

5	BHEL, Bhopal	Top Management Program on Process Excellence through Six-Sigma Methodology, Role of Champions in Process Excellence through Six-Sigma Methodology, Six Sigma Training for Black Belts (On going)	165
6	ELGi Equipments, Colmbatore	Retraining of Black Belts	30
7	Emdad Khodro, Tehran, Iran	Process Excellence	60
8	Software Industries, Bangalore	Software Process Excellence using Six-Sigma Methodology	17
9	HPFO, Chennai & Bangalore (10 Batches), L G Balakrishnan & Brothers, Coimbatore, L & T EmSyS, Mysore, LTM, Chennai, Triveni Engineering, Bangalore (2 Batches)	Six Sigma Training for Black Belts, Six Sigma Training for Green Belts	801
10	IKCO, Iran	Six-Sigma management for Champions and Process Owners, Lean Six-Sigma for Top Management	35
11	India Foils Limited, Kolkata	Six-Sigma management for Champions and Process Owners	25
12	Iran Khodro, Iran	Black Belt Extension training program for certified Green Belts	35
13	Macmillan India Ltd, Bangalore	Six Sigma Training for Green Belts (Ongoing)	15
14	MICO, Bangalore / Jaipur / Nasik	Training Programme on Engineering Statistics, Six Sigma Training for Black Belts, Six Sigma Training for Green Belts, Training Programme on DOE and Taguchi Methods	185
15	Philips Semiconductors Limited, Calamba, Philippines	Balanced Business Score Card	30
16	Quality Council of India, Delhi	Assessors Training Program	15
17	Rao Insulating Company, Bangalore	Training Programme on FMEA	20
18	Reliance Industries Ltd Polyester Group, Nagpur, Silvasa Punjab, Orissa, Lucknow Allahabad	Six Sigma Training for Green Belts (13 Batches), Six Sigma Training for Black Belts (2 Batches)	393
19	RIL, Business Group, Mumbai	Six Sigma Training for Champions	25
20	Saint Gobain-Coated abrasive Division, Bangalore	Six Sigma Training for Green Belts, Advanced training for trained Black Belts	55
21	Samsung India Ltd., Bangalore	Statistical Methods for Software	20

22	SAPCO, Iran	Six-Sigma management for Champions and Process Owners, Six Sigma Training for Black Belts (3 Batches), Top Management Program on Six-Sigma Over View	170
23	SYSTAT, Bangalore	Six-Sigma Tools	10
24	Timken Ltd, Bangalore	Lean Six-Sigma for Expert 1	20
25	WIPRO Light & Power Ltd, Bangalore / WIPRO Technologies Ltd, Bangalore	Workshop on Taguchi Design / Two Day Programme on DOE and Taguchi Methods	40

Externally Funded General Training programme

- "THREE WEEK INTERNATIONAL MASTER BLACK BELT TRAINING PROGRAM" was conducted at ISI, Bangalore during 25.01.05 – 13.02.05. Twentyfive persons from IRAN, two persons from Ultratech and one person from Sainl Gobain participated.
- "PROGRAM ON SOFTWARE PROCESS EXCELLENCE", a sixteen day (weekend) program was organized during July – November 2004.

SQC & OR Unit, Baroda

Scientific Activities

Economic Sampling Plans for Relays

This project was undertaken at a company which supplies a wide variety of relays to Indian Railways (IR). The IR unilaterally changed the existing double sampling scheme to a single sampling scheme with acceptance number as zero for all the plans. The objective of this study was to study the appropriateness of the modified scheme and to suggest the best course of action for product acceptance. Accordingly the following approach was adopted for the study: (i) Evaluation of the expected performance of the old and the new plans, (ii) Review of the actual performance of the old plans, (iii) Understanding the present status of process control, (iv) Estimation of the break-even quality, (v) Deciding on the best course of action – 0%, 100% or sampling inspection and (vi) Determining the appropriate sampling plan, if necessary. Considering the unstable nature of the process and its variation related to the break-even quality, sampling inspection was considered to be appropriate. The recommended sampling plans were selected from IS 2500 (part I) : 1992, where the AQL, was decided based on the lot size category and the estimate of the break-even quality.

Reduction of variation of gas balancing equations for a transmission and bulk distribution network

Gujarat Gas company Ltd., Surat was suspecting to be suffering substantial financial loss because of the unaccounted gas as revealed by the gas balancing equations. The line charts of the unaccounted gas for various segments revealed that the process was fluctuating widely over time. Next, the erratic meters were identified by comparing the standard error of the F_x where F_x is the flow recorded by the i^{th} meter on the i^{th} day. However this could not explain the abnormal behaviour of the UAG during certain periods. Next, sensitivity analysis was carried out to identify the contribution of the various meters to UAG. The results of this analysis together with the erratic meters identified for different line periods could explain the abnormal behaviour of the UAG. Next, the discriminant analysis revealed that the process variables like temperature and specific gravity were having significant impact on UAG. This was an important finding, since the flow meters are supposed to record flow under standard conditions. Accordingly, an L25 experiment has been planned to validate the software of the flow meters. The experiment is in progress.

P. Mandi

Externally Funded (Consultancy) Project

Though the unit was constrained with limited resources in terms of scientific manpower, five externally funded consultancy projects and one training programme were pursued during the year. The funding organizations for these projects were ONGC, Baroda and Mahsana, Gujarat Gas Company Ltd., Surat, Tata Chemicals Limited, Mithapur, Munjal Auto Ltd., Waghodia and Integra Hindustan Control Ltd., Haldol. Of these five, two of the projects have been completed and three are still continuing.

Externally Funded In-plant Training Programme

An externally funded training programme, on Internal Auditing for ISO 9001:2000, was conducted for ONGC, Baroda in November 2004.

SQC & OR Unit, Chennai

Research activities

Product Warranty Analysis

A general framework for statistical modeling of two-dimensional process was developed for system (product) level analysis.

D.K. Manna and S. Pal

Semi Definite Linear Complementarity Problems

The Lipschitz Continuity of solution map in Semi Definite Linear Complementarity Problem is investigated. For a monotone linear transformation, we show that on the space of $n \times n$ real matrices, the Lipschitz Continuity of the solution map implies the GUS property.

D. Sampangi Raman

Consultancy Projects (Externally Funded)

Estimation & Designing Model to predict availability of hides and skins, Central Leather Research Institute, Chennai.

Six Sigma Green Belt Training and associated business projects at Sutherland Global Services.

Four projects have been taken up. They are

Reduction of average handle time of incoming calls for problem resolution. This would enable the company taking more number of calls thereby increasing business volume and hence, revenue to the tune of half a million dollars per annum.

Reduction of unattended call rate. This would satisfy the client in terms of the end user being satisfied to a higher degree.

Enhancement of training effectiveness. This would ensure that higher proportion of agents would be able to resolve issues coming from customers at a higher rate.

Computer stationery sale after successfully attending a problem is one of the businesses of the company and its client. This project aims at increasing volume of business.

Reduction of packet-to-packet weight and other ingredients' quality variation in washing powder, Henkel SPIC India Ltd.

Inventory management of raw material. In spite of huge inventory there are occasional stock out situations forcing the company to shut down one of the product lines. This project aims at finding out economic order quantity and reorder level, taking into consideration the usual inventory parameters.

Representation of quality of a pack of detergent by a single number. Though detergent in general has several parameters, each one varying independently, it becomes difficult to compare two different packets with reference to their quality. This project aims at evolving a single dimensional measure taking into consideration, all the parameters.

Externally Funded Training Programs:

Sl.No.	Title	Organization
1	Statistical Process Control	Holiconns Infotech & Industrial Services / Saint Gobain Glass / ABI-Showatech / Henkel SPIC / UCAL Fuel Systems / Bharti Infotel Ltd
2	Statistical Techniques for Six Sigma	HCL Technologies Ltd
3	Statistical Process Control Plus	HCL Technologies Ltd
4	Design FMEA – III Edition	Simpson & Co. Ltd
5	Design of Experiments	Saint Gobain Glass
6	Measurement System Analysis	Leo Fasteners

SQC & OR Unit, Colbatore

Teaching and Training

Teaching assistance was provided to the M.Tech. (OROR) programme of the ISI in the form of project guidance to two of the first year students during May - July, 2004.

Research and Other Activities

EWMA Chart for Automated Machinery

The objective of this work was to explore the possibility of using control schemes on automated machinery for product consistency on drawing frame of a spinning mill. An automated process continuously monitors and effects correction, through electronic sensor media, so the scope for analysis for off line data output of such product quality is not usually considered. But the market demands more consistent yarn over a long period from the high-speed modern machines. The variation is measured and analysed through dynamic moving average for such automated machinery. Finally an EWMA control chart has been successfully developed to detect small drift from the target and predict the trend. This has enabled proactive corrections in back process as well as in calibration process in order to maintain high consistency in silver quality.

Maintaining Target in Road Transport Project

A successful application of Taguchi's loss function was made in national golden quadrilateral road transport project for the first time in order to avoid wastes of rework and for speedy completion of the project in Chennai-Bangalore highway. The study was carried out at each level of Bituminous concrete, Densest Bituminous Macadam, Wet mix Macadam, Granular sub-base. It has not only helped meet the target on the critical quality characteristics of road laying process of compaction level and surface smoothness but also has considerable economic significance as well. The study revealed the necessity of Panel machine setting of co-linearity and calibration of panel machine for maintaining the levels. The development of control limits for each layer (instead of specification limits) enabled the control of mix proportion of compositions of bituminous macadam, making the engineers efficient in cost reduction and effective in timely completion.

Evaporation Loss Control In Petroleum Products

As a part of this project a market discipline guideline was developed and circulated countrywide to all retail outlets, which specified control of evaporation loss of petroleum products on annual sales. The tank 'diprod' and calibration chart and the data generation procedures for inventory accountability were developed. Regular estimation of the evaporation loss was introduced. The need for prudent inventory management could be highlighted. The system, MSA, cumulative chart were developed for evaporation loss, and the total loss was brought down below 1% for each outlet. Prudent control of storage, preservation, handling and control techniques were established.

A. Rajagopal

Externally Funded In-plant and General Training Programmes

Sl. No.	Title of the Programme	Venue	No. of participants
1	Quality System Implementation	Hindustan Petroleum Ltd., Conference Hall	20
2	Technical and Statistical Analysis in Jewellery Industries	SQC & OR Unit, Coimbatore	15
3	Advanced programme on Statistical Techniques for practical problems	SQC & OR Unit, Coimbatore	18
4	ISO 9001 Six Sigma Way	Sambandam Spg. Mills, Salem office premises	40
5	DOE Training classes for reducing foundry rejections	Texmo Foundry Motor Pump Divn.	30
6	Statistical Techniques for Consistency in Productivity and Quality – Exposure Training Programme	Salem Productivity Council-Salem	25
7	Upgradation Training for ISO 9000	Bannariaman Spg. Conference Room	40
8	Six Sigma Way for World Class Manufacturing – Promotional Programme	Coimbatore Productivity Council	35
9	Errors in experimentation and OAs for efficient and effective experimentation	Sugarcane Breeding Institute-Conference Hall	40
10	Study and systems development in mining operation	Orissia Mining Corpn. Under SRC Projects, Salem	22
11	Study on Tolerance Evaluation – Methods and Techniques	SQC Unit, Conference Hall	25
12	Tolerance Evaluation	PRICOL – Conference Hall	30
13	Quality in Educational Institution defining the process product and customs and its significance	CCAS, Chennai	50
14	Financial performance evaluation for garment industries	State Bank of India, Chennai	20
15	Customer satisfaction study – Six Sigma Approach	HPCL, Mangalore	10
16	TQM – Tools and Techniques for Spg. Industry	Bannari Amman Institute of Technology, Coimbatore	25
17	TQM – Innovated way for overall improvement	PSG College of Technology	50

18	Environmental standards, process parameters to pollution characteristics	TN Processing and spinners	15
19	Quality Management In dying process	Vallabhai Patel Textile Institute, Textile Institute of Management	55

SQC & OR Unit, Delhi

Teaching and Training

Faculty support was provided for M.Stat. (1st year) at ISI, Delhi. Faculty members also acted as supervisors for projects undertaken by M.Tech. (QROR) students during 2004-2005.

Research and other Scientific Activities

Research Activities

Topics of Research : Reliability; Consecutive K-out-of-n:F System, Linear Complementarity Problem (LCP), Semidefinite Linear Complementarity Problem (SDLCP), Cone complementarity over Jordan Algebra, Noncooperative games, Stochastic Games.

S.R. Mohan, S.K. Neogy and A. Sen

Cone linear complementarity problems

Building on the earlier research and study of the linear complementarity problem over the cone of positive semi-definite matrices (SDLCP), interesting results have been obtained on the linear complementarity problem over a closed convex cone in a finite dimensional real inner product space. Some of the special cases are the semi-definite cone, the Lorentz cone and the well studied R^+ .

M. Malik and S.R. Mohan

Projects

Projects were taken up at Janani, an NGO, partially funded by the Government and engaged in helping rural and urban people of Bihar, Jharkhand, U.P. and M.P. to adopt family planning and improve health of the mother and child. The objectives of these projects are to help them achieve around improvement in their services and to make these more cost effective. The studies also aim at improving performance and cost efficiency of their clinics, improving administration through shortened bill processing time, efficient inventory control of condoms and pills, improved productivity and availability of sales personnel, improved effectiveness of till centers, etc. A survey is currently under progress to find out satisfaction level of clinics and till centers from Janani's services rendered to them as well as satisfaction level of the population catered to by the clinics and till centers with a view to effect improvement in these services.

B. Majumdar

Externally Funded In-plant and General Training Programmes:

- (a) A training programme was conducted on Acceptance Sampling for Recruited Inspectors for RITES Industries in Gurgaon during 13 – 15 May, 2004. Twenty-five participants attended the programme.
- (b) A 10 day training programme on *Black Belt Six Sigma* was conducted at R Systems International Ltd., Noida during May-September, 2004. Ten executives were selected to undergo the black-belt training programme.
- (c) Four Six Sigma Black Belt Training Programmes were conducted at Reliance Industries, Hazira during April 2004 - March 2005.
- (d) Four Six Sigma Green Belt Training Programmes were conducted at Reliance Industries, Hazira during April 2004 – March 2005.

- (e) Two Six Sigma Champions Programmes were conducted at Reliance Industries, Hazira during April 2004 – March 2005.
- (f) Two (2 days duration) induction programmes on Basics of Statistical Quality / Process Control and Sampling Plans were conducted at Flex Industries Ltd during July-Aug, 2004. Twenty participants attended each programme.
- (g) A two-day training programme on Statistical Techniques and Six Sigma was conducted at Janani, Patna during November 9 – 10, 2004.
- (h) A Six Sigma Green Belt Training Programme was organized at ISI, Delhi Centre during November 22 – 24, 2004. Ten participants attended the programme.
- (i) A Five-Day Residential Training Programme on Environmental "Data Interpretation, compilation, Analysis, presentation and Reporting" was organised during February 22-26, 2005 for Central Pollution Control Board at ISI, Delhi Centre. 18 participants attended the programme.
- (j) A 5-day training programme was organized on "Statistics for Standard Chartered Bank Executives" during the period 26.2.05 to 2.3.05 at Dubai.
- (k) A 5-day training programme was organized on "Statistics for Standard Chartered Bank Executives" during the period 7.3.05 to 11.3.05 at Chennai.
- (l) A 5-day training programme was organized on "Statistics for Standard Chartered Bank Executives" during the period 14.3.05 to 18.3.05 at HongKong.
- (m) A three-day Training Programme was organized on "Statistical Quality Control" during March 14 – 16, 2005 at National Thermal Power Corporation, Noida.
- (n) A Four-Day Training Programme was organized on "Six Sigma Green Belt" In March 2005 at Nu Wave eSolutions Pvt. Ltd., New Delhi

SQC & OR Unit, Hyderabad

Teaching and Training

Teaching in Part-time Certificate Course in SQC were continued for two new batches during February – July 2004 (31st batch) and August 2004 – January 2005 (32nd batch). A total of 23 and 29 students were admitted in the respective batches. 11 students of the first batch passed the final examination while the final examination for the second batch is yet to be held.

G.S.R. Murthy taught Linear Programming to the students of M.Sc. I year, of the University of Hyderabad. P. Bhasankaram gave an invited talk on "Exposing the conspirators in collinearity" to the faculty of Indian School of Business, Hyderabad. S.V.S.N. Murthy gave an invited talk on "Process Capability and Multivariate SPC" to faculty and students of M.Sc at Nagarjuna University, Guntur.

All the faculty members acted as supervisors for project works of the students of the Part-time certificate course in SQC at the Hyderabad Unit. A.L.N. Murthy and S.M. Subhani guided project works of M.Tech. (QR&OR) students during May - July 2004.

A Winter school on Operations Research and its applications was organized during 17 January – 7 February, 2005 at ISI, Hyderabad. Teaching faculty / research scholars from various Universities / colleges across the country participated in the programme. Besides ISI faculty (Chennai, Bangalore, Delhi and Hyderabad), distinguished scientists like Dr. Katta G. Murthy, Dr. M.R. Rao delivered guest lectures in the programme.

Research activities :

Linear models, Regression analysis and Regression Diagnostics, Multivariate Statistical process control, matrix partial orders.

P. Bhasankaram

Research is being pursued in the area of 'Multivariate Statistical Process Control' and on 'Measurement system analysis'.

S.V.S.N. Murthy

Research work is continuing in the area of Linear Complementarity Problem.

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

The new measures Batting Infallibility %, Batting Excellence % and Batting Quality % in Cricket, proposed and sent by Mr. S.M. Subhani have been acknowledged as new ideas by the International Cricket Council in March 2005. Further work is in progress on Evolutionary innovative measures based on Probability concepts for assessing the performance of a cricketer or a team with respect to Batting, Bowling, Fielding and wicket keeping.

S.M. Subhani

Externally funded projects

Externally funded consultancy projects are continuing at State Bank of India, Inspection & Audit Department, Hyderabad; Reliance Infocomm Ltd, Mumbai; Amaraja Batteries Ltd, Tirupati; Satyam Ventures Ltd, Hyderabad; Avenion Ltd., Hyderabad; TVS Rubber, Madurai; Premier Explosives Ltd, Bhongir; VST Industries Ltd., Hyderabad; Suryalata Spinning Mills Ltd., Kahvakurthy; ICICI Securities Ltd., Mumbai; A.P. Central Power Distribution Company Ltd. And Satyam Computer Services Ltd.

Some of the projects undertaken are:

- i) "Cost effectiveness and efficacy of concurrent audit system" at Inspection & Audit Department of State Bank of India, Hyderabad.
- ii) "Estimation of electrical consumption for the agricultural use for AP Central Power Distribution Co. Ltd."
- iii) Guidance on Development and Implementation of Quality Management System for ISO 9001-2000 certification and also on development of statistical quality control system at Suryalata Spinning Mills Ltd., Kahvakurthi, AP.
- iv) Guidance on 15 Six Sigma Black Belt Quality Improvement projects being given at TVS Rubber Industries Ltd., Madurai.
- v) Guidance is being given on 18 Six Sigma Black Belt projects undertaken on zero defect and timely bill delivery (end to end process) at Reliance Infocomm Ltd., Mumbai.
- vi) Guidance is being given on Six Sigma Quality Improvement projects at Premier Explosives Ltd, Bhongir, AP.

Externally Funded In-plant/General Training Programmes

Sl. No.	Name of the Programme	Organization	Period	No. attended
1	Design of Experiments for Product and Process Improvement	Amaraja Batteries Ltd, Tirupati	29 – 30 April 2004	20
2	Statistical techniques for Software Quality	Software Process Improvement Network (SPIN), Hyderabad	7 – 8 May 2004	18
		Satyam Ventures Ltd; Hyderabad	11 – 12 June 2004	20
3	Six Sigma Black Belt Training – Define and Measure Phases; Analyze Phase, Improvement Phase, Control Phase	Reliance Infocomm Ltd, Mumbai	5 – 8 Aug 2004, 13 – 16 Sep 2004, 5-8 Jan. 2005 & 15-19 Feb. 2005	70
4	Executive Briefing on Six Sigma	Premier Explosives Limited, Bhongir	10 Aug 2004	30
5	Statistical Techniques for Six Sigma	Satyam Venture Engineering Services, Hyderabad &	11-12 June 2004, 9-10 Sep. 2004	35

		TVS Rubber, Madurai		
6	Software Six sigma Black Belt training	Jointly organized with SPIN, Hyderabad	Sep.-Oct 2004	15
7	Time Series and Econometrics	ICICI Securities Ltd., Mumbai	13-22 June and 14 – 18 July 2004	15
8	Statistical Process Control	Centre for Electronic Test Engineering, Hyderabad	28-30 July 2004, 28-30 Sep 2004 & 19-21 Jan. 2005	53
9	Quality Management	Matrix Laboratories Ltd., Hyderabad	1 – 3 April 2004	20
10	Measurement System Analysis	VST Industries Ltd., Hyderabad	26 May 2004	7
11	Statistical Techniques in Spinning Mills	Suryalata Spinning Mills, Kalvakurthy	20 Sept. 2004 15 March 2005	30
12	Six Sigma	BDL, Hyderabad, Ordnance Factory	17 Feb. 2005, 22 Feb. 2005	30
13	"Advanced Statistical Techniques" for Six Sigma Master Black Belt Certification	Satyam Computer Services Ltd.	9-10 & 14-16 March 2005	29

Other activities

All the scientific workers of the unit actively participated as members of Local Organizing Committee in the international conference on "FUTURE OF STATISTICAL THEORY, PRACTICE AND EDUCATION" organized at Indian School of Business (ISB), Hyderabad during 29 December 2004 - 01 January 2005. P. Bhimasankaram was the Chairman of Local Organizing Committee.

SQC & OR Unit, Kolkata

Teaching and Training

The staff members of the unit provided faculty support to ISI's regular postgraduate programmes in 5 different grades.

Research activities

Generalized Positive Subdefinite (GPSBD) Matrices

In connection with linear complementarity theory, the class of generalized positive subdefinite (GPSBD) matrices is considered and some properties of this class are obtained. We show that copositive GPSBD matrices are P_0 and a merely generalized positive subdefinite (MGPSBD) matrix with some additional conditions belongs to the class of row sufficient matrices. Further, it is shown that for a subclass of GPSBD matrices, the solution set of a linear complementarity problem is same as the set of KKT-stationary points of the corresponding quadratic programming problem. A counterexample is provided to show that a copositive GPSBD matrix need not be sufficient in general. We also show that if a matrix A can be written as a sum of a copositive-plus MGPSBD matrix with an additional condition and a copositive matrix and if it satisfies a feasibility condition then Lemke's algorithm can solve $LCP(q, A)$. This further extends the applicability of Lemke's algorithm.

A.K. Das and S.K. Neogy

Almost Classes of Matrices

Two principal pivot transform based matrix classes namely almost fully copositive and almost fully semimonotone matrices are introduced and studied. The almost classes studied have algorithmic significance and if these classes are also in Q_0 then these classes are processable by Lemke's algorithm. We introduce a new limiting matrix class called almost \bar{N} and obtain a sufficient condition for a matrix of this class to have Q -property. A counterexample is produced to show that an almost matrix need not be an R_0 -matrix. We also introduce two new limiting matrix classes, namely \bar{N} -matrix

of exact order 2, $\bar{E}(d)$ for a positive vector d and prove sufficient conditions for these classes to satisfy Q -property. Pang's conjecture $E_0 \cap Q \subset R_0$ is not true even when E_0 is replaced by C_0 . We show that Pang's conjecture is true if E_0 is replaced by almost C_0 .

A.K. Das and S.K. Neogy

Stochastic Games:

Two classes of structured stochastic games, namely, undiscounted zero-sum switching controller stochastic game and undiscounted zero-sum additive reward and additive transitions (ARAT) games are considered. The problem of computing the value vector and optimal stationary strategies is formulated as a linear complementarity problem for these two classes of undiscounted zero-sum games. This provides an alternative proof of the orderfield property for these two classes of games.

A.K. Das and S.K. Neogy

Externally Funded Projects

Improving the Yield of O.K. Wheels from Wheel Ingots

This study has been undertaken at Durgapur Steel Plant as a part of their Six Sigma initiatives. Process under consideration begins with SMS special casting bay for wheel ingot casting and spanning up to the final inspection of O.K. Wheels at W&A plant. The yield of the entire process at the current level is quite low to the tune of 54 %. The objective of the study is to ensure a better yield.

Improving Quality and Productivity of Section Mill

Six Sigma initiatives at the Section Mill of Durgapur Steel Plant led to the project of improving quality and productivity. Process under consideration begins with the Blooms at Bloom Stock Bay (BSB) and continues up to the production of finished products at Section Mill, ready for dispatch. The typical problem of the mill is its availability. Besides, an attempt has to be made to improve Section Mill yield as a whole.

For both the preceding projects, Road Maps and Project Charters preparation were done. Baseline Sigma levels and identifying achievable targets were estimated. Identification of weak sub-processes, their causes and interrelationships and action areas have been completed. Accordingly, various data collection plans at different processes of W&A Plant and Section Mill have been chalked out.

P. Das and A.R. Mukherjee

Managing the Finished Stock

The difference between physical stock and computerised stock of finished ink at Coates of India Limited, Kolkata was increasing over time. To tackle this problem, all the possible causes of mismatch were identified and this was followed by a comprehensive snap study. On analysing the collected data, it was found that Part Material after Pot-off, Dispatch during Manufacturing, Urgent Dispatch Physical Counting of Material during Stock-taking were the major issues causing the mismatch. System and procedures were developed and people working in those areas were trained. After training and implementing the procedures mismatch reduced drastically. Further work is in progress to identify other small causes and taking appropriate actions to get rid of the small mismatches.

R. Saha

Supply Chain Management

The supply chain considered in Khadir's Retail business operations was from Suppliers to Warehouse and to Retail Outlets spread all over India. The key logistics issues considered under the project were customer service, return goods handling, inventory management, demand forecasting, order processing, logistics communications and procurement. A total of eight projects were selected to streamline the identified supply chain. A scientific vendor rating system appropriate for the supplier supplying multi-items with multi-sizes has been developed and its implementation has been initiated. A new model for requisitioning quantity determination under (T, R) inventory policy was determined. The implementation of the model has been done successfully. The reverse logistic system related to

customer complaints was streamlined and different modules for receipt, analysis and reporting were integrated with the existing software system in Khadin's. Consumer feedback surveys have been conducted and the areas requiring improvement for better consumer satisfaction were identified. Based on these findings the management has taken suitable policy decisions and technical actions for improvement of the existing system after performing cost-benefit analysis. Remaining projects related to identification of outlet profile, dominance of footwear group in business, forecasting of sales, etc. are in progress.

P. Das and S.K. Gauri

Development of Model for Monitoring New Brand Adoption Using Retail Data

The objective was to develop a model for forecasting sales of a new consumer package product at the early stage of its introduction, for planning manufacturing and reviewing the marketing program. The proposed model was developed based on dealer data as the available data from market research companies in India was based on retail level. Multiple performance criteria, both sales and non-sales, obtained from monthly dealer data were used to compare the new product with previously introduced products in similar categories that exhibit similar growth patterns. Based on the n^{th} month performance of these products, we made a $(n+x)^{\text{th}}$ month projection of the given product with respect to the identified criterion, which was then converted to a sales projection. The model could reasonably predict the brand sales. A software tool has been made for implementing the above methodology. The ACNielsen ORG-MARG has validated the model and the software for 15 brands from different categories.

Development of an Index for Monitoring Brand Performance

An index to monitor brand performance was developed to indicate the direction in which the brand is heading. The index was based on important performance criteria of the product. The parameters Gap, Repeat Factor, Distribution Infrastructure and Average Brand sales were found to explain the variations adequately in market share. The correlation between the Market Share and the developed Index was observed to be quite strong. Out of 16 brands observed, only two brands didn't show good correlation. This might be due to some other factor related to promotion, brand visibility, dealer incentive, etc. relative to the category in which the brand lies. The index is now being validated with other brands at the company's end.

A. Majumdar and R. Selt

Minimization of Loose Short through Efficient Grouping of Tobacco Grades

This study was made at ITD, ITC Limited to reduce the occurrence of loose shorts (amount of tobacco that falls off from the cigarette ends after manufacturing) in the tobacco blends. Loose short depends on tobacco characteristics. Initially the tobacco grades were grouped into different classes based on quantity of loose shorts. Loose shorts resulting from grades belonging to each group are modeled in terms of applicable process parameters. Optimal values of the process parameters are then obtained by simultaneously maximizing the modified desirability function. These optimal values are then used to obtain optimum operating zone of the process parameters keeping loose short quantity within a specified value. Finally to judge the effectiveness of the obtained optimum zone, three new blends were developed and trial runs were conducted, in which the process parameters were allowed to vary within the respective optimum zone. Outcome of these trial runs were found to be very encouraging and accordingly some existing blends were modified and new blends were developed.

R. Selt and A. Gupta

Externally Funded In- Plant Training Programmes

Organization	Title	No. of Participants
Coates of India	Awareness Programme on ISO 9001 QMS	13
	Awareness Programme on ISO 14001 EMS	11
	Programme on Statistical Process Control	8
	Internal Auditors Programme on ISO 14001 EMS	9
Patni Computer Systems Limited	Training Programme on Software Metrics	48
Tata Infotech Limited		
L&T Infotech Limited		
Khadim's Industries Pvt. Ltd.	General awareness of Supply Chain Management (SCM)	15
	Methodologies of SCM related to Khadim's Projects (3 Programs)	25
	General Issues on Conducting Customer Survey	15
	Role of Simple Statistical Tools for SCM	7
Durgapur Steel Plant, Durgapur	Awareness Programme for Top Management on Six Sigma Quality	25
	Six Sigma Metrics and Statistical Techniques	30
TISCO, Jamshedpur	Programme on Statistical Methodologies	30
SNPL, Nepal	Awareness Programme on ISO 9001 QMS	12
	Internal Auditors Programme on ISO 9001 QMS	8
East India Pharmaceuticals Works Ltd.	Awareness Programme on ISO 14001 QMS	17
	Internal Auditors Programme on ISO 14001 EMS	9
Usha Martin Limited	Programme on Supply Chain Management	24
Dum Dum Valves & Bearings	Awareness Programme on ISO 9001 QMS	8

Internally Funded (Northeast) Project

Organised a workshop on SQC & OR at Statistics Department of Dibrugarh University as a North-East Project during 04-06 October 2004. The number of participants was 34, which includes faculties of the various universities.

SQC-OR (T & P) Unit, Kolkata

Teaching and Training

Teaching in the M.Tech.(OROR) 1st year (Engineering and Statistics streams) and 2nd year (combined streams) continued during the current year. Faculty assistance was also provided to B. Stat. (II year) and M. Stat. (II year) courses at ISI, Kolkata.

Research Activities

Economic Design of Control Chart

Theoretical research on economic design of control charts under logarithmic series distribution as process failure mechanism has just been completed.

Quality Adjusted Lifetime

Parametric and Non-parametric modelling of Quality Adjusted Lifetime under simple illness-death has been completed. Work on the nature of bias is in progress.

Progressive Type-II censoring

Point and Interval Estimation of Lifetime Distribution of a k-unit Parallel System, based on Progressively Type-II Censored Data is In progress.

Estimation of Reliability of Shared Load Parallel System

Estimation of Reliability of 2-unit Shared Load Parallel System when the failure time of the first unit is unobserved has been completed.

B. Pradhan

Externally Funded / Consultancy Projects

Control of Profile and Flatness of Steel Sheet

The objective of this project at TISCO, Jamshedpur is to identify the most important process parameters responsible for flatness defects in cold rolling steel sheet and to predict the flatness values of the sheets at different points across the width of the strip for any given input. Data on forty one process parameters and flatness values measured at five positions across the width of the sheets are analyzed. Important process parameters responsible for flatness defects are identified. A relationship between flatness and process parameters has been established. Design of experiment to get the optimum process parameter level is in progress.

Improvement of productivity of Batch Annealing Furnace at TISCO, Jamshedpur

The productivity of Batch Annealing Furnace is measured in terms of RAM time and Stack weight. The analysis (by ANCOVA technique) revealed that productivity depends upon the grade of the steel, width of the coil and Stack height. The mean adjusted productivity (adjusted for width and Stack height) corresponding to each grade has been estimated. It has now been decided that the study of productivity of batch annealing furnace will be done separately for each grade. Further work is in progress to decide the optimum process parameter levels to improve the productivity for each grade.

B. Pradhan

Developing an Index for Trading at the Multicommodity Exchange of India

This prestigious project has been taken up for Multicommodity Exchange of India Ltd. Indian commodity market is all set for a paradigm shift. The setting up of nation-wide online multi commodity exchanges that would create a centralized trading environment across India for offering futures trading in all the commodities is one such significant change. The objective of this project is to construct an effective trading index to enable commodity producers/processors, to sell their produce in advance to protect them against possible price fall and to allow consumers consisting of traders, processors and exporters to buy in advance to protect against possible price increase. The construction of the index has been completed and the validation of the same is in progress.

A.R. Mukherjee, B. Pradhan and A. Gupta

Developing Model for Gate Assignment Problem at Airport

In airline industry assignment of gates at airport for the flights that are arriving and departing is an important area. In this work, the over-constrained gate assignment problem of an airlines industry was considered where many restrictions like fixing of flights in a particular gate, adjacent gate restriction, adjacent gate push time restriction, etc. apply. The problem was formulated as an integer programming formulation with the objective of minimizing total walking distances of passengers subject to eight constraints given by the industry.

Developing A Model for Cubicles Allocation Problem to New Employees

In modern concept, the employees of a company sit in the small space equipped with computer desks called cubicles. The cubicles should be assigned in such a way that a member of the same team or project can contact other members easily. In this project the internal cubicle allocation problem of SkyTech Solutions was considered for new employees with the objective that team members of the same project should be closer to each other. Two models (one heuristic and one integer programming formulation) were developed for the problem.

Measuring Effectiveness of the Training Programs

In this project, a method for finding the effectiveness of different training programs at SkyTECH Solutions was found out. Earlier there was no proper method to analyze the data coming from the feedback forms of the trainees after the completion of the training programs. The analysis was done using Mahalanobis distance. One effectivity measure was proposed using this distance.

Evaluation of Customer Satisfaction Level of Different Projects

Customer satisfaction, being the key element for success in business, is a major concern for any industry. In this project we propose a customer satisfaction index using principal component analysis for Skytech Solution Company. This index was used as an input for the marketing division to identify their potential customers from their past experience.

Comparison of the Performance of Glpk with Cplex as an Optimization Software

In this project the performance of leading commercial optimization software CPLEX was compared with open source software GLPK which needs no money for using. Since CPLEX is a very expensive software Skytech management was eager to know the usefulness of GLPK in comparison with CPLEX. The comparison was made with respect to functionality (algorithms, interfaces, platforms, etc.) and performance in solving different types of combinatorial optimization problems to find the usefulness of GLPK as an alternative to CPLEX.

N. Das

Externally Funded Consultancy Project / Training Programme

Consultancy service for TISCO, Jamshedpur has started and is in progress. This is a joint effort of SQC-OR unit, Kolkata and SQC-OR (T&P) unit, Kolkata.

Externally Funded In-Plant Training Programmes

- (a) A five-day in-plant training programme on Multivariate Statistical Techniques was organised at TISCO, Jamshedpur during 21-25 February 2005 jointly with SQC & OR Unit, Calcutta. 30 participants attended the programme.
- (b) A training program on Six Sigma, Lean Six Sigma and Knowledge Mapping was organised for executives of Orient Fans Ltd., Calcutta on 12 January 2005.
- (c) A two-day top management training program on Six Sigma Strategy Deployment and Six Sigma Infrastructure was conducted at Orient Fan Ltd., Calcutta, during 25-26 January, 2005.

SQC & OR Unit, Mumbai

Externally Funded (Consultancy) Projects

Engineering Lead-time reduction

A study to reduce the lead-times for engineering data, electrical release and mechanical release was undertaken. Lead-time for releasing engineering data, electrical release and mechanical release was 82.10 hrs, 28.41 hrs and 47.95 hrs respectively and considered very high. The problem is more due to

non-optimal resource utilization. The problems were identified as (i) Multi-tasking is very high, (ii) 33% time is spent in Sales support, Approvals and Change Management, (iii) Priorities decided on a job to job basis and finally (iv) Commitments not made based on resource allocated and available. A process flow model is developing taking care of skill and existing workload. Implementing the model helped to reduce the lead-time and thus improve the yield. Average lead-time is reduced to 64.74 hrs, 24.41 hrs., and 39.91 hrs for engineering data, electrical release and mechanical release respectively.

Variation reduction in Aura Wound Stator Grinding Process

Oversize and undersize of stator in grinding operation resulted in rejection in the Final assembly line. Measurement process was found incapable, which resulted in initial problems. Measurement process improved. After investigation it was found that the process is having a trend due to wear out of grinding wheel. Other causes are identified through FMEA analysis. Corrective and preventive action was taken. A feed back control plan is developed to take care of wear out. The process variation is reduced and resulted in Rs. 6 lakhs saving.

A. Sarkar

Externally Funded General Training Programmes:

- Programme on Six Sigma Deployment was conducted during July 15-16, 2004
- Programme on SPC was conducted during September 15-17, 2004
- Programme on Six Sigma Deployment was conducted during Dec 1-3, 2005

Externally Funded In-plant Training Programmes

Sl. No.	Title	Venue	No. of Participants
1	Black Belt Training Programme	Reliance Industries, Fibre Business Group	40
2	Green Belt Training Programme (2 programmes)	CIPL Nagpur	50
3	Black Belt Training Programme	Larsen & Toubro, Sales & Mktg. Associated with Bangalore unit	15
4	FMEA Training Programme	Ordnance Factory Nagpur	25
5	SPC Training Programme	Asahi Glass Ltd, Mumbai	22
6	Seminar on Six Sigma	Small Industries Service Institute, Mumbai	100
7	Black Belt Training Programme	Reliance Industries, Silvassa	40
8	Black Belt Training Programme	Larsen & Toubro, Powai	20
9	Design of Expts	RPG Life Sciences	22
10	Programme on Design of Expts.	RPG Life Sciences	22
11	SPC Training Programme	Crompton Greaves Ltd.	23
12	Internal Audit program on ISO 9001:2000	Wimco Ltd	8
13	Inferential Statistics	Crompton Greaves Ltd.	23
14	Six Sigma Black Belt training	BHEL, Bhopal	32
15	Design of Experiments	Crompton Greaves Ltd.	23

SQC and OR Unit, Pune**Externally Funded In-Plant Training Programmes**

Organization	Title	Number of participants
Reliance Industries Limited, Hazira	Champion's Programme on Six Sigma 6days	35
	Black-belt Programmes on Six Sigma: 3 batches with 18 days each	78
	Green-belt Programme on Six Sigma for 3 batches: 4 days for each batch.	150
	Process Owner's Programme: 3 batches each with 2 days	75
Reliance Infocomm	Black-belt Programmes on Six Sigma: 1 batch with 12 days	18
Johnson & Johnson, Ethicon Div.	Black-belt programme: 1 batch with 20 days	25
	Green-belt programme 2 batches with 10 days	40
IPCL, Nagothane	Training Programme on SPC: 3 batches each with 3 days	60
IPCL, Baroda	Awareness Programme on Six Sigma for top management	30

Externally Funded (Consultancy) Projects

About 80 Six Sigma projects have been guided in Reliance, Hazira and 18 projects at Reliance Infocomm.

Library, Documentation and Information Sciences Division**Documentation Research and Training Centre (DRTC), Bangalore****Research and other Scientific Activities**

The main areas of research in which the different members of the DRTC Faculty were engaged during the period, are furnished below:

The study of various methods of knowledge representation, such as, semantic nets, frames, and predicate calculus, etc.

The application of the Modern scientific management techniques to the planning and management of information system, centers and services.

The study of Internet technology and its applications.

The development of bibliometric and scientometric measures for evaluating the use of library and information services and scientific output respectively.

The development of guidelines and software for library house keeping operations, such as, circulation control, service control and acquisition control, etc.

Library, Kolkata

The Central Library of ISI is located in Kolkata with a network extending to other locations at Delhi and Bangalore. Over the years, the Library has occupied a unique place in providing information sources for academic and research activities of the Institute and attained the distinction of being one of the richest libraries of the country, particularly in the field of Statistics, Mathematics, Economics, Computer Science and related disciplines. The Library has also been the Eastern Regional Center Library of National Board for Higher Mathematics (NBHM) since 1989. It also receives grant from the NBHM, Department of Atomic Energy, Government of India.

It is an automated library having an excellent collection of books, journals, reports and large number of electronic journals and databases. The Library is open throughout the year (except on national holidays) and the library staff aims to provide optimum services to the faculty members, scholars, students, visiting scientists and Institute Members.

To achieve the goal of the Library, the following activities were undertaken during the year under report –

Collection: 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 858 books out of which 771 were purchased (including 47 from NBHM grant) and 87 books were received on complimentary basis. The Library also accessioned 1220 bound volumes of journals and subscribed to 476 scholarly journal titles in print. It maintains the publication exchange programme of 'Sankhya- the Indian Journal of Statistics' with national and international institutions/organizations through which the library has got 99 titles in this period. More than 35 journal titles were received on complimentary basis. The library received and processed more than 5000 loose issues of journals. It classified and catalogued 1264 new books and filed 5056 computer printed catalogue cards. It also processed 448 titles on government reports/data-books, etc. Beside this, the library has added a collection of 115 books, mainly in English and Bengali, on literature, humanities, travel, health and recreation in its statistical workers' circulating library totaling its collection to over 37000. In addition to that the library has about 32000 reprints. Recently the library has weeded out a large stock of government reports/data sources published by different countries in foreign languages other than English and Chinese. Thus the total collection of the library stands at around 306225.

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 added 45 CDs & floppies containing books and 18 CDs on statistical data. Thus the total collection of CDs has risen to 753. The library has provided online access to about 350 full-text journals. It has renewed the online databases like MathSciNet, EconLit and ScienceDirect and subscribed to Springer Link through consortia. It also subscribed to the IEL Online of the IEEE/IEE publications, Current Index to Statistics (CIS) on Web, IndiaStat.com – India specific socio-economic statistical facts and figures. The library has also subscribed to few statistical data sources available on CDs such as Census of India, National Sample Survey (NSS) data, Central Statistical Organization (CSO) data, etc.

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, 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 by filling up the Membership form and receive a bar-coded "Library Card". During this period library membership was given to 558 persons and 1052 readers were given special permission to use the library for short periods. Currently the total number of library members rose to 3189. Total number of members including staff, students and research scholars of the Institute rose to 874 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.

Circulation Service: During this period 126934 books and other documents were issued to the users on loan and reference. 1350 publications from Government of India and other International Organizations and 52 data CDs, were issued to users on reference. The library supported 4023 reprint requests for journal articles. It introduced the email-based services like 7-day advance alert, long overdue notice and check-in information. 35000 books from the workers' circulating library were issued for lending and reference in this period.

Inter-library loan: 11 books and journals were borrowed from other libraries and 70 books and journals were lent to other libraries.

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

Self-Photocopying Service: The library has started the Self-photocopying service from June 2003 in its journal section and made this service available everyday throughout the library hours. During this period 30391 pages were photocopied from the journals.

Electronic Document Delivery Service: Full-text articles and/or bibliographical data were provided through email from online resources. Besides electronic document delivery, 650 pages of printout from full-text articles were provided.

Online Full-Text Access to Journals/Databases: During the period under review, the library has provided services from more than 350 online journals and major databases like MathSciNet, Econt, ScienceDirect, IEL Online (IEEE/EE Electronic Library), Springer Link, CIS on Web. The online access is available through campus-wide network.

Reprographic & Photographic Services: During this period, it produced more than 4 lakhs photocopies of research and academic materials, over 1.55 lakh digital copy prints, around 4000 photographs including lecture slides, copy negatives, overhead transparencies and about 3000 items of computer output (color and B&W), graphic designs, scanning, CD writing, restoration and modification of images, etc.

Documentation Service: It prepared a searchable bibliographic database on scientific contributions made by the ISI scientists on all subject fields since 1934. During this period 3033 entries were added taking the total to 8980 entries.

General Enquiry Assistance & Consultation Service

Special Initiatives:

Consortia arrangements: During the year under report, the Library has initiated different consortia to enhance the electronic collection and to cope with the increasing subscription cost and diminishing budget.

Duplicate journal donation program: Around 10000 duplicate issues of scientific journals, received over a period by the library, were distributed to the libraries like ISI Delhi, Calcutta Mathematical Society, Calcutta University, Rabindra Bharati University, R K Mission Vidyamandir, S N Bose National Centre for Basic Sciences, Saha Institute of Nuclear Physics, etc.

Preservation and conservation: In this period a total of 1911 books, 1220 journals and 200 reports were bound. Lamination and de-acidification of 14 rare books and 2 bound volume of journals, lamination of 378 books and 160 bound volumes, and photocopying of 4 rare and out-of-print books were made during this time.

Electronic Article Surveillance (EAS) System: To enhance the security of the central library, an imported radio frequency (RF) based electronic article surveillance (EAS) system has been installed and about 22000 tags were pasted to the books of selected subject areas.

Digitization of ISI Ph.D. Theses: During this period, 142 theses have been digitized on Compact Disk to be made available on the Web after the completion of the work.

Retrospective conversion of computerized cataloging of around 5800 English books on literature, travel, entertainment, etc. of the workers' circulating library was completed.

Prasanta Chandra Mahalanobis Memorial Museum and Archives

The Museum and archives carried out regular maintenance programme for the large collection of original source materials in respect of life and works of Professor P C Mahalanobis and the growth of Indian Statistical Institute. The museum now has five galleries with the display of 752 exhibits and a collection of artifacts.

The renovation of the first floor has been completed and incorporated as the extended display area. The large drawing entitled "Pratyagata" by artist Nandalal Bose with a poem written on it by Rabindranath Tagore was restored by the conservation team of Indian Museum, Kolkata and was placed on display in the museum.

The museum was visited by the students of 14 different schools of Kolkata under a project of the Institute. Distinguished personalities, visiting scientists, research scholars and students from universities and colleges visited the museum in this period.

Among the archival collections, 15 audio spools and 4 film rolls were converted into CD. 50 items of 6000 sheets of letters, files, reports, etc. were treated for preservation. Five researchers have used the archival documents for research purpose.

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, Econometrics, 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. Some of the main activities of the Library during the period under review were as under :

Acquisition : Library purchased 615 books during the current year from both the regular and NBHM funds. It received 77 books as gift, thus raising the stock to 41394 volumes.

Periodicals : During the period under review, 256 titles of journals, both foreign as well as Indian have been approved for renewal.

Consortium for MathSciNet with the American Mathematical Society, Elsevier Science Direct (Consortium of the 3 campuses of ISI, Kolkata, Bangalore and Delhi) and Academic membership with SIAM has been renewed.

Twelve journals, both Foreign as well as Indian are being received in the library as gift from various sources.

638 sets of loose issues of periodicals have been bound and added to the stock.

Approximately 100 Technical Reports/Discussion Papers in Economics have been received in the library from various sources, in exchange to ISI Delhi "Discussion Papers in Economics".

Circulation Services : During the current year, 130 members, availed the lending facilities as permanent members of the library, whereas 778 members availed reference facilities as temporary members of the library. More than 3890 publications have been circulated among the members.

Reprographic Services : Indian Statistical institute, Delhi centre Library provides photocopying services to its users. During the year, more than 47319 pages have been copied and made available to both the permanent and temporary members of the library and outsiders.

In addition to photocopying facilities, 70 articles have been downloaded in PDF format, attached to e-mail and sent to different users on request.

Other Activities :

NBHM Regional Library

ISI, Delhi Centre Library, being the regional library to serve the Northern Region, received an additional grant of Rs.19,00,000 from National Board for Higher Mathematics (NBHM), for strengthening its resources in Mathematics and Statistics.

Current Contents/Newsletter

Brought out 12 monthly issues of the "Current Contents of Journals", by photocopying the contents page of each journal received at ISI, Delhi Centre Library, during a specified period and distributed to 30 departments of Statistics and Mathematics of universities in the northern region.

Similarly, to keep the users informed about the new books acquired at the ISI, Delhi Centre Library, a quarterly issue of "Newsletter" is produced and widely distributed. An electronic issue is also maintained on the Net and sent to those who desire to receive it through e-mail.

Online access to the full text of the articles of more than 200 journals has been acquired, and all those have been listed on the web with direct access to the publishers web page under the heading "Electronic Journals".

Proposals

For security measures, it is proposed to get an electronic surveillance system in the Library. The proposal is under review.

Library, Bangalore

Book Acquisition : During the year, 430 books were added to the library by purchase, 82 were received gratis.

Stock Position: The total stock position as on 31st March 2005 is as follows:

Books	: 26333
Books received gratis	: 1784
Bound volumes of periodicals	: 12245
No. of periodicals subscribed	: 300
No. of periodicals received gratis	: 31

Technical Processing: About 480 books were classified and catalogued during the period.

Circulation : During the period, library facilities were enjoyed by 621 users. 219 of them availed lending facilities, 10 visiting professors of different units of ISI were also provided with lending facilities. A total of about 19201 books and periodicals (including loose issues), were circulated by the library. The in-house use of books and periodicals was around 4200. About 48 inter library loan transactions were registered.

Inter Library Loan Service: Inter library loan facilities were availed by the ISIBC library users from the following local libraries.

1. British Library
2. Indian Institute of Management, Bangalore
3. Indian Institute of Science, Bangalore
4. Tata Institute of Fundamental Research, Bangalore

Indian Statistical Institute, Bangalore Centre library extends inter library loan facility to :

1. Indian Institute of Science
2. Tata Institute of Fundamental Research, Bangalore

Reprographic Service : Library provided 180000 photocopies to the users during the year under review.

Documentation Service : The following publications were brought out regularly from the library :

1. Bimonthly list of books
2. Monthly list of current periodicals
3. Current content of journals
4. Online Public Access Catalogue (OPAC)

Computer and Statistical Services Centre

CSSC maintains the campus-wide network of the Baranagar campus of ISI. It provides internet and e-mail access to all users of Baranagar campus of ISI. It also provides computer access to students, research scholars and faculty for carrying out assignments and research activities. It has installed a number of statistical and graphics packages to help them carry out their work. Faculty and other personnel of CSSC help other units of ISI in teaching and solving statistical and computer-related problems. CSSC also takes part in conducting workshops in North-East India.

During the year, the campus-wide network has been extended to the new Academic Building, Phase I and the new Boys' Hostel and new Ladies' Hostel.

4. INTERNALLY/EXTERNALLY FUNDED PROJECTS

Internally Funded Projects

Ongoing Projects

1. Name of the project : Implementation of provably secured public key protocols
Project leader : Palash Sarkar
Unit involved : ASU
2. Name of the project : Effect of traffic noise on hearing of school children in Kolkata
Project leader : Anup Dewanji
Unit involved : ASU
3. Name of the project : Facility Location Problem
Principal investigator : Subhas C. Nandy
Unit involved : ACMU
4. Name of the project : Multi-layer VLSI Routing
Principal investigator : Susmita Sur-Kolay
Unit involved : ACMU
5. Name of the project : Checkpointing in Distributed Systems
Principal investigator : Krishnendu Mukhopadhyaya
Unit involved : ACMU
6. Name of the project : Wireless Networks and Mobile Computing
Principal investigators : B. P. Sinha, J. Dattagupta and N. Das
Unit involved: ACMU
7. Name of the project : Low-power Testing of VLSI Circuits
Principal investigator : B. B. Bhattacharya
Unit involved: ACMU
8. Name of the project : Document Analysis
Principal investigator : U. Pal
Unit involved : CVPRU
9. Name of the project : Handwritten Character Recognition
Principal investigator : U. Bhattacharya
Unit involved : CVPRU
10. Name of the project : Natural Language Processing
Principal investigator : B.B. Chaudhuri
Unit involved : CVPRU
11. Name of the project : Speech Analysis and Synthesis
Principal investigator : B.B. Chaudhuri
Unit involved : CVPRU
12. Name of the project : Digital Data Compression and Security
Principal Investigator : U. Garain
Unit involved : CVPRU
13. Name of the project : Information Retrieval
Principal investigator : M. Mitra
Unit involved : CVPRU

14. Name of the project : Image compression using BTC-VO
Principal investigator : Bhabatosh Chanda
Unit involved : ECSU
15. Name of the project : Computational Intelligence (CI) approaches for detection of breast Cancer
Principal investigator : Srimanta Pal
Unit involved : ECSU
16. Name of the project : Tracking Temporally Deformable Objects
Principal investigator : Dipri Prasad Mukherjee
Unit involved : ECSU
17. Name of the project : Digital watermarking and image/video compression using wavelet and fractals
Principal investigator : Malay K. Kundu
Unit involved : MIU
18. Name of the project : Integration of splines and neural network for multiresolution classification
Principal investigator : Sambhunath Biswas
Units involved : MIU
19. Name of the project : Soft Computing Approach to Protein Folding
Principal investigator : A. Ghosh
Units involved : MIU
20. Name of the project : Discovering patterns for large, complex data with application to bioinformatics
Principal investigator : Sanghamitra Bandyopadhyay
Units involved : MIU
21. Name of the project : Support vector machines and web page ranking for data mining
Principal investigator : C. A. Murthy
Units involved : MIU
22. Name of the project : Geodynamics of the Precambrians of the East Indian Shield
Principal investigator : Samarendra Bhattacharya
Unit involved : GSU
23. Name of the project : Evolution of the Nallamalai fold belt – fault reactivation and kinematics
Principal investigator : Dilip Saha
Unit involved : GSU
24. Name of the project : Mesozoic tetrapods from the Satpura and Pranhita-Godavari basins
Principal investigator : D. P. Sengupta and S. Bandyopadhyay
Unit involved : GSU
25. Name of the project : Sedimentology and palaeoclimatology of the upper Gondwana Succession in the Satpura basin
Principal investigators : S.N. Sarkar, T. Chakraborty, P. Ghosh and P. Maulik
Unit involved : GSU
26. Name of the project : Physicochemical Studies of Self-organized systems using Surfactant(s)/Cosurfactant(s)/Oil(s)/Polar solvent(s) (aqueous and nonaqueous) [Micellar and Microemulsion systems]
Principal Investigator : Bidyut K. Paul
Unit involved : GSU

27. Name of the project : (NE Project) River Dynamics Of The Sub - Himalayan Alluvial Plain In Northeastern India: A Study of Interaction Between Tectonics and Climate In a Foreland Setting.
Principal Investigators : Parthasarathi Ghosh and Tapan Chakraborty
Unit Involved : GSU
28. Name of the project : Integral Equations and Applications
Principal investigator : B. N. Mandal
Unit Involved : PAMU
29. Name of the project : Phase Statistics In Interacting Fock Space
Principal investigator : P. K. Das
Unit Involved : PAMU
30. Name of the project : Waves on Thin Flowing Film
Principal investigator : B. S. Dandapat
Unit Involved : PAMU
31. Name of the project: Interaction of flow and sediment suspension over bedform structures :
experimental and theoretical studies
Principal investigator : B. S. Mazumder
Co-investigators : J. K. Ghosh and Chandan Chakraborty
Units Involved: PAMU, SMU and GSU
32. Name of the project : Ecology and physiological studies on the mangroves of Sundarbans
Principal investigator : M. Ghose
Unit Involved: AgSU
33. Name of the project : Studies on the ecology, conservation, propagation, and utilization of palms with special reference to rattans (Northeast Project)
Principal investigator : M. Ghose
Unit Involved: AgSU
34. Name of the project : Study of the microbial succession and changing molecular microbial diversity in a bio-organic composting system
Principal investigator : S. Chanda
Unit Involved : AgSU
35. Name of the project : Ponds, aquatic weeds and water quality: An Investigative study
Principal investigator : A. Dewanji
Unit Involved : AgSU
36. Name of the project : Mathematical ecology and epidemiology
Principal investigator : J. Chattopadhyay
Unit Involved : AgSU
37. Name of the project : Studies on productivity, stability and sustainability of rainfed agricultural systems in the eastern plateau region
Principal Investigators : P. Banik and P.K. Ghosal
Unit Involved : AgSU
38. Name of the project : Studies on hepatoprotective activity of neem (*Azadirachta indica*) leaves
Principal Investigator : R.R. Chattopadhyay
Unit Involved : AgSU

39. Name of the project : Innovative biopesticidal efficacy of some indigenous plants on insect pests
Principal Investigator : A. Goswami
Unit involved : AgSU
40. Name of the project : Adaptability and yield performance of new sugar beet (*Beta vulgaris* L.) varieties in lower Gangetic plains of West Bengal
Principal investigators : S. Bank and S. Chanda
Unit involved : AgSU
41. Name of the project : Status of Austro-Asiatic tribes in the peopling of India
Principal investigator : B.M. Reddy
Unit involved : BAU
42. Name of the project : DNA polymorphisms in the castes and tribes, Andhra Pradesh, India.
Principal investigator : B.M. Reddy
Unit involved : BAU
43. Name of the project : Health and disease among populations inhabiting contrasting ecological niches
Principal investigator : S. Mukhopadhyay
Unit involved : BAU
44. Name of the project : Adolescent reproductive health : Biocultural dimensions
Principal investigator : S. Mukhopadhyay
Unit involved : BAU
45. Name of the project : Genetic affinity and diversity among the Adi tribe of Arunachal Pradesh
Population structure and genetic differentiation of Adi-Pasi tribe
Principal investigator : T.S. Vasulu
Unit involved : BAU
46. Name of the project : Health and Disease : Comparison between two ecological settings
Principal investigator : S.K. Roy
Unit involved : BAU
47. Name of the project : HPV Infection and cervical cancer in the Northeastern states of Sikkim and Manipur
Principal investigator : S. Sengupta
Unit involved : HGU
48. Name of the project : Studies on genetic epidemiology and Diversity in Indian Populations
Principal investigator : P.P. Majumder
Unit involved : HGU
49. Name of the project : Studies on genomic diversity and affinities in ethnic populations of Northeast India
Principal investigator : P.P. Majumder
Unit involved : HGU
50. Name of the project : Political Economy of Well-Being of West Bengal
Project leader : A. Sarkar
Unit involved : ERU
51. Name of the project : Language Identification, Classification and Analysis in Children with neuro-linguistic, speech and hearing Disorders
Principal investigator : M. Indu
Unit involved : LRU

52. **Name of the Project : Mapping Water Demand**
Principal investigator : E. Somanathan
Unit involved : PU, Delhi
53. **Name of the Project : Regional Economic Growth in India**
Principal investigator : C. Ghate
Unit involved : PU, Delhi
54. **Name of the Project : Determinants of Child Labour**
Principal investigator : S. Das
Unit involved : PU, Delhi
55. **Name of the project : A Study on Preferences to different reading and writing motives of tribal children in Primary education of Tripura and Manipur**
Principal investigator : D. Dutta Roy
Unit involved : PRU
56. **Name of the project : Economic reforms and Indian agriculture in North-East**
Project leaders : V.K. Ramachandran and M. Swaminathan
Unit involved : SRU
57. **Name of the project : Occupational segregation in the factory sector in Indian industries (1961- s2001)**
Project leaders : M. Chattopadhyay and M. Swaminathan
Unit involved : SRU
58. **Name of the project : Role of social connections in coping with the changing situation : an exploratory study on the villagers of West Bengal.**
Project leader : A. K. Chatterjee
Unit involved : SRU
59. **Name of the project : Process of empowerment of women in rural areas : case studies in two North-Eastern states.**
Project leader : B. N. Ghosh
Unit involved : SRU
60. **Name of the project : Digitization of Seminar Volumes - Prototype Development**
Project leader : Devika P. Madalli
Unit involved : DRTC, Bangalore

Completed Projects

1. **Name of the project : Robust estimation and goodness of fit tests for circular models**
Project leader : Ashis SenGupta
Unit involved : ASU
2. **Name of the project : Hybridization of knowledge-based and case-based reasoning in neuro-fuzzy frame for pattern recognition problems**
Principal investigator : S.K. Pal
Unit involved : MIU
3. **Name of the project : Multi-scale image segmentation, representation and storage for context based image retrieval**
Principal investigator : M.K. Kundu
Unit involved : MIU

4. **Name of the project :** Application of Symmetry Algebras to some problems of Quantum Physics
Principal investigator : P. Roy
Co-investigators : B. Roy and R. Roychoudhury
Unit involved : PAMU
5. **Name of the project :** Interacting Fock Space
Principal investigator : P. K. Das
Co-investigators : Luigi Accardi and Dr. Marcolino Nhani, Rome, Italy
Unit involved : PAMU
6. **Name of the project :** Wave Scattering & Associated Mathematical Techniques
Principal investigator : B. N. Mandal
Unit involved : PAMU
7. **Name of the project :** Waves on thin conducting liquid film flowing down an inclined plane (North-East Project)
Principal investigator : B. S. Dandapat
Co-investigators : A. K. Borkakali, Ashim Mukhopadhyay and Bhim Prasad Sarmati
Unit involved : PAMU
8. **Name of the project :** Polymorphisms in NAT1 and NAT2 drug-metabolizing genes and risk of tobacco related oral cavity precancer and cancer in India
Principal investigator : B. Roy
Unit involved : HGU
9. **Name of the project :** Cervical Neoplasia: Host genetic factors for high-risk HPV infection and its natural history
Principal investigator : S. Sengupta
Unit involved : HGU
10. **Name of the project :** Study on Some Health Economic Issues in the North East
Project leader : S. Mitra
Unit involved : ERU
11. **Name of the project :** Quantification and Non-Quantification : Searching for Convergence
Principal investigator : A. Choudhry
Unit involved : LRU
12. **Name of the Project :** Socialization and Cognitive moral development of children across cultures
Project leader : A. Ghosh
Unit involved : PRU
13. **Name of the Project :** (North-East Project) - Workshop on SOC & OR
Project Team : Sukalyan Sengupta, Prasan Das and Arup Kumar Das
Unit involved : SOC & OR Unit, Kolkata

Externally funded projects

Ongoing Projects

1. **Name of the project :** Improved Genome Annotation Through a Combination of Machine Learning and Experimental Methods
Principal Investigators : Probal Chaudhuri and Rajeeva Karandikar
Unit(s) involved : SMU, Kolkata and Delhi
Funded by : CSIR (under NMIMT scheme)

2. Name of the project : Hypergraceful Graphs
Principal investigator : Tarkeshwar Singh
Unit involved : SMU
Funded by : DST
3. Name of the project : Extremal Structures in Banach spaces
Principal investigators : V. Indumathi, Pondicherry University; Pradipta Bandyopadhyay of ISI, Kolkata, TSSRK Rao of ISI, Bangalore and Bor-Luh Lin, University of Iowa, USA
Unit(s) involved : SMU, Kolkata and Bangalore.
Funded by : DST-NSF
4. Name of the project : Homogeneous Operators
Principal investigator : G. Misra
Unit/division involved : SMU, Bangalore
Funded by : DST
5. Name of the Project : Swarnajayanti fellowship project
Principal investigator : B.V. Rajarama Bhat
Unit involved : SMU, Bangalore
Funded by : DST
6. Name of the project : Reliability Estimation of a Solid Rocket Motor with limited Data
Project leader : Debasis Sengupta
Unit involved : ASU
Funded by : ISRO
7. Name of the project : Evaluation of reliability of a unit of flight control software
Project leader : Anup Dewanji
Unit involved : ASU
Funded by : ISRO
8. Name of the project : Software development for tiger pugmark analysis
Project leader : Debashis Sengupta
Unit involved : ASU
Funded by : Directorate of forests, Govt. of India under the aegis of UNDP
9. Name of the project : Visual cryptographic schemes
Project leader : Bimal Roy
Unit involved : ASU
Funded by : ISRO
10. Name of the project : Sample surveys of elephant population in elephant reserves of West Bengal
Project leader : Debashis Sengupta
Unit involved : ASU
Funded by : Ministry of Environment and Forests, Govt. of India
11. Name of the project : Development of Cryptographic protocols based on Weil and Tate pairing on elliptic curve
Project leader : Bimal Roy
Unit involved : ASU
Funded by : MIT

12. Name of the project : Steganographic Schemes for Satellite Images for ISRO
Project leader : Subhamoy Maitra
Unit involved : ASU
Funded by : ISRO
13. Name of the project : Cryptanalysis and design of steganographic schemes
Project leader: Subhamoy Maitra
Unit involved : ASU
Funded by : DRDO
14. Name of the project : Development of an Indigenous Block Cipher Scheme for ISRO
Project leader . Palash Sarkar
Unit involved : ASU
Funded by : ISRO
15. Name of the project : Investigation of means to assess errors in surveys by judicious techniques
Project leader : Anjit Chaudhuri
Unit involved : ASU
Funded by : CSIR
16. Name of the project : Development of algorithm for robust speaker recognition by statistical methodology
Project leader : Amita Pal
Unit involved : ASU
Funded by : Ministry of Information Technology, Govt. of India
17. Name of the project : Statistical classifiers for encryption algorithm
Project leader : Ayanendra Nath Basu
Unit involved : ASU
Funded by : SAG, DRDO, Govt. of India
18. Name of the project : Development of design aid/tool for primitive polynomial over $GF(2^8)$
Project leader : Bimal Roy
Unit involved : ASU
Funded by : CAIR, DRDO, Govt. of India
19. Name of the project : New Techniques of Fast Image Compression based on Human Vision Systems and Geometric Data Structures.
Principal investigators : B. B. Bhattacharya and M. K. Kundu
Co-Investigator : C. A. Murthy
Units involved : ACMU and MIU
Funded by : Intel Corporation, USA
20. Name of the project : Delay Fault Modeling and Test Generation for Power Supply Noise
Principal investigator : S. Sur-Kolay
Co-Investigator : B. B. Bhattacharya
Unit involved : ACMU
Funded by : Intel Corporation, USA
21. Name of the project : Handwriting Recognition for Postal Automation
Principal investigator : B. B. Chaudhuri
Unit involved : CVPRU
Funded by : Indo-French Centre for the Promotion of Advanced Research (IFCPAR)

22. Name of the project : Computational Intelligence Based Remote Welding System
Principal investigator : Nikhil Ranjan Pal
Unit involved : ECSU
Funded by : Board of Research in Nuclear Sciences, BARC
23. Name of the project : Soft Computing for Medical Image Segmentation and Classification
Principal investigator : S. Bandyopadhyay
Unit involved : MIU
Funded by : INSA
24. Name of the project : Knowledge-based Connectionist Data Mining System : Design and Applications
Principal investigators : S. K. Pal and S. Mira
Unit involved : MIU
Funded by : CSIR
25. Name of the project : Advanced techniques for remote sensing image processing
Principal investigator : A. Ghosh
Unit involved : MIU
Funded by : DST, India and MEA, Italy
26. Name of the project : Center for Soft Computing Research : A National Facility
Principal investigator : S.K. Pal
Unit involved : MIU
Funded by : DST,
27. Name of the project : Mafic crustal xenoliths.
Principal investigator : Samarendra Bhattacharya
Unit involved : GSU
Funded by : DST
28. Name of the project : Turbulent and incipient suspensions due to bursting and their sedimentological implications . An experimental study
Principal investigator : B. S. Mazumder
Co- investigators : J. K. Ghosh and Chandan Chakraborty
Units involved : PAMU, SMU and GSU
Funded by : DST
29. Name of the project : Water Wave Diffraction by Floating and Submerged Bodies
Project leader : B. N. Mandal
Unit involved : PAMU
Funded by : CSIR
30. Name of the project : Studies on the Effect of Multiple Scattering on the Shift of the Spectral Lines and Applications
Principal investigators : Sisir Roy and H. C. Kandapal
Projector coordinator : R. Merotra
Units involved : PAMU, ISI, Optical Radiation Standards, NPL, New Delhi and ORS, NPL, New Delhi
Funded by : DST
31. Name of the project : Algebraic Analysis of some Exactly Solvable Quantum Models
Project leader : Preeti Parashar
Unit involved : PAMU
Funded by : DST

32. **Name of the project :** Studies on Environmental and Ecological Aspects of Mangrove Biology
Principal investigator : M. Ghose
Unit involved : AgSU
Funded by : University of Western Sydney, Australia
33. **Name of the project :** Forest and Tree Resources for the Poor Urban Households in Developing Countries
Principal investigator : B. Mukhopadhyay
Unit(s) involved : BAU and AgSU
Funded by : DFID
34. **Name of the project :** Genomic Diversity in the Tribal Populations of AP in the Broader Context of the Peopling of India
Principal investigator : B.M. Reddy
Unit(s) involved : BAU and CCMB, Hyderabad
Funded by : CSIR
35. **Name of the project :** People's Use of Forest Resources vis-à-vis Impact of Forest Depletion on Livelihood Issues of Local People in the Sikkim Himalaya
Principal investigator : B. Mukhopadhyay
Unit involved : BAU
Funded by : Ministry of Environment and Forests, Govt. of India
36. **Name of the project:** Physical Growth, Body Composition and Nutritional Status of the Bengali School aged children, adolescents and young adults of Calcutta, India
Principal investigator : P. Dasgupta
Unit involved : BAU
Funded by : Neys-van-Hoogstraten Foundation (NHF), The Netherlands
37. **Name of the project:** Single Nucleotide Polymorphisms: Validation and Identification in ethnic populations of India
Principal investigator : P.P. Majumder
Unit involved : HGU
Funded by : Department of Biotechnology, Govt. of India
38. **Name of the project :** Molecular Genetic Studies on Type-2 Diabetes and Diabetic Retinopathy
Principal investigator : P.P. Majumder
Unit involved : HGU in collaboration with Madras Diabetes Research Foundation and Indian Institute of Science
Funded by : Department of Biotechnology, Govt. of India
39. **Name of the Project :** Spatial Dimensions of Reproductive health Status and Services - An Analysis of RCH/RHS/NFHS
Principal investigator : B.N. Bhattacharya
Unit involved : PSU
Funded by : Indian Council of Medical Research
40. **Name of the project :** External evaluation of Total Literacy activities in West Tripura and Dhalai districts of Tripura
Project leader : A. Dasgupta
Unit involved : SRU
Funded by : State Resource Centre, Tripura and the Zila Saksharata Samitis of West Tripura and Dhalai districts of Tripura

41. Name of the project : Six Sigma & Market Research Training
Project team : A.K. Chaudhuri
Unit involved : SQC & OR Unit, Bangalore
Funded by : ABC Business Solutions, Delhi
42. Name of the project : Six Sigma Training & Implementation
Project team : A. K. Chaudhuri
Unit involved : SQC & OR Unit, Bangalore
Funded by : ACN- ORG MARG, Baroda
43. Name of the project : Siject : Sigma Implementation
Project leader : P. K. Perumallu
Unit involved : SQC & OR Unit, Bangalore
Funded by : AFL, Hoshiarpur
44. Name of the project : Training & Implementation of TS 16949 – 2002 & Six Sigma
Project team : A. K. Chaudhuri, U. H. Acharya. T. Sreenivasa Rao
Unit involved : SQC & OR Unit, Bangalore
Funded by : AT & S, Nanjangud
45. Name of the project : Six Sigma Training & Implementation
Project team : A. K. Chaudhuri, P.K. Perumallu, A. R. Chowdhury, Somnath Ray, Sanjit Ray,
E. V. Gijo, Ashok Sarkar
Units involved : SQC & OR Unit, Bangalore and Mumbai
Funded by : BHEL, Bhopal
46. Name of the project : Process Development
Project team : U. H. Acharya, I. Islam, T. Sreenivasa Rao
Unit involved : SQC & OR Unit, Bangalore
Funded by : BHEL- EPD, Bangalore
47. Name of the project : Six Sigma Implementation
Project team : Ashok Sarkar
Units involved : SQC & OR Unit, Bangalore and Mumbai
Funded by : CIPL, Nagpur
48. Name of the project : Six Sigma Training & Implementation
Project team : A. K. Chaudhuri, U. H. Acharya, E. V. Gijo
Unit involved : SQC & OR Unit, Bangalore
Funded by : ELGI Equipments Ltd., Coimbatore
49. Name of the project : Six Sigma Training
Project team : A. K. Chaudhuri, P. K. Perumallu, A. R. Chowdhury, U. H. Acharya, Somnath
Ray, Sanjit Ray, E. V. Gijo, T. Sreenivasa Rao
Unit involved : SQC & OR Unit, Bangalore
Funded by : Hewlett Packard e-Global, Bangalore
50. Name of the project : Six Sigma Training & Implementation
Project team : A. K. Chaudhuri, P. K. Perumallu, A. R. Chowdhury, Somnath Ray, Sanjit Ray
Ashok Sarkar, E. V. Gijo
Units involved : SQC & OR Unit, Bangalore and Mumbai
Funded by : Iran Khodro Company, Iran
51. Name of the project : Six Sigma Implementation
Project team : Somnath Ray
Unit involved : SQC & OR Unit, Bangalore
Funded by : IPL, Lucknow

52. Name of the project : Six Sigma Training & Implementation
 Project team : A. K. Chaudhuri, K. K. Chowdhury, T. Sreenivasa Rao
 Unit involved : SQC & OR Unit, Bangalore
 Funded by : L&T, Chennai
53. Name of the project : Six Sigma Training & Implementation for Software Development
 Project team : A. K. Chaudhuri, T. Sreenivasa Rao
 Unit involved : SQC & OR Unit, Bangalore
 Funded by : L&T EmSys, Mysore
54. Name of the project : Six Sigma Implementation
 Project team : P. K. Perumallu
 Unit involved : SQC & OR Unit, Bangalore
 Funded by : L&T Komatsu, Bangalore
55. Name of the project : Six Sigma Training & Implementation
 Project team : A. K. Chaudhuri, A. R. Chowdhury
 Unit involved : SQC & OR Unit, Bangalore
 Funded by : L&T, Mysore
56. Name of the project : Six Sigma Training & Implementation
 Project team : U. H. Acharya, T. Sreenivasa Rao
 Unit involved : SQC & OR Unit, Bangalore
 Funded by : L G Balakrishnan & Brothers, Coimbatore
57. Name of the project : Six Sigma Training & Implementation
 Project team : A. K. Chaudhuri, A. R. Chowdhury
 Unit involved : SQC & OR Unit, Bangalore
 Funded by : Macmillan, Bangalore
58. Name of the project : Six Sigma Training & Implementation
 Project team : A. K. Chaudhuri, A. R. Chowdhury, U. H. Acharya, E. V. Gijo, T. Sreenivasa Rao
 Unit involved : SQC & OR Unit, Bangalore
 Funded by : MICO, Bangalore (Adugodi)
59. Name of the project : Six Sigma Implementation
 Project team : A. K. Chaudhuri, A. R. Chowdhury, U. H. Acharya
 Unit involved : SQC & OR Unit, Bangalore
 Funded by : MICO, Nagnathapura
60. Name of the project : Six Sigma Training & Implementation
 Project team : A. K. Chaudhuri, E. V. Gijo
 Unit involved : SQC & OR Unit, Bangalore
 Funded by : MICO, Nasik
61. Name of the project : Six Sigma Training & Implementation
 Project team : A. K. Chaudhuri, T. Sreenivasa Rao
 Unit involved : SQC & OR Unit, Bangalore
 Funded by : MICO, Jaipur
62. Name of the project : Six Sigma Training & Implementation
 Project team : Sanjii Ray
 Unit involved : SQC & OR Unit, Bangalore
 Funded by : OPL, Orissa

63. Name of the project : Six Sigma Training & Implementation
Project team : A. K. Chaudhuri, A. R. Chowdhury
Unit involved : SQC & OR Unit, Bangalore
Funded by : RSL, Allahabad
64. Name of the project : Six Sigma Training & Implementation
Project team : A. K. Chaudhuri
Unit involved : SQC & OR Unit, Bangalore
Funded by : Saini Gobain Coated Abrasives, Bangalore
65. Name of the project : Six Sigma Training & Implementation
Project team : A. K. Chaudhuri, U. H. Acharya, E. V. Gijo, T. Sreenivasa Rao
Unit involved : SQC & OR Unit, Bangalore
Funded by : SAPCO, Iran
66. Name of the project : Six Sigma Training & Implementation
Project team : A. K. Chaudhuri, U. H. Acharya, T. Sreenivasa Rao
Unit involved : SQC & OR Unit, Bangalore
Funded by : SIPL, Silvasa
67. Name of the project : Six Sigma Training & Implementation
Project team : A. K. Chaudhuri, Sanjit Ray, E. V. Gijo
Unit involved : SQC & OR Unit, Bangalore
Funded by : Triveni Engineering, Bangalore
68. Name of the project : MBB Training
Project team : A. K. Chaudhuri
Unit involved : SQC & OR Unit, Bangalore
Funded by : Ultratech, Tadipatri
69. Name of the project : Quality Improvement
Project team : Sanjit Ray, U H Acharya
Unit involved : SQC & OR Unit, Bangalore
Funded by : Vikrant Tyres, Mysore
70. Name of the project : Quality Improvement
Project team : Bobby John
Unit involved : SQC & OR Unit, Bangalore
Funded by : Progeon, Bangalore
71. Name of the project : Quality Improvement
Project team : A. R. Chowdhury, Somnath Ray
Unit involved : SQC & OR Unit, Bangalore
Funded by : WIPRO, Bangalore
72. Name of the project : Quality Improvement
Project team : Bobby John
Unit involved : SQC & OR Unit, Bangalore
Funded by : ITC, Bangalore
73. Name of the project : Software Development
Project team : A. K. Chaudhuri, E. V. Gijo, T. Sreenivasa Rao
Unit involved : SQC & OR Unit, Bangalore
Funded by : SYSTAT, Bangalore

74. Name of the project : Six Sigma
Project team : A. K. Chaudhuri
Unit Involved : SQC & OR Unit, Bangalore
Funded by : IFL, Kolkata
75. Name of the project : ISO 9001/QS/TS 16949 – 2002 Audit
Project team : A. K. Chaudhuri, K. K. Chowdhury, P. K. Perumali
Unit involved : SQC & OR Unit, Bangalore
Funded by : NVT-QC, Bangalore
76. Name of the project : QS 9000/TS 16949 – 2002 Audit
Project team : P. K. Perumali
Unit Involved : SQC & OR Unit, Bangalore
Funded by : AQA, Bangalore
77. Name of the project : Lean Six Sigma
Project team : A. K. Chaudhuri
Unit involved : SQC & OR Unit, Bangalore
Funded by : TIMKEN, Bangalore
78. Name of the project : ISO/TS 16949 – 2002/SQC Implementation
Project team : K. K. Chowdhury, Somnath Ray
Unit involved : SQC & OR Unit, Bangalore
Funded by : Rao Insulating Company Limited, Bangalore
79. Name of the project : Statistical Methods in Software
Project team : G. Ravindran, K. K. Chowdhury
Unit involved : SQC & OR Unit, Bangalore
Funded by : Samsung India Limited, Bangalore
80. Name of the project : Implementation of ISO 2001:2000
Project team : P. Mandal
Unit involved : SQC & OR Unit, Baroda
Funded by : ONGC, Baroda and Mehsana
81. Name of the project : Reduction of variation of gas balancing equations for a transmission and bulk distribution network
Project team : P. Mandal
Unit involved : SQC & OR Unit, Baroda
Funded by : Gujarat Gas Company Ltd., Surat
82. Name of the project : Training Programme on Internal Auditing for ISO 9001:2000
Project team : P. Mandal
Unit involved : SQC & OR Unit, Baroda
Funded by : ONGC, Baroda
83. Name of the project : Estimation & Designing Model to predict availability of hides and skins
Project team : V.V. Iyer, A.K. Biswas and D. Sampangi Raman
Unit involved : SQC & OR Unit, Chennai
Funded by : Central Leather Research Institute, Chennai
84. Name of the project : Six Sigma Green Belt Training and associated business projects
Project team : D. Sampangi Raman and A.K. Biswas
Unit involved : SQC & OR Unit, Chennai
Funded by : Sutherland Global Services

85. **Name of the project :** Reduction of packet-to-packet weight and other ingredients' quality variation in washing powder
Project team : D. Sampangi Raman
Unit involved : SQC & OR Unit, Chennai
Funded by : Henkel SPIC India Ltd
86. **Name of the project :** Forecasting monthly consumption of Urea as fertilizer in each district
Principal investigator : Arvind Seth
Project team : S.R. Mohan, S.K. Neogy, R.B. Bapat
Unit(s) involved : SQC & OR Unit, Delhi and SMU, Delhi
Funded by : India Software Group (ISG) , New Delhi
87. **Name of the project :** Improvement of Productivity In Sales, Clinical & Non-Clinical Cases & Strengthening the Rural Network of Janani
Principal Investigator : B. Majumdar
Unit involved : SQC & OR Unit, Delhi
Funded by : Janani, Patna, Bihar
88. **Name of the project :** Six Sigma Implementation
Principal investigator : Ashok Sarkar, A. K. Chaudhuri
Units involved : SQC & OR Unit, Mumbai and Bangalore
Funded by : Larsen & Toubro Ltd. Powai
89. **Name of the project :** SPC Training and Implementation
Principal investigator : Ashok Sarkar
Unit involved : SQC & OR Unit, Mumbai
Funded by : Crompton Greaves Limited
90. **Name of the project :** Implementation of Six Sigma
Principal investigators : Subrata Rath, A. Seth, K. K. Chowdhury
Units involved : SQC & OR Units, Pune, Delhi and Bangalore
Funded by : Reliance, Hazira
91. **Name of the project :** Support on ISO 9001 & ISO 14001
Principal investigator : Ranjan Sett
Unit involved : SQC & OR Unit, Kolkata
Funded by : Coates of India Limited, Kolkata
92. **Name of the project :** Implementation of ISO 9001: 2000
Principal investigators : Ranjan Sett, Anup Majumdar
Unit involved : SQC & OR Unit, Kolkata
Funded by : Surya Nepal Pvt. Ltd., NEPAL
93. **Name of the project :** Implementation of ISO 14001: 1996
Principal investigators : Sukalyan Sengupta, Abhijit Gupta
Unit involved : SQC & OR Unit, Kolkata
Funded by : East India Pharmaceuticals Works Limited, Kolkata
94. **Name of the Project :** Modelling Traffic Movement
Principal investigator : Sugata Adhikari
Unit involved : SQC & OR Unit, Kolkata
Funded by : VSNL, Kolkata
95. **Name of the project :** Construction of Multi Commodity Index
Principal investigator : Arup Ranjan Mukherjee, Abhijit Gupta, Biswabrata Pradhan
Units involved : SQC & OR Unit, Kolkata and SQC-OR (T&P) Unit, Kolkata
Funded by : Multi Commodity Exchange of India Ltd., Mumbai

96. Name of the project : Implementation of Six Sigma
Principal investigators : Prasun Das, Arup Ranjan Mukherjee
Unit involved : SQC & OR Unit, Kolkata
Funded by : Durgapur Steel Plant, Durgapur
97. Name of the project : Developing Warehouse Management System
Principal investigators : Prasun Das, Susanta Gauri
Unit involved : SQC & OR Unit, Kolkata
Funded by : Khadim Chain Stores Pvt. Ltd., Kolkata
98. Name of the project : Developing Supply Chain Management System
Principal investigators : Ranjan Sati, Amitava Banerjee
Unit involved : SQC & OR Unit, Kolkata
Funded by : Usha Martin Limited
99. Name of the project : Implementation of ISO 9001: 2000
Principal investigator : Anup Majumdar
Unit involved : SQC & OR Unit, Kolkata
Funded by : Dum Dum Valves & Bearings (P) Ltd., Kolkata

Completed Projects

1. Name of the project : Development of Versatile Portable Software for Bioinformatics
Principal investigators : Probal Chaudhuri and Rajeeva Karandikar
Units involved : SMU, Kolkata and Delhi
Funded by : NMITLI Project, Funded by CSIR
2. Name of the project : Studies in geometry of Banach spaces.
Principal investigators : TSSRK Rao of ISI, Bangalore, Pradipta Bandyopadhyay of ISI, Kolkata, and G. Godefroy and Daniel Li from France
Units involved : SMU, Bangalore and Kolkata.
Funded by : IFCPAR
3. Name of the project : Banach Algebra techniques and the geometry of Banach spaces.
Principal Investigators : T.S.S.R.K Rao of ISI, Bangalore, Pradipta Bandyopadhyay of ISI, Kolkata, and K. Jarosz of SIUE, USA
Units involved : SMU, Bangalore and Kolkata.
Funded by : DST-NSF
4. Name of the project : Development of versatile, portable software suite for Bioinformatics
Principal investigator : R. L. Karandikar
Units involved : SMU, Delhi and Kolkata
Funded by : CSIR (Under NMITLI scheme)
5. Name of the project : Spatial Stochastic processes
Principal investigator : Rahul Roy
Unit involved : SMU, Delhi
Funded by : DST
6. Name of the project : Studies in geometry of Banach spaces
Principal investigator : T. S. R. K. Rao
Unit involved : SMU, Bangalore
Funded by : IFCPAR (Indo-French)
7. Name of the project : Development of an ANN based prediction model for juteyam quality
Principal investigator : Srimanta Pal
Unit Involved : ECSU
Funded by : Indian Jute Industries' Research Association

8. Name of the project : Tectonic setting of Alkaline complexes in the Eastern Ghats Belt
Principal investigator : Samarendra Bhattacharya
Unit involved : GSU
Funded by : CSIR
9. Name of the project : Depositional Motifs of the Satpura Gondwana succession : It's spatio-temporal variability in relation to tectonics
Principal investigator : Tapan Chakraborty
Unit involved : GSU
Funded by : DST
10. Name of the project : Turbulent and incipient suspensions due to bursting and their sedimentological implications : An experimental study
Principal investigator : B. S. Mazumder
Co- investigators : J. K. Ghosh and Chandan Chakraborty
Units involved : PAMU, SMU and GSU.
Funded by : DST
11. Name of the project : Water Wave Diffraction by Floating and Submerged Bodies
Project leader : B. N. Mandal
Unit involved : PAMU
Funded by : CSIR
12. Name of the project : Studies on the Effect of Multiple Scattering on the Shift of the Spectral Lines and Applications
Principal investigators : Sisir Roy and H. C. Kandapal
Projector co-ordinator : R. Merhotra
Unit involved : PAMU,
Funded by : DST
13. Name of the project : Algebraic Analysis of some Exactly Solvable Quantum Models
Project leader : Preeti Parashar
Unit involved : PAMU
Funded by : DST
14. Name of the project : Development of Improved Jute Cultivars in Rainfed Agro- Ecosystem for Quality Textile Fibres
Principal investigator : A. Goswami
Unit involved : AgSU
Funded by : World Bank (via CRIDA, ICAR)
15. Name of the project : Genetic predisposition to anti-tuberculosis drug induced hepatotoxicity
Principal investigator : B. Roy
Unit involved : HGU
Funded by : Indian Council of Medical Research
16. Name of the project : External evaluation of State Resource Centre-Patna (ADRI), Bihar
Project leader : A.Ghosh
Unit involved : PRU
Funded by : Directorate of Adult Education, Ministry of HRD, Govt. of india
17. Name of the project : Empirical study on the labour-related problems of tea gardens in West Bengal
Project leader : A. Dasgupta
Unit Involved : SRU
Funded by : Labour Department, Govt. of West Bengal

18. **Name of the project :** Study on status of women in West Bengal
Project leader : A. Dasgupta
Unit involved : SRU
Funded by : State Women's Commission, Govt. of West Bengal
19. **Name of the project :** Evaluation of State Resource Centre of National Literacy Mission in Bihar
Project leader : Anjali Ghosh
Co-investigators : A. Dasgupta, Ajay Ghosh and D. Sen
Units involved : PRU and SRU
Funded by : National Literacy Mission, Ministry of HRD, Govt. of India
20. **Name of the project :** Quality Improvement
Project team : A. R. Chowdhury
Unit involved : SOC & OR Unit, Bangalore
Funded by : Lincoln, Bangalore
21. **Name of the project :** Quality Improvement
Project team : Sanjit Ray
Unit involved : SOC & OR Unit, Bangalore
Funded by : IFB, Bangalore
22. **Name of the project :** Implementation of SPC
Project team : P. Mandal
Unit involved : SOC & OR Unit, Baroda
Funded by : Tata Chemicals Limited, Mithapur
23. **Name of the project :** Guidance for TOPS 8D projects
Project team : P. Mandal
Unit involved : SOC & OR Unit, Baroda
Funded by : Munjal Auto Ltd., Waghodia
24. **Name of the project :** Development of economic sampling plans for relays
Project team : P. Mandal
Unit involved : SOC & OR Unit, Baroda
Funded by : Integra Hindustan Control Ltd., Halol
25. **Name of the project :** ISO 9001 Implementation
Project team : P. K. Perumallu and E. V. Gijo
Unit involved : SOC & OR Unit, Bangalore
Funded by : MPT, Goa
26. **Name of the project :** Improvement in ISO 9001 QS
Principal investigator : Ashok Sarkar
Unit involved : SOC & OR Unit, Mumbai
Funded by : WIMCO Limited
27. **Name of the project :** Six Sigma Implementation
Principal investigator : Ashok Sarkar
Unit involved : SOC & OR Unit, Mumbai
Funded by : Huber Chemicals India Pvt. Ltd.
28. **Name of the project :** Improvement of Brand Share Prediction Model
Principal investigator : Anup Majumdar
Unit involved : SOC & OR Unit, Kolkata
Funded by : ACN ORG-MAEG Pvt. Ltd.

29. Name of the project : Implementation of Software Metrics
Principal Investigator : Amitava Banerjee
Unit Involved : SQC & OR Unit, Kolkata
Funded by : L&T Infotech Ltd., Tata Infotech Ltd. & Patni Computer Systems Ltd., Mumbai
30. Name of the project : Implementation of Software Metrics
Principal Investigator : Amitava Banerjee
Unit involved : SQC & OR Unit, Kolkata
Funded by : Robert Bosch India Limited, Bangalore
31. Name of the project : Training Programme on Statistical Methodologies
Principal investigators : Anup Majumdar, Sugata Adhikari, Biswabrata Pradhan, Deepankar Raychowdhury
Unit(s) involved : SQC & OR Unit, Kolkata and SQC-OR (T&P) Unit, Kolkata
Funded by : TISCO, Jamshedpur
32. Name of the project : Training Programme on Six Sigma, Lean Six Sigma and Knowledge Mapping
Principal investigator : S. K. Majumdar
Unit involved : SQC-OR (T&P) Unit, Kolkata
Funded by : Orient Fans Ltd., Kolkata
33. Name of the project : Training Programme on Six Sigma Strategy Deployment and Infrastructure
Principal Investigator : S. K. Majumdar
Unit involved : SQC-OR (T&P) Unit, Kolkata
Funded by : Orient Fans Ltd., Kolkata

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

Symposia and Conferences

Conference on "Recent Advances in Probability and Stochastic Processes" was organized by SMU, Kolkata during January 10-12, 2005 at ISI, Kolkata.

International Conference on "Operator theory, quantum probability and noncommutative geometry" was organized by SMU, Kolkata during December 20-23, 2004 at ISI, Kolkata.

18th International Conference on "VLSI Design" and 4th International Conference on "Embedded Systems" was organized by ACMU, Kolkata during January 3-7, 2005 at Taj Bengal, Kolkata.

The 11th International Conference on "Neural Information Processing, (ICONIP 2004)" was organized by ECSU during November 22-25, 2004 at Science City, Kolkata.

The 4th Indian Conference on "Computer Vision, Graphics and Image Processing (ICVGIP04)" was organized by ECSU and MIU during December 16-18, 2004 at Science City, Kolkata.

A one-day seminar on "Cancer Genomics in commemoration of the birth anniversary of Professor J.B.S. Haldane" was organized by HGU on November 4, 2004 at ISI, Kolkata.

Conference on "Models and Methods in Economics" was organized by ERU during December 8-10, 2004 at ISI, Kolkata.

Conference on "Growth, Development and Macroeconomic Policy" was organized by Planning Unit during December 17-18, 2004 at New Delhi.

A "Golden Jubilee Conference" was organized by SQC & OR Unit, Bangalore jointly with Quality Council of India during March 18-19, 2005 at Hotel Taj Residency, Bangalore.

National Conference on "Tools and techniques for productivity Improvement" was organized by SQC & OR Unit, New Delhi during February 8-9, 2005 at ISI, New Delhi.

Conference on "Consortium Approach to Resource Sharing : Issues and Policies" was organized by DRTC, Bangalore during October 6-8, 2004 at Bangalore.

Workshops and Training Programmes

Workshop on "Longitudinal Data Analysis" was organized by SMU, Kolkata during December 6-10, 2004 at ISI, Kolkata.

Instructional workshop on "Harmonic Analysis on Symmetric Spaces" was organized by SMU, Bangalore during June 21-July 9, 2004 at ISI, Bangalore.

An advanced instructional workshop on "low-dimensional topology and geometric group theory" was organized by SMU, Bangalore during July 12-24, 2004 at ISI, Bangalore.

Workshop on "Introductory Computer Course" was organized by ASU, Kolkata during September 27-October 15, 2004 at ISI, Kolkata.

Winter School on "Design of Experiments and Sample Surveys" was organized by ASU, Kolkata during October 4-9, 2004 at Department of Statistics, Panjab University, Chandigarh.

6th International Workshop on "Distributed Computing" was organized by ACMU, Kolkata during December 27-30, 2004 at ISI, Kolkata.

International Workshop on "Document Analysis" was organized by CVPRU, Kolkata during March 8-11, 2005 at ISI, Kolkata.

Workshop on "Image Processing, Pattern Recognition and Applications" was organized by CVPRU, Kolkata during December 13-17, 2004 at Computer Science Department, Manipur University, Imphal.

ISI-NERIST Winter School on "Soft Computing, Data Mining and Bioinformatics" was organized by MIU, Kolkata during February 14-18, 2005 at Nirjuli, Arunachal Pradesh.

Workshop on "Genetic Epidemiological Methods for Dissection of Complex Traits" was organized by HGU during December 13-21, 2004 at Hyatt Regency, Kolkata.

Workshop on "Statistical and computing methods for life science data analysis" was organized by BAU during November 22-27, 2004 at Assam University, Silchar, Assam.

Workshop on "Quantitative Analysis of North East Indian Economy" was organized by ERU during December 13-18, 2004 at Dibrugarh University, Dibrugarh.

Workshop on "Industrial Organization and International Trade" was organized by ERU during February 10-11, 2005 at ISI, Kolkata.

Workshop on "Technique of Analyses of Demographic and Health Statistics and Application of Computer Softwares" was organized by PSU during March 11-20, 2005 at Department of Statistics, Manipur University, Canchipur, Imphal.

Workshop on "Building Digital Libraries using DSpace" was organized by DRTC, Bangalore during March 7-11, 2005 at Bangalore.

Lectures and Seminars

The Lectures/Seminars organised by the Institute and delivered by visiting scientists are listed below :

Theoretical Statistics and Mathematics Division

Stat-Math Unit, Kolkata

Adhikari, Sukumar Das, Harish Chandra Research Institute (January 13, 2005) : Some Zero-sum problems in Combinatorial Number Theory.

Arai, Sun-ichi, Riken Brain Science Institute, Japan (November 23, 2004) : Population Coding and information geometry.

Aravinda, C.S., CMI, Chennai (October 4, 2004) : Rigidity in nonpositive Curvature : Topological vs smooth.

Bandyopadhyay, Antar, Chalmers Institute of Technology, Sweden (January 18, 2005) : "Back to the Linear" Method : Application to Branching Random Walk.

Banerjee, Sudipto, University of Minnesota, USA (July 22, 2004) : On the Statistical Assessment of Curvilinear Boundaries under Spatial Process Models.

Basak, Tathagata, University of California, Berkeley (January 6, 2005) : The story of a monster.

- Basu, Sudeshna, Morgan State University (January 17, 2005) : Frame Theory and its applications.
- Bhavs, N.S., University of Pune (January 7, 2005) : Semigraphs.
- Brahmachaitanya, Brahmachari, Ramakrishna Mission Vidyamandira, Belur (February 3, 2005) : Cannon-Thurston Maps.
- Chatterjee, Sourav, Standord University, USA (August 30, 2004) : Spin Glasses : New techniques in Probability.
- Chatterjee, Sourav, Stanford University, USA (September 13, 2004) : An Invariance Theorem and Other Topics.
- Dass, Sarat C., Michigan State University (January 7, 2005) : Statistical Model for Feature Extraction and Matching in Fingerprint Images.
- Ghosal, Subhasish, North Carolina State University, USA (May 27, 2004) : Gaussian process prior for Bayesian Curve estimation.
- Goswami, Samrat, The Ohio State University, USA (February 25, 2005) : Reconstruction and segmentation of 3D Objects from Point Samples.
- Guivarch, Y., University of Rennes, France (February 23, 2005) : Renewal theorem for products of random matrices and tails of stationary measures for recurrence relations with random coefficients.
- Guivarch, Y., University of Rennes, France (February 25, 2005) : Density or finiteness of orbit closures of semi-groups of toral endomorphisms, and random walks on the linear group.
- Holmstrom, Lasse, University of Oulu, Finland (February 28, 2005) : Bayesian Multiscale Smoothing with Application to Climate Reconstruction.
- Kar, Anirban, University of Warwick Coventry, UK (September 1, 2004) : Core selection and cost monotonicity on minimum cost spanning tree games.
- Keshari, Manoj, Harish-Chandra Research Institute (March 17, 2005) : Complete intersection ideals and a question of Nori.
- Khmaladze, V. Estale, Victoria University of Wellington, New Zealand (January 3, 2005) : Geometry and Point Process.
- Khmaladze, V. Estale, Victoria University of Wellington, New Zealand (January 5, 2005) : Martingale methods in Statistics.
- Khmaladze, V. Estale, Victoria University of Wellington, New Zealand (January 25 and 27, 2005) : Statistical Analysis of Large number of rare events.
- Nadkarni, M.G. (September 20, 2004) : On Measure-Free Martingales.
- Ōnoda, Nobuharu, University of Fukui (March 21, 2005) : Generic Fibrations by A^{11} and A^* over Discrete Valuation Rings.
- Pal, Debashis, Stanford University, USA (December 15, 2004) : Asymptotics of the leading sample eigenvalues for a spiked covariance model.
- Pal, Jayanta Kumar, University of Michigan, USA (November 19, 2004) : On the Distance between Cumulative Sum Diagram and its Greatest Convex Minorant for Unequally Spaced Design Points.

- Pai, Soumik, Columbia University, USA (August 16, 2004) : On minimax hypothesis testing.
- Pai, Soumik, Columbia University, USA (August 18, 2004) : Combining multiple opinions in decision making : Boosting, bagging and the like.
- Poddar, Mainak, University of Waterloo, Canada (April 26, 2004) : Motivic Integration and McKay Correspondence.
- Ramakrishnan, S., University of Miami, Florida, USA (August 4, 2004) : On convergence of throughput in large cyclic networks.
- Roy, Arati, Tata Institute of Fundamental Research, Mumbai (September 22-29, 2004) : Quadratic Spaces, I – IV.
- Sengupta, Jyoti, TIFR, Mumbai (February 17, 2005) : Harish-Chandra's method of descent.
- Sinha, Ashoka, Tilburg University, The Netherlands (October 15, 2004) : Estimating the probability of a rare event.
- Srinivas, V., TIFR, Mumbai (May 27, 2004) : The Noether-Lefschetz Theorem.
- Vijayakumar, Ambat, Cochin University of Science and Technology (August 12, 2004) : Combinatorial Convexity in Discrete Structures.
- Vijayakumar, Ambat, Cochin University of Science and Technology (August 24, 2004) : Construction of a non measurable subset of \mathbb{R} – A Graph Theoretic approach.
- White, Denis A., University of Toledo, USA (February 14, 2005) : Meromorphic Continuation of the Scattering Matrix.
- Stat-Math Unit, Delhi*
- Aithreya, K.B., Iowa University (January 31, 2005) : Harris Irreducibility of Markov chains generated by iteration of iid interval maps.
- Borkar V.S., Tata Institute of Fundamental Research, Mumbai (March 16, 2005) : Transmission power control over randomly varying channels.
- Borkar V.S., Tata Institute of Fundamental Research, Mumbai (March 17, 2005) : Equilibrium selection in stochastic dynamics.
- Deshpande, Jayant V., University of Pune (February 22, 2005) : The proportional hazards model in reliability and nonparametric Inference for the constant of proportionality.
- Deshpande, Jayant V., University of Pune (February 24, 2005) : Ranked set sampling and its applications.
- Ghorpade, R., Indian Institute of Technology, Bombay (December 28, 2004) : Codes, Enumeration and Varieties over Finite Fields.
- Holbrook, John, University of Guelph, Canada (April 13, 2004) : How mean can a Mean Value Theorem be?
- Holbrook, John, University of Guelph, Canada (April 27, 2004) : Schur norms and Toeplitz matrices.

Krishnan, T., Systal Software Asia Pacific Limited, Bangalore (March 21, 22 & 24, 2005) : Some Generalizations of the EM algorithm.

Kulathinal, Sangita, National Public Health Institute (KTL), Helsinki, Finland (March 31, 2005) : Case-cohort design and related statistical issues.

Ma, Zhi-Ming, Institute of Applied Mathematics, Beijing (February 9, 2005) : Fractional Laplacian and its probabilistic counterpart.

Maddaly, Krishna, Institute of Mathematical Sciences, Chennai (January 17, 2005) : Random Jacobi operators – spectral theory.

Maddaly, Krishna, Institute of Mathematical Sciences, Chennai (January 19, 2005) : Random Jacobi operators-inverse spectral theory.

Moslehian, Mohammad Sal, Ferdowsi University, Iran (March 9, 2005) : Stability of Functional Equations.

Mukherjee, Rahul, Indian Institute of Management, Kolkata (February 15, 2005) : Expected Length of Confidence intervals based on Empirical Discrepancy Statistics.

Nitsure, Nithin, Tata Institute of Fundamental Research, Mumbai (October 25, 2004) : Algebra and Geometry.

Nitsure, Nithin, Tata Institute of Fundamental Research, Mumbai (October 27, 2004) : Topology and Geometry.

Nitsure, Nithin, Tata Institute of Fundamental Research, Mumbai (October 29, 2004) : Grothendieck.

Osingher, Enzo, University of Rome, Italy (March 4, 2005) : Random motions in the plane.

Paranjape, Kapil, Institute of Mathematical Sciences, Chennai (August 18, 2004) : Generic approach to index calculus methods for the discrete log problem.

Ramakrishnan, S., University of Miami (July 29, 2004) : On convergence of throughput in large cyclic networks.

Ramprasad, L., Rutgers University (August 11, 2004) : Statistical Options – Crash Resistant options derived from Robust location estimators.

Sinha, Ashoke Kumar, Tilburg University, The Netherlands (October 11, 2005) : Estimating the probability of a rare event.

Stehlik, Milan, Comenius University, Slovakia (January 24, 2005) : D-optimal designs with correlated observation and its applications.

Vanninathan, M., Tata Institute of Fundamental Research, Bangalore (April 1, 2004) : Homogenization Problems in non-homogeneous Media.

Zăinescu, C, University Al. I. Cuza Iasi, Romania (April 21, 2004) : Slice convergence for some classes of convex functions.

Stat-Math Unit, Bangalore

Ahayanakar, Shreeram, Purdue University, USA (January 12, 13, 17 and 19, 2005) : Ramification and Resolution I, II, III and IV.

Ananthanarayan, B., Indian Institute of Science, Bangalore (November 4, 2004) : Nobel Prize in Physics, 2004.

Athreya, K.B., Iowa State University, USA (August 5, 2004) : An expository lecture on Markov Chain Monte Carlo Methods.

Athreya, K.B., Iowa State University, USA (February 11, 2005) : Approximation of Feller chains by finite state space chains.

Banerjee, Sudipto, University of Minnesota, USA (July 19, 2004) : On the Statistical Assessment of Curvilinear Boundaries under Spatial Process Models.

Betten, Lynn, Deakin University, Australia (December 13, 2004) : Algebraic attacks on Cryptosystems.

Das, Bhagwan, Indore University, Indore (January 10, 2005) : Theory of knowledge and its application on social welfare.

Dattagupta, Sushanta, Satyendra Nath Bose National Centre for Basic Sciences, Kolkata (February 24, 2005) : Einstein's work on Brownian Motion and the Photon.

Johnson, K., University of Georgia, Athens (December 30, 2004) : Differential operators and principal series representations.

Khmaladze, Estate V., Victoria University of Wellington, New Zealand (January 28, 2005) : Differentiation of set-valued functions and application to statistics.

Koranyi, Adam, The City University of New York, (January 19, 2005) : Finite dimensional spectral Theorem.

Krishnapur, Manjunath, University of California, USA (July 15, 2004) : Zeros of Gaussian Analytic functions.

Kulkarni, Upendra, Truman State University Kirksville, USA (July 26, 2004) : Modular and integral representations of GL_n .

Nanda, Seema, Department of Math and EEB, Knoxville, USA (October 7, 2004) : Optimal Drug Control in a Leukemia model.

Narasimha, Roddam, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore (March 24, 2005) : Fluid Dynamics and Mathematics.

Narasimhan, M.S., TIFR, Bangalore (February 21, 2005) : Stable Bundles and Hermitian-Einstein metrics.

Narasimhan, M.S., TIFR, Bangalore (January 31, 2005) : Bonnet's Theorem for local Embeddings of surfaces in R^3 .

Narayanan, E.K., Indian Institute of Science, Bangalore (September 16, 2004) : Injectivity of the spherical mean operator on conical manifolds of spheres.

Pisier, G., Texas A&M University and Paris VI, USA (December 27, 2004) : Similarity degree characterization of nuclear C^* algebras.

Ramakrishnan, S., University of Miami, USA (July 28, 2004) : On convergence of throughput in large cyclic networks.

- Ricci, Fulvio, Scuola Normale Superiore di Pisa (January 10, 2005) : Spectral multiplier for the Hodge Laplacian acting on 1-forms in the Heisenberg group.
- Shah, Nimish A., TIFR, Mumbai (November 9, 2004) : Dense orbits of actions of Z^d -actions by automorphisms – Examples.
- Shah, Nimish A., TIFR, Mumbai (November 10, 2004) : On locally compact groups with Z^d -actions by automorphisms.
- Skalski, Adam, University of Nottingham, UK (January 3, 2005) : Noncommutative entropy and Markov subshifts.
- Sreekantan, Ramesh, University of Toronto, Canada (August 27, 2004) : Non-Archimedean regulator maps and special values of L-functions.
- Srinivas, V., TIFR, Mumbai (January 6, 2005) : Lefschetz Theorems for the Divisor Class Group.
- Sriharan, S., University of Wyoming, USA (July 30, 2004) : Nonlinear filtering for Stochastic Navier-Stokes equations.
- Sunder, V.S., Institute of Mathematical Sciences, Chennai (January 27, 2005) : The Tarski Alternative.
- Upmeyer, H., University of Marburg, Germany (December 31, 2004) : The Geodesic Calculus : A general Quantization Method for Symmetric Domains.
- Ushadevi, A.R., Bangalore University (April 22, 2004) : Einstein-Podolsky-Rosen Paradox and Bell's inequalities.
- Vasudeva, R., University of Mysore (April 21, 2004) : On almost sure behaviour of stable processes.
- Verma, Kaushal, Indian Institute of Science, Bangalore (October 20, 2004) : Symmetry principle in several complex variables.

Applied Statistics Division

Applied Statistics Unit

- Bhaduri, Purandar, TRDDC, Tata Consultancy Services (August 13, 2004) : Model checking visual specification of requirements.
- Bhattacharya, Sourabh, Trinity College, Dublin, Ireland (February 15, 2005) : An importance resampling proposal for cross-validation in inverse problems.
- Bouza, Carlos N., University of Havana, Cuba (August 24, 2004) : Behavior of randomized response procedures when ranked set sampling is used as an alternative to the usual simple random sampling schemes.
- Ganguli, Bhaswati (March 1, 2005) : Feature significance in geostatistics.
- Ghosal, Subhashis, North Carolina State University, USA (May 25, 2004) : Proportional mean regression under censoring : a Bayesian approach through mixture models.
- Ghosh, Sujit K., North Carolina State University, USA (November 30, 2004) : Bayesian capture-recapture analysis and model selection for closed population models.

Mukherjee, Bhramar, University of Florida, USA (July 6, 2004) : Optimal sample designs for stochastic processes with a product covariance structure.

Nandi, Rajesh, University of Washington, Seattle (February 1, 2005) : A semi-parametric approach to estimate the family-wise error rate in fMRI using resting-state data.

Nandi, Swagata, University of Mannheim (August 17, 2004) : Analyzing two signal processing models : sinusoidal frequency model and chirp signal model.

Pal, Jayanta Kumar, University of Michigan, USA (November 23, 2004) : Shape restricted regression with smoothness adjustments, using green's function.

Roy Choudhury, Kingshuk, UCC, Cork, Ireland (December 7, 2004) : Error analysis for algebraic strain estimation.

Sankaran, P.G., Cochin University of Science and Technology (June 1, 2004) : On bivariate competing risk models.

Sen, Pranab K., University of North Carolina at Chapel Hill (December 28, 2004) : Hamming distance in genomic studies : Some nonparametric perspectives.

Computer and Communication Sciences Division

Advanced Computing and Microelectronics Unit

Goswami, Partha P., University of Calcutta (February 26-April 25, 2004) : k nearest neighbors of lines and segments.

Pach, Janos, Courant Institute of Mathematical Sciences, New York, USA (January 17, 2005) : Forbidden patterns and distances.

Roop, Partha S., University of Auckland, New Zealand (March 28, 2005) : Direct execution of Esterl programs on reactive processors.

Sanyal, Sugata, Tata Institute of Fundamental Research, Mumbai (June 25, 2004) : SCIDS : A soft computing intrusion detection system.

Computer Vision and Pattern Recognition Unit

Baird, H.S., Lehigh University, USA (December 18, 2004) : Automatic recognition of images of extremely poor quality.

Jain, Ajal, IIT, Kanpur (January 4, 2005) : Machine translation : problems and techniques.

Venkatesh, K.S., IIT, Kanpur (December 20, 2004) : Signals and systems on sets : Towards a non-numerical theory of systems.

Electronics and Communication Sciences Unit

Basu, Anirvan, INSEAD, France (March 4, 2005) : High-tech startups – How far are we from Silicon Valley?

Capell, Steve, University of Washington, Seattle, USA (May 7, 2004) : Interactive character animation using dynamic elastic simulation.

Dutta, Kaushik, Florida International University, MIAMI (May 12, 2004) : AppBalance : Request distribution for application server clusters in Multi-tiered architectures.

Saha, Punam Kr., University of Pennsylvania, USA (September 2, 2004) : Theory of object class uncertainty and its application to Image segmentation.

Machine Intelligence Unit

Bhaduri, Anirban, National Centre for Biological Science-TIFR, Bangalore (October 19, 2004) : Spatially Conserved Interacting Motifs and Genome Analysis.

Mitra, Sanjit K., University of California, USA (November 30, 2004) : Structural Sub-band Decomposition : A New Concept in Digital Signal Processing.

Physics and Earth Sciences Division

Physics and Applied Mathematics Unit

Alzaimehr, Hossain, Isfahan Institute of Technology, Iran (March 15, 2005) : Influence of Turbulence on Incipient Motion of Gravels.

All, T., University of Concordia, Canada (December 22, 2004) : Generalised Wavelet Transforms.

Bal, Subrata, Kyoto University, Japan (August 4, 2004) : Nonperturbative Studies of Fuzzy Spheres in a Matrix Model with the Chern-Simons term.

Benedetti, A., Optical Microscopy Lab., CNRS, Pisa, Italy (February 18, 2005) : Video Confocal Microscopy Principles and Application.

Bernroider, Gustav, University of Salzburg, Austria (November 2, 2004) : The Organization of Information in the Brain.

Chakrabarti, A., IISc, Bangalore (March 3, 2005) : Solution of Weakly Singular Integral Equations and their Applications in Water Waves.

Dalal, D.C., Indian Institute of Technology, Guwahati (July 28, 2004) : Higher Order Compact Method.

Deguchi, Shinichi, Nihon University, Chiyoda-ku, Tokyo, Japan (March 7, 2005) : Second Quantized Formulation of Geometric Phases.

Dey, Subhasish, Indian Institute of Technology, Kharagpur (February 1, 2005) : Control of Scour at Vertical Circular Piles under Wave and Current.

Freeman, Walter, University of California, USA (November 24, 2004) : Predicted Relations Between Quantitative Neurodynamics & Theoretical Physics.

Ghosh, Sibasis, University of York, Heslington, UK (January 11, 2005) : Laplacian of a Graph as a Density Matrix.

Grandpierre, Attila, Konkoly Observatory of the Hungarian Academy of Science, Budapest (December 2, 2004) : On the Onset and Development of Thermal Metastabilities in the Solar Core.

Gruska, Jozef, Masaryk University, Brno, Czech Republic (February 21, 2005) : Why and How Quantum Complexity Theory can be useful for Information Processing (QIP) and Quantum Mechanics.

- Hazra, Subhendu, University Trier, Germany (April 8, 2004) : Simultaneous Pseudo-Time Stepping in PDE-Model Based Optimization Problems.
- Heintzmann, Rainer, King's College, London University, UK (February 17, 2005) : On Space and Frequency Domain Reconstruction Strategies.
- Joag, P.S., University of Poona (June 11, 2004) : Sequences of Pseudorandom Numbers with Arbitrarily Large Periods.
- Joag, Pramod, University of Poona, (December 2, 2004) : Simulating Bell Correlation by Classical Communication.
- Kandpal, H.C., NPL, New Delhi (April 1, 2004) : Dynamic Multiple Scattering & Laboratory Experiments.
- Khan, S.K., Gulbarga University, Karnataka (May 6 and 14, 2004) : Viscoelastic Fluid Flow over a Stretching Sheet.
- Lipson, S., Technion, Haifa, Israel (February 14, 2005) : Pattern Formation in Evaporating Water Films.
- Mukherji, Sudipta, Institute of Physics, Bhubaneswar (January 13, 2005) : Black Hole and Phase Transition.
- Rao, Sumathi, Harish Chandra Research Institute, Allahabad (November 30, 2004) : Effect of Interactions on Transport through Quantum Dots and Wires.
- Scholtz, F.G., University of Stellenbosch, South Africa (January 25,2005): Non-perturbative Flow Equations from Continuous Unitary Transformations.
- Sisoev, Grigori M., Moscow State University, Russia (February 16, 2005) : Wave Regimes in Films Flowing on Vertical or Spinning Substrates : Similarity and Difference.
- Tanaka, Hitoshi, Tohoku University, Sendai, Japan (March 1, 2005) : Development of Measuring System of Suspended Sediment Concentration at a River Entrance.
- Wang, Zhao-Yin, Tsinghua University, Beijing, China (March 7, 2005) : Yellow River Sedimentation and Management Strategies.
- Yasuda, Hidekazu, National Fisheries University, Shimonoseki, Japan (March 7, 2005) : Dispersion of Suspended Particles due to Boundary Layer : The Effects of Stokes and Ekman Layers or Dispersion Processes in Coastal Water.

Biological Sciences Division

Agricultural Science Unit

Nedbal, Ladislav, Department of Systems Biology, Landscape Ecology AVCR & Inst. Phys. Biology, Czech Republic (February 17, 2005) : Some aspects of cell, plant and community photosynthesis.

Human Genetics Unit

Brahmachari, Samir K., Director, Institute of Genomics & Integrative Biology, CSIR, Delhi (January 17, 2005) : Genome Research : Where do we stand?

Chakraborty, Ranajit, Center for Genome Information, University of Cincinnati (December 24, 2004) Population genomics : A paradigm for post-genomic studies of complex diseases.

Dasgupta, Biplob, Washington University School of Medicine (December 4, 2004) : Neurofibromin : a Ras regulator in brain cancers and neural stem cell biology.

Data, Jashodeep, Colgate University, USA (January 12, 2005) : Cytoplasmic mislocalization of Rb in cancers due to CDK-dependent active nuclear export.

Nanya, Saitou, National Institute of Genetics, Mishima, Japan (November 23, 2004) : Comparative genomics with special reference.

Social Sciences Division

Economic Research Unit

Banerji, Sanjay, McGill University, School of Management (July 29, 2004) : Macroeconomic Fluctuations under Moral Hazard.

Basu, Kaudhik, Cornell University, Ithaca, NY (January 5, 2005) : Gender and Say : A Model of Household Decision Making with Implications for Female Labour Supply.

Bera, Anil K., University of Illinois, Urbana – Champaign, USA (January 11, 2005) : Moment Entropy Density Estimation and Its Use in Analyzing Financial Data.

Bera, Anil K., University of Illinois, Urbana – Champaign, USA (April 8, 2004) : Testing spatial Autoregressive Model and a Formulation of Spatial ARCH (SARCH) Model with Application.

Bhattacharya, Debopam, Dart Mouth College, Hanover, USA (September 2, 2004) : Inference on Inequality from Complex Survey Data.

Chakravarty, Deepita, Centre for Economics and Social Studies, Hyderabad (September 9, 2004): Women Workers, Entrepreneurs and Behavioural Rationality : A Case Study of Indian Garment Manufacturing.

Chatterjee, Soumitra, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia (February 3, 2005) : An Economic Analysis of Total Factor Productivity in Agriculture with Reference to West Bengal.

Chattoraj, Trina, Innovest Group, New York (May 13, 2004) : Making and Measuring the Business Case for Sustainability.

Ghosh, Aurobindo, Singapore Management University, Singapore (December 23, 2004) : Smooth Test for Equality of Two Densities.

Ghosh, Dastidar Krishnendu, CESP, Jawaharlal Nehru University (May 27, 2004) : On Procurement Auctions with Fixed Budgets.

Ghosh, Suman, Florida Atlantic University, USA (July 22, 2004) : Standard Promotion Practices vs. Up-or-out Contracts.

Jerson, Michael, University of Albany, State University of New York (January 6, 2005) : Real Income Growth, Consumer Inconsistency and Welfare Analysis.

Kar, Anirban, University of Warwick, Coventry, U.K. (August 26, 2004) : Core selection and cost monotonicity on minimum cost spanning tree games.

Majumdar, Mukul, Cornell University, Ithaca, USA (January 20, 2005) : Walrasian Approach to Survival and Famines.

Mallick, Soumitra K., Indian Institute of Social Welfare & Business Management, Kolkata (January 27, 2005) : Dynamic Financial Pricing in Emerging Economies : An application to stock markets in India.

Mutewasmi, Suresh, University of Essex, Colchester, UK (March 3, 2005) : Competition and Efficiency in Markets with Quality Uncertainty.

Poddar, Sougata, National University of Singapore (June 24, 2004) : Some Economics of Online Music Piracy.

Raut, Lakshmi K, California State University At Fullerton, USA (September 23, 2004) : Long term effects of preschool : evidence from NLSY.

Sarangl, Sudipta, Louisiana State University, United States (August 12, 2004) : Network Formation under consent.

Sen, Debapriya, University of California, San Diego, United States (August 19, 2004) : A theory of sharecropping and interlinked contracts.

Sikdar, Soumyen, Calcutta University (January 18, 2005) : Growth costs of Forex accumulation.

Economic Analysis Unit

Azez, Abdul, Institute for Social and Economic Change (July, 2004).

Madheswaran, Institute for Social and Economic Change (January, 2005).

Tendulkar, Suresh D., Delhi School of Economics (March, 2005).

Vittal, M.P., Indian Institute of Plantation Management (July, 2004).

Planning Unit

Batabyal, Amit, Rochester Institute of Technology (July 23, 2004) : A Differential Game Theoretic Analysis of International Trade in Renewable Resources.

Beaudry, Paul, University of British Columbia and NBER (December 15, 2004) : Globalization, Returns to Accumulation and the World Distribution of Output.

Bhaduri, Amit, Council for Social Development (September 24, 2004) : The Stability of Wage-led and Profit-led Economic Expansion.

Bhargava, Alok, University of Houston (July 21, 2004) : Healthcare Infrastructure, contraceptive use and infant mortality in Uttar Pradesh, India.

Bhattacharya, Debopam, Dartmouth College (September 13, 2004) : Inference on Inequality from Complex Survey Data.

Chakrabarti, Rajesh, Georgia Tech (August 27, 2004) : Mars-Venus Marriages : Culture and Cross-Border M&A.

Dasgupta, Inderaneel, University of Nottingham, UK (November 19, 2004) : Evasive Return : Informalisation in a Liberalised Economy with Wage-setting Unions.

Dufo, Esther, MIT (January 10, 2005) : Socio Economy Impact of Dam Construction in India, 1973-1999.

Ghosh, Arghya, University of New South Wales (January 28, 2005) : Political Economy of Infrastructure Investment.

- Katayama, Seichi, Kobe University (February 21, 2005) : Cost heterogeneity and the Destination of Direct Foreign Investment.
- Kundu, Rajendra P., Delhi School of Economics (November 5, 2004) : Economic Efficiency, Distributive Justice and Liability Rules.
- Lahiri, Amartya, The Federal Reserve Bank of New York (November 25, 2004) : A Tale of Two States.
- Molen, Remco Van Der, University of Groningen, The Netherlands (July 22, 2004) : Capital Allocation in Indian Business Groups.
- Moyes, Patrick, CNRS, IDEP and GRAPE, University Montesquieu Bordeaux IV (March 18, 2005): Does the Lorenz Curve Really Measure Inequality? Another Look at Inequality measurement.
- Mutswami, Suresh, University Essex (March 11, 2005) : Competition and Efficiency in Markets with Quality Uncertainty.
- Pritchett, Lant, World Bank (February 18, 2005) : Does Learning to Add up Add up? The Returns to Schooling in Aggregate Data.
- Ramachandran, K.S., NIILM Centre for Management Studies (December 3, 2004) : Subsidies : A Case for Phase Out.
- Sabarwal, Tarun, University of Texas at Austin (July 30, 2004) : An Ex-Post Consistent Firm Objective when markets are Incomplete : Profit Maximization.
- Sengupta, Manimay, (August 6, 2004) : The Classical Welfare Theorems without Completeness, Transitivity or Local Non-Satiation of Preferences.
- Singh, Gurbachan, Jawaharlal Nehru University (September 3, 2004) : Bank Runs, Lender of Last Resort, Suspension of Convertibility and Enabling Laws.
- Smith, Rodney, University of Minnesota (January 14, 2005) : Disease Dynamics and Economic Growth.

Linguistic Research Unit

- Chengappa, Shyamala K., IISH, Mysore (October 14, 2004) : Disorders of language in Autism/PDD.
- Mohanty, Panchanan, CALTS, University of Hyderabad (August 29, 2004) : British language politics in 20th Century India and the Oriya language movement.

Sociological Research Unit

- Gupta, Swarupa, SOAS, University of London (July 9, 2004) : Redefining *Jati* and *Samaj* : perspective on nationhood in Bengal.
- Nagaraj, K., Madras Institute of Development Studies, Chennai (February 21-24, 2005) : Economic reforms and Indian agriculture with special reference to the North-East.
- Rawal, Vikas, Centre for Economic Studies and Planning, Jawaharlal Nehru University (May 17, 2004): Some empirical aspects of credit markets in rural West Bengal.

Statistical Quality Control and Operations Research Division

SQC & OR Unit, Delhi

- Kabadi, S., University of New Brunswick, Canada (December 28, 2004) : Multipath Flows – Analysis, Network Synthesis and Realizability Problems.

Library, Documentation and Information Sciences Division

Documentation Research and Training Centre (DRTC)

Egghe, Leo, Librarian, Limburgs Universitair Centrum, Belgium (December 3, 2004) : A Universal Method of information retrieval evaluation : the 'missing' link M and the universal IR surface.

Egghe, Leo, Librarian, Limburgs Universitair Centrum, Belgium (December 6, 2004) : The first and n^{th} citation distributions and applications.

Egghe, Leo, Librarian, Limburgs Universitair Centrum, Belgium (December 8, 2004) : Duality revisited : construction of fractional frequency distributions based on two Dual Lotke Laws.

Kohl, David F., Dean and University Librarian, Emeritus, Univ. of Cincinnati (October 4, 2004) : Mass Print Repositories.

Kohl, David F., Dean and University Librarian, Emeritus, Univ. of Cincinnati (October 5, 2004) : The Digital Future: non-text resource.

Kohl, David F., Dean and University Librarian, Emeritus, Univ. of Cincinnati (October 11, 2004) : Professional issues in Librarianship.

Paul, Nieuwenhuysen, Vrije Universiteit Brussel, Belgium (February 28, 2005) : Finding Scholarly Information through the Internet and the WWW.

Proctor, Edward, South West Missouri State University, USA (February 14, 2005) : Vocabulary Issues in retrieval.

Library (Bangalore)

Krishnamurthy, M., University of Sheffield, UK (January 9, 2004) : Subject Gateway over the net.

Krishnamurthy, M., University of Illinois, Urbana Champaign, USA (June 22, 2004) : Fullbright Scholar Experience in GSLIS in Developing a digital Library.

Krishnamurthy, M., Karnataka Library Association (September 7, 2004) : Meta Search in Electronic Resources.

Krishnamurthy, M., Bangalore University, Bangalore (December 3, 2004) : Digital Library : An overview, Canara Bank School of Management.

Krishnamurthy, M., Canara Bank School of Management, Bangalore University (December 4, 2004) : Distributed Electronic Resources.

6. Sankhya

The following issues of Sankhya have been published during April 2004 to March 2005.

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November 2004 : Volume 66, IV
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7. SCIENTIFIC PAPERS AND PUBLICATIONS

Books Published

Theoretical Statistics and Mathematics Division

Stat-Math Unit, Delhi

Bapat R. B. : *Aisi Prameye Rasike (In Marathi)*, Rajhansa Prakashan, Pune, 250, 2005.

Bhatia R. *Fourier Series*, Mathematical Association of America, Washington DC, 120, 2005.

Applied Statistics Division

Applied Statistics Unit

Chaudhuri, A. and Stenger, H. : *Survey Sampling : Theory and Methods*, Second Edition, Chapman & Hall/CRC, Taylor & Francis Group, New York, 2005.

Kundu, D. and Basu, A. (eds.) : *Statistical Computing : Existing Methods and Recent Developments*, Narosa Publishing House, 2004.

Computer and Communication Sciences Division

Advanced Computing and Microelectronics Unit

Das, N., Sen, A., Sinha, B.P. and Das, S. (eds.) : *Proceedings of the 6th International Workshop on Distributed Computing*, Lecture Notes on Computer Science, LNCS - 3326, Springer, Heiberg, Germany, 2004.

Suri-Kolay, S. and Roy, K. (eds.) : *Proceedings of the 18th International Conference on VLSI Design and 4th International Conference on Embedded Systems*, IEEE CS Press, USA, 2005.

Computer Vision and Pattern Recognition Unit

Dash, Niladri Sekhar : *Corpus Linguistics and Language Technology*, Mittal Publications, New Delhi, 465, 2005.

Pal, N.R., Kasabov, N., Mudi, R.K., Pal, S. and Parui, S.K. (eds.) : *Neural Information Processing LNCS 3316*, Springer - Verlag, Berlin, 1368, 2004.

Pal, U., Parui, S.K. and Chaudhuri, B.B. (eds.) : *Document Analysis*, Allied Publishers Pvt. Ltd. Chennai, 296, 2005.

Electronics and Communication Sciences Unit

Pal, N.R., Kasabov, N., Mudi, R., Pal, S. and Parui, S.K. (eds.) : *Neural Information Processing ICONIP 2004*, Springer Verlag, LNCS 3316, 2004.

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Machine Intelligence Unit

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Biological Sciences Division

Biological Anthropology Unit

Ghosh, A.K., Ghosh, J.K. and Mukhopadhyay, B. (eds.) : *Sustainable Environments : Ecological, Economic, Sociocultural and Statistical Aspects*, Indian Statistical Institute, Kolkata, pp.214, 2004.

Social Sciences Division

Economic Research Unit

Ghosh, R. and Neogi, C. (eds.) : *Theory and Application of Productivity and Efficiency: Econometric and DEA Approach*, Macmillan India Pvt., Ltd., New Delhi, 306, 2005.

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Ramaswami, B., Ravi, S. and Chopra, S.D. : *Risk Management : State of the Indian Farmer - A Millennium Study*, Academic Foundation, New Delhi, 158, 2004.

Sociological Research Unit

Ghosh, B.N. : *Issues of Empowerment of Women*, De, U.K. (ed.), Mohit Publication, New Delhi, 2004.

Ramachandran, V.K. and Swaminathan, M. (eds.) : *Financial Liberalisation and Rural Credit in India*, Tulika Books, New Delhi, 2005.

Statistical Quality Control and Operations Research Division

SQC & OR Unit, Delhi

Mohan, S.R. and Neogy S.K. (eds.) : *Operation Research with Economic and Industrial Applications*, Anamaya Publishers, New Delhi, pp. 211, 2005.

SQC & OR (T&P) Unit, Kolkata

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Stat-Math Unit, Kolkata

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