

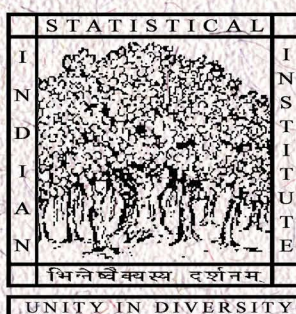
# **FIFTY-SIXTH CONVOCAATION ADDRESS**

by

**Prof. Gagandeep Kang**

The Wellcome Trust Research Laboratory  
Christian Medical College, Vellore

**2<sup>nd</sup> March 2022**



**Indian Statistical Institute**

## Gagandeep Kang



**G**agandeep Kang, a leading virologist, professor of microbiology, and co-chair of the Lancet Citizen’s Commission on reimagining India’s health System, was born in Shimla on 3 November 1962. Her mother was a teacher of English and history, and father a mechanical engineer in the Indian Railways. Because of her father’s transferable job in the Indian Railways, Kang grew up in small towns of West Bengal like Liluah, Kanchrapara and Adra besides Alipore and Garden Reach in Kolkata. Kang has a younger sister, who is a journalist.

She grew up touring in northern and eastern India, changing schools 10 times. At her childhood, she often practiced science at a home laboratory along with her father. She examined leaves, dissected and observed them under a microscope. An experiment for generating hydrogen nearly blasted the roof of the house. The close connection with science motivated her to choose a career in science. Kang had been interested in physics, medicine and also history. She decided to appear for the entrance exam for CMC-Vellore. This decision may have been influenced by her fascination with the stories of her uncle, a physician who had trained at CMC-Vellore.

After completing her MBBS and internship at CMC-Vellore in 1986, she joined the ophthalmic hospital at the All India Institute of Medical Sciences in New Delhi, but rapidly returned to Vellore to complete the Doctor of Medicine (MD) in Microbiology in 1991. At this time she joined a group within CMC called the Wellcome Trust Research Laboratory, which did community research. “I enjoyed the idea of public health and working with community rather than working with a single patient,” she said. “ So I decided to try it out and I ended up in gastrointestinal research.” She got her PhD in 1998. Her focus on intestinal bacteria in her doctoral studies shifted later to the rotavirus, which is the leading cause of deaths due to diarrhea in children.

Kang wanted to study the virus more and understand how it affected Indian children and public health. So, after her PhD she went to the UK, both to take the examinations for membership of the Royal College of Pathologists and to acquire skills for the characterisation of the rotavirus and rotavirus infections. She continued her postdoctoral research with Mary K. Estes, one of the world’s leading experts on rotavirus at the Baylor College of Medicine, Houston.

In the late 1990s and early 2000s rotavirus infections were leading to over 130,000 deaths yearly in India. After returning to India Kang set up large scale field studies to understand rotavirus infections among children. Dr. Kang learned that these infections occurred among Indian children when they were much younger than the children of other parts of the world. As a result the number of infections increased before Indian children developed immune defenses in their bodies. This information was important for the development of vaccines and understanding their potential. Kang has adopted a broad approach, including conducting phase I to III clinical trials of vaccines, providing appropriate lab support for vaccine

development and setting up surveillance networks for affected populations. Having worked in enteric disease research for the past three decades, she has a broad perspective on many of the health challenges confronting her native India. Her contributions have resulted in two WHO-approved vaccines that are capable of preventing rotavirus disease -- Rotavac, developed by Bharat Biotech, and Rotasiil, developed by the Serum Institute -- that have also given her the title of 'Vaccine Godmother'. Kang and her multi-disciplinary team are involved in complementary studies on water safety, vaccine trials and evaluation of vaccine efficacy.

After the emergence of Covid-19 in India in March 2020, Kang's priorities were to assess the role of the institute for epidemiological research and to create platforms to provide the basis for vaccine scale-up by the pharmaceutical industry. She is active in COVID-19 policy work, notably through her role on WHO's SAGE Working Group on COVID-19 Vaccines and WHO's South-East Asia Regional Immunization Technical Advisory Group, and through various national and state advisory roles in India. And it is the impact of COVID-19 on widening health inequities in India that underpins Kang's determination to help shape future health system reform. "The lack of delivery of health care in the public sector has led to an over-dependence on private health provision, with around 65–70% of expenditure for health services being out of pocket, often at catastrophic personal cost", Dr. Kang explains. She is a co-architect of the Lancet Citizens' Commission on re-imagining India's health system that is now operative. "This will call for an achievable 10-year road map towards universal health coverage, with tangible targets of reducing out-of-pocket expenses over the coming decade. It is all about creating transitional pathways, not trying to do everything tomorrow", she says.

Dr. Kang pointed out how, in the last twenty years, the SARS, MERS, Ebola, and COVID-19 outbreaks have shown that our concept of epidemics must evolve from crisis response during individual outbreaks to an integrated cycle of preparation, response, and recovery.

She has been a part of organisations or advisory committees like India's National Technical Advisory Group on Immunisation. She has also been a part of many of WHO's committees that advise on vaccine development, safety, policy and impact. Kang has also been associated with institutions across the world. She is the recipient of honorary appointments at the Johns Hopkins University Bloomberg School of Public Health in Baltimore, Maryland, Tufts University School of Medicine in Boston, Massachusetts, the Tata Institute of Fundamental Research, and the Jawaharlal Nehru Advanced Centre for Scientific Research.

Dr. Kang is a Professor in the Department of Gastrointestinal Sciences at the Christian Medical College, Vellore, India. Prior to that she had been the Executive Director of the Translational Health Science and Technology Institute, Faridabad.

Professor Kang has published over 400 papers in international and national journals. She has also been on the editorial board of several prestigious publications such as PLoS Neglected Tropical Diseases, Tropical Medicine and International Health, Current Opinion in Infectious Diseases, etc. Dr. Kang is co-author of book *Till We Win: India's Fight Against The COVID-19 Pandemic*.

She is the first, and so far the only, Indian woman scientist to be elected a Fellow of the Royal Society (FRS) in the 361 years of history of this prestigious scientific academy. She was the ninth woman and the first physician-scientist to be awarded the Infosys Prize. She is the first Indian and the first woman to edit *Manson's Textbook of Tropical Medicine*. Her notable awards and honours include:

National Talent Scholarship for MBBS (1981-1987), National Talent Scholarship for MD (1988-1991), Dr. P.N. Berry Fellowship( 1998-1999), The Lourdu Yedanapalli Award for Excellence in Research (2005), Woman Bioscientist of the Year (2006), Fellow, Royal College of Pathologists, London (2008), Abbott Oration Award, Indian Society for Gastroenterology (2009), Fellow, American Academy of Microbiology (2010), Fellow, Indian Academy of Sciences (2011), Dr. Y. S. Narayana Rao Oration Award, Indian Council of Medical Research (2011), Fellow, National Academy of Sciences (2013), Ranbaxy Research Award 2013 for Medical Research (2014), Dr. S. C. Parija Oration Award, Indian Academy of Tropical Parasitology (2015), Fellow, Indian National Science Academy (2016), Infosys Prize in Life Sciences (2016), Elected a Fellow of the Royal Society (FRS) (2019), D.Sc (Honoris Causa) 2021.

Prof. Kang will deliver the 56<sup>th</sup> Convocation Address of Indian Statistical Institute on 2<sup>nd</sup> March 2022.

*Article by Sandip Kumar De and Sushavona Chatterjee, Library, with support from Prof. Debasis Sengupta, Dean of Studies, Indian Statistical Institute.*

FIFTY-SIXTH  
CONVOCATION ADDRESS

by

Prof. Gagandeep Kang

The Wellcome Trust Research Laboratory  
Christian Medical College, Vellore

Respected Director, members of the administration, faculty and graduands of the Indian Statistical Institute and your families,

This is a special occasion. After years of striving and effort, and two chaotic years of uncertainty and loss, you have achieved what you set out to do, and the path to this success will not have been easy except for very few.

It is a matter of privilege to be from the Indian Statistical Institute, which is recognised for its unique and powerful history, and its high standards. This is an institution that has from its foundation contributed to the building of India. Established to advance theory and methods, it has also focused on practical application to address problems of national development and social welfare. As students, the rigour of your education will have shown you why this institution is a point of reference for the world and a facilitator of a remarkable vision of contribution to the building blocks of statistical theory as much as the research that contributes to a range of disciplines from genomics to operations. This is a remarkable vision, and there is a responsibility that is placed on the faculty and students to build abilities and skills to transform those who pass through the Institute and enable them to contribute to society.

In discovery and in application, science responds to societal needs and global challenges. In my own field of medicine, statistics has played a major role in improvements in health care, in identifying and monitoring disease and predicting its outcomes, but rather than focus on the present and future, I would like to first take you back to the 19th Century and to a woman who stood at the intersection of medicine and statistics.

The Crimean War of 1853-1856 was the first high-technology conflict, using the railways, telegraph, photography and high explosive shells. Florence Nightingale and her team came to run hospitals for wounded soldiers evacuated from Crimea. Her work in the Scutari barracks has gone down in history and legend for the effects on modern medical care.

But when Florence Nightingale arrived with her 38-strong nursing team in the Crimea in November of 1854, they were greeted by hospitals with no beds no blankets, and rats and fleas everywhere. They saw

soldiers suffering from frostbite, from dysentery, cholera and typhus living in ‘utterly chaotic, unsanitary and inhumane living conditions’.

On top of that, the nurses found inadequate medical records. There was no systematic recording or reporting; with hundreds of soldiers buried without a record being made of their deaths, and bureaucratic inertia prevented nurses and administrators from spotting obvious flaws in the system. Two years later, Florence Nightingale had developed pioneering statistical methods to convince people that widespread reform was vital. The scandal that she uncovered was that more soldiers were killed by preventable disease caused by unsanitary healthcare than as a result of battlefield wounds. She instituted reforms, a part of medical history that we learn in school, with hygiene, sanitation and good nursing practice, but she also collected data before and after her interventions. She needed policy for reform in order to sustain impact and for that she needed to be able to communicate with members of Parliament, with government officials and army officers, few of whom had any statistical or scientific training.

To do that, she collaborated with Harriet Martineau to publish a book ‘England and her soldiers’ and included a fold-out page at the front which had two polar area diagrams. Each wedge represented a month, the size of the wedge represented the number of soldiers that died that month. Each wedge had three colours proportionate to the number of deaths, blue for preventable diseases, red for battlefield wounds and black for other causes. The two diagrams represented what had happened before and after Nightingale and her nurses instituted her reforms.

Readers could see two things. The first was that the reforms Nightingale implemented and campaigned for had made a huge positive difference to mortality. The second, and possibly more shocking, result was that more soldiers had died from preventable diseases during the war than from injuries.

Through history, we recognise the seminal contributions of those who can discover the way our natural world works, the patterns and their consequences, and communicate to change our society, our leaders and our scientists respond. This then is your goal, to build on your foundations, gained so ably here, and respond to what your life and your professional path bring to you.

For all of you, who are graduating today, I have three messages—the ABC of life and of work. Be accountable, be brave and have a contingency plan.

Accountability goes beyond responsibility, to active management to accomplish what you set out to do. No excuses, and control of the path and the outcome. Accountability builds trust. Highly accountable people are clear about what needs to be done, when and what resources and collaborations are needed. Accountable people are trusted and that is foundational to any relationship.

We have all heard the story about four people named Everybody, Somebody, Anybody, and Nobody. There was an important job to be done and Everybody was asked to do it. Everybody was sure Somebody would do it. Anybody could have done it, but Nobody did it. Somebody got angry about that, because it was Everybody’s job. Everybody thought Anybody could do it but Nobody realized that Everybody couldn’t do it. It ended up that Everybody blamed Somebody when Nobody did what Anybody could have done. Don’t be everybody, somebody, anybody or nobody—you are you and you are accountable.

Moving to the second which is to be brave that’s not easy. Our society expects us to succeed, recognises success and looks down on failure. Today, you have achieved success, but in the future, don’t be afraid of

failure. In our personal and our professional lives, ambition requires bravery and failure. In order to make contributions that are large and lasting, you have to be ambitious.

And there is no lack of ambition at Google. In 2008, Google proposed big data in action with Google's data-aggregating tool Google Flu Trends or GFT. The program was designed to provide real-time monitoring of flu cases around the world based on Google searches that matched for terms that were related to influenza. GFT overestimated the prevalence of flu in the 2012-2013 and 2011-2012 seasons by more than 50%. From August 2011 to September 2013, GFT over-predicted the prevalence of influenza in 100 out of 108 weeks. GFT failed and was withdrawn, but new approaches to real-time monitoring during the pandemic have come from other big data sources such as mobile phone and mobility. All new discoveries and technologies require iteration, and learning from what did not work and these valuable insights can only come after failures.

Accepting and learning from those insights is key to succeeding in every project and in life. Think of all the opportunities that you'll miss if you let your failures stop you.

And then to being prepared for the future and contingency plans. There is no completely safe and fool-proof way to live life. To plan ahead to identify what is critical, what the risks and threats are and understand their impact, allows for ways of mitigation and of minimising poor outcomes. How will you react if and when it becomes necessary in an unexpected environment? If we have thought through what problems we might encounter in the future, we can also think about solutions, and even about opportunities. We remove fear by creating a path to handling what might be the dangers and risks of failure. We increase the probability of success by modelling different scenarios and our responses to them.

From my own field, I believe that the future of the pandemic and our resilience depends deeply on scenario planning. For example, during the delta wave, my one most important piece of advice to family and friends was to plan for what would happen in case a family member became ill. Where was the nearest hospital? the nearest pharmacy? Was there transport? A doctor's phone number? A friend to call to look after children at home? This kind of preparedness allows us to function without paralysis and is an essential part of building our capabilities.

Finally, it is important to constantly recognize and appreciate how much you have achieved and to have the confidence that it takes to follow your heart and your dreams! Often following your passion and doing what you feel is right for your life will involve going out on your own and being independent and standing against what you are told to do, but you are strong and all of us together are ultimately going to change society.

Today, we see you at the start of the next phase of your journey. You will grow, you will change, and you will make a difference, I hope that you will come back to show your alma mater who you have become. And we will all be proud of you.

Jai Hind.