

Director's Report

Honorable Chief Guests Professor Tan Chorh Chuan, President, National University of Singapore, Mr. B Prasada Rao, Chairman and Managing Director, Bharat Heavy Electricals Limited, Prof. M Anandakrishnan, 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, alumni, staff and students, invited dignitaries, guests, and members of the media: I heartily welcome you all on this occasion of the forty-eighth convocation of the Indian Institute of Technology Kanpur.

Established in 1959, the Indian Institute of Technology Kanpur was the fourth oldest among the group of IITs created to set a new benchmark of modern engineering education in the country. Since inception, IIT Kanpur distinguished itself as the pioneer of science based engineering education in India, owing to a decade-long fruitful collaboration with a consortium of US Universities under the Kanpur-Indo-American-Program (KIAP). In the last 55 years, IIT Kanpur has developed the 'gold standard' in technological education. It is one of the pioneers to introduce computer science and material science disciplines in India, develop several key technologies by partnering with industry, make significant contributions in generating new knowledge in science and engineering, and above all, produce over 30,000 alumni who have established themselves as leaders in their respective domains by their distinguished contributions.

Academic Activities

The academic session ending in May 2015 has been satisfying, and I consider it a privilege to review our activities pertaining to this period. I am very happy to share with you that since the last convocation (47th convocation held in February, 2015) award of 63 Ph.D. degrees have been approved by the senate. With this, the total number of Ph.D degrees approved by the senate during July 2014-June 2015 is 136. This is the record number for any academic year in the history of the Institute. Earlier, in 2010, 131 Ph.D. degrees were awarded in the academic year 2009-2010. In addition to 63 Ph.D degrees, 474 other PG degrees (124 M.Tech; 52 MBA; 9 M.DES; 38 VLFM; 95 M.Sc. (2 Year); 104 M.Sc. (Integrated); 52 B.Tech-M.Tech (M.Tech part of dual degree)) and 434 UG degrees (359 B.Tech, 52 B.Tech-M.Tech (B.Tech part of dual degree) and 24 Bachelor of Science (4 Year)) will be awarded in this convocation. In the academic year 2014-15, 09 new Undergraduate and 46 new Postgraduate courses are approved by the standing committees of the senate.

Creation of New Academic Program “MS by Research”

The Senate has recently approved a new postgraduate academic program called “Master of Science (MS) by Research” in the following disciplines: Chemical Engineering; Civil Engineering; Electrical Engineering; Environmental Engineering and Management; Mechanical Engineering and Photonics Science and Engineering. The objective of this program is to promote project-based and industry sponsored research. The first batch of students to this program will be admitted in July 2015.

Grades Related

In the graduating class of BTech students 16 have scored a CPI of > 9.5 and Mr. Karan Singh from the Department of Computer Science and Engineering has a perfect score of 10. Among BS students 3 have a CPI of > 9.5. Integrated MSc students have displayed a similar level of proficiency.

Among postgraduate students, 13 have been awarded the best paper and poster award while 6 have received the best doctoral thesis award in the past one year. These details are available in the Director's report. We do acknowledge that a vast majority of publications from the Institute stemmed from the hard work of our post graduate students. These numbers have been rising happily over the years.

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It is noteworthy that over 50 students have participated in filing patents last year while 13 start-ups are presently registered.

We have recently introduced an annual event called '**Research Scholar day**' in each department and interdisciplinary program. Here, the doctoral students display their research output through oral or poster presentation and engage in extensive discussion with their peer and the faculty. This exercise is readily welcomed by the scholar community and has added new vigor and enthusiasm in the academic community.

MOOCs (Massive Open Online Courses) are an effort to reach the millions of students worldwide and issue certificates after conducting an online proctored examination. NPTEL has embarked on this new initiative of offering online courses (MOOCs) through its portal <https://onlinecourses.nptel.ac.in>. IITK has prepared 18 MOOCs (Massive Open Online Courses) courses for NPTEL and has developed its own platform (MOOKIT) in collaboration with TEQIP II to administer MOOCs.

Peer Review of the Institute

Inspired by the IIT Council, IIT Kanpur undertook first time in its history, an extensive peer review exercise. The first stage consisted of academic review of each Department and subsequently the whole Institute by separate sets of well-known experts drawn from academia, industry and R&D organizations from India and abroad. Each of these reviews lasted for several days. It covered relevant aspects such as teaching, course curriculum, laboratory and related infrastructure, faculty profile, student and staff feedback, research output and collaborations, internationalization and peer recognition. The second stage of review was at the institutional level. The Expert Team then visited the concerned Departments, Centres and facilities, interacted with the faculty, staff and students and reviewed the overall progress of the Institute in teaching and research. The final report of the Committee was submitted to the Board of Governors. This year two more interdisciplinary programs (MSP and EEM) have conducted this review process. Since IIT Kanpur has always believed in an open, transparent and objective process of evaluation, we treat this exercise as a rare opportunity to assess our strengths and weaknesses and forge ahead in our pursuit of excellence.

Research & Development

The Institute has shown sustained growth in its Research and Development activities in this year. The number of externally funded ongoing projects has reached 455 with a total sanctioned amount of Rs. 368 crores. The Department of Electronics and Information Technology (DeitY) has sanctioned Rs. 132 crores for the Centre for Excellence for Large Area Flexible Electronics (FlexE Centre). During 2014 - 2015, the Institute received sanctions for 134 sponsored projects worth Rs. 101 crores and 82 consultancy projects of value Rs. 14 crores. Some of the major grants sanctioned by various agencies during the year include Department of Electronics and Information Technology (DEITY, Rs. 132 crores), Ministry of Human Resource and Development (MHRD, Rs. 30 crores), Department of Science and Technology (DST, Rs. 14 crores), Science and Engineering Research Board (SERB, Rs. 12 crores), Ministry of Power (MoP Rs. 6 crores), and Ministry of Labour and Employment (MOLE, Rs. 5 crores). Some of the major industries which have funded projects this year include Unilever, Tata Steel, Samsung, Boeing, Shell, LG, GE, General Motor, Intel, Saint Gobain and Thermax. A list of major projects granted this year is given at the end of the report.

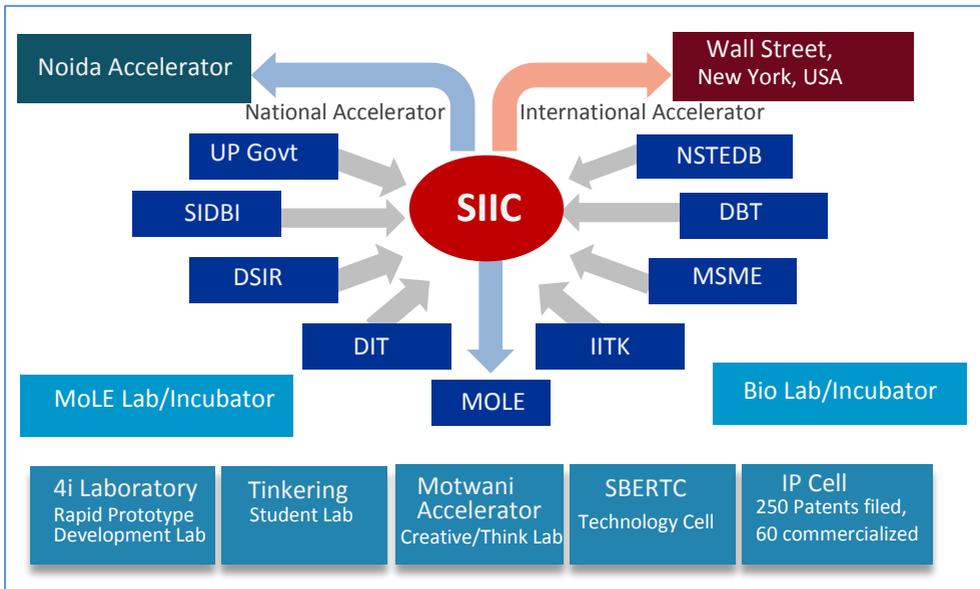
During the year, we filed 56 patents which include 3 international patents. Eight patents were granted in the year, 20 technologies were licensed for commercialization. The earning from intellectual property is well over US \$49000.

Till date, 294 Indian Patents have been filed of which 41 are international, 10 are design patents, 40 patents were granted. Over 40 technologies have been licensed for commercialization.

A total of 21 companies are currently incubated at SIDBI Innovation and Incubation Centre (SIIC) and 31 have graduated till date.

IIT Kanpur has successfully procured the project of setting up an Incubator in the area of power generation, transmission, distribution, wiring and electrical equipment with generous funding of Rs. 5 crores from the Ministry of Labour and Employment (MoLE). The objective of the project is to allow select ITI students access to the existing Incubation Centre facilities to incubate their original ideas.

The Innovation Ecosystem at IIT Kanpur is a unique experimental and incubation space fostering innovation and entrepreneurship in the whole country. The ecosystem is driven by a set of laboratories and testing facilities encompassing the entire gamut of engineering disciplines from Bio-Engineering, Mechanical, Electronics and Electrical to IT & ITES and is open to anyone with an innovative idea. These facilities provide the students, innovators and entrepreneurs both within the institute and outside a unique environment to fructify their ideas into viable high technology intensive products thus helping them in building a successful entrepreneurial venture with minimum cost. SIIC along with the Innovation Council is at the epicentre of this ecosystem fostering, facilitating and funding these nascent entrepreneurial ventures. IIT Kanpur faculty members play an important role in this ecosystem in providing knowledge and technical expertise as mentors to make them globally competitive. A graphical representation of this ecosystem with SIIC as the pivot is provided here.



Command structure of the Innovation Ecosystem to be coordinated by SIIC, IIT Kanpur

Curadev Pharma Private Ltd., a company currently being incubated at IIT Kanpur, has entered into a research collaboration with Roche for the development and commercialization of IDO1 and TDO inhibitors. The company was promoted by our alumnus Dr. Arjun Surya. Curadev is presently valued at approximately Rs. 100 crores.

The Syndicate Bank Entrepreneurship Research and Training Centre at IIT Kanpur organized E – Summit in association with the student E-cell. E-Summit 2014 was organized from 22nd to 24th August, 2014. The activities comprised talks by eminent personalities, workshops and competitions.

Major projects sanctioned

Some of the major projects sanctioned in 2014-15 are briefly described below.

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).

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 contribute building infrastructure and manpower. Owing to use of new materials and methods of manufacturing, Flexible Electronics represents a break from the past and provides a fresh opportunity to become a significant manufacturer of electronics. The aim of this Centre is to act as a catalyst for development of the flexible electronics industry in the country. Its objectives include development of a national technology roadmap in coordination with other academic and industrial partners, 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 Institute along with the Prabhu Goel Foundation has funded following 3 projects in the area of UAVs:

- (a) *Design and Fabrication of Autonomous Flapping Wing Unmanned Air Vehicle for Surveillance and Aerial Photography:*
- (b) *Development of Small Sized Fixed Wing Unmanned Aerial System (UAS):*
- (c) *Design and Development of Visually Guided Autonomous Quadrotors: Application in Surveillance and Disaster Management:*



Functioning UAVs developed as a part of a project supported by the Institute and Prabhu Goel Foundation

An open house demonstration of this technology was held on 27th March, 2015. The projects were reviewed by aerospace experts who praised the progress and their achievements.

Design and Development of an Autonomous Mini Helicopter - Phase II: Based on the successful progress in integrating sensors, actuators, communication systems and control algorithms for the “Design and Development of Autonomous Mini Helicopter”, Department of Science and Technology has continued the funding of this R&D activity, under Phase-II, to further demonstrate the vehicle’s capability in outdoor flying conditions and other intelligent manoeuvres. Phase-II of the project was started in June 2014 and the funding is provided for four years till 2018. The accompanying figure shows the stabilized hovering flight of the helicopter in outdoor conditions. With this flight, we can say that we now have the capability for

auto stabilized flight of a conventional helicopter. Presently under an MOU between HAL, ADE and IIT-Kanpur, work is under progress towards the development of a technology demonstrator of a 10 kg Rotary UAV of conventional configuration.

SERB has funded a project titled *Porphyrin Dimers as Model of Di-heme Proteins: Inorganic and Bioinorganic Perspectives and Consequences of Heme-Heme Interactions*. The project aims



Demonstration of an autonomous mini-helicopter

at biomimetic study of di/multi-heme proteins in order to understand the structure-function relationships at the molecular level. The presence of more than one redox center provides nature with a further tool to modulate various properties via heme-heme interactions that can be cooperative or anti-cooperative but both having functional consequences. Active site analogues can explain various aspects of Nature's sophisticated design to develop such architectures. Model of the di/multi-heme centers will be synthesized in which two or

more porphyrin macrocycles are covalently bound by spacers. Judicious choice of the spacer will allow precise control in the spatial arrangement for inter-macrocycle interactions and possible electronic communications. Focus will be on how the nature and extent of heme-heme interactions influence the structure, function and properties of the individual heme centers.

Courts, Networks and Start-Ups: Institutions Matter for South-Asian Small Enterprises: This project is funded by IDRC, Canada. The growth of business, especially small and medium scale enterprises (SME) is critical for employment generation in less developed countries. The optimism that small scale enterprises, and their traditional way of doing business, are just a transitory phase in the process of development does not hold much ground anymore. Instead, large and small firms are thriving together in different types of complementary roles. The project is expected to work on how two competing institutions of contract writing -- formal and informal legal institutions -- complement, substitute and interact with each other to affect people's decision to do business.

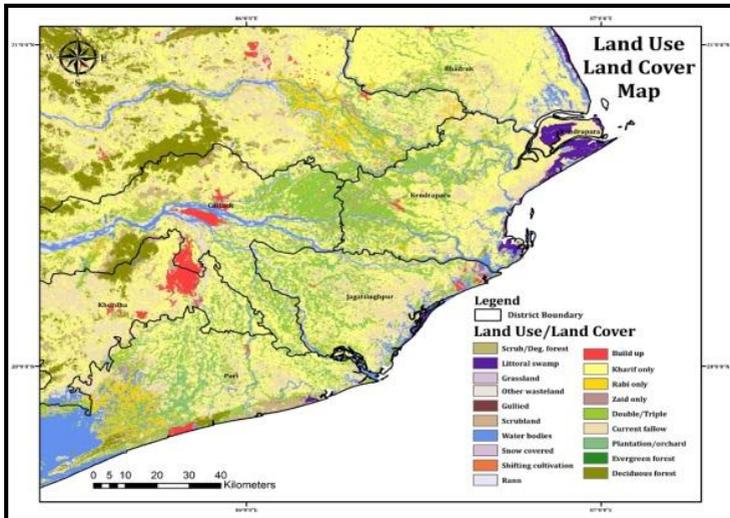
A new project entitled *A solution based approach to the fabrication of novel chalcogenide glass microlens arrays for the 6-12 μm IR optics applications* has been funded by DRDO. Mid Infrared (MIR) technology is now major part of current research in sensing (chemical/biological) and military applications. However, to use this particular spectral range, cost effective and easy to fabricate optical materials and structures that are transparent in the MIR are needed to focus and detect the light. With the recent development of less expensive un-cooled detector technology, expensive optics is among the remaining significant cost drivers. As a potential

solution to this problem, chalcogenide glass has been studied in recent years. The current project will explore solution phase deposition and patterning in chalcogenide glasses. It will also develop a set up to test optical performance of the developed microlens arrays with the help of IRDE, Dehradun.

Ministry of Earth Sciences has sanctioned a new project titled *Monsoon Dynamics and thermodynamics from the land surface through convection to the continental-scale* under Indo-UK joint program. The monsoon is the primary driver of the agriculture and industry in South Asia, and is thus significant in the lives of more than a billion people residing in the region. Unfortunately, our capability to forecast monsoon is limited by large, rapidly developing errors. To quantify the land surface properties and fluxes, which interact with the monsoon on different temporal and spatial scales, an eddy covariance flux tower will be set up in Kanpur. The tower will directly measure the sensible and latent heat fluxes and help us understand the land-atmosphere feedback processes and how they relate to monsoon pattern of the region.

The project *Deltaic Environments, Vulnerability and Climate Change: Migration and Adaptation and its Policy Implications* has been funded by the International Development Research Centre (IDRC) as a part of Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA) program. The aim of this project is to determine vulnerability in the climatic hotspots and to understand the drivers of migration in the populous deltas in the world. The focus is on the Ganga-Brahmaputra and Mahanadi deltas where, apart from mapping various climatic hazards and vulnerability, we are evaluating a set of climate and landuse/land cover change strategies to project the changes in fluxes of N, P and sediments into the delta system.

A project titled *Innovative Thermal Energy Storage Systems – INOTES* has been sanctioned under EU-INDO New INDIGO Partnership Program, DST. If thermal energy is available e.g. solar heat and/or industrial waste heat, but no demand at the same time, that heat cannot be used. Efficient heat storage systems overcome that weakness, because heat supply/source and heat demand/sink become disconnected in time. Such thermal energy storage systems can play an important role in reducing the primary energy consumption and related GHG emissions. This collaborative project aims on research,

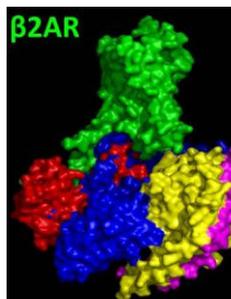


Climatic hazards and the vulnerability in the Ganga-Brahmaputra and Mahanadi delta

development and innovation on phase change materials (PCM) for energy storage. To achieve this goal, a consortium with an interdisciplinary team of researchers is formed. This team will focus on materials research, thermal performance research and application research (robust and sustainable applications) for these PCMs.

An MoU has been signed with MHRD, Govt. of India, for Establishment of Centers of Excellence in Frontier Areas Of Science and Technology (FAST).

The project on the *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 major goal of this project is to visualize the three dimensional structure selected GPCRs at atomic resolution by X-ray crystallography. Such



Superimposition of a GPCR-G protein complex and a GPCR arrestin protein complex

Such structural visualization should facilitate novel drug design as a potential treatment for several human diseases.

A new project entitled *Fluid dynamical methods for gravity* has been sanctioned by University Grant Commission and Israel Science Foundation. The goal of the project is to use fluid dynamical methods to study black hole solutions of general relativity. While the two theories seem strikingly different at first glance, recent developments over the last five years allows for a formal mathematical construction which enables a clean relation between the two theories, a 'fluid-gravity correspondence'.

A project on *Advanced Communication and Control for the Prevention of Blackouts* has been accepted by DST. The aim of the project is to create an end-to-end process for the real-time prediction and mitigation of blackouts. The scope

encompasses the creation of information extraction techniques; design of robust, secure and suitable communication networks; real-time state estimators and instability predictors, as well as adaptive corrective controllers that redesign their actions in real-time in response to the actual system conditions during contingencies. The above process is enabled by the extensive use of Synchronized Measurement Technology (Phasor Measurement Units, Data Concentrators and Communication infrastructure) and can be considered as a novel Smart Transmission Grid solution.

Indo-German Science and Technology Center has funded a project titled *Reduction of Earth Metals in Chalkopyrite based Solar Cells*. Relatively limited reserves of Indium and Gallium are expected to result into increased cost of CuInGaSe_2 (CIGS) based solar-cells. To address this challenge, (a) one could replace Indium and Gallium with Zinc and Tin that are relatively abundant, and also, (b) improve the CIGS material itself so that less amount of In and Ga (thinner CIGS film) is required for the same-efficiency solar-cell. This project aims at pursuing both of these alternatives. Thin-film solar cells will be fabricated using sputtering and CBD technique followed by high temperature treatment.

A Pan-IIT initiative of MHRD, called IMPRINT (IMpacting Research, Innovation and Technology) is being led by IIT Kanpur. It involves developing an education policy and research plan in Health care, Energy, Sustainable urban design, Water resources and Manufacturing.

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



Advanced imaging facility

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.

The department of Biological Engineering and Biosciences received program support from MHRD for establishing a *Centre of Excellence in Chemical Biology* in partnership with the Chemistry department of the Institute. This 5 year program support would promote BSBE-Chemistry collaborative research in thematic areas.

New Facilities under the FIST Scheme of the DST: Departments of Chemical Engineering has been sanctioned a total grant of Rs. 5.7 crores under the FIST Scheme of the DST to procure the following facilities: ICP-MS, Universal Testing Machine, Multi-channel electrochemical analyzer, and Micro-PIV. The Department of Civil Engineering received generous equipment grants of Rs. 6.60 crores to procure 2500 kN servo-

hydraulic four column loading frame and controller of Universal Testing Machine (UTM), 600 lpm Hydraulic Power Unit, Cyclic Simple Shear Apparatus, Instrumentation and Data Acquisition system for the Pseudo Dynamic testing facility, Water Isotope Analyzer, Short range laser scanner.

New Facilities under the CARE Scheme: During the year, the following facilities were sanctioned under the CARE scheme of the Institute: Establishment of Surface Plasmon Resonance (SPR) Spectroscopy Facility, Thermal transport measurement at sub-kelvin temperature, Ultralow Frequency Raman Microprobe with Mapping capabilities, Universal Measurement Spectrophotometer, High Resolution Stereo Camera System for PIV and Flow Visualization, Multi-channel hdEEG g-tech setup, Establishment of High Performance Liquid Chromatography Mass Spectrometry Facility, Dynamic Light Scattering Particle Size and Zeta Potential Analyzer (Malvern Model Nano ZS) for characterizing colloidal particles in water, Atomic Force Microscopy (AFM), and Real Space™ Audio Camera.

ACMS Facility Rejuvenation: ACMS has been completely rejuvenated with augmentation of research equipment worth more than 70 crores in the last 2 years. Some of the sophisticated characterization instruments are: Laser confocal optical microscopy for life cell imaging; XPS-AES system for surface characterization of entire range of materials metals, semi-conductors, ceramics, polymers; X-ray facility for thin film, high temperature XRD, texture and residual stresses. Chemical analysis is enhanced with EPMA and Optical emission spectroscopy. The newly added equipment are the state-of-art in their category and provided the much needed research infrastructure to do cutting edge, high quality research.



Rejuvenated ACMS Building

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

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: 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, Netherland, 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,

Australia, University of Delaware, U.S.A., University System of Taiwan, Taiwan, and Yeungnam University, South Korea.



Director, Professor Indranil Manna is signing a MoU with universities of Finland and Norway

Financial Resource Mobilization

The year 2014-15 has witnessed significant growth in financial resource of the Institute. The total Grant-in-aid received during the financial year from MHRD, Govt. of India, under non-plan was Rs. 192 crores and under Plan Rs. 205 crores.

The year 2014-15 has turned out to be good for fund raising. During the financial year 2014-15, the Institute has received Rs. 490 lakhs from 823 donations made by 734 donors (559 donors from India and 175 donors from abroad). A total of 169 donors (72 from India and 97 from abroad) contributed to total 214 donations of Rs. 36 lakhs under the Annual Gift Program. Donations received under AGP have been utilized for providing travel support to the students for attending international conferences, cash award for publication of their research papers in reputed journals, support to community services and other activities encouraging excellence in the Institute.

Various Awards, medals & scholarships have been instituted at IIT Kanpur with the support from donors, alumni & well wishers. Dr. B.P. Pundir, former Professor, Mechanical Engineering instituted “Smt Shashi Pundir Memorial Medal” for the Best M.Tech thesis in Fluids and Thermal Sciences of the Department of Mechanical Engineering. Mrs. Ila Bajpai, wife of late Prof. V.N. Bajpai (MT/CE/1976) (PhD/1983) has instituted “Dr. Vishwanath Bajpayee Memorial Gold Medal” in his memory for the best thesis of MTech student of Earth Sciences.

Friends of late Dr. Prateek Mishra (BT/EE/2006) have instituted “Dr. Prateek Mishra Memorial Scholarship” in his memory for a 2nd year UG student in Electrical Engineering department. Mrs. Rekha Rani Prasad, sister-in-law (bhabhi) of Dr. Ajay Bhushan Pandey (BT/EE/1983) has instituted “PSB Prasad Memorial Scholarship” in memory of her late husband Mr. Shashi Bhushan Pandey for a student in MSc (Physics)/ B.Tech (Electrical Engineering). Mr. Ashutosh Garg (BT/CHE/1974) has instituted 4 scholarships namely Smt. Shyam Lata Garg Scholarship, Shree Anand Swaroop Garg Scholarship, Smt. Shanti Devi Garg Scholarship and Shree Ramjee Lal Garg Scholarship for needy and meritorious BTech male and female students. Shri Ashok Shah (BT/EE/1970, MT/EE/1972) has instituted “Mahabala – Rajaraman Scholarship” to be given to a 3rd year B Tech student of EE/CSE Department. Shri Ajay Dubey (BT/ChE/1980) has donated Rs. 30 lakhs for instituting Shrimati Madhuri Dubey Scholarship and Shrimati Vidyawati Dubey Scholarship. The scholarships will be given to the most needy student. Each scholarship will be of Rs. 4000 per month for 10 months. These scholarships will be open to students of all departments and programs.

Shri Somdeb Lahiri has donated Rs. 9 lakhs for instituting “Dr. Rajyashree Khushu Lahiri Memorial Lecture Series” in the Department of Humanities and Social Science

Shri Kushal S Sacheti (MT/ChE/1971) has donated Rs. 59.14 lakhs towards English Proficiency Program, Jugaad Technology, Faculty Development Program, Opportunity School and Interim Innovation Center.

The Ministry of Sports and Employment (MoLE) has 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.

Prof Tapan Bagchi, former faculty department of IME at IIT Kanpur has donated an amount of Rs 38.12 for “Ashiyana – the New Shopping Complex” coming up near the Swimming pool.

More than 100 students of IIT Kanpur and other alumni have contributed Rs. 1.39 lakhs towards Prayas. A donation of Rs. 11.94 lakhs have been received towards English Proficiency Program. An Alumni Sports fund was initiated this year, with the purpose to promote sports among the students. SURGE 2014 program was conducted during summer 2014 which saw a participation of 43 students from various Institutes across India and 45 faculty members from IIT Kanpur as mentors. The selection of student participants was very competitive as 2591 applications were received from various institutions across India, which gives a clear indication of its increasing popularity.

The Institute encourages research by providing travel support to students and rewarding students for publishing research papers in high quality journals. Institute has extended financial support to the tune of Rs 1.2 crores over 200 students for presenting papers in international conferences and cash awards of Rs 17.83 lakhs to 142 students for publication of their research papers in reputed ISI Web Journals during the present financial year.

The institute is working on an ambitious plan for raising resources and increase the research and development activities on campus and hopes to launch new initiatives in the year 2015-16.

Faculty Recruitment

We have appointed 29 new faculty members (AP 25, ASP 2, P 2) 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 a warm welcome on our campus.

Awards and Honors

Reporting the awards and honours won by our faculty and students is a proud 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 and Planetary Sciences.

I am also happy to mention that Prof. Manindra Agrawal (CSE) has been elected as a foreign associate of the US National Academy of Sciences.

Professor Ashutosh Sharma (CHE), Department of Chemical Engineering, has been appointed as the Secretary of Department of Science and Technology.

The Prime Minister has launched the National Air Quality Index (AQI) on April 6, 2015, developed at IIT Kanpur. This AQI was developed through a sponsored study from Central Pollution Control Board, Delhi, headed by Prof. Mukesh Sharma (CE) and Dr. Arnab Bhattacharya (CSE).

The many prestigious scholarships and awards received by our students have been a source of pride and pleasure for us. Anshul Rai, Shouvik Sachdeva, Arpit Srivastava, Akash Goel, Pranav Ravindra received the Aditya Birla Scholarship. Sachin Kumar Shaw received ACC Fellowship. Vasu Sharma received World Quant. Richa Agrawal, Ashutosh Kumar, S Gautam Raj received the O.P. Jindal scholarship. Akshay Aggarwal, Akshay Vijay Chaudhari, Siddhartha P received Honda Yes scholarship.

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. The Institute strongly believes that an abiding social

and humane engagement is the hallmark of its student body. To translate such a belief into reality, the Institute nurtures social, cultural and sporting activities pursued by the students' gymkhana and other student groups. With a firm belief in self-governance, Students' Gymkhana continues to provide platform to all students to pursue their interest.

The Institute witnessed stiff inter- Hall competition in the form of **Galaxy, Takneek, Spectrum** and **Inferno**, inter- Hall Cultural, Science & Technology, Films & Media and Sports championships respectively. Fresher Inferno tournament was organized to find new talents from the freshers' batch. The sole guiding principle behind organizing these championships is to provide the students of this campus, a much needed platform to compete and showcase their cultural and sports talents and give them a reason strong enough, to come out of their rooms and participate in group activities.

Significantly, the students also engaged in an Energy Savings Competition amongst hostels through an Inter-Hall Competition called **Green Opus**. The results were astounding in that the students just by internal competition were able to markedly reduce the average energy consumption. Results from all the five Inter Hall Competitions will be used to identify the winner of the **Overall Championship Trophy**.

Presidential Council

The Vivekananda Samiti organized many Community Collection Drives such as the J&K Fund Relief. This year Vivekananda Youth Leadership Convention was organized which witnessed eminent speakers like Narendra Kohli, Pramod Joshi and Shashikant. The E-Cell in association with SIDBI organized the E-Summit which saw participation from the

students. Prayas has increased its activities significantly in the last year such as English Teaching Workshop, sports competition and fine arts workshop. A new Students' Welfare Cell was established to assist students.

Science and Technology Council

The Science and Technology council participated and won various inter-collegiate festivals: (i) Inter-IIT Tech Meet- IIT Kanpur emerged as the first runner-up at 3rd Inter IIT Tech Meet, (ii) SAE Motorsports- SAE Motorsports team participated in Student Baja competition and was awarded the 'best incoming team' and bagged the 4th position in design and acceleration event, (iii) ROBOCON: Bagged the 11th position overall. IIT Kanpur established the first student designed and operated observatory for amateur astronomical research. The S&T Council organized more than 50 lectures and workshops in programming, robotics and aero-modeling.

Cultural Council

The clubs of the Cultural Council organized workshops, competitions and performances throughout the year. The Dance Club and Dramatics club were appreciated every time they participated in an Inter-College meet. Students from here participated in a number of events such as (i) Dance Club won 3rd prize in group dance and 2nd prize in street dance in Antaragni'14. (ii) The Literary Society (Hindi and English) won various prizes in Antaragni'14. (iii) The Fine Arts Club won the 1st prize in Rendezvous'14 (IIT Delhi).

Music club

The club is actively working on launching a music album of its own, a first of its kind of initiative by any student group in India.

It has composed three patriotic songs and is working on composing an Anthem for IIT Kanpur.

Films and Media Council

The Films and Media council organized a large number of workshops in photography, designing, animation and film making throughout the year. It has started Insight 360- a video journalism show which releases a video once in two weeks. The council has revived print journalism in the form of Vox Populi and launched an online news portal voxitk.com. The walls of new SAC building have been decorated by the photographs clicked by the Photography Club. For the cinema lovers the council has started Film Galas to discuss cinema. It organized Spectrum'14 an annual film festival, screened over 40 movies covering many genres, foreign and regional languages and invited prominent personalities from the film industry.

Games and Sports Council

The efforts of the Council are directed to ensure that each and every person enjoys the game. There is a need to create an atmosphere where playing in the evening is an integral part of each person's schedule. Diverse activities organized during the year aimed at broadening the outreach of sporting activities among various segments of campus community. The Council members believe that all unique activities introduced will bring in great value and foster new connections.

With the pressure of having to defend the newly attained title of General Champion in the last year's Inter IIT sports meet, the task this year was onerous. After six days of grueling competition and nail-biting encounters, the institute emerged as the General Champion in Boys with a total of 69 points and with a narrow margin of 0.5 points ahead of Roorkee. The results in

the girls' events were a mixed bag, but, we managed to achieve an overall second position behind Bombay. The win was headlined by the overall championship in Athletics (Boys and Girls); Gold medals in Tennis, Badminton and Water Polo in Boys Category; Badminton in women's category; Silver medal in Weightlifting; and Bronze medal in Swimming (men) and Volleyball (women).

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. All these social, cultural and sporting activities play a crucial role in the transformation of a student into a complete human being. These festivals have vastly improved participation levels, both from within the Institute and also from students from other national and international institutions. The revenues generated for conducting these festivals saw an impressive growth last year, a tribute to the managerial and logistic skills of our students.

UDGHOSH, an Annual Sports Festival of IIT Kanpur was organized during 25th-28th September 2014. UDGHOSH '14 in association with E-Cell organized Ink talk which had an audience of more than a thousand. UDGHOSH'14 witnessed a plethora of events from Motivational Talks, Gymnastic Shows and Sport Quizzes to



A scene from UDGHOSH

various sports events like Athletics, Chess, Carrom, Cricket, Football, Hockey, Volleyball, Basketball, Badminton, Tennis, Table Tennis, Squash, Weightlifting and Kho-Kho. This year we had players who participated in national tournaments, leading to an increased level of competition.

Antaragni'14 was a sky full of stars. It started with a bang with the mesmerizing music performance by Agnee and ended on a high note with Vishal-Shekhar's electrifying performance. But amidst this glitz and glamour, Antaragni'14 stayed true to its purpose. It gave students a platform to compete with the countries' finest. Antaragni'14 made sincere attempts to showcase the rich Indian culture with Cultural Night, Indian Haat, ALI and Kavi Sameelan. To sum it up, Antaragni '14 notched up the benchmark for future Antaragnis, all the while staying grounded in its roots.

Continuing the legacy of 21 years, Techkriti'15 accounted for several new happenings. (i) INAE-IIT Kanpur-BHEL National Competition "Innovation in Manufacturing Practices 2015" - A national level competition organized by the Students Gymkhana of IIT Kanpur in collaboration with INAE and BHEL to provide the brightest minds, a platform to display and exuberate their talent in design and manufacturing. (ii) For the first time Startup Weekends were organized, 54-hour events where developers, designers, marketers, product managers and startup enthusiasts come together to share ideas, form teams, build products and launch startups. (iii) Techkriti Open School Championship: At the 21st edition of our festival, we extended the opportunity to be a part of this extravaganza to the whiz kids from classes 9th to 12th from Kanpur and Lucknow. (iv) IamStrong: Aimed at spreading awareness about causes, signs and ways to prevent suicide. The campaign was

kick-started by honorable Vikram Singh, retired IPS officer, on 7th September, 2014. (v) Auto Expo was organized for the first time at IIT Kanpur. Tia and Avanti developed by DC Design along with a car from Mercedes was exhibited at the Tech Expo.

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



A view of newly acquired astronomical observatory

remotely. The telescope will be used for amateur astronomical observations, research and photography.



Demonstration of a racing vehicle by SAE club, IIT Kanpur

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 setup gives a peak torque of 560 N-m after

final reduction and makes the car capable of climbing an inclination of 41° 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.

At the recently concluded 3rd Inter IIT Tech Meet hosted by IIT Kharagpur, IIT Kanpur secured 2nd 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 participating in inter-IIT Tech meet

SPO and Counselling Service

The Counselling Service is an active wing of our students. The activities include organizing the orientation program for UG as well as PG students, providing specific attention to students having academic, financial or personal problems; monitoring the progress of students who need special attention.

Students' Placement

Despite fear of a sizeable increase in the number of students sitting for placements this year, the percentage of students getting job offers increased from the previous with several companies actively participating in the Campus placement programme. Apart from the traditional Consulting, FMCG and core engineering sectors, the e-commerce sector registered a

sizeable presence with a total of 35 job offers from companies such as Flipkart, Delhivery and Snapdeal.

Around 2300 students registered for placements this year. Overall 77% of the registered students got placement through SPO. Amongst the various programmes, the MBA had the highest percentage of placement at 100%, followed by Dual Degree at 96%, MSc at 90%, B.Tech at 86% , M.Des at 83% and M.Tech at 70%.

Social Mission

The Institute celebrated *Swachh Bharat Mission* on 2nd October, 2014. It observed *Rashtriya Ekta Diwas* (National Unity Day) in honor of the Birth Anniversary of Sardar Vallabhbhai Patel. The Institute celebrated *Vigilance Awareness Week* to promote transparency, probity and



Swachh Bharat Mission at IIT Kanpur

integrity in public life. *National Education Day* was celebrated to commemorate the birth anniversary of Maulana Abul Kalam Azad. While observing *Good Governance Day* on 25th December 2014 an open seminar on "Use of Technology and Innovation in promoting Good Governance" was organized. The institute is keen on empowering the citizens of the campus and is practicing health initiatives mooted by the Government. In this respect, it has created an Academics Ethic cell, Green cell, woman cell and legal cell. Keeping in mind the health a No tobacco oath was observed in April 2015.

Epilogue

Dear degree recipients, on this important occasion of the forty-eight convocation, I congratulate and commend each one of you on your achievements and convey my best wishes to the entire class of 2015 graduating today. I also seize this opportunity to greet your triumphant parents for devoting their best against all challenges to help you realize your ambition. Now that you are ready to embark on a bigger voyage towards greater glory, I wish to share some of my own thoughts with you.

Lord Buddha said “What we are today comes from our thoughts of yesterday, and our present thoughts build our life of tomorrow”. It is indeed true that the coveted degree you have earned today from a premier institute like IIT Kanpur has materialized due to your arduous endeavor and dedication. But, to begin with, your journey started with a dream - a dream, to receive one of the best possible academic training in your field of interest and prove highly valuable to the society. Let the momentum gathered in this process drive you towards a greater goal. Let there be a new dream, a dream that will inspire you to become truly invaluable for the mankind. In the words of the Isha Upanishad:

विद्यां चाविद्यां च यस्तद्वेदोभयं सह
अविद्यया मृत्युं तीर्त्वा विद्ययाऽमृतमश्नुते

Knowledge and Ignorance both cross life and death but since the former leads to Eternity the latter brings one back to Existence.

Let the flame of knowledge ignited at IIT Kanpur make you the architects of paradigm change and yet the custodian of harmony.

May God bless you with health, happiness and peace, 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 to bask in your glory, and above all, may your unstinted effort turn victorious, sooner than later.

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. Aeroservoelasticity - Modeling and Control Prof. Ashish Tiwari (AE), Birhhäuser Boston, USA, 2015.
6. Methods in Enzymology – Volume 556 – Membrane Proteins: Production and Functional Characterization, Arun K. Shukla (BSBE), Elsevier, 2015.
7. Analysis of pavement structures, Animesh Das (CE), CRC Press - Taylor & Francis Group, USA, 2014.
8. Engineering Electromagnetics, 8/e (SIE), W H Hayt, J A Buck, M J Akhtar (EE), McGraw Hill Education (India) Private Ltd., 2014.
9. FinFET Modeling for IC Simulation and Design: Using the BSIM-CMG Standard, Yogesh S. Chauhan (EE), Darsen Lu, Sriram Venugopalan, Sourabh Khandelwal, Juan P. Duarte, Navid Paydavosi, Ali M. Niknejad, and Chenming Hu, Elsevier London, 2015.
10. 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.
11. Textual Travels: Theory and Practice of Translation in India, Mini Chandran and Suchitra Mathur (HSS) (eds), Routledge (Taylor & Francis), New Delhi, 2014.
12. Gandhian Philosophy of Voluntarism: A Comparative Study of Development in the Ashram Villages and Outside, A. K.

- Sharma (HSS) Concept Publishing Company Pvt. Ltd New Delhi.
13. Women's Empowerment: A strategy for development
Editor: Binay Kumar Pattnaik (HSS), Bookwell, New Delhi, 2015.
 14. Logic and its Applications, 6th Indian Conference, ICLA 2015, Mumbai, proceedings, Mohua Banerjee (M&S) and Krishna S. (eds), Springer-Verlag.
 15. 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.
 16. Developments in Nanocomposites, Kamal K. Kar (ME) and Alma Hodzic (University of Sheffield), Research Publishing Services, Singapore, 2014.
 17. Handbook of Polymer Nanocomposites. Processing, Performance and Application, Volume B: Carbon Nanotube Based Polymer Nanocomposites, edited, Kamal K. Kar (ME and MSP), Jitendra Kumar Pandey (Seoul National University), and Sravendra Rana (Nanyang Technological University, Singapore), Springer.
 18. Biosurfaces: From the Perspective of Materials Science and Engineering, Vivek Verma and Kantesh Balani (MSE), Arvind Agarwal, Roger Narayan, Wiley Inc., Hoboken, NJ, USA, 2015.
 19. A review titled "Progress in Material Selection for Solid Oxide Fuel Cell Technology: A Review," Dr Kantesh Balani and Dr Shobit Omar (MSE), Neelima Mahato, Amitava Banerjee, and Alka Gupta, journal Progress in Material Science. This comprehensive review (472 pages) highlights recent advances in the science and engineering of materials used in the area of solid oxide fuel cells.
 20. Quantum Phase Transitions in Transverse Field Spin Models: From Statistical Physics to Quantum Information,

Amit Dutta (PHY), Gabriel Aeppli, Bikas K. Chakrabarti Uma Divakaran, Thomas F. Rosenbaum, Diptiman Sen, Cambridge University Press.

21. An Introduction to Astronomy and Astrophysics, P K Jain (PHY), CRC Press.

Fellowship

1. Prof. J. K. Bera (CHM) has been elected Fellow of National Academy of Sciences India, Allahabad.
2. Prof. Mukesh Sharma (CE) has been elected Fellow of Indian National Academy of Engineering.
3. Prof. Manindra Agrawal (CSE) has been elected Fellow of the US National Academy of Sciences.
4. Prof. S N Singh (EE) has been elected Fellow of Indian National Academy of Engineering.
5. Prof. K. Muralidhar (ME) has been elected Fellow of National Academy of Sciences India, Allahabad.
6. Dr. Nitin Saxena (CSE) received the DST Swarnajayanti Fellowship for the year 2014.
7. Prof. J N Moorthy (CHM) has been elected for J C Bose Fellowship by Dept. of Science and Technology.
8. Prof. R P Chhabra (CHE) has been elected for J C Bose Fellowship by Dept. of Science and Technology.
9. Dr. Shilpi Gupta (EE) received Ramanujan Fellowship, DST, Govt. of India.
10. Drs. Raghunath Tewari (CSE) received the DST Inspire Fellowship for the year 2015.
11. Rajat Mittal (CSE) received the DST Inspire Fellowship for the year 2015.
12. Dr. Shilpi Gupta (EE) received INSPIRE Faculty Award, DST, Govt. of India.
13. Dr. Abhijit Pal (M&S) received INSPIRE Faculty Award, DST, Govt. of India.

14. Dr. Arun Kumar Shukla (BSBE) has been elected Fellow of Wellcome Trust DBT India Alliance Intermediate Fellowship.
15. Dr. Nitin Gupta (BSBE) received Ramalingaswamy Fellowship.
16. Prof. Yogesh Joshi (CHE) has been selected as a fellow under "Shri V V Mariwala Visiting Professorship in Chemical Engineering Endowment", 2014-15, Institute of Chemical Technology, Mumbai.
17. Prof. T. Ravichandran (HSS) received Fullbright- Nehru Academic and Professional Excellence Fellowship.
18. Prof. Gurumurthy Neelakantan (HSS) received Erasmus Mundus Fellowship by EMINTE/LUND University.
19. Prof. P Murali Prasad (HSS) got EUPHRATES Erasmus Mundus Programme Scholarship (May – 2015) EUPHRATES Erasmus Mundus Programme, University Santiago de Compostela, Spain.
20. Prof. P Murali Prasad (HSS) received Erasmus Mundus Mobility Fellowship for Six months by University of Goettingen, Germany.
21. Prof Kripa Shanker (IME) became Emeritus Fellow, Distinguished Adjunct Faculty of Asian Institute of Technology, Thailand.
22. Prof Kripa Shanker (IME) became Adjunct Faculty, ABV Indian Institute of Information Technology, Gwalior.

Awards and Honors

1. Prof. Sanjay Mittal (AE) received Rajib Goyal Prize by Kurukshetra University.
2. Dr. Jayandharan G Rao (BSBE) has been conferred Young Scientist Award by YIM, Boston.
3. Dr. Arun K. Shukla (BSBE) has been awarded Prof. Ratna Phadke Award by Indian Biophysical Society.

4. Dr. Jayandharan G Rao (BSBE) received Bayer hemophilia award program 2nd global webinar winner by Bayer Inc, USA.
5. Dr. Nitin Gupta (BSBE) has been selected for the "Innovative Young Biotechnologist Award (IYBA)" for the year 2014.
6. Dr. Arun K. Shukla (BSBE) has been selected for the "Innovative Young Biotechnologist Award (IYBA)" for the year 2014.
7. Prof. S. N. Tripathi (CE) has been conferred the Shanti Swarup Bhatnagar Prize in Earth, Atmosphere, Ocean & Planetary Sciences.
8. Prof. Manindra Agrawal (CSE) received ACCS-CDAC Foundation Award by Advanced Computing and Communication Society.
9. Prof. Manindra Agrawal (CSE) has been elected as a foreign associate of the US National Academy of Sciences.
10. Prof. Rajat Moona (CSE, currently Director General CDAC) has been chosen the winner of IESA Technovation 2014 - TechoVisionary Award in the category of "Academia Awards."
11. Dr. Naveen Tiwari (CHE) received Young Scientist Research Award by BRNS, DAE.
12. Dr. Raju Kumar Gupta (CHE) has been awarded IAAM Young Scientist Award by International Smart Materials and Surfaces Conference.
13. Dr. Raju Kumar Gupta (CHE) received IEI Young Engineers Award by The Institution of Engineers (India) for 2014-15.
14. Prof. P. K. Bharadwaj (CHM) received a silver medal from CRSI.
15. Prof. Sandeep Verma (CHM) has been awarded for ISCB Award for Excellence in Chemical Sciences by Indian Society of Chemists and Biologists.

16. Prof. Sandeep Verma (CHM) received Darshan Ranganathan Memorial Lecture Award by the Chemical Research Society of India.
17. Prof. Sandeep Verma (CHM) received OPPI Scientist Award by Organization of Pharmaceutical Producers of India.
18. Prof. S P Rath (CHM) received a bronze medal from CRSI.
19. Dr Basker Sundararaju (CHM) received DAE Young scientist 2014 BRNS, Mumbai.
20. Dr D H Dethe (CHM) received AVRA Young Scientist Award by A V Ramarao Foundation, Hyderabad.
21. Dr A Singh (CHM) received DAE Young scientist 2014, BRNS, Mumbai.
22. 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.
23. Dr. Sandeep Anand (EE) has been awarded POSOCO Power Systems Award.
24. Prof. Y N Singh received IEEE Region 10 EA Award on major Educational Innovation, 2014.
25. Professor S N Singh (EE) received Dr. P S Nigam Power Sector Award 2014 for the Best Technical Paper on Power Section entitled /PQ Capabilities Curve of a single-stage Utility Scale Grid Connected PV Systems, 94th Annual General Meeting of the Institution of Engineers (India), UP State Center, November 30, 2014, Lucknow.
26. Dr. Kumar Vaibhav Srivastava (EE) has been listed as one of the best papers for the paper titled 'Design of a two-dimensional metamaterial cloak with minimum scattering using a quadratic transformation function'. ' appeared in the Journal of Applied Physics.

27. Dr. Arvind Kumar (ME) received IEI Young Engineers Award 2014-2015 in Mechanical Engineering discipline by The Institution of Engineers (India).
28. Prof. V K Jain (ME) has been awarded Life Time Achievement Award by All India Manufacturing Technology and Research (AIMTDR).
29. Dr. Shantanu Bhattacharya (ME) received design award by the Institution of Engineers (India).
30. Professor N S Vyas, (ME) (currently Vice Chancellor, Rajasthan Technical University), has been appointed as Chairman of newly created Technology Mission for Indian Railways (TMIR).
31. Prof. Indranil Manna (MSE) has been elected Vice President of Indian Institute of Metals and Indian National Academy of Engineering (INAE).
32. Prof. Dipak Mazumdar (MSE) received 2014 IIM Distinguished teacher award by Indian Institute of Metals.
33. Prof. Ashish Garg (MSE) received MRSI Medal Lecture Award by Materials Research Society of India.
34. Dr. Kantesh Balani (MSE) has been awarded Young Scientist Award 2014 by the Centre for Education Growth and Research, India.
35. Dr. Tanmoy Maiti (MSE) received Young Engineers Award 2014 in Metallurgical and Materials Engineering by The Institution of Engineers, India (IEI).
36. Prof. Anish Upadhyaya received Distinguished Alumnus Award 2015 (Metallurgical Engineering) by Indian Institute of Technology BHU, Varanasi
37. Prof. Shalabh (M&S) received the IISA (International Indian Statistical Association) Young Scientist award of 2014.
38. Prof. R. Vijaya (PHY) has been selected as Inspiring woman scientist by Engineering Watch, India.

39. Paper by Prof. K Deb (former faculty, ME) in IEEE Transactions in Evolutionary Computation has crossed 6,000 citations in Web of Science.

Editorships

1. Prof. C. Venkatesan (AE), Member, Editorial committee, International Journal of Intelligent Unmanned System, Emerald Group.
2. Prof. Sanjay Mittal (AE), Member, Editorial committee, INAE Letters.
3. Prof. Sanjay Mittal (AE), Member, Editorial committee, Proceedings of Indian National Science Academy.
4. Prof. Sanjay Mittal (AE), Member, Editorial committee, Journal of Computational and Applied Mechanics, University of Miskolc, Hungary.
5. Dr. Abhishek (AE), Member, Editorial committee, Journal of Unmanned System Technology, International Society for Intelligent Unmanned Systems.
6. Dr. Arun K. Shukla (BSBE), Academic Editor, PLOS One, PLOS.
7. Dr. Jayandharan G Rao (BSBE), Associate editor, Indian Journal of Hematology and Transfusion Medicine, Springer.
8. Prof. S Ganesh (BSBE), Associate Editor, Journal of Genetics, Springer and Indian Academy of Sciences.
9. Dr. Ashwani Thakur (BSBE), Member, Editorial Board of Scientific Reports, Nature Publishing Group.
10. Prof. Ashu Jain (CE), Associate Editor, Hydrological Sciences Journal, IASH, Taylor and Francis.
11. Prof. Sandeep Verma (CHM), Member, Editorial Advisory Board, Chemical Communications, Royal Society of Chemistry, UK.
12. Prof. Sandeep Verma (CHM), Member, Editorial Advisory Board, Journal of Peptide Science, Wiley Vch, Germany.

13. Prof. Sandeep Verma (CHM), Associate Editor, Journal of Chemical Sciences, Indian Academy of Science, Bangalore (Springer).
14. Prof. Sandeep Verma (CHM), Member, Editorial Advisory Board, Indian Journal of Chemistry, Sect B, CSIR, India.
15. Prof. Amalendu Chandra (CHM), Member, Editorial Advisory Board, Indian Journal of Chemistry, Sect A, CSIR, India.
16. Prof. J N Moorthy (CHM), Member, Editorial Advisory Board, Journal of Chemical Sciences, Indian Academy of Science, Bangalore (Springer).
17. Prof. D Goswami (CHM), Chairman, Quantum Computing and Communication Technical Group, The Optical Society of America, USA.
18. Prof. D Goswami (CHM), Member, International Organizing Committee, Quantum and Nano Computing Systems and Applications.
19. Prof. D Goswami (CHM), Editor in Chief, Journal of Spectroscopy and Dynamics, Cognizure.
20. Prof. P K Bharadwaj (CHM), Co-Editor, CrystEngComm, Special issue on SC-SC Transformation, Royal Society of Chemistry, UK.
21. Prof. Animangsu Ghatak (CHE), Member, Editorial Board Journal of Adhesion Science and Technology Taylor and Francis.
22. Prof. Nishith Verma (CHE), Member, Advisory Board Environmental Science: Nano Royal Society of Chemistry, Cambridge, U.K.
23. Prof. A. R. Harish (EE), Editor, International Journal on RF and Microwave Computer-Aided Engineering, Wiley Periodicals, Inc.
24. Prof. A. R. Harish (EE), Editor, IETE Technical, Taylor & Francis Online.

25. Dr. Ramprasad Potluri (EE), Editor, IETE Technical Review, Taylor & Francis Online.
26. Dr. Adrish Banerjee (EE), Editor, IETE Technical Review, Taylor & Francis Online.
27. Dr. M. J. Akhtar (EE), Editor, IETE Technical Review, Taylor & Francis Online.
28. Dr. Nishchal K. Verma (EE), Editor IETE Technical Review Journal, Taylor & Francis.
29. Dr. Nishchal K. Verma (EE), Guest Editor, International Journal of Computational Vision and Robotics Inderscience.
30. Prof. K S Venkatesh (EE), Member of Editorial Board, ISRN Machine Vision Journal, Hindawi Publishing Corporation.
31. Prof. Rajiv Sinha (ES), Member, Editorial Board, Current Science, Multidisciplinary journal, India
32. Prof. Gurumurthy Neelakantan (HSS), Consulting Editor (Continuing), Philip Roth Studies, Purdue USA.
33. Dr. Praveen Kulshreshtha (HSS), Member, Editorial Board, Studies in Microeconomics, Sage Publications.
34. Prof. P.M. Prasad (HSS), Member Editorial Advisory Board, IMDR's Journal of Management Development and Research Institute of Management and Research, Pune.
35. Prof. Debasis Kundu (M&S), Associate Editor, Journal Sankhya Series B.
36. Prof. V.K.Jain (ME), JESTECH (Engineering Science & Technology, an International Journal), Elsevier.
37. Dr. Kantesh Balani (MSE), Member, Editorial Board, Defense Science Journal, DRDO, Gol.
38. Dr. Tanmoy Maiti (MSE), Member, Editorial Board, Journal of Surface and Hybrid Coating Technology, STM Journals.
39. Prof. Ashish Garg (MSE), Member, International Advisory Board, Energy Harvesting and Systems, De Gruyter.

40. Dr. Tanmoy Maiti (MSE), Member, Editorial Board, Advances in Materials Science and Engineering: An International Journal (MSEJ), AIRCC Publishing Corporation.
41. Dr. Krishanu Biswas (MSE) Member, Board of Review, Journal Metallurgical and materials Transactions A.
42. Prof. R. Vijaya (PHY), Member, Editorial Board, Journal of Optics, Springer.
43. Prof. R C Budhani (PHY), Editorial Board, European Journal of Applied Physics, European Physical Society.
44. Prof. R C Budhani (PHY), Member, Editorial Board, Journal of Magnetism and Magnetic Materials, JMM.
45. Dr. Sayantani Bhattachary (PHY), Member, Editorial Board, Scientific Report, Nature Publishing Group.

Students' Awards

1. Mr Vipul Bhatia (BSBE) has won the Massively Parallel Sequencing (NGS) data analysis contest in the NGS workshop organized by National Institute of Biomedical Genomics (NIBMG), Kalyani.
2. Ms Jessica Judith Nunes (BSBE) won Gold (4x100 mts), Silver (100, 200 and 4x400 mts relay) and Bronze (400 mts) at the inter IIT Sports meet 2014.
3. Ms Anshika Goenka (BSBE) received the best poster award for her work presented at the annual symposium of the Indian Society of Cell Biology, held at CDRI Lucknow.
4. Ms Vasvi Tripathi and Ms Megha Jhansi (BSBE) received best poster award in the national symposium conducted by Panjab University.
5. Mr Vikas Kumar Vidyarthi (CE) got the Best Young Researchers Forum Award at the "3rd International Conference on Hydrology & Meteorology" held on

September 15-16, 2014 in Hyderabad International Convention Centre, India.

6. Mr Anand Kumar (CE) received 3rd best poster award received in Indian Aerosol Science and Technology Conference, BHU, for poster on the development of a High Volume PM2.5 Sampler.
7. Mr. Pramod Soni (CE) received the Best Poster Award in "Monsoon simulation and prediction" for the poster titled "Performance of WRF--Chem model during monsoon season over India, in Annual Monsoon Workshop Pune (IMSP) organized by India Institute of Tropical Meteorology (IITM), Pune.
8. Mr Arindam Mukhopadhyay (CHM) received Memorial Award for Best Poster in 11th National Symposium on Radiation Photochemistry.
9. Ms. Saona Seth (CHM) received the Best Poster Prize at Gordon Conference on 'Crystal Engineering' Waterville Valley, NH, USA.
10. Mr Pardeep Kumar (CHM) received Best Poster Award, DCCBS-2014.
11. Mr. Nikhil Jamdade and Mr. Toshib Bagde (DESIGN) won Gandhian Young Technological Innovation Award, 2015
12. Mr. Hariprasad Kv (DESIGN) won 1st prize in The Great Indian Dustbin Contest, Asian Paints.
13. Mr. Ashwin Gandhi and Sachin NP (DESIGN) has won 1st prize in 3rd Inter IIT TechMeet, Product Design Competition.
14. Mr. Sooraj Ramchandran won 1st prize in Aerospace Design Challenge, Honeywell.
15. Mr Anand Kumar (EEM) has been awarded 3rd prize for BestPoster Presentation at the Conference of Indian Aerosol Science andTechnology (IASTA) 2014 held at Banaras Hindu University, Varanasi, India.

16. Mr Shiv Singh (CESE) has been awarded 1st prize for Best Poster Presentation at the Conference of Fuel Cells 2014 Science & Technology held at N.H. Grand Krasnapolsky, Amsterdam, Netherlands.
17. Best Poster Award: Mr. Pardeep Kumar and Debabrata Goswami, won Best Poster Award on Measurement constraint in laser based thermal lens experiments”, Dynamics of Complex Chemical and Biological Systems (DCCBS-2014), Department of Chemistry, Indian Institute of Technology Kanpur.
18. IIT Kanpur team consisting of Amrita Bal, Bhanu Pratap Singh, Deepam Kedia and Gaurangi Gupta (EE) has won the Second Prize in the 2014 AP-S Student Design Contest held at 2014 IEEE International Symposium on Antennas and Propagation, Memphis, TN, USA in July 2014.
19. Ms Pragya Kushwaha (EE) received Best Paper Award for her paper titled "BSIM-IMG with Improved Surface Potential Calculation Recipe" at IEEE INDICON, Pune, 2014.
20. Mr Avirup Dasgupta (EE) received Best Poster Award for his paper titled "Analysis and Modeling of Quantum Capacitance in III-V Transistors" at IEEE International Conference on Emerging Electronics (ICEE), Bangalore, Dec 2014.
21. Megha Nawhal and Priyajeet Kaur (EE) received Eaton Excellence Award.
22. Ms Ruchi Tripathi (EE) has received the best presenter award in the PhD Forum at International Conference on Communication Systems & Networks (COMSNETS) 2014, held in Delhi, Jan. 6-10.
23. Mr. Mahesh Vardikar (EE) won the POSCO Power System Award (PPSA2014). Thesis title: Power system state estimation with external network equivalents considering measurement transformation.

24. Sudhir Kumar (EE) received the Indo-EU Namaste Fellowship at the University of Oxford.
25. Abhishek Kumar Jha (EE) has received the prestigious Graduate Fellowship Award of the IEEE Microwave Theory and Techniques Society for 2015. The award is given every year by the IEEE MTT Society to 8-10 PhD students selected from all over the world.
26. Mr Ankush Sharma (EE) has been selected for POSCO Power System Award (PPSA 2015) for his Ph.D. thesis titled, "Multi-Area Power System State Estimation Utilizing Synchrophasor Measurements, Multi Agents and Common Information Model".
27. Mr Ch V V S Bhaskara Reddy (EE) has been selected for POSCO Power System Award (PPSA 2015) for his Ph.D. thesis titled, "Early Detection & Control of Voltage Stability and Fast Assessment of ATC Using Synchrophasor Measurements".
28. Mr Mahesh Kumar (EE) has been selected for POSCO Power System Award (PPSA 2015) for his Ph.D. thesis titled, "Design Modelling and Control of Smart DC Microgrid for Integration of Renewable and Non-Renewable Energy Sources".
29. Mr Kanna Bhaskar (EE) has been selected for POSCO Power System Award (PPSA 2015) for his Ph.D. thesis titled, "Wind Power Forecasting & its Applications in Optimal Bidding and Optimal Reactive Power Dispatch of Wind Farms".
30. Ms Shikha Chittora (EE) has been selected for POSCO Power System Award (PPSA 2015) for her M.Tech. thesis titled, "Coherency Based Dynamic Equivalencing of Electric Power System".
31. Mr Megha Nawhal (EE) received the Pratibha-Eaton Excellence Award.

32. Ms. Aswathy P. Viswambharan (HSS) was awarded Fulbright Doctoral Fellowship from August, 2014 to May, 2015 at the Indiana University, Bloomington, USA.
33. Mr. Amitava Banerjee (MSE), was awarded prestigious “IIM Dr. AK Bose Gold Medal” for his M.Tech. Thesis during Indian Institute of Metals’ Annual Technical Meeting at College of Engineering, Pune.
34. Mr. Amitava Banerjee (MSE), received “Bogineni Chenchu Raman Naidu” Gold Medal for securing best CPI in the Materials Science and Engineering Department, IIT Kanpur, 2014.
35. MR. Gunda Manideep, Mr. Saumen Mandal, Mr. Mridul Boro & Mr. Ankit Nagar (MSE), received Appreciation award in Ghandhian Young Technological Innovation (GYTI) Awards-2014 under ‘Technological edge category’ for the entry titled “Fabrication of organic thin film transistor using single drops organic or hybrid insulator, conductor and semiconductor materials”.
36. Ms. Sunita Mehta, Mr. Saravanan Murugeson (MSE) received Best Paper award for paper titled “Microbes based Stamps for Printing of Electrodes in Electronic Devices” in International Symposium for Research Scholars December 2014.
37. Ms. Deepa Singh (MSE) has received Best oral presentation for Paper entitled “Effect of processing conditions on P(VDF-TrFE)based memory devices ” in International Symposium for Research scholars (ISRS) on metallurgy, Materials Science and Engineering, Indian Institute of Technology Madras, December 2014.
38. Mr. Mohammad Faisal (MSE), has been selected as President’s Council of Student Advisors (PCSA) delegate for year 2014-15 by The American Ceramic Society.
39. Mr. Saleem Shaik (MSE), has been selected in “IC-

IMPACTS 2015 Summer Institute in Optical Sensing Technologies for Water, Infrastructure and Health” to be held in Toronto, Canada June 2015.

40. Ummer K.V (PHY) received the Best Innovative Research award in the international conference ICONN 2015 held in Chennai during Feb.4-6, 2015, for his oral presentation on “Photonic band edge induced enhancement in absorption and emission”.
41. SAE Baja Team of IIT Kanpur in their very first attempt at BAJA Student India 2015 got 4th Position Design Event, 4th Position Acceleration Event and won the trophy from Best Incoming Team.

Major Projects sanctioned

1. Multi Mobile Wireless Sensor Networks in Tracking and Surveillance (DEITY).
2. Integration of In-Situ Electron Backscatter Diffraction and Crystal Plasticity Simulations to Decipher-Tension-Compression Asymmetry in Titanium and Ti6a14v (SERB).
3. Porphyrin Dimers as Model of Di-Heme Proteins: Inorganic and Bioinorganic Perspectives and Consequences of Heme-Heme Interactions (SERB).
4. Design and Development of an Autonomous Helicopter-Phase II (SERB).
5. Sediment Dynamics and Sediment Connectivity in the Koshi Basin: Implications for River Hazards (ICIMOD).
6. Control of Cyber-Physical Systems- Applications to Smart Grid and Formation of UAVs (DEITY).
7. Adaptive Clustering for Decentralized Resilient Energy Management (DST).
8. Externally Aided Project for Reforms and Improvement in Vocational Training Services Rendered by the Central and the State Government (MOL).

9. A Solution Based Approach to the Fabrication of Novel Chalcogenide Glass Microlens Arrays for the 6-12 UM MID IR Optics Applications (ER&IPR).
10. Establishment of a Distinguished Chair Professorship for Education & Research in Technology and Science (MOL).
11. Deltaic Environments, Vulnerability and Climate Change: Migration and Adaptation and its Policy Implications (IDRC).
12. Seamless Affordable Assistive Technology for Health (SAATH) (DBT).
13. 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).
14. Understanding the Functional Regulation of Fragile X Mental Retardation Protein (FMRP) using Murine Models of a Neurological Disorder (DBT).
15. Innovative Thermal Energy Storage System (DST).
16. Investigating the Role of Retinoic Acid Signaling in the Development of Medical Forebrain Structures (DBT)
17. Structure, Function and Novel Signalling Pathways of the Noncanonical G Protein Coupled Receptors (Wellcome Trust).
18. Fluid Dynamical Methods for Gravity (UGC).
19. Optimized Adeno-Associated Virus Mediated Gene Transfer Strategies for Phenotypic Correction of Haemophilia (DST).
20. Active Flow Control High Lift Study (Boeing).
21. Reconfigurable Distribution Networks (DST).
22. Enantioselective Total Synthesis of Antimalarial Flindersia Alkaloids (SERB).
23. Advanced Communication and Control For The Prevention Of Blackouts (DST).

24. Reduction of Earth Metals in Chalkopyritebased Solar Cells (IGSTC).
25. Centre for Excellence for Large Area Flexible Electronics at IIT Kanpur (DEITY).
26. Courts, Networks and Start-Ups: Institutions Matter for South Asian Small Enterprises (IDRC).
27. Monsoon Dynamics and Thermodynamics from the Land Surface, Through Convection to the Confidential Scale (Indian institute of Tropical Meteorology).
28. Local Heat Transfer Coefficient during Film Condensation of Steam Hydrogen Mixtures (BRNS).

Labs/ Facilities developed

1. A Live Cell Imaging facility with a state-of-the art multi-photon laser confocal microscope (ACMS).
2. Scanning Tunneling Microscopy Facility (CHM).
3. Electrochemical STM Development (CHM).
4. Establishment of High Performance Liquid Chromatography-Mass Spectrometry Facility (CHM).
5. Surface plasmon resonance (SPR) spectroscopy facility (CHM).
6. Single particle-level nonlinear optical spectroscopy facility (CHM).
7. Atmospheric Modeling laboratory (CESE)
8. Device Characterization facility (EE).
9. Development of a scale testbed of four wheel steering, four wheel driveelectric vehicle (EE). In addition to being an electric vehicle testbed, it can also support activities in distributed control.
10. A spherical microphone array setup for 3D audio recording and renderingfor use in both anechoic and varechoic environment (EE).

11. Broadband Dielectric Spectroscopy facility established in the High Voltage Laboratory Frequency range: 3 μ Hz – 40 MHz, Temperature range = 20°C - 400 °C (\pm 0.2 °C) from NoVocontrol (EE).
12. Acoustic and Vibration Data Acquisition Facility. Intelligent Condition Based Health Monitoring of Rotating Machine system has been setup which consists of four sets of single stage, double stage compressors, induction motor and two acoustic and accelerometer based data acquisition system (EE).
13. Inventory Management System (EE).
14. Single Cylinder Optical Gasoline Direct Injection Engine (ME).
15. 2D, 3D and Tomographic PIV Facility for Engine Combustion (ME).
16. 2D and 3D Phase Doppler Anemometry for Engine Sprays (ME).
17. Optical Profilometry (MSE).

Softwares developed

1. Direction Detection Software (EE).
2. Audio Analyser (EE).
3. Microphone Array based Acoustic Echo Canceller for DTV (EE).
4. Inventory Management System (EE).
5. Intelligent CBM using Smartphones (EE).
6. Future Image Frame Generator (EE).
7. Development of Aircraft Flight Data Analysis Software (AFDAS) for SSFDR of MiG-27 Upgraded (EE).
8. BSIM-IMG Model (EE).

Technologies developed

1. Design and fabrication of autonomous flapping wing unmanned air vehicle for surveillance and aerial photography (AE).
2. Development of autonomous rotary unmanned aerial vehicle (RUAV) in 10 kg weight (AE).
3. Design and development of an autonomous mini helicopter (AE).
4. Multi scale damage modeling, testing and analysis for life prediction of fibrous composite structures (AE).
5. Design of composite structures: methodologies and criteria (AE).
6. Characterization and modeling of uncertainties in composites (AE).
7. Interface strength characterization of thin films using laser induced stress waves (AE).
8. Application of bio-fuels for aviation (AE).
9. Development of morphing wing (AE).
10. Aero-elastic study of turbo-machinery blades (AE).
11. Liquid jet breakup in swirling air flow (AE).
12. Passive and active control of hooting (AE).
13. Study of internal flow dynamics in a 2d curved nozzle and development of fluidic thrust vectored nozzle (AE).
14. Development of test facility for fire propagation and associated thermal hydraulic aspects in multiple compartments (AE).
15. Air sampling device (2-stage bioaerosol sampler) (CE).
16. Slit-based hi-vol pm2.5 impactor (CE).
17. Adhesive for delivery of drug, nutrients and metabolites by (CESE).
18. Environmentally benign reusable adhesive (CESE).
19. Optofluidic optical lens and lens filter system (CESE).
20. Comprehensive air sampling device (CESE).

21. Water purification filter (CESE)
22. Laser-facilitated synthesis of metal nanoparticles and carbon nanofibers-dispersed PVA-based micro channels for water remediation (CESE).
23. Design and development of compact, low cost carry bag making machine (Design)
24. Handheld RFID reader (EE).
25. Controlled neutral density filter for HDRI (EE).
26. Gain swept HDR imaging from conventional cameras (EE).
27. Systems and methods for signature verification systems and methods using stereo camera and Pressure digitizer tablet (EE).
28. Natural daylight color visualization for NIR multispectral (700-1100nm) imagery (EE).
29. Tooth crown finishing (ME).
30. Wall heat flux sensor (ME)