

## **Director's Report**

Honorable Chief Guest Mr. Adil Zainulbhai Chairman, Quality Council of India, Prof. M Anandkrishnan, Honourable Chairman, Board of Governors of the Indian Institute of Technology Kanpur, Members of the Board of Governors, Members of the Academic Senate, all graduating students and their family members, members of faculty, staff and students, invited dignitaries, guests, and members of the media: I heartily welcome you all on this occasion of the forty-seventh convocation of the Indian Institute of Technology Kanpur.

### **Graduation**

The current academic year so far has been momentous. I consider it a privilege to review our activities pertaining of this period. I am very happy to share with you that 73 Ph.D students have graduated till date during the academic year. The number of graduating students at the post and undergraduate level are 366 and 71 respectively.

### **Research & Development**

During the year (about 8 months), the Institute witnessed significant growth in its R&D activities. The number of externally funded ongoing projects reached 493 with a total sanctioned amount of Rs. 501 crores. Since April 2014, the Institute received sanctions for 127 sponsored projects worth Rs. 230 crores and 74 consultancy projects of value Rs. 12 crores. Some of the major grants sanctioned by various agencies during the year include Department of Electronics and Information Technology (DEITY, Rs. 135 crores), Department of Science and Technology (DST, Rs. 22 crores),

Science and Engineering Research Board (SERB, Rs. 12 crores), Department of BioTechnology (DBT, Rs. 2 crores), Ministry of Labour and Employment (MOLE, Rs. 5 crores), Wellcome Trust (WT, Rs. 5 crores) and Ministry of Power (MOP, Rs. 12 crores). Private industries have funded projects include Unilever, Tata Steel, Chevron, Samsung, Boeing, Shell, LG, and GE.

Our faculty members have published research papers in reputed national and international journals. This year Dr. Arun Kumar Shukla (BSBE) published a paper in SCIENCE and he is the first author of the paper.

Till date, 12 books have been published by the faculty and are listed at the end of this report. As of date, the Institute has filed 281 patents of which 37 are international. 37 patents have been granted. In this year, 41 national patents were filed. 4 patents were granted in the year. Our earnings from intellectual property stand at around US\$ 38300. 21 companies are currently being incubated at SIDBI Innovation and Incubation Centre (SIIC) and 31 have graduated.

IIT Kanpur has been sanctioned a project for setting up an Incubator in the area of power generation, transmission, distribution, wiring and electrical equipment with generous funding from the Ministry of Labour and Employment (MoLE).

The MoLE has also sanctioned a sum of Rs 100 lakhs towards setting up a Distinguished Chair Professor for Education & Research in Technology and Science related to *Power Generation, Transmission, Distribution, Wiring and Electrical Equipment* at IIT Kanpur.

## **Major projects sanctioned**

The newly created Department of Earth Sciences received major projects related to Sediment Dynamics and Sediment connectivity in the Koshi Basin: Implications for river hazards (ICIMOD), Deltaic Environments, Vulnerability and Climate change: migration and adaptation and its policy implications (DECCMA) (IDRC), Effects of Climate Change on Cryosphere river linkages: insights from seasonal and inter-annual variation of Glacial Melt Discharge in the head waters of the Ganga river (USAID).

Several significant projects have been sanctioned in this year. To name a few: Design and development of an autonomous helicopter (SERB); Control of cyber-physical systems applications to smart grid and formation of UAVs (DEITY); Externally aided project for reforms and improvement in vocational training services rendered by the Central and the State Government (MOLE); Reconfigurable distribution Networks (DST); and Reduction of earth metals in chalkopyrite based solar cells (IGSTC).

The project titled *Centre for Excellence for Large Area Flexible Electronics (Flex E Centre) at IIT Kanpur* has been sanctioned by DEITY in which IIT Kanpur will provide building infrastructure and manpower. Owing to new materials and methods of manufacturing, flexible electronics represents a break from the past and provides fresh opportunity to become a significant manufacturer of electronics. The aim of the Centre is to act as a catalyst for development of the flexible electronics industry. Its objectives include development of a national technology roadmap in coordination with other academic and industrial partners in the country, establishment

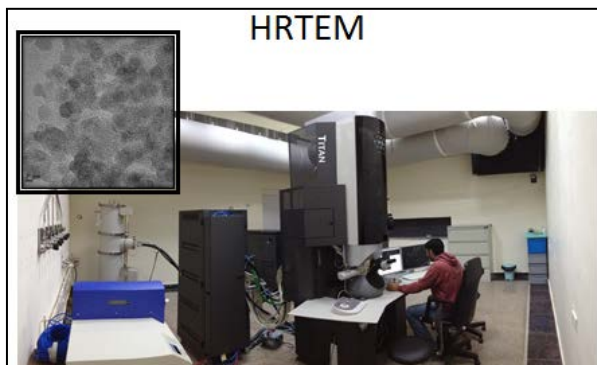
of a broad research program that leads to development of a critical set of electronic components and partner with industry to develop unique prototypes. The Center will function as a National Resource Center functioning closely with the industry.

The Project entitled *Structure, Function and novel signaling pathways of the Non-canonical G Protein Coupled Receptors (GPCRs)* was sanctioned by the Wellcome Trust DBT India Alliance. The goal of this project is to visualize the three dimensional structure selected GPCRs at atomic resolution by X-ray crystallography. Such structural visualization should facilitate novel drug design as a potential treatment for several human diseases.

### **Research Infrastructure**

*Advanced Imaging* at IIT Kanpur was started with a generous internal grant from the Institute to procure high-resolution transmission electron microscope for researchers engaged cutting-edge materials research. The building houses microscopes, sample preparation and wet laboratory facility, and

conference rooms. The following machines are located in the facility: FEI Titan G2 60-300 TEM and FEI TECHNAI



G2 12 Twin TEM; ultramicrotome for room- and cryo-temperature sectioning and a Vitrobot for vitrification process. Departments of Chemical Engineering and Civil Engineering received generous equipment grants under the FIST Scheme of the DST.

### **International Collaborations**

Recognizing the value of international cooperation, the Institute has signed MoUs with many foreign Institutions for collaboration in academic and research activities: Aalto University Design Factory, Finland, Aalto University, Finland, Consortium of Finnish Higher Education Institutions, Finland, Hamburg School of Business Administration, Germany, Kent State University, U.S.A, Kyushu Institute of Technology, Japan, Nanyang Technological University, Singapore, National Chiao Tung University, Taiwan, National Tsing Hua University (NTHU), Taiwan, NILU- Norwegian Institute for Air Research, Kjeller, Norway, The Eindhoven University of Technology, The NETHERLANDS, The Norwegian University of Science And Technology (NTNU) Norway, The University Of Oslo, Norway, The Nelson Mandela African Institution for Science and Technology, (Tanzania ) Africa, The University of Massachusetts Lowell U.S.A., The University of Melbourne, Australian, University of Delaware, U.S.A., University System of Taiwan, Taiwan, and Yeungnam University South Korea.

An MoU was entered into with MHRD, Govt. of India, for Establishment of Centers of Excellence in Frontier Areas Of Science and Technology (FAST).

## **Financial Resource Mobilization**

The year 2014-15, until now has witnessed significant growth in financial resource of the Institute. It has received 3.48 crores from 609 donations made by 556 donors (434 donors from India and 122 donors from abroad). A total of 104 donors (46 donors from India and 58 donors from abroad) contributed to total 132 donations of Rs. 20.65 lakhs under the Annual Gift Programme.

## **Awards and Honors**

Reporting about the awards and honors won by our faculty and students always remains a cherished moment for me. It gives me enormous sense of pride to share with you that Prof. S. N. Tripathi, Professor, Department of Civil Engineering who has been conferred the prestigious Shanti Swarup Bhatnagar Prize in Earth, Atmosphere, Ocean & Planetary Sciences.

The full list of awards to the faculty is given at the end of the report.

## **Students' Activities**

Our Institute has recently installed an amateur astronomical observatory. It hosts a Schmidt-Cassegrain telescope with a 14-inch primary mirror and a CCD camera for imaging. Both the



observatory dome and the telescope can be operated remotely. The telescope will be used for amateur astronomical observations, research and photography. It can provide useful information about solar system objects, variable stars,

comets, spectrum and brightness of astronomical objects as well as special astronomical events such as eclipses and occultations. The observatory is also likely to generate interest and enthusiasm in astronomy in our campus.

The students of the SAE club have designed and manufactured an off-road racing vehicle. The car is powered by a Briggs and Stratton 305cc engine coupled with Continuously



Variable Transmission (CVT) and a FNR gearbox. This set up gives a peak torque of 560 N-m after final reduction and makes the car capable of climbing an inclination of  $41^\circ$  from a dead stop. The car has ergonomically designed pedal assembly to facilitate driver comfort. The team was awarded the best incoming winner trophy at the Baja Student India 2015 competition.

I am glad to inform you that IIT Kanpur has retained the men's general championship and also won the second position in the women's general championship in the 50th inter-IIT Sports meet – 2014 held in IIT Bombay.

At the recently concluded 3<sup>rd</sup> Inter IIT Tech Meet hosted by IIT Kharagpur, IIT Kanpur secured 2<sup>nd</sup> position in the overall tally. IIT Kanpur won 2 gold and 3 bronze medals in the meet which had 8 events encompassing technology, knowledge and application.

## **Students' Placement**

Around 1200 students registered for placements this year. Overall 78% of the registered students got placement through SPO till date. Amongst the various programmes, the Dual Degree had the highest percentage of placement at 98%, followed by M.Sc. (I) at 92%, MBA at 90%, B.Tech at 80%, M.Tech at 70%, M.Des at 62% and M.Sc. (2yr) at 49%.

## **Compliance**

The Institute celebrated *Swachh Bharat Mission* on 2nd October, 2014. It observed *Rashtriya Ekta Diwas* (National Unity Day) in view of the Birth Anniversary of Sardar Vallabhbhai Patel. The Institute celebrated *Vigilance Awareness Week* to promote transparency, probity and integrity in public life. *National Education Day* was celebrated to commemorate the birth anniversary of Maulana Abul Kalam Azad. While observing *Good Governance Day*, an open seminar on "Use of Technology and Innovation in promoting Good Governance" was organized.

## **Epilogue**

Dear degree recipients, on this occasion of the forty-seventh convocation, I extend my heartiest congratulations and best wishes to the Class of 2015 passing out today. I also take this opportunity to salute your proud parents for making you what you are today and encouraging you to continually strive for excellence. This hard earned success is a major milestone in your career which should trigger many more to add in future.

The world is full of challenges. You are capable of bringing in transformation given your training, passion, knowledge and determination. Always look for ways and means to help your



countrymen. Discover your own spark, prepare yourselves to attain goals, innovate, create and go ahead.

May God bless you with health and happiness. May you prove yourself a worthy son or daughter of this great nation. May each one of you scale so high that we never tire of extolling you and bask in your glory.

Jai Hind!

## **Books published**

1. Theoretical and Computational Aerodynamics, Tapan K. Sengupta (AE), John Wiley Press, NJ, 2014.
2. High Enthalpy of Gas Dynamics, E. Rathakrishnan (AE), John Wiley Press, NJ, 2014.
3. Fundamentals of Helicopter Dynamics, C. Venkatesan (AE), CRC Press, Taylor and Francis Group, 2014.
4. Experimental Combustion: An Introduction, D P Mishra (AE), Taylor and Francis, 2014.
5. Analysis of pavement structures, Animesh Das (CE), CRC Press - Taylor & Francis Group, Boca Raton, FL, USA, 2014.
6. Engineering Electromagnetics, 8/e (SIE), W H Hayt, J A Buck, M J Akhtar (EE), McGraw Hill Education (India) Private Ltd., 2014.
7. Qualitative Research on Illness, Wellbeing and Self-growth: Contemporary Indian Perspectives, Kumar Ravi Priya (HSS) and A. K. Dalal, Routledge (Taylor & Francis), New Delhi, 2014.
8. Textual Travels: Theory and Practice of Translation in India, Mini Chandran and Suchitra Mathur (eds), Routledge (Taylor & Francis), New Delhi, 2014.
9. Calculus for Business, Economics, Life Sciences and Social Sciences, 13th edition, Global Edition contributions by Vimal Kumar (HSS) (authored by R. A. Barnett, M. R. Ziegler & K. E. Byleen), Pearson, New Delhi, 2014.
10. Plasticity: Fundamentals and Applications, P.M. Dixit (ME) and U.S. Dixit (IIT Guwahati), CRC Press, Taylor and Francis Group, Boca Raton, Florida, USA, 2014.
11. Developments in nanocomposites, Kamal Kar (ME) and Alma Hodzic (University of Sheffield), Research Publishing Services, Singapore, 2014.

12. Biosurfaces: A Materials Science and Engineering Perspective, Vivek Verma and Kantesh Balani (MSE), Wiley Inc., Hoboken, NJ, USA, 2015.

### **Fellowship**

1. Dr. Arun Kumar Shukla (BSBE) has been elected Fellow of Wellcome Trust DBT India Alliance Intermediate Fellowship.
2. Dr. Nitin Gupta (BSBE) received Ramalingaswamy Fellowship.
3. Prof. J. K. Bera (CHM) has been elected Fellow of National Academy of Sciences India, Allahabad.
4. Prof.
5. Mukesh Sharma (CE) has been elected Fellow of Indian National Academy of Engineering.
6. Prof. J N Moorthy (CHM) has been elected for J C Bose Fellowship by Dept. of Science and Technology.
7. Prof. R P Chhabra (CHE) has been elected for J C Bose Fellowship by Dept. of Science and Technology.
8. Prof. S N Singh (EE) has been elected Fellow of Indian National Academy of Engineering.
9. Prof. T. Ravichandran (HSS) received Fullbright- Nehru Academic and Professional Excellence Fellowship.
10. Prof. K. Muralidhar (ME) has been elected Fellow of National Academy of Sciences India, Allahabad.

## **Awards**

1. Dr. Ashoke De (AE) has been awarded IEI Young Engineer award.
2. Prof. Sanjay Mittal (AE) received Rajib Goyal Prize by Kurukshetra University.
3. Dr. Jayandharan G Rao (BSBE) has been conferred Young Scientist Award by YIM, Boston.
4. Prof. S. N. Tripathi (CE) has been conferred the Shanti Swarup Bhatnagar Prize in Earth, Atmosphere, Ocean & Planetary Sciences.
5. Prof. Manindra Agrawal (CSE) received ACCS-CDAC Foundation Award by Advanced Computing and Communication Society.
6. Dr. Naveen Tiwari (CHE) received Young Scientist Research Award by BRNS, DAE.
7. Dr. Raju Kumar Gupta (CHE) has been awarded IAAM Young Scientist Award by International Smart Materials and Surfaces Conference.
8. Dr. Raju Kumar Gupta (CHE) received IEI Young Engineers Award by The Institution of Engineers (India) for 2014-15.
9. Prof. P. K. Bharadwaj (CHM) received a silver medal from CRSI.
10. Prof. Sandeep Verma (CHM) has been awarded for ISCB Award for Excellence in Chemical Sciences by Indian Society of Chemists and Biologists.
11. Prof. Sandeep Verma (CHM) received Darshan Ranganathan Memorial Lecture Award by the Chemical Research Society of India.
12. Prof. Sandeep Verma (CHM) received OPPI Scientist Award by Organization of Pharmaceutical Producers of India.
13. Prof. S P Rath (CHM) received a bronze medal from CRSI.

14. Dr. Kumar Vaibhav Srivastava (EE) received IEI Young Engineer Award 2014 in recognition of his contributions in the field of Electrical Engineering by The Institution of Engineers, India.
15. Dr. Sandeep Anand (EE) has been awarded POSOCO Power Systems Award.
16. Dr. Arvind Kumar (ME) received IEI Young Engineers Award 2014-2015 in Mechanical Engineering discipline by The Institution of Engineers (India).
17. Prof. V K Jain (ME) has been awarded Life Time Achievement Award by All India Manufacturing Technology and Research (AIMTDR).
18. Dr. Shantanu Bhattacharya (ME) received design award by the Institution of Engineers (India).
19. Prof. Dipak Mazumdar (MSE) received 2014 IIM Distinguished teacher award by Indian Institute of Metals.
20. Prof. Ashish Garg (MSE) received MRSI Medal Lecture Award by MRSI India.
21. Dr. Kantesh Balani (MSE) has been awarded Young Scientist Award 2014 by the Centre for Education Growth and Research, India.
22. Dr. Tanmoy Maiti (MSE) received Young Engineers Award 2014 in Metallurgical and Materials Engineering by The Institution of Engineers, India (IEI).
23. Prof. Shalabh (MATHS) received the IISA (International Indian Statistical Association) Young Scientist award of 2014.
24. Dr. Amit Agarwal (PHY) has been selected for Adjunct Professorship (Junior Level) at Harishchandra Research Institute, Allahabad.