Editorial

D. Kanjilal

Inter University Accelerator Centre (IUAC),
Aruna Asaf Ali Marg,
New Delhi 110067, India
Fax: 91-11-26893666
E-mail: dkiuac@gmail.com

Sanjeev K. Sharma

Ansal Institute of Technology,
Sector 55, Gurgaon, Haryana 122003, India
E-mail: sanjeev.sharma@aitgurgaon.org

M. P. Singh

Ansal Institute of Technology and Management,
Lucknow, India
E-mail: profmpsingh33@gmail.com

Biographical notes: D. Kanjilal is a Senior Scientist and Program Leader at Inter University Accelerator Centre (formerly Nuclear Science Centre). He was the Leader of the technical team involved in the development, installation, operation and maintenance of the large electrostatic tandem accelerator (15UD Pelletron) and associated beam lines in the 1980s. He initiated materials science research activities using swift heavy ion beam at the Centre and supervised research activities of a large number of PhD students and research groups from all over India. He is the Program Leader of niobium quarter wave resonator based super conducting linac accelerator being developed and installed at the Centre.

Sanjeev K. Sharma did his PhD in Biochemistry from Indian Agricultural Research Institute, Pusa,New Delhi. The field of specialisation during his research was Molecular Biology and Genetic Engineering. He started his job career as an Assistant Professor, Biotechnology in Doon (P.G.) Paramedical College, Dehradun, Uttranchal. He then joined as Assistant Professor, Biotechnology in College of Biotechnology and Allied Sciences, Allahabad Agricultural Institute, Deemed University, Allahabad, UP. He supervised about 20 Undergraduate and Post graduate students for their dissertation works. He co-authored a book on Biochemistry and Clinical Pathology published by TATA publisher, New Delhi. He has also contributed in writing book chapters and made several publications in National and International Journals. He had given invited presentations in many national and International conferences also convened many International and National Conference and workshops. He was invited as a visiting Professor by North Dakota State University (NDSU), USA, where he participated in the research work on studies of Biofilm production by bacteria and development of Nanocoatings for its reduction. He also worked on studies of Feline Caliciviruses. Presently he is serving as an Associate Professor Biotechnology and Assistant Dean, School of International Studies of Ansal University.

M.P. Singh, founding Director, Ansal Institute of Technology, Gurgaon and currently Executive Director, Ansal Institute of Technology and Management, Lucknow is a Fulbright Scholar and studied in the USA; he received his PhD from University of Maryland. He retired from IIT Delhi, where he had served as a Professor concurrently in the Department of Mathematics, Centre for Atmospheric Science and Centre for Biomedical Engineering. Before joining Ansal Institute, he held a Senior Faculty position in the USA. He is a fellow of the Indian National Science Academy, Delhi and Fellow, National Academy of Sciences, Allahabad. He was given the 4th Dr. Y.S. Parmar Gold Medal and Oration Award, 1984 and was UGC National Lecturer during the year 1976 1977. He was awarded the prestigious Knight of the order of Academic Palms in 2009 by French Prime Minister for his exceptional contribution in education. Recently, Prof. Singh was conferred "Distinguished Service Award" by IIT, Delhi and Award for "Leadership and Global Educator" by Hope Medical Institute, USA along with The Medical University of Lublin and The Medical University of Silesia, Europe in recognition of several decades of contribution in the field of biomedical engineering, atmospheric sciences. He has played a trail-blazing role in developing multidisciplinary programs in the country. He represented India in the scientific delegation to the then Soviet Union in 1988 and in the Indo-US Sub-commission on Science and Technology in 1985 and 1987. He was a member of the Indian delegation to attend the prestigious Science and Technology initiative meet in 1983, the so-called Blue Ribbon Panel on Meteorology set up by the then Indian Prime Minister, Mrs. Indira Gandhi and then USA President, Mr. Ronald Reagan. He was a member of ICSU International Committee for the International Decade for Natural Disaster Reduction during 1990-1992. He has supervised 27 students for the award of PhD Degree. In addition, he directed several international conferences and workshops on topics related to Environment in India, Italy and Brunei. He has published about 100 research papers in journals of International repute. He is the co-author of the book, (written jointly with Professor Sethu Raman) titled Dynamics of Atmospheric Flow published under the' Advances in Fluid Mechanic Series, UK'. He has been one of the Guest Editors of the special issues (on Air Quality) of the prestigious international journal: Atmospheric Environment that appeared in 1991 and 1995. He had been on the Editorial Board of the journals - Atmospheric Environment (1988-1994); Non-linear World (1992 1996) and Advances in Fluid Mechanics Series under the aegis of Computation Mechanics Publications, UK (1994 1998). The prestigious journal, Pure and Applied Geophysics (PAGEOPH, a Switzerland based journal), has brought out special edition in the form of two books entitled Weather and Climate: The M.P. Singh Volume I & II, in honor of Professor M.P. Singh with leading experts from all over the world as contributors. Recently, a 2-volume book entitled Air Quality, a PAGEOPH Topical Volume with Prof. Singh as one of the Guest editors of the prestigious publication by Birkhauscr Verlag, Bascl, Boston, Berlin, has appeared in early 2003. Prof. Singh is one of the Guest Editors of International Journal of Nanotechnology - 2009 issue (Vol. 6). He has been a Visiting Professor at several Universities including University of Alabama, USA; University of Brunei; University of Calgary, Canada; University of Cambridge, UK; University of Kuwait; University of Reading, UK; National Institute of Informatics and Automatics, Paris, France; National Institute for Research and Environment, Japan. He has visited China and Poland as a guest of the respective Academics.

Nanoscience and nanotechnology have made great strides in the development of core technology in the 21st century. The main unifying theme is the control of matter on a scale much smaller than one micrometre, as well as the fabrication of devices on this

same length scale. Much of the fascination with nanotechnology stems from these surface phenomena that matter exhibits at the nanoscale. These include statistical mechanical and quantum mechanical effects, for example the 'quantam size effects' leading to alteration in electronics, optical properties etc. of solids. For example, nanotechnology-enhanced materials will enable a weight reduction accompanied by increase in stability and an improved functionality. For instance, opaque substances become transparent (copper) inert materials become catalysts (platinum), stable materials turn combustible (aluminium), solids turn into liquids at room temperature (gold), insulators became semiconductors (silicon). Materials such as gold, which is chemically inert at normal scales, can serve as potent chemical catalyst at nanoscales. As manufacturing methods are perfected and scaled up, nanotechnology is expected to soon pervade, and often revolutionise, virtually every sector of industrial activity, from electronics to warfare, from medicine to agriculture, from the energy we use to drive our cars and light our homes to the water we drink and the food we eat. Nanotechnology is today's version of the space race, and countries around the globe are enthusiastically pouring billions of dollars into support of research, development, and commercialisation.

The total societal impact of nanotechnology is expected to be much greater than that of the silicon integrated circuits because it has applications in many more fields than electronics. Much speculation exists as to what new science and technology might result from these lines of research. Keeping this in view the Indo-French Workshop–cum-Conference on Nanoscience and Nanotechnology was held at Ansal Institute of Technology (AIT) from October12-16, 2009 to review the current state of knowledge in the field of nanoscience and technology along with their novel applications and current challenges as well as opportunities for industries, academics and health care sectors.

Department of Science and Technology, Government of India and All India Council for Technical Education supported the program. The rationale behind organising this event at AIT was that the institute wishes to develop this emerging field as thrust area under innovative programs. The young faculty will get an opportunity to interact with the leading experts and have insight into current research directions in nanotechnology. It will also enable them to develop interest for undertaking studies and research in the emerging field of nanoscience and technology.

The major objectives behind organising this conference-cum-workshop were:

- To review the current state of knowledge in the field of nanoscience and nanotechnology and its novel applications, current challenges and opportunities.
- To bring together experts to address research and technology frontiers and interfaces between Nanoscience, Nanotechnology and Nanomanufacturing.
- It will provide a proper platform for young researchers/scholars to discuss the recent trends in the materials and technological developments in the subject to generate productive ideas to be realised in future.

The above conference brought together eminent professionals from leading research institutions, corporate world, key officials from the relevant government bodies and academicians for contributing scientific sessions targeted for both commercial and scientific audiences.

Twenty-nine experts from USA, Canada, France, Australia, Brazil and Colombia presented invited talks/participated at the occasion and about twenty-four experts from India made the presentation and participated at the occasion. Overseas experts among

others came from renowned C Nano group, France and other prestigious organisations and laboratories. Indian speakers came from leading academic institutions like IISc.Bangalore, IITs, TIFR Mumbai, IISER Pune, IACS Kolkata, Delhi University, AIIMS, NPL and IUAC Delhi. More than hundred participants registered for the conference drawn from all over the country. Latest research work and reviews in some of the relevant fields were presented. The keynote speaker was Prof.J.Narayan, The John Family Distinguished Chair Professor at North Carolina State University, USA who is actively associated with the program on Nanoscience and Nanotechnology initiated by US Government.

At the end of the Indo-French workshop, a panel discussion was organised to bring out the major outcomes of the event.

We acknowledge the support and help received from all the members of Organising Committee, Program Committee, National Advisory committee and the International Committee. The continuous guidance and support rendered by Prof. M.P.Singh, Director, AIT, Gurgaon, India from conception to the successful completion of the conference are gratefully acknowledged. We would like to thank all faculty members, students and staff of AIT who helped in organisation of the conference. Finally, we thank all the participants for their active participation in the conference deliberations.

The refereeing work was carried out rigorously to high standard of International Journal of Nanotechnology. We are thankful to the referees for their time and efforts to review the original and revised manuscript. We are thankful to the authors as well for their cooperation without which the job couldn't have been completed.

This special issue contains many original findings and some review papers. This volume is expected to be a source book for research. Some of the papers could be discussed at graduate level classes dealing with nanotechnology. The scientific community in this field will find this book a useful addition to their personal and institutional library.