Convocation Report of the Director

Honorable Chief Guest Professor Satish K Tripathi, President, State University of New York at Buffalo. Dr. Arvind Panagariya, Vice Chairman, NITI Aayog, Mr R. C. Bhargava, Honourable Chairman, Board of Governors of Indian Institute of Technology Kanpur, Professor C.N.R. Rao, National Research Professor and Honorary President of Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, Mr. Viswanathan Anand, Chess Grandmaster and former World Chess Champion, Members of the Board of Governors, Members of the Academic Senate, all graduating students and their family members, members of faculty, alumni, staff and student community, invited dignitaries, guests, and members of the media: I heartily welcome you all to the forty-ninth convocation of the Indian Institute of Technology Kanpur.

Established in 1959, IIT Kanpur was the fourth institute among the group of IITs established and designed to set a new benchmark in modern engineering education in the country. Since its inception, IIT Kanpur distinguished itself as the pioneer in the field of science based engineering education in India. It has been also aided by a decade-long fruitful collaboration with a consortium of US Universities under the Kanpur Indo-American Program (KIAP). In the last 56 years, IIT Kanpur has developed the 'gold standard' of education and research in the field of engineering and technology. Heralding Computer Science and Materials Science as new disciplines in interdisciplinary education, as early as in 1970's, are hallmarks that bear testimony to the pioneering contributions of IIT Kanpur in the domain of engineering education in India.

Academic Activities

The academic session ending in May 2016 has been truly satisfying, and I consider it a privilege to review our activities pertaining to this period. I am very happy to share with you that the total number of Ph.D degrees approved by the Senate for this convocation is 151, which, is a record in the history of this Institute. In addition, 1017 other PG degrees (513 M.Tech; 33 MBA; 37 M.DES; 39 VLFM; 124 M.Sc. (2 Year); 21 M.Sc. (Integrated); 250 B.Tech-M.Tech (M.Tech part of dual degree)) and 885 UG degrees (497 B.Tech, 250 B.Tech-M.Tech (B.Tech part of dual degree), 49 Bachelor of Science (4 Year), 12 Double Major, 66 BS-MS, 6 BT-MS, 1 BT-MBA and 4 MS-PD) will be awarded in this convocation. To keep pace with the evolving knowledge in the ambit of science and technology

28 new Undergraduate and 54 new Postgraduate courses have been approved by the Academic Senate during the academic year 2015-16.

New Initiatives in Academic Courses

NPTEL Phase IV has proposed several new activities which is in tune with the recently initiated scheme of MHRD, called the Central Sector Scheme (CSS) and compliant with Massive Open Online Courses (MOOC) initiative.

It is anticipated that the CSS of MOOC compliant e-contents under NPTEL IV will play an important role towards affordable, high-quality, online and open access education drive of MHRD.

The Institute experimented with blended mode teaching for a course with 400+ students under the Pandit Madan Mohan Malviya National Mission on Teachers and Teaching (PMMMNMTT). Lectures were recorded and released at the beginning of a week, while the classroom was used for discussions, clarifications and problem solving. We were happy to note that the method worked out quite well. A tool has been designed and successfully implemented to correct programming assignments in the first course on programming. A new MOOC management system, 'mooKIT' with special features for developing countries has been developed and utilized to teach about 12 MOOCs, including one on Climate Change by the University of South Pacific Fiji and another on agriculture (under NPTEL), with the help of agriculture experts).

Research & Development

The Institute has registered steady growth in its Research and Development activities during this year. The number of externally funded ongoing projects has reached 553 in number, with a total sanctioned amount of Rs. 511 crores. During 2015 - 2016, the Institute

received sanctions for 161 sponsored projects worth Rs. 98 crores and 122 consultancy projects valued at Rs. 16 crores. Some of the major grants sanctioned by various agencies during this year include Department of Science and Technology (DST), Rs. 25 crores, Ministry of Communications and Information Technology (MCIT), Rs. 17.5 crores, Science and Engineering Research Board (SERB), Rs. 14 crores, Ministry of Human Resource and Development (MHRD), Rs. 9 crores, Board of Research in Nuclear Sciences (BRNS), Rs. 5 crores and Bhabha Atomic Research Center (BARC) Rs. 5 crores. Some of the major industries which have funded projects this year include Central Pollution Control Board, Ford Motor Company, GAIL (India) Limited, Hindustan Petroleum Corporation Limited, International Water Management Institute, U. P. Small Industry Dev. Corpn., Unilever Industries Pvt. Ltd., Larsen & Toubro Limited, Hindustan Aeronautics Limited, National Thermal Power Corporation, Research Designs & Standards Organisation (RDSO), Samsung (India), Boeing, Lanco Infratech Ltd. to name some. A list of major projects granted this year is given at the end of the report.

Major Projects Sanctioned

Some of the major projects sanctioned in 2015-16 are briefly described below:

A project titled "Studies on Aerosol Behaviour under Severe Accident Conditions" in the context of Indian Nuclear Reactors by Setting Up of National Aerosol Facility has been funded by Bhabha Atomic Research Center and Board of Research in Nuclear Sciences. Nuclear energy is a viable option to meet the country's increasing demand of energy. Nuclear reactor safety is often analyzed using numerical simulators, but, the need for experiments is clear. In this context, the first National Aerosol Facility not only of the country, but also amongst the academic institutes of Asia is currently being set up in our campus, along with the support of Department of Atomic Energy. This new facility will help quantify the aerosol source, term simulators for 'Severe Reactor Accident Scenario' and their impact on the environment.

Ministry of Human Resource and Development has funded the establishment of a Design Innovation Centre at IIT Kanpur to promote a culture of innovation and creative problem solving. The Centre aims to facilitate interdisciplinary design-focused education, research and entrepreneurial activities, besides encouraging partnerships between the academia and the industry for commercialitation the technology.

The Ministry of Communication and Information Technology (MCIT) funded a major project to set up Electronics and ICT Academics. The project aims at the development and delivery of a high technology platform using cloud computing and other state of the art storage and delivery mechanisms for delivery of courses in the Information and Communication Technology. The platform would build upon, improve and scale existing technological platforms in the education domain, already developed and tested at IIT Kanpur like intelligent tutor and mini MOOC platforms for capacity building of sixteen thousand faculty members across four states of Uttar Pradesh, Haryana, Delhi and Chandigarh.

The Ministry of Human Resource Development funded a project titled "Teaching And Learning Centre". The Centre will work at multiple levels: at the level of Teacher Enablement and Quality Improvement; at the level of Curriculum Audit, Curriculum Design and Curriculum Adoption Strategy; and also design and develop powerful electronic platforms to enable between the two modes of interaction.

This portal will play the host of all electronic course offerings from IITKanpur

The project titled *Understanding Innate Responses To Odors And Odor Mixtures: Across-Species Integrated Approach* is being funded by the University Grants Commission (UGC) and the Israel Science Foundation (ISF). Mosquitoes detect humans using a variety of cues, among which host odors play an important role. Similarly, in other species such as mice, specific odors can elicit innate attraction or aversion, and these behavioral responses help in the detection of food, danger, or mates. The mechanisms which determine the innate valence for odors are not well understood. The project would involve a set of experiments that combine electrophysiology, behavioral tests, and optogenetics stimulations in two animal systems (mosquitoes and mice) to determine the underlying mechanisms.

The project titled *Triggered Source of Single Photons and Photon Pairs* funded by SERB, proposes to develop a high-brightness triggered source of single photon and photon pairs, using laser cooled ensemble of Rubidium atoms, coupled with two optical cavities. A cascaded four-wave mixing scheme is proposed for optically pumped cold atoms to generate on-demand photons together with a fast multi-photon counting system to characterize the source. The key novelty of the project

is implementation of a double-cavity system, integrated in conjunction with the atomic ensemble to enable operation at extremely low light levels. The high brightness photon source, once developed, will be used in conjunction with a confocal microscope to couple with triggered photons to single nano-particles towards creating an interface between cold atoms and solid-state materials.

The project titled *Active Fault, Paleoseismic and Crustal Deformation In North-West and Central Himalaya India*: An Integrated Approach Towards Seismic Hazard Assessment is part of a national initiative by Ministry of Earth Sciences. It covers the area of Kumaon-Garhwal and Himachal Pradesh in the Himalayas. The objectives of the project is to identify the most earthquake prone (seismically active)
areas in the Himalayas, to prepare Digital Active Fault Atlas of the Himalayas, reconstruction of Paleo-earthquake history and hquake hazard in the Himalayas and its neighborhood.

The Department of Science and Technology funded the project titled *Developing Prototype of a Smart Superconducting Fault Current Limiter (SCFCLSM) with Three Dimensional Field and Current Mapping Technology for Early Fault and Hot Spot Detection*. There is an ever increasing need for power grids against damage by making them resistant to faults which are major fluctuations in the power drawn from a grid. The project aims to build a prototype of a smart superconducting circuit breaker which isolates the power grids during a fault condition. A new imaging technique which helps in detecting local hot regions (hot spots) generated in superconducting switches, is also being developed. Image of a hot spot imaging technique that is being built is shown.

Department of Biotechnology funded a project titled *Modulation of Adeno-Associated Virus (AAV) Replication by Host Cell Transcriptional Repressors: Pharmacologic and RNA Interference to Improve AAV Vector Delivery during Gene Therapy*. Gene therapy using adeno-associated virus (AAV) vectors is an attractive strategy for the treatment of human genetic disease. The current project attempts to understand the cellular regulators involved in anti-viral immunity in general and microRNAs in particular. This information will then be used to design strategies to modulate specific microRNA regulators to dampen the host immune response during liver directed gene therapy.

Research Infrastructure

Honourable Prime Minister, Shri Narendra Modi, remotely launched the National Center for Flexible Electronics at IIT Kanpur on July 1, 2015, as a part of the national mission on 'Digital India' sponsored by the Department of Electronics and Information Technology (DeitY).

Department of Chemistry received a Level II FIST grant from DST amounting to Rs 5.2 crores for
installing Single Crystal X-Ray Diffractometer, Mass Spectrometry and a Cell Culture Facility at IIT Kanpur.

LCP Mosquito high-throughput robotic set-up for crystallisation of membrane proteins

Department of Biological Engineering and Biosciences received a similar Level II FIST grant of Rs. 4.86 crores to augment research infrastructure and initiate new lines of investigations in molecular and structural biology by installing a high-end Fluorescence-Activated Cell Sorting (FACS): a next-generation sequencing system: a robotic device for crystallisation of membrane proteins. Additionally, a high-resolution micro-computed tomography (micro-CT) system is being added for imaging small animals. Similarly, Department of Civil Engineering received a generous equipment grant of Rs. 6.60 crore under FIST to procures 2500 kN servo-hydraulic four column loading frame, a controller of Universal Testing Machine (UTM), a 600 lpm Hydraulic Power Unit, a Cyclic Simple Shear Apparatus, an Instrumentation and Data Acquisition system for the Pseudo Dynamic testing facility, a Water Isotope Analyzer and a short range laser scanner.

A list of some of the other sophisticated facilities established in the Institute during this year is appended at the end of this report.

Industry Collaboration

MOUs were signed between IIT Kanpur with Dow Chemical International Pvt. Ltd. (DCIPL) and with Emerson Network Power at Rashtrapati Bhawan on Nov 6, 2015.

IIT Kanpur signed an industry-academia agreement with BHEL, a Navratna public sector unit and a premier electrical engineering company. This is aimed at leveraging the extensive and state of the art infrastructure available at BHEL, to help undertake path breaking research relevant to energy generation and transmission activities in India.

On 15th October 2015, IIT Kanpur hosted a large delegation from the IT giant TCS, led by Mr. Ananth Krishnan, CTO, as a part of TCS Innovation Day Drive, in which many faculty members and students participated to explore the possibility of carrying out collaborative research and create a 'Research Cafe' for

free wheeling interaction between TCS professionals and research scholars and faculty members of IIT Kanpur.

IIT Kanpur enthusiastically participated in the exhibition and contest held at the MMRDA Exhibition Ground, Mumbai, as a part of the **Make in India Week 2016** (13th to 18th February 2016) and displayed the recently developed technological innovations by the institute's students and scholars.

The Institute celebrated **Technology Day** on 11th May, 2016. Dr. R. K. Sinha, Homi Bhabha Chair Professor (former Chairman, Atomic Energy Commission and Secretary, DAE, and former Director of BARC, Mumbai) graced the occasion as the Chief Guest. Two invited lectures were delivered by Mr. Vishnu Agarwal, CMD, Technical Associates Limited, and Mr. Rajiv Kumar, CEO, HAL Accessories.

Display of Technology Developed at IIT Kanpur

Innovation and Incubation

During the year, 45 patents including 7 design patents were filed and 7 previously filed patents were granted, besides getting 4 technologies licensed for commercialization. The estimated earning from intellectual property is this year stands around Rs 17 lakhs.

Till date, 344 Indian Patents have been filed, out of which, 34 patents have been granted so far. Altogether 53 technologies have been licensed for commercialization to date.

A total of 24 companies are currently incubated at SIDBI Innovation and Incubation Centre (SIIC), IIT Kanpur, and 38 have graduated till date.

A report titled "Good Incubation" in India was commissioned by the UK Government's Department for International Development and written by Nesta as part of a strategic partnership between Nesta and DFID India. The report includes five case studies for highlighting successful incubators in India and includes SIIC as one of the successful units in the country.

SIIC was awarded sanction for becoming a Social Incubator under the Innovative Ventures and Technologies for Development (INVENT) Program. This program is supported by Technology Development Board, Government of India and the Department for International Development (Government of United Kingdom).

Aarav Unmanned Systems (AUS - www.aus.co.in), an unmanned aerial vehicles (UAVs) startup, incubated at SIIC, has raised next level funding from StartupXseed Ventures, 3ONE4 Capital (a family fund of Mr Mohandas Pai), The Phoenix Fund and HNIs.

The Institute has successfully licensed a technology developed on an exclusive basis to VisageMap Inc., a US based Startup Company. The technology enables personal identification in social networks using face recognition from weak supervision with noisy labels. The technology was also published as paper *Where is my Friend? – Person identification in Social Networks*, in IEEE Conference on Automatic Face and Gesture Recognition (FG) 2015, Slovenia.

An Incubate company, GT Silicon Pvt. Ltd, has been adjudged the Top 10 Promising Start-Ups in the CII Industrial Innovation Awards 2015. GT Silicon is carving a niche in foot-mounted pedestrian navigation. Their pedestrian navigation technology has won the DST-Lockheed Martin India Innovation Growth Program 2015 by featuring in the list of top 30 innovations.

Singhal Labs Private Limited, an Incubate company, won the 2015 AABI Torch Award for Internationalization.

Shabd Nagari, a Hindi social networking portal, has raised Rs 1.2 crore in angel investment from Kanpur Angels and a couple of other investors. This portal is flagship of Trident Analytical Solutions Private Limited, an Incubate Company.

The Bio incubator at SIIC was inaugurated on 4th March, 2016 under the Bio-Incubator Support Scheme (BISS). It is a huge fillip for budding entrepreneurs working in the areas of biotechnology, biopharma and biomedical devices. The facility has complete infrastructure for large scale protein production and purification for pharmaceutical purposes. To support commercialization ready implant fabrication, the

incubator has a high-end class 10000 Clean room which is unique in the incubation space.

Pushpak, the SAE Aero Design team of IIT Kanpur, secured overall second runner-up position in both the Micro Class and the payload fraction category at SAE Aero Design East 2016, Dallas, Taxas.

International Academic Collaborations

Recognizing the value of international cooperation, the Institute has signed MoUs with many Foreign Institutions for collaboration in academic and research activities. The list includes the University of Melbourne, University of Technology at Troyes, Ecole Centrale De Nantes, National Research Tomsk Polytechnic University, KTH Royal Institute of Technology, Lund University, Luleå University of Technology, McMaster University, University of Calgary, University of Ontario, University of Texas at Dallas, University of Miyazaki, National Ilan University (NIU), Chulalongkorn University, The Nelson Mandela African Institution for Science and Technology.

MoU signing with University of Calgary

Financial Resource Mobilization

During the F.Y. 2015-16, the Institute has received Rs. 412.70 lakh from 750 donations made by 642 donors (461 donors from India and 181 donors from abroad).

Notable contributions among the above are as follows:

- Prof. Ashoke Sen (MSC2/Phy/1978) has contributed towards naming the conference room in Physics Department.
- Mr. Taranbir Singh (BT/CSE/2006) has contributed towards Faculty Recruitment Fund.
- Dr. Ravinder Kumar Sakhuja (BT/ME/1966) has contributed Sakhuja Innovation Centre.
- Mr. Bhadresh Shah (BT/MME/1974) has contributed towards Scientific Research.

The following awards, medals & scholarships have been instituted at IIT Kanpur with generous support from donors, alumni & well-wishers:

- Dr. Kailash N Srivastava had instituted Prof. L.P. Singh Power System Research Award to be awarded to a M. Tech student of Electrical Engineering Department every year.
- Mr. Vasudev Dattaram Navelkar (MT/CSE/2000) has instituted Radhabai Vasudeo Navelkar Award at Department of Computer Science & Engineering to be awarded to a graduating girl student of M.Tech in CSE with highest CPI.
- Eaton Corporation has awarded Pratibha – the Eaton Excellence Award to 3 deserving female students.
- Krish Venkatraman Krishnan (BT/EE/1975) has instituted Jayalakshmi Scholarship to be awarded to a female student of B.Tech. program.
- Mr. Swapan Sengupta (BT/CE/1976) has instituted Sengupta Grant. The scholarship is to be awarded to a M.Tech student of Civil Engineering Department with specialization in structures.
- Dr. Ashok K. Jain (PhD/CE/1978) and ex visiting faculty IIT Kanpur instituted Mrs. Shanti Jain Memorial Scholarship.
- Dr. Ramesh Chandra Srivastava, retired professor of Physics, IIT Kanpur has instituted B.P. Srivastava Scholarship. The scholarship will be awarded to a student on the basis of means and continued in subsequent years if the progress is satisfactory.
- Mr. Santosh Mehra (BT/EE/1966) & Mrs. Anita Mehra, donors of Anita and Santosh Mehra Scholarship instituted in 2010 have donated more funds to enhance the existing amount of scholarship.

Other note worthy contributions have been made by batches Other noteworthy contributions have been made by Batches of 1965, 1989 and 1990 towards social and other initiatives such as Opportunity School, Campus School etc. Prof Tapan Bagchi, and alumnus (BT/ME/1967) and also a former faculty in Department of IME at IIT Kanpur has extended his generous support for a New Shopping Complex.

SURGE 2015, an outreach program for students from other institutions across India, supported by alumni contributions was conducted during summer 2015, which saw a participation of 64 students from various Institutes across India and 55 faculty members from IIT Kanpur as mentors. The selection of student participants was very competitive as approximately 2200 applications were received from various institutions across India.

Alumni Impact

A. Notable Achievements In The Field of Science and Technology by our Alumni

Some of our distinguished and respectable alumni members have been proud recipients of various honors and awards during F.Y. 2015-16. A few of them are -

- Dr. Rakesh K. Jain (BT/CHE/72) has been conferred upon the prestigious award National

Medal of Science. Dr. Jain is the first IIT alumnus among all IIT's to be the recipient of this highest honor for science in the US.

- Dr. Saurabh Srivastava (BT/ME/1968), the man known for his immense contribution to the Indian IT industry and for leading the creation of a vibrant entrepreneurial ecosystem in India, was awarded Padma Shri, the fourth highest civilian award in India.
- Prof. Veena Sahajwalla (BT/MME/1986) has been awarded for innovation under 2015 AFR-Westpac 100 Women of Influence list. Prof. VeenaSahajwalla is an inventor and Scientia Professor of materials science in the faculty of science at UNSW, Australia. She is the Director of the UNSW SM@RT Centre for Sustainable Materials Research and Technology and an Australian Research Council Laureate Fellow.
- Prof. Mahan Mitra (MSC/MTH), Batch of 1987, and Prof. Gattamraju Ravindra Kumar (PHD/PHY), Batch of 1983, were honored with Infosys Prize 2015 by the Infosys Science Foundation.

B. Notable Entrepreneurial Endeavours By Our Alumni

Some Entrepreneurial endeavors by our alumni members are:

- Shuttle launched in April 2015 by IIT Kanpur alumni Deepanshu Malviya (BT/MME/2006) and his colleagues raised $20 million in Series A from Lightspeed, Sequoia India & Times Internet Ltd. Currently operational in Delhi NCR, the platform provides shuttle services to commuters across 50 routes and 500 buses, and handles 15,000 rides per day across the metropolitan area.
- EnCashea.com, a doorstep, free service for collecting all unused stuff from your location, was launched by IITK alumnus Rahul Jaiswal (BT/MME/2002) with other co-founders. EnCashea.com supports *Teach for India*, a non-profit organization working to remove educational inequality and India's biggest ever cleanliness drive *Swachh Bharat Abhiyan*.

Faculty Recruitment

We have appointed 17 new faculty members (AP 17) in the past year. The appointment was spread over all the departments including Earth Sciences. The incoming faculty colleagues are highly qualified with strong international exposures. The institute has high expectations from them and we offer them a warm welcome to our campus.

Awards and Honors

Our faculty has played a significant role in pushing the frontiers of knowledge. This has been duly recognized in the form of various awards and honors, including fellowships of professional societies and editorships of international journals.

It gives me enormous sense of pride to share with you that Prof. Yogesh Joshi, Department of Chemical Engineering, has been conferred the prestigious Shanti Swarup Bhatnagar Prize in Engineering Sciences.

Prof. S. Ganesh, Department of Biological Sciences and Bioengineering, has been elected as Fellow of the Indian Academy of Sciences. Dr. Nitin Gupta, Department of Biological Sciences and Bioengineering, received WT-DBT Intermediate Fellowship by Wellcome Trust-DBT India Alliance. Prof. Sandeep K. Shukla, Department of Computer Science and Engineering, Dr. Shilpi Gupta, Department of Electrical Engineering, received Ramanujan Fellowship from SERB, Govt. of India. Dr. Ashis K. Patra, Department of Chemistry, received JSPS Invitation Fellowship by JSPS, Japan. Prof Sandeep Verma, Department of Chemistry, has been elected Fellow, Indian National Science Academy, New Delhi. Prof Manas K Ghorai, Department of Chemistry and Prof. Sachchidanand Tripathi, Department of Civil Engineering, have been elected Fellow of the National Academy of Sciences, India (Allahabad). Prof Debabrata Goswami, Department of Chemistry, has been elected as Fellow of the Royal Society of Chemistry (UK). Prof. Sachchidanand Tripathi, Department of Civil Engineering, and Prof. Avinash Kumar Agarwal, Department of Mechanical Engineering, have been elected as Fellows of the Indian National Academy of Engineering, India. Prof. Indranil Manna, Director, has been elected as Fellow of The World Academy of Sciences (TWAS) for the advancement of science in developing countries.

Dr. Jayandharan G Rao, Department of Biological Sciences and Bioengineering, received Birla Science Prize by Birla Science Centre. Prof. Manindra Agrawal, Department of Computer Science and Engineering, received NASI-Reliance Platinum Jubilee Award, National Academy of Sciences, India. Dr Nitin Saxena, Department of Computer Science and Engineering and Dr Nilesh P Gurao Department of Materials Science and Engineering, have been chosen for INSA Young Scientist Medal for the year 2015. Prof K Srihari, Department of Chemistry, received Bronze Medal from Chemical Research Society of India. Prof R Gurunath, Department of Chemistry, received Platinum Jubilee Lecture Award (2015) by Indian Science Congress in Environmental Sciences. Prof J N Moorthy, Department of Chemistry, received Platinum Jubilee Lecture Award (2015) by Indian Science Congress in Material Sciences. Prof Sandeep Verma,

Department of Chemistry, received Platinum Jubilee Lecture Award (2015) by Indian Science Congress in Chemical Sciences. Prof. Amalendu Chandra, Department of Chemistry, received Silver Medal from Chemical Research Society of India (CRSI). Prof. Jitendra K Bera, Department of Chemistry has been selected for Department of Atomic Energy-Science Research Council (DAE-SRC) Outstanding Investigator Award-2014. Dr. Tarun Gupta, Department of Civil Engineering has been awarded Scopus Young Scientist award-2015 by National Academy of Sciences, India. Prof. Kripa Shanker, Department of Industrial Management and Engineering, received Outstanding Teachers Award, 2015. Prof. Kripa Shankar, Department of Industrial Management and Engineering and Prof. Dipak Mazumdar, Department of Materials Science and Engineering, have been chosen for INAE Outstanding Teacher Award for the year 2015.

The many prestigious scholarships and awards received by our students have been a matter of pride and pleasure for us. Pranav Ravindra Maneriker, Arpit Shrivastava, Arihant Jain, Shruti Agrawal, Saksham Sharma received the Aditya Birla Scholarship. Nisha received ACC Fellowship. Akshay Vijay Chaudhari, Piyush Jain, Richa Agrawal, Semanti Mukhopadhyay received the O.P. Jindal scholarship. Shaksham Agarwal and Hardik Parwana received Honda Yes scholarship. Sanchari Sen Sarma, Ila Barshilia and Yashika Sharma received Pratibha Eaton Awards.

The full lists of awards received by the faculty and students are given at the end of the report.

Students' Activities

IIT Kanpur continues its effort to encourage an equitable balance between academics and extracurricular activities among its students. Our vision is to create future leaders in their field of interest and not just technically accomplished individuals as an abiding social and humane engagement is the hallmark of the empowered youth. To realize this lofty goal, the Institute nurtures social, cultural and sporting activities pursued by the students' gymkhana, which itself is a self governed body of the students.

The Inter-Hall cultural (Galaxy), science and technology (Takneek), films and media (Spectrum) and sports (Inferno) competitions this year were widely participated, keenly contested and thoroughly enjoyed events as usual. Fresher Inferno tournament allowed spotting new talents from the freshers' batch. The General Championship of 2015-16 witnessed a new competition called Mélange to inculcate the spirit of leadership and community welfare among the students. Also, there were two new Intra-Campus festivals: CultX, which showcased performances from the various clubs of the Cultural Council and Montage, which witnessed screening of movies of International acclamations.

The Female students are a quintessential part of the Students' Community. In order to give them equal opportunity to build their own leadership prowess amd general competence, a new pool called Veeras was introduced in the General Championship 2015-16, making the total numbers of pools to 5. Students' Gymkhana underwent a major restructuring with introduction of new entities called Cells, who would conduct specific tasks and report to the Students' Senate.

Science and Technology Council

The Science and Technology council participated and won in many national and international competitions like:

- Inter-IIT Tech Meet where IIT Kanpur bagged 1st runner up position in the event wining Silver in 5 events.
- SAE AERO Design East 2016 where Team Pushpak, IIT Kanpur put in a lot of effort this year for the competition and bagged 2nd runner up position in the Micro Class. IITK Motorsports- Motorsports team participated in 3 events namely Formula SAE India, BAJA Student India and NIS Efficycle winning Best Tech Ready Team award in BAJA Student India.
- ROBOCON- Team Robocon, IIT Kanpur for the first time made it to the top three securing 3rd position in the competition.
- Teams from IIT Kanpur won many prizes in Techfest'15 (IIT Bombay) and Techkriti'16.

The S&T Council also organized various lectures and workshops in programming, robotics, and aeromodelling. CAD modeling workshop was organized during Summer Camp by Autodesk.

Cultural Council

Some of the new initiatives are:

- The Cultural Council in collaboration with Hera Pheri Films started a video project with its aim of exposing the talent of different clubs.
- Various group discussions were conducted.
- Cultural Council for the first time organized In-Sem Workshops conducted by professionals.

Major Achievements

- Dhun is a pan India music band competition organized by National Skill Development Corporation (NSDC) under Ministry of Skill Development and Entrepreneurship (MSDE), in

collaboration with the Citizens Alliance. IIT Kanpur's band Abhilasha was selected amongst the top 10 from 150 entries all over India.

- A contingent of 8 members participated in 3 events of Rendezvous (IITD's cultural festival). IITK won the first prize in the individual event where 2 teams participated in the Parliamentary Debating.
- The major accomplishment of various clubs in Antaragni'15 are Fine Arts club -1st position in the competition like Modern Art, quiling, speed art and charcol. Dramatic Club – 2nd position in Nukkad, English Literary Society club bagged 1st position in Poetry Slam, Dumb C, Word Games and JAM, Debating and Discussion Society stood 1st in Parliamentary Debate and Hindi Sahitya Sabha won 1st position in Aamne, Samne, Kavyanjali, Kirdar, Shabdarang and Isharao Isharon.
- Hindi magazine Antas got the First Prize in a competition among similar magazines published by Rajbhasha Prakoshths of all the Government departments in India.

Films and Media Council

The Council aspires to convey information to the people through various means of communication. We intend to make it a platform where people can voice their needs and express their views with freedom. The Films and Media council organized a large number of workshops in photography, designing, animation etc. throughout the year. This year, the Animation Club organized a workshop on Stop Motion for freshers to publish a stop-motion video for the Freshers Night by the freshers.

Anime Society

- The Anime Society was formed last semester and various events were organized to cater to the needs of various campus residents who are interested in the Anime Culture.
- A large project was finally culminated into a video showcasing the glory of the campus.
- The Teacher's Day Video was also a first of its kind. The idea involved gifting each professor a balloon and a card on the eve of Teachers' Day.
- Gatthar: A 50 minute length short movie made in association with Hera Pheri films.

Major Achievements

- BIOMOD is an annual biomolecular design competition for students. A team of undergraduates from IITK – Bioluminati –participated in this competition and secured a silver medal for their efforts.
- One of the major highlights of the session was the revival of Campus Journalism Society- Vox Populi, which recently gave its annual print edition for the session 2016.

Games and Sports Council

The diverse activities organized during the year aimed at broadening the outreach of 'sporting activities' among various segments of campus community. Some of the new initiatives are formation of Bicycling Hobby Group, Summer Camp, Archery Workshop, Duathlon, Skat-a-thon, Aqua Buddies, Ivy Campus Run, RGFI National Rural Games, Sports Star Series and Performer of the Year Award.

A contingent of 115 members participated in IIT Roorkee's sports fest, Sangram'15. IIT Kanpur participants won Gold in Athletics (both boys and girls), Table Tennis and Badminton; Silver in Volleyball and Bronze in Tennis, Weightlifting, Cricket and Football.

Inter IIT Sportech – 2016

IIT Kanpur sports contingent outshined all other IITs and won the 'Overall Championship' of both men and women in this inter-IIT competition Sportech'16.

Festivals

The overriding objective of large-scale events of the Institute such as Antaragni (the cultural festival), Techkriti (the technical and entrepreneurship festival) and Udghosh (the sports festival) is to infuse a sense of richness and purpose in the lives of students. The revenues generated for conducting these festivals saw an impressive growth last year which reflects the managerial and logistic skills of our students.

Udghosh

Udghosh, Annual Sports Festival of IIT Kanpur was organized from 1st October to 4th October 2015. Udghosh is one of the large scale sports festivals held in the country witnessing participation from about 54 colleges including IITs, NITs and other major institutes; the offering an unparalleled competitive environment.

Udghosh 2015 organized a plethora of sports events like Cricket, Hockey, Footbal, Athletics, Kho Kho, Squash, Lawn Tennis, Table Tennis, Badminton, Carrom, Chess, Volleyball, Basketball and Power Lifting. This year we experienced participation from maximum number of IITs and national level players. Kho Kho men was introduced for the first time which witnessed participation from 12 colleges. A torch run was organised around the campus followed by performance of The Local Train in OAT, in the inaugural night. Udghosh'15 was brought to an end with a closing ceremony with Mr. Sanath Jayasuriya, ex-Sri Lankan Cricket player, as the Guest of Honor.

Major Highlights of this event included a marathon on 4th October morning. Participants ran for 11km and made the marathon a success with the participation of over 150 people. Duathlon witnessed the participation of 200 people including faculty members. A bike stunt show performed by 'Ghost Riders' was organized on the second day in front of the auditorium. A concert by 'Nikhil D'Souza' was held in the Concert Night. The screening of the live match between India and South Africa also took place.

Antaragni

Last year, Antaragni, IIT Kanpur celebrated its Golden Jubilee Year. The Road-Trip of Antaragni (Nationwide Prelims) has expanded its reach till Kathmandu, Nepal, which was the first ever international Road-Trip for Antaragni. For the very first time, Antaragani introduced "Prodigy", a school level cultural championship. IITK MUN (Model Unite
model was implemented in Antaragni'15 via "Single Day Registrations", allowing more participants to take part in the biggest cultural festival of north India.

Antaragni'15 invites great artists like Amit Trivedi, Nucleya, Anish Sood, Sunidhi Chauhan, Neeti Mohan, Bhayanak Maut (Rock band), Blackstrat Blues (Rock Band), Indian Jam Project, Acollective (Jewish Band), Skiller (Bulgarian beatboxer), Ranvijay, Kumar Manor, Rahat Indori and many more.

Techkriti

Techkriti, the annual inter-collegiate technological and entrepreneurial festival, organized by the students of Indian Institute of Technology Kanpur. The theme for the 22nd edition, Beyond Our Planet, witnessed a footfall of over 2400 participants from several (ational and international college. Dr. Hamid Karzai, Former President, Afghanistan, inaugurated the festival at OAT. Apart from him, the other speakers were Mr. Vikas Swarup - Spokesperson, Ministry of External Affairs, Author: Q & A, Dr. Lyn Evans – Director, Linear Collider collaboration CERN, Ex Project Head, Large Hadron Collider, Mike Libecki -Nat Geo Adventurer of the year 2013, Pradeep Sindhu - Founder, Juniper Networks, Jorge Gabriel Cham - Chinese Panamanian cartoonist and roboticist, creator of "PHD Comics", Alex Hutchinson - Creative Director, Ubisoft. Some of the major exhibitions for this edition of Techkriti were Automated Chess, Smart Technologies, Smart Vehicle Expo, Gesture Controlled Gaming, Golf Simulator, and Urban Flow.

Techkriti also witnessed fierce competitions in events like *International Autonomous Robotics Challenge* (IARC), International Robots Got Talent (IRGT), Techkriti Grand Prix (TGP), Techkriti Innovation Challenge (TIC), Multirotor, Wild Soccer, Sky Sparks, Embedded, Appathon, Business and Entrepreneurial Events to name a few. Adding to it, the second edition of Techkriti Open School Championship was held in 11 cities in 3 rounds.

This time Technocruise, the zonal round of Techkriti, was conducted in 8 cities. In this, 1000 participants for competitions and 1700 participants for workshops participated. In its 22nd edition, Techkriti undertook some social Initiatives like: Spreading Smiles, Car launch Event of Team FSAE, IIT Kanpur, New Year Celebration, Accessible India Campaign, Astro Photography and Panel Discussion on Space Exploration.

Last but not the least; Techkriti witnessed some great performances like Farhan LIVE: Concert by Farhan and team, Sunburn Campus, Interactive Session with TVF, Fire and LED show and Bike Stunt Show as the major attraction.

Counselling Service

The Counselling Service (CS) is an organisation that strives to ensure the welfare of the students by providing them emotional, academic and financial assistance and sensitizing the campus community towards key campus issues. By looking after their well-being, the Service tries to ensure that IITK is not just an institute, but a home away from home. The CS consistsof a team of professional counsellors, psychiatrists and a group of student volunteers dedicated towards the welfare of the student community.

There were 1377 counselling sessions held in academic year 2015-16. Psychiatrists visit the campus each semester and whenever there is an emergency, the student is directly sent to the psychiatrist's clinic, along with some student volunteer.

Financial Assistance

The CS grants scholarship to students requiring financial assistance through Students Benevolence Fund (SBF). This is for students who demonstrate financial need, but could not acquire finance from the institute or any other means. In 2015-16, 100 students were provided SBF scholarship of Rs.1500 per month for a period of 9 months. Apart from this, SBF Loans are also given to those who are in dire need.

Academic Assistance

Academic Assistance is provided to students facing difficulty in coping with the academic load. Remedial

Classes, Study Hours, Technical Terminology Classes are organised at individual as well as for groups and is free of cost.

Support to Students Under Academic Probation
One of the most important responsibilities of the Counselling Service is to provide emotional as well as academic support to the students in academic probation/warning. This year, the students in AP/WR were allotted a guide from the operations or guidance team, whose responsibility was to look after his/her allotted counselee and also to act as a link between the student and the counsellor. A session for the first year students in probation/warning was conducted by the counsellors.

Orientation Programme
Each year, an Orientation Programme is organized for the freshmen before the start of the session to acquaint them with the facilities, services, personnel, rules and regulations of the institute to facilitate a smooth transition into life at the institute.

Gymkhana Presentations, Session by counsellors, group activities and wing competitions were organised as part of the Orientation Programme. A session on social awareness and a talk on Ethics by Prof. H C Verma were also organised this year.

Session on Mindfulness Based Meditation Technique, Session on Addictive Behaviour were organised. World Suicide Prevention Day was observed with the theme of "Let's be there for each other.

English Conversation Classes are organized free of cost during the semesters for the students who face difficulty in understanding and communicating in English.

Sessions On Other Broad Issues like Explore Your Department; Session on Study Techniques; Intern Gyan; ESO/SO Awareness Session; What to Do in Summers were organised.

PG Education at IIT Kanpur
The goals of postgraduate programmes at Indian Institute of Technology, Kanpur are the development of scientific and engineering manpower of the highest quality, to cater to the needs of industry, R&D organizations and educational institutions, a broad grasp of the fundamental principles of the sciences and scientific methods, a deep understanding of the area of specialization, an innovative ability to solve new problems, and a capacity to learn continually and interact with multidisciplinary groups. With these goals as focal point, the postgraduate programmes are designed to include courses of study, seminars and project/thesis through which a student may develop his/her concepts and intellectual skills.

I am very happy to share with you that since the last convocation, the total number of Ph.D degrees approved by the senate is 151. In addition, 1017 other PG degrees (513 M.Tech; 33 MBA; 37 M.DES; 39 VLFM; 124 M.Sc. (2 Year); 21 M.Sc. (Integrated); 250 B.Tech-M.Tech (M.Tech part of dual degree) will be awarded in this convocation.

New PG Program
In 2015, a new postgraduate academic program called Master of Science (MS) by research has started in the following departments: Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Computer Science and Engineering. An interdisciplinary program has started in Photonics Science and Engineering.

Activities Related to PG Students
The annual event called Research Scholar day was held in each department and interdisciplinary program. The doctoral students showcased their research output through oral or poster presentations and engaged in extensive discussions with their peer and the faculty. This exercise was readily welcomed by the scholar community and added new vigor and enthusiasm in the academic community.

The Department of Biotechnology supported M.Tech program of Department of Biological Sciences and Bioengineering was rated the best amongst 71 such programs in the country. This independent evaluation was done by an expert team in collaboration with the Biotech Consortium India Limited.

Students Placement at PG Level
About 300 companies actively participated in the Campus Placement Programme. Some of the major companies that took part in recruitment drive were Google, Facebook, Mitsubishi, Schlumberger, American Express, SAP, ITC etc.

Among 411 PG students registered for placements this year, 280 students got placement through SPO till date. Amongst the various programmes, the M.DES Degree had the highest percentage of placement at 100%,

followed by DUAL degree at 93%, MBA at 80%, M.Tech at 64%, and M.Sc. (2yr) at 60%. Apart from regular placement offers, other 108 Pre Placement Offers (PPOs) were also made to our students.

Feats of Distinguished PG Alumni

Alumni of IIT Kanpur had earned national/international recognition by making significant contribution to the world of Science, Technology, Business and Innovation. Dr. Gopal Balasubramanian, Professor, Molecular Biophysics Unit, IISc, Bangalore and Dr. Pradyut Ghosh, Professor, Department of Inorganic Chemistry, IACS won Shanti Swarup Bhatnagar award 2015 in Biological and Chemical Sciences respectively. Dr. Ravindra Kumar Gattamraju, Senior Professor, Department of Nuclear and Atomic Physics, Tata Institute of Fundamental Research, Mumbai and Dr. Mahan Mitra, Professor, School of Mathematics, Tata Institute of Fundamental Research, Mumbai received 2015 Infosys Prize in Physical Sciences and Mathematical Sciences respectively. Dr. Indranil Banerjee, Presidential Fellow, Novartis Institute for BioMedical Research is the recipient of Pfizer Research Prize 2016. Dr. Archisman Ghosh, Postdoctoral fellow, International Centre for Theoretical Sciences (TIFR) received Fundamental Physics "Breakthrough Prize" (2016) and Dr. Rohan Erande, Postdoctoral Research Associate, Rice University received Eli Lilly Outstanding Thesis Award 2014. Dr. Naveen Vetcha, Staff Engineer at ManTech (Nexolve) / Lecturer at UAH won Outstanding Young Mechanical Engineer of the Year 2016 by ASME (2016) and Dr. Olive Roy, Research Engineer at GE Global Research has been awarded with the second prize in IEEE-Industry Application Society (IAS) Thesis contest, 2016. Ms. Jyoti Mishra is selected as the Director, Business Strategy & Planning, American Express. Prof. Ashwini Nangia has been appointed as the Director of the CSIR-National Chemical Laboratory, Pune. Mr. Nikhil Upadhye, Co-founder and CEO at Aarav Unmanned System has been awarded for positioing the company among top ten companies in the Qualcomm Design in India Challenge.

UG Education at IIT Kanpur

The objectives of undergraduate programmes at IIT Kanpur are to provide the highest level of education in technology and science, and produce competent, creative, and imaginative engineers and scientists, promote a spirit of free and objective enquiry, and development of knowledge in different disciplines, produce highly skilled technologists and scientists with well-honed managerial and entrepreneurial skills having team spirit and leadership qualities and also to increase student participation in nation building through technology development that is sensitive to local needs.

The academic session ending in May 2016 has been satisfying. The total number of UG degrees approved by the senate for this convocation is 885 (497 B.Tech, 215 B.Tech-M.Tech (B.Tech part of dual degree), 49 Bachelor of Science (4 Year), 12 Double Major, 66 BS-MS, 6 BT-MS, 1 BT-MBA and 4 MS-PD)).

Students Placement at UG Level

Among 638 UG students registered for placements this year, 524 students got placement through SPO till date. 79% of the B.Tech students got placement through SPO till date. Apart from regular placement offers other 108 Pre Placement Offers (PPOs) were also made to our students.

Feats of Famous UG Alumni

It gives me immense pleasure to share with you that IITK alumnus Dr. Saurabh Srivastava, Chairman, CA Technologies Inc. has been conferred the 2016 Padma Shri which is India's fourth highest civilian award. Dr. Rakesh K. Jain, Andrew Werk Cook Professor of Tumor Biology at Massachusetts General Hospital in the Harvard Medical School and Director of the E.L. Steele Laboratories for Tumor Biology at the Massachusetts General Hospital has been chosen for the National Medal of Science, the US' highest honours for achievement and leadership in advancing the fields of science and technology. President Barack Obama will felicitate the 65-year-old Indian-American professor at the Harvard Medical School with the US' highest honour at a White House ceremony. Prof. Veena Sahajwalla, Scientia Professor of Materials Science in the Faculty of Science at UNSW Australia and Director of the UNSW SM@RT Centre for Sustainable Materials Research and Technology has received 2015 - Australian Financial Review & Westpac Group, 100 Women of Influence Award in Innovation Category. Dr. Arup Chakraborty, Professor at MIT has been elected to the National Academy of Sciences, USA. Mr. Varun Khaitan and Mr. Abhiraj Bhal, Co-founder Urban Clap received Startup of the year award 2015 by the Financial Times (Rank II). Transerve Technologies Pvt. Ltd, co-founded by our alumni Mr. Ashwani Kumar Rawat and Mr. Amarsh Chaturvedi is the only Indian startup to win at India's international startup summit held at Goa. Mr. Saroj Kumar Jha is being appointed as the the Senior Director of World Bank's Fragility, Conflict and Violence Group in February, 2016.

Financial Resource Mobilization and the Hurdles

The total Grant-in-aid received during the financial year 2015-16 from MHRD, Govt. of India, under Non-Plan was Rs. 199.85 crore and under Plan Rs.

197.50 crore. Per student, the government invested about Rs. 6.25 lakhs in 2015-16. The Institute recognizes competing priorities of government funds and therefore needs to augment its internal resource generation to further enhance its research capabilities and provide more enriched student experience.

Fund Raising Appeal

At IIT Kanpur, we have several initiatives like Faculty Chairs, Young Faculty Research Fellowships, Scholarships and Awards for students, Community outreach activities, Students' projects, Students' travel (to present papers in international conferences), infrastructure & various research projects which have gained immense success. These programs have been made possible only because of your generous help and support. Our objective will be to build on these accomplishments and work on strengthening the existing ties between the Alumni and the Institute.

The sponsored research funding and research output of the institute has grown significantly over the years and the success achieved in various disciplines has given us national and international visibility. However, to continue fulfilling our goals of novel research and discovery, knowledge creation, generating commercially viable patents, spin off ventures, we need to set up a state of the art Research Complex for further improving the research infrastructure on the campus.

Moreover, with the increased student strength, a need for capacity expansion has been felt since long. Additional laboratory infrastructure for core courses and additional space for the academic activities of various departments are the need of the hour for which we need financial support and generous contribution from all our esteemed alumni and well-wishers.

I encourage you to extend your gracious support towards bolstering the institute's R&D environment and thus enthuse the student & faculty of IIT Kanpur.

Epilogue

Dear Students, on this magnificent assembly of the forty-ninth convocation, I congratulate and commend each one of you on your praiseworthy achievements and extend my best wishes to the entire class of 2016 graduating today. I also admire your parents for their patience and relentless inspiration to you to reach this summit. Today, you have set yourself apart with flying colours from the millions of students aspiring for the coveted degree from this citadel of learning by your intelligence, perseverance and a desire for rising above the 'average' with a lofty goal in mind. Now that your voyage towards the real world begins, I would like to share some of my thoughts with you.

During your exposure at IIT Kanpur, for days in the pursuit of science and truth, you have been able to contribute something to the bigger domain of knowledge and that's how the civilization advances. Rutherford, the father of nuclear physics, had lucidly explained that:

"Science goes step by step… scientists are not dependent on the ideas of a single man, but one of the combined wisdom of thousands of men, all thinking of the same problem and each doing his little bit to the great structure of knowledge".

The greatest souls of our country have always emphasized on the final goal of education to offer not a mere certificate or a recognized standardization, but, a power of freedom from ignorance, prejudice and vanity. I would like to recollect these few lines from Gitanjali of Rabindranath Tagore:

'This is my prayer to thee,
My Lord
Give me the strength to
Make my love fruitful in service.
Give me the strength never
To disown the poor or bend my knees before insolent might.
And give me the strength
To surrender my strength to thy will with love.'

The days at IIT Kanpur will soon change to busier and faster days of the professional world. The cares offered by your parents and your alma mater in your transformation will become sweet memories. I wish, the education you received at IIT Kanpur and the memories of your stay here will vibrate inside you all along your course of life.

Jai Hind!

Books published

1. Adaptive Aeroservoelastic Control, Ashish Tewari (AE), John Wiley & Sons, Chichester, UK.
2. Elements of Heat Transfer (Complex Chinese), E. Rathakrishnan (AE), GauLih Book Co., CRC Press.
3. Dynamique Des Gaz(French), (Translated by Dr. Y. Ribaud, ONERA, France), E. Rathakrishnan (AE), Praize Worthy Prize Publishing House, Napoli, Italy.
4. Compressible Fluid Dynamics (Arabic), (Translated by Professor Maher GamilHigazy), E. Rathakrishnan (AE), Dar El Maarefa Bookshop, Cairo, Egypt.
5. Methods in Cell Biology – Volume 132 – G Protein-Coupled Receptors: Signaling, Trafficking and Regulation, Edited by. Arun K. Shukla (BSBE), Elsevier, International publisher.
6. Supermacroporous Cryogels: Biomedical and Biotechnological Applications, Edited by Ashok Kumar (BSBE), CRC Press (Taylor & Francis Group), International publisher.
7. Nanoscale and Microscale Phenomena: Fundamentals and Applications, Springer Tracts in Mechanical Engineering, Joshi, Y. M. (CHE) and Khandekar S. (ME) (Editors), Springer, Delhi, 2015.
8. Highlights in Theoretical Chemistry, vol. 7, Srihari Keshavamurthy (CHM), Stephen Wiggins, Springer, Berlin.
9. Principles of Modern Wireless Communications Systems, Aditya K. Jagannatham (EE), Tata McGraw Hill.
10. Psycho-Social Aspects of Health and Illness, Shikha Dixit (HSS), Concept Publishing Company Pvt. Ltd., New Delhi.
11. Frontier Areas in Economics and Trade, Somesh K Mathur (HSS), Sarbjit Singh and Rahul Arora, Palgrave Macmillan, US, China, Europe and UK.
12. Methods and Applications in Trade Policy Research, Somesh K Mathur (HSS), Sarbjit Singh and Rahul Arora, Athena Publishers/Anne Books, London, Delhi, Bangalore, Mumbai.
13. Transport Phenomena in Microfluidic Systems, P K Panigrahi (ME), John Wiley andSons, ISBN: 978-1-118-29841-1, 507 pages, (2016).

Fellowships

1. Prof. Ashish Tewari (AE) has been elected as an Associate Fellow of American Institute of Aeronautics & Astronautics (AIAA).
2. Prof. S. Ganesh (BSBE) has been elected as Fellow of Indian Academy of Sciences.
3. Dr. Nitin Gupta (BSBE) received WT-DBT Intermediate Fellowship by Wellcome Trust-DBT India Alliance.
4. Prof. Sandeep K. Shukla (CSE) received Ramanujan Fellowship, DST SERB, Govt. of India.
5. Dr. Ashis K. Patra (CHM) received JSPS Invitation Fellowship by JSPS, Japan.
6. Prof Sandeep Verma (CHM) has been elected as Fellow of Indian National Science Academy (FNA).
7. Prof Manas K Ghorai (CHM) has been elected as Fellow of National Academy of Sciences, (FNASc).
8. Prof Debabrata Goswami (CHM) has been elected as Fellow of Royal Society of Chemistry, (UK).
9. Prof. Sachchidanand Tripathi (CE) has been elected as Fellow of the National Academy of Sciences, India.
10. Prof. Sachchidanand Tripathi (CE) has been elected as Fellow of the Indian National Academy of Engineering, India.
11. Dr. Shilpi Gupta (EE) received Ramanujan Fellowship, SERB, DST, Govt. of India.
12. Prof. A. K. Sharma (HSS) has been elected as Fellow of Indian Academy for Mathematical Modeling and Simulation (IAMMS).
13. Prof. Indranil Manna Director, has been elected as Fellow of The World Academy of Sciences (TWAS) for the advancement of science in developing countries.
14. Prof. Avinash Kumar Agarwal (ME) has been elected as Fellow of Indian National Academy of Engineering, India.

Awards and Honors

1. Prof. C. Venkatesan (AE) has been honoured with Lifetime Contribution to Indian Helicopter Technology by 4-th Asian/Australian Rotocraft Forum.
2. Dr. Arun K. Shukla (BSBE) has been conferred with Young Scientist Award by Indian Society of Chemists and Biologists.
3. Prof. S. Ganesh (BSBE) received KT Shetty Memorial Oration Award by Indian Academy of

Neurosciences.

4. Dr. Jayandharan G Rao (BSBE) received Birla Science Prize by Birla Science Centre.
5. Prof. Ashutosh Sharma (CHE) received Distinguished International Alumni Award, State University of New York at Buffalo (2016) by Alumni Association, SUNY Buffalo.
6. Prof. Yogesh M Joshi (CHE) has been conferred the Shanti Swarup Bhatnagar Award in Engineering Sciences by Council of Scientific and Industrial Research, Government of India.
7. Prof. Animangsu Ghatak (CHE) received S.K. Sharma Medal & Chemcon Distinguished Speaker Award -2015 by Indian Institute of Chemical Engineers, India.
8. Prof. Manindra Agrawal (CSE) received NASI-Reliance Platinum Jubilee Award, National Academy of Sciences, India.
9. Dr Nitin Saxena (CSE)has been chosen for INSA Young Scientist Medal for the year 2015.
10. Prof K Srihari (CHM) received Bronze Medal of Chemical Research Society of India.
11. Prof R Gurunath (CHM) received Platinum Jubilee Lecture Award (2015) by Indian Science Congress in Environmental Sciences.
12. Prof J N Moorthy (CHM) received Platinum Jubilee Lecture Award (2015) by Indian Science Congress in Material Sciences.
13. Prof Sandeep Verma (CHM) received Platinum Jubilee Lecture Award (2015) by Indian Science Congress in Chemical Sciences.
14. Prof. Amalendu Chandra(CHM) received Silver Medal of Chemical Research Society of India (CRSI).
15. Prof. Jitendra K Bera (CHM) has been selected for Department of Atomic Energy-Science Research Council (DAE-SRC) Outstanding Investigator Award-2014.
16. Dr. Tarun Gupta (CE) received Scopus Young Scientist award-2015 by National Academy of Sciences, India.
17. Prof. Sachchidanand Tripathi (CE) received Distinguished Alumnus Award-2015 by Banaras Hindu University, India.
18. Prof. S. N. Singh (EE) received Emerald Literati Network 2015 Awards for Excellence by Emerald Publication UK.
19. Prof. S. N. Singh (EE) received Global Citizen Award by KNIT Sultanpur 2016.
20. Dr. Indra Shekhar Sen (ES) received National Mineral award by Ministry of Mines, New Delhi.
21. Prof. G. Neelakantan (HSS) received Distinguished Alumni Award by St. Joseph's Higher Secondary School, Cuddalore (TN).
22. Prof. Raghu Nandan Sengupta (IME) has been selected as DAAD Research Stays for University Acaor; ACS Applied Materials & Interfaces, Americademics and Scientists, 2015, Technische Universität Dresden, GERMANY.
23. Prof. RRK Sharma (IME) received Membership Award, 2015 by International Academy of Business and Economics; USA.
24. Prof. RRK Sharma (IME) has been selected as Distinguished Scientist, Venus International Foundation Research Awards, 2015 by Centre for Advanced Research and Design; Chennai.
25. Prof. RRK Sharma (IME) has been selected for the Distinguished Educator Award 2016 by Industrial Engineering and Operations Management Society, USA.
26. Prof. Kripa Shanker (IME) received Outstanding Teachers Award, 2015, Indian National Academy of Engineering.
27. Prof. Kripa Shanker (IME) received Distinguished Mechanical Engineering Alumnus Award, 2016 by IIT BHU, Varanasi.
28. Prof. Kripa Shankar (IME) has been chosen for INAE Outstanding Teacher Award for the year 2015.
29. Prof. Dipak Mazumdar (MSE) has been chosen for INAE Outstanding Teacher Award for the year 2015.
30. Dr .Nilesh P Gurao (MSE) has been chosen for INSA Young Scientist Medal for the year 2015.
31. Dr .Nilesh P Gurao (MSE) received Young Metallurgist of the Year award by Indian Institute of Metals and Ministry of Steels, Government of India.
32. Dr. Kaustubh Kulkarni (MSE) received Editor's Choice Award by Journal of Phase Equilibria and Diffusion.
33. Prof. J. Ramkumar (ME) received National Design And Research Forum award by the Institution of Engineers (India).
34. Prof. J. Ramkumar (ME) received Eminent Engineer Award, The Institution of Engineers (India).

Editorships

1. Prof. S. Ganesh (BSBE), Member of Editorial Board, Meta Gene, Elsevier.
2. Prof. S. Ganesh (BSBE), Member of Editorial Board, Gene Reports, Elsevier.
3. Dr. Arun Kumar Shukla (BSBE), Member of Editorial Board, Scientific Reports, Nature

Publishing Group.

4. Prof. R P Chhabra (CHE), Member, Editorial Advisory Board, Journal of non-Newtonian Fluid Mechanics.
5. Prof. Ashutosh Sharma (CHE), Member of Editorial Board: Associate Editn Chemical Society.
6. Prof. Sandeep K. Shukla (CSE), Editor in Chief, ACM Transactions on Embedded Computing Systems, Association of Computing Machineries, ACM, USA.
7. Prof. Sandeep K. Shukla (CSE), Associate Editor, ACM Transactions on Cyber Physical Systems, ACM, USA.
8. Prof. Sandeep K. Shukla (CSE), Category Editor, ACM Computing Reviews, ACM, USA.
9. Prof. Sandeep K. Shukla (CSE), Series Editor, River Publishers Series in Information Science and Technology, River Publishers, Denmark.
10. Prof Debabrata Goswami (CHM), Elected as IEEE Senior Member.
11. Prof Debabrata Goswami (CHM), Sigma Xi, Full member.
12. Prof M L N Rao (CHM), Editorial Board Member, Mini Reviews in Organic Chemistry, Bentham Science.
13. Dr. N. K. Verma (EE), International Chapters Committee Member, IEEE Computational Intelligence.
14. Dr. N. K. Verma (EE), Associate Editor, IEEE Computational Intelligence Magazine, IEEE.
15. Dr. N. K. Verma (EE), Associate Editor, International Journal of Advances in Intelligent Informatics, IEEE.
16. Dr. N. K. Verma (EE), Editor, IETE Technical Review Journal, IETE.
17. Dr. N. K. Verma (EE), Associate Editor, Transaction of the Institute of Measurement and Control, SAGE Publisher.
18. Dr. D. Paul (ES), Member, Editorial Board of Chemical Geology, Elsevier.
19. Prof. R. Sinha (ES), Member, Editorial Board of Earth Surface Processes and Landforms, Wiley.
20. Prof. R. Sinha (ES), Member, Editorial Board of Current Science, Indian Academy of Sciences.
21. Prof. P.S. Ghoshdastidar (ME), Editorial Board Member, Engineering Science and Technology, an International Journal (JESTECH), Elsevier.
22. Prof. P. Venkitanarayanan (ME), Associate Editor, Experimental Mechanics, Springer for Society for Experimental Mechanics, USA.
23. Prof. Bishakh Bhattacharya (ME), Editorial Board Member, The Journal of the Institute of Smart Structures and Systems, Springer.
24. Prof. Dipak Mazumdar (MSE), Editor, Transactions IIM, Springer.
25. Prof. Dipak Mazumdar (MSE), Sub Editor or Key reader, Materials Transactions B, Springer.
26. Dr. Kantesh Balani (MSE), Guest Editor, Journal of Thermal Spray Technology, Springer.
27. Dr. Kallol Mondal (MSE), Editor, Scientific Reports, Nature.

Students' Awards

1. Mr. Yonas Gebre (AE), has won first prize in the student mechanism design contest at 2nd International and 17th National Conference on Machines and Mechanisms (iNaCoMM 2015).
2. A team of UG students (named "Bioluminati"; comprising Amrita Singh, Ishita Jain, Ishita Gupta, Abhinav Soni, Shubam Tripathi and Kashish Jain) (BSBE) have own Silver Medal at the International Bio-Molecular Design Competition (Biomod 2015) held at Cambridge, USA.
3. Ms. Shalini Awasthi (CHM), has received first prize in poster presentation during CPMD Meeting 2016, held at the University Chicago, USA.
4. Mr. Vadlamuri Veeraswamy (CHM) was honoured with prestigious *Professor P. Sengupta Memorial Award* at 52nd Annual Convention of Chemists 2015, Jaipur.
5. Mr Mahesh M Parsutkar (CHM) secured AIR 1 in CSIR-NET Examination and AIR 2 in GATE 2016 examination in Chemical Sciences.
6. Ms Khushboo Yadav (CHM) and Ms Gagandeep Kaur (CHM) have been declared winners in the Artistic Micrography Contest 2015-16, jointly organized by Indian Institute of Metals, Kanpur Chapter, and Material Advantage, Kanpur Chapter.
7. Mr B Vijay Kumar (CHM) has been awarded Royal Society of Chemistry, UK, sponsored Organic and Biomolecular Chemistry Best Poster Prize at XI J-NOST conference for

research scholars held at NISER Bhubaneshwar.

8. Mr P Chandrasekhar (CHM) was selected for International Union of Crystallography (IUCr) Poster Prize, in 13th Conference of Asian Crystallographic Association, held in Kolkata.
9. Ms Anijamol T Philip (CHM) was identified for the Best Poster Prize in the Royal Society of Chemistry (UK)-IIT Kanpur meeting for poster titled Amino Acid Derived Chirons for Rational Design of Organocatalysts and Unusual Amino Acids.
10. Mr Vivek Gupta (CHM) was identified for the Best Poster Prize in the Royal Society of Chemistry (UK)-IIT Kanpur meeting for poster titled Cyclic Six Membered Palladium Complexes Derived from Palladium Mediated C-N coupling of Organonitrile/Formamidine: Synthesis, Structure and Catalytic Application.
11. Mr Subhomoy Das (CHM) was identified for the Best Poster Prize in the Royal Society of Chemistry (UK)-IIT Kanpur meeting for poster titled Stereoselective Synthesis of Cyclohexanone Derivatives Containing Quaternary Carbon Center via Domino Michael-Michael and Aldol-Aldol Reactions.
12. Mr. Prithwidip Saha (CHM) has received a merit award for his oral presentation during the International Conference on Electron Microscopy 2016, jointly organized by the Electron Microscopy Society of India (EMSI) and IIT BHU Varanasi.
13. Ms. Thanikella Vijayasri (CE) has received the best paper award for her paper entitled "Numerical simulation of dynamic behaviour of Renusagar pond ash embankment in India using a fully-coupled nonlinear approach" in the International Conference on Geo-Engineering and Climate Change Technologies for Sustainable Environmental Management (GCCT-2015).
14. A paper entitled "Vertical uplift capacity of two coaxial anchors subjected to limiting displacement in Cartesian and polar coordinate system" by Mr. Avishek Nath, Mr. Srinivasan V (CE) has been awarded to be one of the best 5 papers of the conference GCCT-2015.
15. Mr. Manish Agrawal (CE) got the Best Poster award and Bursary award in European Aerosol Conference 2015, Milan, Italy.
16. Mr. Olive Ray (EE) has won the 2nd Prize (PhD Category) in the IAS CMD Student Thesis Contest 2016.
17. Mr. Vignesh V (EE) has been selected for POSOCO Power System Award (PPSA 2016) for his Ph.D. thesis titled, "Stability Analysis and Control of Power Systems with High Wind Penetration Including New Approach of Load Modelling".
18. Mr. Vivek Nandan Lal (EE) has been selected for POSOCO Power System Award (PPSA 2016) for his Ph.D. thesis titled, "Performance Analysis and Power Forecasting of Single Stage Large Scale Grid Connected PV System".
19. Mr. Sanjeev Kumar Mallick (EE) has been selected for POSOCO Power System Award (PPSA 2016) for his Ph.D. thesis titled, "Hybrid State Estimation and Enhanced Monitoring of Power Systems Using Synchrophasors".
20. Mr. Neeraj Kumar Sharma (EE) has been selected for POSOCO Power System Award (PPSA 2016) for his M.Tech thesis titled, "Observability analysis & topology error processing of power systems in the presence of hybrid measurements".
21. Mr. Rahul Ranjan Jha (EE) has been selected for POSOCO Power System Award (PPSA 2016) for his M.Tech thesis titled, "Development of Control Strategies for Power Management with Renewable Resources".
22. Mr. Bharadwaj Kaka (EE) has been selected for POSOCO Power System Award (PPSA 2016) for his M.Tech thesis titled, "Design, Simulation and Development of Multifunctional active power filter for Power distribution system".
23. Mr. Abhishek Maji (EE) has been selected for POSOCO Power System Award (PPSA 2016) for his M.Tech thesis titled, "Power Quality Improvement and Power Capacity Enhancement of Power Plant for Rural Telecom Applications".
24. Mr. Abhishek Kumar Jha (EE) has received the Gandhian Young Technological Innovation (GYTI) 2016 Award from the Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI).
25. Mr. Saksham Agarwal, (EE) has won the prestigious "Honda Young Engineer and Scientist Award" for the year 2015.
26. Mr. Debdeep Sarkar (EE) has won the Best Report Award in the International Microwave and RF Conference organized by IEEE MTT Society.
27. A team of PhD and M.Tech students consisting of Mr. Abhishek Kumar Jha, Mr. M. Arif Hussain Ansari, Mr. Muhammed Shafi K T and Mr. Surya Prakash Singh (EE) has been awarded second prize at the IEEE SIGHT Design

Contestorganized by IEEE MTT Society for the project titled "RF Sensor for Contamination Detection in Edible Products".

28. A team of PhD and M.Tech students consisting of Ms. Sanchari SenSarma, Ms. Sandhya Chandravanshi and Mr. Abhishek Kumar Jha (EE), has been awarded third prize at the IEEE SIGHT Design Contest organized by IEEE MTT Society for the project titled "Ambient RF Energy Scavengers for Health Monitoring Appliances in Wireless Body Area Networks (WBAN)".
29. Dr. Somak Bhattacharyya (EE) has been awarded first position in Young Scientist Award in "2nd URSI Regional Conference on Radio Science (RCRS 2015)" organized by Indian Committee for International Union of Radio Sciences (INC-URSI), Indian National Science Academy (INSA) and School of Environmental Studies, Jawaharlal Nehru University, New Delhi.
30. Ms. Sonal Dixit (EE) has won the Best Poster Award for her research paper titled "Thermal Imaging based CBM on Android Platform" at IEEE Bombay Section Symposium.
31. Mr. Rahul Sevakula (EE) has received FUZZ-IEEE 2015 Student Travel Grant Award from IEEE Computational Intelligence Society.
32. Mr. Rahul Sevakula (EE) has been nominated for the Young Researcher in the Area of CI Award (From Student Community) from IEEE UP Section Computational Intelligence Society Chapter.
33. Ms. Ponnaganti Pavani (EE) has received IEEE India Council M V Chauhan All India Student Paper Award 2015 (Second prize) for her paper titled "Binary Genetic Algorithm Based Reconfiguration of Distribution Systems having Distributed Generations".
34. Ms. Soumita Boral (ES) received the Guest Student appointment at Woods Hole Oceanographic Institution to visit the institution.
35. H. Khoont (ME) received best Research Paper Award for the paper entitled "Investigation of transport phenomena in selective laser melting of Ti-6Al-4V" at 3rd Annual International Conference, Materials Science, Metal & Manufacturing.
36. T.K. Pradhan, (ME) receivd Best Paper Award for the paper titled "Experimental investigation of fluid convection inside an evaporating droplet of binary mixture", at 42nd National Conference on Fluid Mechanics and Fluid Power, NIT Karnataka.
37. Mr. Sahil Kalra (ME) got best Poster and Exhibiton Award at the 9th International Collaboration Symposium in the IPS Waseda University, Japan.
38. Mr. Raghunandan Sharma (ME) received "Second Prize" in the "National Conference on Carbon Materials for Energy Applications-2015 (Hindi)" held at National Physical Laboratory, New Delhi.
39. Bharat Lal Meena (PHY) awarded 'Gandhian Young Technological Innovation (GYTI) Award 2016 for his work titled "Development of portable device based on polarized fluorescence for detection of cervical cancer".
40. Anil Kumar Singh (PHY) has received best poster presentation award for his poster titled Rapid growth and STM/STS study of graphene.in Second International Conference on Materials Science and Technology (ICMST-2016).
41. Mr.Chandan Mondal (PHY) received the Best Poster Award in the conference Light Cone 2015 held in Frascati, Italy for his poster on "A comparative study of nucleon structure in light front quark models in AdS/QCD".

Major Projects sanctioned

1. Modulation of Adeno - Associated Virus (AAV) Replication by Host Cell Transcriptional Repressors: Pharmacologic and RNAI Interference to Improve AAV Vector Delivery during Gene Therapy (DBT).
2. Studies on Aerosol Behaviour under Severe Accident Conditions in the Context of Indian Nuclear Reactors by Setting Up of National Aerosol Facility (BRNS and BARC).
3. Optimal Power Architecture for Next Generation Datacenters (SERB).
4. Target-Specific Nanomaterials as Contrast Agents for High Precision Multimodal Bioimaging Applications (SERB,DST).
5. Development of Compressed Air Based Test Bed for Pipe-Line Health Monitoring Robot (GAIL).
6. Three Problems in Algebraic Complexity Theory (DST).
7. Wind Tunnel Study of Intake Tests on LCA Air Force Mk 1 Model (ADA).
8. Advancing the Efficiency and Production Potential of Excitonic Solar Cells (Apex Phase II) (DST).
9. Fiber-Optic Hydrophone Sensor Array for Underwater Surveillance (NRB).
10. Enantic Selective Synthesis of Isoindolinones

and Tetrahydroisoquinolines (SERB).
11. Photodiode Arrays for Near Infrared Detection and Tracking (DRDO).
12. Design Innovation Centre (MHRD).
13. Controlling Electronic Switching in Organo-Metallic Molecular Patterns at Solid-Liquid-Interface using Scanning Electrochemical Tunneling Microscopy (DST).
14. Teaching and Learning Centre (MHRD).
15. Wetting Behavior of Fluids in Presence of Large Particles on Surfaces (SERB).
16. Establishing a Critical Zone Observatory (CZO) in the Ganga Basin: Focus on Water Balance, Water Quality, and Hydrometeorological Information System (MOES).
17. Special Manpower Development Programme for Chips to System Design (DEITY).
18. Setting up of Electronics and ICT Academies (MCIT).
19. Understanding Innate Responses to Odors and Odor Mixtures: Across-Species Integrated Approach (UGC).
20. Research on Metal Organic Framework (MOFS): Searching of Paradigms for Selective and Reversible Hydrogen Storage at Ambient and Near Ambient Temperatures (MNRE).
21. Stereoisomers of New Dipicolylamine Complexes from Multi-Component One-Pot Reactions: Isolation and Post Synthetic Modification Transmetallation and Bioinspired Hydrogen Production Catalysis (SERB).
22. Microstructural and Tribological Characterization of Stainless Steel 316l obtained by Modilated Machining (DAE).
23. Modeling and Simulation of Methane Extraction from Gas Hydrates via Simultaneous Depressurization and CO_2 Injection (OIDB).
24. KHEL (Knowledge Hub for E-Learning) (Industrial Design Center, IITB).
25. Active Fault, Paleoseismic and Crustal Deformation in NW and Central Himalaya India: An Integrated Approach towards Seismic Hazard Assessment (MOES).
26. Developing Prototype of a Smart Superconducting Fault Current Limiter (SCFCLSM) with Three Dimensional Field and Current Mapping Technology for early Fault and Hot Spot Detection (DST).
27. Central Sector Scheme for MOOC-Compliant E-Content Creation (NPTEL phase IV) (MHRD).
28. Department of Science and Technology (DST) India, under the FIST program (Level-II), has sanctioned three new projects in the Department of Chemistry, Department of Civil Engineering and Department of Biological Sciences and Bioengineering

Labs/ Facilities developed

1. Acoustic and Vibration Data Acquisition Facility: Intelligent Condition Based Health Monitoring of Air Compressors system has been setup which consists of four sets of single stage and double stage compressors and two acoustic and accelerometer based data acquisition system (EE).
2. Brain Computer Interface Laboratory: Brain Computer Interface is a direct communication modality between brain and external environment that bypasses the usual peripheral pathways. In Intelligent Informatics the Brain Computer Interface Laboratory, we have the emotiv epoc, a 14-channel high resolution wireless EEG system (EE).
3. Development of Geophysics laboratory (ES).

Softwares developed

1. CAFDAR (Comprehensive Aeroelastic and Flight Dynamic Analysis of Rotorcraft). The code was accepted after validating with ALH flight test data for more than 100 flight test cases (AE).
2. Transfer, installation, training and acceptance of the code SDRA (Structural Dynamic Analysis of Rotorblades) (AE).
3. Object Counting Application (EE).
4. Sensitive position finder (EE).
5. Intelligent Condition Based Monitoring App (EE).
6. Data Analytics Apps (EE).
7. A GUI based thermal and material balance calculation for Electric Arc Furnace A Steelmaking (MSE).

Technologies developed

1. Community based integrated filter system for cleaning drinking water, technology recognized by ICMR & NIF at Rashtrapati Bhavan- 2016 (BSBE).
2. Automatic Guided Vehicle prototype developed for implementing the real time AGV vehicle that can address multi-color path tracking, object following, pick and place operation, obstacle avoidance and optimal path routing (EE).
3. Brain Computer Interface Laboratory Brain Computer Interface is a direct communication

modality between brain and external environment that bypasses the usual peripheral pathways. This system consists of active sensors that tune into electrical signals produced by the brain to detect user thoughts, feelings, and expressions. (EE).

4. A hardware-in-the-loop simulation test-bed for the networked control systems of multi-wheel-drive multi-wheel steer electric vehicles and for the networked coordination of multiple motors handling a common job (EE).
5. Method for Monitoring the health of Aluminum Electrolytic Capacitor (EE).
6. Single phase dynamic voltage restorer (DVR) with active filtering capability (EE).
7. Automatic Guided Vehicle which can perform various operations i.e. object recognition, optimal path tracking, vision based path following and obstacle avoidance (EE).
8. Inventory management: A vision based inventory system used for managing and locating objects or materials and keeping the count of object (EE).
9. Data Analytics Tools: Development of data analytic tools/apps to perform sensitive position detection, data acquisition, preprocessing, feature extraction, feature selection and classification on most operating systems for Windows Phone, Tablets and Smartphones (EE).
10. Amla Pricking machine by RuTAG (ME).
11. Table Top 4-Axis Magnetic abrasive finishing machine for free form surfaces (ME).
12. Tomographic set-up for compact plasmas (ME).
13. Pipe Health Monitoring Robot (ME).
14. Active Antenna Shape Control System (ME).
15. Technology for intermetallic free weld joints of steel and aluminum alloys (MSE).