has been proposed. The property of symmetry has been incorporated in a number of existing cluster validity indices. It is empirically established that incorporation of the property of symmetry significantly improves the capabilities of these indices in identifying the appropriate number of clusters. The property of point symmetry has also been utilized to develop a genetic fuzzy clustering technique (Fuzzy-VGAPS) that can automatically determine the number of clusters present in a data set as well as a good fuzzy partitioning of the data. A new fuzzy symmetry based cluster validity index, FSym-index, has been used for optimization. The proposed index can detect clusters of any size, shape or convexity as long as they possess the property of symmetry. It has been mathematically justified via its relationship to the Dunn's index, for which the condition of uniqueness has already been established.

S. Bandyopadhyay

A new correlation-based biclustering algorithm, called bi-correlation clustering algorithm (BCCA), has been developed. BCCA has been able to produce a diverse set of biclusters of co-regulated genes over a subset of samples where all the genes in a bicluster have a similar change of expression pattern over the subset of samples. The presence of common transcription factors' binding sites, in the corresponding promoter sequences, signifies that a group of genes in a bicluster are co-regulated. Biclusters determined by BCCA also show highly enriched functional categories. Using different gene expression datasets, the strength and superiority of BCCA over some existing biclustering algorithms have been demonstrated.

R.K. De

Research Activities

A new measure of roughness and granularity has been proposed using the values in the domain for the features space. This has the advantage of distinguishing the two different granularities, in a better manner than the existing measures. Also the roughness measure defined will help in choosing the partition, which gives better approximation of the set under consideration. These measures are helpful in classification and feature selection problems.

B. Uma Shankar

Studies were conducted on the thunderstorm data of Kolkata and that of Florida, USA data. It was found that the Palm Beach region in Florida State has significant negative correlation with Kolkata thunderstorm data.

A new semantic similarity measure between words has been defined for text mining problems. The measure is found to reflect similarity better than the existing such measures. A new algorithm for clustering of web data using the semantic similarity has been proposed. This algorithm was found to provide better results than the existing algorithms.

C.A. Murthy

A new term weighting scheme for retrieval of documents under vector space model retrieval has been formulated for text mining problems. In addition to the conventional term frequency and inverse document frequency factors, a new component, named as document weight, has been introduced here. This factor provides a measure of overall information content of a document and Shannon's entropy has been utilized to measure it. The performance of the scheme was found to be superior than other leading retrieval models when implemented on some real life data sets including TREC (Text Research Collection). The scheme was also found to be effective in adversarial information retrieval for web spam with keyword stuffing.

D.P. Mandal

Machine Vision and Perception

In any complex system, the inherent contradiction between the independent behavior of the parts and the mutual control of one part on the other through network connectivity, gives rise to the emerging properties of the system. However, the main controversy lies in arriving at a quantitative measure or computational model of such complexity. The "eye-brain" complex, which contributes maximally to visual perception, is an extremely complex system where recurrent feed-forward and feed-back networks play a crucial role. Hence, the understanding of the brain and its cognitive and perceptual functions also has to follow an approach built upon recurrent bottom-up (inductive) logic (the differential/atomist road) and top-down (deductive) logic (the integral/probabilistic road) in order to bring us a gradually clearer picture of the system. An attempt is presently being made in the direction of constructing such computational models based on psychophysical and/or behavioural data.

K. Ghosh

A spatio-temporal segmentation based moving objects detection scheme has been studied. This includes two segmentation approaches: spatial segmentation and temporal segmentation. Here the spatial segmentation task is performed in MAP estimation principle, where the attributes like color or gray value in the spatial direction, color or gray value in the temporal direction and edge map both in spatial and temporal directions are modeled with MRFs. A hybrid algorithm (hybrid of both simulated annealing and Iterated Conditional Mode) is used for corresponding MAP estimation. Similarly, for temporal segmentation a change detection mask is considered based on the difference of segmented frame result obtained so far.

A. Ghosh

Systems Science and Informatics Unit

Geospatial Information Processing and Modelling

Segmentation

A morphology based algorithm was developed to segment binary and grayscale images. The abrupt change in the areal extents under the succession of spatial scales simulated via multiscale morphological opening transformation is taken as the basis to define the threshold crossover scales to segment the images. Resultant segmented images yield morphologically significant regions. Applications of this algorithm were demonstrated on synthetic fractal images, and on certain geophysical fields like clouds retrieved from MODIS data.

Spatial Informatics

An original technique for spatial interpolation has been developed. This technique can be generalized to visualize the spatiotemporal behavior of phenomena that belong to varied categories. It has been shown (i) how Hausdorff-Dilation and Hausdorff-Erosion metrics could be employed to categorize the time-varying spatial phenomena, and (ii) how thematic maps in time-sequential mode can be used to visualize the spatiotemporal behavior of a phenomenon, by recursive generation of median elements. Spatial interpolation that was earlier seen as a global transform has been extended by introducing bijection to deal with even connected components. This developed framework solves problems in spatial-temporal GIS.

B.S.D. Sagar

Computational Neuroscience

Brain signal processing

Fourier coefficients of human scalp EEG have been studied. When signals from two or more electrodes are coming largely from the same source, a kind of uniformity among the coefficients has been observed which has been termed as Fourier uniformity. This has been applied to localize cortical sources of the scalp EEG. A review of various soft computing approaches to human scalp EEG has been undertaken and a paper has been communicated. Deep brain continuous EEG signal of 21 epileptic patients has been studied. A novel differentiation and statistics based algorithm to automatically detect seizure onset and duration has been developed. Multiresolution analysis based on DB4 wavelets is going on.

Behavioral modeling

Game theory has been applied in behavioral modeling. A one person game called "Indian policeman's dilemma" has been designed. This has been treated as a two persons game of two mutually conflicting personality modules of the same person. Probabilistic inferences have been applied to give a complete solution of the game.

K. Majumdar

Wireless Network Design

Wireless mesh network

The capacity of wireless mesh networks (WMN) must usually be upgraded as usage demands evolve over time. This is normally done by adding wireline gateways which serve to increase the backhaul capacity of the network. Use of hybrid Free Space Optic/Radio Frequency (FSO/RF) gateways has been proposed, incorporating the strong rate-distance dependence of practical FSO links, to cope up with such post-deployment capacity degradations. A joint clustering and gateway placement problem

has been formulated which, without changing the existing wireline gateways, minimizes the additional hybrid-FSO/RF gateways needed to satisfy the target capacity requirements. The presented algorithm was then modified to allow for balancing the traffic load that is carried by each gateway. Many scenarios have been considered to demonstrate the value of this technique for obtaining post-deployment capacity upgrades.

Channel Assignment in Cellular Network

An efficient algorithm has been developed for the channel assignment problem in a hexagonal cellular network, having non-homogeneous demand vector. It concerns partitioning the given problem into smaller subproblems, each of which is constituted by a homogeneous demand vector on a simple subgraph of the original cellular graph. When tested on the well-known benchmark instances, the proposed algorithm assigns the channels with a bandwidth always within 5% more than the optimal bandwidth, requiring a very small execution time (few milliseconds only on a HPxw8400 workstation). In contrast to this, the best known algorithm generates optimal assignments with about 10-20 seconds on a comparable workstation. This makes the proposed algorithm attractive for very fast assignments of channels in real-life situations, with a marginally small deviation from the optimal bandwidth.

Universal Mobile Telecommunication System (UMTS) network planning

A new approach has been introduced to improve tractability for network planning problem in UMTS systems. This concerns changing the resolution of the problem scenario by creating ***virtual*** entities which combine spatial traffic requirements. The results show only a marginal reduction in quality of network evaluation, while efficiency is much improved.

Several optimization models have been developed involving the optimal selection and configuration of base stations and the transmission power assignment to the selected base stations, with a view to maximizing the user's coverage. Upper bounds on coverage have been derived using a meta-heuristic approach (tabu search). The results of experimentation showed that the tabu search is competitive with the derived lower bounds and has substantially lower execution time for larger problems.

S.C. Ghosh

Physics and Earth Sciences Division

Geological Studies Unit

Growth and evolution of Neoproterozoic carbonate platforms in the Chattisgarh and Cuddapah basins, South India: Tectonic and palaeogeographic implications

The principal research effort for 3nd Year of the project was to complete the detail map in the area around Rajnandgaon in the western part of the Chattisgarh basin, and solve the existing stratigraphic problem. An integrated analysis of stratigraphy, depositional processes, depositional systems, and provenance of the Chattisgarh basin is in progress.

Detail facies classification of the carbonates from Chattisgarh and Kurnool has been completed in the field, and interpretation of environment is under progress (manuscript is under preparation). Physical and chemical aspects of carbonate depositional systems and their potential in predicting climatic changes on regional scale are in progress.

S. Patranabis Deb and D. Saha

Geochronological constraints on tectonic assembly and dispersion, in relation to the Eastern Ghats Orogen

Protolith age of khondalites is constrained by Sm-Nd data, as between 2.0 and 2.5 Ga. Age of sedimentation could be constrained by Sr-model date as 1.6 Ga. Chemical compositions of the Khondalites indicate a shale-greywacke sequence, or turbidites. However, more ferruginous composition relative to average shale could only be explained by the presence of some mafic rocks in the provenance. Interestingly, both granitic and basaltic rocks of the age range, 2.0-2.5 Ga, are reported from the Bastar craton, adjoining the Eastern Ghats belt to the west.

Isotopic data for the Koraput complex indicate ca, 917 Ma alkaline magmatism from a depleted mantle source and post-crystalline thermal overprint at ca. 745 Ma, also recorded from sheared metapelitic country rocks. The calc-alkaline magmatism of the Rairakhol complex occurred around 938 Ma, from an enriched mantle source, closely following Grenvillian granulite facies imprint in the charnockitic country rocks.

Samarendra Bhattacharya, W. Teixeira, M. Basei, A.K. Chaudhary and Rajib Kar

Depositional systems and sequence stratigraphy of the Vindhyan inlier of the Hosangabad-Bhopal area

The Vindhyan succession of the Bhopal-Hoshangabad region is about 500 m thick and stratigraphically lies above the topmost unit of the Son valley region. The succession comprises of a number of 50-100 m thick parasequences stacked dominantly in an aggradational pattern.The different depositional systems recognized are: a) aeolian-aqueous coastal flat, b) tidal flat without any record of eolian activity, c) tide-influenced shoreface, d) storm-influenced shoreface, e) braidplain delta and f) inner shelf.

C. Chakraborty

Tectonosedimentary evolution of the Talchir Gondwana basin, India

About 280 m. thick siliciclastic succession represents the Talchir Formation, the basal unit of the Gondwana succession in this basin and it rests above the Precambrian basement granulites with unconformable contacts. The Talchir Formation is conformably overlain by younger sediment piles of the coal-bearing Karharbari Formation (Maejima et. al., 2004, Bhattacharya and Bhattacharya, 2010). The glacigenic features present in the Talchir strata are various diamictites containing clasts of glaciogenic process, striated gravels and boulders, bullet shaped clasts, dropstones etc. The principal constituent lithologies include conglomerate, pebbly sandstone, sandstone and limestone bearing shale. The major lithofacies in the Talchir Formation are: matrix- to clast- supported conglomerate, cross-stratified coarse to pebbly sandstone, hummocky and wavy bedded pebbly to coarse sandstone, sheet sandstone and sand- or mud-dominated heterolith, and green to black mudstone with carbonate layers and nodules.

P. K Maulik

Diversity of Mesozoic terrestrial tetrapods of the Gondwana basins of India with special reference to the Rewa, Satpura and Damodar basins

During 2009 to 2010, the project on the diversity of the Mesozoic terrestrial tetrapods of Indian Gondwana basins has been completed. Since the inception of the geological Studies Unit, the vertebrate paleontologists of GSU have discovered nearly 50 new terrestrial tetrapods from the Mesozoic deposits of the Gondwana basins of Peninsular India. A synthesis on the available data indicates that this spectacular array of vertebrates was deposited chiefly in a fluvial milieu. It has been noted that the maximum numbers of amniote taxa are known from the late Triassic and there is a decline of diversity among the nonamniotes during that period. The richness index of Indian Mesozoic fauna is lower than the South African, North or South American coeval fauna. The evenness of the

Indian Mesozoic vertebrates, particularly, at the Early Triassic is more in India. The Richness Index is most in the Late Triassic Maleri Fauna of the Pranhita -Godavari basin.

S. Bandyopadhyay and D.P. Sengupta

Sediment transportation and sorting processes in sand-pebble mixture in experimental channel and their geological implications.

Sedimentological data and samples have been collected from modern sediments (Shankarpur and Bakkhali, West Bengal and Chandipur, Orissa). The velocity data in clear water has been collected and some experiments with very fine-grained sand in the Fluvial Mechanics Laboratory has been performed to see the sequence of bedform development. The sediments used in experiments were collected from Bakkhali and are characterized by unimodal grain-size distribution. Interestingly, it has been observed bimodal grain-size distribution in suspended sediments collected from 5 cm above the bed both in the upstream and downstream side of the experimental channel.

Rajat Mazumder

Surface, Colloid and Environmental Sciences

(a) Physicochemical studies of self-assembled systems (mixed surfactants microemulsions and reverse micelles)

The prospect of using mixed surfactants w/o micoremulsions for the synthesis of nanoparticles with small size, have been developed and characterized, as self-assembled systems like microemulsions/reverse micelles exhibit some special characteristics

(b) Synthesis and characterization of mesoporous materials and nanoparticles/ nanomaterials in mixed surfactants self-assembled systems

A simple soft-templating approach for the synthesis of new mesoporus iron oxide materials having semi-crystalline pore wall by using an anionic surfactant, sodium dodecyl sulphate (SDS) as structure-directing agent (SDA) or template at low temperature.

(c) Water solubilization capacity of [AOT+Tween-85 (nonionic) reverse micelles stabilized in biocompatible oils

Solubilization of water in mixed reverse micellar systems comprising anionic surfactant (AOT) and nonionic (Tween-85) at different proportions stabilized in isopropyl myristate (IPM), isopropyl palmitate (IPP), ethyl myristate (EM), ethyl palmitate (EP) and ethyl oleate (EO) as biocompatible oils has been studied at 303K.

(d) Water solubilization capacity of (DDAB+nonionic surfactants) RMs in biocompatible oil (IPM)

Water solubilization capacity of DDAB+ nonionic surfactants of different physicochemical properties (viz. Tweens, Brijs and Igepals) in biocompatible oil, IPM has been studied at 303K. Similar solubilization behaviors, as in case of mixed anionic (AOT)+ nonionic (Tween-85), have been noticed.

Bidyut K. Paul and Kaushik Kundu

North-East Project-I: Geomorphology and sedimentology in a foreland basin setting: A study in parts of north-eastern Himalayan foothill regions

As a part of the multidisciplinary initiative to understand the interplay between different earth processes, a terrain analysis was performed to study the variation of fluvial erosion across a major part of the Himalayan orogen. It has been noted that the intensity of erosion varies significantly along the length of the orogen and it is highest in its central part (Nepal Himalayas) and at western and eastern syntaxes. It has been further investigated how this pattern corresponds with the pattern of rainfall and

the disposition of the different litho-tectonic elements. It has been found that the hinterland catchment basins of the rivers that drain the Himalayas can be grouped into three classes. These classes are distinct by size, frequency and "drained-litho-type" and these three classes of basins are disposed in three orogen parallel bands. The boundaries of these bands are well-correlated with zones of precipitation and disposition of litho-tectonic elements – suggesting genetic link among surface and deep crustal processes.

P. Ghosh and T. Chakraborty

North-East Project-II: Thrust sequences, cross faults and fault zone rocks in the Eastern Himalaya: partitioning of ductile displacements and brittle fault slips

In Sikkim, Proterozoic metasedimentary rocks are juxtaposed against the Greater Himalyan Crystallines (GHC) along the Main Central thrust (MCT) which accommodates major intracontinental shortening. New data and analysis suggest oblique transpression in some sectors of the MCT in Sikkim. In contrast, the Proterozoic metasedimentary rocks and Ziro granite gneiss in Arunachal Pradesh form a wide belt particularly in the west, and the MCT appears on map as two widely separated strands (through Dirang and Lumla). An alternative interpretation of a break-back, reactivated MCT has been suggested. The MCT in eastern Arunachal is also distinct in juxtaposing the GHC rocks over the Paleoproterozoic Ziro granite gneiss which intruded metasedimentary sequences similar to the Daling Group in Sikkim. In Arunachal Pradesh stacking of thrusts over the MBT and MCT due to higher convergence rates, led to greater mid-upper crustal thickening.

Dilip Saha

Mesczoic Gondwana Vertebrates from Madhya Pradesh, India: An Integrated Study on Paleobiology

Six vertebrate fossil localities were noted within an area of about 250 x 217 sq m. These localities are characterised by multispecies accumulation including rhynchosaurs, phytosaurs, rauisuchids and few advanced cynodont remains; however, rhynchosaur is the dominant taxon. Such bone accumulation belonging to multiple taxa indicates mass mortality.

Apart from the osteological studies of the Tiki rhynchosaur, osteohistological studies of different limb bones, rib fragments and centra of the Tiki rhynchosaurs are being examined to know their growth regime, histovariability and life style adaptations.

S. Bandyopadhyay

Sedimentation history of Paleoproterozoic Dhalbhum and Dalma Formations in the Kokmpara-Tata Sector, eastern India and its implications

This project has been started in mid-August 2009. So far three field trips have been organixed. Sedimentological data and samples have been collected for geochemical (XRF, ICPMS) and heavy mineral analyses. Prof. A.J. Van Loon has participated in one field trip. A ms. on the sedimentary petrography of the volcaniclastics of the Dalma Formation has been submitted to a peer regviewed earth science journal.

R. Mazumder

Thermal evolution of Penninsular India

New isotopic data, SHRIMP data on monazite from high-Mg-Al-granulite, confirms the Grenvillian age (1.0 Ga) of the high-geothermal gradient metamorphism (previously reported by us, in Bhattacharya et al., 2003). Moreover, it is evident that this high-geothermal gradient metamorphism can not be distinguished from the dominant Grenvillian imprint recorded from different lithologies and different segments of the northern Eastern Ghats belt. The difference in temperature records from common khondalites and high-Mg-Al-granulites, could therefore be explained as compositional difference in the original pelites. It is important to note that peraluminous granitoids closely associated with the

khondalites have been shown as product of biotite-dehydration melting in the khondalite-precursors and this melting might have buffered temperature. On the other hand, high-Mg-Al granulites occurring in a migmatitic fashion, show evidence of in-situ melting at higher temperatures.

Samarendra Bhattacharya

Nellore schist belt and Proterozoic tectonics of southeastern margin of India

The above DST sponsored project has recently been taken up (January 2010). The ongoing field work has demonstrated dismembered Paleoproterozoic ophiolite with thrust slices of layer 2 of oceanic crust with a topping of deep water sediments, and gabbroic domains, in the southern part of the Nellore schis belt.

Dilip Saha

Physics and Applied Mathematics Unit

Astro Optics

Analytic framework for systematic analysis of extinction spectra data for astronomical (mainly interstellar) dust medium has been developed.

A. K. Roy

Bayesian Approach to Data Analysis in Astronomy

New Bayesian methodology as developed by Bhattacharya et al in ISI has been applied to a large data set for redshifts from SDSS quasar catalogue to study the recent unsolved cosmological issues. This is not only significant to verify the suitability of such approach for massive data structure but also will shed new light in the prevailing cosmological debates.

S. Roy

Classical Optics (Scattering)

A model phase function has been constructed for the study of light scattering from a size-distribution of small sized particles. Through this work the single particle phase function developed earlier, was extended to cover wider range of situation arising in areas like atmospheric optics, marine optics and biological optics.

Study of Dynamics Light Scattering experimental data (scattered intensity correlogram) corresponding to small size particulate bio-systems was pursued with a view to develop simple analytic model formulas leading to size-geometry estimations. An analytic model framework has been constructed.

A. K. Roy

Cosmology

New models for explaining the expansion history of the universe have been proposed, which take into account early universe (inflation) as well as present universe (dark energy) from two different points of view -- one from using a scalar field potential and the other from a generalized theory of gravity. The mathematical formalisms required for both the sectors have been developed to a great extent by deriving the analytical expressions for most of the physical quantities related to cosmic expansion and perturbations. The results have then been subject to observational verification by estimating the values of those observable parameters, both analytically and numerically. The numerical results from the models are found to be in excellent agreement with observational data. Further, the generalized theory of gravity has been utilized to produce bouncing solutions, resulting in a singularity-free cosmology within the classical domain.

S. Pal, S. Ghosh and B. Basu

Entropic formulation of Newton's law of dynamics and gravitation

The entropic derivation of Newton's law was extended to include quantum corrections augmented by Planck scale physics.

S. Ghosh

High and Ultrahigh Energy Physics

The present day hype in the domain High Energy Particle Physics is the commissioning and start of the Large Hadron Collider (LHC)-Studies. In fact, this could be paraphrased as: LHC Episode in Particle Physics: Small Wonders and Big Questions? Similar expectations were voiced and publicized circa 2001-2003, while RHIC-operations at Brookhaven National Laboratory (BNL) were in the infancy generating similar big hopes of winning almost everything. That ended in a near-fiasco with observations of too hazy signposts for the laboratory diagnosis of the Quark-Gluon Plasma (QGP), which was the brainchild and hobbyhorse for a section of the top-notch High Energy Physicists.

Come-what-may, we would certainly aim at collecting the reliable and significant laboratory-data from the reported LHC-observations, try to analyze them as much objectively as possible, [i.e., with NO special fascination for the so-called Standard Model (SM)] and arrive at some definite conclusions which might raise some serious questions to the mindset of the theorists in Particle Physics. Besides, if possible, the topical and important issues related to the Astroparticle physics and Cosmic Ray phenomena would also be dealt with. Application of the ideas of Non-extensive Thermodynamics to the analyses of some problems in the domain of Particle Physics and Astroparticle Physics could also constitute our area of interests.

S. Bhattacharyya

Quantum Control, Interacting Fock Space and Boson Fock Space

Derivation of weighted energy control of the optimal quantum mechanical system by representing the unitary operator in terms of the projection operators of the Hamiltonian of the control system has been obtained. The admissible Hilbert space of controllers of the system is expressed as the tensor product of the Hilbert spaces corresponding to the weights of the controllers of the quantum mechanical system. The optimal control, which steers the state of the quantum mechanical system from the initial state to a target state, minimizing the weighted energy, is formulated in terms of the controllability operator of the system.

The dynamical behaviour and the state space representation in stochastic field of the optical QED system provide the basis for developing quantum feedback QED control system. This study is also motivated by the design of quantum networks of any number of optical QED baths connected in parallel. We are also in the process of generating W state with the help of designing QED baths connected in parallel.

Non-classicality of a superposition of coherent states has been studied in terms of sub-poissonian photon statistics as well as negativity of the Wigner function. An analytic expression for the Wigner function was derived from which it was found that the function has some negative region in phase space. A compact form of Wigner function was obtained when de-coherence occurs and the effect of de-coherence on the state has been studied. The behaviour of the non-classicality indicator was also demonstrated.

P. K. Das

Quantum Information Theory

Any two-qubit pure entangled state violates some Bell's inequality. Whether the same result holds for three or more qubits still remained unresolved. The problem has been solved for three qubits showing that any three-qubit pure entangled state also violates a Bell's inequality. The problem will be further

probed for more than three qubits. The study of Hardy's non-locality in the context of generalized non-local theory has already been carried out for two and three qubit systems. This has also been recently investigated from the point of view of information causality condition.

Study of multi-partite quantum correlations is an important issue in quantum information theory. It was proven that the generalized W class of N-qubit states are uniquely determined by just their bipartite reduced marginals. This result is valid in higher dimensions also. Similar analysis has been carried out for Dicke states.

G. Kar and P. Parashar

Quantum Mechanics

The possibility of obtaining bound state in continuum (BIC) solutions within the framework of effective mass models has been studied and some interesting results have been obtained. Exceptional orthogonal polynomials have also been studied from the point of view of supersymmetry and nonlinear algebra. In particular exceptional orthogonal polynomials related to the Hermite and generalized Laguerre polynomials have been obtained. Different features of classical mechanics with complex interactions are also being studied.

Effects of extended uncertainty principle for de Sitter space-time has been studied. A new non-commutative space-time structure has been proposed that is compatible with the recent Very Special Relativity framework. Explicit form of action for a point particle in this space-time has been derived. The formalism is based on Dirac constraint analysis scheme.

The possibilities for designing quantum spectra of effective mass Hamiltonians offered by the intertwining technique were investigated. The non-classical properties and the revival structure of coherent states of effective mass models have been studied. Some exactly solvable potentials in the position dependent mass background were generated whose bound states wave functions were given in terms of exceptional orthogonal polynomials have been reported. These potentials were shown to be isospectral to the potentials involving classical orthogonal polynomials. Generalized quantum nonlinear oscillator has been studied from the viewpoint of shape invariance and super-symmetry (broken and unbroken). Also using Pseudo-Hermicity concept, PT symmetric breaking of a periodic Potential in an optical lattice is being studied.

The analytical solutions to one and two-particle Schrödinger equation for an electron in a quantum dot with a short-range confinement potential in the presence of Rashba spin orbit interaction and external magnetic field were presented. The exact energy levels and wave functions were derived.

P. Roy, S. Ghosh, B. Roy and B. Basu

Quantum Tunneling for Dissipative System

Recently Schroedinger-Langevin equation using the stochastic quantization procedure proposed by Nelson has been constructed. The stability of the stationary solutions of this equation is under present investigations.

S. Roy

Theoretical Condensed Matter Physics

The zero temperature phase transition, known as 'Quantum phase transition' (QPT) has attracted a lot of attention recently. The geometric phase associated with a many body ground state exhibits a signature of QPT in various spin systems. The dynamics of the geometric phase of a quantum Ising model associated with a quench induced QPT was studied. The number of defects produced in the system were estimated, which were found to depend on the quench time. The behavior of the geometric phase in the adiabatic limit of the quench induced QPT has also been investigated.

Berry phase and quantum fidelity for the ground state of a three qubit Lipkin-Meshkov-Glick model has also been studied.

B. Basu

Theoretical Plasma Physics

Solitary wave solutions in dusty plasma in a magnetic field were studied. This study was extended to magnetized plasma with non-thermal electron taking into account the kinetic viscosity of plasma.

R. Roychoudhury

Convection-Diffusion Process

The work concerns with the determination of effective transport coefficients associated with the oscillatory flow through a tube where a solute undergoes nonlinear chemical reactions both within the fluid and at the boundary. Method of homogenization, a multiple-scale method of averaging, was adopted to derive the transport equation that contains advection, diffusion and reaction. The resultant equation showed how the transport coefficients are influenced by the rate and degree of the nonlinear chemical reaction. Two different nonlinear reactions were considered at the bulk flow and the boundary. The reactions at the boundary may be reversible and irreversible in nature. Several facts were established from the model by fixing the rate or degree of the nonlinear reactions.

B.S. Mazumder

Integral Equations

Work on integral equations involved numerical solution of integral equations using Bernstein polynomial basis and Haar wavelets.

B.N. Mandal

Laminar and Turbulent Flows

In recent times much interest is taken on applied problems of laminar and turbulent flows. The nonlinear dynamical equations involved in these problems were solved by the similarity and group-theoretic methods. Problems of both Newtonian and non-Newtonian fluid flows, as applied to industry and in many practical situations were tackled. In case of turbulent flows, importance was given to the construction of an improved model for turbulent boundary layer, employing the data from sophisticated laboratory measurements. Some theoretical problems on ZPG turbulent boundary layer and turbulent boundary layer with adverse and favourable pressure gradients have been worked out. Besides, problems of turbulent flow with suspended sediments were also studied.

H.P. Mazumdar

Water Waves

The water wave problems were investigated which involved scattering by small bottom undulations in the presence of discontinuity in surface boundary condition, by circular cylinder half-immersed in deep water with ice-cover, by a thin elastic plate of arbitrary width floating on deep water, by two vertical barriers, by undulating bed topography in a two-layer ocean and also wave radiation by a sphere submerged in a two-layer ocean.

B.N. Mandal

Combined Wave-Current Flows

Study of turbulent flow and its characteristics over dune shaped structures with or without surface waves, and understanding its impact on sediment movement has been one of the important objectives of the problem. The presence of surface waves and bottom undulations changes the flow dynamics and consequently the suspended sediment concentration changes significantly. Then the question

arises here: how the flow over dunes leads to erosion, transportation and deposition? The present study simulates the turbulence and its characteristics along a series of static dune structures to understand the physics of flow in the Fluvial Mechanics Laboratory of ISI. These studies have great potential relevance to the applications for the solution of practical problems in the field of river sedimentation (both geologically ancient and modern), siltation of reservoir, genesis of bedforms, deciphering palaeo-hydraulic conditions etc.

B.S. Mazumder

Econophysics

In the interesting area of the analysis of city size distributions, a general model was built, which explained the morphology of the urban agglomerations for the developing countries. As an example, the Chinese census data was studied, which showed that the empirical observations are in good agreement with the proposed model.

A comprehensive study of the evolution of the expenditure distribution in India was also done. The proposed model was validated using the data of the National Sample Survey Organization Reports for the years 1983-2007. As income goes often underreported and consumption is more stable measure of one's well being, the previous studies with income could be verified using the consumption data.

B. Basu

Flow Visualizations using Digital Imaging

The mechanical characteristics of saltation behavior of individual particles near the channel bed under flowing water were studied. Experiments have been carried out by means of high-speed photographic camera to study the movements of different sizes of sand grains over the rough beds due to turbulent flow of different Reynolds numbers. A theoretical model has been developed to determine the migration velocity of the particles considering the Magnus effect due to the spin into the energy balance equation. The proposed model has been tested with experimental data and the agreement with mean particle velocities is excellent.

B.S. Mazumder

Information Processing in the Brain

The information processing and the issue of cognition is one of the challenging issues in brain research. A geometric structure for the neuronal architecture of Central Nervous System (CNS) has been proposed and the use of Fisher information in this context was explored. The noise played a significant role in understanding brain function.

S. Roy

Multivariable System and Control Theory

Numerically reliable algorithms have been developed for identification and realization of system. Work has been done to develop numerical method for decoupling of multivariable descriptor variable system. Stability of the system has also been studied. Dynamical system of equations in the form of Schimizu-Morioka has been studied.

S. Gangopadhyay

Biological Sciences Division

Agricultural and Ecological Research Unit

Introducing Tropical Sugar Beet `TSB` (*Beta vulgaris* L.) in West Bengal: A Study on Yield Performance and commercial potentialities

The different aspects of agronomical experiment on Sugar beet (*Beta vulgaris* L.) showed that this crop can be grown successfully in West Bengal but production of ethanol from this crop is still not attempted. It is intended to develop and modify the technology, namely, "Solid Phase Fermentation" in the laboratory and to observe the variation between the varieties for producing ethanol in a particular growth stage. It is being tried to establish the new varieties of this crop in this agro climatic region through Agricultural Research Farm of the Government of West Bengal for the transfer of technology from experimental plots to farmers' plots.

S. Barik

Development and value addition of innovative agro-entomotoxic materials from natural sources

Mapping of natural biological world for nanoparticle diversity showed several important points. Serum and biological fluids as well as sap of higher plants contain small size nanoparticles (~1-20 nm) apart from a large size class (~150—300 nm). In the latex and lower plants, this small class is absent. It was observed that aforesaid large size class undergoes through a major size change when subjected environmental stress conditions (such as hot water spring).

Mapping of mine impact soils vis a vis adjoining farm soils for inorganic nanocomposites demonstrated that small size to large size nanocomposites are present in minute quantities. It is estimated that microorganisms and water chemistry play a major role in generation and processing of these nanocompsoites.

Naked, capped and quantum nanoparticles of gold and silver were synthesized and their bio-efficacy studies have been conducted on a large number of model systems.

Biosafety studies in two model systems (DNA microarray in *Drosophila* and mouse) of these nanoparticles have been completed.

A. Goswami

Integrated Nutrient Management for Sisal cultivation in laterite soil of Girdih, a Sub-Tropical Plateau Region of India

Sisal (*Agave sisalana* Perrine) is a perennial leaf fibre producing plant, which can tolerate prolonged droughts and high temperature (up to 45°) with minimum maintenance cost. The plantation has been raised in ISI Giridih farm. Intercropping with elephant foot yam, soybeans, groundnut, Niger, peas etc. are in progress along with application of fertilizers to find out the optimum doses.

M. Ghose, B. Sarkar and R. Dasgupta

Mycorrhizal status of Mangroves of the Sundarbans

The arbuscular mycorrhizae (AM) fungi are known to act as potent soil binders, help nutrient cycling and increase soil fertility. The present investigation may help in the ecological management of Sundarbans delta in West Bengal and other similar ecosystems. The present study is almost complete on the following areas:

(i) Estimation of mycorrhizal colonization of mangroves and mangrove associates of different islands of the Sundarbans.
(ii) Identification of VAM spores in the rhizospheric soils.
(iii) Effects of physico-chemical properties of soils and tidal inundation on the mycorrhizal status, and
(iv) Effects of root exudates on VAM spore germination and hyphal growth.

M. Ghose and T. Kumar

Monitoring of pond biodiversity to assess the ecological status of ponds

For monitoring pond health, water quality, macrophytes and phytoplanktons are being recorded and identified from a large number of pond water samples in Baranagar area. An index will be built based on this which will help predict the ecological health of ponds.

Anjana Dewanji, P. Ghosal, C. Medda,
Anup Dewanji and D. Sengupta

Allelopathy in Natural and Manipulated Ecosystems – with reference to root exudates, leaf leachates and fruit pulp

Natural agrochemicals play a significant role in agricultural systems that seek to reduce the input of synthetic chemicals and conserve natural fauna. These are effective and often quickly biodegradable and present no problems of toxic residue. 2-amino-9-(4-oxoazetidin-2-yl)-nonanoic acid, [$C_{12}H_{22}N_2O_3$, mol.wt. 242] has been isolated and purified from the root exudates of *Cleome viscose*, which is highly active on both gram negative (*Pseudomonas* sp) and gram positive (*Staphylococcus aureus)* bacteria.

Isolation and identification of bioactive compounds from *Tamarindus indica* L. leaves is a potential approach for developing new pesticides. Methyl-4,4-dimethyl-trtra-decanoate (M-4,4-DMT-DA) (m.w.270) have been isolated and identified from tamarind leaves (TrHF). Both the compounds exhibited antifungal and antibacterial activity on a wide range of microbial species and may be utilized as a bioactive fungicide and bacteriocide.

S. Mandal Biswas and S. Chanda

Exploration of Plankton Dynamics and Associated Ecosystems: Field study, Laboratory Experiment and Mathematical Modeling

Enrichment of a simple predator-prey system results the destruction of stable steady state and further enrichment leads to the extinction of the species, is a classical problem in ecology and known as paradox of enrichment. Most of the theoretical studies show the destabilization of predator-prey system due to enrichment. But there is a discrepancy between the empirical evidences and theoretical predictions. Recently we present a simple predator-prey system in presence of cannibalism among predators and offer a novel resolution to the paradox of enrichment. It is observed that even in the face of sufficient enrichment the system remains stable in the vicinity of critical nutritional value. In case of lower cannibalism rate we also observe similar kinds of behavior. But for higher cannibalism rate, the system remains always stable and does not depend upon the nutritional value of prey, i.e., paradox of enrichment does not hold at all in such situation. We also observe that, cannibalism can have positive as well as negative effect on population abundance, depending on cannibalism rate.

J. Chattopadhyay

Chemical and microbiological studies on Haritaki (*Terminalia chebula* Retz.) against uropathogenic *Escherichia coli*

Studies conducted in our laboratory revealed that *T. chebula* fruit extract possessed strong antibacterial activity against trimethoprim-sulphamethoxazole (SXT/TMP) - resistant uropathogenic *Escherichia coli.* Phytochemical analysis and TLC-bioautography revealed that phenolics were the major active phytoconstituents. It was interesting to observe that phenolics of *T. chebula* fruits possessed both dose and time dependent antibacterial activity against the test isolates and have synergistic effect when combined with some of the tested antibiotics. These findings reinforce the importance of ethnomedical approach as a potential source of bioactive compounds for the treatment of urinary tract infections caused by *Escherichia coli.*

R.R. Chattopadhyay, A. Bag and S.K. Bhattacharyya

Study of Molecular Genetic Diversity of some degraded Mangroves of Sundarbans

The present study deals with some endangered mangrove species of the Sundarbans with the aim of resource survey analysis. Some important stress enzymes were studied both qualitatively and quantitatively and were compared with their counterparts grown in other geographical area in order to study their enzyme polymorphism. PCR based technique, using RAPD marker is being studied for understanding their nature of genetic polymorphism, if any.

S. Das, P. Ghosal and K. Bhattacharya

Development of information on agricultural and horticultural production and their marketing using RS and GIS in some districts of West Bengal

The digital data on natural resources, land use pattern and local *hats* and agricultural marketing system (spatial & attribute) generated using RS and GIS tools can also be considered as the base line for the future of e-marketing or geo-marketing system of West Bengal. With this backdrop, four districts of west Bengal have been selected to study the local *hats* and market and their accessibility for marketing the agricultural and horticultural produces. An approach has been adopted to integrate the primary household and market survey data with the spatial data (thematic maps of the districts, maps of local markets etc) to develop an in-depth market information system using RS & GIS tools.

P. Banik

Farm household survey (Purulia district) for study of agricultural development and poverty in remote rural villages of Eastern India

Eight villages of Purulia district have been surveyed to identify the changes in agricultural activities and as a whole the livelihood of the local villagers. Here the earlier studied villages have been selected to provide base line data. Earlier study was conducted in collaboration with International Rice Research Institute.

P. Banik

Biological Anthropology Unit

A molecular genetic study of couples with recurrent spontaneous abortions

The HLA based work on the couples with recurrent spontaneous abortions and the recently taken up project on the genetic etiology polycystic ovary syndrome have considerable social relevance. The findings on the HLA based work, which is in the concluding stage, may help in genetic counseling of these couples and in designing appropriate therapeutic measures.

B.M. Reddy

Identification of susceptibility genes and epigenotypes with Polycystic Ovary Syndrome (PCOS) among Indian women

The project on polycystic ovary syndrome is initiated with the overall objective of studying the candidate genes implicated in various physiological pathways involved in the etiology of PCOS and to establish association of the susceptibility genes with the disorder in the context of Indian populations which will be extended to understand the etiological mechanisms of PCOS through an epigenetic perspective and to study the effect of environmental factors on the manifestation of this syndrome.

B.M. Reddy

Diet, Activity and Aging: A Prospective Study among the Elderly of Kolkata

The project aims to evaluate age related variations in respect of selected biological/health characteristics, both physical and mental, among the elderly population, inhabiting Kolkata in relation

to dietary practices and physical and mental activity patterns. It furthermore, examines seasonal variation of health status of the elderly.

B. Mukhopadhyay

Human Genetics Unit

Genomic and Epidemiological Studies on Common Diseases in Indian Populations. The focus of these studies is to understand the genomic and environmental contributions to common diseases in India.

Genomic Studies on oral cancer

Deregulation of MiRNA expression and mechanism of progression from oral precancer to cancer MicroRNAs (miRNA) have been isolated from normal, precancer and cancer tissues from oral cavity. Deregulation of expression of miRNAs is being quantified by miRNA-specific Taqman assay. Among the four miRNAs (mir205, 137, 193a and let7c) tested, it was observed that expression of mir205 was up regulated in cancer tissues when compared to the expression of internal control RNU44. Expression of other miRNAs will also be checked in more number of samples. This study may be useful to find out relationship between the deregulation of expression of miRNA and progression of disease from normal to precancer to cancer stages.

Mitochondrial mutation in oral cancer

Apart from nuclear DNA, it is now becoming evident that mutation in mitochondrial DNA (mtDNA) plays important roles in the process of carcinogenesis. A common ~5kb deletion in mtDNA has been observed in both precancer and cancer tissues whereas single base mutation in HVS1 and HVS2 regions has been observed mostly in cancer tissue. These observations suggest that ~5kb deletion and single base mutation in mtDNA could be early and late events, respectively, in the process of carcinogenesis. It was also noticed that most of leukoplakia and cancer tissue contained heteroplasmy in 5kb deletion. Since a cell contains 50-1000 mitochondria, now it is being quantified how many of mitochondrial DNA are being deleted in leukoplakia and cancer tissues compared to controls.

Bidyut Ray

Genomic Studies on cervical cancer

Role of HPV16 viral load in disease pathogenesis

In India, among the HPV positive cervical cancer cases (CaCx), 50% are HPV16 DNA positive, and this is also the most prevalent type within normal populations. We tested the hypothesis that cervical cancers (CaCx) harbor high HPV16 viral load compared to controls and this is influenced by E2-status and age of subjects. Viral load (natural log transformed values) per 100 ng genomic DNA was estimated (152 cases and 87 controls) by Taqman assay. Median viral load was significantly higher (Mann-Whitney U test) among cases compared to controls, irrespective of E2-status or upon considering E2-status as a co-variate in logistic regression model. Viral load of E2 intact cases was significantly higher compared to those with disrupted E2. At equivalent probability of being a case, viral load was higher among individuals (i) of lower age, irrespective of E2-status, and (ii) with intact E2 but of similar age as those with disrupted E2. Thus viral load in association with E2-status and/or age might be of causal relevance in CaCx pathogenesis.

Role of polymorphisms in genes of one carbon metabolism pathways in the pathogenesis of cervical cancer

HPV infection appears to be the major etiologic factor for cervical cancer (CaCx) development. Therefore, host pathogen interactions could influence disease pathogenesis. We examined, whether

polymorphic variation within genes of folate metabolic pathway (MTHFR C677T, A1298C & MS A2756G) influence i) the risk of HPV related CaCx, and ii) methylation of the HPV 16 enhancer promoter region encompassing LCR-E6 or specifically E2 binding site I (E2BSI) within LCR, as a functional consequence. Genotyping was performed using 157 CaCx samples (136 HPV16/18 positive) and 237 cytogically normal cervical scrapes (98 HPV16/18 positive). Variant genotypes at both loci (MTHFRC677T and MSA2756G) were significantly overrepresented among CaCx cases either HPV16/18 positive or HPV16 positive with intact E2 gene, compared to HPV negative controls, and in contrast to those harboring variant genotypes of MS2756 only. Methylation of HPV16 (E2 intact) within LCR-E6 of CaCx cases having combined susceptible genotypes was significantly lower compared to the group having variant genotypes at MS2756 only, with no variation in E2BS-I methylation of LCR between the two genotype groups. This study highlights that nonsynonymous SNPs within folate and methionine metabolizing genes are associated with cervical cancer susceptibility jointly and this correlates with mechanisms adopted by the virus to achieve sustained oncogene expression.

Sharmila Sengupta

Genomic Studies on Other Common Diseases

Earlier study on Gilbert's syndrome has been expanded to address the question of genomic contributions to determination of bilirubin levels. In collaboration with the N.R.S. Medical College and Institute of Post-Graduate Medical Education and Research, Kolkata, a carefully designed case-control study has been initiated. Sample collection and biomarker assessments of which are in progress, along with resequencing the UGT1A1 gene for detecting relevant mutations and polymorphisms.

Population Genomics

Analyses of frequency profiles of markers on disease or drug-response related genes in diverse populations are important for the dissection of common diseases. A reported "Genetic landscape of the people of India: a canvas for disease gene exploration" was prepared in collaboration with 7 CSIR laboratories. These include 32 large (>10 million individuals) and 23 isolated populations, representing a large fraction of the people of India. High levels of genetic divergence were observed between groups of populations that cluster largely on the basis of ethnicity and language. These data and results are useful for designing studies on complex traits.

In collaboration with the TCG-ISI Centre for Population Genomics (Kolkata), The Centre for Genomic Application (Delhi), National Institute of Cholera and Enteric Diseases (Kolkata), Research Triangle Institute International (USA) and Duke University (USA), the results of an extensive and comprehensive study of genetic diversity in 12 genes of the innate immune system in a population of eastern India have been reported. Almost half of the 548 DNA variants discovered was novel. DNA sequence comparisons with human and chimpanzee reference sequences revealed evolutionary features indicative of natural selection operating among individuals, who are residents of an area with a high load of microbial and other pathogens.

Opposing views were tested concerning evolution of genes of the innate immune system that (*i*) being evolutionary ancient, the system may have been highly optimized by natural selection and therefore should be under purifying selection, and (*ii*) the system may be plastic and continuing to evolve under balancing selection. Twelve (12) important innate-immunity genes have been re-sequenced and have found that most of the human haplotypes are many mutational steps away from the ancestral (chimpanzee) haplotypes, indicating that humans may have had to adapt to new pathogens. Purifying selection was found to operate on these innate immunity genes. This genetic surveillance system recognizes motifs in pathogens that are perhaps conserved across a broad range of pathogens. Hence, functional constraints are imposed on mutations that diminish the ablility of these proteins to detect pathogens.

Research Activities

DNA sequence variation in and around the genes *ICAM1* and *TNF* was studied. The genes play functional and correlated roles in inflammatory processes and immune cell responses. The pattern of nucleotide variation in these genes was found to have been modulated by both demographic history and selection.

Isolated population groups are useful in conducting association studies of complex diseases to avoid various pitfalls, including those arising from population stratification. Since DNA resequencing is expensive, it is recommended that genotyping be carried out at tagSNP (tSNP) loci. For this, tSNPs identified in one isolated population need to be used in another. The issue of tSNP portability was examined by sampling individuals from 10 isolated ethnic groups from India. We generated DNA resequencing data pertaining to 3 genomic regions and identified tSNPs in each population. An index of tSNP portability was defined and showed that portability is low across isolated Indian ethnic groups.

Human Y-chromosome haplogroup structure is largely circumscribed by continental boundaries. One notable exception to this general pattern is the young haplogroup R1a that exhibits post-Glacial coalescent times and relates the paternal ancestry of more than 10% of men in a wide geographic area extending from South Asia to Central East Europe and South Siberia. Its origin and dispersal patterns are poorly understood as no marker has yet been described that would distinguish European R1a chromosomes from Asian. In collaboration with a large number of scientists from India and abroad, the frequency and haplotype diversity were estimated for more than 2000 R1a chromosomes assessed for several newly discovered SNP markers that introduce the onset of informative R1a subdivisions by geography. Primary frequency and diversity distribution correlates well with some of the major Central and East European river basins where settled farming was established before its spread further eastward.

Partha P. Majumder

Statistical Genomics

The focus of these studies is to critically analyze existing statistical methodologies and to develop new methodologies for human genetics, especially for gene-mapping, genotype-environment interactions and human evolution.

Statistical Methods for Analysis of Complex Traits

Some novel statistical methods have been developed for linkage and association analyses of complex genetic traits. These include,

Analytic and empirical comparison of population-based case-control studies and the family-based TDT.

Evaluation of effects of population stratification on association analyses of population-based quantitative trait data

Developing a regression-based method for linkage mapping of multivariate phenotypes.

Sourav Ghosh

Developing a kernel based multi-locus association method using genotypic similarity among individuals in the context of case-control association study

Developing a test for joint effect of two loci in a case-control association study

Indranil Mukhopadhyay

Social Sciences Division

Economic Research Unit

Increasing Returns, Non-Traded Goods and Wage Inequality

This work focuses on the role of non-traded goods in generating symmetric movements in skilled to unskilled wage ratio in a model of trade. Consumers have quasi-linear utilities and the traded good is produced under increasing returns to scale in a monopolistically competitive market structure. Alternative labour market regimes are considered. First, where the supply of skilled and unskilled labour is inelastically given; this case starkly brings out the fact that trade can, through a very natural route, raise wage inequality in both the trading countries. Second, in the case where unskilled labour is tied down to unskilled job but skilled labour can potentially be employed in both the skilled and unskilled jobs, besides holding the possibility of generating symmetric increase in skill premium in both the trading countries also demonstrates that trade can help increase utilization of under utilized skilled labour; a result very much in the spirit of Myint's "vent for surplus". Third, introducing the possibility of accumulating skill by incurring a cost, the labour market regime once again shows that skilled to unskilled wage ratio can increase in both the trading countries, alongside that, trade leads to higher skill acquisition.

Brati Sankar Chakraborty and Abhirup Sarkar

Reduced Form Polarization Indices

An abbreviated or reduced-form monotonic polarization index is an increasing function of the between-group term and a decreasing function of the within-group term of a population subgroup decomposable inequality index. The between-group term represents the 'identification' component of polarization and the within-group term can be regarded as an inverse indicator of the 'alienation' component of polarization. An ordering for ranking alternative distributions of income using such polarizations indices has been developed. Several polarization indices of the said type have been characterized using intuitively reasonable axioms. Finally, the dual problem of retrieving the inequality index from the specified form of a polarization index is also considered.

Satya R. Chakravarty and Bhargav Maharaj

Measuring Ethnic Polarization

An ethnic polarization index is a summary statistic of ethnic diversity in a population. Reynal-Querol suggested an index of ethnic polarization, the *RQ* index, and discussed its properties. In this study some axiomatic characterizations of the *RQ* index using axioms taken mostly from the earlier literature is developed. A generalized form of the *RQ* index is also characterized. An attractive feature of the characterizations is independence of axioms employed in each characterization.

Satya R. Chakravarty and Bhargav Maharaj

Stochastic Dominance on Unidimensional Grids: Theory and Applications

The objective of this study is to derive some integer-majorization results for variable-sum comparisons. An axiomatic framework to establish equivalence between several intuitively reasonable conditions is employed. Relationship with existing results along this line is clearly demonstrated. The developed results are shown to have a wide range of applications.

Satya R. Chakravarty and Claudio Zoli

Measuring Financial Inclusion: An Axiomatic Approach

It is clearly demonstrated that the axiomatic measurement approach developed in the human development literature can be usefully applied to the measurement of banking financial inclusion. A

conceptual framework for aggregating data on financial services in different dimensions is developed. The suggested index of financial inclusion allows calculation of percentage contributions made by different dimensions to the overall level of inclusion. This in turn enables a policy-maker to identify the dimensions of inclusion that are more/less susceptible to overall inclusion and hence to isolate the dimensions that deserve attention from a policy perspective. The study also illustrates the financial inclusion index using both cross-country data as well as state-level data from India. It highlights the diverse patterns of financial inclusion across geographical regions and attempts to identify the lagging dimension in each region.

Satya R. Chakravarty and Rupayan Pal

An Axiomatic Approach to the Measurement of Poverty Reduction Failure

A poverty reduction failure index is a measure of the extent of inability of a society to reduce its poverty level. This study characterizes a family of poverty reduction failure indices using an axiomatic structure. An ordering for ranking income distributions in terms of poverty reduction failures is also developed. The ordering can be easily implemented using the generalized Lorenz or the Three I's of poverty (TIP) curve dominance criterion.

Satya R. Chakravarty and Conchita D'Ambrosio

Agricultural Economics

Investigations have been made on problems related to agricultural economics, such as, crop diversification, labour use efficiency and employment segregation in rural India.

Manabendu Chattopadhyay

Is the Relative Risk Aversion Parameter Constant Over Time? A Multi-Country Study

This paper develops an information matrix (IM)-based test for testing the hypothesis of constant relative risk aversion parameter in the GARCH-M set up. A detailed Monte Carlo study is then carried out to evaluate the performance of this test in terms of size and power. Further, a bootstrap technique is suggested to correct the over-size problem found in small samples. The proposed test is then applied to the time series of returns on stock markets of five important countries to examine whether this important hypothesis holds or not. It is found that the relative risk aversion parameter is not time invariant for all the five data sets.

Samarjit Das and Nityananda Sarkar

Regional Convergence of Growth, Inequality and Poverty in India-An Empirical Study

The study attempts to examine whether there is regional convergence of consumption growth, inequality and poverty across various states in India. Using panel unit root tests that are robust to cross-sectional dependence, we find that inequality and poverty indicators converge across both rural and urban level. Consumption growth also converges at urban level but not at rural level. Based on factor analysis, we find two groups of states for rural sectors, *viz.*, low growth and high growth states, and that consumption growth converges within each group separately. An attempt has also been made to identify the responsible entities for such divergence-- central or state governments or both.

Samarjit Das, Gouranga Sinha and Tushar K Mitra

Testing for Absolute Convergence: A Panel Data Approach

Recently, new testing procedures for the convergence hypothesis using panel data have been developed. A convergence process is assumed to occur when deviations of a process (say, the per capita GDP) from the cross sectional average approach individual constant values as time approaches infinity. If all these values are zeroes, the convergence process is said absolute (convergence in levels). If at least one of these values is different from zero, the convergence process is said to be

conditional one. A new test has been developed for testing the null hypothesis of absolute convergence against the alternative hypothesis of conditional convergence. The proposed test is robust to cross-sectional dependence. A detailed simulation study has been conducted to examine its performance.

Samarjit Das and Manisha Chakrabarty

Free Licensing to a Rival in a Homogeneous Good Duopoly

It is common that a firm holding a superior technology transfers its production knowledge to a firm holding an inferior or no technology, because such a transfer can be mutually profitable. Can there be a technology transfer agreement between two firms, which compete in the same product market? The existing literature shows that such a transfer can be possible when the efficiency effect dominates the competitive effect. In such a situation the transferee can fully compensate the loss of payoff of the transferor by means of payments in the form of fixed fee and/or royalty. Then the question is: Can free licensing of technology to a rival be profitable? The present paper discusses this question in a scenario where the licensor derives profits from product market competition and input sale to the licensee.

Tarun Kabiraj

Analysis of Poverty

Proper assessment of regional disparities in the levels of economic well-being is essential for designing welfare measures and for prioritization of policy measures with a view to lowering the disparities. For this, one needs to identify the sources and characteristics affecting economic well-being (deprivation). The incidence of poverty is related to various socio economic indicators using the World Bank methodology and the disparity in poverty estimates (in particular, the Head Count Ratio (HCR) or FGT0) between rural North Bengal and South Bengal is studied. The difference between the poverty estimates is then decomposed into a *characteristics effect*, showing the effect of the regional characteristics and a *coefficients effect*, showing the effects of the differential impact of the characteristics over the regions using the Oaxaca decomposition method.

Amita Majumder and Somnath Chattopadhyay

The present study estimates an earnings/income frontier using the parametric stochastic frontier approach. The earnings frontier (potential earnings) describes the highest potential income associated with a given stock of *human capital* and *endowment*. Individuals who translate their potential earnings into actual earnings enjoy a fully efficient position. In contrast, individuals who earn less than their potential earnings are suffering from some kind of *earnings inefficiency*. The measure of *inefficiency* obtained thus would give a measure of '*inadequacy of command over resources*'. The fact that some individuals are located below the frontier gives rise to a series of questions in the context of poverty: For what proportion of the population does the frontier lie below poverty line? Are the skills, endowments and social opportunities qualitatively different for those who are *efficient* and those who are *inefficient*? Answers to these questions have important policy implications, as it would help assess the performance/applicability of various poverty alleviation programmes. Splitting the sample into an *efficient* and *inefficient* part based on the estimated frontier, the status of poverty in the two groups has been studied in light of the questions posed using the Oaxaca decomposition of the poverty gap.

Amita Majumder and Somnath Chattopadhyay

Performances of Asia-Pacific Countries – 1975-2005: A New approach

Asian and Pacific countries are rapidly emerging as engines of global growth. In 2006, the 7.9 percent increase in the size of the region's developing economies represented one third of worldwide growth. Developing economies in the Asia-Pacific region grew at 7.9%, up from 7.6% in 2005. The region's impressive economic performance was against the backdrop of a present worldwide depression. In this context, it is of highly significant to observe whether the countries of the region are also improving in other aspects of human life, such as, social and environmental aspects. This study attempts to obtain the socio-economic-environmental performances of the fifteen major countries of the Asia-

Pacific region over the last three decades: 1975 to 2005. The countries are: Bangladesh, China, Hong Kong, India, Indonesia, Lao PDR, Malaysia, Nepal, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand. This study proposes a new composite index comprising of economic, social and environmental variables and use the new index "Index of Performance" (IP) for measuring the performances of the countries. Related important questions are whether inequalities among the countries of the region are increasing or decreasing; whether the countries are converging or diverging; whether pair wise distances between the countries are increasing or decreasing over time; which country is most close to an 'ideal point'.

Krishna Mazumdar

Life Expectancy at Birth: Proposed Measure for Human Well-being

Human well being is the center of all human activities. Associated with this is the issue of measurement of human well being. This study proposes to measure human well being in terms of achievement in life expectancy at birth. . The reason behind is that, people expected to be most happy with added years of life - each and every people in each and every society in all time all over the world aspires for longer life. In fact, increase in life expectancy is an important manifestation of improvement in human well being. More over, life expectancy is associated with many other indicators representing human well-being. Therefore, it is worthy to obtain what are the major factors that determine the life expectancy of the people of a country. In this context, the study formulates a simultaneous equations model. Data for 2005 are used to estimate the model. Ultimately, relevant policies for improvement in life expectancies have been suggested.

Krishna Mazumdar

Life Expectancy at Birth Half Century: Changes, Causes and Consequences

Over the last fifty-sixty years life expectancy at birth has increased beyond expectation in most of the countries. This is a major achievement of mankind in the last century. The study attempts to find absolute and relative changes in life expectancy over the last half century (1960 to 2009) for the countries, for which time-series data is available. In this respect regional variations have been taken into account. It has been observed that there exist stark differences among countries in the level and rate of achievements in life expectancy. Also it has been found that there are inter-regional variations. This study further tries to find the causes behind the levels and rates of achievements of different countries as well as different regions.

Krishna Mazumdar

Achievements in Education: A Cross-Country Analysis

Recently, the social sector has drawn attentions of the academicians, economists, policy makers and the political leaders. In fact, it has been observed that up liftment in the social sector leads to the growth in the economic sector. Education is a major part of the social sector. This study formulates educational indices for more than 100 countries of the world. The components of this index are: adult literacy rate, net primary enrollment ratio, net secondary enrolment ratio, net tertiary enrollment ratio, people teacher ratio in the primary education, people teacher ratio in the secondary education etc. The study further attempts to test the hypothesis, whether level of educational attainment of a country, as measured by the educational index, has any impact on (i) per capita income of the country, (ii) growth rate of per capita income, (iii) inequality, (iv) life expectancy, (v) female life expectancy, (vi) infant survival rate, (vii) under weight birth, (viii) baby immunization, (ix) access to sanitation, (x) access to potable water, (xi) CO_2 emission, (xiii) withdrawal of fresh water, (xiv) deforestation etc. It also attempts to see whether there are differences among countries belonging to different development levels and among countries belonging to different regions.

Krishna Mazumdar

Bertrand versus Cournot in the presence of public firms and endogenous privatization.

The classic comparison between Bertrand and Cournot outcomes in a mixed market with private and public firms is revisited. The results are strikingly different and often opposite to the ones obtained from a similar comparison in the standard setting with all profit maximizing firms.

Manipushpak Mitra and Arghya Ghosh

Group strategyproofness in queueing models.

A natural and intuitive class of mechanisms called the k-pivotal mechanisms are identified and characterized. The axioms used are efficiency, pairwise strategyproofness, equal treatment of equals and weak linearity. Also the sub-class of these mechanisms, which do not run a budget deficit at all profiles and the mechanism which runs the least budget surplus, are identified. It is also shown that while k-pivotal mechanisms are also weak group strategyproof, strong group strategyproofness and efficiency are incompatible.

Manipushpak Mitra and Suresh Mutuswami

Incentives in Symmetrically Excludable Public Goods Problems.

The symmetric class of public goods problems with exclusion possibilities where first best is achievable is characterized. First best means that efficient public decisions can be attained by means of balanced transfers. It is shown that FB implementability is possible if and only if "full excludability" is permitted, that is, the public good acquires the characteristic of a private good.

Manipushpak Mitra and Arunava Sen

No Envy in its consequences in the Queueing Problem.

The complete class of no envy allocations for the queueing model is characterized. This is an interesting class to analyze as it includes allocations that are immune to individual manipulation (strategyproof) as well as allocations that are immune to group manipulation (weak group strategyproof). Among the class of no envy allocation rules with linear transfers the complete class of strategyproof and pairwise strategyproof allocations are characterized. It is also shown that no envy is incompatible with egalitarian equivalence.

Manipushpak Mitra, Youngsub Chun and Suresh Mutuswami

Efficient access pricing and endogenous market structure.

How regulatory mechanisms influence the nature of competition in a network industry is investigated. In the downstream segment of the market, the seller of a differentiated retail product competes with an incumbent firm. The incumbent firm is also the owner of the essential input. The regulator cannot observe the costs of the entrant, and to maximize social welfare designs the retail prices and the access charge that the entrant pays to the incumbent. The optimal access charge is a uniform price that respects the criteria of transparency and non-discrimination that are imposed by the competition and regulation directives in most of the countries. New formulas for retail and access prices adhering to the Ramsey rule are derived. Since the competing firm takes the decision to enter following the choice of the regulatory regime, the nature of the retail market competition is endogenous. It can either be served by both the firms, or can have the incumbent as the monopoly supplier of the retail good.

Manipushpak Mitra, Kaniska Dam and Axel Gautier

On that Old Rivalry: Bertrand versus Cournot

The classic comparison between Bertrand and Cournot outcomes in a symmetric differentiated oligopoly where each firm maximizes a weighted average of its own profit and welfare is considered in this study. For general utility functions, the standard Bertrand-Cournot rankings are reversed for all

variables---prices, quantities, profits, consumer surplus, and welfare, provided the weight on profit is strictly less than a threshold value. Surprisingly, it is found that the threshold can be arbitrarily close to unity for two widely used utility specifications, quadratic and CES. The threshold weight increases as the degree of substitutability declines. In addition, for CES, the threshold (i) increases as the number of firms increases and (ii) irrespective of the degree of substitutability, tends to unity as the number of firms approaches infinity.

Manipushpak Mitra and Arghya Ghosh

Privatization in open economies

A differentiated oligopoly market is considered where a domestic public firm competes with foreign firm(s). Under fairly general demand and constant marginal costs, it is shown that partial privatization of the public firm improves welfare by cutting down public sector losses. Surprisingly, even at the optimal level of privatization the public firm's price lies strictly below marginal cost and it makes losses. In the long run, with free entry of foreign firms, partial privatization improves welfare through an additional channel: more foreign varieties. However, in the long run, under optimal privatization, below-cost pricing does not occur and the public firm earns positive profits.

Manipushpak Mitra, Bibhas Saha and Arghya Ghosh

Micro Credit in Potato Market

One of the most important channels of growth, security and upward mobility for the poor in LDCs is diversification of agriculture into high-value cash crops. Barriers to this include limited access to credit, insurance, technology and marketing channels. Poor farmers typically rely on middlemen traders for all of these, through interlinked credit-cum-insurance-cum-input provision-cum-marketing contracts. These middlemen often represent the most important link between the poor in rural areas, and the external world. The farmers often are unable to provide appropriate documentation due to weak land records. Neither they are able to put forward collaterals. The advantage including subsidy thus flows to the large who have some control over the system. Long-term relationships, personal knowledge and social connections cement the link between middlemen and poor farmers. In these circumstances it is hard for external agencies (governments, NGOs, private banks etc.) to compete effectively with local traders in offering key inputs and marketing support to farmers. Formal credit programs have typically been afflicted by low repayment rates, the result of weak information and sanctions available to external organizations relative to local traders. This enables traders to earn high middlemen margins, as a return to their monopoly over information and sanctioning ability *vis-à-vis* their traditional clientele. In West Bengal, India, where we are conducting ongoing studies of potato farming, traders charge annual interest rates of 50% and above, over-price seeds they provide, and under-price potatoes they buy from the farmers and resell on wholesale markets outside the village. Most of the farmers grow potato in the expectation of high gain within shortest period of time. The credit requirement for the cultivation is quite significant. It is, therefore, relevant to study the thriving credit market for potato cultivation. In recent years, microcredit has emerged as a viable solution to the above-mentioned problem of low repayment by poor borrowers. Microcredit programs creatively use local information and social capital within local communities, and have managed to create substantial clienteles. Yet rigorous experimental evaluations of their effects, which have only recently become available indicate rather modest effects on entrepreneurship, business growth or living standards among the poor. In a rural context, their effectiveness is further limited by their very nature: being limited to groups of women borrowers, with frequent repayment frequencies, these loans are typically used for non-agricultural purposes. It is doubtful whether they will materially advance poor farmers' prospects of diversification into cash crops (though this, too, needs to be studied carefully). One of the standard criticism of the usual MF is that they have stringent guideline of repayment and high rate of interest. This questions the appropriateness of such a mechanism in agriculture where returns flow after the crop is harvested. There is thus a room for tailor made MF relevant for agriculture.

Sandip Mitra, Dilip Mookherjee and Pushkar Maitra

Microfinance Beyond Group Lending: An Experimental Approach

Group lending, where individuals receive loans as long as they are a part of a group with the group as a whole being responsible for repayment (joint liability) has long been used by many NGOs and microfinance institutions around the world to provide credit to the poor. In recent years there is a move back to individual lending. The important question then is: how does one solve the problems of moral hazard and adverse selection when making individual loans? This project uses economic experiments to design and analyse innovative alternative lending contracts that can address issues of informational asymmetry. In this study a new and innovative methodology is used to design and analyse alternative lending contracts. Clearly there are a large number of possible alternatives. However in this project, three mechanisms have been focused on. 1.A bilateral contracting model with dynamic incentives; 2. An agent based credit delivery model; 3. Enforcement in Self-help groups. While the first two mechanisms provide loans to individuals (there are no group lending elements here), the third is based on the group lending model, but adds to the basic group lending. Each of these treatments will be compared to the benchmark of a standard group lending model with joint liability and peer monitoring. Economic experiments both based in the laboratory and in the field will be used to examine this issue. Gaining an understanding of how programmes work in practice is necessary for developing innovations that can help achieve the full promise of microfinance. There are few systematic attempts to sort out the different models. The best test would involve a single lender who employs a range of contracts. But in practice most micro lenders use just one main type of contract, leaving little variation with which to identify impacts. The best evidence would come from well-designed, deliberate experiments in which loan contracts are varied but everything else is kept the same. This is precisely the goal of this project.

Sandip Mitra, Pushkar Mitra, Dilip Mookherjee and Sujata Visaria

Interlinked Contracts, Multi-tiered hierarchies and Credit Policy in Developing Countries: Theory and Evidence

Small farmers account for a large part of the total agricultural production in developing countries around the world, but benefit little from agricultural diversification and export growth in these countries. These farmers are forced to rely on informal moneylenders for credit at rates substantially above market rates, and to sell their produce to local traders at prices substantially below market prices. The primary aim of this project is to understand the nature and implications of such contractual relations between farmers and intermediaries (referred to as hierarchical contracting nexuses) and on the design of policies that can reduce the vulnerability of small farmers arising from such contracts Small farmers account for a large part of the total agricultural production in developing countries around the world. Yet only a limited fraction of the benefits of agricultural diversification (from subsistence to cash-crops) and export growth in these countries trickle down to small farmers. An important reason for this is the exclusion of these farmers from direct participation in organized credit and marketing channels of the economy. Owing to lack of access to formal credit and information, these farmers are forced to rely on informal moneylenders for credit at rates substantially above market rates, and to sell their produce to local traders at prices substantially below market prices. The primary aim of this study is to understand the nature and implications of such contractual relations between farmers and intermediaries (referred to as hierarchical contracting nexuses) and on the design of policies that can reduce the vulnerability of small farmers arising from such contracts.

Sandip Mitra, Motta Alberto, Dilip Mookherjee **and** Pushkar Maitra

Burden of anemia and its socioeconomic determinants among adolescent girls in India

Anemia is still one of India's major public health problems, especially among adolescent girls. This study investigates the severity and distribution of anemia among Indian adolescent girls aged 10 to 19 years and its association with socioeconomic and socio demographic factors.

The study used data from the District Level Household Survey, round II, 2002–04, conducted under the reproductive and Child Health Project. Data were collected on hemoglobin along with

socioeconomic and socio demographic factors of the households. The survey covered rural and urban areas of 35 states or union territories. Data from 177,670 adolescent girls were analyzed.

The highest prevalence of anemia (99.9%) was observed in Jharkhand in eastern India. The prevalence in the northeastern states was relatively low. The highest prevalence rates were observed among older girls (15 to 19 years), illiterate girls living in rural areas, girls in illiterate households, girls from households with a low standard of living, non-Christian girls, girls from Scheduled Tribes, girls living in west India, and married girls. The highest percentages of girls with normal hemoglobin were reported among Christian Scheduled Tribes (39.4%) and among girls in northeastern India (40.1%). Analysis by binary ordered logistic regression showed that anemia status did not depend on urban or rural residence or on age.

It was noted that enhancement of the economic status of families, especially poor families, is a prerequisite to the amelioration of anemia among adolescent girls. The level of education of the girls is also a major factor.

Manoranjan Pal, Premananda Bharati, Suparna Shome, Suman Chakrabarty and Susmita Bharati

Growth and Nutritional Status of Pre-School Children in India: Rural-Urban and Gender Differences

This cross-sectional study of growth and nutritional status makes an attempt to find the gender and rural-urban differences among Indian preschool children. This study is based on the data of weight and height of children aged 0–35 months taken from 26 States (total 26,369 children; 13784 boys and 12585 girls). The children are found to be lighter and shorter compared to International standards irrespective of age and sex. Boys are heavier and taller than girls. Urban preschool children are heavier and taller compared to rural counterparts. In the urban area, higher percentages of girls are affected by underweight (37.1%) and stunting (35.0%) than boys. In rural areas, the prevalence of underweight is also higher among girls (47.9%) compared to boys (45.7%), which is found to be much significant ($p < 0.01$). There is a significant rural-urban as well as gender difference in growth and nutritional status of Indian preschool children.

Manoranjan Pal, Premananda Bharati, Susmita Bharati, Suman Chakrabarty, Suparna Som and Ranjan Gupta

On Some Measures of Gender Discrimination

This study proposes some measures of gender discrimination that can be derived from the existing measures of inequality by decomposing these measures into within and between male and female population groups and then giving equal weights to male and female population.

Manoranjan Pal

Socio-economic determinants of underweight children in West Bengal, India: A District Wise Analysis

In order to understand under nutrition at district level along with socio-economic influence, an attempt has been made here to study the socio-economic determinants and the district-wise prevalence of underweight children of age 0-71 months in West Bengal. The data have been accessed from the Reproductive and Child Health Survey (RCHS-II) conducted in 2002-03 which contains information on 7550 children and their parents. Information on socio-economic variables of the associated families of these children has also been taken for our study. This study computes weight- for- age z- scores to assess the nutritional status of the children using WHO (2006) reference. The prevalence of underweight is seen to vary over the districts. Districts with very high prevalence of underweight children are Murshidabad, Burdwan, Purulia, Medinipur, Howrah and South 24 Parganas. High prevalent districts for both the boys and girls are Jalpaiguri and Coochbihar. Low prevalent districts for both boys and girls are South Dinajpur, Nadia and Kolkata. The percentage of underweight children are found to be more in rural areas, among Muslim families, with illiterate parents and belonging to

families with low standard of living. In Murshidabad, Bankura, Nadia, Medinipur and South 24 Parganas districts, that is, where prevalence of underweight children are more, the rural and urban differences are less. The characteristics like religion, parent's educational status and standard of living index show a significant effect on the children's weights. Public intervention programs on the parent's education and the standard of living of the households at district level should be given high priority to combat the children's undernutrition problems so far as weight for age is concerned.

Manoranjan Pal, Suman Chakrabarty, Susmita Bharati, Premananda Bharati and Suparna Shome

Financial Econometrics

Empirical determination and forecast ability of major economic and financial variables like foreign exchange rate, stock market index and inflation, are very important for any economy, especially for emerging economies like that of India. Keeping this in mind, empirical research has been carried out on the following topics by applying modern techniques of time series econometrics. In this, due consideration has been given to important data characteristics like volatility and multiple structural breaks.

(i) Forecasting volatility of Indian stock market based on different volatility models.
(ii) Improved forecasts combining forecasts based on several models.
(iii) Forecasting based on SETAR, SETAR-GARCH and double threshold GARCH models for foreign exchange rate as well as for stock return.
(iv) Smooth transition autoregressive model and the Markov switching regression model for exchange rate return.

The empirical exercises done on the topics mentioned above throw some light on the nature of volatility in the financial variables concerned, the extent of scope of improvements in the forecast values and also the extent to which these nonlinear models are able to capture volatility, persistence and regime shifts inherent in the financial variables of an emerging/developing country like India.

Works are also being done on modeling India's inflation as well as the uncertainty in inflation. In this, different filters are being used along with consideration to breaks to estimate output gap etc. The usefulness of different hybrid models on inflation is being studied in the Indian context. Research is also being done to find some kind of a unified approach in modeling and forecasting inflation.

Nityananda Sarkar

Project: Survey of Present Status of Model Steel Villages (MSVs) - evaluation and monitoring

A report on the project was submitted to the funding authority focusing the need for more income generating schemes, along with infrastructural development and awareness generating programme, keeping in mind the traditional skills and the market in question. It is intimated that in line with the said survey report, Durgapur Steel Plant (DSP) has already taken up the proposal for awareness building programme at the model steel villages (MSVs). After complete initiation of schemes ISI will evaluate the impact of these schemes through a survey to be conducted in the MSVs.

Snigdha Chakrabarti, A. K. Adhikari, B. Roy, S. Bandopadhyay, P. Sarkar, K. Chattopadhyay, S. Das and S. Mitra

ISI-ERU & SINP-CAMCS Collaboration: the Kolkata Paise Restaurant problem and resource utilization

The Kolkata Paise Restaurant (KPR) problem which is an infinitely repeated game with N agents (restaurants) has been introduced. Though the restaurants charge the same price for providing dinner, agents have a strict preference ranking over these N restaurants, which is identical for all agents. A sub-class of the KPR problem is identified for which the stage game has the property that the set of pure strategy Nash equilibrium coincides with the socially efficient allocations (allocations leading to a one-to-one mapping between agents and restaurants). Therefore, as long as the set of agents is small

and agents are rational, one can sustain any socially efficient allocation as an equilibrium outcome of this sub-class of KPR problem. However, if N is large and if agents cannot expect the other agents to be rational then we argue that the KPR problem is intrinsically dynamic. The statistics for the utilization fraction under different `simple' stochastic strategies is analyzed and the daily fluctuation in the underutilization is found to be Gaussian for the strategies considered here. In terms of strategic and the associated utilization fraction the main findings are (a) with no learning, the utilization fraction on an average is higher in comparison to some `limited' learning and (b) the statistics for utilization fraction can improve with a strategy where each agent, after getting dinner from a restaurant in period t, goes back to the same restaurant in period $(t+1)$ (ignoring the ranking of the restaurants).

Manipushpak Mitra, Anindya Sundar Chakrabarti, Bikas K. Chakrabarti and *Arnab Chatterjee*

Impact of Economic Reform on Tribal Poverty

The project has been sponsored by NABARD, Mumbai and started from January this year. During this period, the structured schedules to be canvassed among 1000 households have been prepared. Since our fields will cover three states (viz, Jharkhand, Orissa and West Bengal), the questionnaires were translated into Hindi and Oriya languages apart from Bengali.

The Principal Investigator has visited Berhampur University, Orissa, Divyan Krishi Vigyan Kendra of Ramakrishna Mission, Ranchi, Jharkhand; Vivekananda Vikash Kendra, Bagmundi Purulia and four blocks of Jalpaiguri district, West Bengal. The Principal Investigator also met more than 30 resource persons including Mr B. D. Mina (I.A.S.), Principal Secretary, Ministry of Backward Community, Govt. of W.B. and different B.D.Os for various logistic support. The local investigators have been selected for all the study areas of three states. Field surveys have been started in the districts of Purulia, Jalpaiguri of W.B., and Dumka and Jamtara of Jharkhand. Household survey in Koraput district of Orissa will begin as soon as the general Loksabha elections are over there.

Kunal Chattopadhyay, Chiranjib Neogi and Snigdha Chakrabarti

Development of Methodology Towards Measurement of Poverty

Ministry of Statistics and Programme Implementation (MoS&PI) requested Indian Statistical Institute to take up a research project on development of a statistical methodology towards measurement of poverty This is in view of the fact that the norm of 2400 Kcal for rural India and 2100 Kcal for urban India for calculation of poverty line was prescribed sometime in the beginning of seventies. It is desirable to know whether these norms still hold good as of now as the consumption pattern as well as the quantum of daily energy requirement might have undergone changes during the last 35 years. Accordingly the director of Indian Statistical Institute (ISI) entrusted the charge to Professor Manoranjan Pal, who prepared a project proposal and getting approval from the ministry started the project work in April 2006.

Some of the findings and recommendations of the project are given below:

Calorie norms supplied by the Task Force, Expert Group, ICMR and FAO are used. It suffices to compare only ICMR and FAO estimates.

The calorie poverty rates by direct method are always higher than the fixed calorie line method. Urban poverties are found to be more than corresponding rural poverties when activity levels of adults are not considered. Calorie poverty rates show an increasing trend whichever method is used except for urban sector during 50^{th} and 55^{th} rounds of NSS.

The Poverty Rates using both linear and quadratic methods of regression of DPCI on MPCE for each class interval give almost same result.

Two entirely new methods have been proposed in this report – Calorie Decomposition Method and the Error Distribution Method. Poverty Rates found by both the methods are higher than expected. Some modifications of the error decomposition method have also been proposed.

Regrouping the NCO-1968 codes according to the activity status and calculating the poverty rates by direct method improved the estimates to some extent.
Most of the south Indian states show very high values of the poverty rates. Also these values are relatively higher than those states known to be the poorest states in India. For example Bihar has the rural poverty rate as 0.55, whereas the states like Karnataka and Tamilnadu have poverty rates higher than 0.80.

Manoranjan Pal

Economic Analysis Unit, Bangalore

The Economic Analysis Unit (EAU) is engaged in research in quantitative methods in economics and social sciences. Application of these methods to different problems in agriculture, industry and monetary economics is actively pursued. Topics for the current research include estimating the effects of the economic reforms, developing economy-wide models using VAR and VEC methodologies and simulations for estimating production, savings and commodity-wise consumptions in India for the 11th Five year plan period.

Linguistic Research Unit

During the period April 2009 - March 2010, the Linguistic Research Unit of the Institute continued with its research programmes in the areas of Cognitive Linguistics, Corpus Linguistics and Language Technology, Sociolinguistics and Clinical Linguistics along with relevant micro-linguistic studies.

Cognitive Linguistics

The unit has initiated the substantivist study of conceptual networks on the basis of Whole Word Morphology. Earlier work has demonstrated a connection between this inquiry and the linguistics of lexicophrasal difficulty. The unit now has initiated research in conceptualization kernel studies.

Probal Dasgupta

Corpus Linguistics and Language Technology

The unit is developing a corpus-based digital lexicon for modern Bengali; designing a model for Computer Assisted Language Teaching (CALT), developing domain-specific parallel corpora between Hindi and Bengali, and developing strategies for Computational Lexicography for the Indian languages. So far it has developed a model for corpus-based dialectology, worked out a strategy for usage-based grammar in Bengali; and defined the rules for POS-tagging of words in digital language databases. Recently, it has successfully explored the area of Bengali script for the purpose of text-to-speech conversion, language teaching, language cognition, and machine learning. It has started working for developing an English-Bengali dictionary of idiomatic expressions, set phrases, and lexical collocation for machine learning; and developing digital lexical databases for basic as well as graded vocabularies for designing Computer-Assisted Language Teaching materials.

Niladri Sekhar Dash

Clinical Linguistics

The unit conducted important global assessments on children suffering from various neurolinguistic disorders while carrying out its speech therapy programme. These language and cognitive assessments included Boston Diagnostic Aphasia Examination, Boston Naming Test and Rey

Auditory-Verbal Learning Test. The process of redefining the speech language pathology nexus revealed that a habilitation program for children suffering from language impairment (L1) calls for thorough up-gradation of present assessment tools. The homogenized therapeutic aroach is one such methodology that has been adopted in the upgraded database, generated from detailed analysis of the developmental status of speech sounds of various Indian languages.

Shubhasree Ganguly

Sociolinguistics

The unit has taken up studies in linguistic (lexical and syntactic) difficulty. The sociolinguistic dimension of linguistic difficulty has been studied within single languages, in relation to the maing between the full conceptualization system and its basic level kernel, and across languages in the Indian context. Here the important target of study has been the place of English in the sociolinguistic fabric of India.

Probal Dasgupta

Cognitive Linguistics

The unit has initiated the substantivist study of conceptual networks on the basis of *Whole Word Morphology*. Earlier work has demonstrated a connection between this inquiry and the linguistics of lexicophrasal difficulty. The unit now has initiated research in conceptualization kernel studies.

Probal Dasgupta

Planning Unit, Delhi

Planning unit currently has 6 Senior Research Fellows and12 Junior Research Fellows. A number of PhD and MSQE courses in microeconomic theory, game theory, statistics and probability, panel data econometrics, mathematical economics, development economics and international trade are taught by members of the unit. The faculty of the unit has, as in the past, continued to work on the cutting edge of economics research, both in theory, as well as empirical analysis. Moreover, much of the research conducted by the unit has relevance for India in particular, and LDCs in general. Bargaining theory has been used to analyze multi-person bargaining with potential applications to the land acquisition problem, an issue of obvious topical interest to India. Theory has also been harnessed to analyze the appropriate role of NGO intervention in micro-finance, with possible direct implications for the SHG-linkage approach to micro-finance being followed in India. Other issues of theoretical interest analyzed by the faculty include, cost allocation in minimum cost arborescence problem, cooperative games with limited communication and multidimensional mechanism design for public goods. In keeping with the award of the Noble prize in Economics to trade theory, issues like trade policy and polarization in labor markets, diversity and break-ups have also been investigated. Issues affecting the Indian growth performance, as well as the bio-technology and cotton input market in India has also attracted attention. Social capital and collective action in the Himalayas, payments for ecosystem services in Kerala/Tamil Nadu, agricultural fires and air pollution in India have also attracted attention. Measurement of economic burden of households suffering from cancer, firm investment with imperfect capital markets, public investment, the effect of national rural guarantee scheme, are some of the other issues examined.

Here is a more detailed break-down of research interests:

Trade Policy and Labour Markets

Satya P. Das

Indian economic growth and business cycle fluctuations

Of the four projects related to the above topic, the first one utilizes new econometric techniques to address the issue of Indian economic turnaround; the second project is on unbalanced growth in India;

the third project deals with tax policy and educational investments in primary and secondary education in India and the fourth is part of a larger project to develop and estimate a new Keynesian DSGE model for India.

Chetan Ghate

Endogenous information opacity in moral hazard environments with contracting, public goods environments with decentralized contributions and endogenous selection

Priyodorshi Banerjee

Economics of Food Labelling, Impact of Food Subsidies

Bharat Ramaswami

Cost sharing in networks, Multidimensional mechanism and auction design and aggregation of preferences

Debasis Mishra

Public-private Partnerships in Micro-finance; Bertrand Competition with Non-rigid Capacity Constraints, Mixed Oligopoly with Distortions; Financial Intermediation and Employment; Firm Size and Pricing Policy, Joint Venture Instability and Monitoring

Prabal Roy Chowdhury

Migration in Palanpur (with Himanshu, Peter Lanjouw and Nicholas Stern); **Heterogeneity in Urban India** (with S. Chandrasekhar); **Effect of HIV- AIDS on Labour Supply: Case of India** (with T. Ray and M. Thomas); **Duration of Indian Imports** (with N. Patel); **Effects of a National Rural Employment Guarantee Scheme on Intra-Household Labour Allocation** (with N. Gravel and Himanshu); **Longitudinal Study of Cancer Patients** (with B.K. Mohanty and IRCH team at AIIMS)

Abhiroop Mukhopadhyay

Environmental and Natural Resource Economics Payments for Ecosystem services in the Western Ghats

E.Somanathan

Integrating Mental Health in Welfare Evaluation; Negative Reality of the HIV Positives: Evaluating Welfare Loss in a Low Prevalence Country; Income Inequality, Spatial Distribution and Welfare of Poor; Regional Inequality, Location Choice and Product Quality; Uncertainty, Arbitrage and Industry Location.

Tridip Ray

Mechanism Design with reference to Voting and Auctions, Decision Theory

Arunava Sen

Population Studies Unit

Estimating population numbers required annually for Unique Identity Cards in India

Indian has launched a massive project on biometric cards, which is expected to be useful for residents in several ways, from obtaining driving license to passports etc. Several deterministic approaches are being developed in estimating annual requirements of new cards for the governments. How do we account for missing population so that a unique identity is provided is investigated.

Arni S.R. Srinivasa Rao

Research Activities

Large undercount

In census leads to great problems in planning and growth of every country. Work is in progress on this very untouched area for coverage error estimation in Indian Census. Using Post Enumeration Survey (PES) attempts are being made to give some robust coverage error estimates through probabilistic model.

Arni S.R. Srinivasa Rao

Bayesian Analysis in Mortality

Bayesian analysis is performed on the child mortality data obtained from three round of National Family Health Surveys (1992-93, 1998-99 and 2005-06). Posterior probabilities of child mortality are computed by taking mother's education as an independent variable.

Reetabrata Bhattacharya and Arni S.R. Srinivasa Rao

Mathematical Models in transmission dynamics of emerging infectious diseases

This is one of the major activities in the Unit. Lotka-Voltera type of models were constructed to understand Swine flu in India, which will be used by public health policy makers in the Country.

Arni S.R. Srinivasa Rao

Diffusion models for Avian Influenza (Bird Flu) in West Bengal

Two models to understand the spread of Avian Influenza were developed, which were found to be in good fit with the real data supplied by the government. These models could be used for appropriate planning for the future epidemics. Two of the related papers appeared in high impact factor mathematical biology, general science journals.

Arni S.R. Srinivasa Rao

Discrete mathematics

Some questions related to Roter-Router models in one dimension, higher dimension are studied. Extension of roter-router models in connected spaces and proving general theorems are in progress. Crank functions and their significance in partitions is also being investigated. Problems related to prime numbers and distance between individual and group of prime numbers are explored in deterministic and probabilistic ways.

Arni S.R. Srinivasa Rao

Non-linear mathematical models for AIDS, H5N1, Rota Viruses

Models were developed for spread of HIV and Rota viruses. Distribution of ART to the individuals suffering with AIDS is one of the tasks for the third phase of national AIDS control policy in the country. Above models developed are in use by the government and a detailed publication of the same will be appearing in a well known applied mathematics journal.

Arni S.R. Srinivasa Rao

Statistical Techniques for Extracting Useful Information from Anomalous Reporting on Occurrences of Sexually Transmitted Infections in Major States in India

Sexually transmitted infections (STI) are often under-reported in India due to various reasons. Additionally, there are serious unexplained discrepancies in the reported number of STI cases. While health infrastructure has an important role in ensuring the quality of reporting, natural prevalence of STI is influenced by various epidemiological, socio-economic, demographic and cultural factors. Detection of presence and finding out the extent of under-reporting is very much necessary, given that STI is one of the major risk factors for HIV/AIDS and non-treatment or improper treatment of STI leads to further transmission of it. This study makes use of the available data on the major Indian states and attempts to answer the following questions. (i) How are the reported STI cases related to health infrastructure and various socio-economic, demographic and cultural factors? (ii) How should the

states be categorized by severity of STI? (iii) What are the factors that contribute to the gender inequality in reporting? (iv) Is it possible to really estimate the extent of under-reporting? (v) Is it possible to identify the major risk groups for better future surveillance? (vi) Is it possible to identify the major factors that contribute to the quality of reporting?

Prasanta Pathak and Sudipta Pal

Special Form of Gompertz Model and its Application to Indian Fertility Data

A special form of Gompertz model has been suggested for quantifying fertility behavior. Current work extends the basic literature by adding one more important dimension called the *effective fertility period*, which is the age interval within which the fertility level of a cohort rises from $100\xi\%$ to $100(1-\xi)\%$ of saturation level (meaning the Cohort Total Fertility Rate). The model is fitting well to the Indian fertility data and has noteworthy advantages over other fertility models. Capitalizing on these advantages, fertility experience of Indian women cohorts that have crossed/going to cross childbearing age during 1993-2012 has been analysed.

Samaba Siva Rao Pasupuleti and Prasanta Pathak

Fertility Behavior of Indian Woman Cohorts Crossing Childbearing Age during 1993-2012 by Socio-economic Conditions

The fertility experience of Indian woman cohorts belonging to various socio-economic groups, who are crossing child bearing age in various calendar years during 1993-2012 have been studied by making use of the data from three rounds of National Family Health Survey. For understanding the fertility behavior of above cohorts, a special form of Gompertz curve has been used. Its parameters are easy to interpret. Wide differentials in fertility behavior among various socio-economic groups have been found. Attempt has been made to identify those factors which truly contribute to fertility differentials and which could be used for policy prescriptions to bring down fertility. The transitions that have occurred in the determinants of fertility over cohorts have also been detected.

Samaba Siva Rao Pasupuleti and Prasanta Pathak

Cohort wise Variation of the Impact of Empowerment of Women on Reproductive Choices in Different Regions in India

Several studies have revealed that empowerment of women has a strong influence on demographic and health outcomes. In Indian context, cohort wise variation of the impact of empowerment of women on reproductive choices across different regions has not been studied so far. Present study makes use of the responses to the questions asked on empowerment of women in the third National Family Health Survey (NFHS-3) conducted during 2005-2006 and investigates the link between empowerment and different reproductive choices, such as ideal number of children wanted, children ever born, sex preference and contraceptive practice across different regions and different cohorts in India. The effect of empowerment of women on their reproductive choices after controlling the effects of education, place of residence, religion, caste, economic condition, occupation, age, etc, has not been found consistently significant and matching popular perception at all ages and in all regions, including India as the whole region. The findings raise a suspicion on the adequacy of the questions that were asked in the NFHS-3 to have some idea about the level of women empowerment.

Samaba Siva Rao Pasupuleti and Prasanta Pathak

Spatial and Temporal Changes in Fertility Behavior of Cohorts in Recent Times and Future Prospects: India

Present work is a study on fertility experience of cohorts in different regions in India, who are crossing childbearing age in different calendar years in the recent years to understand the spatial and temporal changes in their fertility behavior. Fertility behavior of females who are going to cross childbearing age in various calendar years during 2012-2025 has been forecasted. For the present study we have used selected portions of data from all the three National Family Health Surveys that were conducted in India. Some of the interesting findings of the present study are (1) fall in cohort total fertility rate(CTFR)

during 1993-2012 is expected to be maximum in the Southern India (a fall from 4.69 births per female to 2.97 births per female), (2) the shortest age interval in which most of the births (90% of the total births) occur, defined as effective fertility period, is shrinking (though unevenly) in all the regions of India and (3) estimated CTFR for females who are going to cross childbearing age in 2024 in the South India, the West India, the North-East India, the North India, the East India and the Central India are 2.3, 2.8, 3.2, 3.3, 3.6 and 4.7 respectively.

Samaba Siva Rao Pasupuleti and Prasanta Pathak

Old Age and Health in India: Aspects of Health from a Social Perspective

The study investigates upon the social determinants of the burden of diseases and the burden of impairments among the older adults population of India. For this purpose, four different groups of older adults, namely rural males, rural females, urban males and urban females, are considered. The study is based on a countrywide representative sample of 29,120 older adults that was obtained as a part of the 60th round of the National Sample Survey (2004). Regression models for count data based on the Poisson distribution and the Negative Binomial distribution are utilised to model the number of diseases and the number of impairments for an older adult, respectively. The effects of economic dependency, marital status and number of children are significant correlates of diseases and impairments among older adults. Education is found to be a significant predictor of diseases and impairments only among rural males and rural females. The effect of caste differentials is significantly discernible in case of female populations in both rural and urban areas. Religion has a significant role to play in determining the burden of diseases and the burden of impairments for rural males and rural females.

Sanjeev Bakshi and Prasanta Pathak

Method for Assessing Availability and Accessibility of a Public Health Facility: A Case on First Referral Units in Rajasthan

Present study suggests a method to find out how functional status and locations of these facilities deviate from the desired state. First Referral Units (FRUs) in Rajasthan, which are to play key role in the management of obstetrical complications and reducing thereby the maternal and infant mortalities, are in the focus of this study. The study shows how the spatial distribution of the FRUs needs to be considered simultaneously with its functional status and locations so as to assess the true state of availability and accessibility of the facilities. It has found that almost 50% of the FRUs lack basic physical facilities such as telephone, tap and water supply, etc. While patients in general need to travel on an average 27 km to reach a FRU, the ones in Bikaner and Jaisalmer need to travel more than twice of this state average. The FRUs in Sikar, Jaipur and Churu, which are having relatively higher load of referred cases, are found very undesirably located in terms of distance having no provision of vehicles. Number of staff positions in all FRUs under various staff categories such as Junior Surgeon (Obstetric and Gynecology), Staff Nurse and Male Nurse are found lying vacant and needing supplementation by more than half of the existing occupied positions. Given lot of variation in the availability of surgical and delivery equipment, it gives the impression that the equipment has not been distributed uniformly. Equipment, has not been in use in a large number of FRUs, particularly in the districts of Pali, Barmer, Jaisalmer and Nagaur. Side Laboratories and Blood Transfusion Facilities are also not being used uniformly due to inadequate supply of various materials.

Prasanta Pathak

Projects:

Estimation of Technical Manpower Requirement through Effective Means for Improving Quality of Training of Technicians (Govt. of West Bengal)

The project attempts to find out the demand in the next ten to twelve years for those who are trained by the polytechnic and the industrial training institutes. It also finds out effective means for improving

the quality of training of the technicians. The study is being done covering the whole of the state of West Bengal.

Prasanta Pathak

Analysis of Trends in Age Specific Mortality Rates in India

Objective of this study is to evaluate the trends of child and age-group wise mortality rate in India and major states by sex and residence. Attempt is also made to analyse mortality projection using the Time Series data from Sample Registration System (from 1970 to 2006).

Subhash Barman

Correlates of Child Labour in India

Objective of this study is to examine the causes of prevalence of child labour aged 5-14 years in India and states. The study will also examine the regional differences of child labour by some socio-economic characteristics using National Family Health Survey (NFHS 3) and Census 2001 data.

Subhash Barman

Educational Attainment of Children in India

Objective of this study is to explore the educational attainment of children aged 5-14 years in India and states. The study will explore regional differences of literacy by some socio-economic characteristics using National Family Health Survey (NFHS 3) and Census 2001 data.

Subhash Barman

Female Trafficking and Illegal Migration

Trafficking, the selling of women and children for monetary profit often leads to forced displacement of population or more specifically to say forced illegal migration. Specific gender related issues become evident when female migrants suffer human abuses because of their dual vulnerability as migrant as well as woman. It is very difficult to explain with reliable data that trafficking of women and children takes place along the path of illegal migration. This study is devoted to throw light on trafficking of women and children leading to illegal migration along Indo-Nepal and Indo-Bangladesh border. It is observed that though documented female migration obtained from census reflects decreasing trend, undocumented i.e. illegal migration due to trafficking is increasing along Indo-Nepal and Indo-Bangladesh open border.

Pranati Dutta

Evaluation of Indian Census Data

Due to complexity of operation 'perfect' census of human population is almost unattainable. It is therefore essential to evaluate the quality of census data. An attempt has been made to evaluate content error of Indian census data using age-sex accuracy index, digit preference index, inter-censal cohort survival ratio etc. It is observed that there is not much improvement in the age data over time. Age ratio score, sex ratio score, UN age sex accuracy index indicate large inaccuracies in Indian age data. Preference for digit 0 and 5 is reflected in Whipple index, Myers' digit preference, and graphical representation of single year age return of Indian Census data. The census survival ratios do not follow expected systematically declining trend but are subject to fluctuations. Special care is required while collecting data in census to reduce content error.

Pranati Dutta

Immunization Coverage in India using Survey Data

Statistical analysis of immunisational status of child and mother is performed in different States of India throughout the time period using NFHS1, NFHS2 and NFHS3 data. Interstate child mortality within and between women is found by estimating parameters of Extended Beta binomial distribution.

Swati Sadhu

Spatial Development in India: Lessons from the Districts

The study has dealt with 575 rural and 573 urban districts separately. The novelty ot the study is that this is the first time an attempt has been made to find linkage between various components of social development indicators and economic factors. The former consists of WPI, HCI, HHI and TCI, while the latter consists of HCR, PP and Gini coefficient. In addition to this, an empirical investigation is performed for the first time on the issues relating to divergence among the districts over the decade from 1991 to 2001. Attempt has also been made to identify the most vulnerable districts in India separately for rural and urban areas with the help of NSS 61st round household consumption expenditure.

Swagata Gupta

Inequalities in utilization of Health Care Services and Impact of Socioeconomic Inequality on Child Mortality

It is well known that the burden of social inequality and in particular poverty falls disproportionately on child health and survival. This study has provided an insight in understanding different demographic, socio–economic and geographic parameters of inequalities prevailing within the poor or disadvantaged children. It also explained the reasons behind the slow progress in preventive child survival interventions. Using logistic regression analysis (Odd Ratios), different socio-cultural and developmental correlates were obtained for the use of reproductive and child health care services provided by the Government. As a measure of inequality and to compare the disparities between different states of India, concentration curves and indices were constructed from infant and under five mortality data classified under different quintiles of wealth index, which represents the socio-economic status of household. From these measures, the extent of inequalities and also the causes behind inequalities leading to deprivation have been suggested for constant monitoring and revision of different policy measures for reducing inequality in child mortality in India. For the entire analysis National Family Health Survey (NFHS-III) data were utilized.

Partha De

Psychological Research Unit

Emotional Display Rules and Personality Pattern across Different Groups of Individuals

The regulation of emotional display is a necessary process for effective social functioning. The objective of the study is to investigate the pattern of emotional display rules and its relationship with personality in visually challenged and normal individuals. Data have been collected from visually challenged and normal individuals from different parts of India. The analysis so far done indicate that both visually challenged and normal individuals display their emotions differently toward different target persons under different contexts. The personality dimensions of extraversion and conscientiousness were found to be significantly correlated with happiness whereas neuroticism was found to be associated with negative emotions like fear and anger.

Anjali Ghosh

Self-efficacy of agricultural Farmers

Objective of the study was to develop a questionnaire for assessing self-efficacy of agricultural farmers. Based on focused group discussion, interview with farmers and observing farmer behavior in Burdwan, Chakdah and Hingleganj, a 50 items questionnaire with 5 subtests has been developed. Five subtests are measuring 5 traits of self-efficacy namely (i) self monitoring, (ii) enactive mastery, (iii) self-regulation, (iv) vicariousness, (v) physical and emotional changes. Questionnaire was administered to 53 farmers in a psychological and agricultural training program at Hingleganj, North 24 pgs. Cronbach's alpha reveals high reliability in terms of internal consistency among the items of each subtest. Significant positive and high correlations among five subtests suggest high content validity of the questionnaire.

D.Dutta Roy

Bullying in school and its Effect on Behavioural Aspects of School Students

The objective of this study is to assess the level of bullying on class VII and VIII students of Govt. and Govt. aided schools of Kolkata and students of rural and urban settings of Hooghly district of West Bengal. Resultants of bullying and personality of students may throw light to the future behavior of the students both in short term as well as in long term and even affect Academic Achievement. Literature review has been done. Questionnaires have been selected and data are being collected from different schools.

Rumki Gupta

Exploring Life Meaningfulness among Recovering Substance Users

The present study was done primarily to address two major research gaps: firstly, development of an empirical measure of life meaningfulness for substance users and secondly, to determine the psychosocial determinants of life meaningfulness among the substance users. The study is classified into two phases: the first phase which dealt with development of Life Meaningfulness Scale and the second phase which examined the relationship between life meaningfulness and social support, abstinence self efficacy and depression. Both qualitative and quantitative approaches were used for framing items. A Principal Component Analysis yielded three components: Overall Goal Directedness, Striving for healthy lifestyle and Concern for loved ones which collectively accounted for 42.06% of the total variance. The scale and its subscales were also found to be highly reliable. Multiple regression analyses in the second phase of the study revealed that social support and abstinence self efficacy significantly predicated life meaningfulness among 48 recovering inmates of a de-addiction center while level of depression failed to predict life meaningfulness.

Fouzia Alsabah Shaikh and Anjali Ghosh

Pattern of Distributive Justice and Its' Correlates in Different Groups of School Students

Distributive justice development is concerned with child's progressive understanding regarding the fair criteria for the distribution of resources. It is a principle of values of what should be done. The present research work aims to study the pattern of distributive justice and its' correlates in different groups of school going adolescents of Kolkata. The study was conducted on 687 school students aged between 13-15 years from Bengali and English medium schools under West Bengal Board of Secondary Education (WBBSE) of Kolkata. In addition to this 400 mothers of the selected students were also interviewed. The results indicate the significant effect of age, gender, medium of instruction in schools and parental education on distributive justice of adolescents. Authoritative parenting style dimension is found to be positively correlated with distributive justice whereas authoritarian parenting style is negatively correlated with distributive justice of the students. There exists an overall fair agreement between students and their mothers regarding students' preferences of different stages of distributive justice and mothers' expectations regarding their children's preferences.

Rita Karmakar and Anjali Ghosh

Relationship between Career stages and Locus of Control of Teachers

A literature review on the relationship between career stages and teachers' locus of control has been done. Super's career stage model (1990) essentially posits four identifiable stages in a worker's career, namely, exploration, establishment, maintenance and disengagement. The model was suitably adapted for teachers by Huberman (1989). He proposed career entry, stabilization, diversification and change, stocktaking and interrogations at mid-career, serenity and affective distance, conservatism and disengagement. Huberman largely characterized the proposed career stages in term of teachers' individual behaviours and beliefs, the latter not only about themselves and their work, but about students, other teachers and work environments. A study has been conducted on 78 teachers of

Kolkata. It has been found that career stages are significantly related with locus of control, teacher self-efficacy and job satisfaction. Further data are being collected to examine the relationship betv'een the variables.

Rituparna Basak and Anjali Ghosh

Symptomatology and Unawareness of Mental Disorder in Schizophrenia

Most of the schizophrenic patients appear to deny, fail to acknowledge or broadly, lack awareness of having a mental disorder. This lack of awareness influences compliance with medication regimens and with treatment in general. This is a major problem to clinicians as well as to the family members who repeatedly failed to convince the patient that he/she needs treatment. Most of the studies on insight are carried out during the active phase of schizophrenia ignoring its importance in the remitted phase. Objective of the study is to examine relation between symptomatology and unawareness of mental disorder in schizophrenia. Standardized instruments like PANSS (positive and negative scale of schizophrenia) and SUMD (scale for unawareness of mental disorder) were administered to 45 patients diagnosed with schizophrenia. Result reveals that the patients with high negative symptoms are more unaware regarding their condition as compared to their counterpart. Second, the higher the severity, higher the unawareness. The findings are important for development of specific psychological therapeutic modules.

D.Dutta Roy and Shivani Santosh

Attitude towards learning disabled children

Learning-disabled children are currently allowed to study in the mainstream school with normal children. This study examined the attitude if special educator of special school and that of schoolteachers of general school in Kolkata and its adjoining areas. A 29-item questionnaire with yes and no responses was administered to 35 special educators of schools for LD and Mentally challenged children and 35 schoolteachers. Results revealed significant mean differences in the mainstream education domain between two groups, however no significant difference was noted in the awareness and stigma domains.

Shivani Santosh and D. Dutta Roy

Perceived Environmental Uncertainty in Banks

In order to examine perceived environmental uncertainties of the managers in different banks, initially, few bank managers were interviewed and fish-bone diagrams were developed. Finally, based on diagram, 24-items questionnaire was developed and administered to the bank managers of SBI and Non-SBI banks and of banks in private and public sectors. Results revealed differences in pattern of perception to uncertainties in technology, customer attitude, RBI policy and attitude of shareholders.

D.Dutta Roy, Rajiv Jaiswal and Dip Kumar Saha

Inflow-Outflow Pattern Analysis

This study examined inflow-outflow pattern of funds allocated to different districts of West Bengal through SSA or Sarva Shiksha Abhiyaan. Year (2002-07) and district wise (20 districts) inflow-outflow report was collected from the Directorate of school education of the Govt. of West Bengal. Results noted significant changes in both flows and inflow-outflow differences over the periods. Caste, female literacy, number of gram samsads, number of educational circles play critical role in inflow-outflow variation.

D.Dutta Roy and Anirban Roy

Helmet as an Important Equipment of Industrial Safety and its marketing Strategy

This study examined satisfaction with helmet among the industrial workers. A 24-items questionnaire was administered to 150 workers of two heavy engineering industries. Results revealed that most of

the workers experienced less comfort, easiness and felt hot and sweating using the helmet. Findings are important in helmet innovation.

D.Dutta Roy and Amitava Sen

Sociological Research Unit

Research in the Unit during the year has encompassed a variety of topics under the broad rubric of studies of socio-economic development.

Socio-economic studies of Indian villages

During the year, the team was engaged in analysis of statistical data collected through village surveys in different States with a focus on differences across socio-economic classes and social groups. One major output was a book titled *Socio-Economic Surveys of Three Villages in Andhra Pradesh: A Study of Agrarian Relations*, published by Tulika Books, New Delhi. The book has separate chapters on land and asset inequality, tenancy, household incomes, crop incomes, employment and wages, indebtedness, literacy and school education, and household amenities. The book attempts to contribute information, statistical data and analysis to the discussion on agrarian relations and economic distress in contemporary rural Andhra Pradesh and India.

V. K Ramachandran, Madhura Swaminathan, Aparajita Bakshi, Paramita Ghosh, Niladri Sekhar Dhar and Shamsher Singh

Empowerment of women

The project attempts a comparative study of the process of empowerment of women in rural areas of three States, namely, Tripura, Meghalaya and Jharkhand. The author has engaged in data collection in these regions for several years.

Bholanath Ghosh

Evaluation child labour schools

As part of this project, ten child labour schools have been selected in North 24 Parganas distirct, and from each school, 20 children were selected for a survey. Data have been collected from the children and the schools and processing is underway. The objective is to understand and evaluate successes and failures in the implementation of child labour schools, a key component of the strategy to eliminate child labour in India.

Aniruddha Chakravarty

Occupational Segregation

Research has been undertaken on gender segregation in the factor sector, using data from the Annual Survey of Industries, for the period 1989-90 to 2000-01, and on the decline of the Mica industry in Giridih and its impact on women workers.

Molly Chattopadhyay

Statistical Quality Control and Operations Research Division

The Division comprises of eight SQC & OR Units located at Bangalore, Chennai, Coimbatore, Delhi, Hyderabad, Kolkata, Mumbai and Pune and the Central SQC (CSQC) Office located in the main campus at Baranagore. The CSQC Office functions as the office of the elected Head of the Division and co-ordinates various activities of the Division.

The activities of the division consist of consultancy and training, research with a focus on the applied one, academic teaching including conducting M.Tech. (QROR) programme at Kolkata and Part-Time Certificate course at Bangalore and Hyderabad. The faculty members of the division also teach in

other academic programmes like B.Stat. and M.Stat. Supervision of Ph.D. thesis along with the dissertation and project work by M.Tech. (QROR) and M.Stat. students are another part of the responsibilities discharged by the divisional members.

The divisional members carry out theoretical and applied research work. About 42 scientific papers have been published in various journals and about 1 paper has been published in book. About 9 papers have been presented in conferences and included in the conference proceedings.

The activities of the Division under different headings are furnished in the following.

SQC and OR Unit, Bangalore

Six Sigma initiatives and its effectiveness in Business Process

Sanjit Ray

Developing Model for Business Process Improvement through Statistical Techniques

E V Gijo

SQC and OR Unit, Delhi

Mathematical Programming, Combinatorial Optimization, Linear Complementarity Problem (LCP) and its generalizations, Matrix Theory (Study of Matrix Classes useful in Complementarity, Optimization and Game Theory), Variational Inequality, Non-cooperative games, Algorithms for Stochastic Games.

S.K. Neogy

SQC and OR Unit, Hyderabad

Development of Robust Methodology for Estimation of Agricultural Power Consumption

Government of Andhra Pradesh supplies free electricity for agricultural purposes in the state. The power is supplied by the distribution companies (DISCOMs) and the DISCOMs are required to estimate the electricity power consumed for the agricultural purposes (henceforth shall be referred to as AGL consumption) each year. The existing methodology, which is based on metered DTR readings and a census of the pump sets and the loads carried out in the year 2000, has a number of problems. Following the recommendation of the Government of Andhra Pradesh, M/s AP TRANSCO convened a joint meeting of the DISCOMs, Indian Statistical Institute (ISI), and a nominee from M/s Andhra Pradesh Electricity Regulation Commission (APERC) on December 7, 2007 to evolve an alternative robust methodology of estimation of AGL consumption and a procedure for auditing the implementation of the same. In that meeting, it was decided that ISI would explore the possibility of an alternative robust methodology and make a presentation for further discussions and necessary action. Accordingly ISI has developed the methodology and made presentation on August 11, 2009 to CMDs and other officials of DISCOMs and APTRANSCO. The methodology has been submitted for acceptance by APERC which in turn passed necessary instructions for trail implementation by the DISCOMs for the year 2010-11.

A.L.N. Murthy & G.S.R. Murthy

Power in Statistics - Some Recent Industrial Applications

This talk presents some recent applications of Statistics in some private and public sector organizations. The emphasis is more on the necessity and the benefits of applying statistics. A couple of the applications are aimed at discussing the level of understanding and awareness present among decision makers about the sampling methods and sample sizes and how simulation technique can be effectively used in convincing the decision makers about the statistical methodologies. The talk also presents how simulation models of complex practical situations are handled using *Copulas*.

G.S.R. Murthy

A Statistical Procedure for Minimizing In Vivo Tests

Biotechnology and pharmaceutical industries use in vivo tests, in addition to in vitro tests, for drug evaluation. These in vivo tests are carried out on nonhuman animals, and drug regulating authorities insist on rigorous animal testing before issuing license for human use. For various reasons (Wales 2009), there is a global move towards minimizing the in vivo tests. This article presents a case study carried out in a biopharma industry on minimizing in vivo tests for evaluating efficacy of recombinant Hepatitis B vaccine produced by the company. Exploring the past data with different statistical methods, the study recommends a statistical procedure to assess the efficacy of the vaccine produced in each batch based on in vitro test result and provides a decision rule on when to conduct in vivo test. The benefits of the study are discussed in the article. The approach suggested may be extended to similar cases where in vivo tests are involved. It is hoped that this study will be contributing to the cause of minimizing in vivo tests.

T. Krishna Mohan and G.S.R. Murthy

Space Optimization for Warehousing Problem - A Methodology for Decision Support System

This article presents a way of tackling a special class of space optimization problems that arise in a number of practical applications in industry and elsewhere. It presents an elegant solution to a problem that was considered by Das, 2005 in optimizing storage space in warehouse of a footwear manufacturing company. In Das, 2005 the problem was formulated as a nonlinear programming problem. In this article, it is shown that the problem can be formulated as a generalized transportation problem which is a special case of generalized network flow problems. Further, a facile scheme is devised to handle the dynamic situation of warehousing problem which can be easily translated into a decision support system for the warehouse management system. Also, the article points out certain obscurities and gaps in Das, 2005.

A.L.N. Murthy

Statistical Thinking: The Silent Revolution in an Indian Paper Industry

Business organizations embrace from time to time different Quality Management approaches such as TQM, Kaizen, TPM, Six Sigma etc., to remain efficient, competitive, sustain growth and to keep the personnel focused towards the organizations' business goals. Initially, adoption of these newer approaches and philosophies get the required attention of all the people in the organizations and achieve seemingly a success. But, as the time passes, each of these approaches fades away in spite of the commitment and best efforts made by the senior management. This is generally due to the lack of analytical back up and there by non-development of conviction in the approaches among the people.

This talk highlights the case of a large Indian Paper Industry which had gone through a stage where people have become averse to any new approaches being thought of introduced in the organization. Further, it highlights how from this stage the silent revolution that had taken place in the organization towards statistical thinking that transformed the way people think; adopt scientific principles and approaches as a way of life and true to the phrase "In god we believe, everyone else has to bring data to the table". An overview of the success stories created by the analytical approaches adopted by the executives at different levels across the organization with the commitment and involvement of top management that made the organization a strong contender for the National Quality Award, will be shared.

A.L.N. Murthy

Process Development and Optimization

Review of text documents such as technical documents, legal documents etc is a highly operator (human) dependent activity. This activity calls for adopting suitable processes and also substantive domain expertise of the reviewers. The output is measured mainly on the extent of errors committed,

time taken to review. The required standards or benchmarks for these are very high as any error or delay can impact he customer or end user severely. Designing and developing these processes is a challenge from the adoptability and sustenance perspective. Effective and efficient knowledge transfer to the reviewers to execute their work fast & error free needs a scientific approach. Heterogeneity at project level, input level and processing level is a key challenge to address with the help of analytical methods. Statistical & related methods can be extensively used during the design, development and testing phases as well as during operation. In a KPO catering to the requirements of fortune 500 companies, innovative approaches couples with application of statistical methodologies are being tried out and adopted in a continual manner to achieve the highest level of quality & customer satisfaction.

G. Murali Rao

Six Sigma with a special reference to lean Practices

Methodologies surrounding Statistical Techniques developed to improve business performance have originated with SQC/SPC and presently Six Sigma is doing wonders by providing overall business solutions. Six Sigma has succeeded in bringing in a new dimension with the integration of Business Thinking with Statistical Thinking. The DMAIC/DMADV step by step approach of Six Sigma with efficient integration of the statistical techniques could alleviate the problem of engineer's understanding of statistics and vice versa. Presently Industries are seeking for better and efficient Lean practices strengthened with Statistical theories to counter the competition and providing a quality product/service at reasonable price and time. Six Sigma, Lean, Statistics and business domain expertise are becoming the four fundamental pillars of business excellence. Six Sigma integrated with the Lean manufacturing practices has thrown up a number of open questions on the need for appropriate and adoptable statistical methods. This applied research attempt is in the direction of identifying and developing statistical methods which can enhance the Six Sigma & Lean methodology from the application as well as sustenance of the results perspective.

G. Murali Rao

Text Data Mining

Business and scientific organizations handle large amount of textual data in the form of papers, reports, presentations, technical / scientific / financial calculations, drafts, emails etc. The volume of the textual data has increased multifold in the recent years due to extensive usage of computers, internet and emails. Security & confidentiality requirements have resulted in handing the textual data in a scientific and intelligent manner. It is humanly impossible to review all the documents in a pool to identify the relevant ones when such a need arises. To execute this review in an efficient manner one requires application of advanced multivariate statistical methods to cluster/classify and reduce the effort at the same time do not miss the intended information. In this applied research initiative an attempt is made to come up with efficient text data reduction processes coupled with application of statistical methods to improve the efficiency.

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G.S.R. Murthy

SQC and OR Unit, Kolkata

Modeling, Optimization and Characterization of Materials and its related process improvement

Design of materials through traditional exhaustive experimentation and knowledge extraction for development of theory is expensive and time consuming. The materials design is a process to derive optimal chemical composition, identify suitable processing routes, and processing parameters to robustly meet specific performance requirements such as physical and mechanical properties, corrosion resistance and special application dependent properties. A process called 'materials informatics' allows a designer to review complex, multiscale information in a high-throughput, statistically robust, and yet physically meaningful manner. The application of such an approach is shown to have significant impact in materials design and discovery. The content of the research work is limited to development of computational methodologies in materials science and engineering with the help of data mining techniques which are blend of statistics, machine learning and artificial intelligence, designed for pattern recognition and prediction through the extraction of knowledge from the data. Design of materials based on computed information especially through sophisticated soft computing tools like genetic algorithms, neural networks are already being in use. But the milestone indicates that there are huge opportunities to further strengthen the subject by integrating the soft computing tools based computations with the present materials informatics schemes.

Prasun Das

Identifying Critical Success factors & Effectiveness Measurement System of Six Sigma Initiatives in Business Processes

Literature survey on recent works reveals that most of the works, at present, are being carried out in comparing Six Sigma with other quality initiatives like Lean, Business Process Review (BPR), and Design for Six Sigma (DFSS) with the objective of whether Six Sigma can lead to achieve different quality awards etc. The present research work deals with the identification of critical success factors both in manufacturing and service sectors, which is important for a successful Six Sigma project and also evolving a methodology to measure the effectiveness of the project. The major research will be carried out in the areas of six sigma initiatives - DFSS for new or modified product and processes, and DMAIC for existing product and processes – about its objective, implementation and effectiveness measurement, and method for improvement. A part of the research will be in the direction improving process efficiency through measuring, identifying and isolating the unsafe working environment. In this context, developing process safety indices through modeling of incidence-accident behaviour are thought of. The comparison between the DFSS and DMAIC with respect to the problems faced and the counter measures through development of the improved methods is already in progress.

Prasun Das

Impact of Competency of e-Learning Developers on the Quality of e-Learning Products

According to the definition of quality and evaluation research, an educational process can be subdivided into sub-processes i.e. context-quality, structure-quality, process-quality, output-quality and impact-quality. The meaning of Quality applies to each of these sub processes differently. It is important to clarify different semantic understandings of what quality actually means. Defining quality thus means positioning oneself in this multi-dimensional space. Quality development always has to take different perspectives and different meanings into account. The scope of the proposed research work is restricted within the identification of important quality parameters, quality control process, competencies required for developers who are engaged in the development of e-learning products. In the next step, the impact of developer's competencies in the e-learning product quality will be found out.

Prasun Das

Semi-parametric estimation of quality adjusted lifetime (QAL) distribution

In this work, we consider semi-parametric approach to estimate the QAL distribution in illness-death models. Hazard rate in each health state is modeled using Cox's proportional hazard model. Consistency and asymptotic normality of the proposed estimator have been established. A real data set is analyzed to illustrate the proposed methodology.

Biswabrata Pradhan and Anup Dewanji

Bayesian analysis of progressively censored competing risks data

In this work, we consider the Bayesian inference of the unknown parameters of the progressively censored competing risks data. It is assumed that the latent cause of failures have independent Weibull distributions with the common shape parameter, but different scale parameters. Bayesian analysis is performed under the assumption that the shape parameter has a log-concave prior density function, and for the given shape parameter, the scale parameters have Beta-Dirichlet priors. We propose to use Gibbs sampling procedure to compute the Bayes estimates and highest posterior density (HPD) credible intervals. Monte Carlo simulations are performed to investigate the performances of the estimators. We also provide a methodology to find the optimum Bayesian censoring scheme.

Biswabrata Pradhan and Debasis Kundu

Software Reliability Modeling with Periodic Debugging Schedule

Based on our experiences in ISRO, Trivandram, an earlier model developed by us is being modified to make the model more realistic. The results obtained with the earlier model are revisited and some very interesting results have been obtained.

Ashis Chakraborty, Professor Gopal Basak and Sumana Das

Estimating Reliability of a Flight Control Software

Reliability of flight control software used in the third phase of satellite launch at ISRO, Trivandrum is estimated based on test data obtained from simulated experiments. The software is very critical, since it is used in the last phase of satellite launch to place the satellite into its orbit.

Ashis Chakraborty, Professor Anup Dewanji and Debasis Sengupta

Generalized convex analysis

The class of functions satisfying Hanson property is known as invex function (invariant convex) and the convex like property of such a function remains invariant under all diffeomorphisms. We consider constrained minimization problems with nonlinear equality constraints in addition to inequality constraints of invex functions and show that the stationary points are also global minimization points. An alogorithm for solving mathematical programming problem involving Hanson functions is developed.

Arup K. Das

Study on Some Challenging Issues in Implementing Lean Six Sigma

Guidance is being provided to Mr. Ashoke Sarkar, Technical Officer (Gr. I), working at the SQC & OR Unit, Mumbai, ISI, for Ph.D. in Engineering at Jadavpur University. It has been planned to consider the following aspects for this research work.

a) Reducing machining or operational cycle time by systematic elimination of non-value adding activities.
b) Optimum allocation of manpower through application of queuing theory.
c) Reducing work-in-progress inventory level through appropriate quantitative methodology.
d) Increasing productivity of manufacturing line through complete enumeration method with the help of appropriate solver.
e) Waste reduction in material processing through integer programming.
f) Evolving a holistic approach for Lean and Six Sigma, addressing the above issues.

Arup Ranjan Mukhopadhyay

Study on Some Implementation Issues of TQM in Higher Education and Other Service Sectors and Gap Analysis by Lean Management

Guidance is being provided to Mr. Debaprayag Chaudhuri for Ph.D. in Engineering at Jadavpur University. The scope of this work has been restricted to the degree engineering colleges in West Bengal. The present baselines will be evaluated for the engineering colleges falling in four broad categories. Side by side, weak areas will be identified. Benchmarking will be done so that the new benchmark is achieved by getting rid of the identified weak areas.

Arup Ranjan Mukhopadhyay

Development of Electroless Hard Coatings for Automotive Applications

Guidance is being provided to Ms. Jhumpa De for Ph.D. in Engineering at Jadavpur University. In the automotive industry, in order to decrease fuel consumption, there has been great interest in using

Magnesium and its alloys for automobile parts to decrease weight without sacrificing structural strength. The objectives of the work will be the following.

a) Exploring a chemical synthesis route for developing an anti-corrosive coating on Magnesium and its alloys used in automobile industries
b) Application of statistical model in optimization of the process variables in the electroless deposition process.
c) Selection of the deposition parameters to investigate inter alia structure / property / process relationships and draw comparisons with the literature
d) Quantification and characterization of the film deposit will be done in the light of the statistical optimization.

Arup Ranjan Mukhopadhyay

Impact of Noise Quality Due to Highway and Related Infrastructure Development: A Case Study of Construction of Second Vivekananda Bridge and Its New Approach Road

Technical assistance is being provided to Mr. Tarun Roy for his empirical studies being carried out at Jadavpur University that eventually should lead to his obtaining Ph.D. in Engineering. The field of work is environmental engineering and its management. It deals with the assessment of noise pollution, evolving methodology for its quantification, followed by analysis, inference and, where applicable, the necessary remedial measures.

Arup Ranjan Mukhopadhyay

A control procedure for monitoring accounts receivable

A procedure, has been framed by Wilbur G. Lewellen and Robert O. Edmister (LE) have developed a measure as an alternative to DSO and other to measures of receivable to take care of effects of a) fluctuations in credit sales b) arbitrary choices of averaging periods for account grouping and c) potential distortions involved in aggregating receivables arising from different sales intervals, Based on the L-E defined collection experience matrix, a simple procedure for monitoring accounts receivable is being worked out. This will be validated with the data from the live cases.

Anup Majumdar

Evaluation of Mil-Std-1235 sampling plans

The discontinued use of specifications incorporating AQLs and LTPDs, and contractual reference to standards based on them, left a serious void in the procurement quality assessment. The avoidance of language in procurement documents and standards which could be construed as allowing any non-conformances, led to the adoption of plans with acceptance numbers (c) of zero. In response to this mandate to not specify fixed levels of nonconformances in procurement, MIL-STD-1916 was developed by a committee comprised of volunteer members from education, government, and industry. This standard has replaced of MIL-STD-105, MIL-STD-414, MIL-STD-1235, ANSI/ASQC Z1.4, and ANSI/ASQC Z1.9. An exercise has been undertaken to evaluate this new standard. In particular the composite OC functions under the modified switching rules for the new sampling plans are being constructed. A Markov process formulation has been developed.

Anup Majumdar

Bayesian sampling plans for continuous prior distribution

The economic design of multi-attribute sampling schemes taking account of Bayesian principles based on appropriate prior distribution was considered by Schmidt and Bennett (1972), and further by Case, Schmidt and Bennett (1975), Ailor, Schimdt and Bennet (1975), Majumdar (1980, 1990, 1997, 2005), Moskowitz, Plante and Tang (1986), Moskowitz, Plante and Tang and Ravindran (1984) and Tang, Plante and Moskowitz (1986).. Later we have developed the model for the generalized cost function at a given process average and further obtained the general expression for the average cost when any

prior distribution of the the process averages. For the case when the process average for each attribute can be assumed to follow a gamma distribution. We now wish to demonstrate how this expression can be used to compare the expected costs for different acceptance criteria.

Anup Majumdar

Data Quality Management for the department of Petroleum Planning analysis and Control (PPAC) Government of India

The overall goal of the project is to develop a manual that clearly spells out the various steps to be followed with a view to ensure that the data collected by PPAC meet the laid down quality norms/standards. Accordingly, the primary objectives of the project include a) Understanding the various facets of data quality as applicable to PPAC b) Developing a system to measure and report the quality of data c) Identifying the different stake holders and their interests / incentives d) Designing a system for collection and compilation of data keeping in view different aspects of quality as articulated from the stakeholder interests

Currently the existing literature and systems related to the assessment and control of quality of data has been surveyed. In particular the elements followed by different bodies like JODI and Energy Information Administration, USA have been looked into. It has been noted that the Energy Information Administration, USA (EIA) primarily emphasizes on three major parameters of data quality, namely a) accuracy b) Timeliness, and c) Accessibility. In this preliminary phase of the project the team is now set to address the following major elements viz. A) Gathering business requirements. B) Assessing hardware / software issues and c) Assessing possible failure modes d) Assessment of current quality of data.

S.K.Majumdar, Anup Majumdar and Amitava Bandopadhyay

Library, Documentation and Information Sciences Division

The Library, Documentation and Information Science Division comprises the Central Library at Kolkata, Centre Libraries at Delhi and Bangalore, and the Prasanta Chandra Mahalanobis Memorial Museum and Archives at the headquarter. The Division is the most important central facility of the Institute.

Library, Kolkata

The Central Library occupies a unique place in academic and research activities of the Institute. The Central Library moved to its present location in 1978, and it occupies 4 floors (56000sq.ft) of a ten-storied building at Calcutta. The Central Library seeks to:

- Meet the informational, educational, recreational, and cultural interests and needs of the user community by providing timely access to print and non-print resources appropriate to those needs.
- Encourage and facilitate reading, literacy and lifelong learning by supplying resources in a variety of formats designed to interest, inform, and enlighten.
- Protect the public's right to know by providing equal access to information needed for informed and effective daily living, decision making, problem solving and thoughtful participation in civic/community affairs.
- Provide the highest quality service and to organize and display the collection for easy, open access by all.
- Maintain publication exchange programme of the Institute with regional, international, national, and foreign institutions and organizations.
- Continue to function as the Eastern Regional Library of the National Board of Higher Mathematics [NBHM], Department of Atomic Energy, Government of India since 1989.

Over the years, the ISI Central Library has attained the distinction of being one of the richest libraries in India in the areas of mathematics, statistics, economics, theoretical computer science and related areas. To achieve the goals of the Library, following activities were undertaken during the year under report:

Collection Development:
The Library maintains an excellent collection of books, journals, reports, rare and special collection, government publications, data-books, theses and other documents/ materials in print and electronic formats. During the year under report, the library accessioned 1497 books out of which 1316 were purchased from ISI budget and 181 from NBHM grant, while 99 books were received on complimentary basis. Added 02 books to the project collection. The Library also accessioned 1002 bound volumes of journals and subscribed to 506 scholarly journal titles in print. More than 52 journal titles were received as complimentary and 98 titles in exchange with Sankhya. The library received and processed more than 10000 loose issues of journals. It classified and catalogued 1040 new books and filed 4260 computer printed catalogue cards. It also processed 401 titles on government reports/data-books etc. Beside this, the library has added a collection of 158 books, mainly in English, Bengali and Hindi on literature, humanities, travel, health and recreation in its Statistical Workers' Circulating Library totaling its collection to 38720.

In addition to this, the library has about 32000 reprints. Thus the total collection of the library stands at around 355251

E-Resources:
The library has a good collection of electronic resources on different media and has access to several online journals/databases. During the year under report, the library has added 37 CDs & floppies containing books and CDs on statistical data. Thus, the total collection of CDs has risen to 1007. The library has provided the online access to about 400 full-text journals. It has renewed the online database like MathSciNet, ScienceDirect, Springer Link, JSTOR Archive, Oxford University Press Journals on consortia basis among three centers of ISI – Kolkata, Delhi and Bangalore. It has subscribed to the Web-of-Science-Science Citation Index Extended covering year 2004-2011. It has also subscribed to the IEL online of the IEEE/IEE publications, ACM Digital Library and Current Index to Statistics (CIS) on Web.

Publications Exchange Programme: The library maintains the publication exchange programme of 'Sankhya - the Indian Journal of Statistics' with 57 national and 23 international institutions/organizations. The 23 international agencies are from various countries of the world such as Bangladesh, Belgium, Brazil, Canada, China, Taiwan, Croatia, Czech Republic, Denmark, France, Hungary, Italy, Japan, Pakistan, Poland, Romania, Russia, Slovakia, Spain, Switzerland, Thailand, UK, and USA. In exchange Library has received 98 titles during the reporting period.

Membership: Membership of the ISI-Library is restricted to persons with post-graduate or equivalent academic qualification, interested in the objectives of the Institute. Faculty members, research scholars, students, research associates, visiting scientists, ISEC trainees, project-linked staff, project assistants, ISI-employees, outside students and the Institute members are eligible for the membership of the Institute Library. However, they have to apply for the membership of the library and receive a bar-coded Library Card. During this period, library membership was given to 355 persons and 820 readers were given special permission to use the library for a short period. Currently the total number of library member rose to 2480. Total number of members including staff, students and research scholars of the Institute rose to 960 in its workers' circulating library.

Services: The ISI-Library, since its inception has been providing a variety of library and information services to its users. The services presently being provided include;

Web-OPAC- Members use this facility to browse and search the database to see the status of a document including their own transactions.

(i) Lending/Document Delivery Service: During this period, 88964 books and other documents were issued to the user on loan and reference. Publications from Government of India and other International Organization and data CDs, were issued to users for reference purpose. The library supported 3346 pages of reprint requests from journal articles. It provided email-based reminder services like 7-day advance alert, long overdue notice and check-in information. 40000 books from the workers' circulating library were circulated for lending and reference during this period.

(ii) Inter-library loan: 35 Books and journals were borrowed from other libraries, while 103 books and journals were lent to other libraries.

(iii) Current Awareness Service: 12 monthly lists of current additions to the library were made available online.

(iv) Self-Photocopying Service: The library provided the Self-photocopying service in its periodical section which was available everyday throughout the library hours. During this period 18000 pages were photocopied from the journals.

(v) Electronic Document Delivery Service: Full-text articles and/or bibliographical data were provided through email from online resources. Besides electronic document delivery, 2000 pages of printouts were also supplied against demand.

(vi) Online Full-Text Access to Journals/ Database: During the period under review, the library has provided services from more than 400 online journals and major databases like MathSciNet, Econlit, ScienceDirect, Springer Link, IEL Online (IEEE/IEE Electronic Library), ACM Digital Library, CIS on WEB, OUP online, JSTOR, Web of Science-SCIE etc. The online access is available through campus-wide network.

(vii) Reprographic & Photographic Service: During the year, it provided around 356267 pages of photocopies, 275 graphic designs, 3005 scanned pages, 3500 pages of color and b/w pages of print outs, 6758 copies of plates, 6267 pages of color photocopies, and 175 spiral bindings, laminated 650 pages.

(viii) Documentation Service: A searchable bibliographic database has been prepared on scientific contributions made by the ISI scientists on all subject fields since 1934. The entries are currently being subjected to editing.

(ix) General Enquiry Assistance & Consultation Service.

Special Initiatives:

(i) Consortia arrangements: During the reporting year, the Library has further strengthened the consortia initiative to enhance the electronic collection and online access to scholarly resources to cope up with the increasing subscription cost and diminishing budget.

(ii) Preservation and conservation: Total 800 books, 1000 journals were bound. Lamination and de-acidification of 11 rare books of 3059 pages, fumigation of 273 books, photocopying of 4 rare and out-of-print books were executed during this period.

(iii) Institutional Repository (IR): A prototype of IR of ISI has been created. Currently it covers metadata of about 800 ISI research papers, full text of all convocation addresses and some Ph.D thesis that are accessible online.

(iv) Digitization of ISI Question papers: During this period, about 18000 pages of question papers have been digitized and are currently available on compact Disks. These will be made available on the Web after the completion of the work.

Prasanta Chandra Mahalanobis Memorial Museum and Archives

The Museum and Archives carried out regular up keeping programmed for 752 exhibits through 91 panels and a collection of artifacts related to Professor. Mahalanobis displayed in the ground floor, chatal, and Professor's residence along with the pest control programme for the whole building of Amrapali. Among other programmes it had taken up the work of restoration of old film rolls, audio spools etc. through CD conversion (13 nos. audio spools & 2 nos. film rolls), scanning of archival documents (3,500 nos. of document) and conservation of archival materials (4,000 documents). It had also taken up programmes for reprint of guide book and folder.

For the ongoing project of the archives 'Formulation of Archival Description and Authority Records', which reached the final year as pilot project, descriptive authority files had been created for the database files and cataloguing module had been developed in the existing software for archival database.

School students from other states, as well from the city itself visited the museums. The eminent persons and scientists, college and university students were among the visitors of the museum.

Library, Delhi

Indian Statistical Institute, Delhi Centre, maintains an academic library, which aims to be a leading library in the fields of Mathematics, Statistics, Economics, Operations Research and Statistical Quality Control.

The library caters, mainly to the needs of bonafide students, scholars and staff of the Institute. However, it is also open for reference to academic and research users of other educational and scientific institutions of the city and its neighbouring regions. It is an automated library with an extensive collection of books, journals, CDs, reports, govt. publications and other documents in print and electronic formats. Some of the main activities of the library during the period under review were as under:

Collections

The library purchased 287 books, during the period April 01, 2009 to March 31, 2010 both from the regular and NBHM funds. Received 60 books as gift. Thus raising the stock to 47005 volumes (Books + Journals). During the period under review, 252 titles of journals, both foreign as well as Indian have been renewed.

The library renewed online access to the Elsevier Science journals, Springer-Kluwer journals, JSTOR archive, OUP journals through the Consortium among the three centers of ISI. It has also renewed the MathSciNet with the American Mathematical Society and Academic Membership with SIAM through consortium arrangements. Access to Online databases such as "Current Index to Statistics" (CIS) and "EconLit" has also been renewed. It has renewed to Web of Science-SCIE among three centers.

Membership: During the period, 114 members availed of the lending facilities as permanent members of the library and 363 members were provided reference facilities as temporary members of the library.

Exchange programme: Exchange programme established with some of the Scientific Institutions in the regions of Netherlands, China, Korea, Poland, Spain and Vietnam for getting their publications in

exchange for our journal "Sankhya" - Indian Journal of Statistics and "Texts and Readings in Mathematics".

Circulation: More than 5092 books and other documents have been circulated among the members. During the period under review, 16 publications were borrowed on Inter-library loan from the neighbouring Institute libraries. 19 books were lent out to other Institutes under the same program.

Reprographic Services: More than 12442 pages have been Xeroxed and made available to both the permanent and temporary members of the library and outsiders. 185 requests both from internal staff (faculty and research scholars) and 95 from outsiders were received. Library also provided Xerox facilities to 45 outsiders under NBHM programme.

Online Full-Text Access to Journals: During the period under review, the library has provided Online services from more than 500 Consortia based Online journals. These Online journals have been listed on the web with direct access to the publisher's web page under the heading "Electronic Journals"

Electronic Document Delivery Service: In addition to Xerox facilities, 210 full texts articles were provided through email to 60 research scholars from Online journals under NBHM programme.

Current Awareness Service: The following lists were brought out regularly from the library:

(i) Monthly list of current periodicals (Online)
(ii) New additions (books) Online
(iii) Current Contents of journals (print form)

Brought out monthly issues of the "Current Contents" of Journals, by photocopying the contents page of each journal received at ISI, Delhi Centre library. During period (June 2009 to February 2010) the Current Contents issues of 38650 pages were distributed to 34 departments of Statistics and Mathematics of Universities in the Northern region.

Web-OPAC: The Users have been given an access to the complete Catalogue of the library holdings through the CATALOG-OPAC. A Web search engine has been provided in the library Home page.

NBHM Regional Library: ISI, Delhi Centre Library being the regional library to serve the Northern Region, received an additional grant from National Board for Higher Mathematics (NBHM), for strengthening its resources in Mathematics and statistics. From NBHM grant, library purchased 166 books and subscribed/renewed 62 journals in the field of Mathematics and Statistics.

Library, Bangalore

Indian Statistical Institute Bangalore Centre Library is aiming to be identified as a model library in the Indian academic scenario. The library is providing many modern library services using Internet and they are popularly known as Web based information services. Bangalore centre Library has recently tried to initiate Lib 2.0 applications where in users are made more interactive. The library has developed a very distinguished collection in the different knowledge domains namely Mathematics, Statistics, Economics, Quality control and Operations Research and Library and information Science. Latest addition to this list is neural networks, spatial data analysis and communication networks. Various services are designed to meet the information needs of the faculty members, students, research scholars and visiting scientists. Walk in users from other research institutes and universities are also permitted to use the reading facility of the library.

The following activities were undertaken by the library to achieve the aim during the year April 2009-March 2010.

Collection Development: As a result of the establishment of a new Unit namely System Science and Informatics Unit at the Bangalore centre, additional grant was given to the Library as start up grant to develop collection in the new area of study to support the faculty of the new unit. In order to meet the Collection development needs a "BOOK EXHIBITION" was arranged on 11-12 Feb, 2010 at the library premises.

The library purchased 608 books during this period of the report and thus amounting to a total of 29126 accessioned books in the library. The library received 110 books as complimentary. So the total books accessioned on gratis during this period are 2084. The library subscribed to 294 journals out of which 9 are in electronic format and rest in hard copy format. 8 titles were received as gratis. 12 journal titles were subscribed from NBHM grants. Additionally Library has subscribed to "IEL ONLINE" which gives access to whole lot of journals and technical reports published by IEEE. During this period 873 bound volumes were added to the shelf and thereby leading to 15058 bound volumes in the library. Around 260 CD_ROMS were added to the collection, which was a part of purchased books. 38 E-Books from World Scientific Publishing is the latest addition to the Collection of Bangalore Centre Library.

Technical Processing: Total number of books classified and catalogued during this period is 220.

Membership: 127 registered users enjoyed the library facilities and the services. Also these facilities were extended to 1526 walk-in users during this period.

Library Services

Circulation Service: Around 5960 books and 720 bound volumes of journals were circulated during this period. 1675 loose issues of journals were issued overnight to users.

Inter Library Loan Service: ISI Bangalore Central Library has been identified as one of the best libraries in the select fields of study. As a result and also due to good liaison amongst local libraries the library has been involving itself in providing inter library loan service. Library has attended 350 inter library loan requests. The library has borrowed 22 books from the other research libraries on ILL.

Document Delivery Service: Under this service around 116 documents provided to the registered users from e-versions of the journals.

Reprographic Service: During this period 36180 xerox copies were supplied to the library users.

Web based library services: The library has devised various services using World Wide Web. It has access to around 450 journals. The library also provides access to LISA, Mathscinet, Current index to statistics, Web of Science.

Current Awareness Service: Library regularly compiles a bi-monthly list of books procured and a monthly service of "Current contents" of journals. This "Journal Current Contents Alert" service is provided to the scholarly community of ISI.

Center for Soft Computing Research: A National Facility

Image Processing

An automatic exact histogram specification technique has been proposed and used for global, mean brightness preserving, dynamic and local contrast enhancement of images. A new method of measuring image contrast based on local band-limited approach and center-surround retinal receptive field model has also been devised. This method works at multiple scales (frequency bands) and combines the contrast measures obtained at different scales using L^p-norm. In comparison to a few

existing methods, the effectiveness of the proposed automatic exact histogram specification technique in enhancing contrasts of grayscale and color images has been demonstrated through qualitative analysis and the proposed image contrast measure based quantitative analysis.

D. Sen and S. K. Pal

Multi Objective Evolutionary Algorithm (MOEA) based methodology has been used for automatic Remote Sensing Image Enhancement. The effectiveness of MOEA was also demonstrated for selecting optimal transformation function (modulation operator) for digital watermarking by optimizing imperceptibility and robustness.

D. Bhandari, C. A. Murthy and S. K. Pal

Cognitive Vision

The extra-classical receptive fields (that are frequently present in retinal, LGN as well as cortical level visual networks) have been modeled through an eigenfunction based generalization of the Gaussian Derivative approach that resulted in a modification of Ernst Mach's equation on retinal processing which comprised of the Laplacian operator. This resulted in the introduction of a higher order isotropic derivative (Bi-Laplacian) of Gaussian and a fourth moment operator. The model performs figure-ground segregation in Gestalt sense and provides a holistic view of the image even in a binary map. Most importantly, such higher level perceptual grouping in turn provides cues towards a supposedly lower level phenomenon, viz. predicting the direction of brightness induction.

K. Ghosh

Evolutionary Algorithms

An extension of the optimal stopping criterion of elitist genetic algorithms is being developed, with suitable modification for Multi-Objective Genetic Algorithms (MOGA) framework.

D. Bhandari, C. A. Murthy and S. K. Pal

Swarm Intelligence

Motivated from group forming behavior of real ants, two novel ant based (supervised and unsupervised) algorithms have been proposed to automatically generate land use map from multispectral remotely sensed images. Here supervised land use map generation is treated as classification task which requires some labeled pattern/pixel beforehand, whereas the unsupervised land use map generation is treated as clustering based image segmentation problem in the multispectral space. Experimental results of the proposed algorithms have been compared with corresponding popular state of the art techniques with various evaluation measures. Potentiality of the proposed algorithms has been justified from the experimental outcome.

A. Halder and A. Ghosh

Granular Computing

Granular computing refers to the tools and techniques where computation and operations are performed on information granules (clump of similar objects or points). The main task to be focused is to construct and describe information granules, which play essential roles in human cognition. Generation of informative granules leads to a better retrieval of information and is useful for pattern classification. Two models for pattern classification have been developed, based on granular space. The models use the merits of fuzzy sets, rough sets and wavelet transform, and their hybridization.

S.K. Meher and S.K. Pal

An important problem related to mining large datasets, both in dimension and size, is of selecting a subset of the original features. When class labels of the data are available then supervised feature selection is appropriate, otherwise unsupervised feature selection is used. A new supervised feature selection method has been developed using a granular neural network concept. A novel concept of

granular neural network is integrated in this method in order to establish a relationship between the class labels of data. The superiority of the algorithm in terms of performance is established on a number of datasets.

A. Ganivada and S.K. Pal

Bioinformatics

A new scoring framework, called Biological Score (BS), has been developed by combining the information about genes arising from microarray and other biological data sources. It has a positive predictive value of 0.98 vis-à-vis 0.88 as achieved usually by related scores in predicting the function of unclassified Yeast genes. In this regard, novel functional predictions of 12 unclassified Yeast genes provided some new directions in biological research and the related publication is included in the Saccharomyces Genome Database (SGD) as a curated paper. The importance of soft computing techniques like artificial neural networks (ANN), genetic algorithms (GAs) and simulated annealing (SA) to analyze and interpret RNA sequence data for predicting RNA secondary structure have been investigated.

S.S. Roy and S.K. Pal

Biological domain knowledge, in terms of gene ontology, has been incorporated for feature selection during clustering of microarray gene expression data. This was found to generate improved decision making in the reduced space.

S. Ghosh and S. Mitra

Computer and Statistical Services Centre

CSSC manages the central computing facilities of ISI, Kolkata. It serves approximately 700 users. Software packages available at the centre are – Oracle, Arc GIS, BMDP, Mathematica, SAS, SHAZAM, S-Plus and TSP. The centre manages campus-wide network and internet facilities at ISI, Kolkata, in consultation with the Committee for Extension and Monitoring of Campus Network and Internet Services. The center also manages the inventory of computers in consultation with the Computer Purchase Committee. The centre provides statistical and numerical consultancy services to scientists and research scholars, including non-ISI scientists. The centre occasionally conducts workshop for training ISI officials on using of computers. The centre organizes courses for North-eastern states of India. Members of CSSC take part in teaching different courses of the institute. Members of CSSC supervise project work of non-ISI students studying MCA, B-Tech, etc.

3. PROJECTS

Internally Funded Projects

Ongoing Projects

Sl. no.	Name of the project	Principal Investigator(s)	Unit(s) involved
Applied Statistics Division			
1.	Bayesian Modelling and Inference for Directional Data	Sourabh Bhattacharjee	BIRU
Computer and Communication Sciences Division			
1.	Techniques for Robust Physical Design of nanometer ICs	S. Sur-Kolay	ACMU
2.	Energy-efficient Routing in Mobile Ad-hoc Networks	Nabanita Das	ACMU
3.	Geometric Covering Problems	Subhas C. Nandy	ACMU
4.	Moving Guards in Polygonal Environment	Sandip Das	ACMU
5.	Offline handwritten document processing	B.B. Chaudhuri	CVPR
6.	Multi-lingual document analysis	U. Pal	CVPR
7.	Bangla WordNet for NLP	B.B. Chaudhuri	CVPR
8.	Pattern analysis using Artificial Immune Systems	U. Garain.	CVPR
9.	Improvement of algorithms for the analysis and correction of hearing disabilities	S. Palit	CVPR
10.	Sub-document level information retrieval	M. Mitra	CVPR
11.	Automatic reading of texts in camera captured images	U. Bhattacharya	CVPR
12.	Prediction of Radiation Fog using DNA Computing	K.S. Ray	ECSU
13.	Protein Fold Prediction using Short Structural Motifs (Building Blocks)	N.R. Pal	ECSU
14.	Content Based Video Indexing and Retrieval using Rectilinear Motion	B. Chanda	ECSU
15.	Studying Meaningfullness of Image and Video Content	D.P. Mukherjee	ECSU
16.	Rough-Fuzzy Hybridization for Clustering Large Biological Databases	P. Maji	MIU
17.	Soft Data Mining for Analysis of Gene Expressions	S. Mitra	MIU
18.	Development of pattern recognition and machine learning tools for solving certain problems in systems biology - II	R.K. De	MIU
19.	An Integrated Approach to Rational Drug Design	S Bandyopadhyay	MIU
20.	Soft Computing approach to watermarking and semantic based retrieval of image and video frames. (Phase-II)	M.K. Kundu	MIU

Projects

21.	Face Recognition in color images	C.A. Murthy	MIU
22.	Fuzzy Information Retrieval: Question Answering Paradigm	D.P. Mandal	MIU
23.	Rough sets and Granular Computing to Image Processing Applications.	B. Uma Shankar	MIU
24.	Evolutionary computation and data mining	C.A. Murthy	MIU
Physics and Earth Sciences Division			
1.	Depositional systems and sequence stratigraphy of the Vindhyan inlier of the Hosangabad-Bhopal area	C. Chakraborty	GSU
2.	Sediment transportation and sorting processes in sand-pebble mixture in experimental channel and their geological implications	R. Mazumder	GSU
3.	Physicochemical Studies on Organized Assemblies (Microemulsions/ Reverse Micelles) of Mixed Surfactants	B.K. Paul	GSU
4.	Talchir Sedimentation	P.K. Maulik	GSU
5.	Growth and evolution of Meso-Neoproterozoic carbonate platforms in the Chattisgarh and Cuddapah basins, south India: Tectonic and palaeogeographic implications	S. Patranabis Deb	GSU
6.	Geochronological constraints on tectonic assembly and dispersion, in relation to the Eastern Ghats Orogen	S. Bhattacharya	GSU
7.	Diversity of Mesozoic terrestrial tetrapods with special reference to Rewa, Satpura and Damodar basins	D.P. Sengupta	GSU
8.	Experimental investigations on the genesis of obstacle marks and their implications for the generation of current crescents	B.S. Mazumder	PAMU
Biological Sciences Division			
1.	Study of Molecular Genetic Diversity of some degraded Mangroves of Sundarbans	S. Das	AERU
2.	Introducing Tropical Sugar Beet 'TSB' (*Beta vulgaris* L.) in different places of West Bengal: A Study on Yield Performance and commercial potentialities	S. Barik	AERU
3.	Development and value addition of innovative agro-entomotoxic materials from natural sources:	A. Goswami	AERU
4.	Integrated Nutrient Management for Sisal cultivation in laterite soil of Girdih, a Sub-Tropical Plateau Region of India	M. Ghose	AERU & Stat-Math Unit
5.	Mycorrhizal status of Mangroves of the Sundarbans	M. Ghose	AERU

6.	Monitoring of pond biodiversity to assess the ecological status of ponds	A. Dewanji	AERU & ASU
7.	Allelopathy in Natural and Manipulated Ecosystems – with reference to root exudates, leaf leachates and fruit pulp	S. Mandal Biswas	AERU
8.	Exploration of Plankton Dynamics and Associated Ecosystems: Field study, Laboratory Experiment and Mathematical Modeling	J. Chattopadhyay	AERU
9.	Chemical and Microbiological Studies on Haritaki (*Terminalia chebula* Retz.) against Uropathogenic *Escherichia coli*	R.R. Chattopadhyay	AERU
10.	A Moleculer genetic study of couples with recurrent spontaneous abortions	B.M. Reddy	BAU
11.	Diet, Activity and Aging: A Prospective Study among the Elderly of Kolkata	B. Mukhopadhyay	BAU
12.	Elucidation of the functional significance of potentially susceptible genetic variants of the host and virus implicated in epithelial cell carcinoma with special reference to HPV16/18 associated cervical cancer and oral cancer	B. Roy and S. Sengupta	HGU
13.	Studies on expression status of microRNAs	B. Roy	HGU
Social Sciences Division			
1.	Generation of Differentiated Electronic Lexicon for Bangla	Probal Dasgupta	LRU
2.	Interlexical Study of Assamese and Boro Nominal Items	Probal Dasgupta	LRU
3.	Labor Productivity in the Indian Steel industry: A Study of the Rail and Structural Mill of the SAIL Plant in Bhilai	E.Somanathan & Rohini Somanathan (Delhi School of Economics)	Planning Unit
4.	Sectoral Policies and Sectoral reallocation in the Growth Process	Chetan Ghate & Gerhard Glomm (Indiana University)	Planning Unit
5.	Adult Literacy, Human Capital Accumulation, and Economic Growth.	Chetan Ghate & Gerhard Glomm (Indiana University)	Planning Unit
6.	Optimal Compensation with Team Work: An Experimental Investigation.	Priyodorshi Banerjee	Planning Unit
7.	Long-run Impact of Displacement on Income and other Component of Well-being.	E. Somanathan & Rohini Somanathan (Delhi School of Economics)	Planning Unit
8.	The Economic Causes of Crop Residue Burning in the Rice-Wheat System of the Indo-Gangetic Plain.	Ridhima Gupta (ISI, Ph.D Student) & E. Somanathan	Planning Unit
9.	Multiple Decrement tables in population Health Insurance Policies	Arni S.R. Srinivasa Rao	PSU

Projects

10.	Emotional Display Rules and Personality Pattern Across Different Groups of Individuals.	Anjali Ghosh	Psychology Research Unit
11.	Bullying in School and its effect on behavioral aspects of School Students	Rumki Gupta	Psychology Research Unit
12.	Self-efficacy of agricultural farmers	D. Dutta Roy	Psychology Research Unit, SRU & AGU
13.	Evaluation of child labour welfare programmes through the study of child labour schools in North 24 Parganas, West Bengal	Aniruddha Chakravarty	SRU
Statistical Quality Control and Operations Research Division			
1.	Development of Classification Scheme for Sliver Defects of Interstitial-free Steel towards Optimization of the Steel Processing System	Prasun Das	SQC & OR, Kolkata
Library, Documentation and Information Sciences Division			
1.	Restoration and Digitization of Photo Archives of ISI	Nibedita Ganguly	Library, Kolkata
2.	Standard Subject Index	Sutapa Saha	Library, Kolkata
3.	Digital Repository of Contribution of ISI Scientist	Ashis Pal	Library, Kolkata
4.	Growth and Development of ISI Library: 1931-2009	Aloka Sarkar	Library, Kolkata

Completed Projects

Sl. No.	Name of the project	Principal Investigator(s)	Unit(s) involved
Theoretical Statistics and Mathematics Division			
1.	How much market is influenced by big traders	Gopal K. Basak	Stat-Math Unit, Kolkata
Applied Statistics Division			
1.	Investigation of Global Dynamics of Nonlinear Cellular Automata	Prabitra Pal Choudhury	ASU
Computer and Communication Sciences Division			
1.	Mine Telephony	Bhabani P. Sinha	ACMU
2.	Floorplan Optimization for Nanobiochips	Bhargab B. Bhattacharya	ACMU
3.	Localization in Wireless Sensor Networks	Krishnendu Mukhopadhyaya	ACMU
4.	Facet Analysis and Enhancement of Information Retrieval in the Digital Environment	K.S. Raghavan	DRTC
5.	Digital Libraries	Devika P. Madalli	DRTC
6.	Development of Automatic Weather Station for Collection of Atmospheric Data	N.C. Deb	ECSU
7.	Development of algorithms for protein analysis: Applications in rational drug design	S. Bandyopadhyay	MIU

8.	Development of pattern recognition and machine learning tools for solving certain problems in systems biology.	R.K. De	MIU
Physics and Earth Sciences Division			
1.	Tectonosedimentary evolution of the Talchir Gondwana basin, India	P.K. Maulik	GSU
2.	Diversity of Mesozoic terrestrial tetrapods of the Gondwana basins of India with special reference to the Rewa, Satpura and Damodar basins	D.P. Sen Gupta	GSU
Biological Sciences Division			
1.	Studies on Genetic Epidemiology and Diversity in Indian Populations	P.P. Majumder	HGU
2.	Studies on Genomic Diversity and Affinities in Ethnic Populations of Northeast India	P.P. Majumder	HGU
Social Sciences Division			
1.	Equilibrium Play and Learning in the Decentralized Voluntary Provision of Public Goods	Priyodorshi Banerjee	Planning Unit
2.	Measuring the Burden of Cancer on Households	Abhiroop Mukhopadhyay	Planning Unit
3.	Inter-State comparison of the empowerment of women in rural areas	Bhola Nath Ghosh	SRU
Library, Documentation and Information Sciences Division			
1.	Retro-Conversion of Workers' Circulating Library's Catalog	Tapan Kr. Mondal	Library, Kolkata
2.	Formulation of Archival Description and Authority Records	Krishna Bhattacharya	PCM Museum & Archive, Kolkata
3.	Reclassification of selected areas of Library Collections	Sikha Bhowmick	Library, Kolkata
4.	ISI: Reminiscences Platinum Jubilee	Nibedita Ganguly	Library, Kolkata

Externally Funded Projects

Ongoing Projects

Sl. no.	Name of the project	Principal Investigator(s)	Unit(s) involved	Funded by
Theoretical Statistics and Mathematics Division				
1.	A study of Asymptotic Properties of Records	Sreela Gangopadhyay	Stat-Math Unit, Kolkata	Dept. of Scinece & Technology (DST), Govt. of India
2.	Non Commutative Geometry and Quantum Groups	Debashish Goswami	Stat-Math Unit, Kolkata	INSA

Projects

3.	Atiyah-Singer Index theorem and Gauge-theoretic Physics	Amiya Mukherjee	Stat-Math Unit, Kolkata	DST
4.	J.C. Bose Fellowship	Arup Bose	Stat. Math. Unit, Kolkata	DST
5.	Random Geometric Graphs	Rahul Roy	Stat-Math Unit, Delhi	DST
6.	Interacting Particle Systems: Scaling Limits and Long Term properties	Siva Athreya	Stat-Math Unit, Bangalore	CSIR
7.	Dynamic Random Walks on Algebraic Structures	C.R.E. Raja (along with R. Schott of UHP, Nancy)	Stat-Math Unit, Bangalore	IFIM
Applied Statistics Division				
1.	Universal one-way Hash Family (UOWHF)	Bimal Roy	ASU	WESEE, Ministry of Defence
2.	Research and Development of some Cryptographic Primitives	Bimal Roy	ASU	Ministry of Information Technology
3.	Exploratory Paradigms in Visual Cryptography	Bimal Roy	ASU	WESEE, Ministry of Defence
4.	Robust implementation of a Variant of the Rajndael (AES)	Palash Sarkar	ASU	WESEE, Ministry of Defence
5.	Analysis of Cryptographic Algorithms & Evaluation on Enhancing Network Security Based on Mathematical Science	Bimal Roy	ASU	DST
6.	International Passenger Survey in India 2008-2010	Ashis SenGupta	ASU	Ministry of Tourism, Govt. of India
7.	Design and Development of Database and Analytical Tools for Microarray Data on *Leishmania donovani* Parasite	Ashis SenGupta	ASU	Ministry of Science & Technology, Govt. of India
8.	Language and Brain Organization in Normative Multilingualism	Sumitra Purkayastha	BIRU	DST
Computer and Communication Sciences Division				
1.	New Techniques of Fast Image Compression based on Human Vision Systems and Geometric Data Structures.	B.B. Bhattacharya & M.K. Kundu	ACMU MIU	Intel Corporation, USA
2.	Delay Fault Modeling and Test Generation for Power Supply Noise	S. Sur-Kolay & B.B. Bhattacharya	ACMU	Intel Corporation, USA
3.	Online Handwritten Character Recognition using Character Sub-Strokes and Discriminative	S.K. Parui	CVPR	HP Research Lab, Bangalore
4.	Online Handwriting Recognition – Bangla	S.K. Parui	CVPR	Dept. of Information Technology (DIT), Govt. of India

5.	Development of Robust Document Analysis and Recognition Systems for Indian Printed Scripts	B.B. Chaudhuri	CVPR	DIT
6.	Cross-Language Information Access System (CLIA)	M. Mitra	CVPR	DIT
7.	Living Knowledge	A.R.D. Prasad & Devika P. Madalli	DRTC	European Union Commission
8.	To predict the meteorological images from given sequences of images. (MOP-II)	B. Chanda	ECSU	Indian Space Research Organisation (ISRO).
9.	Advanced Techniques for Remote Sensing Image Processing - Phase II	A. Ghosh	MIU	DST and University of Trento
10.	Processing and Analysis of Aircraft Images with Machine Learning Techniques for Locating Objects of Interest	A. Ghosh	MIU	US Army
11.	Computational Methods for microRNA Target Detection and its Role in Cancer Development	S. Bandyopadhyay	MIU	DST (Swarnajayanti Fellowship Scheme)
12.	Distributed Knowledge Disocvery in Ad Hoc and Sensor Networks for Event Monitoring	S. Bandyopadhyay	MIU	DST
Physics and Earth Sciences Division				
1.	Stratigraphic analysis of the Chattisgarh succession: Implications on Meso-to-Early Neoproterozoic lithospheric dyamics	S. Patranabis Deb	GSU	DST
2.	Mesozoic Gondwana Vertebrates from Madhya Pradesh, India: an integrated Study on paleobiology.	S. Bandyopadhyay (Co PI)	GSU	DST
3.	Sedimentation history of Paleoproterozoic Dhalbhum and Dalma Formations in the Kokpara-Tata sector, eastern India and its implications	R. Mazumder	GSU	DST
4.	Thermal evolution of Penninsular India	S. Bhattacharya	GSU	DST
5.	Nellore schist belt and Proterozoic tectonics of southeastern margin of India.	D. Saha	GSU	DST
6.	Influence of bedforms on turbulent characteristics and its implications to sedimentology: An experimental study	B.S. Mazumder	PAMU	DST
7.	Image processing technique to study the particle behavior in the near wall region of turbulent open channel flow	B.S. Mazumder	PAMU	CSIR
8.	Digital imaging technique for investigations of particle-fluid interactions due to turbulent flow	Anindita Bhattacharya, (DST Fast Track Young Scientist)	PAMU	DST

Projects

9.	Water wave scattering and associated mathematical techniques	B.N. Mandal	PAMU	National Academy of Sciences India (NASI)
Biological Sciences Division				
1.	Farm household Survey (Purulia District) for Study of Agricultural Development and Poverty in Remote Rural Villages in Eastern India	P. Banik	AERU	East-West Center, USA
2.	Development of information on agricultural and horticultural production and their marking using RS and GIS in some district of West Bengal	P. Banik	AERU	DST, West Bengal
3.	Studies on Environmental and Ecological Aspects of Mangrove Biology	M. Ghose	AERU	University of Western Sydney, Australia.
4.	Development of agro-entomotoxic nanoparticles and their use in medical science: applied and basic aspects	A. Goswami	AERU	Department of Biotechnology, Govt. of India
5.	Designing, and studying mode of action and biosafety of nanopesticides	A. Goswami	AERU	ICAR (NAIP), India
6.	Process for the protein-assisted nanocomposite synthesis of silica-protease/chitinase-humic acid (Si-Protease/Chitinase-Has) as bioencapsulated pesticides	A. Goswami	AERU	Department of Biotechnology, Govt. of India
7.	Physical Growth, Body Composition and Nutritional Status of the Bengali School aged children, Adolescents and Young adults of Calcutta, India. Effects of Socioeconomic factors on secular trends.	P. Dasgupta	BAU	The NHF, The Netherlands
8.	DNA Sequence Variation in Human Populations of India: Assessing the Roles of Evolutionary History and Gene Function, with Special Reference to Complex Diseases	P.P. Majumder	HGU	Department of Biotechnology, Govt. of India
9.	Statistical Methods For Mapping Multivariate Phenotypes	S. Ghosh	HGU	Fogarty International Center, NIH
10.	Studies on expression and analysis of miRNA genes in oral cavity cancer and precancer: Significance in marker development and pathogenesis	B. Roy	HGU	Department of Biotechnology, Govt. of India
11.	Host-virus interactions at the genetic and epigenetic levels in HPV related cervical cancer in Indian women	S. Sengupta	HGU	Department of Biotechnology, Govt. of India
12.	Statistics in Genetic Medicine: Developing Methods for Quantitative Trait Locus Mapping and Estimating Genotype-Environment Interactions	S. Ghosh	HGU	ICMR

Social Sciences Division				
1.	Survey of Present Status of Model Steel Villages (MSVs) – evaluation and monitoring	Snigdha Chakrabarti	ERU	Steel Authority of India
2.	Impact of Economic Reform on Tribal Poverty	Kunal Chattopadhyay	ERU	NABARD
3.	Language & Brain Organization In Normative Multilingualism.	Probal Dasgupta	LRU	DST
4.	Indian Language Corpora Initiative (ILCI)	Niladri Sekhar Dash	LRU	DST & MICT
5.	Economic Mechanisms to Create and Preserve Habitat Connectivity in the Western Ghats of India	E. Somanathan	Planning Unit	The University of Melbourne, Australia
6.	Estimation of Technical Manpower Requirement through Effective Means for Improving Quality of Training of Technicians	Prasanta Pathak	PSU	Govt. of West Bengal
7.	Combating infectious diseases of livestock in developing countries	Arni S.R. Srinivasa Rao	PSU	BBSRS/ DFID, United Kingdom
8.	Molecular epidemiology and development of Reagents for Diagnostics and Vaccines	Arni S.R. Srinivasa Rao	PSU	Department of Biotechnology, Govt. of India
Statistical Quality Control and Operations Research Division				
1.	Training on Problems Solving	P.K. Perumallu & A.R. Chowdhury	SQC & OR Unit, Bangalore	Hindustan Aeronautics Limited, Bangalore
2.	Six Sigma Black Belt	U.H. Acharya, E.V. Gijo, A.R. Chowdhury, Sanjit Ray & Somnath Roy	SQC & OR Unit, Bangalore	Bharat Electronics Limited, Bangalore
3.	Quality Improvement	Sanjit Ray	SQC & OR Unit, Bangalore	J K Industries Ltd., Mysore
4.	Six Sigma Black Belt Training	Boby John	SQC & OR Unit, Bangalore	Infosys BPO Limited, Bangalore
5.	TS 16949 Certification Audits	P.K. Perumallu	SQC & OR Unit, Bangalore	NQA India Operations Ltd., Bangalore
6.	Six Sigma Implementation	U.H. Acharya, A.R. Chowdhury, E.V. Gijo & Somnath Roy	SQC & OR Unit, Bangalore	Qualmind Global, Bangalore
7.	Six Sigma Training	K.K. Chowdhury	SQC & OR Unit, Bangalore	TUV Academy Germany & Iran

Projects

8.	Program on Business Analytics & Optimization	Boby John	SQC & OR Unit, Bangalore	TESCO Hindustan Service Centre Pvt. Ltd. Bangalore
9.	Business Analytics & Optimization	Boby John	SQC & OR Unit, Bangalore	Honeywell Tec. Solutions Lab. Pvt. Ltd., Bangalore
10.	S.P.C. Implementation	A.R. Chowdhury & U.H. Acharya	SQC & OR Unit, Bangalore	National Engineering Industries Ltd., Jaipur
11.	TQM and Six Sigma Training	U.H. Acharya, E.V. Gijo, A.R. Chowdhury, Sanjit Ray & Somnath Roy	SQC & OR Unit, Bangalore	National Academy for Defence Production, Nagpur
12.	Six Sigma Black Belt Training	U.H. Acharya, E.V. Gijo & A.R. Chowdhury	SQC & OR Unit, Bangalore	TVS Motor Company, Harita, Hosur
13.	Six Sigma Green Belt Training	U.H. Acharya, Sanjit Ray & P.K. Perumallu	SQC & OR Unit, Bangalore	Ordnance Factories Institute of Learning. Nagpur
14.	Software Reliability Modeling	Boby John	SQC & OR Unit, Bangalore	Cognizant Tec. Solutions India Pvt. Ltd., Bangalore
15.	Quality Management Training	K.K. Chowdhury	SQC & OR Unit, Bangalore	ISQT Process & Consulting Services, Bangalore
16.	Six Sigma Training	E.V. Gijo	SQC & OR Unit, Bangalore	Intent Global Management Services, Trivandrum
17.	Advanced Statistical Techniques for Six Sigma Black Belts	Boby John	SQC & OR Unit, Bangalore	First Source Solutions Pvt. Ltd., Bangalore
18.	S.P.C. Training	P.K. Perumallu	SQC & OR Unit, Bangalore	HAL, Aircraft Division, Bangalore
19.	Development of Service level Agreement (SLA)	Boby John	SQC & OR Unit, Bangalore	Wipro technologies, Bangalore
20.	Six Sigma Green Belt Training	A.R. Chowdhury, E.V. Gijo, U.H. Acharya & Somnath Roy	SQC & OR Unit, Bangalore	Tata BP Solar
21.	Quantitative Project Management	Boby John	SQC & OR Unit, Bangalore	Robert Bosch, Bangalore
22.	Six Sigma Black Belt	A.R. Chowdhury	SQC & OR Unit, Bangalore	Praxair India Ltd., Bangalore
23.	Quality Improvement	Sanjit Ray	SQC & OR Unit, Bangalore	Triveni Engg. Ltd., Bangalore

24.	Field Theory Data Analysis	P.K. Perumallu	SQC & OR Unit, Bangalore	Meyer, Turkey
25.	Six Sigma Green Belt Training	E.V. Gijo	SQC & OR Unit, Bangalore	Quality Management Services, Trivandrum.
26.	S.P.C. Training	Somnath Roy	SQC & OR Unit, Bangalore	ITC Tobacco Technology Center.
27.	Training Program on Six Sigma Black Belt	D. Sampangi Raman	SQC & OR Unit, Chennai	Vodafone Essar South Limited, Chennai
28.	Training Program on Six Sigma Green Belt Certification	D. Sampangi Raman	SQC & OR Unit, Chennai	Apollo Hospitals Enterprise Limited, Chennai
29.	Sampling Techniques	D. Sampangi Raman	SQC & OR Unit, Chennai	ITC Limited, Chennai
30.	Statistical Process Control	D. Sampangi Raman	SQC & OR Unit, Chennai	JSW Steel Limited, Salem
31.	Implementation of Control Charts at the Shop Floor	Rina Chakravorty	SQC & OR Unit, Delhi	HEG, Bhopal
32.	Application of Statistical & Quality Management Methodology for Process Improvement	G Murali Rao	SQC & OR Unit, Hyderabad	Quislex Legal Services Pvt. Ltd.
33.	Development of Statistical Procedures for improving operations management	A.L.N. Murthy & G.S.R. Murthy	SQC & OR Unit, Hyderabad	Central Power Distribution Corporation of AP (APCPDCL)

Completed Projects

Sl. no.	Name of the project	Principal Investigator(s)	Unit(s) involved	Funded by
Theoretical Statistics and Mathematics Division				
1.	Swarnajayanthi Fellowship	B.V. Rajarama Bhat	Stat-Math Unit, Bangalore	DST
Applied Statistics Division				
1.	Accountability of Some Traditionally Managed Natural Resources in the Practice of Ethodietetics and Ethnomedicine	Tapas Samanta	ASU	National Innovation Fundation, Ahmedabad
Computer and Communication Sciences Division				
1.	Workshop on Digital Image Processing and Synthesis (under GeoICT – IDH hampi – Capacity Building and Training programme)	Bhabatosh Chanda	ECSU (jointly with SCC)	DST

Projects

Social Sciences Division				
1.	Estimating Poverty at the District Level: A Methodological study	Amita Majumder	ERU	United Nations Development Programmes and Govt. of India (UNDP & GoI)
2.	ISI-ERU & SINP-CAMCS Collaboration	Manipuspak Mitra	ERU	Saha Institute of Nuclear Physics (SINP)
3.	Construction and Analysis of Regional Variations of Social Development Indices in India	Buddhadeb Ghosh	ERU	Ministry of Statistics and Programme Implementation, Govt. of India (MOSPI & GoI)
4.	Development of Methodology Towards Measurement of Poverty	Manoranjan Pal	ERU	MOSPI
Statistical Quality Control and Operations Research Division				
1.	Executive Development Programs	A.L.N. Murthy &. G. Murali Rao	SQC & OR Unit, Hyderabad	BHEL, Corporate Quality
2.	Training on Statistical Process Control & Design of Experiments	A.L.N. Murthy & G. Murali Rao	SQC & OR Unit, Hyderabad	Solar Semiconductor
3.	Lean Manufacturing	A.L.N. Murthy & G. Murali Rao	SQC & OR Unit, Hyderabad	Ordnance Factory Institute of Learning, Medak
4.	Development of Robust Methodology for AGL Power consumption estimation	A.L.N. Murthy & G.S.R. Murthy	SQC & OR Unit, Hyderabad	Transmission Corporation of AP (APTRANSCO)
5.	Training on Statistical Methods for Product Process Improvement	A.L.N. Murthy & G. Murali Rao	SQC & OR Unit, Hyderabad	Matrix Laboratories Ltd.
6.	Training on Design of Experiments	S. M. Subhani	SQC & OR Unit, Hyderabad	Matrix Laboratories Ltd.
7.	Training on Measurement Systems Analysis	S. M. Subhani	SQC & OR Unit, Hyderabad	Rane Engine Valves Ltd.
8.	Improving profitability by controlling product mix	Amitava Bandyopadhayay	SQC & OR Unit, Kolkata	CRODA Chemicals
9.	Improving revenue productivity of ADM projects	Amitava Bandyopadhayay	SQC & OR Unit, Kolkata	Wipro Ltd.
10.	Developing forecasting model to predict day-ahead price of electricity in PJM market	Amitava Bandyopadhayay	SQC & OR Unit, Kolkata	Wipro Ltd.
11.	Developing productivity measures for maintenance projects	Amitava Bandyopadhayay	SQC & OR Unit, Kolkata	Patni Computers
12.	Developing system to assess vulnerability of large number of desktop and laptop computers	Amitava Bandyopadhayay	SQC & OR Unit, Kolkata	Infosys

13.	Developing strategy to improve revenue productivity of software projects	Amitava Bandyopadhayay	SQC & OR Unit, Kolkata	Infosys
14.	QMS and EMS Implementation Support	Ranjan Sett	SQC & OR Unit, Kolkata	DIC India Ltd.
15.	Training and Implementation of SQC Techniques.	Abhijit Gupta & Prasun Das	SQC & OR Unit, Kolkata	NALCO, Damanjodi
16.	Application of statistical and Quantitative methods for improvement initiatives	Anup Majumdar and Ranjan Sett	SQC & OR Unit, Kolkata	Tata Steel Ltd, Noamundi
17.	Data Quality Management for the department of Petroleum Planning Analysis and Control (PPAC) Government of India	S.K. Majumdar, Anup Majumdar & Amitava Bandyopadhayay	SQC & OR Unit, Kolkata	Petroleum Planning Analysis and Control (PPAC) Government of India
18.	Six Sigma Implementation	A. Sarkar	SQC & OR Unit, Mumbai	Larsen & Toubro Ltd
19.	Training on Six Sigma Green Belt	A. Sarkar	SQC & OR Unit, Mumbai	ICICI Bank
20.	Training on Six Sigma Green Belt	A. Sarkar	SQC & OR Unit, Mumbai	ICICI Lombard Insurance
21.	Six Sigma Implementation	A. Sarkar	SQC & OR Unit, Mumbai & Bangalore	HDFC Standard Life Insurance
22.	Six Sigma Implementation	A. Sarkar	SQC & OR Unit, Mumbai	SQC & OR Unit, Bangalore
23.	Application of Design of nano Particle Project	S. Rath	SQC & OR Unit, Pune	ARAI, Pune
24.	Consultancy in Six Sigma Deployment	S. Rath	SQC & OR Unit, Pune	ARAI, Pune
25.	SPC Training Prorammes	S. Rath	SQC & OR Unit, Pune	HEG ltd. Bhopal
26.	Problem Solving Approach – Training Programmes	S. Rath	SQC & OR Unit, Pune	ACC
27.	Six Sigma – Green Belt Training Programme	S. Rath	SQC & OR Unit, Pune	Marico, Mumbai
28.	Six Sigma Assignment	S. Rath	SQC & OR Unit, Pune	RIL, Hazira
29.	Analysis of Customer Survey Data	S. Rath	SQC & OR Unit, Pune	Nihilent Technologies Pvt. Ltd., Pune
30.	Six Sigma- Black-belt Programme	S. Rath	SQC & OR Unit, Pune	Marico Ltd., Mumbai
31.	SPC & MSA Training Programme	S. Rath	SQC & OR Unit, Pune	LRQA, Mumbai

North East Projects

Ongoing Projects

Sl. no.	Name of the project	Principal Investigator(s)	Unit(s) involved
Physics and Earth Sciences Division			
1.	*Thrust sequences, cross faults and fault zone rocks in the eastern Himalaya*	*Dilip Saha*	GSU
Biological Sciences Division			
1.	Genetic epidemiology of Malaria and prevalence of Hb E in northeast regions of the country	T.S. Vasulu	*BAU*

Completed

Sl. no.	Name of the project	Principal Investigator(s)	Unit(s) involved
Physics and Earth Sciences Division			
1.	Geomorphology and sedimentology in a foreland basin setting: A study in parts of north-eastern Himalayan foothill regions	P. Ghosh & T. Chakraborty	GSU
Biological Sciences Division			
1.	Studies on Genomic Diversity and Affinities in Ethnic Populations of Northeast India	P.P. Majumder	HGU

4. SYMPOSIA, CONFERENCES, WORKSHOPS, LECTURES AND SEMINARS ORGANISED

Symposia and Conferences

Conference on "*Probability and Stochastic Process*": Stat-Math Unit, Delhi, November 26-28, 2009.

24th Annual International Conference on "*Ramanujan Mathematical Society*": Stat-Math Unit, Bangalore, May 11 – 13, 2009.

International Conference on "*Advances in Statistical Science (AISS 2010) in Celebration of 90th Birth Anniversary of Prof. C.R. Rao*": ASU, Kolkata, January 10-11, 2010.

Conference on "*Semantic Web and Digital Libraries (ICSD-2009)*": DRTC, Bangalore, held at Trento, Italy, September 8-11, 2009.

3rd International Conference on "*Pattern Recognition and Machine Intelligence (PReMI'09)*": MIU, Kolkata with IIT Delhi, held at New Delhi, December 16-20, 2009.

Conference on "*Paleoproterozoic Supercontinents and Global Evolution (UNESCO-IGCP 509)*": GSU, Kolkata, October 26-28, 2009.

5th Annual Conference on "*Growth and Development*": Planning Unit, Delhi, December 16-18, 2009.

Workshops and Training Programmes

Workshop on "*Probability and Stochastic Processes-IV*": Stat-Math Unit, Delhi, November 20-24, 2009.

Instructional Workshop on "*Probability*": Stat-Math Unit, Bangalore, May 14–27, 2009.

Workshop on "*Geometry of Banach Spaces*": Stat-Math Unit, Bangalore, June 1-13, 2009.

Training Programme on "*Nurture contact*": Stat-Math Unit, Bangalore, June 15–July 4, December 10–24, 2009.

National Workshop on "*Statistics in Genomics*": ASU, Kolkata, January 12-15, 2010.

Winter School on "*Computer Applications in Statistics*": ASU, Kolkata, March 8-26, 2010.

Workshop on "*Statistical Software Packages SPSS*" (under North-East Programme): ASU, Kolkata, held at Martin Luther Christian University (MLCU), Shillong, March 29-31, 2010.

Workshop on "*Neural Networks*" (under North-East Programme): BIRU, Kolkata, held in the Department of Statistics, Gauhati University, Guwahati, December 15-17, 2009.

Workshop on "*Graphs: Theory, Algorithms and Applications*" (under North-East Programme): ACMU, Kolkata, held at North Eastern Regional Institute of Science and Technology (NERIST), Nirjuli, Arunachal Pradesh, February 22-25, 2010.

Conferences and Seminars

Second Workshop on "*Forum for Information Retrieval Evaluation*": CVPRU, Kolkata, held at Gandhinagar, February 19-21, 2010.

Workshop on "*Advances in Image and Document Processing*" (under North-East Programme): CVPRU, Kolkata, held at Indian Institute of Management (IIM), Shillong, Meghalaya, March 16-20, 2010.

Workshop on "*Knowledge Transactions*": DRTC, Bangalore, March, 15-17, 2010.

Workshop on "*Digital Image Processing and Synthesis*": ECSU with Centre for Soft Computing Research, Kolkata, December 14, 2009-January 22, 2010.

Winter School on "*Bioinformatics*" (under North East Programme): MIU, Kolkata, with DST Nagaland, held at, Kohima, Nagaland, March 8-12, 2010.

Workshop on "*Brain Science Awareness*": SSIU, Bangalore, March 15, 2010.

Workshop on *"Paleoproterozoics of Singhbhum craton, Eastern India"*: GSU, Kolkata, held at East Singhbhum, Jharkhand, October 30-November 3, 2009.

International Workshop on "*Econophysics of Games and Social Choices*": ERU, with Saha Institute of Nuclear Physics, Kolkata, March 9–13, 2009.

Workshop on "*Survey Data Analysis*": Psychology Research Unit, held at Indian Institute of Psychometry, Kolkata, May 11-17, 2009.

Workshop on "*Reading and Writing Motivation*": Psychology Research Unit, Kolkata, July 20, 2009.

Workshop on "*Stress management*": Psychology Research Unit, held at CBI Regional Training Centre, Kolkata, July 24, 2009.

Workshop on "*How to write Research Proposal*": Psychology Research Unit, held at National Institute of Technical Teachers' Training and Research, Kolkata, July 28, 2009.

Workshop on "*Small sample data Analysis through Excel*": Psychology Research Unit, held at Indian Institute of Psychometry, Kolkata, August 1, 2009.

Workshop on "*Psychological Test Construction Experience*", Psychology Research Unit, Kolkata with Psychology Association and Department of Psychology, Vile Mithibai College, held at Parle (West), Mumbai, August 7-8, 2009.

Workshop on "*Performing Art Therapy in geriatric Care*": Psychology Research Unit with Paripurnata, Kolkata, November 12, 2009.

Workshop on "*Psychometrics & SPSS*": Psychology Research Unit, Kolkata, held at Lalit kala Academy, Delhi, January 23-24, 2010.

Workshop on "*Reliability in Psychological Research*": Psychology Research Unit, Kolkata, March 24, 2010.

Workshop on "*Emotional intelligence and its role in teaching*", Psychology Research Unit, Kolkata, held at Army School, Barrackpur, March 27, 2010.

Certification Program on "*Six Sigma Black Belt (BB07)*": SQC & OR Unit, Bangalore, July 6–11, 2009 (Phase-I) & September 7–12, 2009 (Phase-II).

Statistical Techniques on "*Data Mining Techniques & Business Analytics*": SQC & OR Unit, Bangalore, July 23-24, 2009.

Certification Program on "*Six Sigma Master Black Belt (MBB12)*": SQC & OR Unit, Bangalore, August 17-29, 2009.

Certification Program on "*Six Sigma Black Belt (with Lean) for IT/ITES Industries*": SQC & OR Unit, Bangalore, October 5–10, 2009 (Phase-I) & December 7–12, 2009 (Phase-II).

Certification Program on "*Six Sigma Green Belt (GB03)*": SQC & OR Unit, Bangalore, October 20-24, 2009.

Two-Day Program on "*Statistical Models & Techniques for Quantitative Project Management (QPM)*" SQC & OR Unit, Bangalore, November 19-20, 2009.

Certification Program on "*Six Sigma Master Black Belt (MBB13)*": SQC & OR Unit, Bangalore, January 25- February 6, 2010.

Five-Day Training Program on "*Six Sigma Green Belt*": SQC & OR Unit, Chennai, June 22-26, 2009.

Training Program on "*Six Sigma Black Belt*": SQC & OR Unit, Chennai, September 2009–March 2010.

Five-Day Training Program on "*Six Sigma Green Belt*": SQC & OR Unit, Chennai, November 16-20, 2009.

Training Program on "*Six Sigma Master Black Belt*": SQC & OR Unit, Chennai, March 8-12, 2010.

Five-Day Training Program on "*Six Sigma Green Belt*": SQC & OR Unit, Chennai, March 8-12, 2010.

Training Programme on "*Six Sigma Green Belt*": SQC & OR Unit, Delhi, April 15–17, 2009.

Training Programme on "*Six Sigma Green Belt*": SQC & OR Unit, Delhi, July 15–17, 2009.

Training Programme on "*Six Sigma Black Belt*": SQC & OR Unit, Delhi, August 5–7, 2009 (Module-I).

Training Programme on "*Six Sigma Black Belt*": SQC & OR Unit, Delhi, September 8–11, 2009 (Module-II).

Training Programme on "*Six Sigma Black Belt*": SQC & OR Unit, Delhi, October 20–23, 2009 (Module-III).

Training Programme on "*Six Sigma Black Belt*": SQC & OR Unit, Delhi, November 18–20, 2009 (Module-IV).

Training Programme on "*Six Sigma Green Belt*": SQC & OR Unit, Delhi, September 2–4, 2009.

Training Programme on "*Six Sigma Green Belt*": SQC & OR Unit, Delhi, February 10–12, 2010.

Training Programme on "*Six Sigma Master Black Belt*": SQC & OR Unit, Delhi, February 15–20, 2010 (Module-I).

Training Programme on "*Six Sigma Master Black Belt*": SQC & OR Unit, Delhi, March 15 – 19, 2010 (Module-II).

Conferences and Seminars

Training Programme on "*Measurement of Uncertainty in Chemical and Biological Testing*": SQC & OR Unit, Delhi, sponsored by Central Pollution Control Board, New Delhi, March 3–5, 2010.

Training Program on *"Design of Experiments for Product and Process Improvement"*: SQC & OR Unit, Hyderabad, April 29- May 1, 2009.

Training Program on *"Lean Manufacturing"*: SQC & OR Unit, Hyderabad, held at Ordnance Factory Institute of Learning, Medak, May 18-22, 2009.

Six-day Training Program on "*Statistical methods for product and process improvement*": SQC & OR Unit, Hyderabad, July 2009.

Certificate Program on "*Six Sigma Green Belt*": SQC & OR Unit, Hyderabad, July 13-17, 2009.

Training Program on "*Quality Management for Engineering Functions*": SQC & OR Unit, Hyderabad, August 20, 2009.

Training Program on "*Design of Experiments*": SQC & OR Unit, Hyderabad, November 19-20 & 24-26 2009.

Training Program on "*Measurement Systems Analysis*": SQC & OR Unit, Hyderabad, March 22-23, 2010.

Certificate Program on "*Six Sigma Black Belt*": SQC & OR Unit, Hyderabad, January 18-23, & March 1-6, 2010.

Certificate Program on "*Green Belt*": SQC & OR Unit, Mumbai, May 4-8, 2009.

Certificate Program on "*Green Belt*": SQC & OR Unit, Mumbai, held at L&T, Ahmednagar, June 22-26, 2009.

Certificate Program on "*Green Belt*": SQC & OR Unit, Mumbai, July 27-31, 2009.

Certificate Program on "*Master Black Belt*": SQC & OR Unit, Mumbai, August 17-21, & October 14-18, 2009.

Certificate Program on "*Green Belt*": SQC & OR Unit, Mumbai, October 26-30, 2009.

Certificate Program on "*Green Belt*": SQC & OR Unit, Mumbai, held at ENERCON India, June, September & December 2009.

Certificate Program on "*Green Belt*": SQC & OR Unit, Mumbai, held at ENERCON India, June and September 2009 & January 2010.

Certificate Program on "*Green Belt*": SQC & OR Unit, Mumbai, held at L&T, September & November 2009.

Certificate Program on "*Green Belt*": SQC & OR Unit, Mumbai, held at L&T, Coimbatore, September & November 2009.

Training Programme for R&D Engineers on "*Design of Experiment*": SQC & OR Unit, Mumbai, held at Indofil Chemicals, September & November 2009.

Certificate Program on "*Master Black Belt*": SQC & OR Unit, Mumbai, at L&T, October 5-9, & December 9-13, 2009.

Training Programme on "*Statistics for New Product Development*": SQC & OR Unit, Mumbai, at L&T, October 1-2, 2009.

Certificate Program on "*Green Belt*": SQC & OR Unit, Mumbai, at Birla Sunlife Insurance, November 17-20, 2009.

Training Programme on "*Statistical Process Control*": SQC & OR Unit, Mumbai, held at Welspun Gujarat Stahl Rohren Ltd., Anjar, Gujarat, November 19-21, 2009.

Certificate Program on "*Black Belt*": SQC & OR Unit, Mumbai, November 2009–February 2010.

Training Programme on "*Application of Statistics in Benchmarking*": SQC & OR Unit, Mumbai, held at Mahindra & Mahindra, November 30, 2009.

Certificate Program on "*Green Belt*": SQC & OR Unit, Mumbai, held at HDFC SL, Kolkata, December 7-11, 2009.

Certificate Program on "*Green Belt*": SQC & OR Unit, Mumbai, held at HDFC SL, Delhi, December 3-5, 2009 and January 14-16, 2010.

Certificate Program on "*Green Belt*": SQC & OR Unit, Mumbai, held at HDFC SL, Bhopal, 4-9 January 2010.

Certificate Program on "*Green Belt*": SQC & OR Unit, Mumbai, March 8-12, 2010.

Certificate Programme on "*Six Sigma Black-Belt*": SQC & OR Unit, Pune, June 6-7 & 27-28, July 18-19, August 8-9 & 29-30, 2009.

Certificate Programme on "*Six Sigma Black-Belt*": SQC & OR Unit, Pune, December 12-13, 2009, January 9-10 & 23-24 and February 6-7 & 20-21, 2010.

Exhibition on "*Prasanta Chandra Mahalanobis: The Visionary and Maker of Indian Statistical Institute – through the Lenses of Reprography and Photography Unit, Library*": Library, Kolkata, 29 June-29 July, 2009.

Exhibition on "*Nobel Laureates with a special focus on Venkatraman Ramkrishnan and Elinor Ostrom, the winner of 2009 Nobel prizes*": Library, Kolkata, December 2009–January, 2010.

Workshop on "*Photography and Digital Technique*": Library, Kolkata, 15-17 February, 2010.

Exhibition on "*Photography* and Photo Contest": 15–19 February, 2010.

Workshop on "*Soft Computing (SofCom'09)*": Centre for Soft Computing Research, Kolkata, July 27-31, 2009.

Workshop on "*Knowledge Discovery in Databases (DInK'10)*": Centre for Soft Computing Research, Kolkata, Jan 11-15, 2010.

National Seminar on "*Quality Development in Library & Information Services*", held at Mizoram University, Aizawl, February 24-26, 2010.

Lectures and Seminars

Theoretical Statistics and Mathematics Division

Stat-Math Unit, Kolkata

Aravinda, C. S., Tata Institute of Fundamental Research, Bangalore (15.09.2009): Prescribing nonpositive curvature.

Bagchi, A., Financial Engineering Lab, University of Twente, Netherland (24.07.2009): Filtering and Identification of Affine Term Structures From Yield Curve Data.

Basu, Somnath, State University of New York, Stony Brook, New York (18.01.2010): An introduction to string topology.

Bhattacharya, Amitava, School. of Mathematics, Tata Institute of Fundamental Research (29.06.2009): The polytope of degree partitions.

Bhattacharya, Amitava, School of Mathematics, Tata Institute of Fundamental Research (13.07.2009): Some approaches to solve General (t,k) design existence problem and other related problems.

Biswas, Kingshook, Ramakrishna Mission Vivekananda University (31.08.2009): Pattern Rigidity I.

Chakraborty, Biman, School of Mathematics, University of Birmingham Edgbaston, U.K. (04.01.2010): On a multivariate scale-scale plot.

Chatterjee, Shirshendu, Cornell University, New York, USA (28.01.2010): Contact process on power-law random graphs.

Chen, Louis H. Y., National University of Singapore, Singapore (15.04.2009): Zero bias, Discretized Normal Approximation and Cramer-type Moderate Deviation.

Dabeer, Onkar, Tata Institute of Fundamental Research (10.12.2009): Threshold Results for Collaborative Filters.

Dey, Arijit, Tata Institute of Fundamental Research, Mumbai (25.08.2009): Cohomology of certain module spaces of vector bundles over a Riemann surface.

Dey, Partha, Sarathi, University of California, Barkeley, USA (04.02.2010): Central Limit Theorem for First-Passage Percolation across thin cylinders.

Dutta, Santanu, Tezpur University (22.07.2009): MISE of a kernel density estimator.

Ganguly, Satadal, School of Mathematics, Tata Institute of Fundamental Research, Mumbai (08.02.2010): A higher degree large sieve inequality.

Ghosh, M.K., Dept. of Mathematics, Indian Institute of Science, Bangalore (24.07.2009): Nonlinear Filtering to Credit Risk.

Ghosh, Subhankar, University of Southern California, USA (01.02.2010): Concentration of measures via size biased couplings.

Gongopadhyay, Krishnendu, School of Mathematics, Tata Institute of Fundamental Research (25.05.2009): Algebraic Characterizations of the Isometries of the Hyperbolic Space.

Goswami, Anindya, University of Twente, Netherlands (08.10.2009): Risk sensitive optimization of portfolio wealth in a semi-Markov modulated market.

Kuroda, Shigeru, Department of Mathematics and Information Sciences, Tokyo Metropolitan University, Japan (17.08.2009): Some problems on polynomial rings.

Kuroda, S., Tokyo Metropolitan University, Japan (25.08.2009): A structure theorem for initial algebras and its application.

Kuroda, S., Tokyo Metropolitan University, Japan (27.08.2009): Shestakov-Umirbaev inequality and automorphisms of a polynomial ring.

Kuroda, S., Tokyo Metropolitan University, Japan (15.03.2010): Wildness of polynomial automorphisms in three variables.

Kuroda, S., Tokyo Metropolitan University, Japan (16.03.2010): The infiniteness of the SAGBI for certain invariant rings.

Mj. Mahan, Ramakrishna Mission Vivekananda University (07.09.2009): Pattern Rigidity II.

Martin, Miguel, Universidad de Granada, Spain (23.06.2009): the Daugavet property.

Mazumder, Satyaki, Department of Mathematical Sciences, University of Texas at Dallas, USA (21.12.2009): Exponential Inequality and Bahadur Representations for the MAD and Application.

Naolekar, A. C., Indian Institute of Science Education and Research, Pune (30.12.2009): Realizing Cohomology Classes as Euler Classes.

Murthy, M., Ram: Queen's University, Kingston, Canada (09.12.2009): The Riemann Hypothesis Today.

Roy, Parthanil, Michigan State University, USA (20.08.2009): Ergodic Properties of Stable Random Fields.

Sarkar, Jaydeb, Department of Mathematics, Texas A&M University, USA (21.08.2009): Quotient Holbert modules of the canonical Holbert module.

Sarkar, Sucharit, Princeton University, USA (29.07.2009): Floer Homology.

Shastry, A. R., Indian Institute of Technology, Bombay (18.12.2009): Mapping degree and proof of fundamental Theorem of Algebra (FTA).

Shastry, Parvati, University of Bombay (26.03.2010): Euclidean Algorithm in Algebraic Number Fields.

Skalski, Adam, University of Lancaster, UK (31.03.2010): How noncommutative is noncommutative topological entropy?

Uma, V., Indian Institute of Technology, Chennai (26.05.2009): K-theory of torus manifolds.

Stat-Math Unit, Delhi

Athreya, K. B., Iowa State University, USA and Indian Institute of Science, Bangalore (18.11.2009): The last common ancestor problem.

Bagchi, Amitabh, Indian Institute of Technology, Delhi (02.09.2009): Hierarchical neighbor graphs: A low stretch connected structure for points in Euclidean space.

Bhaya, Amit, Federal University of Rio de Janeiro, Brazil (10.02.2010): The controlled conjugate gradient trajectory-following algorithm for minimization of non-convex function.

Bose, Amitabh, Jawaharlal Nehru University and New Jersy's Science and Technology University, USA (16.09.2009): Predicting neuronal dynamics through one-dimesional maps.

Burnham, Richard, University of Strathclyde, Glasgow, United Kingdom (02.12.2009): Identifiability for generalised competing risk models in reliability.

Chakraborty, Partha Sarathi, Institute of Mathematical Sciences, Chennai (28.10.2009): Non-commutative geometry of qunatum spheres.

Chaudhuri, Sanjay, National University of Singapore, Singapore (11.11.2009): An empirical likelihood based approach to In corporate sampling weights and population level information.

Franceschetti, Massimo, University of California, San Diego, USA (30.09.2009): Random networks for communication.

Friedland, Shmuel, University of Illinois at Chicago, USA (08.12.2009): Matchings, permanents and their random approximations.

Friedland, Shmuel, University of Illinois at Chicago, USA (09.12.2009): Theoretical and computational methods in statistical mechanics.

Lee, Sungchul, Yonsei University, Seoul, Korea (14.10.2009): CLT of the linear placement statistics.

Chen, Louis H. Y., Institute for Mathematical Sciences, National University of Singapore, Singapore (16.04.2009): Lectures on Stein's method (Lecture-I).

Chen, Louis H. Y., Institute for Mathematical Sciences, National University of Singapore, Singapore (17.04.2009): Lectures on Stein's method (Lecture-II).

Chen, Louis H. Y., Institute for Mathematical Sciences, National University of Singapore, Singapore (18.04.2009): Lectures on Stein's method (Lecture-III).

Mazumder, Satyaki, University of Texas, Dallas, USA (14.12.2009) Exponential inequality and Bahadur representations for the MAD and applications.

Mukerjee, Rahul, Indian Institute of Management, Kolkata (12.01.2010): Probability matching priors for two-sided tolerance intervals in balanced random effects models.

Mukerjee, Rahul, Indian Institute of Management, Kolkata (13.01.2010): Trigonometric approach to quaternary code designs with application to one-eighth and one-sixteenth fractions.

Sinha, Kalyan B., Indian Institute of Science, Bangalore (08.09.2009): Trotter product formula for quantum stochastic flows.

Sinha, Kaneenika, PIMS, University of Alberta, Canada (20.01.2010): Factoring Jacobians of certain modular curves.

Stat-Math Unit, Bangalore

Aravinda, C.S., Tata Institute Fundamental Research Centre for Applicable Mathematics, Bangalore (18.03.2010): Twisted doubles and nonpositive curvature.

Athreya, Jayadev, Yale University, USA (21.07.2009): Cusp excursions for horocycle flows.

Athreya, K.B., Iowa State University, USA (19.06.2009): Unit ball in high dimension, relative rates, harmonic series with gaps: Some interesting calculus problems.

Athreya, K.B., Iowa State University, USA and Indian Institute of Science, Bangalore (30.07.2009): Gibbs measure asymptotics.

Athreya, K.B., Iowa State University, USA and Indian Institute of Science, Bangalore (11.08.2009): An introduction to Indian Classical Music.

Baoulina, Ioulia, Harish-Chandra Research Institute, Allahabad (17.12.2009): On Markoff-Hurwitz equations.

Baoulina, Ioulia, Harish-Chandra Research Institute, Allahabad (22.12.2009): On two problems of Carlitz and their generalizations.

Banerjee, Kalyan, Indian Institute of Technology (Retd.), Kanpur (28.01.2010): How the leopard got its spots.

Basu, Sudeshna, George Washington University, USA (04.06.2009): Ball separation properties of Banach spaces.

Bhamidi, Shankar, University of North Carolina, Chapel Hill, USA (06.01.2010): Flows, first passage percolation and random disorder in networks.

Bharali, Gautam, Indian Institute of Science, Bangalore (17.09.2009): Estimates for the Bergman kernel near an infinite-type point.

Cerny, Christina, University of Nottingham, United Kingdom (21.01.2010): A gauge-invariant uniqueness theorem for Toeplitz algebras of Hilbert modules.

Chen, Louis H.Y., National University of Singapore, Singapore (13.04.2009): Zero, Bias, Discretized normal approximation and Cramer-type moderate deviation.

Datta, B., Indian Institute of Science, Bangalore (18.06.2009): Triangulations of surfaces.

Dritschel, Michael, University of Newcastle, United Kingdom (02.04.2009): Realization and interpolation in semigroupoid algebras.

Fakhruddin, Najmuddin, Tata Institute of Fundamental Research, Mumbai (24.03.2010). Essential dimension.

Fakhruddin, Najmuddin, Tata Institute of Fundamental Research, Mumbai (25.03.2010): Essential dimension-II.

Gadgil, Siddhartha, Indian Institute of Science, Bangalore (09.04.2009): RNA secondary structures, Linking numbers and Allostery.

Conferences and Seminars

Gopalakrishnan, Nedungadi Aatira, Indian Institute of Science, Bangalore (12.10.2009): Granger causality for point processes.

Iyer, Jaya N., University of Hyderabad (10.02.2010): Chow-Kuenneth decomposition for some varieties.

Iyer, Jaya N., University of Hyderabad (11.02.2010): Theory of Chern classes.

Ji, Un Cig, Chungbuk National University, Korea (28.05.2009): Laplacians on White Noise Functionals.

Johanson, Marje, University of Tartu, Estonia (03.06.2009): M(r,s)-ideals of compact operators.

Koul, Hira L., Michigan State University, USA (29.12.2009): Model diagnostics via Martingale transforms.

Koul, Hira L., Michigan State University, USA (30.12.2009): Goodness-of-fitness testing under long memory.

Micheaux, Pierre Lafaye de, University of Montreal, Canada (04.01.2010): Goodness-of-fit tests in ARMA and VARMA models, with a comparison against the Jarque-Bera test.

Misra, Gadadhar, Indian Institute of Science, Bangalore (03.07.2009): Some invariants for Hilbert space operators.

Narayanan, E.K., Indian Institute of Science, Bangalore (24.09.2009): A qualitative uncertainty principle on the Heisenberg group.

Pal, Soumik, University of Washington, Seattle, USA (06.08.2009): A combinatorial analysis of interacting diffusions.

Pancholi, Dishant, Tata Institute of Fundamental Research, Centre for Applicable Mathematics, Bangalore (18.03.2010): Construction of Contact structures using confoliations.

Raghavan, K.N., Institute of Mathematical Sciences, Chennai (28.04.2009): Kazhdan-Lusztig cells and KRS bases.

Rajput, Balram, University of Tennessee, Knoxville, USA (12.01.2010): Asymptotic dependence behaviour of Ornstein-Uhlenbeck semi-stable processes.

Rao, B.V., Chennai Mathematical Institute, Chennai (06.01.2010): Asymptotic free independence of Wigner Matrices.

Rao, K.P.S.B., Indiana State University, USA (30.07.2009): A result on idempotent matrices.

Ravishankar, The State University of New York, New Paltz, USA (26.10.2009): Strong hydrodynamic limit for asymmetric particle systems on Z.

Sen, Pronab, Chief Statistician of India and Secretary, Ministry of Statistics and Programme Implementation, India (18.09.2009): Nutritional Measures of Indian Children: Some compelling regularities.

Sethuraman, Sunder, Iowa State University, USA (24.06.2009): On large deviations in 1D simple exclusion.

Shah, Riddhi, Jawaharlal Nehru University, Delhi (18.12.2009): Some aspects of non-archimedean analysis.

Shwartz, Adam, The Technion – Israel Institute of Technology, Israel (22.02.2010): Diffusion limits and the optimal control of large networks.

Sinha, K.B., Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore (22.06.2009): Mathematics and Physics intertwining with each other.

Sunder, V.S., The Institute of Mathematical Sciences, Chennai (11.11.2009): Free probability: the classical and free CLTs.

Thangavelu, S., Indian Institute of Science, Bangalore (22.06.2009): A Riemann Hypothesis for lesser mortals.

Verma, Kaushal, Indian Institute of Science, Bangalore (15.10.2009): The automorphism group of domains in C^n.

Vinnikov, Victor, Ben Gurion University, Israel (02.04.2009): System theory on the free semigroup and model theory for row contractions.

Viswanath, S., Indian Institute of Science, Bangalore (17.02.2010): Constant Term Identities - From Dyson to Cherednik.

Winter, Anita, FAU Erlangen-Nurenberg, Germany (07.09.2009): Aldou's move on cladograms in the diffusion limit.

Wulbert, Danial, University of California, USA (08.10.2009): Best L_1 Approximation and the Liapanouv Convexity Theorem without compactness.

Zacharias, Joachim, University of Nottingham, UK (12.01.2010): Nuclear Dimension of C*-Algebras.

Applied Statistics Division

Applied Statistics Unit

Chakraborty, S., Department of Applied Mathematics, BIT Mesra, Ranchi (1.12.2009): On Statistical Bounds and Their Empirical Estimates: A computer Experiment Oriented Approach to Algorithmic Complexity.

Chatterjee, S., University of Waterloo, Canada (5.1.2010): On cryptographic protocols employing asymmetric bilinear pairings.

Das, S., Duke University & SAMSI, North Carolina, USA (13.1.2010): Dynamic Generalized Linear Models.

Ghorai, J., University of Wisconsin-Milwaukee, USA (23.3.2010): Large sample properties of semiparametric estimators in random censorship models.

Hardy, M., University of Waterloo, Canada (26.11.2009): Development Mortality Improvement formulae: The Canadian Insured Lives Case Study.

Kundu, S., George Washington University, USA (11.8.2009): A Nonparametric Method of Estimate the Number of Component Processes.

Jammalamadaka, Rao S., University of California, Santa Barbara, USA (10.12.2009): Testing isotropy and a related random walk problem.

Pandy, C., CSE Department, Gandhi Institute for Technology, Bhubaneswar (8.12.2009): Implementation strategy for inducting consciousness into system architecture.

Raha, S., Indian Institute of Science, Bangalore (2.2.2010): The fully implicit stochastic-alpha method for stiff stochastic differential equations.

Roy Choudhury, K., Statistics Department, University College Cork, Ireland (4.8.2009): Constrained Reconstruction of Wave Surfaces from Refracted Light Images.

Rudra, K., Water Resource Project West Bengal Pollution Control Board (22.9.2009): Water Crisis in West Bengal: A Statistical Assessment.

Bayesian Interdisciplinary Research Unit

Bhattacharya, Abhishek, Duke University, USA (7.8.2009): Nonparametric Bayesian Inference on Planar Shapes.

Chakrabarty, Dalia, University of Nottingham, U.K. (18.8.2009): Inverse Modelling of Gravitational Dynamical System using CHASSIS.

Dass, Sarat, Michigan State University, USA (11.03.2010): Hierarchical Mixture Models for Assessing Fingerprint Individuality.

Ghosh, Malay, University of Florida, USA (26.11.2009): Bayesian Benchmarking with Applications to Small Area Estimation.

Mondal, Sumona, Clarkson University, USA (31.7.2009): Tolerance Intervals for the Distribution Between Two Independent Normal Random Variables.

Sen, Anindya, Indian Institute of Management, Bangalore (01.02.2010): Credit Derivatives and the Financial Crisis.

Computer and Communication Sciences Division

Advanced Computing and Microelectronics Unit

Aanjaneya, Mridul, Graduate Student, Stanford University, California, USA (23.12.2009): Discovering Stratified Linear Structures in Noisy Data Set.

Chandran, L., Sunil, Indian Institute of Science, Bangalore (30.03.2010): Some Results Regarding Boxicity.

Madhow, Upamanyu, University of California, Santa Barbara, USA (07.07.2009): Multigigabit Wireless Communication New Architectures for Transceiver and Network Design.

Sen, Sandeep, Department of Computer Science and Engineering, IIT Delhi (19.06.2009): An online set cover problem with application to Network Discovery.

Sikdar, Somnath, The Institute of Mathematical Science, Chennai (23.06.2009): Polynomial Kernels for Dominating Set in $k_{(i,j)}$- free and d-degenerate Graphs.

Documentation Research and Training Centre

Kohl, David F., University of Cincinnati, Ohio, USA (30.9.2009): Towards a new understanding of the Library Mission: Vision and Implementation.

Grund, Sonja, Library of the Wissenschaftskolleg zu, Berlin, Germany (01.2.2010): Individual service through the cooperative supply of information.

Electronics and Communication Sciences Unit

Thomson, Reynoldo, University of Guanajuato, Mexico (22.12.2009 & 24.12.2009): Architecture, Art and Digital Image.

Roy Chawdhury, Amit K., University of California, USA (18.12.2009): Efficient Sensing and Analysis of Video in Camera Networks.

Kumar, Subodh, IIT, Delhi (17.12.2009): Graphics and Visualization.

Machine Intelligence Unit

Baragona, R., University La Sapienza of Rome, Italy (05.01.2010): Dissimilarity Measures for Time Series Data.

Systems Science and Informatics Unit

Babu, R.V., Exawind, Bangalore (26.10.2009): Motion analysis of image sequences.

Chattarji, S., National Centre for Biological Sciences (NCBS), Bangalore (15.03.2010): This is your brain under stress!

Narahari, Y., Computer Science and Automation, Indian Institute of Science, Bangalore (05.08.2009): Games, auctions, and market design.

Rangarajan, G., Department of Mathematics, Indian Institute of Science, Bangalore (15.03.2010): Brain machine interface.

Roy, Sasanka, Computer Science and Automation, Indian Institute of Science, Bangalore (03.12.2009): Approximate shortest descent path on a terrain.

Sinha, S., National Institute of Mental Health and Neuro Sciences (NIMHANS), Bangalore (15.03.2010): EEG and epilepsy.

Thomson, Reynaldo, School of Digital Arts, University of Guanajuato, Mexico (15.01.2010): Architecture, art and digital image.

Vardhan, Pratap, 3rd year BE in Electronics & Communication Engineering, NIT Bhopal (15.01.2010): Detecting epileptic activity in brain using differential operator, wavelets and multiresolution analysis.

Physics and Earth Sciences Division

Geological Studies Unit

Mamtani, Manish, Department of Geology & Geophysics, Indian Institute of Technology, Kharagpur (24.02.2010): Structural Geology & Anisotropy of Magnetic Susceptibility.

Physics and Applied Mathematics Unit

Abbas, Afsar S., Centre for Theoretical Physics, University of Jamia Milia Islamia, New Delhi, (04.3.2010): Towards a better understanding of the standard model of particle physics

Bandyopadhyay, R. Promode, Naval Under Sea Warfare Center, Newport, USA (07.12.2009 and 08.12.2009): How did Small Become Large.

Bandyopadhyay, R. Promode, Naval Under Sea Warfare Center, Newport, USA (08.12.2009): Mechanisms of Swimming in Large Animals.

Banerjee, Sanjoy, The Energy Institute, City University of New York, USA (14.01.2010): Fine scale modeling of multiphase systems.

Bhowmik, N.G., Center for Illinois State Water, University of Illinois at Urbana-Champaign, USA (25.11.2009): Sedimentation, Bank Erosion and Flooding on the Mississippi and Illinois Rivers in the USA.

Das, Saurya, University of Lethbridge, Canada (31.7.2009): On the origin of black hole thermodynamics.

Ghosh, Sibasish, Institute of Mathematical Sciences, Chennai (23.6.2009): Complete (or, analytical) proof of Gisin's theorem for three qubits.

Nekorkin, V.I., Institute of Applied Physics of RAS, Nizhny Novgorod, Russia (02.12.2009): Stimulus-Induced Activity Patterns in Oscillatory Neuronal Networks.

Raha, Udit, Department of Physics, University of National Taiwan, Taipei, Taiwan (27.1.2010): Hspace-and Time-like Electromagnetic Pion and Kaon form Factors in Light-cone pQCD.

Sarkar, Sudipta, University of Maryland, USA (05.3.2010): Gravity and Thermodynamics: The Story of going beyond Einstein.

Srivastava, Shashi, Department of Physics, Variable Energy Cyclotron Centre, Kolkata (23.9. 2009): Random Matrix Theory: A Case Study with Cyclic Matrices.

Biological Sciences Division

Agricultural and Ecological Research Unit

Vijayalakshmi, T, Centre for Environment, Institute of Science & Technology, Jawaharlal Nehru Technological University, Hyderabad (04.03.2010): Geospatial technologies for environmental Management.

Human Genetics Unit

Basu, S., Kent State University, Kent, Ohio, USA (30.07.2009): Polymorphism in G-quadruplexes formed by guanosine-rich sequence repeats in the ILPR.

Elston, R.C., Department of Epidemiology and Biostatistics, Case Western Reserve University, Cleveland, Ohio, USA, (12.01.2010): History of the Elston-Stewart Algorithm.

Elston, R.C., Department of Epidemiology and Biostatistics, Case Western Reserve University, Cleveland, Ohio, USA, (13.01.2010): Marker and Two-Marker association tests for Unphased case-control genotype data.

Krishnamurthy, N., Immunology Group, International Centre for Genetic Engineering and Biotechnology New Delhi (29.05.2009): Mycobacterium tuberculosis secretory antigens: Weapons of mass distraction.

Lala, P.K., Ex-Chair, Dept. of Anatomy & Cell Biology and Professor, Dept. of Oncology of The University of Western Ontario, London, Ontario, Canada (16.12.2009): Molecular targets for lymphatic metastasis in breast cancer: challenges and opportunities.

Sen, S., Division of Biostatistics, University of California, San Francisco, USA (01.03.2010): Selective genotyping and phenotyping in a complex trait contex.

Social Sciences Division

Economic Research Unit

Baksi, Soham, Department of Economics, University of Winnipeg, Canada (15.7.2009): Environmental Policy in the Presence of an Informal Sector.

Bandyopadhyay, Subhayu, Research Division, Federal Reserve Bank of St. Louis, U.S.A. (18.06.2009): Bio-Fuel Subsidies and International Trade.

Bhattacharya, Joysankar, University of Siena, Italy (19.01.2010): Group-participation, Women's Empowerment and Capability Enhancement: Application of a MIMIC Model in West Bengal.

Bhattacharya, S. Prasad, School of Accounting, Economics and Finance, Deakin University, Australia (07.02.2010): How Do Legal Systems Affect Land Distribution? : A Long-run Disaggregated Analysis.

Chattopadhyay, Sadhan, Reserve Bank of India, Kolkata (10.07.2009): Agriculture Financing and Profit Efficiency of the Public Sector Banks.

Chattopadhyay, Siddhartha, Department of Economics, University at Albany, SUNY, U.S.A. (13.01.2010): Liquidity Trap, Expectational Dynamics and The Monetary Policy Rule: An Analysis under Adaptive Learning.

D'Ambrosio, Conchita, Universita di Milano-Bicocca, Italy (07.01.2010): Multidimensional Poverty and Material Deprivation.

Deb, Joyee, New York University, Stern School of Business, New York, USA (06.08.2009): Cooperation and Community Responsibility – A Folk Theorem for Repeated Random Matching Games with Names.

Deb, Partha, Hunter College and the Graduate Center, City University of New York (CUNY) and National Bureau of Economic Research (NBER), U.S.A. (30.07.2009): Job Loss: Eat, Drink and Try to be Merry?

Dey, K. Malay, Network Financial Institute, U.S.A. (11.12.2009): Information Content in Small and Large Trade.

Gatheral, Jim, Courant Institute of Mathematical Sciences, New York University & Managing Director, Merrill Lynch, U.S.A. (08.03.2010): Random Matrix Theory and Covariance Estimation.

Ghosh, Sambuddha, Boston University, Department of Economics, U.S.A. (12.08.2009): Ideology Beats Ideals: A Paradox of Strategic Voting.

Gongopadhyay, Kausik, Indian Institute of Management, Kozhikode, Kerala (29.12.2009): Demand for Education: Is Culture a Major Determinant?

Majumdar, Dipjyoti, Concordia University, Montreal, Canada (23.07.2009): Incentive – Compatible Voting Rules with Positively Correlated Beliefs.

Marjit, Sugata, Centre for Studies in Social Sciences, Kolkata (08.04.2009): Two Elementary Propositions on Fragmentation and Outsourcing in Pure Theory of International Trade.

Marjit, Sugata, Centre for Studies in Social Sciences, Kolkata (08.07.2009): Global Recession and the Indian Economy – Unconventional Wisdom.

Nadkharni, M.G., Department of Mathematics, Mumbai University, Mumbai (16.04.2009): An Application of Martingale Convergence Theorem to Analyze Company Data.

Paul, Ketan, Sanjoy, University of Oxford, Oxford, U.K. (28.08.2009): Application of GARCH Model to Analyze Continuous Blood Glucose Monitoring Data for Glycaemic Management.

Sengupta, Ramprasad, Jawaharlal Nehru University, Delhi (23.12.2009): Prospects and Policies for Low Carbon Economic Growth of India.

Sen, Rituparna, Department of Statistics, University of California at Davis, U.S.A. (30.12.2009): Functional Data Analysis for volatility.

Tarafdar, Suchismitam, Department of Economics, W.P. Carey School of Business, Arizona State University, U.S.A. (30.03.2010): Optimization in Economies with Nonconvexities.

Linguistic Research Unit

Bayer, Josef, Department of Linguistics, University of Konstanz, Konstanz, Germany (23.02.2010): A Program for the Study of Discourse Particles in German and Bangla.

Planning Unit

Afridi, Farzana, Syracuse University and ISI, Delhi (Visiting): Social Identity and Inequality: The Impact of China's Hukou System.

Batabtal, Amitrajeet A., Rochester Institute of Technology, New York, USA (03.07.2009): Asymmetric Information, Entrepreneurial Activity, and Scope of Fiscal Policy in an Open Regional Economy.

Bhaskar, V., University College London (05.03.2010): Sex Selection and Gender Balance.

Bhattacharya, Prasad S., Deakin University, Australia (17.03.2010): How do Legal Systems Affect Land Distribution? : A Long Run Disaggregated Analysis.

Carter, Michael, University of Wisconsin, Madison, USA (17.11.2009): Quasi Monte Carlo simulation in finance.

Chakrabarti, Subir K., Indiana University-Purdue University Indianapolis (UPUI), USA (31.07.2009): Collusive Equilibrium in Cournot Oligopolies with Unknown Costs.

Chakravorty, Ujjayant, University of Alberta, Canada (18.09.2009): Think Globally, Act Locally? Stock vs. Flow Regulation of a Fossil Fuel.

Coleman, Andrew, Economic and Policy Research, New Zealand (17.04.2009): The effect of transport infrastructure on home production activity: evidence from rural New York, 1825-1845.

Dutta, Bhaskar, University of Warwick, UK (12.03.2010): Word of Mouth Advertising and Strategic Learning in Networks.

Esteban, Joan, Institute of Economic Analysis (Higher Council of Scientific Research), Moscow, Russia (09.10.2009): Linking Conflict to Inequality and Polarization.

Gigerenzer, Gerd, Max Planck Institute for Human Development, Berlin (26.02.2010): Homo Heuristicus: Why Biased Minds Make Better Inferences.

Guha, Ashok, ISI, Delhi Centre (visitor) (05.02.2010): Kaushik's Conundrum or the possibility of Honesty.

Herring, Ron, Department of Government, Cornell University, USA (04.12.2009): Data as Social product: Whose Numbers Count in Bt Cotton Controversies.

Himanshu, Jawaharlal Nehru University and Visiting Fellow Centre de Sciences Humaines, New Delhi (CSH) (19.02.2010): Towards New Poverty Lines for India.

Khera, Reetika, Centre for Development Economics, New Delhi (22.01.2010): The BPL Census and a Possible Alternative.

Kubo, Kensuke, University of California, Berkeley and Institute of Developing Economies, Japan External Trade Organization (29.02.2010): Inferring the Effects of Vertical Integration from Entry Games: An analysis of the Genetic Pharmaceutical Industry.

Marchant, Thierry University of Ghent, Belgium (15.05.2009): Score-based Bibiometric Ranking of Scientists.

Nunez, Matias, Universite de Montreal, Canada and Ecole Polytechnique, France (24.04.2009): Approval Voting on Large Poisson Games.

Rai, Ashok S., Williams College, UK (26.03.2010): Financial And Insider Arbitrage.

Ratan, Anmol, University of Maryland, USA (12.02.2010): Reference-Dependent References in First Price Auctions.

Ray, Debraj, New York University, USA (13.11.2009): Status, Inter temporal Choice and Risk-Taking.

Roy, Souvik, Maastricht University, Netherlands (21.08.2009): Charactorization of the non-manipulable Profiles under approval rules.

Saran, Rene, Maastricht University, Netherlands (22.05.2009): Competing Trading Platforms: Walrasian Auctioneers vs. Bazaars.

Sen, Rituparna, University of California, Davis, USA (08.01.2010): Functional Data Analysis for Volatility.

Singh, Gurbachan, Visiting ISI, Delhi Centre (19.03.2010): Bank runs, line of Credit, and Pigouvian Subsidies.

Smith, George Davey, University of Bristol, UK (30.10.2009): Some approaches to Strengthening Causal inference in epidemiological Studies.

Somanathan, Rohini, Delhi School of Economics, Delhi University (01.12.2009): The Distributional Implications of Group Lending.

Tarafdar, Suchismita, Arizona State University, USA (25.03.2010): Optimization in Economies nonconvexities.

Thomson, William, University of Rochester, USA (15.12.2009): On the Manipulability of allocation rules through exaggerating and borrowing.

Vasudev, Rahul, Ernst & Young, LLP, Houston (04.09.2009): Testing for Martingales in Continuous Time.

Whittington, Dale, University of North Carolina, Chapel Hill, USA (24.07.2009): A Cost Benefit Analysis of Cholera Vaccination Programs in Beira, Mosambique.

Sociological Research Unit

Athreya, Venkatesh, Professor (retd.), Bharathidasan University, Tamil Nadu (12.03.2010): Analysis of Budget 2010.

De, Utpal, North Eastern Hill University, Shillong (29.01.2010): Problems of Domestic Water Use in a Hill Town by Department of Economics.

Kitamura, Yukinobu, Hitotsubashi University, Japan (05.02.2010): Who will pay for Pensions: The Japanese Experience.

Ohnishi, Hiroshi, Kyoto University, Japan (17.02.2010): A New Dynamic Model of Capitalism.

Library, Documentation and Information Sciences Division

Ganguly, Shantanu, Knowledge Resource Center of Indus World School of Business (IWSB), Greater Noida, Uttar Pradesh (16.05.2009): Quality Librarian Caters Quality Services.

Singh, Rajesh, Central Library, University of Delhi (14.11.2009): Web as a Digital Information Resources in Libraries.

Center for Soft Computing Research: A National Facility

Senthil, V., Thiagarajar School of Management Madurai, Tamil Nadu (06.08.2009): A Novel Approach in Video Watermarking using Edge Information and Wavelet Transforms with Performance Analysis.

Ghosh, S., University of Groningen, Netherlands (21.08.2009): Strategies in multi-agent systems.

Chatterjee, N., Vision Research Foundation, Sankara Nethralaya, Chennai, Tamil Nadu (24.12.2009): Investigating the role of glia in brain function.

Mallik, R.K., Department of Electrical Engineering, IIT Delhi (01.02.2010): Deterministic Combining for Fading Channels.

5. SANKHYA

The internationally renowned journal *Sankhya* was founded by Professor P.C. Mahalanobis in 1932 and began publication under his editorship. It is devoted to original research articles in Mathematical Statistics, Probability and Applied Statistics. Reviews and discussion articles in area of current research activity are also published. Many seminal articles in the above areas have appeared in *Sankhya. Sankhya* receives articles from all over the world and publishes only those which pass the rigorous peer review process. The Editorial Board of *Sankhya* includes internationally reputed scholars in relevant areas from all over the world. The compositions of Editorial Boards serving during 2009-10 appear in Part III, Section 10 of the Report.

From 2003, *Sankhya* has been published in a single series, four times a year in February, May, August and November. Certain issues came out as a special issue devoted to a particular field.

From 2008, *Sankhya* is being published in a two series format, Series A and Series B. Series A covers Theoretical Statistics and Probability while Series B caters to Applied and Interdisciplinary Statistics. Series A is publishing two issues per year, in February and August, and Series B is publishing two issues per year, in May and November, respectively.

The following issues have been published during April 2009 to March 2010.

- February 2008 : Volume 70 Part I, Series A
- August 2008 : Volume 70 Part II, Series A
- February 2009 : Volume 71 Part I, Series A
- May 2008 : Volume 70 Part I, Series B
- November 2008: Volume 70 Part II, Series B
- May 2009 : Volume 71 Part I, Series B

The following issues are currently in press:

- August 2009 : Volume 71 Part II, Series A
- November 2009: Volume 71 Part II, Series B

February 2010, Series A, Volume 72, Part I, which is a special issue in memory of Dr. A. Maitra is editorially closed and is going to Press by March 2010.

Editor-in-Chief : Pranab K. Sen
Editors: Series A : Krishna B. Athreya, Alok Goswami, Soumendra N. Lahiri
Editors: Series B : Ayanendranath Basu, Malay Ghosh, Bimal K. Sinha

The Institute has recently entered into a co-publishing agreement with Springer, and from 2010 Springer will handle the circulation of all international issues of *Sankhya*.

6. SCIENTIFIC PAPERS AND PUBLICATIONS

Books Published

Theoretical Statistics and Mathematics Division

Stat-Math Unit, Bangalore

Rao, T.S.S.R.K.: *Lectures on Operator Theory*, R.M.S. Lecture Notes, pages 8, 2009.

Applied Statistics Division

Applied Statistics Unit

Bose, M. and Dey, A.: *Optimal Crossover Designs*, World Scientific, Hackensack, New Jersey, pages 225, 2009.

Chaudhuri, A.: *Essentials of Survey Sampling*, Prentice-Hall India, New Delhi, pages ix+242, 2010.

Pal Choudhury, P.: *On Operating System Principles and Design*, Prentice-Hall India, New Delhi, pages 640, 2009.

SenGupta, A.: *Advance in Multivariate Statistical Methods*, (A volume in celebration of the birth centenary of Prof. S.N. Roy & Platinum Jubilee of Indian Statistical Institute), Ashis SenGupta (ed.), World Scientific Publication, Singapore, 2009.

Computer and Communication Sciences Division

Advanced Computing and Microelectronics Unit

Bhattacharya, B.B., Sur-Kolay, S., Nandy, S.C., and Bagchi, A. (eds.): *Algorithms, Architectures, and Information Systems Security*, Statistical Science and Interdisciplinary Research Series, 3, World Scientific, Singapore, 2009.

Documentation Research and Training Centre

Madalli, P. Devika (ed): *Proceeding of Workshop on Knowledge Transaction*, Indian Statistical Institute, 2010.

Nanaji, Shewale and Prasad, A.R.D.: *AACR2, MARC21 and WINISIS: A Compatibility Study [Paperback]*, VDM Verlag, Germany, pages 408, 2009.

Tripath, Aditya and Prasad, A.R.D.: *Multilingual Information Retrieval System with MARC21: A Study with Indian Languages [Paperback]*, VDM Verlag, Germany, 2010.

Machine Intelligence Unit

Baeza-Yates, R., Lang, J., Mitra, S., Parsons, S. and Pasi, G. (eds.): *Proceedings of the 9th IEEE/WIC/ACM International Conference on Intelligent Agent Technology (IAT 2009),* IEEE Computer Society Press, Milan, Italy, 2009.

Chaudhury, S., Mitra, S., Murthy, C.A., Sastry, P.S. and Pal, S.K. (eds.): *Pattern Recognition and Machine Intelligence (PReMI 2009),* LNCS 5909, Springer Verlag, Berlin, 2009.

De, R.K., Mandal, D.P. and Ghosh, A. (eds.): *Machine Interpretation of Patterns*, World Scientific Press, New York, 2010.

Physics and Earth Sciences Division

Physics and Applied Mathematics Unit

Basu, Banasri, Chakrabarti, Bikas K., Chakravarty, Satya R., Gangopadhyay, Kausik (eds.): *Econophysics & Economics of Games, Social Choices and Quantitative Techniques,* New Economic Windows, Springer, 2010.

Biological Sciences Division

Biological Anthropology Unit

Pal, Manoranjan, Bharati, P, Ghosh B. and Vasulu, T.S. (eds.): *Gender and Discrimination: Health, Nutritional Status and Role of Women in India*, Oxford University Press, New Delhi, 2009.

Social Sciences Division

Economic Research Unit

Basu, Banashri, Chakrabarti, Bikas, K., Chakravarty, Satya R. and Gangopadhyay, Kausik (eds.): *Econophysics, Economics of Games, Social Choices and Quantitative Techniques,* Springer Italia, Milan, pages 394, 2010.

Pal, Manoranjan, Bharati, P, Ghosh B. and Vasulu, T.S. (eds.): *Gender and Discrimination: Health, Nutritional Status and Role of Women in India*, Oxford University Press, New Delhi, 2009.

Mazumdar, Krishna: *Performances of Asia-Pacific Countries: A New Approach*, Nova Science Publishers, New York, pages 374, 2009.

Linguistic Research Unit

Jorge, Camacho, Dasgupta, Probal, István, Ertl (eds.): *Beletra Almanako 5*, Mondial, New York, 2009.

Jorge, Camacho, Dasgupta, Probal, István, Ertl (eds.): *Beletra Almanako 6*, Mondial, New York, 2009.

Dash, Niladri Sekhar: *Corpus-based Analysis of the Bengali Language*, VDM Publications, Saarbrucken, Germany, 2009.

Dash, Niladri Sekhar: *Corpus Linguistics: Past, Present and Future*, Mittal Publications, New Delhi 2009.

Sociological Research Unit

Pal, Manoranjan, Bharati, P, Ghosh B. and Vasulu, T.S. (eds.): *Gender and Discrimination: Health, Nutritional Status and Role of Women in India*, Oxford University Press, New Delhi, 2009.

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Halder, A., Ghosh, S. and Ghosh, A.: Aggregation pheromone density based classification, *Proceedings of the 10th International Conference on Information Technology (ICIT'08)*, Bhubaneswar, India, 100-105, 2008.

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Saha, S., Murthy, C.A. and Pal, S.K.: Rough set based ensemble prediction for topic specific web crawling, *Proceedings of the International Conference on Advances in Pattern Recognition (ICAPR 2009)*, Kolkata, India, 153-156, 2009.

Papers Published in Books

Applied Statistics Division

Applied Statistics Unit

Sengupta, A.: Optimal tests for the mean direction of a von Mises distribution, *Advances in Statistics* B.K. Kale Felicitation Volume, B.C. Arnold, U. Gather, and S.M. Bendre (eds.), Macmillan Publication India Ltd., 145-164, 2009.

Computer and Communications Sciences Division

Advanced Computing and Microelectronics Unit

Biswas, A., Dutt, M., Bhowmick, P. and Bhattacharya, B.B.: On finding the orthogonal convex skull of a digital object, *Progress in Combinatorial Image Analysis,* P. Wiederhold and R.P Barneva (eds.), Research Publishing Services, Singapore, 25-36, 2009.

Computer Vision and Pattern Recognition Unit

Chaudhuri, B.B.: On OCR of two major scripts: Bangla and Devanagari, *OCR for Indic Scripts*, V Govindaraju and S. Setlur (eds.), Springer Verlag, 27-42, 2009.

Documentation, Research and Training Centre

Neelameghan, A. and Raghavan, K.S.: Relationships in multi-lingual Thesauri in humanities: Issues and case study, *Libraries and Information Systems: From Alexandrian Heritage to Social Networking: Essays in honour of Prof. S. Parthasarathy*, K.S. Raghavan and K.N. Prasad (eds.), Ess Ess Publications, New Delhi, 318-340, 2009.

Raghavan, K.S. and Sajana, C.: Neuron: Modeling ontology for neurosurgery, *Paradigms and Conceptual Systems in Knowledge Organization,* C. Gnoli and F. Mazzocchi (eds.), Ergon Verlag, Wurzburg, 208-215, 2010.

Sahoo, B.B. and Ravichandra Rao, I.K.: A quantitative study of software literature in India with comparison of world literature, *Library and Information Systems: From Alexandrian Heritage to Social Networking,* K.S. Raghavan and K.N. Prasad (eds.), Ess Ess Publications, New Delhi, 293-317, 2009.

Machine Intelligence Unit

Acharyya, M. and Kundu, M.K.: Remote sensing image segmentation using M-band wavelet packet frames and neurofuzzy tools, *Pattern Directed Information Analysis*, D. Dutta Majumder and B. Chanda (eds.), New Age International Publishers, New Delhi, 392-424, 2009.

Bandyopadhyay, S. and Bhattacharyya, M.: A Neuro-GA approach for the maximum fuzzy clique problem, *Advances in Neuro-Information Processing,* M. Koeppen, N. Kasabov and G. Coghill (eds.), Lecture Notes in Computer Sciences-5506, Springer, 605-612, 2009.

Bandyopadhyay S. and Saha, S.: A new principal axis based line symmetry measurement and its application to clustering, *Advances in Neuro-Information Processing,* M. Koeppen, N. Kasabov and G. Coghill (eds.), Lecture Notes in Computer Sciences-5507, Springer, 543-550, 2009.

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Das, R., Mitra, S. and Mukhopadhyay, S.: Cross-correlation and evolutionary biclustering: Extracting gene interaction sub-networks, *Pattern Recognition and Machine Intelligence,* S. Chaudhury, S. Mitra, C.A. Murthy, P.S. Sastry and S.K. Pal (eds.), Lecture Notes in Computer Sciences-5909, Springer Verlag, Berlin, 199-204, 2009.

Das, R., Mitra, S., Murthy, C.A. and Mukhopadhyay, S.. A least squares fitting-based modeling of gene regulatory sub-networks, *Pattern Recognition and Machine Intelligence,* S. Chaudhury, S. Mitra, C.A. Murthy, P.S. Sastry and S.K. Pal (eds.), Lecture Notes in Computer Sciences-5909, Springer Verlag, Berlin, 165-170, 2009.

Datta, M. and Murthy, C.A.: Class specific threshold selection in face space using set estimation technique for RGB color components, *Pattern Recognition and Machine Intelligence*, S. Chaudhury, S. Mitra, C.A. Murthy, P.S. Sastry and S.K.Pal (eds.), Lecture Notes in Computer Sciences-5909, Springer Verlag, Berlin, 351-356, 2009.

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Kundu, M.K. and Pal, S.K: Adaptive thresholding based on human psychovisual characteristics, *Pattern Directed Information Analysis*, D. Dutta Majumder and B. Chanda (eds.), New Age International Publishers, New Delhi, 369-380, 2009.

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Mitra, S.K., Kundu, M.K., Murthy, C.A. and Bhattacharya, B.B.: A new approach for fractal based image compression using probability, *Pattern Directed Information Analysis*, D. Dutta Majumder and B. Chanda (eds.), New Age International Publishers, New Delhi, 313-324, 2009.

Mukhopadhyay, A., Maulik, U. and Bandyopadhyay, S.: Refining genetic algorithm based fuzzy clustering through supervised learning for unsupervised cancer classification, Lecture Notes in Computer Sciences-5483, Springer-Verlag, Heidelberg, 191-202, 2009.

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Physics and Earth Sciences Division

Geological Studies Unit

Mazumder, R., Rodriguez-Lopez, J.A., Arima, M., and van Loon, A.J.: Palaeoproterozoic seismites (fine-grained facies of the Chaibasa Fm., E. India) and their soft-sediment deformation structures, *Palaeoproterozoic supercontinent and its global evolution*, S.M. Reddy, R. Mazumder, D.A. Evans, and A.S. Collins (eds.), Geological Society of London Special publication Vol.-323, 301-318, 2009.

Physics and Applied Mathematics Unit

Basu, B.: The Hall Conductivity of Spinning Anyons, Recent Developments in Theoretical Physics (Platinum Jubilee Series), *Statistical Sciences and Interdisciplinary Research*, Vol.-9, Subir Ghosh and Guruprasad Kar (eds.), World Scientific, 267-278, 2010.

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Biological Sciences Division

Biological Anthropology Unit

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Human Genetics Unit

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Social Sciences Division

Economic Research Unit

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Economic Analysis Unit

Narayana, N.S.S. and Ghosh, Probal P.: Macroeconomic Simulations based on VEC Models, Chapter 3 in Macro-Modelling for the Eleventh Five Year Plan of India (Chapter-3), Kirit S. Parikh (ed.), Planning Commission, Govt. of India, Academic Foundation, New Delhi, 37-118, 2009.

Linguistic Research Unit

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Planning Unit

Ghate, Chetan, Wright, Stephen and Fic, Tatiana: India's Growth Turnaround, *The Concise Oxford Companion to Economics in India*, Kaushik Basu and Annemie Maertens (eds.), Oxford University Press, New Delhi, 33-40, 2010.

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Population Studies Unit

De Partha, Bhattacharya B.N., Dhar, Arpita: Deprivation and Neonatal Mortality: An Approach to Evaluate reasons behind the Deprivation leading to Mortality, *Population, Poverty and Health – Analytical Approaches*, K.K. Singh, R.C. Jadav and Arvind Pandey (eds.), National Institute of Medical Statistics, Hindustan Publishing Corporation, New Delhi, 111-131, 2009.

Psychology Research Unit

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Karmakar,R. and Ghosh, A.: Distributive Justice and Cognitive Ability among Students of Two Regions of India, *Clinical Child Psychology*, R. Shyam and A. Khan (eds.), Kalpz Publications, New Delhi, 93-110, 2009.

Sociogical Research Unit

Ghosh, Bholanath: Nagarik Samaj Andolon, *Bharater Samajik Andolon*, Krishnadas Chattopadhya and Aniruddha Chowdhury (eds.), Levant Book, Kolkata, 238-243, 2010.

Ramachandran, V.K., Swaminathan, Madhura and Bakshi, Aparajita: Food Security and Crop Diversification: Can West Bengal Achieve Both? *Econophysics and Economics of Games, Social Choices and Quantitative Techniques,* Banasri Basu, Bikas K. Chakrabarti, Satya R. Chakravarty and Kausik Gangopadhyay (eds.), Springer, 233-240, 2009.

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Swaminathan, Madhura: Women and Agriculture in India: An Overview with a Focus on Work and Wages, *Gender and Discrimination: Health, Nutritional State and Role of Women in India*, M. Pal, P. Bharati, T.S. Vyasulu and B. Ghosh (eds.), Oxford University Press, New Delhi, 59-78, 2009.

Center for Soft Computing Research: A National Facility

Ben, N., Shiu, S.C.K. and Pal, S.K.: Mutual neighborhood based discriminant projection for face recognition, *Pattern Recognition and Machine Intelligence,* S. Chaudhury, S. Mitra, C.A. Murthy, P.S. Sastry and S.K. Pal (eds.), Lecture Notes in Computer Science-5909, Springer Verlag, Berlin, 440-445, 2009.

Bhandari, D., Murthy, C.A. and Pal, S.K.: Image enhancement using multi - objective genetic algorithm, *Pattern Recognition and Machine Intelligence,* S. Chaudhury, S. Mitra, C.A. Murthy, P.S. Sastry and S.K. Pal (eds.), Lecture Notes in Computer Science-5909, Springer Verlag, Berlin, 309-314. 2009.

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Saha, S., Murthy, C.A. and Pal, S.K.: Hypertext classification using tensor space model and rough set based ensemble classifier, *Pattern Recognition and Machine Intelligence,* S. Chaudhury, S. Mitra, C.A. Murthy, P.S. Sastry and S.K. Pal (eds.), Lecture Notes in Computer Science-5909, Springer Verlag, Berlin, 213-218, 2009.

7. VISITING SCIENTISTS

A number of distinguished scientists from India and abroad participated in the research, training and other scientific activities of the Institute during the year. Some of them came to the Institute on invitation and spent fairly long periods in the Institute to assist in the regular research and teaching programmes, while others came for short periods and gave lectures and seminars. Most of them were available for consultation by the faculty members of the Institute. Names of the visiting scientists are given below.

Theoretical Statistics and Mathematics Division

Stat-Math Unit, Kolkata

Basu, Samik, Harvard University, July 14-August 31, 2009.

Bhattacharya, Amitava, School of Mathematics, Tata Institute of Fundamental Research, June 23-July 23, 2009.

Biswas, Indranil, School of Mathematics, Tata Institute of Fundamental Research, November 29-December 12, 2009.

Dutta, Santanu, Tezpur University, July 13-31, 2009.

Gongopadhyay, Krishnendu, School of Mathematics, Tata Institute of Fundamental Research, September 01, 2009-March, 2010.

Karmakar, Biswajit, Max Planck Institute, Germany, August 01-September 30, 2009.

Kuroda, S., Department of Mathematics and Information Sciences, Tokyo Metropolitan University, August 16-30, 2009.

Mukhopadhyay, Anirban, Institute of Mathematical Sciences, Chennai, August 11-13, 2009.

Onoda, Nobuharu, Department of Mathematics, University of Fukui, September 9-24, 2009.

Sarkar, Swagata, Institute of Mathematical Sciences, Chennai, October 12, 2009-March, 2010.

Vikraman, Uma, Indian Institute of Technology, Department of Mathematics, Chennai, May 18-29, 2009.

Stat-Math Unit, Delhi

Athreya, K.B., Iowa State University, USA, November 14-28, 2009.

Burnham, Richard, University of Strathclyde, Glasgow, United Kingdom, November 16, 2009-January 15, 2010.

Chakraborty, Partha Sarathi, Institute of Mathematical Sciences, Chennai, September 7-13, 2009, October 26-November 1, 2009 and November 30-December 6, 2009.

Chaudhuri, Sanjay, National University of Singapore, Republic of Singapore, November 8-14, 2009.

Chen, Louis, National University of Singapore, Republic of Singapore, April 15-19, 2009.

Dijoux, Yann, Universite de Technologie de Troyes, France, January 18-February 12, 2010.

Doosti, Hassan, Ferdowsi University of Mashhad, Iran, March 1-31, 2010.

Friedland, Shmuel, University of Illinois, Chicago, USA, December 7-12, 2009.

Jain, Tanvi, Undiversity of Delhi, India, April 1, 2009-March 31, 2010.

Kochar, Subhas C., Portland State University, Portland, USA, December 21-28, 2009.

Kumar, Ravinder, Himachal Pradesh University, Shimla, January 19–February 8, 2010.

Laishram, Shanta, University of Waterloo, Canada, December 6-10, 2009.

Lee, Sungchul, Yonsei University, Seoul, October 9-14, 2009.

Mukherjee, Rahul, Indian Institute of Management, Kolkata, January 11-16, 2010.

Pournaki, M.R., Sharif University of Technology, Iran, January 4-February 4, 2010.

Rajput, Balram, The University of Tennessee, USA, January 30-February 24, 2010.

Sethuraman, Jayaram, Florida State University, Tallahassee, USA, March 2-7, 2010.

Sharma, Rajesh, Himachal Pradesh University, Shimla, January 19–February 8, 2010.

Tripathy, Manas Ranjan, Indian Institute of Technology, Kharagpur, November 19-March 31, 2010.

Stat-Math Unit, Bangalore

Baoulina, Ioulia, Harish-Chandra Research Institute, Allahabad, December 11-26, 2009.

Barreto, Stephen, Padre Conceicao College of Engineering, Goa, June 7-13, 2009.

Bhamidi, Shankar, University of North Carolina, Chapel Hill, USA, December 22, 2009-January 7, 2010.

Christina, Cerny, University of Nottingham, UK, January 7-February 1, 2010.

Fakhruddin, Najmuddin, Tata Institute of Fundamental Research, Mumbai, March 21-26, 2010.

Fidaleo, Francesco, University of Rome, Tor Vergata, Italy, June 7-13, 2009.

Iyer, Jaya N., University of Hyderabad, February 10-14, 2010.

Kannan, S., Chennai Mathematical Institute, Chennai, July 2009.

Karn, Anil Kumar, Deen Dayal Upadhyaya College, New Delhi, December 23, 2009-January 7, 2010.

Koul, Hira L., Michigan State University, USA, December 28-31, 2009.

Visiting Scientists

Raghavan, K.N., Institute of Mathematical Sciences, Chennai, April 22-29, 2009 and January 3-5, 2010.

Rajput, Balram, University of Tennessee, USA, January 1-20, 2010.

Rao, B.V., Chennai Mathematical Institute, Chennai, December 22, 2009-January 7, 2010.

Rao, K.P.S.B., Indiana State University, USA, July 16-August 7, 2009.

Ravishankar, State University of New York, New-Paltz, USA, October 26-29, 2009.

Winter, Anita, Mathematisches Institute, FAU Erlangen-Nurnberg, Germany, September 1-21, 2009.

Wulbert, Danial, Nehru-Fulbright Fellow at Mangalore, October 5-16, 2009.

Zacharias, Joachim, University of Nottingham, UK, January 9-17, 2010.

Applied Statistics Division

Applied Statistics Unit

Choudhury, Morshed U., Deakin University, School of Engineering & Information Technology, Australia, July 20–December 19, 2009.

Guha, Apratim, School of Mathematics, University of Birmingham, UK, March 27-31, 2010.

Grant, R., Oxford University, UK, January 10-16, 2010.

Huang, Steward, University of California, Riverside, USA, May 19-June 04, 2009.

Jammalamadaka, Rao, S., University of California, Santa Barbara, USA, November 01, 2009-January 31, 2010.

Kim, Sungsu, University of California, Riverside, USA, December 2009–January 2010.

Venkateswarlu, Ayineedi, Department of Mathematics, National University of Singapore, April 01-October 09, 2009.

Bayesian and Interdisciplinary Research Unit

Chakraborty, Dalia, University of Nottingham, UK, August 4-29, 2009.

Chakraborty, Dalia, University of Warwick, UK, December 21, 2009-January 22, 2010.

Dass, Sarat, Department of Statistics and Probability, Michigan State University, USA, January 11-March 31, 2010.

Computer and Communication Sciences Division

Advanced Computing and Microelectronics Unit

Aanjaneya, Mridul, Stanford University, December 23, 2009.

Chandran, L. Sunil, Indian Institute of Science, Bangalore, March 30, 2010.

Madhow, Upamanyu, University of California, Santa Barbara, July 7, 2009.

Sen Sandeep, Department of Computer Science and Engineering, Indian Institute of Technology, Delhi, June 19, 2009.

Sikdar, Somnath, The Institute of Mathematical Science, Chennai, June 23, 2009.

Computer Vision and Pattern Recognition Unit

Blumenstein, Michael, Griffith University, Australia, September 18-25, 2009.

McGonigle, J. , Department of Computer Science, University of Bristol, UK , August 18-September 1, 2009.

Rodenacker, K., Institute of Biomathematics and Biometry, German Research Centre for Environmental Health, Germany, January 24-February 6, 2010.

Documentation, Research and Training Centre

Asundi, A.Y., University of Bangalore, October 5, 2009–January 29, 2010.

Bhat, P.G., Pluma Knowledge Solutions (P) Ltd., October 9-November 3, 2009.

Chidamparam, Department of Computer Science, Peoples Education Society Institution of Technology, Bangalore, March 11-31, 2010.

Kavi, Mahesh, Department of Computer Science, Peoples Education Society Institution of Technology, Bangalore, March 11-31, 2010.

Kohl, David, University of Cincinnati, Ohio, USA, September 27-October 4, 2009.

Electronics and Communication Sciences Unit

Thompson, Reynaldo, School of Digital Arts, University of Guanajuato, Mexico, January-February, 2009.

Machine Intelligence Unit

Baragona, Roberto, University La Sapienza of Rome, Italy, December 29, 2009-January 12, 2010.

Visiting Scientists

Systems Science and Informatics Unit

Deekshatulu, B.L., Department of Computer and Information Systems, University of Hyderabad, January 28, 2010.

Thomson, Reynaldo, School of Digital Arts, University of Guanajuato, Mexico, January 14-18, 2010.

Physics and Earth Sciences Division

Geological Studies Unit

Van Loon, A.J., Geological Institute, Adam Mickiewicz University, Poland, October 24-December 04. 2009.

Physics and Applied Mathematics Unit

Bajpai, R.B.: North Eastern Hill University, Shillong, October 1–4, 2009.

Bhowmik, N.G.: Center for State Water Survey, University of Illinois at Urbana-Champaign, USA, October 19-November 25, 2009.

Das, G.C.: Department of Mathematics, Institute of Advanced Study in Science and Technology (IASST), Guwahati, April 24–26, 2009.

Ghosh, S.: Department of Physics, Institute of Mathematical Science (IMSC), Chennai, June 14–24, 2009.

Joag, P.: Department of Physics, University of Pune, August 5–9, 2009.

Mohrbach, H.: Paul-Verlain, University of Metz, France, December 3-7, 2009.

Biological Sciences Division

Agricultural and Ecological Research Unit

Vijayalakshmi, T., Centre for Environment, Jawaharlal Nehru Technological University, Hyderabad, March 3-5, 2010.

Biological Anthropology Unit

Williams, S.R. Department of Anthropology, Purdue University, USA, July 3- August 4, 2009.

Human Genetics Unit

Krishnamurthy, N., Immunology Group, International Centre for Genetic Engineering and Biotechnology, New Delhi, May 29, 2009.

Basu, S., Kent State University, Kent, Ohio, USA, July 30, 2009.

Lala, P.K., Department of Anatomy & Cell Biology and Department. of Oncology of University of Western Ontario London, Ontario, Canada, December 16, 2009.

Elston, R.C., Department of Epidemiology and Biostatistics, Case Western Reserve University, Cleveland, Ohio, USA, January 12-13, 2010.

Sen, S., Division of Biostatistics, University of California, San Francisco (UCSF), USA, March 1, 2010.

Social Sciences Division

Economic Research Unit

Bose, Amitava, Indian Institute of Management, Kolkata, April 1-May 31, 2009.

Chakraborty, Bikas K., Centre for Applied Mathematics & Computational Science, Saha Institute of Nuclear Physics, Kolkara, August, 2009 – till date.

Conchita, D'Ambrosio, Universita di Milano-Bicocca, Italy, January 4-13, 2010.

Marjit, Sugata, Center for Studies in Social Sciences Patuli, Kolkata, April 1-May 31, 2009.

Paul, Sanjoy, Ketan, University of Oxford, UK, August 3-12, 2009.

Sengupta, Sarbajit, Department of Economics, Visva Bharati, Santiniketan, January 1-March 31, 2010.

Linguistic Research Unit

Bayer. Josef, Department of Linguistics, University of Konstanz, Germany, February 15-28, 2010.

Planning Unit

Afridi, Farzana, Syracuse University, USA, July 01, 2009-March 30, 2010.

Bardsley, Peter, University of Melbourne, Australia, November 26-December 18, 2009.

Basu, Kausik, Cornell University, USA, July 01-31, 2009.

Bhattacharya, Prasad S., Deakin University, Australia, February 20-26 and March 01-23, 2010.

Bowles, Samuel, Santa Fe Institute, USA, December 12-19, 2009.

Carter, Michael, Kathmandu, Nepal, October 19-November 30, 2009.

Chakraborty, Subir, Indiana University, Indianapolis, July 11-August 08, 2009.

Chakraborty, Tanika, Washington University, USA, July 01-June 30, 2009.

Chakraborty, Ujjayant, University of Albeta, USA, September 14-20, 2009.

Dhillon, Amrita, University of Warwick, UK, July 20-August 17, 2009.

Visiting Scientists

Dutta, Bhaskar, Warwick University, UK, July 01- March 31, 2010.

Easwaran, Mukesh, University of British Columbia, Canada, December 05-18, 2009.

Garg, Dinesh, Yahoo, Research Lab. India, July 28-29, 2009.

Guha, Ashok Sanjay, Jawaharlal Nehru Institute, New Delhi, October 01-September 30, 2010.

Iyer, Lakshmi, Massachusetts Institute of Technology (MIT), USA, May 27-June 12, 2009.

Iversen, Vegard, University of East Anglia, UK, September 01, 2009-March 31, 2010.

Majumdar, Dipjyoti, Concord University, USA, August 02-24, 2009.

Marchant, Thiery, University of Ghent, Belgium, April 01-June 20, 2009.

Ponsati, Clara, Universidat Autonoma De Barcelona, Spain, March 01–28, 2010.

Rajaraman, Indira, National Institute of Public Finance and Policy, India, February 01-March 31, 2010.

Ray, Debraj, New York University, USA, July 01-March 31, 2010.

Roy, Jaideep, Brunel University, UK, September 12–21, 2009.

Singh, Gurbachan, School of International Studies, Jawaharlal Nehru University, New Delhi, January 13–March 31, 2010.

Singh, Rajesh, Iowa State University, USA, October 01-November 30, 2009.

Wadhwa, Wilima, South East Regional Folk Alliance (SERFA), July 27-November 30, 2009.

Psychology Research Unit

Chatterjee, G., Department of Psychology, Harvard University, USA, January 4, 2010.

Chatterjee, M., University of Trier, Germany, January 25, 2010.

Majumdar, S.K., Majumdar Institute of History, Sociology and Philosophy of Science and Health Sciences, Kolkata, May 22, 2009.

Palsapure, S., Fellow of the Albert Ellis Institute, New York, USA, May 12, 2009.

Sociological Research Unit

Athreya, Venkatesh, Bharathidasan University, India, March 11-17, 2010.

Khera, Reetika, Delhi School of Economics, India, November 12-16, 2009.

Kitamura, Yukinobu, Hitotsubashi University, Japan, February, 2010.

Statistical Quality Control and Operations Research Division

SQC & OR Unit, Chennai

Parthasarathy, T., Indian National Science Academy (INSA), 2009-10.

Center for Soft Computing Research: A National Facility

Ghosh, Sujata, University of Groningen, Netherlands, August 3-31, 2009.

8. HONOURS AND AWARDS

Theoretical Statistics and Mathematics Division

Stat-Math Unit, Kolkata

Chaudhuri, P.
Elected: Member of the Council of Bernoulli Society for Mathematical Statistics and Probability for 2009-2013.
Selected: Member of the Sectional Committee for Mathematical Sciences of the Indian Academy of Sciences.

Ghosh, A.
Awarded: INSA Young Scientist Award, 2009.

Goswami, D.
Awarded: Swarnajayanti Fellowship of Department of Science and Technology (DST), 2009.

Stat-Math Unit, Delhi

Bhatia, R.
Selected: Fellow of the Academy of Sciences for the Developing World (FTWAS).

Stat-Math Unit, Bangalore

Rao, T.S.S.R.K.
Elected: Fellow of the Indian Academy of Sciences, Bangalore.

Applied Statistics Division

Applied Statistics Unit

Bandyopadhyay, S.
Appointed: Member of the National Statistics Commission, India.

Biswas, A.
Received: C.R. Rao National Award in Statistics from Ministry of Statistics & Programme Implementation for 2008-09.

SenGupta, A.
Elected: Fellow of the American Statistical Association.
Re-appointed: Advisor, Scientific Advisory Board, Institute of Statistical Mathematics, Tokyo, Japan.

Bayesian and Interdisciplinary Research Unit

Sinha, B.K.
Selected: Member of Municipal Valuation Committee, Kolkata Municipal Corporation
Appointed: Member of Monitoring Committee (5-year Term), DST sponsored Project at C R Rao Advanced Institute for Mathematics, Statistics & Computer Sciences, Hyderabad.

Computer and Communication Sciences Division

Advanced Computing and Microelectronics Unit

Sur-Kolay, S.
Awarded: IBM Faculty Award, 2009

Computer Vision and Pattern Recognition Unit

Garain, U.
Awarded: Google Guest from Google Inc., ICDAR 2009.

Documentation Research and Training Centre

Madalli, D.P.
Awarded: Smt. Satyavathi and Prof. A.A.N. Raju-IASLIC Best LIS Teacher Award.

Electronics and Communication Sciences Unit

Chanda, B.
Elected: Fellow of International Association of Pattern Recognition.

Machine Intelligence Unit

Maji, P.
Awarded: NASI Platinum Jubilee Young Scientist Award, The National Academy of Sciences, India, 2009.
Selected: Associate, Indian Academy of Sciences, 2009.

Bandyopadhyay, S.
Awarded: Alexander von Humboldt Fellowship for Experienced Researchers, Germany, 2009-2010.

Kundu, M. K.
Selected: Fellow of the International Association for Pattern Recognition (IAPR), 2010.

Physics and Earth Sciences Division

Physics and Applied Mathematics Unit

Pal, S.
Awarded: Alexander Von Humboldt Fellowship, Germany, 2010-2012.

Biological Sciences Division

Human Genetics Unit

Majumder P.P.
Awarded: Third World Academy of Sciences (TWAS) Prize (Biology), 2009.

Ghosh, S.
Appointed: Member of Genetic Analysis Workshop, International Advisory Committee by Genetic Analysis Workshop Organization.

Social Sciences Division

Economic Research Unit

Chakravarty, S.R.
Invited: External adviser of the World Bank.

Linguistic Research Unit

Dasgupta Probal
Selected: i) National Visiting Professor of Philosophy.
ii) Indian Council of Philosophical Research, Delhi. 2009.

Planning Unit

Roy Chowdhury, Prabal
Selected: Inclusion in the Marquis-who's-who 2009, for overall contribution to academics.

Population Studies Unit

Rao, Arni S.R. Srinivasa
Awarded: APAC Award, University of Oxford, United Kingdom, 2009.
Selected: National Modeling Expert, Swine Flu H1N1 in India.

Psychology Research Unit

Basak, R.
Selected: Best Paper Award in the National Conference on Cognition, Stress and Mental Health Department of Psychology, Banaras Hindu University, Varanasi, 2009.

9. EDITORIAL AND OTHER SCIENTIFIC ASSIGNMENTS

EDITORIAL ASSIGNMENTS

Theoretical Statistics and Mathematics Division

Stat-Math Unit, Kolkata

Bose, Arup (Associate Editor): *Statistics and Probability Letters*; (Associate Editor): *IMS Collection*, Institute of Mathematical Statistics, USA.

Chaudhuri, Probal (Associate Editor): *The Journal of the American Statistical Association*, Statistica Sinica and Advances in Statistical Analysis.

Goswami, Debashish (Editor): *Advanced Mathematical Physics*, Special Issue.

Stat-Math Unit, Delhi

Bhatia, R. (Senior Editor): *Linear Algebra and Its Applications*, Elsevier, New York; (Advisory Editor): *Indian Journal of Pure and Applied Mathematics*; (Managing Editor): *Texts and Readings in Mathematics series of books*; (Chief Editor): *Proceedings of International Congress of Mathematicians 2010.*

Bhatt, Abhay Gopal (Co-editor): *Sankhya.*

Dewan, Isha (Associate editor): *Computational Statistics and Data Analysis*; *Journal of Indian statistical Association.*

Stat-Math Unit, Bangalore

Ramasubramanian, S. (Co-editor): *Sankhya, Series A*, 71, 2009.

Sastry, N.S.N. (Editor): *Essays in Geometric Group Theory*, Ramanujan Mathematical Society Lecture Notes, 9, 2009.

Rajarama Bhat, B.V. (Member, Council of Editors): *Resonance*, Journal of Science Education, Indian Academy of Sciences.

Applied Statistics Division

Applied Statistics Unit

Biswas, A. (Associate Editor): *Sequential Analysis*; *Marcel Dekker*, New York, Taylor and Francis; *Communications in Statistics*, Taylor and Francis.

Dewanji, A. (Associate Editor): *Calcutta Statistical Association Bulletin.*

Editorial and other Assignments
SenGupta, A. (Editor-in-Chief): *Journal of Indian Society for Probability and Statistics*; (Editor) *Scientiae Mathematicae Japonicae,* Japanese Association of Mathematical Sciences; (Co-editor): *Sankhya B*; (Associate Editor): *Journal of Indian Statistical Association.*

Bayesian Interdisciplinary Research Unit

Basu, A. (Editor): *Sankhya,* Series B, 2009-10; *Journal of Statistical Planning and Inference*, 2009-10.

Computer and Communication Sciences Division

Advanced Computing and Microelectronics Unit

Bhattacharya, B.B. (Editor): *Journal of Electronic Testing: Theory and Applications* (JETTA), Springer.

Sinha, B.P. (Area Editor): *Journal of Parallel and Distributed Computing,* Elsevier.

Sur-Kolay, Susmita (Associate Editor): *IEEE Transactions on VLSI Systems.*

Computer Vision and Pattern Recognition Unit

Chaudhuri, B.B. (Associate Editor): *International Journal of Pattern Recognition and Artificial Intelligence,* World Scientific; *International Journal of Document Analysis and Recognition,* Springer; *IETE Technical Review,* Medknow; *Electronic Letter on Computer Vision and Image Analysis,* ELCVIA; *International Journal of Computer Vision,* Springer; *Vivek,* CDAC, Mumbai.

Pal, U. (Associate Editor): *Electronic Journal on Computer Vision and Image Analysis*, CVC Press; *International Journal of Computer,* Mathematical Sciences and Applications.

Machine Intelligence Unit

Mitra, S. (Associate Editor): *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery (WIRE DMKD); Neurocomputing; Journal of Computational Intelligence in Bioinformatics (JCIB).*

Systems Science and Informatics Unit

Sagar, B.S.D. (Editor): *Discrete Dynamics in Nature and Society*, Hindawi Publishers; (Guest Editor): *International Journal of Remote Sensing*, Taylor & Francis Publishers.

Physics and Earth Sciences Division

Geological Studies Unit

Bandyopadhaya, S. (Editor): *New Aspects of Mesozoic Biodiversity*, Lecture Notes in Earth Science, Vol.-132, Springer-Verlag, 2010.

Mazumder, R. (with Reddy, S.M., Evans, D.A. and Collins, A.S.) (Editors): *Palaeoproterozoic supercontinent and its global evolution*, Geological Society of London Special publication, Vol.-323.

Saha, Dilip (Editor): *Indian Journal of Geology*.

Biological Sciences Division

Biological and Anthropology Unit

Mukhopadhyay, B. (Consulting Editor): *Collegium Antropologicum*, Journal of Croatian Anthropological Association, 2010; (Associate Editor): *Journal of Indian Anthropological Society*, Official publication of Indian Anthropological Society, 2010.

Social Sciences Division

Economic Research Unit

Chakravarty, Satya R. (Member, Advisory Board): Book Series '*Economic Studies in Inequality, Social Exclusion and Well-Being*', Springer, New York; (Associate Editor): *Economics-journal*, Kiel Institute for the World Economy, Germany.

Linguistic Research Unit

Dasgupta, Probal (Guest Editor, with Chiranjib Sur): *Aloconachakra*, Bhashatatta Bishesh Sankhya, Vol.-28, 2010; (Editor, with Humphrey Tonkin): *Language Problems and Language Planning*, Vol.-33, John Benjamins, 2009.

Dash, Niladri Sekhar (Guest Editor): *Language Forum* (Special Issue), Vol.-35, No.-2, 2009.

Planning Unit

Das, Satya P. (Editor): *Indian Growth and Development Review*, Emerald Group Publishing Limited, UK.

Ghate, Chetan (Policy Editor): *Indian Growth and Development Review*, UK.

Ramaswami, Bharat (Co-Editor): *Indian Growth and Development Review*, Vol.-1, Emerald Group Publishing Limited, UK.

Roy Chowdhury, Prabal (Co-Editor): *Indian Growth and Development Review*, Emerald Group Publishing Limited, UK.

Somanathan, E. (Associate Editor): *Environment and Development Economics*.

Editorial and other Assignments

Population Studies Unit

Pathak, Prasanta (Assistant Editor): *Indian Journal of Regional Science*, Vol.-XXXXI, Regional Science Association of India, 2009-2010.

Psychology Research Unit

Dutta Roy, D. (Editor-in-chief): *Psyber News*, Vol-1, No.-1, 2010.

Statistical Quality Control and Operations Research Division

SQC & OR Unit, Bangalore

Acharya, U.H. (Editor in Chief): Newsletter of SQC & OR Division.

John, Boby (Associate Editors): Newsletter of SQC & OR Division.

Ray, Somnath (Associate Editors): Newsletter of SQC & OR Division.

SQC & OR Unit, Delhi

Bapat, R.B. (Editor): Modeling, Computation and Optimization, *ISI Platinum Jubilee Series on Statistical Science and Interdisciplinary Research*, Vol.-6, World Scientific, 2009.

Das, A.K. (Editor): Modeling, Computation and Optimization, *ISI Platinum Jubilee Series on Statistical Science and Interdisciplinary Research*, Vol.-6, World Scientific, 2009.

Neogy, S.K. (Editor): Modeling, Computation and Optimization, *ISI Platinum Jubilee Series on Statistical Science and Interdisciplinary Research*, Vol.-6, World Scientific, 2009.

Centre for Soft Computing Research: A National Facility

Pal, S.K. (Associate Editor): *Pattern Recognition Letters,* Elsevier; *International Journal of Pattern Recognition and Artificial Intelligence*, World Scientific; *Information Sciences,* Elsevier; *Applied Intelligence,* Springer; *Fuzzy Sets and Systems*, Elsevier; *Fundamenta Informaticae*, IOS Press; *International Journal of Computational Intelligence and Applications,* World Scientific; *IET Image Processing*, IEE Press; *Lecture Notes in Computer Sciences Transactions on Rough Sets II*, Springer; *Journal of Intelligent Information Systems*, Springer; *Proceedings INSA-A*, Indian National Science Academy-A; (Editor-in-Chief): *International Journal of Signal Processing,* World Academy of Science, Engineering and Technology; *Image Processing and Pattern Recognition,* Vienna University of Technology; (Book Series Editor): *Frontiers in Artificial Intelligence and Applications (FAIA),* IOS Press; *Statistical Science and Interdisciplinary Research,* World Scientific.

SCIENTIFIC ASSIGNMENTS/ACADEMIC VISITS ABROAD

Theoretical Statistics and Mathematics Division

Stat-Math Unit, Kolkata

Barua, R.:
University of Tokyo, KDDI Corporation, Research Center for Information Security and Kyushu University, Japan, February 17-27, 2010.

Basak, G.K.:
Department of Mathematics, University of Bristol, UK, May 22-June 5, 2009.

Bose, Arup:
1) Department of Economics, University of Cincinnati, USA, May 14-July 14, 2009 and August 14--September 27, 2009; 2) Department of Statistics, Yale University, Connecticut, USA, September 8--9, 2009; 3) Department of Mathematics, Indiana University-Purdue University at Indianapolis, USA, September 14, 2009.

Datta, Mahuya:
Abdus Salam International Centre for Theoretical Physics, Trieste Italy, May 21-July 4, 2009.

Goswami, Debashish:
Department of Mathematics, University of Toulouse, France, May 2009.

Poddar, Mainak:
Seoul National University, Korea, December 17-28, 2009.

Stat-Math Unit, Delhi

Bandyopadhyay, Antar:
Universitat Munster, Munster, May 4-June 30, 2009.

Bapat, R.B.:
University of Illinois, Chicago, USA, September 7-14, 2009.

Bhatia, Rajendra:
(1) University of Lisbon, Portugal, May 18-June 28,2009; (2) International Centre of Theoretical Physics, Trieste, Italy, June 22-July 11, 2009; (3) University of Ljubljana, Slovenia July 13-18, 2009; (4) University of Mazandran, Iran, October 23-31, 2009.

Dewan, Isha:
University of Strathclyde Business School, Glasgow, June 4-12, 2009.

Roy, Rahul:
(1) University of Waterloo, Canada, USA, May 11-31, 2009; (2) University of Sao Paulo, Brazil, June 1-July 31, 2009; (3) Yonsei University, Republic of Korea, January 25-29, 2010.

Stat-Math Unit, Bangalore

Athreya, Siva:
National University of Singapore, Singapore, March 1-3, 2010.

Editorial and other Assignments

Rajarama Bhat, B.V.:
(1) Pontificia Universidad Catolica de Chile, Santiago, Chile, November 23-28, 2009; (2) University of Concepcion, Chile, November 29-December 4, 2009.

Rao, T.S.S.R.K.:
(1) Department of Mathematical Analysis, University of Granada, Spain, November 23-December 13, 2009; (2) Universidad Complutense de Madrid, Spain, December 14-17, 2009.

Sreekantan, Ramesh:
University of Montreal, Canada, February 15-March 15, 2010.

Applied Statistics Division

Applied Statistics Unit

Biswas, A.:
(1) University of Malaya, Kuala Lumpur, Malaysia, May11-June 3, 2009; (2) London School of Economics, UK, November 27-December 10, 2009; (3) International Concrete Conference & Exhibition (ICCX), Cairo, Egypt, December 20-23, 2009; (4) University of Wisconsin, Madison, USA, September 14-18, 2009.

Chaudhuri, A.:
International Statistical Institute Conference, Durban, August 16-22, 2009.

Sarkar, P.:
Queensland University of Technology, Brisbane, Australia, June 7-12, 2009.

SenGupta, A.:
University of California, Riverside, USA, June 8-July 14, 2009.

Bayesian Interdisciplinary Research Unit

Basu, Ayanandranath:
Department of Statistics, Pennsylvania State University, USA, April 01-May 27, 2009.

Sinha, Bikas, K.:
(1) University of Tampere, Finland, August 19-30, 2009; (2) University of Illinois at Chicago, USA, April 27–May 8, 2009; (3) Mahidol University, Bangkok, Thailand, August 14-18, November 15-21, 2009, January 16-18, and February 14-20, 2010.

Computer and Communication Sciences Division

Advanced Computing and Microelectronics Unit

Bhattacharya, B. B.:
(1) 13th International Workshop on Combinatorial Image Analysis IWCIA'09, Playa del Carmen, Mexico, November 24-27, 2009; (2) Centro de Investigacion de Estudios Avanzados del Instituto

Politecnico Nacional (CINVESTAV-IPN), Mexico, November 29–December 3, 2009; (3) University of Nebraska-Lincoln, USA, December 4–5, 2009; (4) University of Southern Illinois, Carbondale, USA, December 6-9, 2009; (5) Department of Computer Science & Engineering, Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh, February 18-20, 2010.

Das, N.:
(1) Center for Tele Infrastructure (CTIF), Aalborg University, Denmark, May 17–23, 2009.

Computer Vision and Pattern Recognition Unit

Bhattacharya, U.:
(1) Department of Computer Science, University of Bristol, UK, July 29-August 1, 2009; (2) Universitat Autònoma de Barcelona, Spain, July 26-29, 2009; (3) Universitat Autònoma de Barcelona, Catalonia, Spain, July 25, 2009.

Chaudhuri, B.B.:
(1) Universitat Autònoma de Barcelona, Catalonia, Spain, July 25, 2009; (2) Universitat Autònoma de Barcelona, Catalonia, Spain, July 26-29, 2009; (3) Helmholtz Zentrum (Institute of Radiation Protection), Germany, August 1-4, 2009; (4) Microsoft Head Office, Redmond, USA, August 11-17, 2009.

Garain, U.:
(1) Universitat Autònoma de Barcelona, Barcelona, Spain, July 26-29, 2009; (2) Understanding and Pattern Recognition (IUPR) Lab, Technical University of Kaiserlautern, Germany, July 30-August 12, 2009; (3) Laboratoire LITIS EA 4108, University of Rouen, France, January 10-February 09, 2010.

Pal, U.:
(1) Al-Azhar University, Cairo, April 5-6, 2009; (2) Computer Vision Center, University Autonoma the Barcelona, Spain, April 7-May 6, 2009; (3) Universitat Autònoma de Barcelona, Spain, July 26-29, 2009; (4) Graduate School Engineering, Mie University, Tsu, Mie, Japan, October 7-30, 2009.

Palit, S.:
(1) Department of Informatics and Telecommunications, University of Athens, Greece, July 2, 2009; (2) Petros M. Nomikos Conference Centre, Santorini Island, Greece, July 5-7, 2009; (3) Applied Electronics Department, University of Roma Tre, Rome, Italy, July 10, 2009.

Documentation, Research and Training Centre

Madalli, Devika P.:
(1) International Workshop of the Living Knowledge, Institute for Social Research and Analysis, Vienna, May 3-8, 2009; (2) ICSD Conference, Spain, August 31-September 18, 2009; (3) The National Library of the Netherlands, The Hague, The Netherlands, October 27-November 4, 2009; (4) European University Institute, Florence, Italy, January 12-16, 2010; (5) The Wissensehaftskolleg zu Berlin-Institute for Advanced Study, Berlin, Germany, March 18-20, 2010; (6) National Science Foundation, Sri Lanka, March 23-26, 2010.

Prasad, A.R.D.:
(1) European Commission, Brussels, May 4-6, 2009; (2) Institute for Social Research and Analysis, Vienna, May 3-8, 2009; (3) Thai National Agris Centre, University Library, Kasetsart University, Thailand, August 1-15, 2009; (4) European Union Commission, Spain, August 31-September 7, 2009; (5) University of Trento, Italy, September 8-11, 2009; (6) University of Trento, Italy, September 12-18, 2009; (7) European University Institute, Florence, Italy, January 12-16, 2010; (8) National Science Foundation, Sri Lanka, March 23-26, 2010.

Editorial and other Assignments

Raghavan, K.S.:
Sapienza University of Rome, Italy, February 23-26, 2010.

Electronics and Communication Sciences Unit

Mukherjee, D.P.:
(1) Department of Computer Science, University of Alberta, Edmonton Canada, June 1-July 31, 2009;
(2) Department of Radiology, Osaka University, Japan, February 1-March 31, 2010.

Machine Intelligence Unit

Bandyopadhyay, S.:
(1) International Center for Theoretical Physics (ICTP), Trieste, Italy, June 8-12, 2009; (2) University of Klagenfurt, Austria, September 25-26, 2009; (3) Faculty of Mathematics and Computer Science, Ruprecht-Karls-University, Heidelberg, Germany, September 28-October 17, 2009.

Ghosh, A.:
(1) University of Trento, May 12-June 5, 2009; (2) University of Milan, May 29, 2009; (3) University of Genuva, Italy, May 23-25, 2009.

Kundu, M.K.:
(1) Palermo, Terrasini, Italy, June 9-12, 2009; (2) Baoding, Hebei, China, July 11-14, 2009; (3) Kingston University, London, UK, December 3, 2009.

Mitra, S.:
(1) IEEE Women in Computational Intelligence, 2010; (2) IEEE CIS Task Force on Machine Learning, 2010; (3) International Rough Set Society, 2010.

Systems Science and Informatics Unit

Sagar, B.S.D.:
(1) Ryerson University, Department of Electrical and Computer Engineering, Toronto, Canada, May 19-30, 2009; (2) University of Cape Town, South Africa, July12-17, 2009.

Physics and Earth Sciences Division

Geological Studies Unit

Bhattacharya, Samarendra:
Curtin University of Technology, Perth, Australia, February 15-28, 2010.

Ghosh, P.:
San Miguel de Tucuman, Argentina, August 24-28, 2009.

Patranabis-Deb, S.:
Durham University, UK, May 2-June 20, 2009.

Sengupta, Dhurjati Prasad:
(1) University of Bristol, UK, September 23-26, 2009. (2) Natural History Museum, UK, September 20-October 4, 2009.

Physics and Applied Mathematics Unit

Das, Pradip Kumar:
(1) Wroclaw University, Poland, August 10-26, 2009; (2) Catania, Italy, September 1-4, 2009.

Ghosh, Subir:
(1) University of Metz, France, August 27-September 13, 2009; (2) Athens University, Greece, September 14- September 30, 2009; (3) Department of Applied Mathematics and Theoretical Physics, University of Cambridge, UK, October 1-25, 2009.

Mazumder, Bijoy Shingha:
(1) The University of Hong Kong, Hong Kong, December 7-20, 2009; (2) The Environmental Fluid Mechanics Laboratory, Standford University, USA, March 14-23, 2010; (3) The Department of Geography, Simon Fraser University, Canada, March 25-31, 2010.

Roy, Sisir:
(1) University of Arkansas, USA, June 15-August 13, 2009; 2) New York University School of Medicine, USA, February 19-March 2, 2010.

Biological Sciences Division

Biological Anthropology Unit

Mukhopadhyay, B.:
Yunnan University, Kunming, China, July 15-20, 2009.

Human Genetics Unit

Ghosh, S.:
(1) Leiden University Medical Center (LUMC), Leiden, the Netherlands and Max-Planck Institute of Psychiatry, Munich, Germany, May 13-16, 2009; (2) Seoul University, Seoul, South Korea, June 28-July 1, 2009; (3) Washington University School of Medicine, St. Louis and National Institutes of Health, Bethesda, USA, September 8-17, 2009; (4) International Genetic Epidemiology Society (IGES), Honolulu, USA, October 18 -25, 2009; (5) Washington University School of Medicine, St. Louis, January 25-28, 2010; (6) Welcome Trust Center at Oxford University, Oxford and Newcastle University, Newcastle, UK, March 24-26, 2010.

Social Sciences Division

Economic Research Unit

Chakravarty, Satya R.:
(1) Yokohama National University, Japan, July 01-August 29, 2009; (2) Yokohama National University, Japan, July 30, 2009.

Editorial and other Assignments
Das, Samarjit:
American University in Cairo, Egypt, December 18-24, 2009.

Mitra, Manipushpak:
Department of Economics, University of New South Wales, Australia, November 30-December 22, 2009.

Mitra, Sandip:
Institute for Economic Development, Boston University, October 23-November 15, 2009.

Neogi, Chiranjib:
Korea Institute for International Economic Policy, Korea, June 22–July 24, 2009.

Linguistic Research Unit

Dasgupta, Probal:
(1) Conference of SAT, Milan, Italy, July 25, 2009; (3) Conference of UEA, Bialystok, Poland, July 26-August 05, 2009; (4) Department of General Linguistics, Adam Mickiewicz University, Poznan, Poland, September 17-18, 2009; (5) University of Konstanz, Konstanz, Germany, September 19-October 1, 2009; (6) University of Strasbourg, Strasbourg, France, January 13, 2010; (7) School of Humanities, University of Haute Alsace, Mulhouse, France, January 15, 2010.

Planning Unit

Das, Satya P.:
Universidad Carlos III de Madrid, Spain, June, 2009.

Ghate, Chetan:
(i) Max Planck Institute of Economics, Jena, Germany, 2009; (ii) Claremont Graduate University, Claremont, USA, August 10, 2009–January 10, 2010; (iii) Indiana University (Bloomington), Indiana, USA, November 18-23, 2009.

Mishra, Debasis:
Universitat Autonoma de Barcelona, Barcelona, Spain, November 19-December 22, 2009.

Mukhopadhyay, Abhiroop:
Asia Research Centre, London School of Economics, June-July, 2009.

Ramaswami, Bharat:
University of Hong Kong, 2009.

Ray, Tridip:
University of Hong Kong, January-July, 2009.

Roy Chowdhury Prabal:
(i) Brunel University (Invited talk 4th CEDI Conference), UK Summer, 2009; (ii) Warwick University, UK Summer, 2009.

Sen, Arunava:
(i) GREQAM, Marseille, conferences in Maastricht, The Netherlands, May 27–June 25, 2009; (ii) Hausdorff Research Institute for Mathematics, University of Bonn, Germany, July 15–20, 2009.

Somanathan, E.:
(i) USA, BREAD Conference, Duke University, April 2009; (ii) Sri Lanka, SANDEE Workshop in Negombo, July 2009; (iii) Feem Conference in Venice, Italy, October 2009; (iv) SANDEE Workshop in Pokhara, Nepal, December 2009; (v) ASSA Conference in Atlanta, USA, January 2010; (vi) Seminar and Public Lecture at MOTU Economic and Public Policy Research, Wellington, New Zealand, March 2010; (vii) University of Melbourne, Australia, March, 2010; (viii) Singapore Management University, Singapore, March, 2010.

Population Studies Unit

Rao, Arni S.R. Srinivasa:
(1) Mathematical Institute, University of Oxford, England, June 9–30, 2009; (2) Palais des Congres, Marakesh, Morroco, September 26–October 1, 2009.

Psychology Research Unit

Gupta, R.:
(1) Szent Istvan University, Tenth Godollo, Hungary, June 23-26, 2009; (2) Faculty of Economics and Social Sciences, Szent Istvan University, Godollo, Hungary, June 24, 2009.

Sociological Research Unit

Ghosh, Bholanath:
(1) Szent Istvan University, Godollo, Hungary, June 23-26, 2009; (2) Institute of Regional Economics and Rural Development, Szent Istvan University, Godollo, Hungary, June 25, 2009.

Ramachandran, V.K.:
(1) China Rural Finance Forum, China Institute of Rural Finance and the Agricultural Bank of China Ltd, Beijing, October 28, 2009; (2) Daegu, South Korea, University of Tokyo and Centre of Asian Studies, Kyunpook National University, March 29-30, 2010.

Swaminathan, Madhura:
(1) World Insitute for Development Economics Research, Helsinki, Finland, April 14-July 3, 2009; (2) Asia Research Centre, Copenhagen Business School, Copenhagen, Denmark, May 11, 2009; (3) Daegu, South Korea, University of Tokyo and Centre of Asian Studies, Kyunpook National University, March 29-30, 2010.

Statistical Quality Control and Operations Research Division

SQC & OR Unit, Chennai

Ravindran, G.:
(1) Department of Mathematics, University of Maryland, Baltimore County, USA, August 8–23, 2009, (2) Gleacher Center, University of Chicago, USA, August 23–28, 2009; (3) Industrial Engineering Department, Massachusetts Institute of Technology, USA, September 4–7, 2009

Editorial and other Assignments

SQC & OR Unit, Delhi

Handa, S.S.:
Department of Mathematics, Shahid Chamran University of Ahvaz, Iran, February 3–12, 2010.

Center for Soft Computing research: A National Facility

Pal, S.K.:
(1) Virje University and IOS Press, Amsterdam, June 2-6, 2009; (2) University of Palermo, Italy, June 7-13, 2009; (3) University of Naples, Italy, June 14-21; (4) University of Milano, Italy, June 22-23, 2009; (5) University of Maryland, College Park, USA, August 16-30, 2009; (6) University of Trento, Italy, September 8-12, 2009; (7) Beijing Jiaotong University, China, October 15-17, 2009; (8) Nanjing University of Science, China, November 4-7, 2009.

SCIENTIFIC ASSIGNMENTS/ ACADEMIC VISITS IN INDIA

Theoretical Statistics and Mathematics Division

Stat-Math Unit, Kolkata

Barua, R.:
Chaired a session, INDOCRYPT 2009, Delhi, December 13-16, 2009.

Basak, G.K:
(1) Invited series of lectures, Seminar on Time Series Modeling, Banasthali University, Rajasthan October 3-6, 2009; (2) Invited lectures on Stochastic Processes in a Programme on Quantitative Economics, Centre for Studies in Social Sciences, Calcutta, March 9, 2010.

Bose, Arup:
(1) Invited speaker, Conference on Economic Theory, Markets and Institutions of Governance, Jawaharlal Nehru University and National Institute of Public Finance and Policy, March 22-24, 2010; (2) Invited speaker, International Colloquium on "Perspectives in Fundamental Research", Tata Institute of Fundamental Research, March 03-06, 2010.

Chaudhuri, Probal:
Invited talk, 2nd Indo-Brazil Symposium on Mathematics, Tata Institute of Fundamental Research, Bangalore, December 14-18, 2009.

Mukherjee, Goutam:
Delivered a series of 6 lectures on "Aspherical manifolds", Advanced Training in Mathematics Schools in Topology in Institute of Mathematical Sciences, Chennai, February 2-13, 2010.

Poddar, Mainak:
(1) Spoke at the Conference on Differential Geometric Methods in Algebraic Geometry, Tata Institute of Fundamental Research Bombay, April 6-16, 2009; (2) Gave a minicourse in the ATM workshop on Topololgy of Manifolds, Institute of Mathematical Sciences, Chennai, February 1-11, 2010; (3) Gave Colloquium talk, Indian Institute of Technology, Bombay, February 23-26, 2010 .

Sarkar, Rudra P.:
Research collaboration in connection with a project titled "Harmonic analysis on Damek – Ricci spaces" funded by NBHM, Department of Mathematics and Statistics, Indian Institute of Technology, Kanpur, September 1-11, 2009 and March 21-27, 2010.

Stat-Math Unit, Delhi

Bhatia, R.:
(1) Academic Secretary, Ramanujan Mathematical Society, May 11-13, 2009; (2) Gave talks, Conference on Recent Trends in Algebra, Punjab University, Chandigarh, November 25-27, 2009; (3) Gave talks, Advanced Training in Mathematics School, Indian Institute of Sciences, Bangalore, March 8-10, 2010.

Thakur, Maneesh:
(1) Indian Institute of Science Education and Research, Mohali, December 15-24, 2009; (2) Visited Department of Mathematics, University of Kashmir, October 12-16, 2009.

Stat-Math Unit, Bangalore

Bagchi, Sunanda:
Delivered an invited talk, International Conference on Frontiers of Interface between Statistics and Sciences, Hyderabad, December 31, 2009-January1, 2010.

Biswas, Jishnu:
Taught, Advanced Instructional School (AIS) on Algebraic Geometry, Bhaskaracharya Prathishthana, Pune, November 30-December 19, 2009.

Rajarama Bhat, B.V.:
(1) Gave lectures, Instructional Workshop on Spectral Theorem, Kerala School of Mathematics, Kozhikode, June 15-17, 2009; (2) Gave invited lectures, Chennai Mathematical Institute and ICM Committee Meeting, Institute of Mathematical Sciences, Chennai, March 1-5, 2010.

Rajeev, B.:
(1) Gave lectures, Harish-Chandra Research Institute, Allahabad, January 25-February 4, 2010.

Ramasubramanian, S.:
(1) Invited research talk, School and workshop on Stochastic Metohds: analysis and algorithms, Tata Institute of Fundamental Research, Mumbai, September 2-5, 2009; (2) Invited talk, Conference on Quantitative Finance, Institute of Mathematics and Applications, Bhubaneswar, February 26-28, 2010.

Rao, T.S.S.R.K.:
Participated, Special semester in Analysis, Chennai Mathematical Institute, January 18-21, 2010.

Sastry, N.S.N.:
Series of lectures, Workshop at Harish-Chandra Research Institute, Allahabad, November 9-13, 2009.

Sury, B.:
(1) Talk, "Density theorems for primes dividing sequences", Tata Institute of Fundamental Research, Mumbai, October 5-9, 2009; (2) Talk, "Group theory in tiling problems", Indian Institute of Science Education Research (IISER), Mohali, February 19-20, 2010.

Editorial and other Assignments

Applied Statistics Division

Bayesian Interdisciplinary Research Unit

Adhikary, Arun Kumar:
(1) Resource Person in Workshop on Statistical Modeling and Simulation, Kalasalingam University Anand Nagar, Krishnakoil, May 28-30, 2009; (2) Organiser of a Workshop on Applied Computer or Development Studies, Tezpur University, Assam, March 30–April 2, 2009; (3) Member of the Exper Committee in Statistics, Central University of Bihar, Patna, February 20-21,2010.

Purkayastha, Sumitra:
Member of Research Area Panel, National Brain Research Centre, Manesar, Haryana, 2009-10.

Sinha, Bikas, K.:
(1) Speaker in Meetings/ Workshops, Indian Agricultural Statistics research Institute (IASRI), Pusa, New Delhi, October 8, December 3-5, 2009 and March 15-17, 2010; (2) Member of Monitoring Committee, CR Rao AIMSCS, Hyderabad, July 24-25, 2009; (3) Research visitor, CR Rao AIMSCS, Hyderabad; (4) Workshop Organizer and Speaker, Kalashalingam University, May 25-30, 2009; (5) Workshop Speaker, Gauhati University, December 24-25, 2009.

Computer and Communication Sciences Division

Advanced Computing and Microelectronics Unit

Bhattacharya, B.B.:
(1) Tutorial Speaker, National Institute of Technology (NIT), Rourkela, June 23-25, 2009; (2) Tutorial Speaker, North Eastern regional Institute of Science and technology (NERIST), Arunachal Pradesh, January 29-February 1, 2010; (3) Presented paper, 23rd International conference on VLSI Design, Bangalore. January 3-7, 2010.

Bishnu, A.:
(1) Delivered lecture, National Institute of Technology (NIT), Tiruchirapally, January 7-9, 2010; (2) Delivered lecture, Institute of Technology- Banaras Hindu University (IT-BHU), January 27-29, 2010; (3) Delivered lecture, National Institute of Technology (NIT), Rourkela, March 25-27, 2010.

Das, N.:
(1) Chair, WIE (Women in Engineering) Affinity Group, IEEE Calcutta Section, April 2009-March 2010; (2) Joint Co-coordinator, Pre-conference workshop, CODEC 2009, Kolkata, December 13, 2009; (3) Panel member, Ph.D. forum, ICDCN 2010, Kolkata, January 6, 2010; (4) Invited lecture, UGC Refresher Course on 'Wireless Adhoc & Sensor Networks', Jadavpur University, Kolkata, January 4-23, 2010; (5) Program Committee Member, NCC 2010, Chennai, January 29-31, 2010; (6) Session Chair, IEEE CASEDCOM, Kolkata, March 13, 2010.

Dattagupta, J.:
Expert, Committee on National Ubiquitous Computing Research Initiative, Department of Information Technology, Ministry of Communication and Information Technology, Govt. of India, April 2009-March 2010.

Sinha, B.P.:
Member, Governing Body, University Institute of Technology, Burdwan, April 2009-March 2010.

Sur-Kolay, S.:
(1) Adjunct Professor, Department of Computer Science and Engineering, Indian Institute of Technology, Kharagpur, December 30-March 31, 2010; (2) Invited lecture, IBM ISTEL-India, April 1, 2009; (3) Invited lecture, Intel India Design Centre, Bangalore, April 2, 2009; (4) Keynote Address, SESVIT-CommV09, Vellore Institute of Technology (VIT) University, October 9, 2009; (5) Invited lecture, Workshop on VLSI Interconnect Routing in the Nanometric Regime, January 27, 2010; (6) Keynote Address, AVLSI Technology Summit, Indian Institute of Technology, Kharagpur, March 25, 2010.

Computer Vision and Pattern Recognition Unit

Garain, U.:
(1) Invited talk, Fourth National Frontiers of Engineering (NatFOE-4) Symposium of the Indian National Academy of Engineering (INAE), Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam, September 16-18, 2009; (2) Delivered Lecture, the workshop on Advances in Image and Document Porcessing, Indian Institute of Management, Shillong, March 16-20, 2010.

Pal, U.:
(1) Delivered talk, UGC Refresher Course, University of Burdwan, Burdwan, March 22, 2010; (2) Invited talk, International Conference on Signal and Image Processing, Mysore, Karnataka, August 12-14, 2009.

Palit, S.:
(1) Delivered lecture, West Bengal University of Technology, Salt Lake, Kolkata, April 1 & 8, 2009; (2) Delivered lecture, Winter School on DSP Algorithms, Architecture & Applications, Institute of Radio Physics & Electronics, University of Calcutta, January 8, 2010; (3) Delivered lecture, National seminar on Next Generation Computing, Vidyasagar University, Paschim Midnapore, March 31, 2010.

Documentation, Research and Training Centre

Krishnamurthy, M.:
(1) Open Access and Building Institutional Repositories, Electronics Corporation of India Limited (ECIL), Hyderabad, July 1-2, 2009; (2) Delivered lecture at Coorg Institute of Technology, Ponnampet, August 21, 2009; (3) KUSAT, Cochin, November 24-25, 2009; (4) 3rd International Conference on Digital Libraries (ICDL), The Energy and Resources Institute (TERI), New Delhi, February 22-26, 2010; (5) Delivered lecture, International Centre and Ambedkar Research Centre, University of Mysore, March 22, 2010.

Madalli, Devika P.:
(1) Viva-Voce Examination for Ph. D., Vidyasagar University, Paschim Midnapore, April 15-17, 2009; (2) Delivered special lecture at Department of Library and Information Science, Karnataka University, Dharwad, May 15-18, 2009; (3) Resource Person for IASLIC National Workshop, Siksha O Anusandhan (SOA) University, Bhubaneswar, August 4-6, 2009; (4) Delivered lecture at UGC Academic Staff College, University of Mysore, August 27, 2009; (5) Delivered Special lecture, International Conference on Academic Libraries, University of Delhi, October 5-8, 2009; (6) Chair Person at Euro-India ICT Cooperation International conference, International Management Institute, New Delhi, December 10-11, 2009; (7) Delivered lecture, READIT-2009, Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakam, December 29-30, 2009; (8) Resource Person, UGC National Level conference, St. Agnes College, Mangalore, January 19-20, 2010; (9) Invited to attend PLANNER-2010, organized by INFLIBNET at Tezpur University, February 18-20, 2010; (10) Invited talk at Academic Staff College, University of Calcutta, February 19, 2010.

Editorial and other Assignments

Prasad, A.R.D.:

(1) Viva-Voce Examination for Ph. D, University of Pune, June 29, 2009; (2) Keynote Speaker, International Conference on Academic Libraries, University of Delhi, October 5-8, 2009; (3) Invited as expert, PLANNER-2010, Tezpur University, February 18-20, 2010; (4) Invited as speaker, 3rd International Conference on Digital Libraries (ICDL), The Energy and Resources Institute (TERI), New Delhi, February 22-26, 2010.

Raghavan, K.S.:

(1) Attended meeting related to a Project on "Kannada Translation of Dr. S.R. Ranganathan's Colon Classification", 7th Edition, Central Institute of Indian Languages, Mysore, April 1-3, 2009; (2) Ph. D. Viva-Voce Examination, IGNOU, New Delhi, Sept. 17, 2009; (3) Attended Editorial Committee Meeting and SRELS, Bangalore, December 21-24, 2009; (4) Attended Board of Appointed Meeting, Indira Gandhi National Open University (IGNOU), New Delhi, January 15, 2010.

Ravichandra Rao, I.K.:

(1) Keynote Speaker, St. Agnes College, Mangalore, August 19-20, 2009; (2) Keynote Address, National Conference on "Webometrics, Informetrics and Scientometrics", Karnataka University, Dharwad, December 21-22, 2009.

Electronics and Communication Sciences Unit

Mukherjee D.P.:

(1) Invited talk at Workshop on Recent Advances in Computer Vision, IEEE GOLD Calcutta, April 16, 2009; (2) Invited talk at Bose Institute Kolkata, October 23, 2009; (3) Invited talk, Image and Video Processing Workshop, IIT Kharagpur, December 3, 2009; (4) Keynote talk, RING 2009, RMD Engineering College, Chennai, December 5 & 7, 2009; (5) Invited talk, IEEE Indicon 2009, December 19, 2009;

Chanda, B.:

(1) Invited lecture at Short-term course on Digital Image and Video Processing, IIT, Kharagpur, December 3, 2009; (2) Session Chair and Invited lecture at IEEE INDICON '10, DAIICT, Gandhinagar, December 19-20, 2009.

Machine Intelligence Unit

Bandyopadhyay, S.:

(1) Invited lecture, National Seminar on Research Challenges in Mobile Ad Hoc Networks (RCIMAN-09), Vel Tech Engineering College, Chennai, April 18, 2009; (2) Invited lecture at Workshop on Data Mining Techniques in Bioinformatics, National Institute of Technology (NIT) Rourkela, December 4, 2009; (3) Invited lecture, Presidency College, December 8, 2009; (4) Invited lecture, National Workshop on Emerging Areas in Mathematics with Applications to Science & Engineering (EAMASE09), Kolaghat Engineering College, December 21, 2009; (5) Tutorial at National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics, LNM Institute of Information Technology, Jaipur, January 15, 2010.

Ghosh, A.:

(1) Invited lecture, Utkal University, Vani Bihar, Bhubaneswar, October 9-10, 2009; (2) Invited lecture, National conference on Computational Biology NCCB-2009, Bhubaneswar, December 28-29, 2009; (3) Invited lecture, National Seminar on Soft Computing Applications In Engineering - NSSCAE-2010, Bhubaneswar, January 9-10, 2010; (4) Invited lecture, Visvesvaraya Technological University (VTU), Mysore, February 24, 2010.

Ghosh, K.:
(1) Invited lecture at the Faculty Updating Program, Center for Development of Advanced Computing (C-DAC), Kolkata, August 18, 2009.

Kundu, M.K.:
(1) Member, National Advisory Committee, IEEE International Conference on Advance Computing (ICAC2009), Thapar University, Patiala, April 6-7, 2009; (2) Member of the National Advisory Committee, 3rd International Conference on Computer and Devices (CODEC-2009), Department of Radio Physics & Electronics, University of Calcutta, Kolkata, December 14-16, 2009; (3) Program Committee Member, 3rd International Conference on Pattern Recognition & Machine Intelligence (PReMI 2009), New Delhi, India, December 19-21, 2009; (4) Keynote lecture, National seminar on Soft Computing Applications in Engineering (NSSCAE-2010), Trident Academy of Technology, Bhubneswar, January 8, 2010; (5) Invited lecture, DST Sponsored Winter School on DSP Algorithms, Architecture & Applications, Institute of Radio Physics and Electronics, University of Calcutta, Kolkata, January 19, 2010.

Mitra, S.:
(1) Invited lecture, Ministry of Human Resource Development, Govt. of India sponsored refresher course, National Institute of Technology (NIT) Warangal, May 25-26, 2009; (2) IEEE Women in Engineering (WIE) lecture, Jadavpur University, June 24, 2009; (3) Invited lecture at International Workshop on Rough Sets, Fuzzy Sets and Soft Computing, University of Pune, July 7, 2009; (4) Invited lecture at Faculty upgradation programme, CDAC, Kolkata, August 27, 2009; (5) Invited lecture, Short-term course SPReAD-09, IIT Kharagpur, October 15, 2009; (6) Program Chair, Third International Conference on Pattern Recognition and Machine Intelligence (PReMI'09), IIT Delhi, December 19-21, 2009; (7) Treasurer, IEEE WIE, Kolkata Chapter, April 01- March 31, 2010.

Murthy, C.A.:
(1) Member, Committee for selecting faculty members for IIT KGP, May 19, 2009; (2) Delivered a lecture, Institute of Textile Technology, Berhampore, West Bengal, June 16, 2009; (3) Member, Committee for selecting faculty members in Computer Science department of Tezpur University, Assam, July 24, 2009; (4) Delivered lecture, IIT Kharagpur, October 6, 2009; (5) Delivered lecture, CSIR lab National Institute of Science Technology and Development Studies (NISTADS), New Delhi, November 6, 2009; (6) Member, Committee for selecting faculty members for IIT Bhubaneswar, December 2, 2009; (7) Member, Research and Advisory Board, National Council of Science Museums, Kolkata, 2009; (8) Program Chair, Third International Conference on Pattern Recognition and Machine Intelligence (PreMI'09) held at IIT Delhi, Dec. 19-21, 2009.

Systems Science and Informatics Unit

Sagar, B.S.D.:
(1) Invited lecture, Centre for Remote Sensing, Andhra University College of Engineering, April 6-9, 2009; (2) Curzonco-Seshachalam lecture, Sarada Ranganathan Endowment for Library Science, Bangalore, June 15, 2009; (3) Invited lecture, University Centre for Earth and Space Sciences (UCESS), University of Hyderabad, September 24, 2009; (4) Invited lecture, University Centre for Earth and Space Sciences (UCESS), University of Hyderabad, February 22, 2010; (5) Member, Board of Studies, Computer Science Department, RV College of Engineering, 2009-10.

Physics and Earth Sciences Division

Geological Studies Unit

Patranabis-Deb, S.:
Invited lecture, monthly meeting of the Geological Society of India, Bangalore, November 28, 2009.

Editorial and other Assignments

Physics and Applied Mathematics Unit

Bhattacharya, Anindita:
Center of Advanced Study in Fluid Mechanics, Bangalore University, August 31-September 2, 2009.

Ghosh, S.:
Department of Physics, Institute of Mathematical Science, Chennai, June 14–24, 2009.

Kar, G.:
Invited talk, International Programme on Quantum Information, Institute of Physics, Bhubaneswar, January 18–30, 2010.

Mandal, B.N.:
(1) Sikkim Manipal Institute of Technology, Sikkim, December 18–24, 2009; (2) Department of Mathematics, Burdwan University, Burdwan, January 20, 2010; (3) Department of Mathematics, Jammu University, Kashmir, February 9, 2010; (4) Department of Mathematics, Sri Mata Vaishno Devi University, Kashmir, February 10, 2010; (5) Department of Mathematics, Gulbarga University, Karnatak, February 22-March 5, 2010; (6) Department of Mathematics, Banaras Hindu University, Varanasi, March 18–20, 2010.

Mazumder, B.S.:
Center of Advanced Study in Fluid Mechanics, Bangalore University, August 31–September 2, 2009.

Parashar, P.:
Invited talk, International Programme on Quantum Information, Institute of Physics, Bhubaneswar, January 18–20, 2010.

Pal, S.:
Department of Physics, Jadavpur University, March 23, 2010.

Biological Sciences Division

Biological Anthropology Unit

Mukhopadhyay, B.:
University of Kerala, January 3-7, 2010.

Mukhopadhyay, S.:
University of Kerala, January 3-7, 2010.

Dasgupta, P.:
Department of Human Physiology, Tripura University, April 19-26, 2009.

Human Genetics Unit

Sengupta, S.:
All India Institute of Medical Sciences, New Delhi, March 26-28, 2010.

Ghosh, S.:
(1) Institute of Genomics and Integrative Biology, New Delhi, November 23-27, 2009; (2) Centre for Cell and Molecular Biology, Hyderabad, December 5-7, 2009; (3) Cochin University of Science and Technology, Kochi, December 29-31, 2009; (4) Andhra University, Visakhapatnam, January 4-5, 2010; (5) Sanjay Gandhi Institute of Post-graduate Medicine, Lucknow, March 6-8, 2010.

Social Sciences Division

Economic Research Unit

Chakravarty, Satya R.:
(1) Invited lecture, Workshop on Rights in Economics and Law, Jawaharlal Nehru University, New Delhi, March 3-5, 2010; (2) Invited lecture, Conference on Economic Theory, Markets and Institutions of Governance, Jawaharlal Nehru University, New Delhi, March 22-24, 2010; (3) Chaired a session, Conference on Economic Theory, Markets and Institutions of Governance, Jawaharlal Nehru University, New Delhi, March 22-24, 2010.

Majumder, Amita:
Invited Lecture, International Conference on Frontiers of Interface between Statistics and Sciences organized by C.R. Rao advanced Institute of Mathematics, Statistics and Computer Science and University of Hyderabad, Hyderabad, December 30, 2009–January 02, 2010.

Sarkar, Abhirup:
(1) Member, Tax Anomaly Review Committee, Kolkata Municipal Corporation; (2) Member, Advisory Group, to advise the Finance Minister, Government of India on issues relating to G-20.

Sarkar, Nityananda:

(1) Invited lectures, Time Series Modelling, Center for Mathematical Sciences, Banasthali University, Jaipur, October 3-6, 2009; (2) NHB RESIDEX Advisory Committee meeting, National Housing Bank, New Delhi, October 31, 2009; (3) Invited lecture, Time Series Analysis: Trend and Seasonal Roots, Structural Breaks and Volatility, 46th Annual Conference of the Indian Econometric Society, University of Jammu, Jammu, January 4-6, 2010.

Linguistic Research Unit

Dasgupta, Probal:
(1) Centre for Philosophy, National Institute of Advanced Study, Bangalore, June 9-10, 2009; (2) Expert at the Workshop for finalizing scientific coordination in cognitive science project on Normative Multilingualism organized by the National Institute of Mental Health and Neuro-Sciences, Bangalore, with the Dept of Science and Technology, Govt. of India, June 11-12, 2009; (3) Expert at the Workshop for elaborating Braille encoding systems for Indian languages organized by the Dept of Linguistics, Kashmir University, Srinagar, with the National Institute of the Visually Handicaed, Dehradun, July 7-8, 2009; (4) Lecture on 'Structuralism', Workshop on Advanced Critical Methods, Department of Bengali, Jadavpur University, Kolkata, November 25, 2009; (5) Lecture, "Translating fiction: pedagogy and the postnational imaginary", Symposium on Translation Theory, Department of French, University of Kolkata, December 3, 2009; (6) Invited lecture, "L.L Zamenhof, Janusz Korczak, and the 1942 Warsaw Ghetto performance of Dakghar", Department of Comparative Literature, Jadavpur University, Kolkata, December 3, 2009; (7) Expert, Workshop on Writing a Binational Grammar of Standard Bangla, Rabindra Okakura Bhavan, Kolkata, Sponsored by Pashchimbanga Bangla Akademi with Bangla Akademi (Bangladesh), February 3-4, 2010; (8) Chaired keynote

Editorial and other Assignments
address, Seminar on 'Connecting cultures: translation and texts', Department of English, University of Kolkata, Kolkata, February 24, 2010; (9) Lecture, 'Translation as a vector of postnational pedagogies: the case of Horvat's *Waitapu*', Symposium on Québec et l'Inde: un dialogue intercultural, Department of French, University of Kolkata, February 25, 2010; (10) Lecture on 'Translation, globalization and knowledge' and Seminar, 'Translating Knowledge Texts: Nuances and Observations', Central Institute of Indian Languages, Mysore Department of Comparative Literature, Jadavpur University, with National Translation Mission, March 10, 2010; (11) Keynote address, 'Conversations and other illocutionary act successions', Seminar, Language as Conversation, Department of Philosophy, Rabindra Bharati University, Kolkata, March 25, 2010.

Dash, Niladri Sekhar:
(1) Expert in the Discussion-Cum-Consultation Programme on "On Ecology of Mathematical Learning", R.K. Mission Sikshanamandira, Belur Math, Howrah, August 26, 2009; (2) Manuscript Editor for a Comprehensive Bengali Grammar written by Dr. Hanne-Ruth Thompson of SOAS, University College London and published by Routledge (Taylor and Francis Group), London, October 01-31, 2009; (3) Expert in the Workshop on Knowledge Text Translation jointly organized by the National Translation Mission of Central Institute of Indian Languages, Ministry of Human Resource Development, Govt. of India, and Dept. of Comparative Literature, Jadavpur University, Kolkata, March 01-10, 2010; (4) Supervisor for "Mother Tongue Survey of India (MTSI)", Office of the Registrar General, Language Division, Ministry of Home Affairs, Govt. of India, January 01-March 31, 2010; (5) Supervisor for B. Tech. Students of Bengal College of Engineering and Technology, Durgapur, West Bengal for Machine Translation from English to Bengali, January 01-February 28, 2010.

Planning Unit

Das, Satya P.:
Visiting Professor, Xaviers Institute of Management, Bhubaneswar, January 19–March 12, 2010.

Somanathan, E.:
Research visit to Indian Institute of Science, Bangalore, May 01–June 30, 2009.

Ghate, Chetan:
(1) Jadavpur University, Conference on Growth and Globalization, April, 2009; (2) Invited Speaker, IIT Roorkee, March, 2010.

Population Studies Unit

Rao, Arni S.R. Srinivasa:
(1) Indian Institute of Science, November, 23-24, 2009 & February 23-25, 2010; (2) Banaras Hindu University, March 5, 2010; (3) National AIDS Control Organisation (NACO), New Delhi, October 21, 2009 & November 7, 2009; (4) Public Health Foundation of India (PHFI), New Delhi, November 11, 2009 & March 4, 2010; (5) Madras Veterinary College, January 6, 2010.

Psychology Research Unit

Dutta Roy, D.:
(1) CBI Regional Training Centre, Kolkata, April 30, 2009; (2) Phoneix Yule, safety audit and suggestion, Kalyani, June 11, 2009; (3) Vinod Gupta School of Management, August 2, 2009; (4) National Institute of Technical Teachers' Training and Research, Kolkata, August 13, 2009; (5) Department of Studies in Statistics Manasagangotri, Mysore, August 28, 2009; (6) Kendriya Vidyalaya

No.-1, Kanchrapara (Defense sector), 24 Parganas (N), October 29, 2009; (7) Indian Oil Company, Kolkata, December 5, 2009; (8) Swami Vivekananda Shramik Shikshan Bhavan, Kolkata, December 14, 2009; (9) Heritage Institute of Technology, Kolkata, January 8-9, 2010; (10) Sir C.V. Raman Centre for Physics and Music, Biren Roy Research Building, Jadavpur University, Kolkata, February 10, 2010; (11) Mizoram University, February 22-23, 2010; (12) National seminar on Quality development in Library and Information services, Mizoram University, February 25, 2010.

Ghosh, A.:
Indian Institute of Technology, New Delhi, December 11-14, 2009.

Gupta, R.:
(1) Delivered lecture, Good Teaching with Quality Education, Theosophical Society Hall, Kolkata, November 8, 2009; (2) Delivered lecture, Examination Phobia for the Youngsters, Panihati Muncipality Auditorium, Sodepur, 24 Parganas (N), December 20, 2009.

Sociological Research Unit

Ghosh, Bholanath:
(1) Guest faculty, West Bengal State University Barasat, February 01-March 31, 2010; (2) Academic Counselor, Indira Gandhi National Open University, Bhairav Ganguly College Centre, West Bengal, 2009-10; (3) Resource person in the colloquium session of a workshop on Studies on North East India, Asiatic Society, Kolkata, March 29, 2010.

Jana, Rabindranath:
Paper presentation, "Means and variances of some statistics in simple social network with given out-degrees", Seventh International Triennial Calcutta Symposium, December 28-31, 2009.

Swaminathan, Madhura:
(1) Participated, Seminar on the Right to Food, M.S. Swaminathan Research Foundation, Chennai, August 7, 2009; (2) Participated, Indo-Japanese workshop on South Asian Economy and Environment, Jawaharlal Nehru Institute of Advanced Study and Nehru Memorial Museum, New Delhi, September 5-6, 2009; (3) Talk, National Seminar on Proposed Food Security Act, Government of Kerala, Department of Food, Civil Supplies and Animal Husbandry, Thiruvananathapuram, September 19, 2009; (4) Invited talk, Food Security at the Department of Humanities and Social Sciences, IIT Kharagpur, October 28, 2009; (5) Invited talk, Seminar on Women, Water and Food Security at the American Centre, Kolkata, organized by the Virginia Guildersleeve International Fund and Indian Federation of University Women's Associations, November 19, 2009; (6) Member, Seminar and Travel Grant Committee of the Indian Council of Social Science Research, New Delhi.

Ramachandran, V.K.:
(1) Participated, Indo-Japanese workshop on South Asian Economy and Environment, Jawaharlal Nehru Institute of Advanced Study and Nehru Memorial Museum, New Delhi, September 5-6, 2009; (2) Visiting Professor, Department of Economics, North Bengal University, Siliguri, March 10-19, 2010.

Statistical Quality Control and Operations Research Division

SQC & OR Unit, Bangalore

Acharya, U.H.:
(1) Lecture, DOE at Shivaji University, Kolhapur, February 17-18, 2010; (2) Talk, Industry-University interaction at Bangalore University, March 30, 2010.

Gijo, E.V.:
Talk, Application of SARIMA model in Forecasting at Kerala Statistical Association, February, 2010.

Editorial and other Assignments

SQC & OR Unit, Delhi

Neogy, S.K.:
(1) Visited Department of Applied Mathematics, Calcutta University, November 17-18, 2009; (2) Visited Banaras Hindu University, Varanasi, February 16-18, 2010.

SQC & OR Unit, Hyderabad

Murthy, A.L.N.:
Member of South Central Regional Committee of AICTE, New Delhi, 2009-10.

Murthy, G.S.R.:
(1) Adjunct Faculty, C.R. Rao Advanced Institute of Mathematics, Statistics and Computer Science, 2009-10; (2) Attended PMMC review meeting of Centre for Mathematical Sciences, C.R. Rao Advanced Institute of Mathematics, Statistics and Computer Science, July 24, 2009; (3) Member of the Rajiv Gandhi National Quality Award Evaluation Committee – Western zone, 2009-10; (4) Participated, Evaluation of paper-II of Mathematical Sciences (Statistics) in respect of NET-2008 of CSIR, CSIR Complex, New Delhi, January19-21, 2009; (5) Participated in the statistical sciences evaluation confidential meeting at HRD group CSIR Complex, New Delhi February 13-15, 2010.

SQC & OR Unit, Kolkata

Pradhan, Biswabrata:
Visited, Collaborative Research, Mathematics & Statistics Department of Indian Institute of Technology, Kanpur, October 12-16, 2009.

Library, Documentation and Information Science Division

Library, Kolkata

Basak, Nanda Dulal:
(1) Seminar, "The Indian National Bibliography in Roman Script vs. Indic Script", National Library, Kolkata, December 17, 2009; (2) National Seminar, "Vision of LIS Education for Modern India", Department of Library & Information Science, University of Calcutta, March 19-20, 2010. (3) Seminar, "Restructing of Library and Information Science (LIS) curriculum", Department of Library & Information Science, Rabindra Bharati University, Kolkata, March 26, 2010.

Basu, Tapas:
International Associateship, The Royal Photographic Society (ARPS), Visual Art Section, Great Britain, 2009.

Center for Soft Computing Research: A National Facility

Ghosh, K.:
(1) Invited lecture, Government College of Engineering and Ceramic Technology, Kolkata, November 26, 2009; (2) Invited lecture, Center for Development of Advanced Computing (CDAC), Kolkata, January 5, 2010.

Pal, S.K.:
(1) General Chair, *3rd International Conference on Pattern Recognition and Machine Intelligence (PReMI'09)*, New Delhi, December 16-20, 2009.

PART III. ADMINISTRATION AND OFFICE BEARERS

10. GENERAL ADMINISTRATION

Administrative Services Division

The Administrative Services Division at the headquarters caters to the various needs of the scientific workers in all the scientific units of the Institute engaged in various scientific, research and academic activities and provides them with necessary infrastructural facilities in their pursuit of excellence. The centres at Delhi and Bangalore, each having a number of science units are, by and large, getting administrative support from the administrative units/sections there. The Administrative Division has the following units at the Headquarters in Kolkata:

Sl. No.	Name of the Unit	Sl. No.	Name of the Unit
1.	Accounts Section	17.	Import & Travel Cell
2.	Audio-Visual Unit	18.	Internal Audit Cell
3.	Binding Unit	19.	Legal Cell
4.	Canteen	20.	Medical Expenses Reimbursement Unit
5.	Cash	21.	Medical Welfare Unit
6.	C E (A & F)'s Office	22.	Personnel Unit
7.	Central Office & Despatch Unit	23.	Provident Fund Unit
8.	Central Stores & Tailoring Unit	24.	Public Relations Unit
9.	Council Section	25.	Publication and Printing Unit
10.	Director's Office	26.	Rajbhasha / Hindi Cell
11.	Electrical Maintenance Unit	27.	Retirement Benefit Cell
12.	Engineering Unit	28.	Sankhya Office
13.	Estate Office	29.	Security Unit
14.	Guest House	30.	Telephone Unit
15.	Hostels	31.	Transport Unit
16.	House Building Cell		

Apart from the Units mentioned above, there are some small cells dealing with Budget, SC / ST issues etc. to take care of the specific needs of the Institute. The Administrative Services Division also looks after the running of hostels for students, research scholars and International Statistical Education Centre (ISEC) trainees and also the running of Canteen for the workers and students of the Institute. The other outlying Units are controlled directly by the headquarters at Kolkata. The Administrative Services Division takes the responsibility for all new construction activities of the Institute at its headquarters and also at outlying centres/branches. A brief report on the construction activity in the current year is narrated in the subsequent paragraphs.

The activities of the Administrative Services in the three Centres, namely Delhi, Bangalore and Chennai and in other outlying branches of the Institute and Giridih Office, are more or less similar but on a much smaller scale.

Officers of the Institute administration during the year:

Director	:	Sankar Kumar Pal
Professors-in-Charge of Scientific Divisions	:	Rajendra Bhatia (Theoretical Statistics & Mathematics)
		Bimal Kr. Roy (Applied Statistics)
		Abhirup Sarkar (Social Sciences)

Administration

		Dilip Saha (Physics & Earth Sciences) Bidyut Roy (Biological Sciences) Swapan Kumar Parui (Computer & Communication Sciences) [upto 31.01.2010] Malay Kumar Kundu (Officiating) [w.e.f. 01.02.2010]
Head, SQC & OR	:	Kalyan Kumar Chowdhury
Head, Delhi Centre	:	R.B. Bapat
Head, Bangalore Centre	:	T.S.S.R.K. Rao
Head, Chennai Centre	:	D. Sampangi Raman (Officiating)
Dean of Studies	:	Aditya Bagchi
Chief Executive (A & F)	:	A.K. Biswas (Officiating) [upto 26.05.2009] S.K. Iyer [w.e.f. 27.05.2009]

List of workers who joined/retired/voluntarily retired/resigned/terminated/died during the year

Appointments

Scientific/Technical Workers

Sl. No.	Name		Sl. No.	Name
1.	Athisii		6.	Ramesh Sreekantan
2.	Sasthi Charan Ghosh		7.	Ashish Biswas
3.	Kausik Kumar Majumdar		8.	Deepayan Sarkar
4.	Supratik Pal		9.	Bikram Roy
5.	Shubhra Sankar Ray		10.	Biswaranjan Behara

Non-Scientific Workers

Sl. No.	Name		Sl. No.	Name
1.	Subramani Kasi Iyer		3.	Himajit Debnath
2.	Sudip Kumar Chakraborty		4.	Prabodh Panchadhyayee

Retirement/Voluntary Retirement

Scientific/Technical Workers

Sl. No.	Name		Sl. No.	Name
1.	Siddhartha Mil		5.	Sanat Kr. Banerjee
2.	Satyabrata Saha		6.	Ram Chandra Ram
3.	Rabindra Nath Ghosh		7.	Ranbir Singh Negi
4.	Nisith Chowdhury		8.	B. Ganesan

Non-Scientific Workers

Sl. No.	Name	Sl. No.	Name
1.	Sandhya De Bhowmick	22.	Dasarath Rana
2.	Bijoy Dhobi	23.	Ajoy Kumar Basu
3.	Jetha Ram	24.	Gour Mohan Dey
4.	Mangal Bahadur	25.	Raja Ram
5.	P.N. Jadav	26.	Arun Kumar Banerjee
6.	Gobinda Chandra Das	27.	Budhua Pashi
7.	Dipak Ghosh	28.	Dilip Das
8.	M. Venkatharamanappa	29.	Santi Giri
9.	Rabi Das	30.	Chitto Rn. Karmakar
10.	Ved Parkash Sharma	31.	Kartik Chandra Halder
11.	Manik Roy	32.	Bidhan Banerjee
12.	Basdeo Mahato	33.	Anil Rn. Roy
13.	Biswanath Dey	34.	Subhas Halder
14.	Bhado Kaita	35.	Basanti Chakraborty
15.	Sovan Chakraborty	36.	Jharna Kar
16.	Sukumar Roy	37.	Ghanasham Koley
17.	Rajendra Singh	38.	Baruni Pera
18.	Kesto Ch. Das	39.	Madan Mohan
19.	Narayan Moitra	40.	M. Pillaiah
20.	Swapan Kr. Nath	41.	Meena Ramachandran
21.	Mina Mukherjee	42.	Sitaram Biswakarma

Resignation/Termination

Non-Scientific Worker

Sl. No.	Name
1.	M.V. Ramaswamy

Death

Scientific/Technical Worker

Sl. No.	Name
1.	Bibhas Ch. Das

Non-Scientific Workers

Sl. No.	Name	Sl. No.	Name
1.	Ramnath Routh	5.	Samir Kanti Dey
2.	B.N. Gururaja	6.	Banwari Lal Balmiki
3.	Bishnupada Dutta	7.	Dhananjoy Das
4.	Manik Das		

Administration

Number of workers in the Institute as on 31 March 2010:

(i)	Scientific and Technical Workers	-	409
(ii)	Non-Scientific Workers	-	727
	Total	:	1136

Breakup of manpower by Gender, Social category and Disability group as on 31 March 2010

Total Strength		Physically Handicapped (PH)	Scheduled Caste (SC)	Scheduled Tribe (ST)
Male	971	06	112	32
Female	165	NIL	15	01
Total	1136	06	127	33

Applications received and action taken by the Institute under RTI Act, 2005

Name of the Appellate Authority: Professor Sankar K. Pal, Director of the Institute

Name of Central Public Information Officer: Shri S.K. Iyer, Chief Executive (Admn. & Finance) of the Institute

A total number of 34 applications were received by the Central Public Information Officer of the Institute during 2009-10 out of which 7 applications were rejected due to non-receipt of cost of information and not falling under the purview of RTI Act, 2005. Central Public Information Officer provided information against remaining 27 applications within the stipulated date. 3 applications were received by the Appellate Authority and all the 3 cases were heard and disposed of by the Appellate Authority. The summary statement in this regard for the year 2009-10 is appended below:-

No. of Application received	No. of cases accepted	Decisions where requests were fully or partially rejected		No. of decisions from Appellate Authority	C I C decision			Amount collected (Rs.)		
		Fully rejected	Partially rejected		No. of decisions received	Penalty imposed	Disciplinary action, if any	Fee	Other Charges	Penalty amount
34	27	7	-	3	1	NIL	NIL	320	357	NIL

Budget and Finance

For the year 2009-2010, Section 8(1) Committee recommended Rs.9242.12 lakhs (Government Grant Rs.9022.12 lakhs and ISI internal receipt Rs.220 lakhs) under Non-Plan (BE) and Rs.2927.74 lakhs

under Plan (BE). The Government approved a sum of Rs.8333.66 lakhs and of Rs.2500 lakhs for Non-Plan and Plan expenditure respectively. At the revised estimate stage, the Institute sought for a grant of Rs.12239.24 lakhs and Rs. 4306.88 lakhs under Non-Plan and Plan respectively which also recommended by the Section 8(1) Committee. The Government sanctioned a grant of Rs.11882.99 lakhs (including the unutilized amount of Rs.1530.11 lakhs during the financial year 2008-2009) under Non-Plan and the Plan RE allocation was fixed at Rs.3363.85 lakhs (including the unutilized amount of Rs.363.85 lakhs during the financial year 2008-2009). The expenditure during report was well within the budget allocation sanctioned by the Government. The Audited Annual Accounts of the Institute for the year 2009-2010 have been furnished in Part IV of this report.

Major Construction / renovation works taken up by the Institute during 2009 - 2010

Kolkata

Construction of Platinum Jubilee Academic Building at ISI.

The Institute started the work of construction of Platinum Jubilee Academic Building during the year 2006-07. The structural and finishing works of the building have been completed during this year. The user units have started shifting to their respective floors.

An amount of Rs. 475.92 lakhs has been paid to the agencies and the consultant regarding the subject work.

Construction of ISEC Building at 202 Campus.

The Institute took up the construction of ISEC Building at 202 Campus with an intention of providing all the facilities under one roof for the ISEC students. The building will have facilities like classrooms, seminar hall, library, accommodation for the students and visiting faculties, dining hall, recreation facilities, etc. The structural work is under progress and will be completed shortly. The tendering for the allied works like air conditioning, installation of lifts, fire fighting and the fire alarm system, interior works have been taken up and the order for the air conditioning work has already been placed.

An amount of Rs.439.34 lakhs has been paid to the agency and the consultant regarding the subject work.

Delhi

Land and Construction

During the financial year 2009-2010, one Works Advisory Committee meeting was held on 15.02.2010.

A write up on major construction activities during the period April 01, 2009 to March 31, 2010 at ISI Delhi Centre.

1. Construction of Platinum Jubilee Hostel (work is in progress).
2. Plaster / painting of outer wall of ISI Buildings including replacement of pipes etc.
3. Construction of cement concrete road near substation and parking area.
4. Repair / renovation of faculty building, Guest House etc.
5. Rewiring of ISI Building & changing of panels etc.
6. Repair of Street light.

Total expenditure incurred Rs.229.00 lakhs approximately.

Bangalore

During the year 2009-2010, the following activities were taken up at Bangalore Centre.

A – Construction:

1. Construction of the additional floor of the faculty block was completed.
2. Construction of the Platinum Jubilee Auditorium was completed.

B – General:

1. The Platinum Jubilee Auditorium was inaugurated by Hon'ble Finance Minister, Shri Pranab Mukherjee on September 19, 2009.
2. The Bangalore Centre hosted the Council Meeting on September 19, 2009.

Society Type Activities

Membership: April 2009 – March 2010

1) During the period 154 persons became Ordinary Members of the Institute.
2) 49 Ordinary Members became Life Members of the Institute.

The membership position as on 31 March 2009 is as follows:

Ordinary Members	-	650
Life Members	-	871
Institutional Members	-	03
Total	-	1524

Finance Committee Meetings: The Finance Committee met three times on 29th May, 2009, 17th September, 2009 and 31st October, 2009. Besides the decisions taken on various financial matters, the Finance Committee recommended RE 2009-10 and BE 2010-11 (both Plan and Non-Plan) in its meeting held on 17th September 2009. The Annual Report including Audited Statement of Accounts for the year 2008-2009 was considered and recommended in the meeting of the Finance Committee held on 17th September 2009.

Council Meetings: During the period under report (2009-10), the Council met five times on 30th May, 2009, 19th September, 2009, 2nd November, 2009, 30th December, 2009 and 28th February, 2010 to take decisions on various academic and administrative matters of the Institute. The Budget Proposals of the Institute both for Plan and Non-Plan (RE 2009-10 and BE for 2010-11) were considered in the meetings of the Council held on 19th September, 2009, as recommended by the Finance Committee in its meeting held on 17th September 2009. The Annual Report including the Audited Statement of Accounts for the year 2008-2009 was considered and approved by the Council in its meeting held on 02nd November, 2009.

A list containing the names of the President of the Institute, Chairman and members of the Council of the Institute and lists of members of different committees constituted by the Council are given in the Back Cover page and in Chapter 12 respectively.

Annual General Meetings: During the period under report (2009-10), the General Body of the Institute met on 17th November, 2009. The Annual Report of the Institute for the year 2008-2009 and Audited Statement of Accounts for the year 2008-2009 together with the Auditor's comments and replies of the Administration thereto were adopted in the meeting of the General Body held on 17th November, 2009.

11. LIST OF MEMBERS OF THE ACADEMIC COUNCIL AND OTHER COMMITTEES OF THE INSTITUTE AS ON 31 MARCH 2010

Academic Council

S.K. Pal, Director (Chairman)

Aditya Bagchi, Dean of Studies (Convener)

Theoretical Statistics and Mathematics Division

Somesh Chandra Bagchi, K. Ramamurthy, S.M. Srivastava, Ratan Dasgupta, R.B. Bapat, N.S. Narasimha Sastry, S. Ramasubramanian, T.S.S.R.K. Rao, Rajendra Bhatia, Bhaskar Bagchi, Sunanda Bagchi, Alok Goswami, Pl. Muthuramalingam, V. Pati, Rahul Roy, Probal Chaudhuri, Arup Bose, Rana Barua, Mohana Delampady, B. Rajeev, Abhay Gopal Bhatt, Goutam Mukherjee, B.V. Rajarama Bhat, Gopal Krishna Basak, B. Sury, V.R. Padmawar, Arup Kumar Pal, Isha (Bagai) Dewan.

Applied Statistics Division

Shibdas Bandyopadhyay, Tapas Kumar Chandra, Pabitra Pal Choudhury, Bimal Kr. Roy, Ashis SenGupta, Anup Dewanji, Rita Saha Ray, Debasis Sengupta, Debapriya Sengupa, Tapas Samanta, Subir Kumar Bhandari, Mausumi Bose, Palash Sarkar, Ayanendranath Basu, Smarajit Bose, Subhamoy Maitra, Atanu Biswas, Arun Kumar Adhikary.

Social Sciences Division

Manabendu Chattopadhyay, Krishna Majumder, N.S.S. Narayana, Monoranjan Pal, Satya Ranjan Chakravarty, Abhirup Sarkar, Nityananda Sarkar, Amita Majumder, Arunava Sen, Bharat Ramaswami, Tarun Kabiraj, Satya P. Das, Madhura Swaminathan, V.K. Ramachandran, Manash Ranjan Gupta, E. Somanathan, Prabal Roy Chowdhury, Probal Dasgupta.

Biological Sciences Division

Monoranjan Ghose, Joydev Chattopadhyay, Ranjan Gupta, Premananda Bharati, Barun Mukhopadhyay, P.P. Majumder, Bidyut Roy, B. Mohan Reddy.

Physics and Earth Sciences Division

Subrata Bhattacharyya, Sisir Roy, Bijoy Shingha Mazumder, Dilip Saha, Pinaki Roy, Samarendra Bhattacharya, Chandan Chakraborty, Subir Ghosh, Barnana Roy.

Computer and Communication Sciences Division

Jayasree Datta Gupta, I.K. Ravichandra Rao, Bhabani Prasad Sinha, Sankar Kumar Pal, Bidyut Baran Chowdhuri, Arun Kumar De, Sambhu Nath Biswas, Bhargab Bikram Bhattacharya, Malay Kr. Kundu, Kumar Sankar Roy, Subhas Chandra Nandy, Nabanita Das, Nikhil Ranjan Pal, Swapan Kr. Parui, Sushmita Mitra, Bhabatosh Chanda, C.A. Murthy, Ashish Ghosh, Dipti Prasad Mukherjee, K.S. Raghavan, Susmita Sur-Kolay, Sanghamitra Bandyopadhyay.

Statistical Quality Control and Operations Research Division

S.S. Handa, S.K. Majumdar, Anup Majumdar, Kalyan Kumar Chowdhury, Ashim Roy Chowdhury, P.K. Perumallu, Amitava Bandyopadhyay, U. Haridas Acharya, G.S.R. Murthy, Dipak Kr. Manna, Samir Kr. Neogy.

Administration

Library, Documentation and Information Sciences Division

Chief Librarian

Computer and Statistical Service Centre (CSSC)

Subhas Ch. Kundu, Debashis Roy, Aditya Bagchi, Amitava Datta.

Member-Secretary, ISEC

Monoranjan Pal.

Other Committees of the Institute

A. Finance Committee

Director (Chairman), Dilip Saha, Bhabani P. Sinha, Ayanendranath Basu, Kalyan K. Chowdhury, Alok Goswami, Somnath Roy, Head, Delhi Centre, Head, Bangalore Centre, Government Representative (Ministry of Statistics & Programme Implementation), Government Representative (Ministry of Finance), Chief Executive (A&F), Amitava Mukherjee (Convener) [upto 25.05.2009], Sudip Chakraborty (Convener) [w.e.f. 26.05.2009].

B. Editorial Committee

Editor-in-chief, Sankhya, Series A and Series B:

Professor P.K. Sen (UNC-Chapel Hill, USA)

Joint Editors, Sankhya, Series A:

K.B. Athreya (Iowa State University, USA), Soumendra N. Lahiri (Texas A & M University, USA) and Alok Goswami (ISI, Kolkata).

Joint Editors, Sankhya, Series B:

Malay Ghosh (University of Florida, Gainesville, USA), Bimal K Sinha, (University of Maryland – Baltimore County, USA) and Ayanendranath Basu (ISI, Kolkata)

Joint Editors:

Mandar Mitra (ISI, Kolkata) and Sourabh Bhattacharya (ISI, Kolkata).

C. Works Advisory Committees

Kolkata

Sujit Basu (Chairman), Sujit K. Majumdar (Vice-Chairman), Malay K. Kundu, Bidyut Roy, Bhabatosh Chanda, Prabir Chattoraj, Expert (Civil), Expert (Architect), Expert (Electrical Engg.), Chief Executive (A & F), Amitava Mukherjee, In-Charge, E.M.U., M.V. Ramaswamy (upto 20.07.2009), Arindam Mukherjee (Convener).

Delhi

T.S. Ratnam (Chairman), R.B. Bapat, Abhay G. Bhat, Chetan Ghate, S.K. Neogy, N. Nagarajan (Electrical), Rajinder Kalla, (Civil), Vishwa Bandhu, S.S. Sethi (Convener).

Bangalore

T. Krishnan (Chairman), M.K. Prapulla Chandra, T.J. Ramamurthy, Chief Engineer (C&B) [or his nominee], Head, Bangalore Centre, Head, Stat-Math Unit, Head, DRTC, Head, SQC & OR Unit, Head, Economic Analysis Unit, Head, Systems Science Informatics Unit (SSIU), P.K. Unnikrishnan (Convener).

D. Ph.D. /D.Sc. Committee

Statistics

Sankar K. Pal, Director (Chairman), Aditya Bagchi, Dean of Studies, P.P. Majumder, Mohan Delampady, Anup Dewanji, Satya P. Das, C.A. Murthy, Alok Goswami, Ayanendranath Basu (Convener).

Mathematics

Sankar K. Pal, Director (Chairman), Aditya Bagchi, Dean of Studies, Rajendra Bhatia, T.S.S.R.K. Rao, S.C. Bagchi, B.S. Majumder, P.P. Majumder, B.B. Chaudhuri, Manas Ranjan Gupta, Alok Goswami, Goutam Mukherjee (Convener).

Computer Science

Sankar K. Pal, Director (Chairman), Aditya Bagchi, Dean of Studies, B.B. Bhattacharya, Nikhil R. Pal, B.B. Chaudhuri, Palash Sarkar, Abhirup Sarkar, P.P. Majumdern, Alok Goswami, C.A. Murthy (Convener).

Quantitative Economics

Sankar K. Pal, Director (Chairman), Aditya Bagchi, Dean of Studies, Satya R. Chakraborty, Satya P. Das, Manas Ranjan Gupta, Abhirup Sarkar, Nikhil R. Pal, P.P. Majumder, Alok Goswami, Amita Majumder (Convener).

E. Policy Planning and Evaluation Committee (PPEC)

Chairman of ISI or his nominee (Chairman), Sankar K. Pal, Director (Vice-Chairman), Director General, C.S.O., Financial Advisor, Ministry of Statistics & P.I., N. Mukunda, Obaid Sidique, Amiya Bagchi, Amitava Kundu, J.K. Ghosh, P.P. Majumdar, R.B. Bapat, B.B. Bhattacharya (Convener).

F. Technical Advisory Committees of different Divisions

Theoretical Statistics *and Mathematics Division*

Sankar K. Pal, Director (Chairman), Tathagata Bandyopadhyay, Rahul Mukherjee, M.G. Nadkarni, S.M. Bhatwadekar, Rajendra Bhatia, Professor-in-Charge (Convener).

Applied Statistics Division

Sankar K. Pal, Director (Chairman), S.P. Mukherjee, Rahul Mukherjee, Tathagata Bandyopadhyay, S.K. Mullick, Asim Pal, Bimal K. Roy, Professor-in-Charge (Convener).

Computer and Communication Sciences Division

Sankar K. Pal, Director (Chairman), B.L. Deekshatulu, Arun K. Majumder, Rajeev Sangal, S.K. Sarkar, L.M. Patnaik, Partha P. Chakraborty, N. Balakrishnan, Amitava Chatterjee, Swapan K. Parui, Professor-in-Charge, (Convener) [upto 31.01.2010], Malay Kumar Kundu, Officiating Professor-in-Charge (Convener) [w.e.f. 01.02.2010].

Physics and Earth Sciences Division

Sankar K. Pal, Director (Chairman), Sampat K. Tandon, Anand Mohan, K.C. Khilar (upto 28.02.2010), S.P. Moulik (w.e.f. 01.02.2010), U.C. Kothyari, Jayanta K. Bhattacharjee, Abinash Khare, Dilip Saha, Professor-in-Charge (Convener).

Biological Sciences Division

Sankar K. Pal, Director (Chairman), V. Nanjundiah (upto 30.05.2009), Kasturi Datta (w.e.f. 01.06.2009), Subrata Sinha, R. Khongsdier, P.K. Singh, Swapan Kr. Datta, Bidyut Roy, Professor-in-Charge (Convener).

Social Sciences Division

Sankar K. Pal, Director (Chairman), Sugata Marjit, Rajni Palriwala, Surendra Munshi, Subrata Lahiri, Narendra Sharma, Krishna Bhattacharya, Abhirup Sarkar, Professor-in-Charge (Convener).

Statistical Quality Control and Operations Research Division

Sankar K. Pal, Director (Chairman), Sujit Basu, S.P. Mukherjee, S.K. Pillai, Bhaskar B. Idage, Kalyan K. Chowdhury, Head, SQC & OR Division (Convener).

Library, Documentation and Information Sciences Division

Sankar K. Pal, Director (Chairman), K.K. Banerjee, S. Ravindran, S. Mondal, Arup Roy Choudhury, Chief Librarian (Convener).

INDIAN STATISTICAL INSTITUTE

SEVENTY EIGHTH ANNUAL REPORT 2009 – 2010

Statement of Accounts and Auditor's Report for the year 2009-2010

CONTENTS

AUDITORS' REPORT
TO THE DIRECTOR,
INDIAN STATISTICAL INSTITUTE

1. We have audited the attached Balance Sheet of the **INDIAN STATISTICAL INSTITUTE** (Institute) as at 31st March, 2010, and the related Income and Expenditure Account of the Institute for the year ended on that date annexed thereto, which we have signed under reference to this report. These financial statements are the responsibility of the management of the Institute. Our responsibility is to express an opinion on these financial statement based on our Audit.

2. We conducted our audit in accordance with the auditing standards generally accepted in India. Those Standards require that we plan and perform the audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosure in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

3. These financial statements have been prepared on the basis of Significant Accounting Policies detailed in Schedule 24 attached to the financial statements. These accounting policies are generally in keeping with the Accounting Standards (ASs) issued by the Institute of Chartered Accountants of India (ICAI) to the extent applicable to the Institute which, in our opinion, being a non-corporate and non-commercial organisation, is a Level III entity as defined by ICAI for the purpose and the deviations from the ASs are indicated below:

   3.1 Depreciation on fixed assets acquired up to accounting year 1985-1986 have not been charged in the accounts from the financial year 1986-1987 onwards [refer Note 2.1 on Schedule 24] which is not in keeping with AS 6 Depreciation Accounting;

   3.2 Certain employee benefits including retirement benefits are accounted for on a cash basis [refer Notes 1.2 (b) and 4 on Schedule 24] which is not in compliance with AS 15 Employee Benefits;

3.3 All transactions pertaining to earlier periods are accounted for as year's transactions under the regular heads of account in the absence of Prior Period Adjustment Account [refer Note 1.4 on Schedule 24] and accordingly compliance with AS 5 Net Profit or Loss for the Period, Prior Period Items and Changes in Accounting Policies cannot be ensured;

3.4 Transactions in foreign currencies are recorded at exchange rate prevailing at the time of settlement [Note 6 on Schedule 24] which is not in line with AS 11 The Effects of Changes in Foreign Exchange Rates.

The consequential impact of the non-compliances mentioned above on the excess of income over expenditure for the year ended 31st March 2010 and the year-end net assets of the Institute is not ascertainable.

4. Attention is drawn to –

4.1 Notes 1.2 (a) and 1.2 (c) on Schedule 24 attached to the financial statements regarding accounting of interest on house building loans and expenditure on disbursement of share of faculty members respectively other than on accrual basis, the consequential impact of such accounting on the excess of income over expenditure for the year ended 31st March 2010 and the year-end net assets of the Institute being not ascertainable.

4.2 Below mentioned Notes on Schedule 25 attached to the financial statements –

4.2.1 Note 1.6 indicating non-adjustment of Rs. 7,00,000 being book value of computer systems stolen in earlier years

4.2.2 Note 1.7 indicating non-adjustment of Rs.10,86,306 included under Current Liabilities being sale proceeds of assets disposed of in an earlier year

4.2.3 Note 2.2 regarding non-provision of Rs. 3,647 being a balance included under Cash and Bank balances, the existence thereof being not ascertainable from the available books and records

4.2.4 Note 2.4 indicating Rs. 30,484.34 included under advances on account of land, which the Institute's Finance Committee recommended to write off from books in June 2007

Had the aforesaid balances been written off in the books, the excess of income over expenditure for the year ended 31st March 2010 would have been reduced by Rs. 18,20,437.34 to Rs. 7,95,33,718.66 with consequential adverse effect on the year-end net assets of the Institute.

4.3 The following notes on Schedule 25 attached to the financial statements indicating inclusion of certain old balances under Advances that may not be ultimately realisable for which no provisions have been made in the books:

4.3.1 Note 2.1 indicating old balances of Rs. 12,76,865 included in T.A Advances

4.3.2 Note 2.3 indicating balances aggregating Rs. 45,82,613.58 included under Advance to Party

4.3.3 Note 2.5 indicating old/ unreconciled debit balances totalling Rs. 3,36,767.included under Advances to Staff and Others.

The consequential impact of the aforesaid non-provision on the excess of income over expenditure for the year ended 31st March 2010 and the year-end net assets of the Institute is not ascertainable.

5. We report that

5.1 We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purposes of our audit;

5.2 The Balance Sheet and the Income and Expenditure Account dealt with by this report are in agreement with the books of account maintained by the Institute and produced to us;

5.3 In our opinion and to the best of our information and according to the information and explanations given to us the financial statements read together with the notes thereon and attached thereto give, **subject to our remarks in paragraphs 3 and 4 above,** a true and fair view in conformity with the accounting principles generally accepted in India:

(i) in the case of the Balance Sheet, of the state of affairs of the Institute as at 31st March 2010; and

(ii) in the case of the Income and Expenditure Account, of the excess of Income over Expenditure for the year ended on that date.

For L.B. Jha & Co.
Chartered Accountants
(Registration No. 301088E)

(K. K. Bhanja)
Partner
Membership No. 14722

Kolkata, dated 27th August, 2010

INDIAN STATISTICAL INSTITUTE

SCHEDULE 1 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

CORPUS / CAPITAL FUND

PARTICULARS	CURRENT YEAR		PREVIOUS YEAR	
SCHEDULE 1 - CORPUS / CAPITAL FUND				
Opening Balance		64,05,06,895		50,18,48,103
Less: Recovered during the year on account of Excess of Income over Expenditure for the Previous Year				
Non - Plan Revenue	15,30,10,710		6,07,74,399	
Plan Revenue	1,31,76,455		2,73,12,142	
		16,61,87,165		8,80,86,541
Add: Contribution towards Capital Fund received during the year 2009-10	18,99,54,000		13,79,94,056	
Less: Recovered during the year	2,32,09,015		3,82,32,056	
		16,67,44,985		9,97,62,000
Add: Transfer of Assets of Dev. Fund		99,25,377		44,33,412
Add: 95% Cost of Books & Journals acquired during the year out of Plan Revenue Grant		6,42,97,028		5,39,65,857
Less: Depreciation on Assets during the year- Schl 8A	11,06,18,535		9,62,74,993	
Dep. on Assets acquired out of Dev. Fund- Schl 8B	79,52,073		13,27,627	
		11,85,70,608		9,76,02,620
Less: Amount written off on Fixed Assets during the year - Schl		481		481
Add: Excess of Income over Expenditure on Non-Plan Grant for the year 2009-10, transferred from Income and Expenditure Account	4,84,15,537		15,30,10,710	
Add: Excess of Income over Expenditure on Plan Revenue Grant for the year 2009-10, transferred from Income and Expenditure Account	3,29,38,619		1,31,76,455	
		8,13,54,156		16,61,87,165
		67,80,70,186		64,05,06,895

(S.K. Chakraborty)
Dy. Chief Executive(F)

(S. K. Iyer)
Chief Executive (A & F)

(Bimal K. Roy)
Director

INDIAN STATISTICAL INSTITUTE

SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	DEV ONLINE H/W RECOGNITION PROJECT 201 I I S,B'LORE		HAPLO TYPE DIVR OF ANGIOTENSIN PROJECT 202 DST,GOI		DNA SEQUENCE VARIATION PROJECT 203 DEP.BIO-TECH	
a) Opening Balance of The Funds		-1,65,812		7,922		5,29,478
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	8,65,434		5,00,000			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		8,65,434		5,00,000		
TOTAL (a+b)		6,99,622		5,07,922		5,29,478
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	4,08,200		2,40,000		22,500	
- Travelling & Conveyance	88,830		8,175		9,214	
- Admn. expenses/Consumables	4,904		1,11,985		94,623	
- Tax Deducted at Source						
- Contingencies	33,274		10,157		5,713	
- Share Of Overhead	1,12,852		88,000			
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		6,48,060		4,58,317		1,32,050
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		6,48,060		4,58,317		1,32,050
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		51,562		49,605		3,97,428

INDIAN STATISTICAL INSTITUTE

SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	INFLUENCE OF BD FORMS ON TUB. PROJECT 204 CHAR.A DST		ONLINE H/W CHA RECOGN..HMM. PROJECT 205 HP LAB RESE B'L		MESOZIC GONDWAA VERTEBRATES PROJECT 206 D.S.T, G.O.I.	
a) Opening Balance of The Funds		85,675		12,783		1,141
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			3,25,840		40,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				3,25,840		40,000
TOTAL (a+b)		85,675		3,38,623		41,141
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	70,371		2,21,097			
- Travelling & Conveyance	45,834		24,582		45,765	
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies	21,711		8,200		7,423	
- Share Of Overhead			42,490		8,000	
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		1,37,916		2,96,369		61,188
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		1,37,916		2,96,369		61,188
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		-52,241		42,254		-20,047

INDIAN STATISTICAL INSTITUTE

SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	VISITING PROF. SSORSHIP B V RO PROJECT 207 NBHM		STUDY OF ASYM PROPERTIES RECS PROJECT 208 DST, G O I		DESIGNING AND STUDYING MODE PROJECT 209 OF ACT. NAIP	
a) Opening Balance of The Funds				-68,290		89,57,248
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	2,08,000		3,42,000		26,47,585	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		2,08,000		3,42,000		26,47,585
TOTAL (a+b)		2,08,000		2,73,710		1,16,04,833
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0				1,34,631	
- Remuneration & Allowances	2,08,000		2,00,000		2,34,700	
- Travelling & Conveyance			4,690		31,06,794	
- Admn. expenses/Consumables			160			
- Tax Deducted at Source					7,42,943	
- Contingencies			4,313		4,85,470	
- Share Of Overhead			59,000			
- Trnf.To Dev.Fund/Int.Receipt						47,04,538
TOTAL		2,08,000		2,68,163		
d) Unsp. Amt/Trf. Othr Fund						47,04,538
TOTAL (c)		2,08,000		2,68,163		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)				5,547		69,00,295

INDIAN STATISTICAL INSTITUTE

SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	NBHM LIB. GRANT BANGALORE PROJECT 212 NBHM,DEP.ATOM		LIVING KNOWLEDG EUROPEAN COMM PROJECT 213 EUROPE		INTERACTING PART. SYSTEM-S. PROJECT 216 ATHREYA CSIR	
a) Opening Balance of The Funds		2,66,898				1,69,058
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	10,33,102		14,56,647			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		10,33,102		14,56,647		
TOTAL (a+b)		13,00,000		14,56,647		1,69,058
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal	11,84,035					
- Other						
TOTAL		11,84,035				
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances					32,000	
- Travelling & Conveyance			11,85,486			
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies			9,593		30,956	
- Share Of Overhead			2,10,691			
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL				14,05,770		62,956
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		11,84,035		14,05,770		62,956
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,15,965		50,877		1,06,102

INDIAN STATISTICAL INSTITUTE

SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	FINANCIAL RESER SWARNJAYTI FELL PROJECT 217 DST,G.O.I.		SOCIO ECON. CONDITIONS PROJECT 220 WB MINO.COMM		STUDIES OF ENVN ECOLOGICAL ASPT PROJECT 221 C H & PLANT SC.	
a) Opening Balance of The Funds		1,45,114		2,95,210		4,82,419
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		1,45,114		2,95,210		4,82,419
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance			78,857			
- Admn. expenses/Consumables			18,505		2,780	
- Tax Deducted at Source						
- Contingencies			13,637		6,120	
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL				1,10,999		8,900
d) Unsp. Amt/Trf. Othr Fund		1,45,114				
TOTAL (c)		1,45,114		1,10,999		8,900
c)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)				1,84,211		4,73,519

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	INT. PASSENGER SURVEY-ASU PROJECT 222 DEPT.OF TOURISM		NBHM BOOKGRANT PROJECT 223 NBHM,DAE G.O.I.		DEV.OF BIO INFO RMATIC TOOLS PROJECT 224 D B T, G O I	
a) Opening Balance of The Funds		69,81,280		-74,796		42,891
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			30,00,000			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				30,00,000		
TOTAL (a+b)		69,81,280		29,25,204		42,891
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal			29,72,638			
- Other						
TOTAL				29,72,638		
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	1,26,922					
- Travelling & Conveyance	2,01,442					
- Admn. expenses/Consumables	6,775					
- Tax Deducted at Source						
- Contingencies	70,056					
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		4,05,195				
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		4,05,195		29,72,638		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		65,76,085		-47,434		42,891

INDIAN STATISTICAL INSTITUTE

SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	IMPACT OF ECO REFORM TRIBAL PROJECT 225 NABARD		DISTIBUTED KNOW DISCOVERY MONI PROJECT 226 DST,GOI		PHYSICAL GROWTH BODY COMP. PROJECT 227 N.H.F, NETHERLA	
a) Opening Balance of The Funds		1,67,371				6,48,398
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			1,88,000			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				1,88,000		
TOTAL (a+b)		1,67,371		1,88,000		6,48,398
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	90,022		93,020		4,07,260	
- Travelling & Conveyance	21,691		70,722		11,737	
- Admn. expenses/Consumables	8,398				15,045	
- Tax Deducted at Source						
- Contingencies	22,616				2,56,250	
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		1,42,727		1,63,742		6,90,292
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		1,42,727		1,63,742		6,90,292
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		24,644		24,258		-41,894

INDIAN STATISTICAL INSTITUTE

SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	UNIVERSITY ONE WAY HASH FAMILY PROJECT 228		ATIYAH SINGER INDEX THEOREM PROJECT 229		PROVISIONAL COMMITTEE MEET PROJECT 230	
FUNDING AGENCY	MIN.OF DEFENCE		GEUGE DST-GOI		DR.R.ROY,DAE,MU	
a) Opening Balance of The Funds		4,06,578		59,915		5,58,124
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund					1,00,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						1,00,000
TOTAL (a+b)		4,06,578		59,915		6,58,124
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets					45,500	
- Books & Journal						
- Other						
TOTAL						45,500
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			1,25,000		15,500	
- Travelling & Conveyance	48,506		10,537		46,527	
- Admn. expenses/Consumables	4,775		3,000		3,300	
- Tax Deducted at Source						
- Contingencies	94,495				8,304	
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		1,47,776		1,38,537		73,631
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		1,47,776		1,38,537		1,19,131
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		2,58,802		-78,622		5,38,993

INDIAN STATISTICAL INSTITUTE

SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	NBHM TRAVEL GRA ND, A BANDYOPAD PROJECT 231		J C BOSE FELLOW PROF. R B BAPAT PROJECT 232		NBHM GRANT NURTURE PROG PROJECT 233	
FUNDING AGENCY	NBHM ,DAE,DEL		DST,N,DELHI		NBHM,DAE.DELHI	
a) Opening Balance of The Funds						
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	47,000		8,00,000		3,60,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		47,000		8,00,000		3,60,000
TOTAL (a+b)		47,000		8,00,000		3,60,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets			1,30,543			
- Books & Journal			9,011		12,915	
- Other						
TOTAL				1,39,554		12,915
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			2,40,000		18,000	
- Travelling & Conveyance	47,000		92,896		74,138	
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies			18,685		71,848	
- Share Of Overhead			60,000			
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		47,000		4,11,581		1,63,986
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		47,000		5,51,135		1,76,901
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)				2,48,865		1,83,099

INDIAN STATISTICAL INSTITUTE

SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	INSA SR. SCIENT SCHEME,DR.A IQB PROJECT 234 AL SINGH INSA		SENIOR SCIENTIS SCHEME, DR.ALOK PROJECT 235 DEY, INSA		J.C. BOSE FELLW PROF. R. BHATIA PROJECT 236 DSTN.DELHI	
a) Opening Balance of The Funds				6,948		4,79,561
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	2,89,951		3,45,869		8,00,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		2,89,951		3,45,869		8,00,000
TOTAL (a+b)		2,89,951		3,52,817		12,79,561
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets					86,600	
- Books & Journal					29,576	
- Other						
TOTAL						1,16,176
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	2,40,000		2,40,000		2,40,000	
- Travelling & Conveyance					94,414	
- Admn. expenses/Consumables					29,837	
- Tax Deducted at Source						
- Contingencies	49,876		27,817		1,000	
- Share Of Overhead					60,000	
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		2,89,876		2,67,817		4,25,251
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		2,89,876		2,67,817		5,41,427
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		75		85,000		7,38,134

INDIAN STATISTICAL INSTITUTE

SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	ECONOMIC MECH CREAT & PRESER PROJECT 237 UNIV.MELBOURN		NBHM TEST SELEC PHD SCHOLARSHIP PROJECT 238 DAE,NBHM		NBHM LECTURE PROB & STOCHAST PROJECT 239 IC,(A.BANDY DAE	
a) Opening Balance of The Funds		1,72,122		91		
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			14,000		3,50,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				14,000		3,50,000
TOTAL (a+b)		1,72,122		14,091		3,50,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets					82,156	
- Books & Journal						
- Other						
TOTAL						82,156
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			11,500			
- Travelling & Conveyance	1,41,252				1,60,794	
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies			2,168		56,568	
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		1,41,252		13,668		2,17,362
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		1,41,252		13,668		2,99,518
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		30,870		423		50,482

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	SWARNAJAYANTI FELLOW. AWARD PROJECT 240		EMERITUS SCITS R K ROYCHOUDHUY PROJECT 241		PROCESS PROTIEN ASSISTED SILIKA PROJECT 242	
FUNDING AGENCY	DST.GOI		C S I R		DEPT.OF BIO-TEC	
a) Opening Balance of The Funds		27,72,142		2,495		20,208
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			1,40,000		1,58,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				1,40,000		1,58,000
TOTAL (a+b)		27,72,142		1,42,495		1,78,208
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets	15,60,788					
- Books & Journal						
- Other						
TOTAL		15,60,788				
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	8,55,939		80,000		1,11,532	
- Travelling & Conveyance	66,376					
- Admn. expenses/Consumables	18,780					
- Tax Deducted at Source						
- Contingencies	39,563					
- Share Of Overhead	70,000				23,000	
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		10,50,658		80,000		1,34,532
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		26,11,446		80,000		1,34,532
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,60,696		62,495		43,676

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	NBHM NURTURE PROGRAMME PROJECT 243 (2006-07)NBHM		DEV. OF INF. OF AGRICULTURAL & PROJECT 244 HORT.WBSCST		GOOGLY RESEARCH AWARD-DR MAN PROJECT 245 GOOGLY INC.MOT	
a) Opening Balance of The Funds		10,000		13,21,154		2,71,537
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		10,000		13,21,154		2,71,537
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets			2,04,202			
- Books & Journal						
- Other						
TOTAL				2,04,202		
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			3,31,180			
- Travelling & Conveyance			9,338			
- Admn. expenses/Consumables			16,177			
- Tax Deducted at Source						
- Contingencies			46,391			
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL				4,03,086		
d) Unsp. Amt/Trf. Othr Fund		10,000				
TOTAL (c)		10,000		6,07,288		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)				7,13,866		2,71,537

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	HANDWRITING ANALY FOR WRITE PROJECT 246		IBM- FACULTY AWARD - 2007 PROJECT 247		NON-COMMUTATIV GEOMETRY QUAN PROJECT 248	
FUNDING AGENCY	INAE,GOI		IBM NEW YORK		DST. GOI	
a) Opening Balance of The Funds		17,593		1,30,330		
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund					7,00,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						7,00,000
TOTAL (a+b)		17,593		1,30,330		7,00,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance			1,20,826			
- Admn. expenses/Consumables	8,350		3,200			
- Tax Deducted at Source						
- Contingencies	2,496					
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		10,846		1,24,026		
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		10,846		1,24,026		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		6,747		6,304		7,00,000

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	CENTRE FOR SOFT COMPUT RESEARCH PROJECT 249		NEW TECHNIQUES OF FAST IMAGE PROJECT 250		CRONIC EXPOSURE TO ENVIRN.TOXIS PROJECT 252	
FUNDING AGENCY	D.S.T., G.O.I.		INTEL CORP,USA		MIN.OF ENV.FORS	
a) Opening Balance of The Funds		3,29,597		2,74,033		1,86,501
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	50,00,000					
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		50,00,000				
TOTAL (a+b)		53,29,597		2,74,033		1,86,501
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal	1,00,486					
- Other	4,10,500					
TOTAL		5,10,986				
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	12,18,907					
- Travelling & Conveyance	2,21,858		1,17,240			
- Admn. expenses/Consumables	16,848				1,50,493	
- Tax Deducted at Source						
- Contingencies	1,23,944		39,313		12,308	
- Share Of Overhead	7,65,096					
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		23,46,653		1,56,553		1,62,801
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		28,57,639		1,56,553		1,62,801
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		24,71,958		1,17,480		23,700

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	DELAY FAULT MODELING & TEST PROJECT 253		RELBLTY. ASSMNT .OF A SOLID R/M PROJECT 254		DIGITAL IMAGING FOR INVESTIGATN PROJECT 255	
FUNDING AGENCY	INTEL.CORP.USA		DEPT.OF SPACE		D S T,MIN SC &	
a) Opening Balance of The Funds		4,15,973		1,69,376		2,32,611
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.	33,792					
TOTAL		33,792				
TOTAL (a+b)		4,49,765		1,69,376		2,32,611
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets					84,272	
- Books & Journal	3,450					
- Other						
TOTAL		3,450				84,272
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	8,867				1,00,000	
- Travelling & Conveyance	22,394				8,517	
- Admn. expenses/Consumables	17,214				11,785	
- Tax Deducted at Source						
- Contingencies	6,038				18,165	
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		54,513				1,38,467
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		57,963				2,22,739
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		3,91,802		1,69,376		9,872

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	STUDIES ON PLAK TONIC DIVERSIY PROJECT 257 DST		PROCESSING AND ANALYSIS AIRCRT PROJECT 258 US ARMY		INSEAD RESEARCH GRANT(FOREIGN) PROJECT 259 CEDEX, FRANCE	
a) Opening Balance of The Funds		99,615		16,59,832		2,56,983
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			11,97,220			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				11,97,220		
TOTAL (a+b)		99,615		28,57,052		2,56,983
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets			69,916			
- Books & Journal						
- Other						
TOTAL				69,916		
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			4,64,109			
- Travelling & Conveyance						
- Admn. expenses/Consumables			15,405			
- Tax Deducted at Source						
- Contingencies			18,118			
- Share Of Overhead			1,56,118			
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL				6,53,750		
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)				7,23,666		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		99,615		21,33,386		2,56,983

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	ANALYSIS OF CRYP. ALGORITHM PROJECT 260 DST,GOI		R&D CRYPTOGRAPY PRIMITIVE PROJECT 261 DIT GOI		INDIAN LANGUAGE CORPORATION PROJECT 262 ILCI	
a) Opening Balance of The Funds		7,70,000		-3,58,332		
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			41,29,000		7,99,703	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				41,29,000		7,99,703
TOTAL (a+b)		7,70,000		37,70,668		7,99,703
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets			3,25,024		1,29,788	
- Books & Journal					1,354	
- Other						
TOTAL				3,25,024		1,31,142
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			11,14,979		1,54,800	
- Travelling & Conveyance	2,41,394		1,49,866		13,917	
- Admn. expenses/Consumables			61,920		73,166	
- Tax Deducted at Source						
- Contingencies	18,170		39,917		17,195	
- Share Of Overhead	70,000		5,38,422		1,04,282	
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		3,29,564		19,05,104		3,63,360
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		3,29,564		22,30,128		4,94,502
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		4,40,436		15,40,540		3,05,201

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	DEV OF AGRO CON NANOPARTICLES PROJECT 263 DBT. G O I		J C BOSE FELLOS ARUP BOSE PROJECT 264 D S T, G O I		DATA BASED FOR DE.CENTRA.PLAN PROJECT 265 HWH ZILLA PARI.	
a) Opening Balance of The Funds		87,757		6,70,396		10,313
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	8,99,000		8,00,000			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		8,99,000		8,00,000		
TOTAL (a+b)		9,86,757		14,70,396		10,313
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets	72,900		1,16,574			
- Books & Journal			1,16,619			
- Other						
TOTAL		72,900		2,33,193		
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	2,81,200		2,40,000			
- Travelling & Conveyance	38,157		1,30,177			
- Admn. expenses/Consumables	97,977				10,310	
- Tax Deducted at Source						
- Contingencies	43,799		14,249			
- Share Of Overhead	1,00,000		60,000			
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		5,61,133		4,44,426		10,310
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		6,34,033		6,77,619		10,310
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		3,52,724		7,92,777		3

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	THERMAL EVOLUT PENINSULA INDIA PROJECT 266		STAT. METHODS FOR MAPN.MULTIV PROJECT 267		DEV.OF ROBUST ANALY AND RECOG PROJECT 268	
FUNDING AGENCY	DST-GOI		N I H.U S A		MIN. OF COM.TEC	
a) Opening Balance of The Funds				81,52,231		15,93,437
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	4,80,000					
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		4,80,000				
TOTAL (a+b)		4,80,000		81,52,231		15,93,437
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal					659	
- Other						
TOTAL						659
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			800		5,76,450	
- Travelling & Conveyance	1,25,899		11,78,861		1,05,500	
- Admn. expenses/Consumables	1,23,426				25,810	
- Tax Deducted at Source						
- Contingencies	26,544		32,752		80,239	
- Share Of Overhead	32,170					
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		3,08,039		12,12,413		7,87,999
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		3,08,039		12,12,413		7,88,658
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,71,961		69,39,818		8,04,779

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	COMPUTATIONAL INTELL. REMOTE PROJECT 269 D.A.E, GOI,MUMB		ECONOMIC CAUSES CROP RESID-RICE PROJECT 273 WHEAT SYS,NEPAL		RANDOM GEOMET GRAPHS (R.ROY) PROJECT 274 D S T N DELHI	
a) Opening Balance of The Funds		36,067				45,343
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			3,86,010			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				3,86,010		
TOTAL (a+b)		36,067		3,86,010		45,343
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets			57,564			
- Books & Journal						
- Other						
TOTAL				57,564		
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	42,439		71,200			
- Travelling & Conveyance			1,88,071		22,721	
- Admn. expenses/Consumables			61,686		7,350	
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead	1,80,621				6,014	
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		2,23,060		3,20,957		36,085
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		2,23,060		3,78,521		36,085
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		-1,86,993		7,489		9,258

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	NBHM RESEARCH AWARD-L.SAHU(DL PROJECT 276 DEPT.ATOMIC ENG		CENTRAL SECTOR SCHOLORSHIP - PROJECT 277 SC STUDENT		NBHM BOOK GRANT LIABRARY(DELHI PROJECT 278 DEPT ATOMIC EGY	
a) Opening Balance of The Funds		5,225		7,725		3,40,290
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund					26,78,156	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						26,78,156
TOTAL (a+b)		5,225		7,725		30,18,446
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal					29,87,917	
- Other						
TOTAL						29,87,917
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)						29,87,917
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		5,225		7,725		30,529

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	LANGUAGE & BRAN ORG.NORRATIVE PROJECT 280		POLYMORPHISM IN CYPIAL CYP2I PROJECT 281		SEDI.HISTORY PALEOPROTEROZO PROJECT 282	
FUNDING AGENCY	D S T , GOI		DST-GOI		DST-GOI	
a) Opening Balance of The Funds				1,23,462		
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	8,74,600				5,38,400	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		8,74,600				5,38,400
TOTAL (a+b)		8,74,600		1,23,462		5,38,400
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets	4,50,000				63,633	
- Books & Journal						
- Other						
TOTAL		4,50,000				63,633
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance					88,464	
- Admn. expenses/Consumables					2,112	
- Tax Deducted at Source						
- Contingencies	237		26,361		6,929	
- Share Of Overhead	75,000				50,000	
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		75,237		26,361		1,47,505
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		5,25,237		26,361		2,11,138
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		3,49,363		97,101		3,27,262

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	SURVEY OF PRENT STATUS OF EVALT PROJECT 283 SAIL, DURGAPUR		NASI SR.SCIENTS P. JUBILEE PROJECT 285 NASI, ALLAHABD		STRATIGRAPHIC CANALYS OF CHAT PROJECT 286 DST,GOI	
a) Opening Balance of The Funds		73,682		2,25,048		-1,88,456
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	1,47,500		6,45,395			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		1,47,500		6,45,395		
TOTAL (a+b)		2,21,182		8,70,443		-1,88,456
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	60,000		4,19,140		1,24,800	
- Travelling & Conveyance	9,585		6,415			
- Admn. expenses/Consumables	11,221					
- Tax Deducted at Source						
- Contingencies			34,986		1,697	
- Share Of Overhead					1,48,000	
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		80,806		4,60,541		2,74,497
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		80,806		4,60,541		2,74,497
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,40,376		4,09,902		-4,62,953

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	DATA MANAGEMNT SYSTEM OIL &GAS PROJECT 287 PETROMEUM PLANG		LANGUAGE & BRAN ORG.INNORMATIVE PROJECT 288 DST,GOI		UNDERSTANDING ROLE OF SYM.IN PROJECT 289 D S T. G O I	
a) Opening Balance of The Funds						62,253
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	4,50,000		4,62,200		4,00,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		4,50,000		4,62,200		4,00,000
TOTAL (a+b)		4,50,000		4,62,200		4,62,253
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other			1,00,000			
TOTAL				1,00,000		
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances					2,40,000	
- Travelling & Conveyance	1,02,521					
- Admn. expenses/Consumables	320				2,250	
- Tax Deducted at Source						
- Contingencies	1,650				17,743	
- Share Of Overhead	90,000		75,000		49,000	
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		1,94,491		75,000		3,08,993
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		1,94,491		1,75,000		3,08,993
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		2,55,509		2,87,200		1,53,260

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	HOST VIRUS INT AT GENETIC PROJECT 290 DEP.OF BIO-TECH		CROSS LINGUAL INF.ACCESS DEP. PROJECT 291 COMMU.INF, DIT		ADV.TECH.FOR REMOTE SENSING PROJECT 292 D S T G.O.I.	
a) Opening Balance of The Funds		1,06,628		-2,90,379		10,54,425
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	5,13,000		6,15,000			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		5,13,000		6,15,000		
TOTAL (a+b)		6,19,628		3,24,621		10,54,425
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets			1,79,640			
- Books & Journal						
- Other						
TOTAL				1,79,640		
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	71,500		9,70,500		4,36,800	
- Travelling & Conveyance					1,06,890	
- Admn. expenses/Consumables	2,88,417		41,015			
- Tax Deducted at Source						
- Contingencies	18,267		5,929		38,920	
- Share Of Overhead	78,000		88,196		2,00,000	
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		4,56,184		11,05,640		7,82,610
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		4,56,184		12,85,280		7,82,610
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,63,444		-9,60,659		2,71,815

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	STUDIES ON EXPR MICRO.RNA PROJECT 293		SOME FEATURE EXTRA & INDEXIN PROJECT 294		DEV.OF EXP.PARA DIGMS VISUAL C PROJECT 295	
FUNDING AGENCY	DBT-GOI		DST.G.O.I.		MIN OF DEFENCE	
a) Opening Balance of The Funds				-1,316		6,96,321
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	14,80,000		1,44,745			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		14,80,000		1,44,745		
TOTAL (a+b)		14,80,000		1,43,429		6,96,321
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			1,14,000			
- Travelling & Conveyance			4,408			
- Admn. expenses/Consumables	77,313					
- Tax Deducted at Source						
- Contingencies	362					
- Share Of Overhead	20,000		23,160			
- Trnf.To Dev.Fund/Int.Receipt					2,69,000	
TOTAL		97,675		1,41,568		2,69,000
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		97,675		1,41,568		2,69,000
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		13,82,325		1,861		4,27,321

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	ISI-ERU & SINP CARCS COL.LABOR PROJECT 296		SPL. HONORARIUM SSB-AWARDED PROJECT 297		PARTICLE FLUID INTERACTION TUR PROJECT 298	
FUNDING AGENCY	SAHA INST.KOL		CSIR, GOI		C S IR ,GOI	
a) Opening Balance of The Funds		7,65,498		8,97,930		
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			9,00,000		4,92,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.			2,070			
TOTAL				9,02,070		4,92,000
TOTAL (a+b)		7,65,498		18,00,000		4,92,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal	4,65,818					
- Other						
TOTAL		4,65,818				
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	27,500		9,00,000			
- Travelling & Conveyance						
- Admn. expenses/Consumables	15,343					
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		42,843		9,00,000		
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		5,08,661		9,00,000		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		2,56,837		9,00,000		4,92,000

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	CONSTRUC. ANALY REGIONAL VARIAT PROJECT 299 MIN.OF STATISTC		J.C.BOSE FELLOW DR S. K. PAL PROJECT 340 DST - GOI		NALLORE SCHIST BELT AND PETERO PROJECT 341 DST-GOI	
a) Opening Balance of The Funds		-4,75,917		1,54,891		
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			8,00,000		22,46,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				8,00,000		22,46,000
TOTAL (a+b)		-4,75,917		9,54,891		22,46,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets					15,53,661	
- Books & Journal						
- Other						
TOTAL						15,53,661
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			2,50,000		2,890	
- Travelling & Conveyance			2,53,284		62,588	
- Admn. expenses/Consumables					2,043	
- Tax Deducted at Source						
- Contingencies	293		64,981		9,686	
- Share Of Overhead			60,000		1,00,000	
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		293		6,28,265		1,77,207
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		293		6,28,265		17,30,868
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		-4,76,210		3,26,626		5,15,132

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	NON COMMUTATIV GEOMETRY &QUANT PROJECT 342		PREDICT THE METEOROLOGICAL PROJECT 343		ISI INTELLECTUA VENTURE INVEN PROJECT 344	
FUNDING AGENCY	I N S A		DEPT. OF SPACE		GATEWAY W. SING	
a) Opening Balance of The Funds		32,629		4,95,534		
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			50,000		5,72,198	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				50,000		5,72,198
TOTAL (a+b)		32,629		5,45,534		5,72,198
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets			1,78,360			
- Books & Journal	14,397					
- Other						
TOTAL		14,397		1,78,360		
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			2,75,000			
- Travelling & Conveyance			33,854			
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies			6,270			
- Share Of Overhead			50,000			
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL				3,65,124		
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		14,397		5,43,484		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		18,232		2,050		5,72,198

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	CHEMICALS WEAP CONVENTION SELE PROJECT 345 DEP.CHEM.PETRO		ROBUST IMPLEMEN TATIONS OF I PROJECT 346 MINISTRY OF DEF		STATISTIC IN GENETIC MEDICIN PROJECT 347 ICMR-GOI	
a) Opening Balance of The Funds		1,74,687		2,65,941		5
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund					2,18,920	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.			36,620			
TOTAL				36,620		2,18,920
TOTAL (a+b)		1,74,687		3,02,561		2,18,925
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances					18,514	
- Travelling & Conveyance			21,938			
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies			23,510			
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL				45,448		18,514
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)				45,448		18,514
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,74,687		2,57,113		2,00,411

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	ESTMATING PROVR DISTRICT LEVEL PROJECT 348 UNDP		DEV.METHODGY TOWARDS MEASRE PROJECT 349 MIN OF STATISTS		FLOOD ADVANCE PROJECT 802	
a) Opening Balance of The Funds		10,39,772		11,040		7,20,000
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		10,39,772		11,040		7,20,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets	34,892					
- Books & Journal	17,126					
- Other						
TOTAL		52,018				
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables	52,265		4,670			
- Tax Deducted at Source						
- Contingencies	37,100		1,400			
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		89,365		6,070		
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		1,41,383		6,070		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		8,98,389		4,970		7,20,000

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	CONVEYANCE ADVANCE PROJECT 804		IMPROVEMENT IN MGMT.ENTRANCE PROJECT C226 - IIM		NBHM NARTURE CONTACT PROG. PROJECT C232 DAE	
a) Opening Balance of The Funds		47,50,000		23,436		5,45,409
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		47,50,000		23,436		5,45,409
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						
d) Unsp. Amt/Trf. Othr Fund				23,436		
TOTAL (c)				23,436		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		47,50,000				5,45,409

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	GENOMIC DIVERSI INDIA POPULATIN PROJECT C244 MST/BBT GOI		IMAGE PROCESS TECH. PARTICEL PROJECT C266		EMERITUS SC. DR. A. CHOUDHUY PROJECT C280 CSIR	
a) Opening Balance of The Funds		12,859		-19,434		5,184
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		12,859		-19,434		5,184
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)						
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		12,859		-19,434		5,184

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	VALUATION OF ECOLOGICAL SERV PROJECT C282 ME & FOREST		SOFTWARE DEV. FOR TIGER PUG PROJECT C284		BOYSCUT FELLOW TO S.S.DAS PROJECT C287 DST	
a) Opening Balance of The Funds		-5,741		14,916		73,047
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		-5,741		14,916		73,047
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance					55,200	
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						55,200
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)						55,200
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		-5,741		14,916		17,847

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	PROJECTION OF ELEPHANT POP. PROJECT C288		MODELLING & PREDICT PRESSUE PROJECT C344		DEV OF DESIGN AID/TOOL FOR PROJECT O204 POLY	
FUNDING AGENCY	DST					
a) Opening Balance of The Funds		67,021		2,53,592		1,14,450
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		67,021		2,53,592		1,14,450
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)						
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		67,021		2,53,592		1,14,450

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	EVALUATION WORK SRC PATNA PROJECT O205		ALGEBRAIC ANALY OF MODEL ETC PROJECT O206 D.S.T., G.O.I.		DESIGN AID TOOS FOR CLECTION PROJECT O207 CAIR	
a) Opening Balance of The Funds		1,26,663		307		10,144
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		1,26,663		307		10,144
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt			307		10,144	
TOTAL				307		10,144
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)				307		10,144
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,26,663				

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	DEV.OF INDIGENO BLOCK ETC ISRO PROJECT O209		BYASIAN NON-PAR AMETIC INFEREN. PROJECT O215		EVALUATION OF TLC KAMRUP ZSS PROJECT O221	
FUNDING AGENCY	DEPT.OF SPACE		CSIR		KAMRUP, GUAHATI	
a) Opening Balance of The Funds		1,22,833		5,877		10,359
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		1,22,833		5,877		10,359
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt					10,359	
TOTAL						10,359
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)						10,359
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,22,833		5,877		

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	STATUS OF WOMAN IN W.BENGAL PROJECT O226 GOVT.OF W.B		CSIR-SENIOR RESEARCH ASSOC PROJECT O227 C.S.I.R.		EFFECT OF ALU INSECTION PROJECT O229 I C M R	
a) Opening Balance of The Funds		1,001		3,692		47,192
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		1,001		3,692		47,192
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt	1,001		3,692			
TOTAL		1,001		3,692		
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		1,001		3,692		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)						47,192

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	NBHM TRAVEL GRANT-L SAHU PROJECT O231 NBHM		ICSSR FELLOWSHP C.JYAL PROJECT O232 ICSSR-DELHI		LONG TERM ECO. IMPORT OF HIV A PROJECT O234	
a) Opening Balance of The Funds		4,668		930		49
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		4,668		930		49
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)						
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		4,668		930		49

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	INSA SENIOR SC. FELLOWSHIP-CHN PROJECT O244		FAST ALGOROTHM FOR DNA PROJECT O245 DST GOI		FARM HOUSEHOLD SURVEY PROJECT O248 E.W.CENTER HOUS	
a) Opening Balance of The Funds		-334		66,747		11,488
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		-334		66,747		11,488
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies					3,120	
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt			66,747			
TOTAL				66,747		3,120
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)				66,747		3,120
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		-334				8,368

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	INV. OF MEANS TO ASS PROJECT O251		MOLECULAR GENET STUDIES PROJECT O255		WATER WAVE DIFF BY FLO & SU PROJECT O256	
FUNDING AGENCY	CSIR				C.S.I.R.	
a) Opening Balance of The Funds		70,833		8,129		17,995
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		70,833		8,129		17,995
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						
d) Unsp. Amt/Trf. Othr Fund						17,995
TOTAL (c)						17,995
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		70,833		8,129		

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	PATTERN INSTAB. INTERFACE WAVS PROJECT O257		REPORT ON STATE DEVELOPMENT PROJECT O258 GOVT.W.B		MAFIC CRUSTAL XENOLITHS IN PROJECT O260 E. GH	
a) Opening Balance of The Funds		43,232		-16,285		-73,613
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		43,232		-16,285		-73,613
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt	43,232					
TOTAL		43,232				
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		43,232				
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)				-16,285		-73,613

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	EVALUATION OF RELBTY.FLIGHT PROJECT O262 DEPTT. SPACE		IMAGE PROCESS TECH.PARTICLE PROJECT O266 CSIR		RES.ASSOCIATES DR.S.SENGUPTA PROJECT O280 C.S.I.R.	
a) Opening Balance of The Funds		1,30,109		20,232		1,834
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		1,30,109		20,232		1,834
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt			20,232		1,834	
TOTAL				20,232		1,834
d) Unsp. Amt/Trf. Othr Fund		1,30,109				
TOTAL (c)		1,30,109		20,232		1,834
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)						

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	SEDIMENTATION HISTORY PALEOP PROJECT O282		SOFT COMPUTING CHEMOGENOMIC PROJECT O283		MOLECULAR GENET IC STUDIES OF S PROJECT O284	
FUNDING AGENCY	DST		SILYCOGNE INFOR		DEPT BIO-TECH	
a) Opening Balance of The Funds		1,56,602		28,190		40,473
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		1,56,602		28,190		40,473
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt	1,56,602		28,190		40,473	
TOTAL		1,56,602		28,190		40,473
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		1,56,602		28,190		40,473
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)						

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	STUDY ON DEV METHOD FOR INDX PROJECT O285 SE.RLY		STUDY ON ISSUES RELATED DATA PROJECT O287 CMRI NAGPUR		UTERINE CANCER PREVENTION PROJECT O289 D.S.T. & NES WB	
a) Opening Balance of The Funds		96,861		85,000		34,999
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		96,861		85,000		34,999
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)						
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		96,861		85,000		34,999

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	OBC STDY OF SOE PROJECT O291 WBC BACKWARD		DEV. OF AN ANN BASED PREDICT PROJECT O293 I J I R A		ACCOUNTBILITY SOME TRADITIONL PROJECT O297 NI.FOUNDATION	
a) Opening Balance of The Funds		27,133		2,07,462		2,193
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		27,133		2,07,462		2,193
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source					2,070	
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						2,070
TOTAL						
d) Unsp. Amt/Trf. Othr Fund						2,070
TOTAL (c)						
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		27,133		2,07,462		123

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	BAYESION AUTOM. RECOG DEPT OF PROJECT O298 SPACE		UGC REFRESHER COURSE PROJECT O299 U.G.C.		NON COMMUTATIV MARKOV PROCS PROJECT O340 D S T	
a) Opening Balance of The Funds		73,886		24,193		4,442
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		73,886		24,193		4,442
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt			24,193		4,442	
TOTAL				24,193		4,442
d) Unsp. Amt/Trf. Othr Fund		73,886				
TOTAL (c)		73,886		24,193		4,442
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)				0		

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	STUDY ON ASSESS THE IMPACT JUTE PROJECT O341 CHEM & PET.ASO		EMPRIAL STUDY LABOUR PROBLEM PROJECT O342 LABOU DPT. W.B		SINGLE NUCLEOTI POLY MORPHISM PROJECT O343 DST	
a) Opening Balance of The Funds		1,19,150		6,872		10,949
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		1,19,150		6,872		10,949
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt			6,872		10,949	
TOTAL				6,872		10,949
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)				6,872		10,949
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,19,150				0

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	DEV DESIGN AID TOOLS PROJECT O344 CAIR(B'LORE)		CRYPTOGRAPHY LUND UNIVERSITY PROJECT O345 DEP.I.T.USENIX		TECHTONIC SETIG OF ALKLINE PROJECT O347 CSIR (GOI)	
a) Opening Balance of The Funds		13,509		-7,699		5,919
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		13,509		-7,699		5,919
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt					5,919	
TOTAL						5,919
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)						5,919
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		13,509		-7,699		0

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	WEAPONS & ELECT RONIC SYSTEM EN PROJECT 235A W.E.S.E.E.		NBHM TEST FOR SELECT MA/MSC PROJECT 238A NBHM		INTERVIEW COND MA/MSC AWARD PROJECT 238B NBHM,DAE	
a) Opening Balance of The Funds		2,71,298		167		2,665
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			10,000			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				10,000		
TOTAL (a+b)		2,71,298		10,167		2,665
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			9,500			
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL				9,500		
d) Unsp. Amt/Trf. Othr Fund				500		
TOTAL (c)				10,000		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		2,71,298		167		2,665

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	NBHM TEST RESH AWARD,PHD SCHO PROJECT 238C		NBHM LECTURE PROB&STOCHAS PROJECT 239A		ESTIMATION OF TECH. MAN POWER PROJECT 250A	
FUNDING AGENCY	NBHM. D A E		DR.R.ROY,DAE,		WBSCTE	
a) Opening Balance of The Funds		5,300				
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	30,000		1,50,000		9,35,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		30,000		1,50,000		9,35,000
TOTAL (a+b)		35,300		1,50,000		9,35,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	9,000				1,32,281	
- Travelling & Conveyance	9,981		17,658		14,100	
- Admn. expenses/Consumables			9,380		29,706	
- Tax Deducted at Source						
- Contingencies	2,362		39,254		43,366	
- Share Of Overhead					1,21,924	
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		21,343		66,292		3,41,377
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		21,343		66,292		3,41,377
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		13,957		83,708		5,93,623

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	NBHM WORLD MATH R.BHATIA PROJECT 275A NBHM,DAE		CSIR FELLOWSHIP SRF/JRF PROJECT 5301 CSIR		NBHM FELLOWSHIP A.MUJUMDER PROJECT 5302 NBHM	
a) Opening Balance of The Funds		8,955		14,41,548		5,000
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			55,43,541			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				55,43,541		
TOTAL (a+b)		8,955		69,85,089		5,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			43,71,124			
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies			3,44,553			
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt					5,000	
TOTAL				47,15,677		5,000
d) Unsp. Amt/Trf. Othr Fund				3,78,813		
TOTAL (c)				50,94,490		5,000
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		8,955		18,90,599		

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	NBHM FELLOWSHIP DR.B BEHERA PROJECT 5303 NBHM		NBHM FELLOWSHIP S.CHATTERJEE PROJECT 5304 NBHM		NBHM FELLOWSHIP PROSENJIT DAS PROJECT 5305 NBHM	
a) Opening Balance of The Funds		27,152		40,152		2,98,913
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		27,152		40,152		2,98,913
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances					2,61,612	
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt	27,152					
TOTAL		27,152				2,61,612
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		27,152				2,61,612
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)				40,152		37,301

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	NBHM FELLOWSHIP ABHIJIT PAL PROJECT 5306		NBHM FELLOWSHIP MAHABIR PD.JHAN PROJECT 5307		ICMR FELLOWSHIP -SUJATA KAR PROJECT 5308	
FUNDING AGENCY	NBHM		NBHM		ICMR	
a) Opening Balance of The Funds				7,966		25,625
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	3,14,000		2,90,000			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		3,14,000		2,90,000		
TOTAL (a+b)		3,14,000		2,97,966		25,625
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	2,70,000		2,62,000			
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies	28,750					
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		2,98,750		2,62,000		
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		2,98,750		2,62,000		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		15,250		35,966		25,625

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	G E FOUNDAYION SCHOLARSHIPS PROJECT 5309 SHIBDAS BONDYO		G E FOUNDATION SCHOLARSHI PROJECT 5310 ARNAB DAS		NBHM GRANT MS R. GAYEN CHU PROJECT 5311 NBHM	
a) Opening Balance of The Funds		44,293		21,370		50,661
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		44,293		21,370		50,661
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)						
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		44,293		21,370		50,661

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	NBHM FELLOWSHI OF SM.A MAITRA PROJECT 5312 NBHM		NBHM FELLOWSHIP PABITRA BARIK PROJECT 5313 NBHM		GE FOUND SCHOL GOURAB DE PROJECT 5314 NBHM	
a) Opening Balance of The Funds				75,000		37,136
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	2,64,600					
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		2,64,600				
TOTAL (a+b)		2,64,600		75,000		37,136
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	1,02,658		36,000			
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		1,02,658		36,000		
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		1,02,658		36,000		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,61,942		39,000		37,136

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	NBHM FELLOWHIP JYOTISHMAN BHOW PROJECT 5315		NBHM FELLOWSHIP SOUMEN SARKAR PROJECT 5316		NATIONAL TALENT SEARCH AWARD PROJECT 5317	
FUNDING AGENCY	NBHM		NBHM		N.C OF.EDU.	
a) Opening Balance of The Funds		2,43,248		2,55,042		30,000
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			61,200		6,78,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				61,200		6,78,000
TOTAL (a+b)		2,43,248		3,16,242		7,08,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	1,00,333		1,99,500		5,56,660	
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		1,00,333		1,99,500		5,56,660
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		1,00,333		1,99,500		5,56,660
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,42,915		1,16,742		1,51,340

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	DBT POST DOC FELLOW- S.MITRA PROJECT 5318 DBT GOI		POST DOC FELLOW NBHM PROJECT 5319 SANJAY PARUI		NBHM MA/MSC SCHOLARSHIP PROJECT 5320 NBHM/DAE	
a) Opening Balance of The Funds		1,02,072		1,22,000		77,660
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			60,000			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				60,000		
TOTAL (a+b)		1,02,072		1,82,000		77,660
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			60,000			
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL				60,000		
d) Unsp. Amt/Trf. Othr Fund		1,02,072				
TOTAL (c)		1,02,072		60,000		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)				1,22,000		77,660

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	AWARD & TRAVEL GRANT MICROSOFT PROJECT 5321		NBHM POST DOCT FELLOW PROJECT 5322 RABEYA BASU		NBHM SCHLARSHIP SAIBAL GANGULY PROJECT 5323	
FUNDING AGENCY	NBHM,DAE				NBHM	
a) Opening Balance of The Funds		5,67,105		1,51,610		
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	5,11,500				4,64,200	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		5,11,500				4,64,200
TOTAL (a+b)		10,78,605		1,51,610		4,64,200
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			45,500		2,99,000	
- Travelling & Conveyance	1,41,127					
- Admn. expenses/Consumables	3,702					
- Tax Deducted at Source						
- Contingencies	24,476				616	
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		1,69,305		45,500		2,99,616
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		1,69,305		45,500		2,99,616
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		9,09,300		1,06,110		1,64,584

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	NBHM POST DOC ANUPAMA PANI PROJECT 5324 NBHM		NBHM POST DOCTORAL FELL PROJECT 5325 S S ROY-NBHM		MSR INDIA RX LA PROJECT 5326	
a) Opening Balance of The Funds						
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	2,64,600		2,64,600		1,00,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		2,64,600		2,64,600		1,00,000
TOTAL (a+b)		2,64,600		2,64,600		1,00,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	3,14,000		2,88,602			
- Travelling & Conveyance			69,330			
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		3,14,000		3,57,932		
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		3,14,000		3,57,932		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		-49,400		-93,332		1,00,000

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	INDIRA GANDHI PG SCHOLARSHIP PROJECT 5327		NBHM SCHOLAR S.JOARDER PROJECT 5328 NBHM		ICMR FELLOWSHIP PROJECT 5329 ICMR	
a) Opening Balance of The Funds						
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	40,000		1,59,000		1,19,200	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		40,000		1,59,000		1,19,200
TOTAL (a+b)		40,000		1,59,000		1,19,200
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	33,320		65,600			
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		33,320		65,600		
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		33,320		65,600		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		6,680		93,400		1,19,200

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	SATELLITE CONF. PROJECT 5330 TSSRK		NBHM-TRAVEL GRANT PROF. BV PROJECT 5331 RAJARAMA BHAT]		NBHM FELLOWS MS SOPHIA DHARN PROJECT 5332 NBHM,DAE,BLORE	
a) Opening Balance of The Funds				95,000		1,373
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	1,00,000		1,45,000		1,59,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		1,00,000		1,45,000		1,59,000
TOTAL (a+b)		1,00,000		2,40,000		1,60,373
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances					84,000	
- Travelling & Conveyance			1,36,539			
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies	1,755					
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		1,755		1,36,539		84,000
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		1,755		1,36,539		84,000
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		98,245		1,03,461		76,373

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	ISS PROB. TRAINING PROG. PROJECT 5333 -CSO-DELHI		CSIR FELLOWSHIP TEJAS KALEKAR PROJECT 5334 C.S.I.R.		NBHM POST DOC G RAMESH PROJECT 5335 D.A.E.MUMBAI	
a) Opening Balance of The Funds		26,900		16,987		
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund					4,26,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						4,26,000
TOTAL (a+b)		26,900		16,987		4,26,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances					2,43,000	
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies					15,000	
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						2,58,000
d) Unsp. Amt/Trf. Othr Fund				16,987		
TOTAL (c)				16,987		2,58,000
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		26,900				1,68,000

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	SATELITE CONFER PROF.NSN SASTRY PROJECT 5336 UNIV.HYD		CONFERENCE OF RAMANUJAN MATHE PROJECT 5337 NBHM,DAE		NBHM GRANT PROF M MARTIN TRAVL PROJECT 5338 NBHM,DAE,B'LOR	
a) Opening Balance of The Funds						
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	1,44,697		5,00,000		1,25,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		1,44,697		5,00,000		1,25,000
TOTAL (a+b)		1,44,697		5,00,000		1,25,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances					40,000	
- Travelling & Conveyance			1,37,916		78,300	
- Admn. expenses/Consumables			20,078			
- Tax Deducted at Source						
- Contingencies	4,200		2,13,109			
- Share Of Overhead			75,000			
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		4,200		4,46,103		1,18,300
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		4,200		4,46,103		1,18,300
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,40,497		53,897		6,700

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	NBHM TRAVEL GRT SHIBANANDA BISW PROJECT 5339 AS. NBHM,DAE		NBHM TRAVEL GRT S. ATHREYA PROJECT 5340 D.A.E, MUMBAI		WORKSHOP REINFORCED RND. PROJECT 5341 WORKS-TIFR	
a) Opening Balance of The Funds				12,944		-19,662
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	85,000				19,662	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		85,000				19,662
TOTAL (a+b)		85,000		12,944		
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance	77,950					
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		77,950				
d) Unsp. Amt/Trf. Othr Fund				12,944		
TOTAL (c)		77,950		12,944		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		7,050				

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	NBHM TRAVEL GRT PROF.NSN SASTRY PROJECT 5342 D.A.E, MUMBAI		ORG.INSTRUCTIO SCHOOL OPERATOR PROJECT 5344 NBHM,DAE		ANNUAL FOUNDATI ONAL SCHOOL PII PROJECT 5345 DAE,MUMBAI	
a) Opening Balance of The Funds		10,395		28,583		1,15,212
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		10,395		28,583		1,15,212
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						
d) Unsp. Amt/Trf. Othr Fund		10,395		28,583		1,15,212
TOTAL (c)		10,395		28,583		1,15,212
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)						

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	CONF.ON PRESPEC TIVES IN MATHEM PROJECT 5347 SCIENCE,DAE.MUM		INSTRUTIONAL WORKSHOP, B RAJ PROJECT 5348 IV, DAE. MUMBAI		NBHMSCHOLARSHI M/MATH,K BANERJ PROJECT 5349 D.A.E, MUMBAI	
a) Opening Balance of The Funds		63,359				62,709
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			4,50,000			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				4,50,000		
TOTAL (a+b)		63,359		4,50,000		62,709
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances					62,709	
- Travelling & Conveyance			6,959			
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies			1,06,594			
- Share Of Overhead			67,500			
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						
d) Unsp. Amt/Trf. Othr Fund				1,81,053		62,709
TOTAL (c)		63,359				
e)Assets Trnf. to Corpus Fund		63,359		1,81,053		62,709
NET BALANCE AS AT THE YEAR END (a+b-c-e)				2,68,947		

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	ORG.INSTRUCTIOL SCHOOL PROJECT 5350		NBHM FELLOWSHIP LINGARAJ SHAHU PROJECT 5351		NURTURE PROGM TSSRK RAO PROJECT 5352	
FUNDING AGENCY	D.A.E, MUMBAI		NBHM		DAE,MUMBAI	
a) Opening Balance of The Funds				1,500		
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	4,00,000		500		6,82,238	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		4,00,000		500		6,82,238
TOTAL (a+b)		4,00,000		2,000		6,82,238
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	14,000		1,500		2,47,839	
- Travelling & Conveyance	73,401				1,29,733	
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies	1,34,770				1,18,860	
- Share Of Overhead	60,000				62,010	
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		2,82,171		1,500		5,58,442
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		2,82,171		1,500		5,58,442
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,17,829		500		1,23,796

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SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	RMO INMO EXAM. PROF. B. V. RAJ PROJECT 5353		NBHM SCHOLAR M K PANDEY PROJECT 5354		NBHM SCHOLAR MADHURESH PROJECT 5355	
FUNDING AGENCY	ARAM, HOMI BHA		NBHM,DAE,MUM		NBHM,DAE,MUM	
a) Opening Balance of The Funds		2,17,352		14,816		
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund	1,49,575		72,000		2,31,000	
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		1,49,575		72,000		2,31,000
TOTAL (a+b)		3,66,927		86,816		2,31,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work	0					
- Remuneration & Allowances	44,800		50,323		1,46,323	
- Travelling & Conveyance	3,842					
- Admn. expenses/Consumables	31,737					
- Tax Deducted at Source						
- Contingencies	52,739					
- Share Of Overhead	2,828		14,806			
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		1,35,946		65,129		1,46,323
d) Unsp. Amt/Trf. Othr Fund		1,89,267				
TOTAL (c)		3,25,213		65,129		1,46,323
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		41,714		21,687		84,677

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	FELOWSHIP S. K. KATTUMANI PROJECT 5356 NBHM		CSIR FELLOWSHIP MS TANVI JAIN PROJECT 5357 CSIR		IMPLE. OF SIX SIGMA- MUMBAI PROJECT 9442 HUBER CHEMICAL	
a) Opening Balance of The Funds		1,38,446				-18,782
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			3,00,800			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				3,00,800		
TOTAL (a+b)		1,38,446		3,00,800		-18,782
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			1,71,600			
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies			8,911			
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL				1,80,511		
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)				1,80,511		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,38,446		1,20,289		-18,782

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	SPC TRG & GUID CROMP & GREAVES PROJECT 9444		SIX SIGMA IMP. R.I.L.(PUNE) PROJECT 9445		QALITY IMPV. PROJECT--HYDERB PROJECT 9446	
FUNDING AGENCY	CROMP & GREAVES		R.I.L.(PUNE)		I.T.C.LTD.	
a) Opening Balance of The Funds		1,14,255		15,30,881		1,60,811
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		1,14,255		15,30,881		1,60,811
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)						
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,14,255		15,30,881		1,60,811

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	IMPLEMENT SPC AT CRIT. PROSS PROJECT 9447 FOSCO, MUMBAI		GRANDING SYS FOR CBSE(DELHI) PROJECT 9449 CBSE		CONVERSION OF MATH CORE ETC. PROJECT 9450	
a) Opening Balance of The Funds		88,153		1,00,000		1,50,000
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			84,000			
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL				84,000		
TOTAL (a+b)		88,153		1,84,000		1,50,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			39,100			
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead			1,44,900			
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL				1,84,000		
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)				1,84,000		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		88,153				1,50,000

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	STAT. TRGN. PRG VSNAL PROJECT 9451		L&T FARIDABAD (MUMBAI) PROJECT 9452		ITC BHADRACHALM HYDERABAD PROJECT 9453	
FUNDING AGENCY	VSANL,KOLKATA		L&T		ITC	
a) Opening Balance of The Funds		6,70,165		3,73,663		2,61,094
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		6,70,165		3,73,663		2,61,094
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)						
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		6,70,165		3,73,663		2,61,094

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS	TQM & ISO9000 WIMCO PROJECT 9454		M/S SAGRIK PROCESS ANA. PROJECT 9455		CONT.OF SILICON % SIRF.OF FGIPG PROJECT 9463	
FUNDING AGENCY	WIMCO ,KOLKATA		PVT LTD DELHI		TATA METALICS	
a) Opening Balance of The Funds		1,58,478		91,223		78,000
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds						
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL						
TOTAL (a+b)		1,58,478		91,223		78,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			22,476			
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt			68,747			
TOTAL				91,223		
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)				91,223		
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,58,478				78,000

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	IMP.OF SIX SIGM SQC PROJECT PROJECT 9474 L&T MUMBAI		DEVELOPEMENT FUND		MAHALANOBIS INT SYMPOSIUM	
a) Opening Balance of The Funds		1,66,317		24,52,01,029		1,30,718
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds			1,77,47,691		13,282	
3. Serv. Charg/SQCOR Receipt			1,72,08,793			
4. Adj of Ovhd/Oth on Ext.			28,00,677			
TOTAL				3,77,57,161		13,282
TOTAL (a+b)		1,66,317		28,29,58,190		1,44,000
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable			18,05,094			
TOTAL				18,05,094		
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables			3,23,945		9,653	
- Tax Deducted at Source			24,76,251			
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt			43,02,199			
TOTAL				71,02,395		9,653
d) Unsp. Amt/Trf. Othr Fund				5,00,000		
TOTAL (c)				94,07,489		9,653
e)Assets Trnf. to Corpus Fund				99,25,377		
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,66,317		26,36,25,324		1,34,347

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	STAFF BENEVOLENT FUND		ENDOWMENT FUND (LECT. IN ECON)		ISI ALUMNI ASSO PRIZE FUND	
a) Opening Balance of The Funds		1,21,424		70,477		59,241
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund					55,000	
2. Income From Investment made on account of Funds	11,112		6,819		5,817	
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		11,112		6,819		60,817
TOTAL (a+b)		1,32,536		77,296		1,20,058
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables					57,918	
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						57,918
TOTAL						
d) Unsp. Amt/Trf. Othr Fund						57,918
TOTAL (c)						
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,32,536		77,296		62,140

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	HALDANE PRIZE FUND		MAHALANOBIS CHAIR/FELLOW FD		RAJA RAO MEMORIAL FUND	
a) Opening Balance of The Funds		2,00,243		16,02,001		1,66,903
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds	19,279		1,41,173		13,557	
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		19,279		1,41,173		13,557
TOTAL (a+b)		2,19,522		17,43,174		1,80,460
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)						
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		2,19,522		17,43,174		1,80,460

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	M.N. MURTHY MEMORIAL FUND		A.S. GHOSH ENDOWMENT FUND		ASIAN CONGRESS ON QUALITY	
a) Opening Balance of The Funds		2,52,657		7,03,082		8,64,781
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund						
2. Income From Investment made on account of Funds	23,584		51,532		80,032	
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		23,584		51,532		80,032
TOTAL (a+b)		2,76,241		7,54,614		9,44,813
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables						
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL						
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)						
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		2,76,241		7,54,614		9,44,813

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	DR. P.K. MENON MEMORIAL FUND		ENDOWMENT FUND J.M. SENGUPTA		ENDOWMENT FUND MS. SUNITI PAL	
a) Opening Balance of The Funds		82,130		265		1,08,054
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			1,10,000			
2. Income From Investment made on account of Funds	7,053		575		12,966	
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		7,053		1,10,575		12,966
TOTAL (a+b)		89,183		1,10,840		1,21,020
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables			9,653		9,653	
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL				9,653		9,653
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)				9,653		9,653
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		89,183		1,01,187		1,11,367

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	ENDOWMENT FUND - S. H.ARAVIND		HOUSE BUILDING ADVANCE		GOLDEN JUBILEE ALUM.-INT INV	
a) Opening Balance of The Funds		1,13,549		3,08,97,319		
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund					5,00,000	
2. Income From Investment made on account of Funds	13,264				24,110	
3. Serv. Charg/SQCOR Receipt						
4. Adj of Ovhd/Oth on Ext.						
TOTAL		13,264				5,24,110
TOTAL (a+b)		1,26,813		3,08,97,319		5,24,110
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets						
- Books & Journal						
- Other						
TOTAL						
ii. Current Asset						
- Bills Receivable						
TOTAL						
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances						
- Travelling & Conveyance						
- Admn. expenses/Consumables	9,653					
- Tax Deducted at Source						
- Contingencies						
- Share Of Overhead						
- Trnf.To Dev.Fund/Int.Receipt						
TOTAL		9,653				
d) Unsp. Amt/Trf. Othr Fund						
TOTAL (c)		9,653				
e)Assets Trnf. to Corpus Fund						
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,17,160		3,08,97,319		5,24,110

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SCHEDULE 3 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

SCHEDULE 3- EARMARKED/ ENDOWMENT FUNDS FUNDING AGENCY	ISI GENERAL FUND		CURRENT YEAR TOTAL		PREVIOUS YEAR TOTAL	
a) Opening Balance of The Funds		1,31,24,101		35,53,40,476		31,24,19,260
b) Additions To The Funds :						
1. Donation/Grants/Othr. Fund			5,76,29,388		6,27,67,331	
2. Income From Investment made on account of Funds	11,19,057		1,92,90,903		2,05,84,618	
3. Serv. Charg/SQCOR Receipt			1,72,08,793		1,87,89,257	
4. Adj of Ovhd/Oth on Ext.			28,73,159		20,22,297	
TOTAL		11,19,057		9,70,02,243		10,41,63,503
TOTAL (a+b)		1,42,43,158		45,23,42,719		41,65,82,763
c) Utilisation / Expenditure						
i. Capital Expenditure						
- Fixed Assets			54,26,013		1,22,83,189	
- Books & Journal			79,16,001		65,30,470	
- Other			5,10,500		8,00,000	
TOTAL				1,38,52,514		1,96,13,659
ii. Current Asset						
- Bills Receivable			18,05,094		24,22,994	
TOTAL				18,05,094		24,22,994
iii. Revenue Expenditure						
- Site Prep. & allied work						
- Remuneration & Allowances			2,15,31,429		1,68,21,777	
- Travelling & Conveyance			71,50,884		35,50,509	
- Admn. expenses/Consumables			51,42,825		29,87,035	
- Tax Deducted at Source			24,76,251		23,79,131	
- Contingencies			35,93,750		38,09,033	
- Share Of Overhead			48,87,550		43,33,520	
- Trnf.To Dev.Fund/Int.Receipt			51,07,286		46,99,607	
TOTAL				4,98,89,975		3,85,80,612
d) Unsp. Amt/Trf. Othr Fund				18,18,672		9,93,736
TOTAL (c)				6,73,66,255		6,16,11,000
e)Assets Trnf. to Corpus Fund				99,25,377		44,33,412
NET BALANCE AS AT THE YEAR END (a+b-c-e)		1,42,43,158		37,50,51,087		35,05,38,351

(S.K. Chakraborty)
Dy. Chief Executive(F)

(S. K. Iyer)
Chief Executive (A & F)

(Bimal K. Roy)
Director

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SCHEDULE 7 FORMING PART OF BALANCE SHEET AS AT 31 March, 2010

PARTICULARS	CURRENT YEAR	PREVIOUS YEAR
A. CURRENT LIABILITIES		
1. Acceptances		
2. Sundry Creditors:		
(a) For Goods		
(b) Others		
3. Advances Received		
4. Interest Accrued but not due on:		
(a) Secured Loans/Borrowings		
(b) Unsecured Loans/Borrowings		
5. Statutory Liabilities:		
(a) Overdue		
(b) Others - ST,IT, P.T.Ser.Tax etc	12,40,262	5,08,006
6 Other Current Liabilities	13,83,26,670	10,98,74,174
TOTAL	13,95,66,932	11,03,82,180

(S.K. Chakraborty)
Dy. Chief Executive(F)

(S. K. Iyer)
Chief Executive (A & F)

(Bimal K. Roy)
Director

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SUB SCHEDULE OF SCHEDULE 7 FORMING PART OF BALANCE SHEET 31 March, 2010

PARTICULARS	CURRENT YEAR	PREVIOUS YEAR
SUB SCHEDULE OF SCHEDULE 7		
A. CURRENT LIABILITIES		
1. STATUTORY LIABILITIES		
(i) Income Tax		
(ii) Income Tax Contractor	6,50,869	2,13,443
(iii) P. Tax	2,12,002	2,05,282
(iv) Sales Tax outside party	3,77,391	61,406
(v) Service Tax		4,089
(vi) Cess on W.B. Cont. Worker Welfare		23,786
Sub-Total (1)	12,40,262	5,08,006
2. Other Current Liabilities		
i) Library deposit	28,15,841	15,19,323
ii) Laboratory deposit	2,65,688	2,49,188
iii) Hostel caution money deposit	4,70,287	3,47,577
iv) Caution money of electric	19,165	19,165
v) Earnest money deposit	41,27,544	41,09,702
vi) Security deposit	1,22,13,958	74,64,408
vii) CTD & annuity deposit	83,920	55,455
viii) Provision For Outstanding Liabilities for Goods & Services	9,27,35,330	7,82,61,880
ix) ISI Co-operative credit society ltd.	12,68,937	3,70,025
x) ISEC ISI FUND	53,39,273	32,90,874
xi) Loan To/From Fund	22,83,192	8,01,734
xii) Additional emoluments compulsary deposit	81,059	81,059
xiii) Group Insurance Exp Delhi & Giridih	24,897	25,457
xiv) Staff insurance premium & group insuran	1,66,026	1,17,835
xv) I.S.I.salary savings (lic)	3,66,693	3,36,320
xvi) Staff insurance prem. (Delhi & Giridi)	48,100	34,698
xvii) GLIC claim from insurance company	8,752	8,752
xviii) Disposal Of Asset	10,86,306	10,86,306
xix) Undisbursed Salary,Stipend,Pension etc	17,90,207	19,53,251
xx) Cimpa Unesco India School	2,50,307	2,50,307
xxi) ADM/entrance Test - PSRU		
xxii) DST - Meeting	70,506	70,506
xxiii) RC Bose Centinary Symposium		2,30,396
xxiv) DST Workshop in Network Analysis etc		
xxv) Joint International INDO-AMA Meeting		
xxvi) International Conference ICAPR		1,26,856
xxvii) Conference Six Sigma SQC	51,914	51,914
xxviii) Int Conf on Theory of Op & it's Application		61,808
xxix) 6th Int Conf on distributed Computing		31,650
xxx) IEEE Transaction on Fuzzy System	2,10,052	2,42,260
xxxi) Workshop On Disciplinary Proceedings		3,463
xxxii) NBHM - Math Olympiad	1,12,417	95,505
xxxiii) DST Meeting -Center For Soft Computing	59,764	59,764

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SUB SCHEDULE OF SCHEDULE 7 FORMING PART OF BALANCE SHEET 31 March, 2010

PARTICULARS	CURRENT YEAR	PREVIOUS YEAR
xxxiv) Training prog. on ISS Probetioners	4,59,825	4,59,825
xxxv) Workshop On Resourse Harvesting	45,900	8,560
xxxvi) Prof. Examination Of Actuarial Society	14,356	1,39,595
xxxvii) Lecture Series/Wrksh/Conf. On Past,Present,Future	3,84,392	4,87,194
xxxviii) Selection Of Research Awardees NBHM 2006-07		
xxxix) Prof. P C M Memorial Archieves		
xxxx) Conf. On Models & Methods In ECO		75,000
xxxxi) Int.Sympo.On Algo.& Application	20,431	20,431
xxxxii) Platinum Jubilee Grant Govt.Of W.B	21,14,685	21,14,685
xxxxiii) Int Conf.On Adv In Pattern Recognition	3,15,419	2,15,419
xxxxiv) Inst.Conf. On S .V. D		72,762
xxxxv) Int.Conf-Premi (MIU)	4,72,727	5,01,305
xxxxvi) Int.Conf on ICONQR-08	6,05,434	6,05,434
xxxxvii) Int.Nat.Conf on COM.VIS GRA/IMAPRO	34,323	34,323
xxxxviii) Int.Workshp on DIG.PRESERVATION	11,266	11,266
xxxxix) Visionary Lecture Series	70,000	70,000
xxxxx) Conf on Recent Adv. in Probability		
xxxxxi) Trng. Prog. Six Sigma	2,71,211	2,71,211
xxxxxii) Int.Workshop on sedment Trans.	1,66,054	13,550
xxxxxiii) Trg. Prog. for SBI Officers	98,342	98,342
xxxxiv) Int.Conference on Geology	1,61,217	1,61,217
xxxxv) Amt Receivable from Govt. of India	6,84,835	6,84,835
xxxxvi) Conrt. to NPS Tier-1	54,22,315	22,60,382
xxxxvii) Stale Cheques	1,66,253	3,565
xxxxviii) Workshop On Topology & Geometry of Poliations		1,01,315
xxxxix) NBHM Travel Grant for ICIA M07-R. Barua		1,06,520
xxxxx) Recovery Of Cost Of Computers	34,632	
xxxxxi) Int. Workshop on Algorithms Com(WALCOM09)	64,595	
xxxxxii) CSCR Workshop on Soft Computing	28,867	
xxxxxiii) National Workshop-Statistics in Genomics	17,345	
xxxxxiv) Workshop Conf. Of Multivariate Stat Method	7,12,112	
Sub-Total (2)	13,83,26,670	10,98,74,174
GRAND TOTAL (1+2)	13,95,66,932	11,03,82,180

INDIAN STATISTICAL INSTITUTE

203, B.T. ROAD, KOL-108

SCHEDULES FORMING PART OF BALANCE SHEET AS AT March 31, 2010

	<---------- GROSS BLOCK ---------->				---------- DEPRECIATION ----------				<---------- NET BLOCK ---------->	
SCHEDULE 8 - FIXED ASSETS										
DESCRIPTION FIXED ASSETS : ASSETS ACQUIRED UPTO MARCH 1986	Cost / Valuation as at beginning of the year(W.D.V. as on 31.03.86)	Additions during the year	Deductions during the year	Cost / Valuation at the year end	As at the beginning of the year	On Additions during the year	On Deductions during the year	Total upto the year-end	As at the Current yearend	As at the Previous year-end
	A	B	C	D=(A+B)-C	E	F	G	H=(E+F)-G	I=(D-H)	
A. LAND & LAND DEVELOPMENT										
LAND : FREEHOLD	4,680,907.17	0.00		4,680,907.17	0.00	0.00	0.00	0.00	4,680,907.17	4,680,907.17
LAND : LEASE HOLD	2568064.29	0.00	481.42	2,567,582.87	0.00	0.00	0.00	0.00	2,567,582.87	2,568,064.29
B.BUILDING										
BUILDING : ON FREEHOLD LAND	12,213,650.47	0.00		12,213,650.47	0.00	0.00	0.00	0.00	12,213,650.47	12,213,650.47
BUILDING : ON LEASEHOLD LAND	8,458,563.82	0.00		8,458,563.82	0.00	0.00	0.00	0.00	8,458,563.82	8,458,563.82
SUPERSTRUCTURES ON LAND NOT BELONGING TO THE ENTRY	908,495.59	0.00		908,495.59	0.00	0.00	0.00	0.00	908,495.59	908,495.59
								0.00		
D. VEHICLES	443,026.16	0.00		443,026.16	0.00	0.00	0.00	0.00	443,026.16	443,026.16
E. FURNITURES, FIXTURES	3,506,756.92	0.00		3,506,756.92	0.00	0.00	0.00	0.00	3,506,756.92	3,506,756.92
F. OFFICE EQUIPMENT	1,974,134.19	0.00		1,974,134.19	0.00	0.00	0.00	0.00	1,974,134.19	1,974,134.19
G. COMPUTER & PERIPHERIALS	965,312.58	0.00		965,312.58	0.00	0.00	0.00	0.00	965,312.58	965,312.58
H. ELECTRIC INSTALLATIONS	2,777,138.27	0.00		2,777,138.27	0.00	0.00	0.00	0.00	2,777,138.27	2,777,138.27
I. LIBRARY BOOKS	16,861,803.75	0.00		16,861,803.75	0.00	0.00	0.00	0.00	16,861,803.75	16,861,803.75
J. TUBEWELLS & WATER SUPPLY SYSTEM	437,890.40	0.00		437,890.40	0.00	0.00	0.00	0.00	437,890.40	437,890.40
K. LABORATORY EQUIPMENT	2,415,998.39	0.00		2,415,998.39	0.00	0.00	0.00	0.00	2,415,998.39	2,415,998.39
TOTAL OF CURRENT YEAR	58,211,742.00	0.00	481.42	58,211,260.58	0.00	0.00	0.00	0.00		
PREVIOUS YEAR	58,212,223.42	0.00	481.42	58,211,742.00						
TOTAL : SCHL 8									58,211,260.58	58,211,742.00

(S.K.Chakraborty)
Dy.Chief Executive (F)

(S.K. Iyer)
Chief Executive (A & F)

(Bimal K Roy)
Director

INDIAN STATISTICAL INSTITUTE
203, B.T. ROAD, KOL-108
SCHEDULES FORMING PART OF BALANCE SHEET AS AT March 31, 2010

	<---------- GROSS BLOCK ---------->				<---------- DEPRECIATION ---------->				<---------- NET BLOCK ---------->	
SCHEDULE 8A - FIXED ASSETS: ASSETS ACQUIRED ON OR AFTER APRIL 1986 .	Cost / Valuation as at beginning of the year	Additions during the year	Deductions during the year	Cost / Valuation at the year end	As at the beginning of the year	On Additions/Adj during the year	On Deductions during the year	Total upto the year-end	As at the Current year end	As at the previous year-end
DESCRIPTION										
FIXED ASSETS ;										
	A	B	C	D=(A+B)-C	E	F	G	H=(E+F)-G	I=(D-H)	
A. LAND & LAND DEVELOPMENT										
LAND : FREEHOLD	26,114,684.20	0.00	0.00	26114684.2	0.00	0.00	0.00	0.00	26,114,684.20	26,114,684.20
LAND : LEASE HOLD	5,373,298.00	0.00	0.00	5373298.0	0.00	0.00	0.00	0.00	5,373,298.00	5,373,298.00
				0.0			0.00	0.00	0.00	
B.BUILDING				0.0			0.00	0.00	0.00	
BUILDING : ON FREEHOLD LAND	335,148,997.24	18,816,446.00	0.00	353965443.2	211,345,549.62	23,448,721.51	0.00	234,794,271.13	119,171,172.11	123,803,447.62
BUILDING : ON LEASEHOLD LAND	73,315,104.69	18,947,373.00	0.00	92262477.7	33,300,385.68	6,870,866.69	0.00	40,171,252.37	52,091,225.32	40,014,719.01
SUPERSTRUCTURES ON LAND NOT BELONGING TO THE ENTRY	5,385,634.92	0.00	0.00	5385634.9	3,066,800.62	407,074.22	0.00	3,473,874.84	1,911,760.08	2,318,834.30
							0.00	0.00	0.00	
D. VEHICLES	9,175,478.38	0.00	0.00	9175478.4	8,885,775.76	212,522.20	0.00	9,098,297.96	77,180.42	289,702.62
E. FURNITURES, FIXTURES	86,365,326.91	5,786,466.00	0.00	92151792.9	63,033,401.17	4,316,067.79	0.00	67,349,468.96	24,802,323.95	23,331,925.74
F. OFFICE EQUIPMENT	36,155,607.35	1,633,389.00	0.00	37788996.4	32,145,134.95	1,359,478.42	0.00	33,504,613.37	4,284,382.98	4,010,472.40
G. COMPUTER & PERIPHERIALS	229,926,499.94	12,932,992.00	0.00	242859491.9	222,372,926.53	14,234,691.31	0.00	236,607,617.84	6,251,874.10	7,553,573.41
H. ELECTRIC INSTALLATIONS	37,165,989.32	3,448,048.00	0.00	40614037.3	30,786,392.87	2,753,708.13	0.00	33,540,101.00	7,073,936.32	6,379,596.45
I. LIBRARY BOOKS	484,032,674.32	64,297,028.00	0.00	548329702.3	442,148,556.72	55,809,531.28	0.00	497,958,088.00	50,371,614.32	41,884,117.60
J. TUBEWELLS & WATER SUPPLY SYSTEM	8,301,243.06	287,700.00	0.00	8588943.1	7,857,410.92	116,045.52	0.00	7,973,456.44	615,486.62	443,832.15
K. LABORATORY EQUIPMENT	27,295,353.07	2,188,732.00	0.00	29484085.1	23,134,094.24	1,089,827.86	0.00	24,223,922.10	5,260,162.97	4,161,258.83
WORK IN PROGRESS	101,985,539.00	80,638,595.00	0.00	182624134.0	0.00	0.00	0.00	0.00	182,624,134.00	101,985,539.00
TOTAL OF CURRENT YEAR	1,465,741,430.40	208,976,769.00	0.00	1,674,718,199.40	1,078,076,429.08	110,618,534.93	0.00	1,188,694,964.01	**486,023,235.39**	**387,665,001.32**
PREVIOUS YEAR	1,299,564,225.40	168,750,898.00	2,573,693.00	1,465,741,430.40	981,801,435.82	96,274,993.26	0.00	1,078,076,429.08	387,665,001.32	
			1						**486,023,235.39**	**387,665,001.32**
TOTAL : SCH-8 + SCH-8A + SCH-8B									549,369,597.42	**449,038,540.82**

(S.K.Chakraborty)
Dy.Chief Executive (F)

(S.K. Iyer)
Chief Executive (A & F)

(Bimal K Roy)
Director

SCHEDULES FORMING PART OF BALANCE SHEET AS AT March 31, 2010

	<---- GROSS BLOCK		---->	<---- DEPRECIATION			---->	<---- NET BLOCK	---->
SCHEDULE 8B - FIXED ASSETS DESCRIPTION: ASSETS ACQUIRED FROM DEVELOPMENT FUND.	Cost / Valuation as at beginning of the year	Additions during the year	Deductions during the year	Cost / Valuation at the year end	As at the beginning of the year	During the year	On Deductions during the year	Total upto the year end	As at the Current year-end	As at the previous year end
FIXED ASSETS :	A	B	C	D=(A+B)-C	E	F	G	H=(E+F)-G	I=(D-H)	
A. LAND & LAND DEVELOPMENT										
LAND : LEASE HOLD	40,443.00	0.00	0.00	40,443.00	0.00	0.00	0.00	0.00	40,443.00	40443.00
B.BUILDING				0.00				0.00	0.00	
BUILDING : ON FREEHOLD LAND	28,870.00	0.00	0.00	28,870.00	22,374.25	5,052.25	0.00	27,426.50	1,443.50	6495.75
BUILDING : ON LEASEHOLD LAND	12,206,291.00	0.00	0.00	12,206,291.00	12,206,283.80	-0.80	0.00	12,206,283.00	8.00	7.20
E. FURNITURES, FIXTURES	2,400,518.00	0.00	0.00	2,400,518.00	2,308,247.75	11,802.90	0.00	2,320,050.65	80,467.35	92270.25
F. OFFICE EQUIPMENT	1,121,371.00	0.00	0.00	1,121,371.00	1,121,341.25	-5.25	0.00	1,121,336.00	35.00	29.75
G. COMPUTER & PERIPHERIALS	12,891,635.00	9,925,377.00	0.00	22,817,012.00	9,985,286.10	7,914,724.20	0.00	17,900,010.30	4,917,001.70	2906348.90
H. ELECTRIC INSTALLATIONS	125,974.00	0.00	0.00	125,974.00	125,971.45	-0.45	0.00	125,971.00	3.00	2.55
K. LABORATORY EQUIPMENT	1,653,223.00	0.00	0.00	1,653,223.00	1,537,022.90	20,500.20	0.00	1,557,523.10	95,699.90	116200.10
TOTAL OF CURRENT YEAR	30,468,325.00	9,925,377.00	0.00	40,393,702.00	27,306,527.50	7,952,073.05	0.00	35,258,600.55	5,135,101.45	3,161,797.50
PREVIOUS YEAR	26,034,913.00	4,433,412.00	0.00	30,468,325.00	25,978,901.00	1,327,626.50	0.00	27,306,527.50	3,161,797.50	
TOTAL : SCH-8B									5,135,101.45	3,161,797.50

(S.K.Chakraborty)
Dy.Chief Executive (F)

(S.K. Iyer)
Chief Executive (A & F)

(Bimal K Roy)
Director

INDIAN STATISTICAL NSTITUTE
203, B.T. ROAD, KOL-108

STATEMENT OF ASSETS ACQUIRED OUT OF EXTERNALLY FUNDED PROJECT

SL.NO	ITEM OF ASSETS	1990-1991	1991-1992	1992-1993	1993-1994	1994-1995	1995-1996	1996-1997
1	LABORATORY ITEM	5238.00	22300.00	7725.00	459065.99	-	936811.00	-
2	COMPUTER & PERIPHERIAL	198144.00	328192.47	986471.80	686689.69	1594046.66	1721969.10	1172530.00
3	OFFICE FURNITURE	487142.74	21570.01	218188.13	5810.00	38245.00	161634.00	63144.00
	TOTAL:	690524.74	372062.48	1212384.93	1151565.68	1632291.66	2820414.10	1235674.00
SL.NO	ITEM OF ASSETS	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-03	2003-04
1	LABORATORY ITEM	1573020.00	-	264083.00	534692.00	12524410.00	2015745.00	-
2	COMPUTER & PERIPHERIAL	755045.00	3240469.00	3898650.00	1208462.00	643932.00	1608667.00	1311428.00
3	OFFICE FURNITURE	50011.00	35700.00	8800.00	20250.00	45905.00	52784.00	15690.00
	TOTAL :	2378076.00	3276169.00	4171533.00	1763404.00	13214247.00	3677196.00	1327118.00

SL.NO	ITEM OF ASSETS	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	TOTAL UP TO 31.03.2010
1	LABORATORY ITEM	1432922.00	8541261.00	328336.00	2510803.00	9417281.00	1710833.00	42284525.99
2	COMPUTER & PERIPHERIAL	3806472.00	9069726.00	2804337.00	4289464.00	2210514.00	3680288.00	45215497.72
3	OFFICE FURNITURE	814452.00	1478838.00	433955.00	8700.00	578650.00	34892.00	4574360.88
	TOTAL :	6053846.00	19089825.00	3566628.00	6808967.00	12206445.00	5426013.00	92074384.59

STATEMENT OF ASSETS ACQUIRED OUT OF ISEC FUND

SL.NO.	ITEM OF ASSETS		2008-2009	2009-2010	TOTAL UP TO 31.03.2010
1	COMPUTER & PERIPHERIALS		250890.00	NIL	250890.00
	TOTAL		250890.00	NIL	250890.00

INDIAN STATISTICAL INSTITUTE

SCHEDULE 9 FORMING PART OF BALANCE SHEET AS AT 31/03/2010

PARTICULARS	CURRENT YEAR	PREVIOUS YEAR
SCHEDULE - 9 INVESTMENTS FROM EARMARKED/ENDOWMENT FUNDS		
1. In Government Securities		
2. Other Approved Securities		
3. Shares		
4. Debentures and Bonds		
5. Subsidiaries and Joint Ventures		
6. Fixed Deposit with Banks	26,80,44,653	20,83,00,814
TOTAL	26,80,44,653	20,83,00,814

INDIAN STATISTICAL INSTITUTE

SUB-SCHEDULE OF SCHEDULE 9

PARTICULARS	CURRENT YEAR	PREVIOUS YEAR
SUB - SCHEDULE OF SCHEDULE 9		
DETAILS OF INVESTMENT IN FIXED DEPOSIT IN BANK		
1. ISI General Fund	1,31,17,000	1,12,82,000
2. ISI Developement Fund	24,47,01,000	19,12,23,000
3. Mahalonobis International Prize Fund	1,30,000	1,17,000
4. Endowment Fund For Lecture in Economics	70,000	56,000
5. Staff Benevolent Fund	1,21,000	1,00,000
6. ISI Alumni Association Prize Fund	59,000	50,000
7. Holdane Prize Fund	2,00,000	1,70,000
8. Raja Rao Prize Fund	1,66,000	1,25,000
9. P.C. Mahalonobis Fellowship Chair	16,02,000	13,45,000
10. M.N. Murthy Memorial Prize Fund	2,52,000	2,05,000
11. Ambar Nath & Santi Ghosh Endowment Fund	7,03,000	5,30,000
12. Asian Congress on Quality & Reliability Fund	8,64,000	7,00,000
13. P.K. Menon Memorial Fund	82,000	65,000
14. Suniti Pal Endowment Fund	1,08,000	1,00,000
15. S.Arvind Endowment Fund	1,13,000	1,02,000
16. Investment Of Tier-I (NPS)	51,56,653	21,30,814
17. Endow. Fund-Prof. J.M. Sengupta	1,00,000	
18. Gold. Jubl. Alumnus Award Fund- Investment	5,00,000	
Total	26,80,44,653	20,83,00,814

(S.K. Chakraborty)
Dy. Chief Executive(F)

(S. K. Iyer)
Chief Executive (A & F)

(Bimal K. Roy)
Director

INDIAN STATISTICAL INSTITUTE

SCHEDULE 11 FORMING PART OF BALANCE SHEET AS AT 31/03/2010

PARTICULARS	CURRENT YEAR	PREVIOUS YEAR
SCHEDULE - 11 CURRENT ASSETS, LOANS, ADVANCES		
(A) CURRENT ASSETS:		
1. Inventories		
(a) (i) Stores And Spares		
(ii) Building Materials		
(b) Loose Tools		
(c) Stock - in trade		
Finished Goods		
Work - in - progress		
2. Sundry Debtors:		
(a) Debts Outstanding for a period exceeding six months	270	1,13,583

INDIAN STATISTICAL INSTITUTE

SCHEDULE 11 FORMING PART OF BALANCE SHEET AS AT 31/03/2010

PARTICULARS	CURRENT YEAR	PREVIOUS YEAR
3. Cash Balances in hand (including cheques / drafts and		
i. At Headquarter (Kolkata)	1,69,098	1,96,062
ii. At Delhi	90,297	8,483
iii. At Giridih	86,375	1,76,085
iv. At Bangalore	43,037	10,757
v. At Hyderabad	3,373	5,244
vi. At Coimbatore	13,527	25,127
vii. At Mumbai	9,166	22,246
viii. At Baroda	3,600	3,077
ix. At Chennai	1,283	990
x. At Pune	1,729	341
SUB TOTAL OF CASH	4,21,485	4,48,412

INDIAN STATISTICAL INSTITUTE

SCHEDULE 11 FORMING PART OF BALANCE SHEET AS AT 31/03/2010

PARTICULARS	CURRENT YEAR	PREVIOUS YEAR
4. Bank Balances		
(a) With Scheduled Banks:		
On Current Accounts		
i. Allahabad Bank (Dunlop Bridge Branch)	16,94,91,425	19,30,50,144
ii. SBI (Shyambazar Branch)	8,50,661	17,80,666
iii. UBI (Dunlop Bridge Branch)	12,88,76,585	11,68,67,902
iv. Indian Bank (Delhi)	90,81,156	59,08,334
v. UBI (Gridih)	6,12,730	2,08,416
vi. UCO Bank (Giridih)	7,038	3,643
vii. UCO Bank (Bangalore)	13,65,583	7,02,833
viii. Bank of Baroda (Bangalore)	5,03,624	4,68,260
ix. Syndicate Bank (Coimbatore)	3,65,818	1,16,298
x. SBI (Chennai)	6,32,970	5,89,770
xi. Canara Bank (Chennai)	70,832	93,408
xii. SBI (Mumbai)	2,77,494	5,28,867
xiii. Bank of Baroda (Baroda)	2,19,474	1,39,442
xiv. Syndicate Bank (Hyderabad)	5,09,281	17,804
xv. SBI (Pune)	59,584	3,57,069
xvi. Nath Bank Ltd. (Liquidation doubtful	3,647	3,647
xvii.. RBI P/L/C		
xviiii.. Allahabad Bank ISI Extn. Counter (PPU)	1,21,328	11,17,314
SUB TOTAL OF AMOUNT WITH BANK	31,30,49,230	32,19,53,817
TOTAL OF CASH AND BANK :-	31,34,70,715	32,24,02,229

INDIAN STATISTICAL INSTITUTE

SCHEDULE 11 FORMING PART OF BALANCE SHEET AS AT 31/03/2010

PARTICULARS	CURRENT YEAR	PREVIOUS YEAR
5. On Deposit Accounts (including margin money)		
TOTAL (A)	31,34,70,985	32,25,15,812

INDIAN STATISTICAL INSTITUTE

SCHEDULE 11 FORMING PART OF BALANCE SHEET AS AT 31/03/2010

PARTICULARS	CURRENT YEAR	PREVIOUS YEAR
B. LOANS, ADVANCES AND OTHER ASSETS		
1. Loans:		
(a) Staff		
i. Advance against TA	46,52,688	28,58,210
ii. Advance against LTC	25,75,359	5,30,884
iii. Advance against purchase of Cycle	4,400	61,136
iv. Advance (Staff & Other)	26,53,610	28,24,211
v. Festival Advance	20,15,030	15,83,530
vi. Advance against purchase of Scooter	10,72,550	8,04,165
vii. House Building Advance	1,17,65,242	1,22,42,282
viii. Motor Car Advance	6,01,590	8,51,180
ix. Group Insurance Except Delhi,Giridih		
x. Unpaid Account	1,426	1,426
(b) (i) Deptt. Imprest	1,68,000	1,61,750
(ii) Loan to /from Fund		

INDIAN STATISTICAL INSTITUTE

SCHEDULE 11 FORMING PART OF BALANCE SHEET AS AT 31/03/2010

PARTICULARS	CURRENT YEAR	PREVIOUS YEAR
2. Advances and other amounts recoverable on cash or in kind		
(a) Charged Prepaid	1,89,49,619	2,32,77,023
(b) Others		
i. Security Deposit	30,13,394	51,720
ii. Advance (Party)	48,94,082	62,05,401
iii. Income Tax deducted (Other than Fund)	7,88,873	6,23,245
iv. Advance for Land	30,848	30,848
v. ISEC- ISI Fund (Course Fee etc)	23,358	23,358
vi. Income Tax - Staff	29,556	31,797
vii. Service Tax Receivable	47,56,336	
viii. Service Tax	1,37,772	
ix. Electric charger recoverable from NSSO-ISI Giridih	42,326	
x. Refund of Employees Contribution-NPS	28,177	
xi. Grant Receivable on A/C of Ext. Funded Project	4,00,000	
3. Income Accrued:		
(a) On Investments form Earmarked/Endowment Funds	20,12,190	27,21,344
4. Claims Receivable		
i. Regional Provident Fund Commissioner	68,603	68,603
5. Conference/Seminar		
i. Worshop On Multivariates Stat Method		18,388
ii. Int. Conference On Multivariates Stat Method	93,281	2,01,819
iii. Tata Steel	60	60
iv. NBHM-RA Selection Test	45,597	45,597
v. ADM/entrance test-PSRU	18,898	18,898
vi. DST Workshop in Network Anl., etc	2,33,059	2,33,059
vii. IKONE BANGALORE 2007	85,767	85,767
viii. Studying Vill. Eco. in India	58,870	1,58,870
ix. Joint International Indo-AMA Meeting	42,830	42,830
x. ISEC ISI Fund-Capital	2,50,890	2,50,890
xi. Conf. on Recent Adv. in Probability		800
xii. Selec. of Research Awardness NBHM 2006-07	2,73,599	83,466
xiii. Prof. P.C. MemorialArchieves		53,702
xiv. Workshop On Topology & Geometry Of Pollations	14,290	
xv. Conf. On Recent Advances in Probability	800	

INDIAN STATISTICAL INSTITUTE

SCHEDULE 11 FORMING PART OF BALANCE SHEET AS AT 31/03/2010

PARTICULARS	CURRENT YEAR	PREVIOUS YEAR
6. Remittance in Transit		2,00,000
7. Accrued Income-Grant		6,52,26,000
TOTAL (B)	6,18,02,970	12,15,72,259
TOTAL (A + B)	37,52,73,955	44,40,88,071

(S.K. Chakraborty)
Dy. Chief Executive(F)

(S. K. Iyer)
Chief Executive (A & F)

(Bimal K. Roy)
Director

INDIAN STATISTICAL INSTITUTE

SCHEDULE 12 FORMING PART OF INCOME & EXPENDITURE FOR THE PERIOD 31/03/2010

PARTICULARS	CURRENT YEAR		PREVIOUS YEAR	
	PLAN REVENUE	NONPLAN REVENUE	PLAN REVENUE	NONPLAN REVENUE
SCHEDULE - 12 MISC. RECEIPTS.				
1) Share of Income from S.Q.C.O.R Consultancy Services		43,02,199		46,97,314
2) Membership Fee		3,64,024		2,53,296
3) Fees for Training Course and Sale of Prospectus etc.		40,69,965		37,53,275
4) Receipt from Sale of Farm Products at Giridih				
5) Misc. Receipt, Examination Fees and Other Receipts		33,35,300		20,44,914
6) Interest on Short Term Deposit		65,47,769		1,72,36,359
7) Sale of Sankhya Publication		87,526		10,97,148
8) Hostel Seat Rent		3,96,841		5,15,003
9) Rent realised from Premises		7,80,340		7,57,000
10) Rent realised - Guest House		13,44,672		11,79,548
11) License Fees From Workers (Staff Qtr)		4,38,293		3,43,058
12) Interest on Scooter/Motor/Cycle Advance		94,850		2,70,923
13) Share of Overhead from Externally funded Project		20,64,330		19,23,920
14) Interest on Marginal Deposit				
15) Interest on House Bldg. Advance		15,56,471		11,95,510
TOTAL		2,53,82,580		3,52,67,268

(S.K. Chakraborty)
Dy. Chief Executive(F)

(S. K. Iyer)
Chief Executive (A & F)

(Bimal K. Roy)
Director

INDIAN STATISTICAL INSTITUTE

SCHEDULE 13 FORMING PART OF INCOME & EXPENDITURE FOR THE PERIOD 31/03/2010

PARTICULARS	CURRENT YEAR		PREVIOUS YEAR	
	PLAN REVENUE	NONPLAN REVENUE	PLAN REVENUE	NONPLAN REVENUE
SCHEDULE - 13 GRANTS/SUBSIDIES				
A.1. Grant From Ministry of Statistics & Program implementation, Govt of India	14,64,31,000	1,18,82,98,710	11,51,00,142	78,90,21,399
2. State Government	NIL	NIL	NIL	NIL
3. Government Agencies	NIL	NIL	NIL	NIL
4. Institutions/Welfare Bodies	NIL	NIL	NIL	NIL
5. Others (Specify)	NIL	NIL	NIL	NIL
TOTAL	14,64,31,000	1,18,82,98,710	11,51,00,142	78,90,21,399

(S.K. Chakraborty)
Dy. Chief Executive(F)

(S. K. Iyer)
Chief Executive (A & F)

(Bimal K. Roy)
Director

INDIAN STATISTICAL INSTITUTE

SCHEDULE 20 FORMING PART OF INCOME & EXPENDITURE FOR THE PERIOD 31/03/2010

PARTICULARS	CURRENT YEAR		PREVIOUS YEAR	
	PLAN REVENUE	NONPLAN REVENUE	PLAN REVENUE	NONPLAN REVENUE
SCHEDULE - 20 ESTABLISHMENT EXPENSES				
(a) Salary & Allowances (DA, HRA, CCA, Transport allowances, Bonus, Leave Salary, Extra Remuneration etc.,LTC, Medical Reimbursement and Medical Wel;fare Expenses. Visiting Scientist's remuneration etc.)	1,12,80,276	81,27,12,379	98,48,441	44,55,54,506
(b) Overtime Allowances	8,46,000	10,13,826	7,64,400	15,22,744
(c) Employer's Contribution to Provident Fund		2,16,76,555		59,22,355
(d) Expenses on Employee's Retirement and Terminal benefits (Gratuity, etc)		4,79,09,059		1,16,10,262
(e) Scholarship / Stipend & Other Assistances to Trainees	70,39,193	2,15,38,816	67,34,858	1,87,71,347
(f) Pension, Graded relief & Commuted value of Pension		18,80,09,595		12,52,15,189
TOTAL	1,91,65,469	1,09,28,60,229	1,73,47,699	60,85,96,403

(S.K. Chakraborty)
Dy. Chief Executive(F)

(S. K. Iyer)
Chief Executive (A & F)

(Bimal K. Roy)
Director

INDIAN STATISTICAL INSTITUTE

SCHEDULE 21 FORMING PART OF INCOME & EXPENDITURE FOR THE PERIOD 31/03/2010

PARTICULARS	CURRENT YEAR		PREVIOUS YEAR	
	PLAN REVENUE	NONPLAN REVENUE	PLAN REVENUE	NONPLAN REVENUE
SCHEDULE - 21 OTHER ADMIN. EXPENSES				
(i) Purchase & Exp. on Giridih Agricultural Farm		25,005	17,400	96,133
(ii) Electricity charges	24,18,000	1,76,51,169	21,95,239	1,52,82,136
(iii) Repairs, Replacement and Maintenance of Office Equipment, Computers and accessories etc	1,70,00,027	34,34,894	1,35,49,772	34,01,888
(iv) Rent, Rates, Taxes and Water charges	26,66,260	67,98,006	24,53,114	70,85,317
(v) Transport Exp -Vehicles Running and Maintenance.	7,68,403	14,75,136	8,86,469	17,21,835
(vi) Postage, Telephone and Communication Charges	15,79,396	16,36,465	14,50,668	15,65,414
(vii) Stationeries, Liveries and Consumable stores for Electrical & Building	34,80,054	28,16,656	32,23,999	21,36,591
(viii) Travelling Expenses	42,81,640	66,51,026	52,83,394	71,02,256
(ix) Society type activities, Seminar and Conference	17,07,452	15,49,393	20,26,801	4,41,781
(x) Audit Fees & Expenses		1,45,596		1,52,360
(xi) Freight and Forwarding Expenses, Insurance, Advertisement, Examination	30,19,776	37,36,764	30,95,290	43,09,244
(xii) Books & Journals	4,53,71,053	2,23,10,030	4,13,22,348	1,54,83,817
(xiii) Printing & Publication	2,90,850	2,14,145	2,37,798	2,40,042
(xiv) Interest & Bank charges	595	68,548	1,329	2,85,777
(xv) Repairs, Maintenance of Building & Petty Constructions.	46,67,803	25,39,596	17,48,205	20,63,361
(xvi) Workers & Student's Walfare & Amenities (excluding Medical Expenses)	8,63,390	9,56,013	8,32,719	8,79,659
(xvii) Lab. & Reprography stores, Consumbles, Tools & Minor Accessories	62,12,213	3,97,083	62,51,443	4,33,943
TOTAL	9,43,26,912	7,24,05,524	8,45,75,988	6,26,81,554

(S.K. Chakraborty)
Dy. Chief Executive(F)

(S. K. Iyer)
Chief Executive (A & F)

(Bimal K. Roy)
Director

INDIAN STATISTICAL INSTITUTE
203, B.T. Road, Kolkata – 700 108

SCHEDULE FORMING PART OF THE ACCOUNTS
FOR THE YEAR ENDED 31ST MARCH 2010

Schedule 24 – Significant Accounting Policies

1. Accounting Convention

1.1. The Indian Statistical Institute is an Institute of National Importance by an Act of Parliament. It is fully funded by Government of India. The financial Statements are prepared on the basis of historical cost convention, and on the accrual method of accounting (unless otherwise stated).

1.2. All Income / Receipts and Expenditure are maintained on accrual basis excepting in following cases: -

(a) Receipts on Interest on house building loan are accounted on recovery basis.

(b) Expenditure on Ad hoc Bonus and portion of D.A. to employees are accounted for on Cash basis.

(c) Expenditure on disbursement of Share of Faculty members in respect of income sharing externally funded by SQCOR consultancy project is accounted for on Cash basis.

(d) Prepaid expenses are charged off in the year, these are incurred other than subscription of Journals.

1.3. In absence of prior period adjustment account, all transactions pertaining to the past year have been accounted for in the regular head of accounts.

2. Depreciation

2.1. Depreciation on assets acquired up to accounting year 1985 – 1986 have been charged up to 1985 – 1986 as per Income Tax Rules and thereafter no depreciation has been charged on those assets and the same have been kept in fixed assets Schedule-8 separately.

2.2. The system of charging depreciation has been reintroduced from the year 2003 – 2004 on assets acquired from 01.04.1986 as per rates specified in the Income Tax Rules 1962.

2.3. Depreciation on assets acquired after 30th September has been charged @50% of applicable rates. Assets which are fully depreciated have been retained at Re.1/-

2.4. Depreciation on the fixed assets for the year is deducted / reduced from the Capital Fund.

3. **Fixed Assets**

3.1. Fixed Assets are stated at cost of acquisition inclusive of inward freight, duties and taxes and incidental and direct expenses related to acquisition.

3.2. All assets which are put to use during the year are capitalized.

3.3. Sale or disposal of fixed assets are recognized on realization basis and credited to Miscellaneous Receipt as Income. The written down value of such asset are deducted from fixed assets as well as from Capital Fund.

4. **Retirement Benefits**

Provision for the accrued liability for Retirement Benefits, viz. Leave Encashment etc. are not made in the Accounts except unpaid liability of Retired employee because those expenses are paid out of grant received from Government. Accrued liability on Account of Gratuity has been disclosed in Notes on Accounts.

5. **Earmarked / Endowment Fund**

All externally / internally funded earmarked / endowment fund are accounted for under distinctive heads. Closing Balances of externally / internally funded earmarked / endowment fund are depicted in the Balance Sheet.

6. **Foreign Currency Transaction**

Transactions in foreign currencies are recorded at exchange rate at the time of settlement.

7. **Investments**

7.1. Investments against General Fund and other Funds stands in the name of Indian Statistical Institute the disclosure of such investment, in Schedule- 9 forming part of the Balance Sheet as at 31.03.2010 under different fund heads are based on internal records.

7.2. Interest received on Investment on General and other Fund are accounted for directly in the fund account itself.

8. **Books and Journals**

All the cost of books and journals have been charged to Income & Expenditure Account. However, 95% of such cost is capitalized by crediting the Capital/Corpus Fund.

9. **Government Grant:**

9.1. Plan Revenue Grant is specifically meant for Teaching, Training and Research activities of the Institute.

9.2. Allocation between Capital and Revenue amount of Plan grant is made by the Institute as per its own convention.

10. Inventories:

In case of laboratory stores, minor accessories, stationary items including computer stationeries, medicine, are charged off to Income and Expenditure Account in the year of purchase.

(S.K.CHAKRABORTY)	(S. K. IYER)	(BIMAL ROY)
Dy. Chief Executive(F)	Chief Executive (A & F)	Director

INDIAN STATISTICAL INSTITUTE
203, B.T. Road, Kolkata – 700 108

SCHEDULE FORMING PART OF THE ACCOUNTS
FOR THE YEAR ENDED 31ST MARCH 2010

Schedule - 25 : Notes on Accounts

1. Fixed Assets

1.1. Depreciation on fixed assets for the current year has been charged in the accounts on assets acquired on and after 01.04.1986 and depreciation on fixed assets acquired upto 31st March 1986 except Lease hold Land and Development could not be charged as the process of incorporation of data in the revised software is under progress.

1.2. Land and Land Development as per Schedule – 8 of this Accounts refers to "Takdah Planters Club, Darjeeling" acquired in 1964 - 1965 for 54 years. A sum of Rs.481.42 is being amortized every year.

1.3. Work-in-Progress in Schedule 8A represent Construction of Platinum Jubilee Academic Building and Platinum Jubilee International Statistical Education Centre Building.

1.4. The Institute has formed a Committee for the Physical Verification of its fixed assets (except for Land, Books & Journals) under the Chairmanship of Mr. S.C. Kundu. During the year the Committee has completed Physical Verification of certain areas. The balance items would be completed before end of the next financial year (i.e. 31.03.2011).

1.5. Insurance Coverage of Fixed Assets excepting vehicle has not been taken in view of the communication received from Government that there is no provision under rule for insuring Government Building ,library books , equipment and computers etc.

1.6. Assets include (Schedule 8A) a computer system value of which is Rs. 7,00,000 was stolen in 1992 – 1993 . The Council has resolved to write off the value of the computer system and the Government has been approached for necessary approval. Adjustment is awaited for approval from Government of India.

1.7. Current Liabilities include Rs.10,86,306 being sale proceeds of fixed assets disposed off in earlier year and lying unadjusted.

2. **Current Assets, Loans & Advances (Schedule – 11)**

2.1 T.A. advance under Loans & Advances for Rs.46,52,688.00 as on 31.03.2010 includes old balances of Rs.12,76,865.00 (over one year). Action has been taken to identify and adjust the old Advances.

2.2. Cash at Bank include Rs. 3,647.00 relating to balance with Nath Bank Ltd., which is in liquidation. The Finance Committee of the Institute in its meeting held on 5th June 2007 has recommended to the Council for writing off the said amount. Approval from Government of India has been sought for. No adjustment has been made pending receipt of requisite approval.

2.3. Advance to party includes Rs.29,09,388.58 paid to erstwhile Statistical Publishing Society as advance. Proposal for write off is initiated and adjustment will be made on approval. Rs.32,213.56 paid to Bharat Overseas Pvt. Ltd. is also considered doubtful. In addition to these balances, there are old balances of Rs.16,41,011.44 (over 2 years). Action is being taken to adjust these balances after proper scrutiny.

2.4. Rs.30,848.34 on account of Advance for land represents cost of contingent establishment and law charges for proposed acquisition of premises at 202 B.T. Road (in 1955) and at 123 Gopal Lal Thakur Road (in 1957). The Finance Committee of the Institute in its meeting held on 5th June 2007 has recommended the Council for writing off the said amount. Approval from Government of India has been sought for. No adjustment has been made pending receipt of requisite approval.

2.5. Advances to Staff & Others, include Rs.3,36,767.00 old / unreconciled debit balances (over two years). Action is being taken to identify and adjust these balances. Of this court case is pending against some staff for recovery for Rs.41,000.00.

2.6.Bills receivable from SQC consultancy amounting Rs.18,05,094.00 represent value of professional services rendered during the year 2009 – 2010, payment against which are not received within the year under audit. Out of the above, Rs.7,22,578.00 has been received within 25.08.2010.

3. Income and Expenditure Account:

3.1.Expenditures on account of Visiting Professor Remuneration and Expenditure on Medical Reimbursement & Medical Welfare, LTC have been included under the head of expenditure under Salary and allowances as recommended by Section 8(1) Committee of the Institute. Medical Reimbursement expenses includes Hospital Advances paid by the Institute.

3.2. Orders for payment of ad hoc bonus and a portion of D.A. for a particular financial year are issued by the Government after the end of a financial year. Accordingly such payment is booked in the year in which it is made.

3.3. Out of net receipts on Statistical Quality Control Services a sum of Rs.43,02,199.00 (being 25% of net receipts on SQC & OR Services with effect from F.Y. 2005 - 2006) is shown in the Income Expenditure Account of the Institute and the balance amount has been retained with the Development Fund.

4 Development Fund:

4.1. TDS are shown as Expenditure and the closing balance of fund is net off TDS.

4.2. Assets amounting to Rs.99,25,377.00 during the year, acquired out of development fund were taken into the asset Schedule 8B.

5. Capital Commitments:

Contracts remaining to be executed on Capital Account amount to Rs.285.80 lakhs (Previous year Rs.1034.67)

6. Gratuity liabilities:

The Gratuity Liability as per Payment of Gratuity Act, 1972 estimated as on 31.03.2010 estimated at Rs 35.03 Crores (Previous year Rs.149.10 Crores).

7. Current Liabilities:

Other current liabilities include Rs.38,01,350.00 on account of Earnest Money / Security Deposits and Rs.1257488.00 on account of Library / Laboratory / Hostel Caution Money Deposit which are outstanding for more than three years and five years respectively. Action has been taken to scrutinize and make appropriate adjustment in the accounts for these balances.

8. General:

8.1. As per decision of the Council, the Institute recovered overhead charges on fund received for externally funded project and credited 50% of the same to the Miscellaneous receipt account and balance to the Development Fund Account.

8.2. Assets acquired out of fund of Externally Funded Projects, during the year under audit, have been shown in the Schedule 3 – Earmarked / Endowment Fund.

8.3. The Institute has been approved by the Central Government of India, Ministry of Finance (Department of Revenue) the purpose of clause(ii) of sub-section (1) of Section 35 of the Income Tax Act, 1961, read with Rule 6 of the Income Tax Rules, 1962 from the Assessment year 2004 onwards.

8.4. Uniform format of Account recommended by the Government of India has been implemented to the extent, it is applicable and suitable to the Institute. Schedules of Accounts forming part of Balance sheet and Income & Expenditure are drawn which are relevant to the Institute. Schedules No. 2,4,5,6,10,14,15,16,17,18,19,22 & 23 are not applicable to the Institute.

8.5.House Building Advances are made to the employees out of Specific Fund granted by the Government of India. Interests are recovered after recovery of the principal amounts and credited to Income and Expenditure account. On recovery, principal amount is credited to the House Building Advance Account and there by gets funded for payment of fresh House Building Advance.

8.6.Break-up of Audit Fees & Expenses – Audit Fee Rs.1,45,596.00* (Previous Year – Rs. 1,32,360.00*), Provident Fund Audit – Rs13,236.00* (Previous Year – Rs. NIL) Taxation matter – Nil (Previous Year – 20,000.00*) (* Inclusive of Service Tax)

8.7. The Institute has applied to the Income Tax Department for the purpose of Registration of Charitable / Religious Trust / Institution under Clause (aa) of Sub-Section (1) 12A of the Income Tax Act, 1961.

(S.K.CHAKRABORTY)	(S. K. IYER)	(BIMAL ROY)
Dy. Chief Executive(F)	Chief Executive (A & F)	Director

AUDITORS' REPORT
TO THE DIRECTOR,
INDIAN STATISTICAL INSTITUTE

1. We have audited the attached Balance Sheet of **Plan and Policy Research Fund (Fund) of Indian Statistical Institute** as at 31st March 2010, and the related Income and Expenditure Account for the year ended on that date annexed thereto. These financial statements are the responsibility of the management of the Fund. Our responsibility is to express an opinion on these financial statements based on our audit.

2. We conducted our audit in accordance with auditing standards generally accepted in India. Those Standards require that we plan and perform the audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimate made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

3. We report that

   (a) We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purposes of our audit;

   (b) The Balance Sheet and Income and Expenditure Account dealt with by this report are in agreement with the books of account;

   (c) In our opinion and to the best of our information and according to the explanations given to us the financial statements give a true and fair view in conformity with the accounting principles generally accepted in India.

      i. in the case of the Balance Sheet, of the state of affairs of the Fund as at 31st March 2010; and

      ii. in the case of the Income and Expenditure Account, of the excess of income over expenditure of the Fund for the year ended on that date.

For L.B. Jha & Co.
Chartered Accountants
(Registration No. 301088E)

(K. K. Bhanja)
Partner
Membership No. 14722

Kolkata, dated 27th August, 2010

INDIAN STATISTICAL INSTITUTE - DELHI CENTRE

PLAN AND POLICY RESEARCH FUND,FUNDED BY PLANNING COMMISSION

BALANCE SHEET AS AT 31st March 2010

PARTICULARS	CURRENT YEAR Rs. P.	PREVIOUS YEAR Rs. P.
ENDOWMENT FUND :		
As per Last Account	46,336,442.87	45,368,145.87
ADD : Excess of Income Over Expenditure	1,685,215.00	968,297.00
	48,021,657.87	46,336,442.87
GENERAL FUND		
Amount Transferred from Endowment Fund		
ADD : 95 % of Cost of Books & Journals & TDS on Accured Interest	1,440,966.00	1,230,113.00
CURRENT LIABILITIES		
Outstanding Liabilities	100,517.00	260,708.00
LOAN AND ADVANCES		
Loan on *FDR*		200,000.00
TOTAL	49,563,140.87	48,027,263.87
ASSETS		
Fixed Assets	5,930,887.00	5,745,575.00
Investment	38,700,000.00	39,109,623.00
Tax Deducted at Source	1,335,278.00	979,311.00
Books & Journals	1,425,645.00	1,214,792.00
CURRENT ASSETS		
Interest accured but not due on Fixed Deposit	294,749.00	310,124.00
Advance & Prepaid Expenditure	181,589.00	165,543.00
Cash & Bank Balance With Indian Bank	1,694,992.87	502,295.87
TOTAL	49,563,140.87	48,027,263.87

S.K.CHAKRABORTY
Deputy Chief Executive (Finance)

S.K.IYER
Chief Executive (A & F)

Bimal K. Roy
Director

In terms of our report of even date
Kolkata, August, 27 2010

For L B Jha & Co
Chartered Accountants
(Registration No.301088E)

(K. K. BHANJA)
Partner
Membership No.14722

INDIAN STATISTICAL INSTITUTE - DELHI CENTRE

PLAN AND POLICY RESEARCH FUND,FUNDED BY PLANNING COMMISSION

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st March 2010

PARTICULARS	CURRENT YEAR Rs. P.	PREVIOUS YEAR Rs. P.
rest on Investment	3,520,577.00	3,546,178.00
st on Saving Bank A/c	21,976.00	9,270.00
TOTAL (A)	**3,542,553.00**	**3,555,448.00**
PENDITURE		
alary,Honorarium	735,743.00	996,069.00
avelling,conveyance etc.	83,427.00	257,338.00
ooks & Journals	221,951.00	235,518.00
epair & Maintenance of Equipment & Computer and Contingencies	333,274.00	561,976.00
ores & Stationeriers and General Charges	13,746.00	31,016.00
ostage,Telephone & Electricity Charges	75,669.00	78,189.00
eminar & Conference	325,876.00	278,481.00
verhead Charges to ISI	67,652.00	148,564.00
TOTAL (B)	**1,857,338.00**	**2,587,151.00**
enditure	**1,685,215.00**	**968,297.00**

CHAKRABORTY
uty Chief Executive (Finance)

S.K.IYER
Chief Executive (A & F)

Bimal K. Roy
DIRECTOR

erms of our report of even date
ata, August, 27 2010

For L B Jha & Co
Chartered Accountants
(Registration No.301088E)

(K. K. BHANJA)
Partner
Membership No.14722

COMMENTS OF AUDITORS FORMING PART OF THEIR REPORT ON THE ACCOUNTS OF THE INDIAN STATISTICAL INSTITUTE FOR THE YEAR ENDED 31ST MARCH 2010 AND REPLIES OF THE ADMINISTRATION

3.1 Depreciation on fixed Assets acquired upto accounting year 1985-86 have not been charged in the accounts from the financial year 1986-87 onwards(refer note 2.1 on Schedule 24) which is not in keeping with AS6 Depreciation Accounting.

Depreciation on fixed assets acquired upto 31st March'1986 is under compilation and is in the process of incorporation through software.Necessary effect will be given in the accounts on completion of the process of incorporation.

3.2 Certain employee benefits including retirement benefits are accounted for on a cash basis(refer notes 1.2(b) and 4 on Schedule 24) which is not in compliance with AS 15 employee benefits

Certain employee benefits like Bonus, Gratuity, DA, etc are paid out of the Grant Received from Government of India and are accounted for on cash basis from time to time on the basis of Government sanction.

However ,the amount of the accrued liability for Gratuity has been disclosed in the Notes on Accounts.

This has been also disclosed in the Significant Accounting Policies of the Institute under Point Nos. 1.2(b) and 4 of the Schedule 24.

3.3 All transactions pertaining to earlier periods are accounted for as year's transaction under the regular heads of account in the absence of Prior Period Adjustment Account(refer note 1.4 on Schedule 24) and accordingly compliance with AS 5 Net Profit or loss for the Period, Prior Period Items and changes in accounting policies cannot be ensured.

The transactions pertaining to earlier period are accounted for during the financial year in regular heads of account as the Institute is not maintaining Prior Period Adjustment Account as per its Significant Accounting Policies.(Point No. 1.4 of Schedule 24)

3.4 Transactions in foreign currencies are recorded at exchange rate prevailing at the time of settlement(Note 6 on Schedule 24) which is not in line with AS 11 The Effects of Changes in Foreign Exchange Rates

Transaction in foreign currencies are recorded at exchange rate at the time of settlement as per the practice being followed as per the Significant Accounting Policies of the Institute. The same has been disclosed in the Point No. 6 of Schedule 24.

4.1 Notes 1.2(a) and 1.2(c) on Schedule 24 attached to the financial Statements regarding accounting of interest on house building loans and expenditure on disbursement of share of faculty members respectively other than on accrual basis,the consequential impact of such accounting on the excess of income over expenditure for the year ended 31st March'2010 and the year end Net Assets of the Institute are not ascertainable.

Receipts on account of Interest on house building loans are accounted on recovery basis from time to time. The expenditure on disbursement of share of faculty members in respect of income sharing from externally funded consultancy project pertaining to SQC & OR is accounted for on Cash basis as per the practice being followed in the Institute based on the Significant Accounting Policies as disclosed in Point Nos. 1.2(a) and 1.2(c) of Schedule 24..

4.2.1. Note 1.6 indicating non adjustment of Rs.700000.00 being book value of Computer System Stolen in earlier years

The Council of the Institute in its meeting held on 26th August 2006 at Kolkata has resolved to write off the value of computer amounting to Rs. 700000.00 (Rupees Seven lacs only) . The Nodal Ministry is requested to accord necessary approval for the same. Necessary accounting effects will be made on receipt of the approval from the Ministry.

4.2.2..Note 1.7 indicating non adjustment of Rs. 1086306.00 included under Current liabilities being sale proceeds of asset disposed off in an earlier year

Sale proceeds of fixed assets are accounted for after ascertaining the cost (book value),date of purchase, depreciation etc from the unit/division/centre where such assets belongs to. The relevant data pertaining to sale proceeds of such Fixed Assets are under compilation for giving necessary accounting treatment.

4.2.3. Note 2.2 regarding non provision of Rs.3647.00 being a balance included under Cash and bank balances,the existence thereof being not ascertainable from the Available books and records

The Council of the Institute in its meeting held on 27th January 2008 at Bangalore has resolved to write off the amount of Rs. 3647.00(Rupees Three Thousand Six Hundred and Forty Seven only). The Nodal Ministry is requested to accord necessary approval for the same. Necessary accounting effects will be made on receipt of the approval from the Ministry.

4.2.4. Note 2.4 indicating Rs. 30484.34 included under advances on account of land ,which the Institute's Finance Committee recommended to write off from books in June'2007

The Council of the Institute in its meeting held on 27th January 2008 at Bangalore has resolved to write off the amount of Rs. 30848.34(Rupees Thirty Thousand Eight Hundred and Forty Eight and Paise Thirty Four only). The Nodal Ministry is requested to accord necessary approval for the same. Necessary accounting effects will be made on receipt of the approval from the Ministry.

4.3.1. Note 2.1 indicating old balance of Rs. 1276865.00 included in T.A. Advances

All old Advances are being reviewed on case to case basis and follow up action for adjustment or write off is being made.

4.3.2. Note 2.3 indicating balances aggregating Rs. 4582613.58 included under Advance To Party

All old Advances are being reviewed on case to case basis and follow up is being made for adjustment or write off as the case may be.

4.3.3. Note 2.5 including old/unreconciled debit balances totaling Rs. 336767.00 Included under Advances to Staff and others

All old Advances are being reviewed on case to case basis and follow up is being made for adjustment or write off as the case may be.

(S.K. CHAKRABORTY) DY.CHIEF EXECUTIVE-F	(S.K.IYER) CHIEF EXECUTIVE(A&F)	(BIMAL K ROY) DIRECTOR

AUDITORS' REPORT

1. We have audited the attached Balance Sheets of **CONTRIBUTORY PROVIDENT FUND (CPF) AND GENERAL PROVIDENT FUND (GPF) of INDIAN STATISTICAL INSTITUTE (ISI) AS AT** 31st March 2010 and the related Income & Expenditure Accounts for the year ended on that date annexed thereto. The financial statements of CPF are the responsibility of the Board of Trustees of CPF and the financial statements of GPF are the responsibility of the Board of Management of GPF. Our responsibility is to express an opinion on these financial statements based on our audit.

2. We conducted our audit in accordance with auditing standards generally accepted in India. Those Standards require that we plan and perform the audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

3. Attention is invited to the following Notes on Accounts :

   3.1 **Note 1 regarding non-maintenance of separate books of account for CPF and GPF and basis of preparation of the Balance Sheets and Income and Expenditure Accounts;**

   3.2 **Note 7 regarding receivable of Rs.8,30,903.24 from GPF by CPF on account of investment made for GPF which implies investments for CPF and GPF are made from a common pool of funds;**

4. **Subject as aforesaid** we report that :

   (a) We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purposes of our audit.

   (b) The Balance Sheets and Income & Expenditure Accounts referred to above are in agreement with the books of account maintained by ISI.

   (c) In our opinion and to the best of our information and according to the explanations given to us the financial statements read together with the notes attached thereto give a true and fair view in conformity with the accounting principles generally accepted in India.

      i) in the case of the Balance Sheets, of the state affairs of CPF and GPF as at 31st March 2010;

      ii) in the case of the Income & Expenditure Accounts, of the excess of income over expenditure of CPF and GPF, for the year ended on that date.

L. B. Jha & Co.
Chartered Accountants
(Registration no. 301088E)

(K. K. Bhanja)
Partner
Membership No. 14722

31 August 2010
Dated , Kolkata

INDIAN STATISTICAL INSTITUTE PROVIDENT FUND

Notes on Accounts of Indian Statistical Institute

Contributory Provident Fund and General Provident Fund

1. No separate books of account are maintained by Indian Statistical Institute (ISI) for Contributory Provident Fund (CPF) and General Provident Fund (GPF). The Balance Sheets and the Income and Expenditure Accounts of CPF and GPF are prepared on the basis of related balances extracted from the books of account maintained by ISI, such balances are periodically reconciled with the subsidiary records maintained by the Provident Fund Unit of ISI which include separate Investment Ledgers for CPF and GPF and personal ledgers of the member-subscribers containing details of loans, withdrawals and final settlement of provident fund balances.

2. Interest is credited to the subscribers' account for each financial year after the audit of the annual accounts of CPF and GPF for the respective year as per rules of the fund. However, in case of a subscriber quits the service of the Institute or dies, interest, for the period for which the rate of interest is yet to be declared, is allowed up to the date of payment at the rate declared last less 2% per annum or rate as fixed by the Government for its employees whichever is lower as an interim payment and balance of interest, if any due are paid to the member or the member's nominee or legal heir as the case may be after the declaration of interest for that period. Accordingly, interest which have been credited to the accounts of the member-subscribers pertains to the previous financial year i.e. 2008-2009 and these have been booked in the Income & Expenditure Account of CPF and GPF respectively for the year 2009-2010.

3. Interest accrued on investment on Post Office Time Deposit has been accounted for on average basis as per past practice, i.e. for investment upto 15th of a month, interest for the full month has been computed ; whereas for investment beyond 15th, interest for the remaining period of the month has been ignored.

4. On the amount of Loan paid to members of both CPF and GPF, interest is not realized. However, interest is credited to the account of member-subscriber of CPF/GPF after deducting any sums withdrawn (including loan) during the current year.

5. D.A to P.F. is being shown in the books of P.F. Accounts since 1990 and Other Deposits both of GPF and CPF respectively represents some arrears arising from the implementation of IVth Central pay commission in the Institute.

6. Interest is not allowed on the balances of erstwhile employees brought forward from earlier years and included as under :

CPF :	
Members' Own Subscription	: Rs.15,81,570.32
Employers' Contribution	: Rs.16,31,027.65
GPF :	
Members' Own Subscription	: Rs. 4,02,594.87

7. Rs.8,30,903.24 due to CPF by GPF is on account of investment with a view to avail higher rate of interest.

(S. K. Joardar) Manager/Secretary	(Swapan Kumar Parui) Member	(Ranjan Gupta) Member
(Subrata Kumar Roy) Member	(Prabir Chattoraj) Member	

INDIAN STATISTICAL INSTITUTE
CONTRIBUTORY PROVIDENT FUND

Balance Sheet as at 31st March 2010

As at 31st March 2009 Rs. P.	Fund and Liabilities	Rs. P.	As at 31st March 2010 Rs. P.
	Members' Own Subscription :		
33,315,959.42	As per last account	35,900,361.04	
79,005.00	Add:Transfer from external sources	123,141.00	
4,434,945.00	Add: Contribution during the year	18,425,996.00	
1,852,548.38	Less:Refunded during the year	1,102,019.29	
77,000.00	Less:Withdrawal during the year	0.00	53,347,478.75
35,900,361.04			
	Employer's Contribution :		
35,181,550.23	As per last account	37,851,472.55	
82,165.00	Add:Transfer from external sources	123,141.00	
4,434,945.00	Add: Contribution during the year	18,425,996.00	
1,847,187.68	Less: Refunded during the year	1,099,845.59	55,300,763.96
37,851,472.55			
	Members' Additional Subscription		
20,071,765.51	As per last account	22,577,175.51	
4,104,462.00	Add: During the year	8,767,544.00	
1,349,052.00	Less:Refunded during the year	1,012,200.00	
250,000.00	Less:Withdrawal during the year	0.00	30,332,519.51
22,577,175.51			
	Other Deposit :		
36,612.46	Opening Balance	32,199.47	
4,412.99	Less: Paid during the year	1,722.35	30,477.12
32,199.47			
	DA to CPF :		
2,292,606.90	Opening Balance	2,125,754.52	
166,852.38	Less:Paid during the year	0.00	2,125,754.52
2,125,754.52			
	Interest :		
	(a)On Members' Own Subscription		
26,424,161.59	As per last account	27,925,351.00	
4,481.00	Add:Transfer from external sources	3,261.00	
4,297,659.66	Add: During the year	4,546,478.35	
2,320,951.25	Less: Paid during the year	652,385.36	
480,000.00	Less: Withdrawal during the year	0.00	31,822,704.99
27,925,351.00			
126,412,314.09			172,959,698.85

INDIAN STATISTICAL INSTITUTE
CONTRIBUTORY PROVIDENT FUND
Balance Sheet as at 31st March 2010

As at 31st March 2009 Rs. P.	Property & Assets	Rs. P.	As at 31st March 2010 Rs. P.
	Investment at costs :		
32,263,000.00	(a) 5 Yrs. Postal Time Deposit	402,000.00	
42,479,000.00	(b) Fixed Deposit with Allahabad Bank, Dunlop Bridge Branch	70,525,000.00	
108,706,700.00	(c) Fixed Deposit with United Bank of India, Dunlop Bridge Branch	108,706,700.00	
155,500.00	(d) RBI Stock certificates	155,500.00	
2,330,000.00	(e) Fixed Deposit with Union Bank of India, Ashok Garh Branch	2,330,000.00	
10,055,851.00	(f) Fixed Deposit with State Bank of India, Bonhooghly Estate Br.	10,055,851.00	
———	(g) Fixed Deposit with State Bank of India,Dunlop Bridge Branch Br.	39,436,000.00	231,611,051.00
195,990,051.00			
	Loan to Members		
4,374,808.00	Opening Balance	5,581,414.00	
3,623,500.00	Add : Loan paid during the year	2,950,500.00	
2,416,849.00	Less: Loan realised during the year	3,614,002.00	4,917,912.00
5,581,414.00			
	Current Assets :		
	Interest Accrued		
1,294,626.00	(a) 5 Yrs. Postal Time Deposit	28,412.00	
23,692,563.54	(b) On United bank of India Fixed Deposit	37,057,668.70	
6,107,835.00	(c) On Allahabad Bank Fixed Deposit	11,509,895.00	
65,693.00	(d) Union Bank of India Fixex Deposit	315,682.00	
0.00	(e) State Bank of India, Dunlop Bridge Branch, Fixed Deposit	523,872.00	
451,880.00	(f) State Bank of India, Bonhooghly Branch, Fixed Deposit	1,610,761.00	
6,381.00	(d) RBI Stock certificates	6,381.00	51,052,671.70
31,618,978.54			
			287,581,634.70
233,190,443.54			

Contd.....(2)

INDIAN STATISTICAL INSTITUTE
CONTRIBUTORY PROVIDENT FUND

Balance Sheet as at 31st March 2010

As at 31st March 2009 Rs. P.	Fund and Liabilities	Rs. P.	As at 31st March 2010 Rs. P.
126,412,314.09	**Brought Forward :**		172,959,698.85
	Interest :		
	(b)On Employers' Contribution		
25,372,582.55	As per last account	27,840,551.89	
4,481.00	Add:Transfer from external sources	3,261.00	
4,520,620.66	Add: During the year	4,894,223.77	
2,057,132.32	Less: Paid during the year	910,044.41	31,827,992.25
27,840,551.89			
	(c)On Members' Additional Subs.		
9,147,684.83	As per last account	10,805,457.83	
2,223,511.00	Add: During the year	2,511,837.00	
565,738.00	Less:Paid during the year	628,980.00	12,688,314.83
10,805,457.83			
			———
3,252,300.76	**Amount due to GPF**		———
65,695,531.87	**Undistributed Income as per Income and Expenditure A/c.**		75,951,699.41
234,006,156.44			**293,427,705.34**

(S. K. Joardar)
Manager/Secretary

(Swapan Kumar Parui)
Member

(Ranjan Gupta)
Member

Date : 31 August 2010

INDIAN STATISTICAL INSTITUTE
CONTRIBUTORY PROVIDENT FUND

Balance Sheet as at 31st March 2010

As at 31st March 2009 Rs. P.	Property & Assets	Rs. P.	As at 31st March 2010 Rs. P.
233,190,443.54	**Brought Forward :**		287,581,634.70
	Cash and Bank Balances		
9,079.45	(i)Postal Savings bank A/c.	1,513,282.45	
538.42	(ii)With Allahabad Bank Savings A/c.	1,213,536.92	
2,051.06	(iii)With Union Bank of India Savings A/c.	1,121.06	
1,600.00	(iv) With Bank of India Savings A/c	1,600.00	
710.28	(v) With United bank of India Dunlop Bridge branch Savings A/c.	735.28	
-----	(vi) With State Bank of India Savings A/c.	1,700.00	2,731,975.71
-----	**Amount due from GPF**		830,903.24
801,733.69	**Amount due from ISI**		2,283,191.69
234,006,156.44			**293,427,705.34**

In terms of our report of even date.

For and on behalf of
L. B. Jha & Co.
Chartered Accountants

(K. K. Bhanja)
Partner
Membership No.14722

INDIAN STATISTICAL INSTITUTE
GENERAL PROVIDENT FUND

Balance Sheet as at 31st March 2010

As at 31st March 2009 Rs. P.	Fund and Liabilties	Rs. P.	As at 31st March 2010 Rs. P.
	Members' Own Subscription		
201,550,439.58	As per last account	223,225,596.88	
636,897.00	Add: Transfer from external sources	0.00	
42,343,987.00	Add: Contribution during the year	61,794,092.00	
14,248,226.70	Less:Refunded during the year	19,298,335.11	
7,057,500.00	Less:Withdrawal during the year	4,766,500.00	260,954,853.77
223,225,596.88			
	Other Deposit :		
172,473.26	Opening Balance	159,541.10	
12,932.16	Less: Paid during the year	15,500.80	144,040.30
159,541.10			
	DA to GPF :		
2,186,253.14	Opening Balance	2,007,499.14	
178,754.00	Less:Paid during the year	Nil	2,007,499.14
2,007,499.14			
	Interest :		
	On Members' Own Subscription		
101,127,936.19	As per last account	112,243,073.01	
3,807.00	Add: Transfer from external sources	0.00	
20,336,468.96	Add: During the year	22,402,873.92	
8,417,139.14	Less: Paid during the year	10,876,285.39	
808,000.00	Less: Withdrawal during the year	893,000.00	122,876,661.54
112,243,073.01			
282,138,757.67	**Undistributed Income transferred from Income and Expenditure A/c.**		317,508,845.90
------	**Amount due to CPF**		830,903.24
619,774,467.80			704,322,803.89

(S. K. Joardar)
Manager/Secretary

(Subrata Kumar Roy)
Member

(Prabir Chattoraj)
Member

Date : 31 August 2010

INDIAN STATISTICAL INSTITUTE
GENERAL PROVIDENT FUND

Balance Sheet as at 31st March 2010

As at 31st March 2009 Rs. P.	Property & Assets	Rs. P.	As at 31st March 2010 Rs. P.
	Investments at costs :		
0.00	(a) 5 Yrs. Postal Time Deposit	Nil	
	(b) Fixed Deposit with Allahabad Bank,		
1,903,000.00	Dunlop Bridge Branch	25,266,000.00	
	(c) Fixed Deposit with United bank		
390,960,375.00	of India, Dunlop Bridge Branch	390,960,375.00	
	(d) Fixed Deposit with Bank of		
38,981,292.00	Maharashtra, Shyambazar Branch	38,981,292.00	
	(e) Fixed Deposit with Union Bank,		
18,957,000.00	Ashokgarh Branch	24,055,000.00	479,262,667.00
450,801,667.00			
	Loan to Members :		
42,866,645.22	Opening Balance	43,234,085.22	
20,477,800.00	Add : Loan paid during the year	24,799,500.00	
20,110,360.00	Less: Loan realised during the year	23,876,719.30	44,156,865.92
43,234,085.22			
	Interest accrued		
0.00	(a) 5 Yrs. Postal Time Deposit	0.00	
287,377.00	(b) On Allahabad Bank Fixed Deposit	1,484,702.00	
	(c) On United Bank of India		
87,481,730.38	Fixed Deposit	133,875,275.53	
	(d) On Bank of Maharashtra,		
1,073,862.00	Fixed Deposit	4,672,865.00	
	(e) On Union Bank of India,		
33,635,540.00	Fixed Deposit	40,216,620.00	180,249,462.53
122,478,509.38			
	Cash and Bank Balances :		
823.32	(i) With Allahabad Bank, Savings A/c	647,335.32	
648.52	*(ii)* With United Bank of India,Savings A/c	682.52	
2,026.00	(iii)With Union Bank of India,Savings A/c	1,383.00	
1,241.00	(iv) With Bank of India, Savings A/c	1,241.00	
3,166.60	(v)With Postal Savings Bank A/c	3,166.60	653,808.44
3,252,300.76	**Amount due from CPF**		———
619,774,467.80			**704,322,803.89**

In terms of our report of even date.

For and on behalf of
L. B. Jha & Co.
Chartered Accountants

(K. K. Bhanja)
Partner
Membership No.14722

INDIAN STATISTICAL INSTITUTE
CONTRIBUTORY PROVIDENT FUND

Income and Expenditure A/c for the year ended 31st March 2010

Year ended 31st March 2009 Rs. P.	Expenditure	Rs. P.	Year ended 31st March 2010 Rs. P.
19,830,569.13	**To excess of Income over expenditure carried down**		22,208,706.66
19,830,569.13			22,208,706.66
	To Interest on :		
4,297,659.66	(i) CPF Members' Own Subs.	4,546,478.35	
2,223,511.00	(ii) CPF Additional Subscription	2,511,837.00	
4,520,620.66	(iii)CPF Employers' Contribution	4,894,223.77	11,952,539.12
11,041,791.32			
65,695,531.87	**To Balance carried over to Balance Sheet**		75,951,699.41
87,779,114.51			**87,904,238.53**

(S. K. Joardar)
Manager/Secretary

(Swapan Kumar Parui)
Member

(Ranjan Gupta)
Member

Date : 31 August 2010

INDIAN STATISTICAL INSTITUTE
CONTRIBUTORY PROVIDENT FUND

Income and Expenditure A/c for the year ended 31st March 2010

Year ended 31st March 2009 Rs. P.	Income	Rs. P.	Year ended 31st March 2010 Rs. P.
	By Interest on :		
3,009,388.00	(a) 5 Yrs. Postal Time Deposit	1,488,989.00	
	(b) Allahabad Bank		
1,823.00	Savings Bank A/c.	2,608.00	
	(c) Allahabad Bank		
3,200,021.00	Fixed Deposit A/c.	5,402,060.00	
	(d) On United bank of India		
13,031,742.63	Fixed Deposit A/c.	13,365,105.16	
	(e) On United Bank of India		
8.00	Savings Bank A/c.	25.00	
	(f) On Union Bank of India		
54.00	Savings Bank A/c.	70.00	
	(g) On Union Bank of India		
65,693.00	Fixed Deposit A/c.	249,989.00	
	(h) S B I.(Dunlop Bridge Branch)		
0.00	Fixed Deposit A/c	523,872.00	
	(i) S B I (Bonhooghly Branch)		
504,731.00	Fixed Deposit A/c	1,158,881.00	
17,108.50	(j) R.B.I. Stock certificates	17,107.50	22,208,706.66
19,830,569.13			22,208,706.66
56,906,754.06	**By amount brought forward from last account**		65,695,531.87
19,830,569.13	**By excess of Income over expenditure brought down**		22,208,706.66
76,737,323.19			**87,904,238.53**

In terms of our report of even date.

For and on behalf of
L. B. Jha & Co.
Chartered Accountants

(K. K. Bhanja)
Partner
Membership No.14722

INDIAN STATISTICAL INSTITUTE
GENERAL PROVIDENT FUND

Income and Expenditure A/c for the year ended 31st March 2010

Year ended 31st March 2008 Rs. P.	Expenditure	Rs. P.	Year ended 31st March 2009 Rs. P.
56,791,152.88	**To excess of Income over Expenditure carried down**		57,772,962.15
56,791,152.88			57,772,962.15
	To Interest on :		
20,336,468.96	GPF Members' Own Subscription		22,402,873.92
	To Balance carried to		
282,138,757.67	**Balance Sheet**		317,508,845.90
302,475,226.63			**339,911,719.82**

(S. K. Joardar)
Manager/Secretary

(Subrata Kumar Roy)
Member

(Prabir Chattoraj)
Member

Date : 31 August 2010

INDIAN STATISTICAL INSTITUTE
GENERAL PROVIDENT FUND

Income and Expenditure A/c for the year ended 31st March 2010

Year ended 31st March 2008 Rs. P.	Income	Rs. P.	Year ended 31st March 2009 Rs. P.
	By Interest on :		
177,906.00	(a)5 Yrs. Post Office Time Deposit	0.00	
6,121.00	(b)Allahabad Bank Savings Bank A/c	1,918.00	
188,403.00	(c)Allahabad Bank Fixed Deposit A/c	1,197,325.00	
46,361,570.88	(d)United Bank of India Fixed Deposit A/c.	46,393,545.15	
159.00	(e)United Bank of India Savings Bank A/c.	34.00	
4,419,698.00	(f) Bank of Maharastra Fixed Deposit A/c.	3,599,003.00	
69.00	(g)Union Bank of India Savings Bank A/c.	57.00	
5,637,226.00	(h) Union Bank of India Fixed Deposit A/c.	6,581,080.00	
0.00	(i) Bank of India Fixed Deposit A/c	0.00	57,772,962.15
56,791,152.88			57,772,962.15
245,684,073.75	**By Amount brought forward from last account**		282,138,757.67
56,791,152.88	**By excess of Income over expenditure brought down**		57,772,962.15
302,475,226.63			**339,911,719.82**

In terms of our report of even date.

For and on behalf of
L. B. Jha & Co.
Chartered Accountants

(K. K. Bhanja)
Partner
Membership No.14722

EDITORIAL BOARD