



Annual Report 2017 - 18



Indian National Academy
of Engineering

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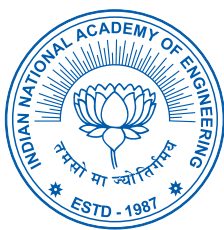
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Indian National Academy
of Engineering



Foreword

I am extremely happy to express my warm greetings to all our Distinguished Fellows, Foreign Fellows, Young Associates and Student members and convey my sincere thanks to each one of you for your dedicated efforts and commitment in progressing the activities of the Academy. We had a very satisfying year with a number of events encompassing a wide range of activities and look forward to have yet another meaningful year with your active participation and support.

I am pleased to give a brief overview of some of the important activities and initiatives during the last one year. INAE, has been focusing more and more to generate the vital inputs towards some of the policy matters related to the government agencies, particularly in the field of engineering. We are also giving a major thrust to provide suitable engineering solutions to many of the issues of National importance. I am happy to inform that with our continuous efforts, we have made substantial progress on the recommendations pertaining to “Development and Production of Civil Aircraft in India”. The necessary approval to set up a Special Purpose Vehicle (SPV) under Ministry of Civil Aviation has since been accorded and in progressing this task, NAL, ADA and HAL will be the major partners. This has been a significant contribution by INAE towards the development and production of civil aircraft in India, which is at present one of the thrust areas.

We have continued our efforts to interface with the Government agencies like DST, PSA Office, NITI Aayog by organising periodical consultative Committee meetings. One of the major outcomes of these efforts is the institution of the Abdul Kalam Technology Innovation National Fellowship based on the deliberations in the INAE-DST Consultative Committee meetings. INAE was requested to institute a Fellowship to recognize, encourage and support translational research in engineering akin to the JC Bose Fellowship for scientists, with the financial support from SERB and DST. Six such Fellowships were already conferred during the last year and these Awardees were felicitated by Dr Harsh Vardhan, Hon’ble Minister of Science & Technology; Environment, Forest and Climate Change and Earth Sciences during the Technology Day celebrations organized by the DST at Vigyan Bhawan, New Delhi on May 11, 2018. This function was graced by Hon’ble President of India Shri Ram Nath Kovind. It is envisaged that, this Fellowship would give a major fillip to the advancement of translational research in Engineering in the Country.

Another important recommendation of the INAE-DST Consultative Committee is to address the issues on “Disposal of Chemical Laboratory Waste from Educational Institutions and R&D Labs”. Accordingly, one day Round Table meeting is being organised to discuss the issue and generate suitable recommendations, in July 2018 at Pune, at Savitribai Phule Pune University. On engineering education, INAE organised a meeting of all experts to consolidate the recommendations on improving the Engineering Education in the country and the same was submitted to the Committee Chaired by Dr K Kasturirangan, constituted to review the National Education Policy. In the month of June 2018 a meeting was held with



Prof K VijayRaghavan, PSA to the Govt. of India to brief him on the activities of INAE. Based on the deliberations, it is planned to organize a Workshop on “Industrial Development in North-Eastern Region of the Country” at Shillong during the next year. Prior to the conduct of the Workshop, a survey is planned to ascertain the status of existing engineering related Industries and the potential in the North-Eastern Region.

Promoting academia-industry interaction is high on the Agenda of the Academy. In consultation with Chairman AICTE, it was decided that an existing joint venture viz “AICTE- INAE Distinguished Visiting Professorship scheme” be extended to retired INAE Fellows from Academia, R&D and Industry as well. The expert lectures delivered by the retired INAE Fellows would certainly help to promote the academia-industry interaction by sharing of practical knowledge of the esteemed INAE Fellows with academia.

Recognising the importance of involving youth in the activities of the Academy an INAE Youth Forum has been instituted this year. This was inaugurated by Dr K Kasturirangan, FNAE, Chairman, Karnataka Knowledge Commission at Birla Institute of Scientific Research, Jaipur during August 2017. The major objective was to provide a platform for young engineering students and professionals to voice their perception on engineering and also its relevance in the context of nation building. The interaction of the young engineering students with our Fellows was very beneficial to all participating youth. It was also decided to induct the award winners as members of INAE Youth Forum.

The existing system of election of INAE Foreign Fellows has been further strengthened to make it more effective by introducing a two-step process of scrutiny of nominations by the Sectional Committees and inviting peer reviews from selected experts on similar lines as the system for election of fellows. The amended process has since been adopted to make the selection of Foreign Fellows more objective, transparent and ensure authentic assessment of the engineering contributions of the nominees during selection.

The NIAS –MNRE-TERI–INAE Workshop on “Enabling 100 GW Solar Power Capacity By 2022” was held in Nov 2017 at New Delhi. The objective of the workshop was to deliberate on all pertinent issues relating to enabling 100 GW Solar Power Capacity in India by 2022 with a view to arrive at actionable recommendations and to forward the same to the concerned stakeholders and policy makers for consideration.

One of the flagship activities of INAE, the National Frontiers of Engineering Symposium -11 was held at IIT Bombay which was well attended. The Fifth Engineers Conclave-2017 was held jointly with CSIR in September 2017 at NAL, Bangalore and the themes were “Regional Air Connectivity” and “Digital Economy”. The Engineers Conclave 2018 is being hosted jointly with Larsen & Toubro Ltd. on Oct 4-6, 2018 at LDA Lonawala. The themes of the EC2018 are: Theme I: “Defence Manufacturing in Private Industries” to be coordinated by L&T and Theme II: “Engineering Challenges in Urban Infrastructure” coordinated by INAE. This will be the first time that the Engineers Conclave will be organized jointly with industry and we seek the active participation of all the Fellows and Young Associates in this important event.

Promoting innovation is another thrust area for the Academy and accordingly, INAE jointly with National Institute of Rural Development and Panchayati Raj (NIRDPR) and Vijnana Bharathi organized a Workshop on “Frugal Innovations” in July 2017 at NIRDPR, Hyderabad. The Workshop attended by many youth across the Country, focused on ways and means of encouraging frugal innovation and was able to create much needed eco system between Government, industry, entrepreneurs and the youth.

I am happy to apprise that the Annual Convention 2018 will be held on Dec 14-15, 2018 at Hyderabad and the details on the venue and programme will be intimated shortly. We look forward to have maximum participation of all our Fellows and Young Associates in this event.

INAE has acquired a new additional Office space this year, in the 9th Floor of SPAZE I -Tech Park, Gurgaon in the same building where the INAE Head Quarters is presently located. It will vastly help to synergise INAE activities in better manner, as some of the activities were located till now in Vishwakarma Bhawan, IIT Delhi Campus, New Delhi. The process for equipping and renovating the premises acquired have been initiated.

A new website for INAE has been developed, incorporating interactive facilities and launched during INAE Annual Convention held at TCS, SIPCOT IT Park, Siruseri, Chennai on Dec 15-16, 2017. This website has various new features apart from its elegant look and feel. In the present context, maximum digitization of all work is encouraged and promoted. In this connection, INAE constituted a Digital Committee with Dr. Pradip, Vice President, INAE as the Chairman. The transition to new platform will take place in three phases including Transactional Activities, Information Downloads and User generated Content and sharing of Information.

As you are aware INAE will have a new President w.e.f Jan 1, 2019. In this connection INAE proposed to select the new President four months in advance to provide an overlap period of four months to have a seamless continuity between the outgoing and incoming Presidents. The new President so selected will be designated as President-Elect with effect from September 1 of the year of election and will take over as President on January 1 of the following year. This proposal has been approved by the Governing Council and will be adopted from this year onwards.

In order to make the activities of INAE more vibrant, I request all our Fellows to have more active involvement and participation. I also look forward for your guidance and suggestions for strengthening the activities and programmes of the Academy.

I take this opportunity to convey my very best wishes to all our Fellows, Foreign Fellows and Young Associates, for the outstanding success in all your professional endeavours and excellence in your career paths.

Dr BN Suresh
President, INAE



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About the Academy

The Indian National Academy of Engineering (INAE), founded in 1987, comprises India's most distinguished engineers, engineer-scientists and technologists covering the entire spectrum of engineering disciplines. INAE functions as an apex body and promotes the practice of engineering & technology and the related sciences for their application to solving problems of national importance. The Academy provides a forum for futuristic planning for country's development requiring engineering and technological inputs and brings together specialists from such fields as may be necessary for comprehensive solutions to the needs of the country.

INAE is the only engineering Academy in India. INAE is a Member of the International Council of Academies of Engineering and Technological Sciences (CAETS). The aims and objects of the Academy are given below.

- (a) To promote and advance the practice of engineering and technology and the related sciences and disciplines (hereinafter referred to as 'Engineering') in India and their application to problems of national importance.
- (b) To disseminate among its members information on all matters pertaining to 'Engineering' and to encourage, assist and extend knowledge and information connected therewith by publishing such proceedings, journals, memoirs and other publications as may be desirable and hold meetings, lectures, seminars, symposia etc.
- (c) To interact, after due and detailed consideration, with professional bodies, engineering and scientific academies etc. already established or as may be established in future in India and abroad.
- (d) To promote and safeguard academic and professional interest of persons involved in 'Engineering' (hereinafter referred to as 'Engineer' in India by laying down a code of ethics which shall be an obligation to be signed by all Fellows of the Academy on admission thereto).
- (e) To provide an association of eminent 'Engineers' and to present at all academic forums research and developmental activities on 'Engineering' on mutually interactive and cooperative basis, both in India and abroad.
- (f) To promote the National Policy on Education of the Government of India as announced from time to time, in all matters of technical education where the Academy is concerned.
- (g) To assist the Government of India, the Local Governments, All India Council of Technical Education and others in analysing, forecasting for the purpose of planning and formulating the policies in respect of education in 'Engineering' and ensuring the appropriate standard thereof.
- (h) To offer the Government of India, the Local Governments and others, facilities for conferring with and ascertaining the views of 'Engineers' as regards matters directly or indirectly pertaining to 'Engineering' and to confer with the said Governments and others in cooperation with other fraternal professional bodies in regard to all matters pertaining to 'Engineering'.

- (i) To encourage inventions, investigations and research and promote their applications for development of both organised and unorganised sectors of the national economy.
- (j) To encourage and promote the pursuit of excellence in the field of 'Engineering'.
- (k) To institute and establish Professorships, Fellowships, Studentships, Scholarships, Awards and other benefactions and to grant Certificates of Competency and Charter whether under any Act of Government of India or otherwise howsoever.
- (l) To do all such other acts and things as are incidental or conducive to the attainment of the above objects or any one of them.

INAE Governing Council for the Year 2018



President

: Dr. BN Suresh, Chancellor, Indian Institute of Space Science & Technology (IIST) and Honorary Distinguished Professor, ISRO hqrs., Bangalore

Immediate Past President :



Vice-President

(Fellowship, Awards & Corporate Communication)

: Prof. Indranil Manna, Professor, Department of Metallurgical and Materials Engineering, Indian Institute of Technology Kharagpur, Kharagpur.



Vice-President

(Finance & Establishment) and Chief Editor of Publications

: Dr. Purnendu Ghosh, Executive Director, Birla Institute of Scientific Research, Jaipur



Vice-President

(Academic, Professional & International Affairs)

: Dr. Pradip, Former Vice-President, TCS, Tata Research Development and Design Centre (TRDDC) (A Division of Tata Consultancy Services Ltd.), Pune

Members



Engg Section-I

: Ms Alpa Sheth, Managing Director, VMS Consultants Pvt Ltd, Mumbai



Engg Section-II

: Prof. Kamala Krithivasan, Formerly Professor and Head, Department of Computer Science and Engineering, IIT Madras, Chennai



Engg Section-III

: Dr. V Bhujanga Rao, ISRO Chair Professor, National Institute of Advanced Studies(NIAS), Bangalore



Engg Section-IV

: Mr. DP Misra, Director, Development Consultants Pvt Ltd & Adviser, Jindal Steel and Power Ltd., Mumbai



Engg Section-V

: Prof. Sivaji Chakravorti, Director, National Institute of Technology, Calicut.



Engg Section-VI

: Prof. UB Desai, Director, Indian Institute of Technology Hyderabad, Kandi, Telangana

	Engg Section-VII	: Dr. G. Satheesh Reddy, Scientific Adviser to Raksha Mantri & Distinguished Scientist, DRDO.
	Engg Section-VIII	: Prof. BS Murty, Department of Metallurgical & Materials Engineering, Indian Institute of Technology Madras, Chennai.
	Engg Section-IX	: Mr. MV Kotwal, Former Member of the Board & President-Heavy Engineering, Heavy Engineering Division, Larsen & Toubro Ltd., Mumbai.
	Engg Section-X	: Dr. V Jayaraman, Prof. Satish Dhawan Professor and Sr. Advisor (Space Applications), ISRO Headquarters, Bangalore.
	Ministry of Science & Technology, Department of Science & Technology	: Prof. Sanjay Mittal, Department of Aerospace Engineering, Indian Institute of Technology Kanpur.
	Ministry of Human Resource Development	:
	Department of Space	: Dr. V Narayanan, Director, Liquid Propulsion Systems Centre, Indian Space Research Organisation, Department of Space, Govt. of India, Thiruvananthapuram.
	All India Council for Technical Education	: Prof. RK Shevgaonkar, Former Professor, Department of Electrical Engineering, Indian Institute of Technology Bombay, Mumbai.
	Indian National Science Academy	: Prof. Anurag Sharma, Physics Department, Indian Institute of Technology, Delhi.
	Asiatic Society	: Prof. Arunendu Banerjee, Sadananda Sadan, Kolkata.
	Indian Academy of Sciences	: Prof. Sandeep Sen, Department of Computer Science & Engineering, Indian Institute of Technology, Delhi.
	National Academy of Sciences (India)	: Prof. SP Mehrotra, Professor-in-charge- R&D, and Professor-in-charge External Relations, Indian Institute of Technology Gandhinagar.



Indian Science Congress Association

: Dr. Er. Nilangshu Bhusan Basu, Principal Chief Engineer (C) & C.M.E. (P & D), The Kolkata Municipal Corporation, Kolkata.



Institution of Electronics and Telecommunication Engineers (IETE)

: Dr. Shamim Ahmad, Formerly Director, Central Electronics Engineering Research Institute, (CEERI), Pilani; Formerly Vice-Chancellor, Jamia Hamdard, (Hamdard University), New Delhi



The Institution of Engineers (India)

: Mr. Pradeep Chaturvedi, Vice-President, World Environment Foundation, New Delhi.



Confederation of Indian Industry (CII)

: Mr. Jibak Dasgupta, Deputy Director, Confederation of Indian Industry (CII), New Delhi.

INAE Committees

Sectional Committees

The composition of the ten Sectional Committees are given below.

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Prof. Sriman Kumar Bhattacharyya

Members

Dr. SK Kamra

Mr. MM Madan

Prof. Nagesh R Iyer

Mr. VN Heggade

Mr. N Raghavan

Prof. DN Singh

Prof. Santosh Kapuria

Prof. Mukesh Sharma

Dr. NK Tyagi

Prof Subrata Chakraborty

Dr. S Arunachalam

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Prof. Subhasis Chaudhuri

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Dr. Soumen Chakrabarti

Prof. Sushmita Mitra

Prof. Pushpak Bhattacharyya

Prof Dipanwita Roy Chowdhury

Prof. Santanu Chaudhury

Prof. CSR Murthy

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Dr. Biswadip Mitra

Dr. Raghu Krishnapuram

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Mr. K Jayarajan

Prof. K Muralidhar

Prof. K Ramesh

Prof. Suman Chakraborty

Mr. NM Dube

Dr. J Krishnan

Mr. A Ravisankar

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Mr. Anil Kumar Sinha

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Prof AK Suresh

Prof. Deepak Kunzru



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Prof. Soumitro Banerjee
Prof. HM Suryawanshi
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Members

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Mr. CK Pithawa
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(Aerospace Engineering)

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Prof. AJ Pal
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Mr. Ramachandran EP
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New Initiatives during the Year

During the last one year, INAE, in addition to many of its well-defined activities, has been giving a major thrust to identify the issues of National importance where engineering interventions can provide the needed solutions and also to get associated with some of the vital policy matters. INAE has been making efforts to identify such problems of National importance in association with many of the Government Departments and is looking at the policy matters which are referred to the Academy by the concerned agencies for generating the right inputs. With this objective in mind, INAE has undertaken a number of new initiatives in terms of commencing new programmes and conduct of unique events during this year, which have enhanced the outreach and visibility of the Academy both in India and abroad. A brief summary of these novel initiatives is highlighted below.

Abdul Kalam Technology Innovation National Fellowship

INAE and Science and Engineering Research Board (SERB), Department of Science and Technology (DST) launched the **Abdul Kalam Technology Innovation National Fellowship** in the year 2017 to recognize, encourage and support translational research by Indian Nationals working in various capacities of engineering profession, in **public funded institutions in the country**. The Fellowship is applicable to persons engaged in the engineering profession only. The Fellowship amount is Rs 25,000/- per month in addition to salary being drawn. A Research Grant of Rs.15.00 lakh per annum, which can be utilized for engineering research and innovation activity including hiring of manpower, consumables, national and international travel for research purposes, chemicals, equipment, etc is also provided. The duration of the Fellowship is initially for three years, extendable by upto two more years depending on the performance.

A Search -cum-Selection Expert Committee (SSEC) has been constituted by DST for selecting the nominees for conferment of the Fellowship and reviewing all activities undertaken under the aegis of the scheme. The call for nominations is issued twice in a Financial Year for conferment of upto a maximum number of 10 Fellowships. The Ist Call for nominations for the Financial Year 2017-18 was issued on Aug 29, 2017 and the IInd Call for nominations was issued on Jan 8, 2018. The Meetings of the Search -cum-Selection Expert Committee (SSEC) were held on Sept 25, 2017 and Mar 10, 2018.

- During the first meeting of the Search -cum-Selection Expert Committee (SSEC) held on Sept 25, 2017 three nominees were conferred the Fellowship as per details below.
 1. **Prof Sirshendu De, Department of Chemical Engineering, Indian Institute of Technology, Kharagpur.** Prof Sirshendu De was conferred the subject Fellowship for his proposal for pursuing the research on developing the following processes with prototype building and field trial viz (i) fluoride removal from groundwater; (ii) removal of heavy metals from groundwater (iii) removal of cyanide from steel plant effluent and (iv) scaling up of cold sterilization technique for storing tender coconut water with high shelf life using suitable membranes.
 2. **Prof Krishnan Balasubramanian, Department of Mechanical Engineering, Indian Institute of Technology Madras.** Prof Krishnan Balasubramanian was conferred the subject Fellowship for his proposal for carrying out work on developing of the Ultrasonic Waveguide Sensor Systems.
 3. **Prof GK Ananthasuresh, Department of Mechanical Engineering, Indian Institute of Science, Bangalore.** Prof GK Ananthasuresh was conferred the subject Fellowship for his



proposal for carrying out work on developing of the following viz. (i) In-situ soil-moisture sensor, (ii) Intracranial pressure sensor and (iii) chair for the elderly and arthritics.

- During the second meeting of the Search -cum-Selection Expert Committee (SSEC) held on Mar 10, 2018 three nominees were conferred the Fellowship as per details given below.
 1. **Prof Navakanta Bhat, Chairperson, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore.** Prof Navakanta Bhat was conferred the subject Fellowship for his proposal for pursuing the research on Nanostructured Semiconductor Gas Sensors with prototype building and Field Trials on anticipated outcomes as follows : New materials and device structures for highly sensitive and selective gas sensors; Optimization of single chip gas sensor array for multiple gas sensing and Detailed Technology transfer document for processing gas sensors in a cleanroom, packaging gas sensors and calibration of gas sensors.
 2. **Dr Sudipta Mukhopadhyay, Associate Professor, Department of Electronics and EC Engineering, Indian Institute of Technology Kharagpur.** Dr Sudipta Mukhopadhyay was conferred the subject Fellowship for his outstanding contributions in the field of Image Processing and his proposal for pursuing the research on Real Time Image Enhancement: Rain and Fog Removal from Videos with software/technology development and Field Trials on development of the following (i) Embedded rain and fog removal software solutions with appropriate interface (ii) Algorithms beneficial in ADAS (Advanced Driver Assistance Systems) to improve the safety in various transportation systems, as well as various security applications and outdoor video coverage.
 3. **Dr Abhishek, Assistant Professor, Department of Aerospace Engineering, Indian Institute of Technology Kanpur.** Dr Abhishek was conferred the subject Fellowship for his proposal for pursuing research on various aspects of Aerospace Technology with prototype building/ Field Trials and commercialization of the following (i) Rotary Wing Unmanned Aerial Vehicle with 5Kg and 10kg payload capacity (ii) High efficiency Vertical Axis Wind Turbine (VAWT) with dynamic blade pitching and (iii) Hybrid Multirotor Convertiplane UAV.

During the meeting of the Search -cum-Selection Expert Committee held on March 10, 2018, it was decided that all nominees who had applied and were not selected during the year 2017-18 are eligible to apply again once during the current Financial Year i.e. April 1, 2018 to March 31, 2019 and in each Financial Year in the next and subsequent years; till they have a residual service of five years left in their parent organizations.

Felicitation of Abdul Kalam Awardees During Technology Day Celebrations on May 11, 2018

The Technology Day was celebrated by Department of Science and Technology (DST), Govt. of India at Vigyan Bhawan, New Delhi on May 11, 2018 and the Function was graced by Hon'ble President of India Shri Ram Nath Kovind and Dr Harsh Vardhan, Hon'ble Minister of Science & Technology, Minister of Environment, Forest and Climate Change and Minister of Earth Sciences. During the function the six Abdul Kalam Awardees selected during the year 2017-18 were felicitated by Dr Harsh Vardhan, Hon'ble Minister of Science & Technology, Minister of Environment, Forest and Climate Change and Minister of Earth Sciences.



Hon'ble President of India Shri Ram Nath Kovind, Dr Harsh Vardhan, Hon'ble Minister of Science & Technology, Minister of Environment, Forest and Climate Change and Minister of Earth Sciences and Prof Ashutosh Sharma, Secretary, DST at Vigyan Bhawan, New Delhi with all Awardees.



Prof Sirshendu De, FNAE being felicitated by Dr Harsh Vardhan, Hon'ble Minister of Science & Technology, Minister of Environment, Forest and Climate Change and Minister of Earth Sciences.



Prof Krishnan Balasubramanian, FNAE being felicitated by Dr Harsh Vardhan, Hon'ble Minister of Science & Technology, Minister of Environment, Forest and Climate Change and Minister of Earth Sciences.



Prof GK Ananthasuresh, FNAE being felicitated by Dr Harsh Vardhan, Hon'ble Minister of Science & Technology, Minister of Environment, Forest and Climate Change and Minister of Earth Sciences.



Prof Navakanta Bhat, FNAE being felicitated by Dr Harsh Vardhan, Hon'ble Minister of Science & Technology, Minister of Environment, Forest and Climate Change and Minister of Earth Sciences.



Dr Sudipta Mukhopadhyay being felicitated by Dr Harsh Vardhan, Hon'ble Minister of Science & Technology, Minister of Environment, Forest and Climate Change and Minister of Earth Sciences.



Dr Abbasbek being felicitated by Dr Harsh Vardhan, Hon'ble Minister of Science & Technology, Minister of Environment, Forest and Climate Change and Minister of Earth Sciences.

Procurement of INAE new Office space

INAE Digital Knowledge Resource Centre (DKRC) is currently housed and functional from the IIT Delhi premises at Vishwakarma Bhawan, IIT Delhi Campus, New Delhi. Recently, IIT Delhi had requested for some space in the existing INAE DKRC office at Vishwakarma Bhawan so as to house their Start-ups. Accordingly, a number of meetings were held with Prof. V Ramgopal Rao, Director, IIT Delhi.

During the meeting it was brought out that since INAE is a professional body registered under the Societies Registration Act, it is mandatorily required that the office address of INAE should be at Delhi as per the Societies Registration Act. In order to fulfil this requirement, it was decided to retain a portion of the existing office in Vishwakarma Bhawan for INAE and a joint utility plan for office was discussed and finalized. In addition, parallel efforts to acquire office space in the upcoming building of DST in Delhi will also be made.

In view of above, INAE constituted a Committee for identifying and acquiring a suitable office space in Gurgaon, preferably in the vicinity of the existing office of INAE : Unit No.604-609, 6th Floor, Tower A, SPAZE I-Tech Park, Sector 49, Sohna Road, Gurgaon to relocate the INAE DKRC in Gurgaon. In this regard, a suitable advertisement was published in the national newspaper for inviting technical and commercial bids. The Committee constituted for procurement of new office space to relocate DKRC office in Gurgaon had carried out the detailed process to include shortlisting of technical bids, visit to shortlisted sites, opening of commercial bids and price negotiation with the finally shortlisted bidders. Accordingly, the new office space at Unit No.928, 9th Floor, Tower A, SPAZE I-Tech Park, Sector 49, Sohna Road, Gurgaon has been procured and approved by the Governing Council. The process for equipping this office has since been initiated.

New process for Election of Foreign Fellows

With a view to improve the existing system of election of Foreign Fellows and making it more effective, it was recommended during the Governing Council meeting held in March 2018 wherein it was decided that the Sectional Committees may process the nominations for Foreign Fellows through a two-stage system similar to the processing of nominations for INAE Fellowship. Accordingly, the Sectional Committees during their first meeting would shortlist the nominations for Foreign Fellows for Peer Review and identify the domain experts for the same. Subsequently, during the second meeting, the Sectional Committees would examine the Peer Review Reports received in respect of the shortlisted nominees and recommend the nominations for consideration of the Selection Committee for Foreign Fellows in which the Conveners are special invitees. During the meeting of the Selection Committee, the Conveners would make a brief presentation on the recommended nominees for selection of the Foreign Fellows which would be ratified by the Governing Council during its meeting held in August each year, for election of Fellows. It is felt that the amended procedure will ensure a more objective, uniform, transparent, impartial and authentic assessment of the engineering contributions and impact of the nominees to the growth of engineering and technology in India and will also strengthen the procedure for election of Foreign Fellows.

Extension of AICTE-INAE DVP Scheme to retired INAE Fellows

A meeting between Dr. BN Suresh, President, INAE and Prof Anil D Sahasrabudhe, Chairman, AICTE was held on Sep 19, 2017 to discuss the scheme with the objective of initiating steps to ensure that more engineering colleges avail the benefits of the scheme. The salient points discussed are as under:

- a. The scheme has been proposed to be extended to all retired INAE Fellows, and retired persons from Industry and R&D who are not INAE Fellows.
- b. The frequency of visits to an engineering college by a DVP has been increased to up to three times a semester with a maximum period of three days per visit.
- c. The honorarium paid to the visiting Industry Expert has been increased to Rs. 10,000/- per lecture day as approved by AICTE.
- d. AICTE will be responsible for promotion of all AICTE-INAE Schemes while INAE will be responsible for implementation and operation of the schemes.

Accordingly, the AICTE-INAE DVP Scheme has since been extended to the retired INAE Fellows.

INAE New Website

A new website for INAE has been developed incorporating interactive facilities and was launched during INAE Annual Convention held at TCS, SIPCOT IT Park, Siruseri, Chennai on Dec 15-16, 2017.

The new website has various new features apart from its new look and feel. The home page has important links presented as tabs (menus) which have further sub tabs(submenus). Other features which have been incorporated are as follows:

- **Easy Navigation**
- **Quick Links**
 - **Website Search**



- **News dash boards with**
 - Recent Activities
 - e-Newsletter
 - Forthcoming activities
- **Bootstrap framework:** The present **INAE** website has been built on bootstrap framework. It is the most popular HTML, CSS, and JS framework for developing responsive, mobile first webs on the website.
- **Wordpress CMS:-** INAE is currently using wordpress as the CMS for managing its website concent easily and efficiently using Wordpress
- **Graphical Design:-** INAE is using wide page design to display results in a better manner using high resolution images.
- **Bilingual :** INAE present site is Bilingual with both English and Hindi text conversion.
- **Responsive:** INAE website is responsive and fits well across all devices.
- **Media Gallery:** INAE website has media gallery, i.e, Image and Video arranged in reverse chronological order of events. High resolution photos depicting different activities taken up by INAE have been uploaded
- **Search :** Search can be performed easily with improved search box in website.
- **Visitor counter:** Visitor counter has been incorporated for keeping a track of visitors.
- **Google analytics:** Google analytics has been incorporated providing indepth analysis of the visitor's visit pattern.
- **Location Map:** For easy navigation of the INAE office map.

It is planned to incorporate new features in the website including online platform for interaction between INAE Fellows and selected students from Engineering Colleges. Besides this, sections with featured highlights on the engineering achievements of Fellows will also be published periodically.

Introduction of the concept of President-Elect in INAE Governing Council so as to have an overlap of tenure of a minimum of three months with the current President

During one of the INAE meetings, the introduction of the concept of President-Elect in INAE Governing Council was recommended. The concept of overlap of period would facilitate in seamless taking over of the appointment of the President in the INAE Governing Council. This practice is also being followed in a large number of Professional Bodies/Academies existing nationally/internationally.

Based on the suggestion, a Base Paper on introducing the new concept of President-Elect in INAE Governing Council was prepared and deliberated in the Governing Council meeting. It was unanimously agreed to introduce the concept of President-Elect and have an overlap of three months so as to ensure seamless transition. It was decided that the process for selection of the new President to be completed by August during the year in which the nominations are invited. The selected Fellow for the position of

President will take over as President- Elect with effect from Sep 01 of the year and thereafter assume the office of the President on Jan 01 of the following year. After deliberations, the new concept of President- Elect has been implemented from this year onwards and the relevant Ordinance on the subject also amended.

Induction of INAE Young Associates during AGM

INAE Young Engineer Award are given for engineering research, excellence in engineering design, technology development and technology transfer since the year 1996. The early recognition has encouraged the best upcoming talent to make innovative engineering and technological contributions for our national development.

During the AGM of Fellows, a suggestion was received to consider formal induction of the winners of INAE Young Engineer Award as “INAE Young Associates” so as to encourage, motivate and involve them in the INAE activities. Accordingly, the existing format for the conduct of INAE Annual Convention, wherein all awardees are formally felicitated, was reviewed to accommodate induction of INAE Young Engineer award winners as “INAE Young Associates”. The inductees were also presented a Certificate during the AGM of Fellows specifying the period of engagement as “INAE Young Associate”, i.e. till attaining the age of 45 years.

MOU with M/s Springer for publication of INAE Book Series

INAE has entered into an agreement with M/s Springer to facilitate publishing of books authored by interested INAE Fellows. Under the aegis of the MoU signed between both parties on “INAE Book Series”, it is proposed that initially INAE liaises with M/s Springer on behalf of the desiring Fellows and assists them in formalizing a separate Book Agreement with the publisher to ensure the speedy publication. The objective of this exercise is to assist the Fellows who may have experienced difficulty in identifying suitable publishers and formalizing an agreement with them. This will in turn also enhance the visibility of the Academy. All Fellows desiring to publish their manuscript by M/s Springer under the framework of the “INAE Book Series” have been invited to forward the proposals to INAE for the same.

Constitution of INAE-PSA Consultative Committee

Periodic meetings of the President, INAE are being held with the PSA to the Govt. of India for identifying activities to be undertaken by INAE wherein engineering interventions are required in areas of national importance. It has been decided to constitute INAE-PSA Consultative Committee which would meet quarterly. The Office Order for constituting the subject Committee has since been issued by the office of the PSA, Govt. of India.

INAE Award Lecture Series

During discussions held in one of the General Body Meetings of Fellows, it was suggested to publish the book series containing the award lectures delivered by awardees of Professor Jai Krishna and Professor SN Mitra Memorial Awards during the Award Function held in the past. Accordingly, the e-publication, namely, “INAE Award Lecture Series” has been compiled based on the manuscripts of the award lectures delivered by the awardees of Professor Jai Krishna and Professor SN Mitra Memorial Awards in the past. The subject e-publication has since been uploaded on INAE website and is available for access under the heading “Publications”.

Academy Activities

Seminars/Workshops/Conferences –National

The Academy organizes Symposia/Seminars/Workshop/Conferences at national/international levels on topics of national importance. Based on the deliberations, INAE invariably brings out policy recommendations for suitable follow-up action by the concerned Ministry/Department/agency(ies).

National Frontiers of Engineering Symposium (NatFOE-11)

The Eleventh National Frontiers of Engineering Symposium (NatFoE-11) was held from June 30-July 1, 2017 at IIT Bombay. Prof. DV Khakhar, Director, IIT Bombay had hosted the NatFOE-11 Symposium at IIT Bombay. The aim of the Symposium was to promote cross-disciplinary exchange of ideas and transfer of new techniques in order to build and sustain the innovation paradigm. The overall purpose of the symposium was to achieve synergy among Aerospace, Energy and Biomedical Engineering disciplines at different scientific scales through discussions in the following four thematic areas:

- Alternate and Advanced Fuels
- Manufacturing and Heat Transfer for Aerospace applications
- Technology for improving Childcare and Mothercare
- Technology for tackling Fog and Pollutants.

56 leading researchers, technologists and policy-makers from various institutes and R&D labs, industries & start-ups came together to share their contributions and discuss the way forward with respect to these themes. Special attention was given to cover policy related aspects relevant to these topics. The Symposium featured several very stimulating talks and close interactions, with interesting interactive sessions held all



Prof DV Khakhar, Director, IIT Bombay Delivering the Welcome Address

day long. Plenary talks by Prof. Baldev Raj, FNAE, Director, NIAS, Bangalore on Energy and Prof. Devang Khakhar, FNAE, Director, IIT Bombay on Need for R&D in India were very well received by the audience. Each of these talks were followed by a particularly thought provoking question-answer session. The keynote talks were delivered by distinguished personalities such as Dr. B.N. Suresh, President INAE, Mr. S.A. Bhardwaj, FNAE Chairman, AERB, Dr. Malini Shankar, Director General, Shipping, Dr. Ajit Sapre, FNAE, Group President–R&T, Reliance Industries Limited and Dr. Rakesh Kumar, Director, CSIR NEERI, Nagpur. Various fine points were brought out in these talks due to the vast personal experience of the speakers in their respective fields.



Dr BN Suresh, President, INAE Delivering the Keynote Address

In addition, 10 distinguished scholars gave invited talks. The remaining invitees gave a brief presentation about their work. There were also two overview talks and a panel discussion, coordinated by Prof. M.D. Atrey, IIT Bombay. The topic of the panel discussion was “Creating Eco system and Mentoring Start ups” and comprised two sets of panel members – those who have helped create eco-system and those who have utilized the eco-system to successfully create their start-ups. The response of the audience to the panel discussion was particularly heartening, even when it was almost the last event in the schedule.

A large number of INAE Fellows and Faculty Members from IIT Bombay also attended the Symposium and contributed by chairing the various sessions. The cross-disciplinary nature of the Symposium allowed a wider perspective to the participants, and exposed them to some of the pressing societal issues and ongoing research work in various parts of the country.

INAE-NIRDPR Workshop on “Frugal Innovations”

INAE jointly with National Institute of Rural Development and Panchayati Raj (NIRDPR) and Vijnana Bharathi organized a Workshop on “Frugal Innovations” on July 7-8, 2017 at NIRDPR, Hyderabad. The Workshop focused on ways and means to encourage frugal innovation to happen in the country and to create much needed eco system between Government, industry, entrepreneurs and the youth. The subject Workshop was planned in continuation of the engagement of INAE with the youth in the country wherein participation of young entrepreneurs involved in Frugal Innovation and the experts in the area spread over

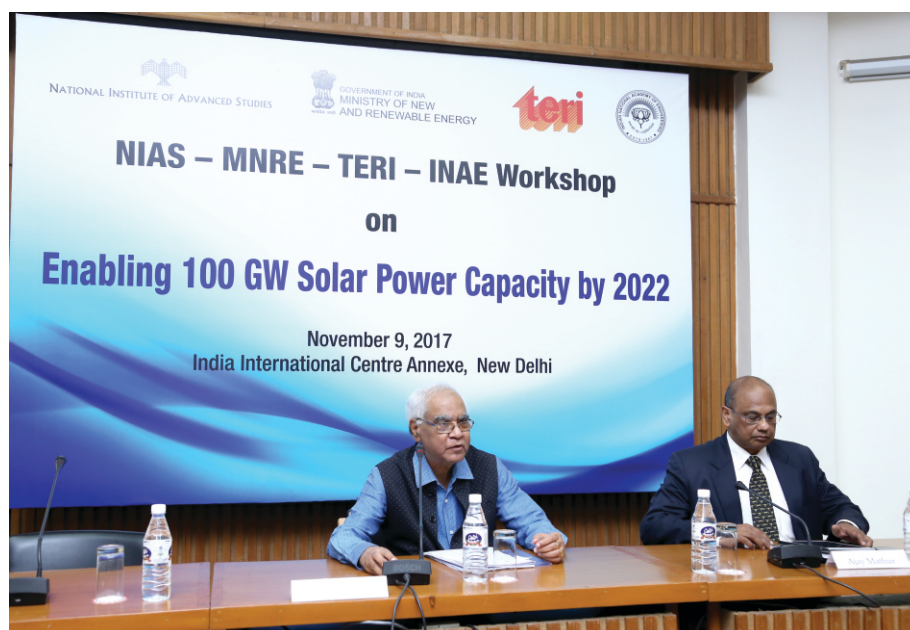
various sessions was envisaged. The Chief Guest Shri M Venkaiah Naidu, Hon'ble Union Minister for Urban Development, Housing and Poverty Alleviation and Information and Broadcasting, Govt. of India on July 7, 2017 delivered the Inaugural Address on July 7th, 2017. Dr WR Reddy, Director General, NIRDPR delivered the Presidential Address in the Opening Session which also featured an Address by Guest of Honour, Shri Konda Vishveshwar Reddy, Hon'ble MP, Lok Sabha, Telangana. The workshop was conducted in four Technical Sessions on “Frugal Innovation”; “Frugal Innovation-Success Stories”; “Voice of Student Innovators” and “Marketing Business Models and Outreach”. The highlight of the Workshop was the participation of about 200 students from all over the country, who were selected through competitions on innovations. Their work was also exhibited in the Workshop. The structure of the Workshop was organized in such a manner, that it addressed all these vital areas and the experienced experts in these areas delivered the lectures. There was a special student's session and 10 students who were selected through a rigorous screening, based on their work just a day prior to the workshop were given an opportunity to present their work. An intense interaction with all stakeholders was also held. The workshop concluded with a Valedictory and Panel Discussion on “Way Forward to Reach Out” that was Chaired by Dr VK Saraswat, Member Niti Aayog, Govt. of India. During this session, presentations were made by the Sessions Chairs of the four Technical Sessions and a Prize Distribution Ceremony was held for the students. After the workshop, a visit was organized to showcase Live Demonstration of different rural technologies including DRDO Life Sciences at Rural Technology Park.



The Chief Guest, Shri M Venkaiah Naidu, Hon'ble Union Minister for Urban Development, Housing and Poverty Alleviation and Information and Broadcasting

NIAS –MNRE-TERI–INAE Workshop on “Enabling 100 GW Solar Power Capacity By 2022”

The NIAS –MNRE-TERI–INAE Workshop on “Enabling 100 GW Solar Power Capacity By 2022” was held on Nov 9, 2017 at India International Centre Annexe, New Delhi. The objective of the workshop was to deliberate on all pertinent issues relating to enabling 100 GW Solar Power Capacity in India by 2022 with a view to arrive at actionable recommendations to be forwarded to the concerned stakeholders and policy makers for consideration. The event was attended by about 45 delegates. During the Inaugural Session Dr. Baldev Raj, Chair of the workshop delivered the Welcome Address and gave a brief overview of the purpose of the workshop. The Keynote Address was delivered by Dr Ajay Mathur, Director General, TERI, New Delhi.



*Dr. Baldev Raj, Immediate Past-President, INAE & Chair of the workshop and
Dr Ajay Mathur, FNAE, Director General, TERI, New Delhi addressing the participants*

The Programme comprised of four Technical sessions on Infrastructure and Human Resource for +100 GW Solar Power and to Add 20-25 GW Each Year; Technology Choices and Manufacturing Status; Business Models for 100 GW and Overall Ecosystem and Policy Issues related to Mission. The workshop concluded with the session on summarizing and way Forward and Final Remarks by the Chair.

Engineers Conclave-2017 (EC-2017)

INAE conducts an annual mega event of engineers each year as “Engineers Conclave” starting from the year 2013, which is being organized jointly with major engineering institutions, essentially to provide a platform for all engineers/scientists to deliberate and address major engineering challenges and opportunities of vital engineering concern to the country. Each conclave has two themes, one specific to the host department and other pertaining to some societal problem where engineering intervention is desired. These two themes are focused from point of view of finding engineering solutions and specific recommendations are formulated for action by the concerned government department and industry. Engineers Conclave has tangible delivery in suggesting possible engineering solutions to the policy makers of the country. The first four Engineers Conclaves, viz., EC-2013 with Defence Research and Development Organization (DRDO), EC-2014 with Indian Space Research Organization (ISRO); EC2015 with Department of Atomic Energy (DAE) and EC 2016 with Indian Institute of Technology Madras were held at New Delhi, Bangalore, Mumbai and Chennai respectively.

The Fifth Engineers Conclave-2017 was held jointly with CSIR on September 14-16, 2017 at NAL, Bangalore. Dr Girish Sahni, DG, CSIR and Dr BN Suresh, President, INAE were the Co-Chairs of Engineers Conclave 2017. The two themes for Engineers Conclave-2017 were: Theme-I on **“Regional Air Connectivity”** coordinated by NAL, Bangalore with Dr Kota Harinarayana, FNAE as the Coordinator and Theme-II on **“Digital Economy”** coordinated by INAE with Prof Veni Madhavan as the Coordinator. Dr VK Saraswat, FNAE, Member, Niti Aayog was the Chief Guest and inaugurated the Engineers Conclave 2017. During the Inaugural Session, the Keynote Address was delivered by Dr Kota Harinarayana, FNAE on behalf of Prof Roddam Narasimha, FNAE. The themes of the Conclave focused on cutting edge solutions and specific recommendations for development by the concerned organizations.



Dr VK Saraswat, FNAE delivering the Inaugural Address



Dr BN Suresh, President, INAE lighting the lamp

Eminent experts and senior functionaries from National and State Centres/ Departments/ Units, Academia, Industry and INAE participated in the conclave to deliberate on the important themes of the EC-2017. There were about 350 participants including 80 INAE Fellows and Young Associates in the Engineers Conclave 2017. The Conclave had five parallel Technical Sessions on each theme. The Technical Sessions on Theme -I were on “Regional air Connectivity: Policy/Regulatory Issues/Operators View Points”; “Airports/No frill Airports”; “Market and Top-Level requirements for new Gen Regional Aircraft”; “Technologies for A New Gen Regional Aircraft” and “Design for Maintenance”. The Technical Sessions on Theme -II were on “Infrastructure and Integration”; “Financial Technologies”; “User Interfaces and Services”; “Cyber Security” and “Human Resources: Development, Employment and Empowerment”.



Release of Souvenir on Engineers Conclave 2017



The highlights of the Conclave were the five Plenary Talks delivered by Mr VVR Sastry, Ex-Director, C-DOT on “Digital Economy- Challenges, Opportunities, Initiatives and way Forward”; on “IAF’s Requirements for Transport Aircraft” by AVM BR Krishna; on “Evolution of Digital Space” by Dr Gulshan Rai, DG-CERT-IN & National Cyber Security Coordinator; on “GST System Project: The Engineering Challenges” by Mr Prakash Kumar, CEO, GST, New Delhi and on “Air Transportation in India- Challenges” by Prof G Raghuram. Director, IIM, Bangalore.

A sideline meeting Chaired by Dr VK Saraswat, FNAE, Member, Niti Aayog on “Development & Production of Commuter & Regional Aircraft in India: Way Forward” was held with all stakeholders and policy makers. Some of the stakeholders who participated in the meeting were delegates from Spicejet, Air India, Indian Air Force, Hindustan Aeronautics Ltd, Pratt & Whitney and Airbus, besides other dignitaries.

On the last day of the Conclave, Parallel Panel Discussion Sessions were held on the two themes to discuss the “Way Forward” which were Chaired by Dr Kota Harinaryana, FNAE and Prof Veni Madhavan, Coordinators of Themes I and II respectively. The objective of the Panel Discussion Session was to summarize the deliberations on each theme and arrive at implementable recommendations and the proposed course of action to progress the same with the concerned stakeholders. The Conclave ended with the Valedictory Session Chaired by Prof Roddam Narasimha, FNAE wherein the summing up of the Technical Sessions of the two themes was carried out by the respective Coordinators. The Conclave concluded with the Valedictory Session during which the Chairman of the Session, Prof Roddam Narasimha delivered a thought provoking Address. Actionable recommendations based on the deliberations of the two themes are being actively progressed with the concerned Government Departments/Agencies for due consideration.

INAE Youth Activities

INAE Youth Forum

Based on the decision taken in the Governing Council meeting held in June 2017, the INAE Youth Forum was launched by Dr. K Kasturirangan, Past President, INAE and Chairman, Karnataka Knowledge Commission during the INAE Youth Conclave held at Birla Institute of Scientific Research (BISR), Jaipur on Aug 11-12, 2017.

The winners of the Online National Essay Competition and Innovative Student Projects Awards at Doctoral, Master's and Bachelor levels were inducted as "Student-Members" during this Conclave. Dr. Kasturirangan delivered an inspirational talk to encourage students for pursuing research and career in academics so as to facilitate the growth of engineering education in the country. He emphasised that by creation of this Forum, INAE would provide a platform for young engineering students and professionals voice their concern on areas of engineering relevant to the nation building. The "Student-Members" would be involved appropriately in the relevant activities of INAE, not only to facilitate their growth, but also to provide an opportunity for raising their concern.



Dr. K Kasturirangan delivering the talk during the Inauguration of INAE Youth Forum

INAE Youth Conclave

The first INAE Youth Conclave was organized at Birla Institute for Scientific Research (BISR), Jaipur on Aug 11-12, 2017 which was hosted by Dr Purnendu Ghosh, Vice -President, and Chief Editor of Publications, INAE and Executive Director, Birla Institute for Scientific Research (BISR), Jaipur. The general theme of the Conclave was Engineering Excellence, Youth Leadership and Nation Building. About 200 engineering students from diverse institutes to include IITs, NITs, REC and private Universities/ Engineering Colleges and around 30-40 senior INAE Fellows had been invited and participated in various interactive sessions during the event. Dr. K Kasturirangan, Past President, INAE and Chairman, Karnataka Knowledge Commission inaugurated the Youth Conclave and addressed the gathering.



Dr K Kasturirangan, FNAE Inaugurating the Youth Conclave



Dr Purnendu Ghosh, Vice-President, INAE delivering the Welcome Address

All the sessions during the Conclave were interactive in nature and views of the engineering students on pertinent issues relevant to engineering were obtained. A special interactive Session was also organized wherein Prof. Sunil Handa from IIM, Ahmedabad and Founder of Eklava Education Foundation gave a talk on “Entrepreneurship” and interacted with students. This session was very much appreciated by all the students present.

Besides, the various presentations planned, the INAE Online National Essay Competition award winners were provided a platform for delivering a short talk on their vision on the engineering challenges facing the country. The Conclave concluded with an interactive session of the students with the panel of INAE Fellows which deliberated on all engineering related issues of concern to the youth and to the society. The feedback was obtained from the students subsequent to the event. The next INAE Youth Conclave is planned at IIT Kharagpur wherein Prof Partha P Chakrabarti, Director, IIT Kharagpur has kindly consented to host the event.



The award winners of the online National Essay Competition 2017 being felicitated during INAE Youth Conclave



The award winner of the online National Essay Competition 2017 delivering short presentations during Youth Conclave 2017



The award winner of the online National Essay Competition 2017 participating in the Interactive Session

Online National Essay Competition

Under the aegis of INAE Youth Forum, one of the major activities undertaken was Online National Essay Competition for 4th year engineering students from B.Tech/ BE /BSc (Tech)/ Integrated MTech/ ME from all MHRD/AICTE approved institutions and universities which was launched during the year 2017. The topic for the first Online National Essay Competition was “Towards Technological Self-Reliance and Leadership” and the essays were invited under the four sections as under.

- a. **Section I:** Mechanical Engineering, Manufacturing, Civil Engineering and Management
- b. **Section II:** Electrical Engineering, Electronics & Telecommunications and Energy
- c. **Section III:** Bioengineering, Materials Engineering, Chemical Engineering and Mining
- d. **Section IV:** Computer Science & Engineering and Information Technology

An overwhelming response was received from the engineering students and a total of over 1000 essays were submitted. INAE Fellowship was requested to assist in evaluation of essays and around 120 INAE Fellows participated in the evaluation process. Subsequent to the evaluation of essays by the INAE Fellows, a Committee was constituted to identify the award winners in various sections.



The following twelve winners of the Online National Essay Competition for the year 2017 were felicitated and the prizes given to them during the INAE Youth Forum held at BISR, Jaipur on Aug 11-12, 2017.

1. Mr. Rohit Murthy, Indian Institute of Technology Guwahati
2. Mr Manraj Bevli, Indian Institute of Technology, Kanpur.
3. Mr. Vivek Anand, Indian Institute of Technology, Dhanbad.
4. Mr Arghya Patnaik, College of Engineering & Technology, Bhubaneswar, Odisha.
5. Ms G Chaitanya Lakshmi, R V College of Engineering, Karnataka.
6. Mr Nimish Bhide, K. J. Somaiya Institute of Engineering and Information Technology, Maharashtra.
7. Ms Haripriya Kannan, National Institute of Technology, Trichy, Tamil Nadu.
8. Ms Samanwitha Kolli, Mahatma Gandhi Institute of Technology, Andhra Pradesh.
9. Ms Yashvi Singh, National Institute of Technology, Tiruchirappalli, Tamil Nadu.
10. Ms Reneta Basu, Government College of Engineering & Textile Technology, Serampore, West Bengal.
11. Mr Poojith Cherukattil, University of Kerala, Kerala.
12. Ms Simran Sidhu, Central University of Punjab, Punjab.

The topic chosen for Online National Essay Competition for the year 2018 is **“National Challenge and its Engineering Solutions”** and the essays are to be submitted online. The essays will be assessed by INAE Fellows and awards will be presented during the Youth Conclave 2018 to be held on August 10-12, 2018 at IIT Kharagpur.

Reaching out to Policy Makers : Interaction with Govt. Agencies

INAE-DST Consultative Committee

INAE-DST Consultative Committee has been reconstituted in 2017 and comprises of Dr. BN Suresh, President, INAE, Prof. Ashutosh Sharma, Secretary, DST; Dr. HK Mittal, Scientist 'G' & Head, NEB, DST; Dr. RK Tayal, Scientist 'G' & Head, IS-STAC, DST; Dr. Rajiv Sharma, Secretary, SERB; Prof. Indranil Manna, Vice-President, INAE; Dr. Purnendu Ghosh, Vice-President, INAE; Prof. V Ramgopal Rao, Director, IIT Delhi; Prof. UB Desai, Director, IIT Hyderabad and Prof. Prem Krishna, Former Vice-President, INAE. The Committee meetings are held quarterly to discuss and deliberate on issues to be undertaken by INAE which are of relevance to the country's need.

During the current year, based on the interactions in the INAE-DST Consultative Committee meetings, the following activities have been initiated.

(a) Launch of Abdul Kalam Technology Innovation National Fellowship

A national level Fellowship to encourage and support translational research in public funded institutions has been launched jointly with SERB. The fund support required for this initiative is being provided by SERB.

(b) Disposal of Chemical Laboratory Waste from Educational Institutions and R&D Labs

DST recommended that INAE may consider the conduct of the Round Table meetings to evolve a methodology for "Disposal of Chemical Laboratory Waste from Educational Institutions and R&D Labs".

Accordingly, an Organizing Committee was constituted with Dr. S Sivaram, FNAE, Former Director, CSIR-NCL and currently the chair professor at IISER Pune as the chairman and Dr. GS Grover, Former Chief Scientist, CSIR-NCL as the Convener for planning and conduct of the same so as to arrive at actionable recommendations and also to establish a pilot plant for disposal of the chemical waste in one of the engineering colleges located at Pune.

INAE-PSA Consultative Committee

During one of the meetings of Dr. BN Suresh, President, INAE with Dr. R. Chidambaram, PSA to the Govt. of India, INAE was requested to undertake a Study to recommend potential for establishment of engineering related Industries in the North-Eastern region so as to enhance development in that region.

Accordingly, INAE has planned to hold a Workshop on "Industrial Development in North-Eastern Region of the Country" at Shillong during the next year. Prior to the conduct of the Workshop, a survey is planned to be carried out to ascertain the status of existing engineering related Industries in the North-Eastern region.

Proposal on "Development and Production of Civil Aircraft in India"

Subsequent to the Round Table meeting chaired by Prof. Roddam Narasimha, Chairman, Engineering Mechanics Unit, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Former Director, NAL held at NIAS in June 2016, the subject recommendations were compiled and submitted to Dr. Harsh Vardhan, the Hon'ble Minister of Science & Technology, Minister of Environment, Forest and Climate Change and Minister of Earth Sciences.



It was further decided that since the manufacturing of civil aircrafts is an area of national importance, this may be pursued as one of the themes in the INAE Engineers Conclave. Accordingly, it was included as one of the themes in the EC2017 held at NIAS, Bangalore on Sept 1-3, 2017.

The recommendations emanating from the Round Table meeting and EC2017 were then deliberated and compiled in a meeting held at NAL, Bangalore. Thereafter, the compiled recommendations were presented to Shri Amitabh Kant, CEO, Niti Aayog in a meeting held in his office on February 1, 2018 which were appreciated and well received. Further, a meeting under the chairmanship of Shri Amitabh Kant was convened on March 14, 2018 which was attended by all concerned stakeholders from the aviation sector including DG CSIR; Director, CSIR-NAL; Chairman, Airport Authority of India; DG, Civil Aviation and former Secretary, DIPP wherein Dr. BN Suresh, President, INAE briefed the members on the INAE recommendations regarding development and production of regional aircraft in India.

The members present in the meeting in general concurred with the INAE recommendations. Shri Amitabh Kant assured the members present that a case would be initiated for creation of Special Purpose Vehicle (SPV) as recommended for approval by the PMO.

This was a landmark achievement in the history of INAE wherein recommendations emanating from a series of meetings for development and production of regional civil aircrafts in India have been accepted and being progressed for implementation.

Research Schemes

INAE Chair Professorship

INAE Chair Professorship was instituted in order to encourage engineers/technologists with outstanding research contributions, promote long-term participation in academic research and enhance the research standards in academic institutions. INAE Fellows between the ages of 45 and 65 years, working in well-recognized teaching/research institutions in India are eligible for consideration.

The following nominations were conferred the INAE Chair Professorship.

- Prof. SV Kulkarni, IIT Bombay.
- Prof. Sushmita Mitra, Indian Statistical Institute, Kolkata.
- Prof. Sukumar Mishra, IIT Delhi

INAE Distinguished Professors/Technologists

INAE Distinguished Professors/Technologists Scheme has been instituted in order to utilize the expertise of INAE Fellows after superannuation for research in engineering institutions/Universities/Research & Development establishments/industry in India. Superannuated Fellows below 70 years of age are eligible for consideration.

The following nominations were conferred as INAE Distinguished Professors/Technologists.

- Prof. Dipankar Banerjee, Indian Institute of Science, Bangalore.
- Prof. Sankar K Pal, Indian Statistical Institute, Kolkata.
- Prof Vijay Chandru, Indian Institute of Science, Bangalore.

Mentoring of Engineering Teachers by INAE Fellows

INAE undertakes mentoring of Engineering Teachers from recognized Engineering institutions, during the summer vacations, with a view to enhance the quality of Engineering education being imparted in the country.

A total of nineteen Engineering Teachers were selected under scheme on “Mentoring of Engineering Teachers by INAE Fellows” this year, as per details given below.

S No	Name of Engineering Teacher	Institution of Teacher	Name of Mentor	Organisation of the Mentor
1	Mr. Sachin Ganeshrao Solanke	Saraswati College of Engineering, Navi Mumbai	Dr. J Krishnan	Former L&T Chair MS university Baroda
2	Mr Rathin Dutta	ITS Engineering College, Greater Noida	Prof. DV Singh	Amity University Uttar Pradesh, Noida
3	Mr. Bir Bahadur Mishra	Rajkumar Goel Institute of Technology, Ghaziabad, Uttar Pradesh	Prof. DV Singh	Amity University Uttar Pradesh, Noida



4	Mr. Brahmabhatt Darshitkumar Tusharkumar	Sardar Vallbhbhai Patel Institute of Technology (SVIT), VVasad, Dist-Anand	Dr. SV Kulkarni	Indian Institute of Technology Bombay, Mumbai -
5	Mr. Swapnil N Jani	Nirma University, Institute of Technology, Ahmedabad -	Dr. SV Kulkarni	Indian Institute of Technology Bombay, Mumbai -
6	Dr. Dharmendra Tripathi	Manipal University Jaipur,	Dr. Suman Chakraborty	Indian Institute of Technology Kharagpur,
7	Mr. A Ashok Kumar	Rajiv Gandhi University of Knowledge Technologies-Basar, Telangana -	Dr. K Bhanu Sankara Rao	Mahatma Gandhi Institute of Technology, Hyderabad -
8	Dr. S Jayalakshmi	Kumaraguru College of Technology (KCT), Coimbatore -	Dr. G Jagadeesh	Indian Institute of Science, Bangalore
9	Ms Ruchi Paliwal	JSS Academy of Technical Education, Noida	Prof. Shiban K Koul	Indian Institute of Technology Delhi, New Delhi
10	Ms Bharathi V	Rajarajeswari College of Engineering, Bangalore -	Prof. KR Padiyar	Indian Institute of Science, Bangalore
11	Ms. Sumangala S Jambli	ACS College of Engineering, Bangalore	Dr. M Arunachalam	Rajarajeswari College of Engineering, Bangalore
12	Mr. Krishna Prasath S	Sapthagiri College of Engineering, Bangalore	Dr. M Arunachalam	Rajarajeswari College of Engineering, Bangalore -
13	Dr. S Anand Kumar	Indian Institute of Technology Jammu, Jammu	Prof. R Gnanamoorthy	Indian Institute of Technology Madras, Chennai
14	Mr. Akhil A Chandran	MVJ College of Engineering, Bangalore	Dr. V Bhujanga Rao	National Institute of Advanced Studies, Bangalore
15	Dr M Durga Prakash	KL University Guntur	Dr. V Bhujanga Rao	National Institute of Advanced Studies, Bangalore
16	Dr. MS Starvin	University College of Engineering Nagercoil Kanyakumari District	Dr. Arun Kumar Bhaduri Centre for Atomic Research, Kalpakkam -	Indira Gandhi

17	Mr. Jai Ganesh S	Sri Venkateswara College of Engineering, Sriperumbudur -	Dr. J Raghava Rao	CSIR-Central Leather Research Institute, Chennai -
18	Ms. Sheetal Sachin Shinkhede	Polytechnic, The Maharaja Sayajirao University of Baroda, Vadodara	Prof. BK Panigrahi	Indian Institute of Technology Delhi, New Delhi -
19	Mr. Shridhar Sudarshan Dudam	SCTR's Pune Institute of Computer Technology, Pune -	Prof. BB Bhattacharya	Indian Statistical Institute, Kolkata

Mentoring of Engineering Students by INAE Fellows

INAE undertakes mentoring of meritorious 3rd /4th year B.E./B.Tech students from recognized Engineering institutions, during the summer vacations, with a view to provide them guidance so as to excel further in their field of study and improve the quality of engineering education.

A total of fifty Engineering Students were selected under the scheme "Mentoring of Engineering Students by INAE Fellows" this year, as per details given below.

S No	Name of Engineering Student	Institution of Student	Name of Mentor	Organisation of the Mentor
1	Mr. Mainak Saha	National Institute of Technology Durgapur,	Prof. K Chattopadhyay	Indian Institute of Science, Bangalore
2	Ms. Jyoti Gupta	Banasthali Vidyapith, Tonk, Rajasthan -	Prof. Sankar K Pal	Indian Statistical Institute, Kolkata
3	Ms Akanksha Acharya	College of Engineering Pune,	Prof. S Ranganathan	Indian Institute of Science, Bangalore
4	Mr. Subhayan Halder	Jadavpur University Kolkata	Prof. Suman Chakraborty	Indian Institute of Technology Kharagpur
5	Ms Shwetha SV	National Institute of Technology, Surathkal,	Prof. KJ Vinoy	Indian Institute of Science, Bangalore
6	Mr. Anish Pal	Jadavpur University, Kolkata -	Prof. Sirshendu De	Indian Institute of Technology Kharagpur,
7	Mr. Akash Saha	Jadavpur University, Kolkata -	Prof. Laxmidhar Behera	Indian Institute of Technology Kanpur,
8	Mr. Krishna Sarath Kumar Busi	RGUKT-IIIT Nuzvid, d, Krishna Dist.-(AP)	Prof. BS Murty	Indian Institute of Technology Madras,



9	Ms Padmapreetha R	PSG College of Technology, Coimbatore	Prof. BS Murty	Indian Institute of Technology Madras, Chennai -
10	Ms. Prajakta Sanjeev Kothawade	College of Engineering Pune,	Prof. KT Jacob	Indian Institute of Science, Bangalore
11	Ms. Arkaprabha Bhandari	Kalinga Institute of Industrial Technology, KIIT Bhubaneswar	Prof. Nikhil R Pal	Indian Statistical Institute, Kolkata
12	Mr. Ajinkya Ajit Phanse	College of Engineering Pune,	Dr. SV Kulkarni	Indian Institute of Technology Bombay, Mumbai
13	Ms. Abhipsa Swain	Veer Surendar Sai University of Technology, Burla, Sambalpur -	Prof. Ganapati Panda	Indian Institute of Technology Bhubaneswar
14	Ms. Anjali Gawande	Visvesvaraya National Institute of Technology, Nagpur -	Dr. Samir V Kamat	Naval Systems & Materials, DRDO, NSTL Campus, Visakhapatnam
15	Mr. Ratnala Dilipkumar Choudary	RGUKT-IIIT Nuzvid,	Dr. Samir V Kamat	Naval Systems & Materials, DRDO, NSTL Campus, Visakhapatnam
16	Mr. Thottempudi Kiran Kumar	RGUKT-IIIT Nuzvid,	Dr. K Bhanu Sankara Rao	Mahatma Gandhi Institute of Technology, Hyderabad
17	Ms. Sudeepta Mukherjee	Visvesvaraya National Institute of Technology, Nagpur	Dr. K Bhanu Sankara Rao	Gandhi Institute of Technology, Hyderabad
18	Mr. Gaurav Gupta	Institute of Engineering & Management, Kolkata	Prof. Sushmita Mitra	Indian Statistical Institute, Kolkata
19	Ms. Somosmita Mitra	Institute of Engineering & Management, Kolkata	Prof Bhargab B Bhattacharyya	Indian Statistical Institute, Kolkata
20	Ms. Pendyala Shravya	University College of Engineering, Osmania University, Hyderabad	Prof. Shibani K Koul	Indian Institute of Technology Delhi
21	Mr. Muhammad Idrees Magray	Islamic University of Science and Technology, Pulwama, Kashmir	Prof. Shibani K Koul	Indian Institute of Technology Delhi

22	Mr. Nitish Sharma	ITS Engineering College, Greater Noida	Prof. DV Singh	Amity University Uttar Pradesh, Noida
23	Ms. Neha Singh	Raj Kumar Goel Institute of Technology, Ghaziabad	Prof. DV Singh	Amity University Uttar Pradesh, Noida,
24	Mr. Divyansh Srivastava	Jadavpur University, Kolkata -	Prof. Dipankar Banerjee	Indian Institute of Science, Bangalore
25	Mr. S Sharath Chandran	MS Ramaiah Institute of Technology, Bangalore -	Prof. Saptarshi Basu	Indian Institute of Science, Bangalore
26	Mr. Gopal Agarwal	Jadavpur University, Kolkata	Prof. Saptarshi Basu	Indian Institute of Science, Bangalore
27	Ms. Nikhita Kulkarni	Matrusri Engineering College, Hyderabad, Osmania University	Dr. BL Deekshatulu	IDRBT(RBI-Govt. of India) Hyderabad
28	Mr. Prashant Kumar	Jadavpur University, Kolkata -	Prof. ES Dwarakadasa	Karnataka Hybrid Micro Devices Ltd., Bangalore -
29	Mr. Sohanjit Ghosh	Indian Institute of Engineering Science and Technology, Shibpur,	Dr. Debasis Chakraborty	Defence Research & Development Laboratory, Hyderabad -
30	Ms. Debapriya Chakraborty	Sreenidhi Institute of Science and Technology Hyderabad	Dr. Dasharath Ram	Defence Research & Development Laboratory, Kanchanbagh P.O., Hyderabad
31	Ms. DKVS Chaitanya	Indian Institute of Technology Bhubaneswar,	Dr. Amit Agrawal	Indian Institute of Technology Bombay, Mumbai
32	Mr. Ashrit Swain	Indian Institute of Engineering Science and Technology, Shibpur Howrah	Prof. Sukumar Mishra	Indian Institute of Technology Delhi
33	Ms. Akansha Hota	Veer Surendar Sai University of Technology, Burla, Sambalpur	Prof. Sukumar Mishra	Indian Institute of Technology Delhi
34	Mr. Dhruvkumar Ashokkumar Patel	Sardar Vallabhbhai National Institute of Technology, Surat	Prof. Sanjay Mittal	Indian Institute of Technology, Kanpur,

35	Mr. Gaurav Upadhyay	Indian Institute of Technology (BHU) Varanasi,	Prof. Sanjay Mittal	Indian Institute of Technology, Kanpur
36	Mr. Subhajit Datta	Jadavpur University, Kolkata	Prof. Anindya Chatterjee	Indian Institute of Technology Kanpur
37	Mr. Prakhar Shukla	NIT Raipur,	Prof. BB Bhattacharya	Indian Statistical Institute, Kolkata
38	Mr. Sadiq R Syed	Indian Institute of Technology Bhubaneswar,	Dr. Pradip Dutta	Indian Institute of Science, Bangalore
39	Mr. Dhananjay Singh	IIT (ISM) Dhanbad, Jharkhand -	Dr. Pradip Dutta	Indian Institute of Science, Bangalore
40	Ms. Jyothi L	MVJ College of Engineering, Bangalore	Dr. V Bhujanga Rao	National Institute of Advanced Studies, Bangalore
41	Ms. Taniya Singh	Indian Institute of Information and Technology (NIT) Hamirpur, Himachal Pradesh	Prof. Amit Konar	Jadavpur University, Kolkata
42	Mr. V Venkitesh	Indian Institute of Technology (ISM) Dhanbad -	Prof. K Muralidhar	Indian Institute of Technology Kanpur
43	Mr. Vishal Kumar Upadhyay	NIT Tiruchirappalli,	Prof. AK Pradhan	Indian Institute of Technology Kharagpur,
44	Mr. Dasari Muthya Venu	RGUKT, Basar, Nirmal Dist.-	Dr. G Sundararajan	Indian Institute of Technology Madras, Chennai
45	Mr. Shashank Sharma	Indian Institute of Engineering Science and Technology, Shibpur, Howrah -	Dr. Soumitra Tarafder	CSIR-National Metallurgical Laboratory, Jamshedpur
46	Mr. Anmol Bakshi	Jadavpur University, Kolkata -	Dr. Soumitra Tarafder	CSIR-National Metallurgical Laboratory, Jamshedpur

47	Mr. Debtanu Pal	Indian Institute of Engineering Science and Technology, Shibpur Howrah	Prof. Dipanwita Roy Chowdhury	Indian Institute of Technology, Kharagpur
48	Mr. Bonagiri Sai Charan	RGUKT, Basar, Nirmal Dist.	Dr. G Madhusudhan Reddy	DMRL, Hyderabad
49	Mr. Abhinav Garg	Visvesvaraya National Institute of Technology, Nagpur	Dr. G Madhusudhan Reddy	DMRL, Hyderabad
50	Ms. K Sai Naga Susmitha	National Institute of Technology Andhra Pradesh	Prof. R Sarathi	Indian Institute of Technology Madras, Chennai



INAE Forums

One of the important objectives of the Academy is to assist the Government from time to time in formulating policies on critical technical issues. For this purpose, seven forums have been constituted – INAE Forum on Engineering Education, INAE Forum on Energy, INAE Forum on Technology, Foresight and Management, INAE Forum on Engineering Interventions for Disaster Mitigation, INAE Forum on Indian Landscape of Advanced Structural Materials, INAE Forum on Manufacturing and INAE Forum on Civil Infrastructure. These forums enable giving inputs to policy makers, institutes of higher learning & research, industries, etc.

Forum on Engineering Education

The INAE Forum on Engineering Education was constituted with a view to deliberate upon issues relevant to engineering education in the country and suggest possible solutions for its growth. The Academy is undoubtedly concerned about the current scenario and challenges faced by the engineering education system in India arising due to perceived degradation in quality of education and low employability of engineering graduates. The Forum comprises of the following INAE Fellows: Prof. Prem Vrat, as Chairman and with Prof. D. Acharya, Prof. Prem Krishna, Prof. TK Datta, Prof. Kehar Singh, Prof. Kripa Shanker, Prof. RK. Shevgaonkar, Prof. Bhim Singh, Prof. Kshitij Gupta, Prof. Anil D. Sahasrabudhe, Prof. Bikramjit Basu, Prof. CVR Murty and Prof. Manoj Kumar Tiwari as Members.

During the last one year, two meetings were held of the Forum on Engineering Education. The first meeting was held on Aug 31, 2017 at INAE Office, Gurgaon and the second on Dec 16, 2017 at TCS, Siruseri, Tamil Nadu on the sidelines of INAE Annual Convention held at TCS, SIPCOT IT Park. During these meetings, presentations were made on the pertinent issues related to the challenges faced by the engineering education system and suggested pathways for improvement. Some Members of the Forum were also involved in discussions and finalizing the inputs from INAE to be submitted to the Dr. K Kasturirangan Committee on Education, constituted by MHRD to review the National Education Policy. Subsequently, Prof Prem Vrat, Chairman of the Forum along with Brig Rajan Minocha, Executive Director also participated in a meeting with Dr. R. Chidambaram, the then PSA to Government of India to discuss issues confronting engineering education in the country and to evolve a methodology for addressing the same.

In these meetings; the Forum expressed serious concern on the quality of engineering education in the country and pro-active steps that need to be taken to reap the benefits of demographic dividend. There is high degree of variability in the quality of engineering education, particularly in the private sector which accounts for nearly 90% output of engineering graduates every year. Since both public and private sector contribute to the process of nation building by nurturing talent, hence private sector cannot be left on its own and facilitating hand-holding of private sector may also need to be done to improve their quality and Fellows of INAE particularly the retired Fellows can contribute in mentoring engineering colleges of their choice in their vicinity. Due to the positive supporting role played by Prof. Anil D. Sahasrabudhe, Chairman AICTE, who himself is a member of Forum; a very effective mentoring role of INAE Fellows supported by AICTE has come into existence very recently.

The Forum addressed the causes affecting the quality of engineering education and felt that expertise of faculty is one of the biggest challenges as well as shortage of faculty even in the public funded institutions is a cause of concern. Teaching and research is not the most preferred career option taken by the bright

and brilliant. The scenario is somewhat more serious in private colleges where major focus is on physical infrastructure. We should be able to benchmark with policies of best institutions in the West where the policies are merit/performance oriented and not on the basis of form of ownership-be it admissions; scholarships, tax benefits and project funding. Industry must pro-actively support engineering education by giving feedback on emerging job potential; desired syllabus; internship; project as well as support through teaching fellowships and paid student internship and projects. Industry must look at academic institutions as nursery of their future talent pool. Imbalance in budgetary support among primary, secondary and technical education system should be reduced. Budget on technical education must increase along with overall budget for education to be at least 6 % of GDP.

The Forum expressed serious concern on the quality of PhD Degrees as the necessary expertise to guide PhD scholars is not always available and there is a compulsion of acquiring a PhD Degree for career growth. Quality of research scholars, combined with their motivation as well as quality of research guidance and facilities available makes engineering research quality highly variable in standards. Some private universities are enrolling a large number of PhD students without expertise to guide them which is a cause of concern. INAE needs to involve itself with policy interventions to control quality of research as well as its relevance. INAE Fellows can play very important hand-holding role in mentoring research and acting as research guides.

Industry must adopt engineering colleges in their vicinity and support them through internships and by delivering experience-based lectures, co-guiding industry-based projects and involving faculty in consulting opportunities in a model similar to hospitals attached to medical colleges. This would improve quality of faculty, provide better training of students on real life problems and industry will also gain through inputs from faculty and students. Government should consider setting up land-grant institutions in order to encourage quality driven, talented and experienced persons to set up engineering colleges with proven calibre.

A balanced P-P-P model between public and private entrepreneurs may be a good policy alternative worth considering. The background and intent of the promoters should be an important screening check and not their capacity of investing in land and buildings alone that should be determining the opening of new engineering colleges.

IT enabled teaching-learning process with MOOCs, NPTEL etc. can enhance reach of education but these can be supplementing in nature. A great teacher can never be replaced with technology. INAE/AICTE could facilitate this by developing long range forecast on the number of engineering graduates required in different branches of engineering and technology so as to guide parents and admission seekers.

To overcome problems of shortage of quality faculty even in reputed government institutions and also utilize the talent of retired professors; the practice of life long employment of professors as practiced in the US universities may be considered.

Forum on Engineering Interventions in Disaster Mitigation

The INAE Forum on Engineering Interventions for Disaster Mitigation, under the Chairmanship of Dr RK Bhandari, FNAE has recorded substantial progress during the year 2017-18 over four items on its agenda: (1) Implementation of the Medium Term Research Study (2) Intensive follow-up of the implementation of the Recommendations of the two National level roundtable meetings on Landslide disasters, (3) Response to the national call for transformational change from the age-old practice of



engineering the structures for safety against individual hazards to multi-hazard engineering and (4) Flood hazard mitigation.

The Medium Term Research Study (MTRS), formulated and discussed threadbare at the meetings of the Forum and PMC on several occasions, builds further on the solid foundations laid by (a) Actionable Recommendations of the two INAE roundtable meetings on “Mitigation of landslide Disasters-the Way Forward” (Volume 1 and Volume 2); and (b) the scores of publications, presentations, lectures, and meetings held with the concerned national institutions, professional bodies and stakeholders. Based on two separate studies of major disasters through critical review of published and unpublished literature, additional investigations, in-depth discussion, detailed scientific analysis and systematic documentation, MTRS aims at delivering best practice examples of documentation of (a) Malpa Landslide Disaster of August 1998 and August 2017 in Uttarakhand State and (b) Malin Gaon Landslide Disaster of 30 July 2014 in the State of Maharashtra. It is for the first time that the documentation of the two selected landslide disasters will not only provide their scientifically validated true stories and insights into the gap areas, but would also reflect on the power of engineering judgment in such studies, acquired through the eyewitness accounts and the messages decoded from the signatures left behind by disasters.

The MTRS focusses on disasters at Malpa and Malegaon, following their careful selection through the collective wisdom of the members of the Forum and the PMC. In the first instance, Backgrounders of the each of the two disasters were prepared by in-depth study of publications and reports and these were then discussed at the Forum and PMC meetings. The Backgrounders were subsequently developed into their advanced versions, enriched by the more intensive literature review, additional field investigations to take care of the gap areas, and study of eyewitness accounts, besides benefitting from the personal knowledge of domain experts. In this twilight period of the MTRS, the draft Monographs on the two disasters are rapidly coasting home, pending a few more rounds of further interactive discussion, and the two separate roundtable meetings to be held within the next four months. At the call of the Forum, the President of Indian Geotechnical Society has set up a small committee at IIT, Roorkee to engage with INAE to add value to the Study located in Uttarakhand. Also, the investigation of the repeat event of August 2017 at Malpa, and its fresh photography for comparative studies have been completed. Dr D.N. Singh, the co-coordinator and the Malin Gaon landslide are both located in Maharashtra, which is mainly why the drone photography of the Malin Gaon landslide and Geotechnical testing for determination of shear strength parameters at boundary shears could be possible.

The recommendations of the INAE roundtable meetings on landslide disaster risk reduction were vigorously disseminated, and well received across the country, especially by the National Disaster Management Authority, Indian Academy of Highway Engineering, Indian Geotechnical Society and Disaster Management Committee of Indian Roads Congress. These were recently flagged by Shri P.P. Shrivastav, a member of NDMA's National Advisory Committee at the historic Shillong Workshop of 12th June 2017 organized by the North-East Council. Guidance of the Forum has been sought towards implementation of INAE Recommendations and one of the major recommendations on permanent fixing of major landslides in the northeast region has already been approved for implementation.

The Forum, in the backdrop of the Sendai Framework for Disaster Risk Reduction (2015-2030), to which India is a signatory, took *suo moto* cognizance of the need to reform the practice of engineering of foundations and structures in areas prone to multiple hazards; earthquakes, landslides and floods included. The current practice of designing structures generally focus on ensuring safety against individual hazards and such structures often fail or perform poorly when hit by multiple hazards. The Chairman of the

Forum brought this matter to the attention of the National Advisory Committee of the NDMA; the Indo-Italian Joint Workshop on Multi-hazard mitigation of Risks to built cultural heritage held in New Delhi on 4-5 December 2017; and the Research Councils of CBRI, CRRI and SERC held late last year. Challenges of housing in multi-hazard context were also highlighted in a paper published in RITES Journal, Volume 20, Issue1 of January 2018.

The Study of Urban Floods undertaken by the Forum, initiated in January 2016 at the behest of the President INAE, concluded with the finalization of its report in the first quarter of 2017 and the follow-up thereafter. Dr C.D. Thatte, one of the best known domain experts and a Fellow of INAE led the Study to identify causes, discuss remedies and suggest Actionable Recommendations (ARs) for flood hazard prevention & mitigation. After carrying out a country-wide consultation and going through a roundtable meeting of several identified experts & representatives of related Institutions, Dr Thatte summarised the consensus view, and sought inputs from the Convenors of Sectional Committees I & X and the Chairman, Forum on TFM. The report presented Recommendations in two Parts: Part 1 aimed at Actions by INAE with the related Ministries and Departments of the Central and State Governments. Part 2 focussed on Actions to be taken by INAE Forum internally.

Inter alia, the report recommended Case Studies to cover, chronicle, analyse and conclude on how each subject city grew during say last 100 years; how it is expected to grow during the next 50 years; how well the Storm Water Drainage (SWD) as distinct from Sewerage was dealt with in past and is being planned for future; how Standards dealing with SWD responded to the ground realities, and how were the wetlands, rural areas, towns, industries, slums accommodated/assimilated in cities growth. It recommended formulation of a Vision Plan for 15 years, which should include Commissioning & Undertaking Case Studies at periodic intervals of 10 years for population beyond 2 M and 5 years for smaller cities. While recommending inclusion of suitable provisions and amendments in the present Acts related to Urban and Rural Planning, the report pointed out that, in the absence of appropriate provisions, ever-expanding Urban Areas become more vulnerable to UF, casting the unbearable economic burden and disruption. The report further suggested that amendments to standards on Town & country Planning, Land-reforms, and Transportation corridors must take care of, inter alia, five yearly dynamic planning for recasting the plans; habitat planning of migrants from R to U regions, and provision of a discrete mix of surface and underground Storm Water Drainage.

Forum on “Technology Foresight and Management”

INAE Forum on Technology Foresight and Management for addressing National Challenges was constituted under the Chairmanship of Dr. VK Agarwal, Formerly Chairman Railway Board & Ex-officio Principal Secretary with Govt. of India & Formerly Director Steel Authority of India with Dr. YP Anand, Formerly Chairman Railway Board & Ex-Officio Principal Secretary, Govt. of India; Prof. Prem Vrat, Vice-Chancellor and Professor of Eminence, ITM University, Gurgaon & Formerly Vice-Chancellor UP Technical University, Lucknow; Dr. CR Prasad, CMD, Everest Power Pvt. Ltd., New Delhi & Formerly CMD, GAIL, New Delhi ; Mr. Anil Kumar Anand, Director Technical – Microtrol Sterilisation Services, Mumbai & Formerly Director (Reactor projects Group), BARC, Mumbai; Mr. Pradeep Chaturvedi, Vice President, World Environment Foundation & Formerly Regional Representative, Centre for Application of Solar Energy (UNIDO); Mr. Kishore Pal Singh, Formerly Managing Director RITES, New Delhi; Mr. Suresh Chandra Gupta, Formerly Member Electrical Railway Board & Ex-officio Secretary to Govt of India; Mr. Vinoo Narain Mathur, Managing Director, Formerly Member Traffic Railway Board & Ex-Officio Secretary to Govt. of India and Mr. Arun Kumar Gupta, Formerly Director Oil India Ltd as the members of the Forum.



The mandate of the Forum is to evolve solutions keeping in view the issues of sustainable development, poverty reduction, and climate change in focus and suggest appropriate technologies accordingly. Further, suitable Engineering Management techniques will be employed to find cost effective and optimal solutions. The Forum has selected five National Challenges for detailed study / examination with a view to foresee the needed futuristic technologies and to evolve suitable engineering management solutions. The five challenges are (a) Energy – Major thrust on Solar (b) Water Management (c) Agriculture – Waste reduction and its Use (d) Transport – Making it Greener and (e) Waste Management. So far two reports had been published. The first report was published in 2014 which covered the areas pertaining to Waste Management, Water – Meeting the Future Challenges and Transport– Making it Greener. The Second report of the forum was published during 2016 which covered the aspects of Agriculture- Waste Reduction and its use; Energy-Major Thrust on Solar and Mass Transit Systems.

The third report of the Forum is under preparation which would cover the aspects on Challenges of Rural Urban Continuum, High Speed Rail for India and Issues of Environment / Climate Change / Sustainability.

Forum on “Indian Landscape of Advanced Structural Materials”

INAE Forum on Indian Landscape of Advanced Structural Materials has been constituted under the Chairmanship of Dr Debashish Bhattacharjee, FNAE & Vice President New Materials Business, Tata Steel, Kolkata. Prof Indranil Manna, Vice-President, INAE & Former Director Indian Institute of Technology Kanpur; Dr Kamachi Mudali, Dr GK Dey, Dr Soumitra Tarafder, Chief Scientist, CSIR-National Metallurgical Laboratory, Jamshedpur; Prof B.S. Murty, FNAE, Indian Institute of Technology Madras; Dr Tim Levertton, Tata Motors, Pune; Prof Bankim Chandra Ray, NIT Rourkela and Dr Biswajit Basu, President, Aditya Birla Science and Technology Centre are the members with Dr Srikumar Banerjee, DAE-Homi Bhabha Chair Professor, Bhabha Atomic Research Centre (BARC), Trombay, Mumbai with Dr Dipankar Banerjee, Professor, Department of Materials Engineering, Indian Institute of Science (IISc), Bangalore as Advisors and Prof Amol Gokhale, Indian Institute of Technology Bombay; Dr GK Dey, Head, Materials Science Division, Bhabha Atomic Research Centre, Trombay, Mumbai and Dr U Kamachi Mudali, Director, Materials Chemistry and Metal Fuel Cycle Group, Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam as three Joint Conveners of the forum.

With the momentum of ‘Make in India’ initiative, India will see an increase in manufacturing of advanced components for aerospace, defense, automotive, energy, health, ICT and other such trending sectors. Materials underpin technology advancements in each of these sectors. Be it developing high specific strength and high stiffness materials for aerospace and automobiles, light weight blast resistance armour plates for defence, higher efficiencies in wind and solar energy harvesting devices, or high efficiency sensors, super capacitors and hard/flexible display materials, materials play a crucial role. The field of materials is also vast, covering structural materials such as the metals (steel, aluminium, titanium etc), polymers, glass, cement and composites; functional materials such photovoltaics, speciality coatings such graphene, etc; and smart materials that respond to stimulus such as piezoelectric materials.

The forum has decided to bring out a report to focus on respective materials and sectors. The report will be in two parts. The first part will be focussed on individual materials. The second part will give a sector view to highlight the requirements in user sectors. The Materials identified are (a) Advanced high strength steels (b) New generation aluminium alloys (c) Titanium (d) Magnesium (e) Fibre Reinforced Polymer (FRP) matrix composite materials (f) Advanced ceramics. The data has been obtained with respect to global as well Indian scenario to include major research groups in India. Similarly the sectors identified to be covered in the report are (a) Defence, (b) Aerospace, (c) Railways, (d) Power generation and (e) Automotive. Data pertaining to the key materials being used in the respective sectors has been obtained

to include the data for the change in materials required in respective sectors. The identification of gaps with respect to structural materials and the Indian landscape of manufacturing capability, research and development capability and status of advanced structural materials compared to the rest of the world is under process for both materials as well as sectors identified. The report is expected to highlight the gaps and point at necessary actions in our national structural materials landscape given the pull that will come from the burgeoning advanced components manufacturing over the next 10-15 years. The scope of the study is limited to structural materials covering metals and alloys, structural polymers, cement, glass, composites and high temperature ceramics.

Forum on “Civil Infrastructure”

A Forum on ‘Civil Infrastructure’ has been recently constituted by INAE under the chairmanship of Prof. Prem Krishna, FNAE & Formerly Professor & Head of Civil Engg. Department, IIT Roorkee with Prof. Mahesh C. Tandon, Managing Director, Tandon Consultants Pvt. Ltd. ; Prof. P.K. Sikdar, President, Intercontinental Consultants & Technologies Pvt. Ltd.; Dr. Kumar N. Sivarajan, Chief Technology Officer, TEJAS Networks; Dr. Mangu Singh, Managing Director, Delhi Metro Rail Corporation (DMRC), Mr. N. Raghavan, Formerly Vice President & Head-Hydel & Nuclear Power Projects, Larsen & Toubro Ltd; Prof. Kritivasan Ramamritham, Head, Kanwal Rekhi School of Information Technology, IIT Bombay and Prof. Satish Chandra, Director, CSIR-CRRI (Central Road Research Institute) as Members of the Forum.

This Forum has been constituted as follow up activity of the INAE VISION 2037, wherein the subject areas such as Engineering Education, Energy, Infrastructure, among others, have been brought into focus. The subject areas of ‘Infrastructure’ include Traffic & Transportation; Housing; different aspects of Water; Energy, as the main verticals.

The Forum intends to cover Traffic & Transportation, Housing and Water, over a period of study of 3 years, beginning with the first area mentioned. The main objective of the forum is to create “White Papers” from its study to provide a set of needed actions, related to, Policy Initiatives, Engineering Development/Research, Education.

The Forum focusses to address the problems being faced in respect of *Traffic & Transportation*, particularly in the large & medium size cities of the country, despite this issue having been in focus for many years. It has been realised that a critical analysis of the efforts and results of the recent years would be required to pave the way forward for the work of the forum. The Forum decided to undertake a comprehensive study of the problem involving not only the engineering issues, but also other related ones such as, policy interventions needed, societal involvement, and, regulatory mechanisms. In making recommendations, the areas ostensibly coming into contention will possibly be, the latest developments in Civil Engineering materials and construction technologies; evolving communication systems for traffic control; energy efficiency issues; the scale of the problem, which will bring in the issue of education system for providing the manpower resource. Efforts will be made to identify a short list of implementable ideas along with strategies for putting these to practice.

Forum on Energy

During 2016-17, INAE had prepared a study on engineering interventions necessary for achieving 175 GW of renewable power by 2022. This report was released by Mr Piyush Goyal, the then Minister for Power at a discussion jointly organized by INAE with TERI and the Energy Transitions Commission on 13th February 2017.



In the current year (2017-18) there has been an active effort to disseminate this Report with a view to influencing the investment decisions of organizations. One discussion was organized at the invitation of the Delhi Metro Rail Corporation in which all their technical staff participated. Different aspects of how DMRC could implement parts of this report in their future activities were discussed. Dr Mangu Singh, Managing Director, DMRC chaired the meeting and the presentation was made by Mr Pradeep Chaturvedi.

A presentation was also made at the Railway Board to senior officials of electrical engineering wing, especially those dealing with renewables and energy efficiency. Various aspects of future renewable energy implementation strategies were discussed, in the perspective of enhancing the already effective energy efficiency and renewable energy programme of the Railways. The officials observed the report offered them directions for future implementation. Subsequently, they called a meeting of all Renewable Energy Implementing Agencies and Vendors offering services to Indian Railways. A presentation was also made to this group which was followed by discussions at length. Their suppliers and vendors appreciated that identified future strategies can help them implement renewable energy programme more cost effectively.

The findings of the report were also presented at the UN Global Conference on Affordable and Clean Energy (Sustainable Development Goal 7). The presentation was made by Mr Pradeep Chaturvedi with the view to disseminate the findings to the global community.

A day-long workshop on renewable energy technologies, focusing on issues that now need further attention was organized by INAE, NIAS and TERI on 9th November 2017. This meeting was inaugurated by INAE former president and NIAS Director, Dr Baldev Raj. Keynote speakers were Dr Ajay Mathur, Director General, TERI; Mr R N Nayak, former CMD, Power Grid; Prof. Ashok Jhunjhunwala, IIT Madras; and Mr Ashish Khanna, CEO & ED, Tata Power Solar Systems.

Key recommendations included:

Rooftop Solar: Promoting new business models which are opex based; and reassessing the potential and target for rooftop solar installation.

Storage: Initiations for large-scale electrical storage (pumped hydro and batteries); energy storage policy; and adequate transmission capacity.

Integration of renewables: Design / retrofit of thermal power stations so as to reduce the lower threshold of stable capacity operation of thermal power plants to 40%; and free Governor mode of operation of power station;

Financial risk mitigation: Mechanism to lower financing cost for renewables; and introduce product liability insurance.

Standardization: Creation of standards for DC home systems; micro grids; and for PV modules and their installation.

Manufacturing: Incentivize domestic manufacture of polysilicon; and dust cleanup systems for PV plants.

Human Resources: Skilling, especially for operation and maintenance of renewable systems.

The Sectional Committee on Energy Engineering also undertook preparatory work for future studies on renewable energy, energy efficiency and energy policy applications with the view to develop recommendations which could be discussed and finalized at the 2018 Engineers' Conclave.

INAE “Satish Dhawan Chair(s) of Engineering Eminence”

INAE Satish Dhawan Chair of Engineering Eminence has been instituted with the objective of enhancing the visibility of the Academy in the policy domain and establishing social connect. Eminent engineers who have contributed to some aspect of nation building are chosen for this esteemed position. The first Satish Dhawan Chairs were conferred on Dr. K Kasturirangan, FNAE, Formerly Chairman, Space Commission and Secretary, Department of Space, Bangalore; Formerly Director, National Institute of Advanced Studies, Bangalore and Formerly Member (Science), Planning Commission, New Delhi and Dr. Anil Kakodkar, FNAE, Formerly Director, BARC, Mumbai; Formerly Chairman, Atomic Energy Commission and Secretary, Department of Atomic Energy, Mumbai.

In the year 2017, the Satish Dhawan Chair was conferred on Dr Kota Harinarayana, FNAE, formerly Programme Director, Aeronautical Development Agency (ADA) Bangalore who was associated with NAL, Bangalore for necessary institutional support. Substantial progress had been made by Dr Kota Harinarayana during the year 2017, on the task undertaken on preparing the policy document on **“Aircraft for Regional Connectivity”** under the aegis of the INAE Satish Dhawan Chair of Engineering Eminence. Based on his contributions and progress, Dr Kota Harinarayana was granted extension of the tenure of his association as Satish Dhawan Chair at NAL Bangalore; for a period of one more year upto end December 2018, in order to facilitate the completion of the task currently under progress and finalize the report.

Engineering Excellence Awards

Life Time Contribution Award in Engineering 2017

This award is given to an eminent Indian citizen who has made most distinguished contributions in the field of Engineering / Engineering Research / Technology, which have brought prestige to the nation and regarded as landmarks of technological development of the country.

During the year 2017, the Life Time Contribution Award in Engineering was conferred on :



Mr. Azim Hasham Premji, Chairman & Managing Director, Wipro Limited, Bangalore. Mr. Azim Hasham Premji was conferred the award in recognition of his outstanding contributions and key role in the growth of the Information Technology (IT) industry in the country and as business leader for commitment towards philanthropic work.



Prof. TK Ghose, Founding Chair, Biochemical Engineering and Biotechnology, IIT Delhi. Prof. TK Ghose was conferred the award in recognition of his outstanding contributions as an academician and for his pioneering role in creating awareness of the discipline of Biochemical Engineering and Biotechnology in the Country.

Prof. Jai Krishna and Prof. SN Mitra Memorial Award, 2017

These awards are given to an eminent engineer, engineer-scientist or a technologist for one or more of the following:

- (a) Academic and scholarly achievements in any discipline of technology
- (b) Outstanding research in engineering and technology and application thereof.
- (c) Outstanding contributions in the management of education and research in engineering
- (d) Outstanding achievements and contributions in the Indian industry, engineering services or engineering projects

Prof Jai Krishna Memorial Award is given from among the disciplines of Engineering Section I (Civil Engineering), Engineering Section III (Mechanical Engineering), Engineering Section IV (Chemical Engineering), Engineering Section VII (Aerospace Engineering) and Engineering Section VIII (Mining, Metallurgical and Materials Engineering). Prof S N Mitra Memorial Award is given from among the disciplines of Engineering Section II (Computer Engineering and Information Technology), Engineering Section V (Electrical Engineering), Engineering Section VI (Electronics & Communication Engineering), Engineering Section IX (Energy Engineering) and Engineering Section X (Interdisciplinary Engineering and Special Fields).

During the year 2017, Prof Jai Krishna and Professor SN Mitral Memorial Awards were conferred on:

Prof Jai Krishna Memorial Awardee



Prof. K Chattopadhyay, INAE Distinguished Professor, Department of Materials Engineering, Indian Institute of Science, Bangalore was conferred the Prof Jai Krishna Memorial Award 2017 in recognition of his outstanding research contributions in the field of quasicrystals and nanomaterials research and pioneering work on embedded nanoparticles and their transformation behaviour.

Professor SN Mitra Memorial Awardee



Prof. SC Dutta Roy, Formerly Professor of Electrical Engineering, IIT Delhi was conferred the Prof SN Mitra Memorial Award 2017 in recognition of his outstanding contributions as a researcher and educationist in the areas of Radio Physics and Electronics and for mentoring students through virtual teaching and video courses.

INAE Outstanding Teachers Award 2017

The Academy has instituted the “Outstanding Engineering Teachers Award” in the year 2013 to honour INAE Fellows who have excelled in the field of teaching in Indian colleges, universities, and institutions, and have provided guidance and inspired students to take up careers in Engineering and Technology. Two such awards are given per year with one award in each group as under.

Group-1 - covering Engineering Section I (Civil Engineering), Engineering Section III (Mechanical Engineering), Engineering Section IV (Chemical Engineering), Engineering Section VII (Aerospace Engineering) and Engineering Section VIII (Mining, Metallurgical and Materials Engineering).

Group-2 - covering Engineering Section II (Computer Engineering and Information Technology), Engineering Section V (Electrical Engineering), Engineering Section VI (Electronics & Communication Engineering), Engineering Section IX (Energy Engineering) and Engineering Section X (Interdisciplinary Engineering and Special Fields).

During the year 2017, INAE Outstanding Teachers Award was conferred on :



Prof. S Narayanan, Professor Emeritus(Adjunct), Indian Institute of Information Technology (Design and Manufacturing), Chennai was conferred the INAE Outstanding Teachers Award in recognition of his outstanding teaching and seminal research contributions in the areas of Vibration, Acoustics and Noise Control and for mentoring students to excel in their professional life



Prof. (Dr.) Ganapati Panda, Professor and Deputy Director, Indian Institute of Technology Bhubaneswar, Bhubaneswar was conferred the INAE Outstanding Teachers Award in recognition of his outstanding contributions in the areas of Electronics and Communication Engineering through his pathbreaking academic research, teaching and professional leadership



INAE Young Engineer Awards 2017

The Academy instituted INAE Young Engineer Awards in 1996, to recognize excellence in design and technology transfer, innovative development and engineering research. The scheme has attracted nominations of bright young talent in the country and has become a prestigious national award since then. So far, 218 young engineers have been conferred this award and their early recognition has encouraged the best upcoming talent to make innovative engineering and technological contributions for our national development. The nominations for INAE Young Engineer Award for the year 2017 were sought from INAE Fellowship, Engineering institutions, R&D Labs. Out of 116 nominations, 30 were shortlisted by the Sectional Committees. The shortlisted candidates gave presentation of their work before the Selection Committee on Aug 17, 2017 at New Delhi.

The following ten candidates were selected and conferred INAE Young Engineer Award 2017.

- 1 Mr. Naimesh R Patel, Scientist/Engineer-SE, GLMD/OPMG/MESA, Space Application Centre, ISRO, Ahmedabad
- 2 Dr. Supreet Saini, Associate Professor, Department of Chemical Engineering, Indian Institute of Technology Bombay, Mumbai.
- 3 Dr. Praveen Kumar, Assistant Professor, Department of Materials Engineering, Indian Institute of Science, Bangalore.
- 4 Dr. Poonam Kumari, Assistant Professor, Department of Mechanical Engineering, IIT Guwahati, Guwahati.
- 5 Dr. Aritra Hazra, Assistant Professor, Department of Computer Science and Engineering, Indian Institute of Technology Kharagpur.
- 6 Dr. Arpita Patra, Assistant Professor, Department of Computer Science and Automation, Indian Institute of Science, Bangalore.
- 7 Dr. Sandeep Anand, Assistant Professor, Department of Electrical Engineering, Indian Institute of Technology Kanpur, Kanpur.
- 8 Dr. Mayank Shrivastava, Assistant Professor, Department of ESE, Indian Institute of Science, Bangalore.
- 9 Dr. Samaresh Das, Assistant Professor, Centre for Applied Research in Electronics, Indian Institute of Technology Delhi, New Delhi.
- 10 Dr. Sushmee Badhulika, Assistant Professor, Department of Electrical Engineering, Indian Institute of Technology Hyderabad, Telangana.

INAE Innovator Entrepreneur Award

The INAE Innovator Entrepreneur Award has been instituted in the year 2017 to encourage and recognize innovation and entrepreneurship among Young Engineers. The engineering innovations/inventions/ concepts that have been actually realized and implemented in industry either in new processes or products are given weightage.

The recipients of the award for the year 2017 are:

1. Mr. Mandava Mohana Rao, Deputy General Manager (GSG&HVE), Bharat Heavy Electricals Limited, Corporate R&D, Hyderabad has been awarded for his contributions in developing an innovation aimed for indigenous design, development, manufacturing and testing of 420 kV gas insulated switchgear (GIS). He has also contributed in design and development of 245 kV gas insulated switchgear consisting of various modules like circuit breaker, disconnector switch, earthing switch, compact bus bar, current transformer, surge arrester etc. Dr. Mohana Rao developed software programmes for (a) optimal designs for conventional and gas insulated substations (b) numerical / experimental quantification of Electromagnetic Interference (EMI) in substations (using wavelet techniques) and (c) analyzing circuit breaker arcs using CFD techniques.
2. Joint awardees
 - (a) Mr. Tanuj Jhunjhunwala, Co-Founder and CEO, Planys Technologies Pvt. Ltd has been awarded for his innovation on underwater robotic inspection and survey solutions using indigenously manufactured underwater robots. The innovative technology spans the domains of marine robotics, advanced Non-Destructive Testing (NDT), and post-inspection analysis tools. The design features include modularity, compactness, portability and high degree of manoeuvrability, thus making them ideal for inspection.
 - (b) Dr. Vinay Kumar, CEO, PathShodh Healthcare Pvt.Ltd has been awarded for his invention on next generation point of care devices and technologies for chronic diseases diagnostics such as Diabetes monitoring and early detection of its complications, Anaemia and Malnutrition, Liver diseases and kidney diseases. He has developed non-enzymatic and non-antibody based novel receptors in Point of Care (PoC) biosensors for a wide range of disease markers.

Innovative Student Projects Awards, 2017

The Academy has instituted Innovative Students Projects Award since 1998 to identify innovative and creative projects undertaken by the students at three levels B.E./ B. Tech, M.E/ M.Tech and PhD in engineering colleges. This Award recognizes innovative and creative projects and theses of students and research scholars in engineering institutions, since an early recognition of merit and talent can often mark the beginning of a brilliant career.

A total 135 nominations received (47 at Doctoral level; 36 at Master's level and 52 at Bachelor level) were examined by the Selection Committee. Out of these, 57 nominations (16 at Doctoral level; 15 at Master's level and 26 at Bachelor level) were shortlisted for presentations of their work before the Selection Committee. Five candidates at Doctoral level, five at Master's level and ten at Bachelor level were selected by the Selection Committee for conferment of Innovative Student Projects Awards 2017 as given below.

Doctoral Level

- 1 Dr. Anirban Roy, Indian Institute of Technology Kharagpur
(Ultra Low Cost Indigenous Technology for Spinning of Hemodialysis Hollow Fiber Membranes)
- 2 Dr. Anindya Pain, CSIR-Central Building Research Institute, Roorkee.
(Modified Pseudo-Dynamic Method for Seismic Earth Pressure and Associated Problems)



- 3 Dr. NS Karthiselva, Indian Institute of Technology, Madras.
(Simultaneous Synthesis and Densification of Ultrahigh Temperature Ceramics and Composites by Reactive Spark Plasma Sintering)
- 4 Dr. Gourab Dutta, Indian Institute of Technology, Madras.
(Effect of Gate Dielectric Engineering on the Performance of GaN-Based MIS-HEMTs)
- 5 Dr. Adarsh Patel, Indian Institute of Technology, Kanpur.
(Robust Spectrum Sensing for Multiple-Input Multiple-Output (MIMO) Cognitive Radio Networks)

Master's Level

- 1 Mr. Mahenderan C, Indian Institute of Space and Technology, Thiruvananthapuram
(Experimental Investigation of Spray and Flame Characteristics in a Swirl Stabilized Burner)
- 2 Mr. Jibin T Philip, Saintgits College of Engineering, Kottayam
(Synthesis of Surfactant-Modified Ceria-Zirconia Hybrid Nanoparticles and Evaluation of its Tribological Properties as an Additive in Coconut Oil)
- 3 Mr. L Karthikeyan, Indian Institute of Space and Technology, Thiruvananthapuram
(Optically-Activated ZnO Nanomaterial for Hydrogen Gas Sensor and its Correlation with Photoluminescence Spectra)
- 4 Ms. Shreyasi Som, Indian Institute of Technology, Bhubaneswar
(Lo Low Voltage DC Microgrid Protection)
- 5 Ms Pallavi Venugopal M, Indian Institute of Space Science and Technology, Thiruvananthapuram
(Computationally Efficient Deep Tracker : Guided MDNet)

Bachelor Level

- 1 Padala Suresh Kumar, Indian Institute of Technology, Delhi.
(Modelling Chloride Ingress in Concrete Exposed to Oceanic Wave Splash)
- 2 A.Raghu, P Bharath Kumar and K.SarikaMahatma Gandhi Institute of Technology, Hyderabad
(Preliminary Evaluation of Multilayer High Temperature Coatings on C_f/SiC Composites)
- 3 Pavithraa Devi A, Vignesh Shankar and Yashvi SinghNational Institute of Technology, Tiruchirappalli
(High Temperature Erosion and Oxidation Behaviour of Gas Nitrided Valve Steel for IC Engine)
- 4 Mallikarjun.S.E, Salil Chadha, Shubham Sham Sangodkar and SudeepDev SInternational Institute for Aerospace Engineering and Management, (IIAEM, JAIN UNIVERSITY), Bangalore
(Design, Analysis and Testing of Foldable Winglet for a Flying Wing MUAV (Mini Unmanned Aerial Vehicle) Configuration)
- 5 Chidambaram. SP, Sakthish Charan. P, Saravanan. K and Sai Krishna. BSri Venkateswara College of Engineering, Sriperambudur
(Design of Variable Braking System Using Intelligent Dual Calipers)
- 6 Sant Saran, Dayalbagh Educational Institute, Agra.
(Study of Optogenetic Control of Neuronal Signalling)

- 7 Saurav Chandel and Piyush Menghani
Delhi Technological University, Delhi
(High Efficiency High Power Density Isolated DC-DC Resonant Converter)
- 8 Divyansh Chourey, Bhilai Institute of Technology, Durg,
(Forecasting the Frequency of Power Grid for Optimal Frequency Stabilization Using Neuro-Fuzzy System on MATLAB Based Platform)
- 9 S Nivetha and K Priyanka
St. Joseph's Institute of Technology, Chennai
(Fool Proof Centralized Voting Machine Using Automation Systems)
- 10 Karthicraja VM and Krishna Prasad VL
St. Joseph's College of Engineering, Chennai
(CASSANDRA-IoT in Women Safety)



Joint Schemes with AICTE

AICTE-INAE Distinguished Visiting Professorship Scheme

The Indian National Academy of Engineering (INAE) launched a Distinguished Visiting Professorship (DVP) Scheme jointly with AICTE in 1999. The Scheme envisages promotion of industry-institute interaction by facilitating the dissemination of knowledge through the expertise of experienced and knowledgeable persons from industry, integrating their rich industrial experience with technical education. The Scheme has received very enthusiastic response from industry and engineering institutions over the years.

A total of 36 nominations received during the current year 2017-18. The Steering Committee during its meeting in the year 2017-18 selected the following 12 industry experts as given below:

1. Dr. MV Ramana Murthy, Scientist 'G', Director, ICMAM-PD, National Institute of Ocean Technology
2. Mr. Nitin D Ghatpande, Ex-Group Director, Power System, Satellite Centre, ISRO
3. Dr. Vishwas Udpikar, Managing Director, SCI-COM Software India Pvt. Ltd.
4. Dr. D. Antony Louis Piriya Kumar, Director-Startup, Agape Piriya Kumar AI Solutions
5. Dr. Sreekumar Thaliyil Veedu, Senior Consultant, Reliance Industries Ltd. (RIL)
6. Dr. Pradeep Chatterjee, Sr. General Manager & Global Solution, Architect, Cummins Inc.
7. Mr. S. Krishna Kumar, Former Senior Vice President (Retired), Lucas TVS Ltd, Chennai
8. Dr. Prasanta Kumar Panda, Chief Scientist and Deputy Head, CSIR-National Aerospace Laboratories
9. Dr. Ananta Lal Das, Ex Director, Society for Applied Microwave Electronics Engineering and Research (SAMEER)(Retired)
10. Dr. G. Raja Singh Thangadurai, Project Director (Scientist 'G') , Defence Research Development Laboratory, Hyderabad
11. Dr. Debi Prasad Das, Senior Scientist , CSIR –Institute of Minerals and Materials Technology

The Steering Committee will meet in July to approve the extension of existing Industry Experts for next one year.

AICTE-INAE Teachers Research Fellowship

Indian National Academy of Engineering (INAE) launched AICTE-INAE Teachers Research Fellowship Scheme jointly with AICTE, for Engineering Teachers to pursue Doctoral Research in Central Laboratories under Council of Scientific and Industrial Research (CSIR)/ Defence Research and Development

Organization (DRDO)/ Department of Space (DOS)/ Department of Atomic Energy (DAE). The Ph.D degree in the chosen field of study will be awarded by the concerned organization of CSIR, DRDO, DOS and DAE.

To effectively implement the scheme AICTE-INAE Programmes Committee has been constituted with members from INAE Fellowship and reps from AICTE, INAE, CII, CSIR, DRDO, DOS and DAE. The Committee met during February 2018 to review the operation of the scheme, shortlist applicants and further recommend them to the above mentioned strategic departments.

The Strategic departments had intimated 46 vacancies in their respective laboratories which can be offered under the proposed scheme during this academic session 2017-18.

During this year, the scheme was promoted effectively by AICTE through advertisement in print media and sending mails to Principals of engineering colleges. 75 applications from eligible engineering teachers were received during 2017-18 under the scheme.

Out of the total number of applications received the AICTE-INAE Committee shortlisted and recommended 24 candidates to CSIR/DRDO/DOS/DAE for allocation of suitable lab and guide. The respective labs are in the process of selecting the candidates based on their own selection procedure before offering admission to the candidates in the concerned labs.

AICTE-INAE Travel Grant Scheme for Engineering Students

Indian National Academy of Engineering (INAE) launched AICTE-INAE Travel Grant Scheme for Engineering Students jointly with AICTE during 2013 to provide financial support to pre final and final year Bachelors and Masters Level engineering students for presenting a research paper in an international scientific event (conference/seminar/symposium/workshop/exhibition etc.) in order to encourage engineering students to engage in research.

The scheme facilitates a student to travel abroad and take part in presenting his/her research work in International Platform by providing of 100% Registration Fee, 100% Visa fee, 50% of the actual Airfare for discounted /concessional air ticket, and local travel from the Engineering College/ Institution to the nearest airport and back. Maximum financial support per student towards registration, concessional travel expenditure and visa fees, is limited to Rs. 1 lakh.

A Selection Committee comprising of INAE Fellows from different engineering sections has been constituted to review the operation of the scheme regularly, select deserving candidate, and revisit eligibility criteria for selection so that more students can avail the scheme. Minimum CGPA/percentage of marks for applying under the scheme was revised and was decided to be 7.0/65% respectively

The Scheme was promoted by AICTE through print media and sending mails to Principals of AICTE approved Engineering colleges.

Out of 43 applications received under the scheme during 2017-18 , 26 students have been provided with travel aid.

INAE Travel Grant Scheme for Engineering Students

Indian National Academy of Engineering (INAE) launched INAE Travel Grant Scheme for Engineering Students during 2014, to present papers abroad with the purpose of enhancing the quality of engineering education in the country. The objective of the scheme is to provide partial travel assistance and registration



fees to third/fourth year B.E./B.Tech; first/second year M.E./M.Tech; or fourth/fifth year Integrated M.Tech Level engineering students from IITs, IISc, NITs, IIITs and other engineering colleges/institutes/universities other than AICTE approved Engineering Colleges in order to encourage engineering students to engage in research.

The applicant should have an invitation for presenting a research paper which has been accepted in a conference /seminar /symposium /workshop abroad. The Selection Committee comprising of experts from each of the ten engineering sections of INAE has been constituted to evaluate the eligibility of an applicant for getting the travel assistance. The scheme is running quite satisfactorily.

Reimbursement of 100% Registration Fee, Visa Fee, 50% of the actual Airfare for discounted/concessional air tickets and actual fare not exceeding AC II Class train fare will be admissible for travel from the Technical Institution to the nearest airport and back. Maximum financial support per student towards registration, concessional travel expenditure and visa fees, is limited to Rs. 1 lakh.

A Selection Committee comprising of INAE Fellows from different engineering sections has been constituted to review the operation of the scheme regularly, select deserving candidates, and revisit eligibility criteria for selection so that more students can avail of the scheme. Minimum CGPA/percentage of marks for applying under the scheme was revised and was decided to be 8.5/80% respectively.

During the year 2017-18, 34 candidates applied and 11 students were selected under this scheme.

Events organized by Local Chapters

INAE Kolkata Local Chapter

The meeting of the INAE Kolkata Local Chapter was held on Oct 10, 2017 at Centre for Soft Computing Research, Indian Statistical Institute, Kolkata to discuss the composition of the new Executive Committee and also the conduct of the activities. The meeting was presided over by Prof. Sankar K. Pal, FNAE, President of INAE Kolkata Chapter. Prof. Sankar K. Pal welcomed the members and gave a brief introduction of the inception of this chapter under his leadership in July 2007 and a brief account of its activities over the last 10 years. After discussion, a new Executive Committee of the INAE Kolkata Local Chapter was constituted as under.

President

Prof. Bhargab B. Bhattacharya, FNAE

Secretary cum Treasurer

Prof. Debatosh Guha, FNAE

Members

Prof. Sankar K. Pal, FNAE (Past President)

Prof. Bidyut B. Chaudhuri, FNAE

Prof. Malay Kundu, FNAE

Dr. Tinku Acharya, FNAE

Dr. Rajendra Nath Basu, FNAE

Prof. Ujjwal Maulik, FNAE

Prof. Soumitra Banerjee, FNAE

Prof. Samit Kumar Ray, FNAE

Prof. Subrata Chakraborty, FNAE

Celebration of Science Day 2017

INAE-Kolkata Chapter had celebrated 'Science Day' on 28th February 2017. Prof. Sankar K. Pal, FNAE presided over the meeting. On this occasion, the seminar lecture was organized by INAE-Kolkata Local Chapter in collaboration with the Center for Soft Computing Research, Indian Statistical Institute. A large number of students, researchers and Faculty members of Indian Statistical Institute including the Fellows of INAE attended the meeting. The details of the lecture organized is as under.

(i) Seminar Lecture on “Genomes, Epigenomes and Beyond”

The Seminar Lecture on “Genomes, Epigenomes and Beyond” was delivered by Prof. Siddhartha Roy, Director (Officiating), Bose Institute, Kolkata on February 28, 2017 at CSCR Seminar Room (1st Floor, R. A. Fisher Bhavan).



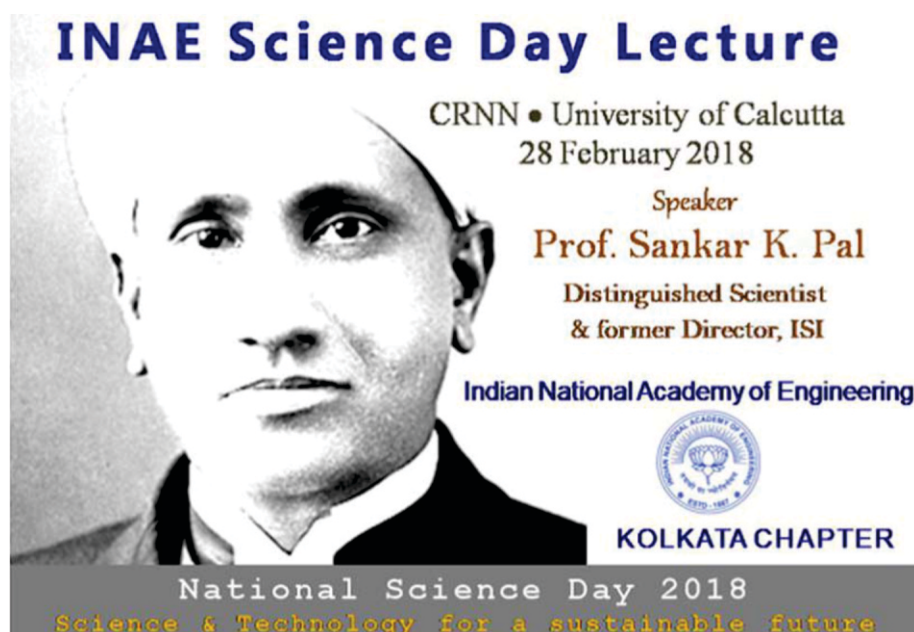
The Abstract of the Seminar Lecture is as under.

Massive genome sequencing data coupled with other omics technologies have opened up new vistas. It is becoming clear that expression of genes is the crucial determinant of biology. Gene expression patterns that are transmitted through cell division and generations are providing a new understanding of inheritance and evolution. In addition, a new generation of DNA manipulation techniques has made it possible to transfer whole biosynthetic pathways across species. This allows commercial production of complex chemicals under controlled conditions. New large-scale DNA synthesis technologies now make it possible to synthesize small microbial genomes. We may very soon enter the era of de novo designed microbes (synthetic life) capable of producing complex molecules and materials with high efficiency. Current scenarios and future possibilities will be discussed.

Celebration of National Science Day 2018

National Science Day is celebrated in India on 28th February each year to mark the discovery of the Raman effect by the Indian physicist, Sir C. V. Raman. This year's theme was "Science and Technology for a Sustainable Future".

On this occasion, Indian National Academy of Engineering (INAE) Kolkata Chapter organized a lecture meeting on Feb 28, 2018 at the Centre for Research in Nanoscience and Nanotechnology (CRNN), University of Calcutta, Salt Lake Campus. Padmashree Prof. Sankar K. Pal, Distinguished Scientist and former Director, Indian Statistical Institute, Kolkata, delivered the lecture to share his experience during his glorious journey over the last 40+ years in the field of Data Science and Machine Intelligence. Prof. Bhargab B. Bhattacharya, President, INAE Kolkata Chapter, presided over the function and discussed the scope and opportunities of various schemes and programs offered by the INAE. Prof. Debatosh Guha, Director, CRNN, Calcutta University, and Secretary, INAE Kolkata Chapter, highlighted the recent activities of the INAE, and addressed the possibilities for the students and faculty members to be associated with the Academy and encouraged them to publish their scientific works in INAE Letters. It was a successful and motivating event attended by more than 60 participants including INAE fellows, researchers, students, and faculty members from various institutes, Universities, and industries in and around Kolkata.





Celebrations of ‘Engineers Day’

INAE-Kolkata Chapter had celebrated ‘Engineers’ Day’ on 15th September 2017. Prof. Sankar K. Pal, FNAE presided over the meeting. A seminar lecture was arranged in connection to this in collaboration with the Center for Soft Computing Research, Indian Statistical Institute. A large number of students, researchers and faculty members of Indian Statistical Institute including the Fellows of INAE attended the meeting. Detail of the lecture follows. This program was covered by Kolkata Door Darshan Kendra news channel under its popular program “Camera Cholchhe”.

The details of the lecture organized is as under.

(i) *Seminar Lecture on “A Story of Challenges and Success in Research Career of an Engineer”*

On the occasion of ‘Engineers Day’, the Seminar Lecture on “A Story of Challenges and Success in Research Career of an Engineer” was delivered by Prof. Debatosh Guha, Institute of Radio Physics and Electronics, University of Calcutta, Kolkata on September 15, 2017 at CSCR Meeting Room.

The Abstract of the seminar lecture is as under.

This talk is aimed to address various challenges which an engineer in our country usually faces in his/ her research career. A few of them may be common to all, while the rest of them, to be discussed, are of very specific types.

One's personal experience of addressing the technical challenges and the subsequent story leading to success in research will be focused. An enthusiastic audience of very wide 'bandwidth' and background are kept in mind to share some interesting examples, which basically include new generation printed and dielectric resonator antennas.

As a research engineer it is inspiring to see the present version of an antenna, which was priced at just Rs. 200 in Kolkata at 2004, in today's air-borne radars used by world's leading Atmospheric Research Centers. Though full of challenges, a journey of this scientific development was undoubtedly exciting. On the occasion of Engineers' Day, it will be an opportunity to share few more similar excitements that happened in the process of several antenna innovations at home and abroad.

INAE Kanpur Local Chapter

Brief details regarding recent events conducted by the INAE Kanpur Local Chapter are given below.

- **Life in the IIT System Talks by and discussion with Professor S. P. Sukhatme & Professor S.P. Mehrotra**

INAE Kanpur Chapter, successfully organized a half day event on *Life in the IIT System* on March 25, 2017 at Indian Institute of Technology (IIT) Kanpur. This event witnessed talks by and discussions with Prof. S.P. Sukhatme (Professor Emeritus, Indian Institute of Technology Bombay), and Prof. S.P. Mehrotra (Retd. Faculty, IIT Kanpur & Ex-Director, NML Jamshedpur). At the outset, Prof. S.P. Sukhatme and Prof. S.P. Mehrotra were welcomed by Prof. Indranil Manna, Director IIT Kanpur and Vice-President INAE. Prof. Sukhatme did express that this visit marks 50 years from when he had visited IIT Kanpur first. Prof. Mehrotra also marked his affiliation with IIT Kanpur to be over 49 years long.



Prof. I. Manna Welcoming Prof. S.P. Mehrotra and Prof. Sukhatme (Right)

At first, Prof. S.P. Sukhatme's biosketch was read by Prof. Yogesh Joshi, Vice-Chair, INAE Kanpur Chapter. During the talk, Prof. Sukhatme provided a detailed history on the making of IITs starting from the Sarkar committee onwards. He stressed on the four pillars that make a successful IIT system: (i) students, (ii) faculty, (iii) funding, and (iv) administration. He, then, focused on the aspects expected of a faculty for making an impact on global community via incorporating proper plan of action, good teaching, pursuing research, consultancy and outreach, remaining committed and learning to live with pressure. Prof. Sameer Khandekar served as a moderator for the hour long discussion session. This talk was followed with a tea-break of fifteen minutes.

The biosketch of Prof. S.P. Mehrotra was read by Prof. Kantesh Balani, Secretary, INAE Kanpur Chapter. In the second talk, Prof. S.P. Mehrotra highlighted the history of IIT Kanpur. His vigour and enthusiasm could make you feel the energy and vibrance he felt when he had joined the institute as a student (in 1963), which continued well late into the 1980s. He also highlighted the reasons of why the institute's research profile continued to rise despite the setbacks of 1960-1970s faced by the country. He attributed this trend to the sense of *belonging* everyone felt for the institute. He emphasized that the excellence of the institute in the prime years was mainly due to the new ideas that were driven by the young minds. He also highlighted the necessity of bringing such a change back to provide new thrust to the system. Again, Prof. S. Khandekar moderated the hour long interaction session of Prof. Mehrotra with the faculty.

Prof. K. Muralidhar, Chair INAE Kanpur Chapter was instrumental in overseeing the successful conduct of the event. The program witnessed interaction of over 40 participants with Prof. S.P. Sukhatme and Prof. S.P. Mehrotra. The presence of Prof. Manindra Agrawal, Deputy Director, IIT Kanpur and Prof. Indranil Manna, Director, IIT Kanpur emphasized the importance of this interaction session. The animated questions and enthusiastic discussions for over an hour that followed after the 45 minute talks indicate the relevance and importance of the information conveyed by the elite speakers. Overall, this event conducted by INAE, Kanpur Chapter, was a great success.

- **Half Day Workshop on Intellectual Property: A Strategic Enabler for Translational Research and Development**

INAE Kanpur chapter organized a half-day workshop on ***Intellectual Property: A Strategic Enabler for Translational Research and Development*** on April 08, 2017. This interactive workshop witnessed over 25 participants, mainly faculty members and post-doctoral researchers from IIT Kanpur, Harcourt Butler Technical Institute, Kanpur, Defence Materials & Stores Research & Development, Kanpur, Dean of Research and Development office, SIDBI Innovation and Incubation Center, Biomaterials Processing and Characterization Laboratory, and Samtel Center for Display Technology, among others. The participants were welcomed by Prof. K. Muralidhar, President, INAE Kanpur Chapter. Prof. Sameer Khandekar, Associate Dean Innovation and Incubation, IIT Kanpur provided the background and impetus for conducting this workshop. Prof. Indranil Manna, Director IIT Kanpur and Vice-President, INAE, elaborated on the importance of protecting IP and the need for such a workshop in this day and age.

Dr. Debankur Bandyopadhyay emphasized the importance of Intellectual Property and how academicians often under-value this aspect. He highlighted, with real-life examples, inventions

from various researchers and scientists that were not recognized just because the inventors had not patented their work. He emphasized the aspect of protecting business by filing patents. He also mentioned that adequate protection of an idea is good strategy, and that patenting can enhance the value of the company. IP protection must not be ignored even by start-ups since an incubating company, after securing IP rights, enhances its firmness in the market and provides an edge over its competitors. Dr. Debankur Bandyopadhyay listed two key types of IPs: (i) *Copyright*, an exclusive legal right available for one over another to copy, distribute, create, derive and adopt artistic material; and (ii) *Patents*, which provide rights to the owner of a device idea and prevents a third party from making, using, offering for sale the product without consent of the owner. Patents hold an edge as they provide legal rights to the owners with *Claims* as the enforceable part of a patent. Further, Dr. Debankur highlighted the importance of utilizing ‘Trademark’ and ‘Tradename’ in business. The talk was interactive, and questions raised were responded to, in detail.

Dr. Debankur was emphatic that a patentable item must have the attributes of: (i) being novel and new, (ii) non-obvious, (iii) having an inventive step, and (iv) being useful. An agency that encourages patenting includes WIPO (World IP organization) and supporting agreements include PCT (Patent corporation treaty) and TRIPS (Trade-Related Aspects of Intellectual Property Rights). Patent filing is expensive and one must ensure that holding a patent at a certain cost is commensurate with its usefulness and value.

The workshop ended with many real-life examples and specific questions stemming from the experience of the participants. Overall, the event was satisfying, with a similar workshop for undergraduate and doctoral students being planned for the future. The successful conduct of the workshop on *IP: A Strategic Enabler for Translational Research and Development* impacted the participants in a very positive manner.

- **One-day Workshop on “Virtual Laboratories”**

To pursue an initiative of Ministry of Human Resource Development (MHRD) under the National Mission on Education through ICT, INAE Kanpur Local Chapter in association with IIT Kanpur organised one-day Workshop on “Virtual Laboratories” on Sep 16, 2017. The Workshop was attended by 110 faculty members from AICTE-approved colleges in and around the Kanpur region.

The aim of this workshop was to create an awareness on the importance and utilization of web-based experiments, followed by virtualization and simulations towards enhanced learning. The target audience was chosen as the baton to pass on the knowledge of web-based experiments to students. The purpose was to facilitate building concepts in colleges where state-of-the-art experimentation facilities and infrastructure are not present.

Inauguration ceremony witnessed Prof. Vinay Pathak, Vice Chancellor, A.P.J. Abdul Kalam Technical University, Lucknow as the chief guest. Prof. K. Muralidhar, President, Indian National Academy of Engineering Kanpur Chapter, welcomed the participants and encouraged them to avail this opportunity in enhancing their experience and serving as ambassadors of Virtual Laboratories back in their institute. He highlighted the role played by INAE Kanpur Chapter in bringing focus back on engineering as a subject of discussion in academic circles and events.



*Lighting of Lamp during inauguration Ceremony for Virtual Laboratories, Sept. 16, 2017.
(Photo: From left to right: Prof. Vinay Pathak, Prof. K. Muralidhar, Prof. Sameer Khandekar)*

Thematic sessions were conducted in parallel to cater to the interest of the participants. Two sections were created by combining various disciplines:

Section (i): Agricultural/ Biotechnology/ Manufacturing/ Materials/ Mechanical/ Aerospace/ Civil

Section(ii): Chemistry/ Computer Science/ Electrical/ Electronics and Communication/ Information Technology/ Physics/

Interaction sessions were arranged thematically and conducted as per the following sequence:

- o Virtual combustion and atomization
- o Aerospace Virtual Laboratory
- o Ultrafast Laser Spectroscopy
- o Transducers and Instrumentation
- o RF and Microwave Characterization
- o Production Shop Simulation Laboratory
- o Optical Visualization of Heat Transfer and Fluid Flow Phenomena
- o Material response to micro-structural, mechanical and thermal stimuli
- o Waves and phenomena
- o Virtual astrophysics laboratory
- o Laboratory on Mechatronics
- o Manufacturing Laboratory



Presentations included the outlining of the concept, content of experiments ready for demonstration, and virtual laboratory experiments developed in Phase I. These were demonstrated live to the audience. The deployable virtual laboratory experiments were well received by the participants. After each presentation, a feedback survey was held in order to enhance the functionality of the concerned websites. The response from the participants was positive and enthusiastic. There was consensus that Virtual Laboratories should be used extensively for enhancing learning and research in smaller colleges.

INAE Delhi Local Chapter

INAE Delhi Local Chapter organized a lecture on 9th October 2017 at IIT Delhi on the topic entitled “Technologies For Pro-Poor Agenda: A New Perspective for India” which was delivered by Dr. T Ramasami, Former Secretary, Ministry of Science and Technology Government of India and Member ABEO, Organization for Prohibition of Chemical Weapons, The Hague, The Netherlands.

The Abstract of the lecture is as under :

Global Science, Technology and Innovation Landscape is changing drastically during the last two decades. For gaining competitiveness in the emerging knowledge economy, nation states are increasing their research intensities. Two key parameters employed to assess research intensity of Nation states are Groee Expenditure on Research and Development (GERD) as a percentage of Gross Domestic Product (GDP) and number of Full Time Equivalent R&D professionals per million populations. Global bench mark figures of FTE/ Million population at 1200 and @ US \$ 275,000 per FTE per year are employed. An argument would be advanced in favour of hypothesis that resource intensive models are un-sustainable to support the technology needs of the citizens of poor countries.

Even at an investment of GERD of India at less than 1% of GDP, the share of the country among the 35 Low Income and 55 Low Middle Income countries is about 90% as per World Bank Data. Already GERD per FTE of India matches well with many developed and emerging economies. No country in the world is able to make @ investments of GDP unless the number of FTE/ million is @1200 or above. India with a value of less than 200 per million FTE would find it hard to match the GERD/GDP bench marks.

While matching the global bench marks of GERD/GDP could be perceived as a challenge, it could be treated also as opportunity to serve the global agenda for Pro Poor Technologies. Technologies developed with high resource intensity by pass the developmental agendas of more than two thirds of global populations. India is in a unique position to convert the low resource setting of the Science, Technology and Innovation landscape into an advantage and develop new perspective for Technologies for pro-poor agenda of the world.

An analysis of research intensity of the world and new perspective for India to seek a unique and leadership position in technology and affordable innovation space would be presented. An appeal to the science and technology community to connect research and development also to technology and trade in addition to discovery processes is proposed. Some case studies are planned for illustrating the proposed perspective.

INAE Pune Local Chapter

Efforts have been made in the recent past to re-activate the INAE Local Chapters with a view to increase the outreach of the Academy. A meeting of the INAE Fellows based at Pune was held on April 21, 2018 at Thermax House, Pune which was attended by about fifteen INAE Fellows, wherein it was decided to launch the INAE Local Chapter at Pune. During the meeting, the Fellows interacted and shared valuable inputs for undertaking various activities. The names of Mr. MV Kotwal as the Chairman and Prof. Vinay Kulkarni as the Honorary Secretary of the Pune Local Chapter were unanimously agreed to. It was suggested that the Pune Engineering Forum be formed under the aegis of the INAE Pune Local Chapter to induct non-Fellows as members, so as to also involve them in the conduct of various activities to be undertaken. An interactive Technical Session on “Technology Imperatives for India in the next decade” was organized by Dr. RR Sonde, FNAE and Executive Vice-President, Thermax. This was followed by a technical visit to the R&D facility and Coal Gasifiers developed by Thermax.

INAE Bangalore Local Chapter

INAE Bangalore Local Chapter celebrated the “Engineers Day” on 15th September 2017. On this occasion, a special lecture entitled “Cyber Physical Systems” was delivered by Dr. Amrutur Bharadwaj, FNAE, Professor, Department of Electrical Communication Engineering & Chairman, Robert Bosch Centre for Cyber Physical Systems, Indian Institute of Science, Bangalore in the area of IOT, CPS or Robotics at MVJ College of Engineering, Bangalore. The special lecture was organised by INAE Bangalore Local Chapter under its Outreach Programme on Engineering Education with VTU affiliated colleges and other Institutions of Engineering & Technology in Bangalore. The special lecture was attended by INAE Fellows located in and around Bangalore, Faculty and students from various Educational Institutions.

In addition, INAE Bangalore Local Chapter in association with National Design & Research Forum (NDRF), The Institution of Engineers (India) Bangalore Centre had also organized a Seminar on “Technologies for Identification, Tracking and Neutralizing Unauthorized Drones” on Nov 23-24, 2017 at NIAS, Bangalore. This was attended by INAE Fellows located in and around Bangalore, Practicing Engineers from Industry, Faculty and students from various Educational Institutions.

Activities undertaken by INAE Sectional Committees

The Activities Undertaken by the **INAE Sectional Committee-V (Electrical Engineering)** during the Year 2017 are highlighted below. The Committee has been working towards achieving the goals mentioned below.

1. Increasing Visibility of Sectional Committee as well as INAE

The Sectional Committee took special drive in this context and has launched its dedicated website which can be viewed at the link <http://www.inaesection5.org.in/>. The website highlights: i) Activities of Sectional Committee – V and ii) Brings INAE Sec-V Fellows in the forefront.

2. Engaging Sec-V Fellows of INAE

With the above goal in mind, ‘Fellows Corner’ is being created in the website. In this online forum, Sec-V Fellows are invited to write small articles expressing their views on topics of their choice.

3. Distinctive Voices

The Sectional Committee is inviting leaders in Electrical Engineering in Knowledge Sharing through this online section of its website.

4. **Bringing in Achievers in the Field of Electrical Engineering in the fold of INAE**

The Sectional Committee is working

- proactively to search for outstanding persons from academia and industry for nomination as INAE Fellows (Indian as well as Foreign Fellows).
- to organize focused programs wherein researchers can come and exchange views.

5. **Promoting Engineering Excellence among Young Engineers and Students**

The Sectional Committee-V is engaged in efforts to achieve the following:

- Promoting outstanding young engineers in the field of electrical engineering through nomination for young engineer award.
- Bringing in more and more excellent electrical engineering students through nomination for best student project awards.

INAE jointly with Indian Institute of Technology Madras organized a one-day Workshop on “High Voltage Engineering-Adaptability to Smart Grids” for Faculty and Students of Electrical Engineering Department of all engineering colleges in Tamil Nadu. The workshop was held at IIT Madras on 14th July 2017 and was coordinated by Prof. Sivaji Chakravorti and Prof. R. Sarathi. Lectures on the following topics were delivered in the workshop.

- a. High Voltage Generation, Measurement and Testing techniques
- b. Condition Monitoring aspects of Power Equipments
- c. Fundamentals of Smart grids

The workshop was well received as more than 45 persons participated in this event.



Participants in the Workshop on “High Voltage Engineering-Adaptability to Smart Grids”

International Affairs

CAETS 2017 Convocation and Annual Meetings in Spain

The CAETS 2017 Convocation was hosted by the Royal Academy of Spain at Madrid from 14th to 16th Nov 2017. INAE delegation led by Dr. BN Suresh, President with Dr. Ajay Mathur, Dr. V Adimurthy and Brig Rajan Minocha as delegates participated.

During the Two-day Convocation, on the first day the technical talks by eminent invited international speakers were delivered on the topics, viz., “Food Security”; “New Genetic Engineering”; and “Blue Economy”. The topic of “Transition to Renewable Energy World” was planned on day-two wherein the INAE delegates actively participated in the discussions and deliberations.

The CAETS Council meeting was held on Nov 16, 2017 wherein besides the CAETS Council meeting Agenda, the discussion on the topics, viz., “Ethics in Engineering” and “Diversity in Engineering” was held. INAE had proposed Dr. V Adimurthy as a panellist in the theme “Diversity in Engineering”. In this regard, Dr. Adimurthy delivered a talk on the perspective related to India.

Dr. Ajay Mathur is the INAE nominated member on the CAETS Energy Committee and participated in the meeting of the CAETS Energy Committee also.

Besides, participating in the Convocation, Dr. BN Suresh, President, INAE along with INAE delegates participated in the sideline meetings with the CAETS Member-Academies for discussion and exploring the feasibility of conducting joint collaborative activities. The details of the sideline meetings held with Member-Academies during the CAETS Convocation are as under.

1. **German Academy of Science and Engineering (acatech)** to discuss a collaborative activity between INAE and acatech in the field of ‘**Manufacturing**’.
2. **Australian Academy of Technology and Engineering (ATSE)** to discuss the collaborative activity between INAE and ATSE on “Sustainable Urban Water Management of Cities in India” which was a follow up of the subject Workshop held at IIT Jodhpur.
3. **National Academy of Engineering of Korea** to discuss and plan the follow up INAE-NAEK second Joint workshop on “High Temperature Materials” to be held at Korea in 2018, subsequent to the first workshop held in India in 2017.
4. **Royal Academy of Engineering, UK** to discuss the possibility of the program for the Exchange of Students for brief Structured Training Programme of 3 days to 5 days and joint Seminars and conferences on topics of mutual interest.
5. **National Academy of Engineering, USA** to discuss the possibility of conducting joint Conference on Frontiers of Engineering on alternate years in India and USA.

The Fellowship

The selection process for election to the Fellowship was reviewed and modified wherein two stage selection process had been introduced. The comments from the Fellowship on the nominations received are also obtained prior to the first meeting of the Sectional Committees. In the first stage, the nominations are initially shortlisted to seek peer review reports from the recommended Fellows/domain experts. In the second stage, the peer review reports received are considered by the Sectional Committees to recommend nominations for election to the Fellowship for approval of the Governing Council. The following were elected as Fellows of the Academy w.e.f. Nov 1, 2017.

Engineering Section-I



- 1 Prof. PP Mujumdar, Chairman, ICWaR; Professor, Department of Civil Engineering, Indian Institute of Science, Bangalore



- 2 Prof. Ligy Philip, Professor, Environmental & Water Resources Engineering, Department of Civil Engineering, Indian Institute of Technology Madras, Chennai.



- 3 Mr. SN Subrahmanyam, CEO & MD, Larsen & Toubro Ltd., Chennai.

Engineering Section-II



- 1 Prof. Hema A Murthy, Department of Computer Science and Engineering, Indian Institute of Technology Madras, Chennai.



- 2 Dr. Rajeev Ramnarain Rastogi, Director, Machine Learning at Amazon, Bangalore



- 3 Dr. Sriram K Rajamani, Managing Director, Microsoft Research India,, Bangalore.

Engineering Section-III



- 1 Prof. AR Mohanty, Professor and Shyamal Ghosh & Sunanda Ghosh Chair Professor, Department of Mechanical Engineering, Indian Institute of Technology, Kharagpur.



- 2 Prof. R Gnanamoorthy, Department of Mechanical Engineering, Indian Institute of Technology Madras, Chennai.



- 3 Dr. Jayanta Chattopadhyay, Scientific Officer (H), BARC, Reactor Safety Division, Hall 7, Bhabha Atomic Research Centre, Mumbai.



- 4 Mr. Jayant Damodar Patil, Whole-time Director (Defence Business) & Sr. Executive Vice-President, Larsen & Toubro Ltd., Mumbai.

Engineering Section-IV



- 1 Prof. GD Yadav, Vice Chancellor & R.T. Mody Distinguished Professor, Institute of Chemical Technology, Mumbai.



- 2 Prof. R Rengasamy, Department of Chemical Engineering, Indian Institute of Technology Madras, Chennai.



- 3 Prof. PK Tewari, Raja Ramanna Fellow, BARC and Professor, HBNI, Desalination Division, Bhabha Atomic Research Centre, Mumbai.

Engineering Section-V



- 1 Prof. Mahesh Kumar, Department of Electrical Engineering, Indian Institute of Technology Madras, Chennai.



- 2 Prof. Laxmidhar Behera, Department of Electrical Engineering, Indian Institute of Technology Kanpur, Kanpur.



- 3 Dr. Archana Sharma, Outstanding Scientist, Head, PP&EMD; Head, PPSS, APPD, Bhabha Atomic Research Centre (BARC), Mumbai.

Engineering Section-VI



- 1 Prof. Anil Kottantharayil, Department of Electrical Engineering, Indian Institute of Technology Bombay, Mumbai.



- 2 Dr. Manav Bhatnagar, Associate Professor, Department of Electrical Engineering, Indian Institute of Technology Delhi, New Delhi.



- 3 Dr. Ishwardutt Parulkar, Senior Principal Technologist, Amazon Development Center India, Brigade Gateway, Bangalore.

Engineering Section-VII



- 1 Mr. S Pandian, Distinguished Scientist and Director, ISRO Propulsion Complex, ISRO, Mahendragiri, Tamil Nadu.



- 2 Dr. Jagannath Nayak, Director, Centre for High Energy Systems & Science (CHESS), DRDO, Hyderabad.



- 3 Mr. P Kunhikrishnan, Director, Satish Dhawan Space Centre, SHAR, ISRO, Sriharikota.

Engineering Section-VIII



- 1 Prof. Ashok M Raichur, Department of Materials Engineering, Indian Institute of Science, Bangalore.



- 2 Dr. Indranil Chattoraj, Director, CSIR-National Metallurgical Laboratory, Jamshedpur



- 3 Dr. SC Sharma, Outstanding Scientist/Deputy Director, Vikram Sarabhai Space Centre, Trivandrum.

Engineering Section-IX



- 1 Prof. Rangan Banerjee, Forbes Marshall Chair Professor, Department of Energy Science and Engineering, Indian Institute of Technology Bombay, Mumbai.



- 2 Mr. AB Mukherjee, Associate Director, Reactor Projects Group, Bhabha Atomic Research Centre, Mumbai.



- 3 Mr. Kuljit Singh Popli, Chairman & Managing Director, Indian Renewable Energy Development Agency Ltd., New Delhi.

Engineering Section-X



- 1 Prof. Ravi Shankar, Department of Management Studies, Indian Institute of Technology Delhi, New Delhi.



- 2 Prof. Sunil Nath, Department of Biochemical Engineering & Biotechnology, Indian Institute of Technology Delhi, New Delhi.



- 3 Prof. AD Sahasrabudhe, Chairman, All India Council for Technical Education, New Delhi.

Newly elected Foreign Fellows



- 1 Prof. ZP Bazant, McCormick Institute Professor and W.P. Murphy Professor of Civil and Mechanical Engineering and of Materials Science, CEE Dept., USA.



- 2 Prof. CS Desai, Regents' Professor (Emeritus), Dept. of Civil Engineering and Engineering Mechanics, University of Arizona, USA.



- 3 Prof. PR Kumar, University Distinguished Professor, Texas A&M University, WEB Department of Electrical and Computer Engineering Texas A&M University, USA.



- 4 Dr William Edward Lee, Professor, Department of Materials, Imperial College London, UK.



- 5 Prof. Sushanta Mitra, Executive Director, Waterloo Institute for Nanotechnology, Canada

Fellows elected under Rule 37(g)

During the AGM of Fellows in the year 2015, it was brought out that many eminent experts from the Industry who have excelled in their respective spheres are not Fellows of the Academy since they are not nominated for election to the Fellowship through the normal process. Therefore, the percentage of elected Fellowship on the rolls of the Academy from the category of "Industry" was only 19%. With a view to enhance the visibility of INAE in Industry domain and also to increase industry representation in the Fellowship, it was decided to increase the intake of eminent experts from thirty to forty at any point of time to be elected as Fellows under Rule 37(g) effective from the year 2016 onwards. Since then, upto five exceptional eminent persons from the Industry category are being elected as Fellows under the Rule 37(g) in a year.

This year, five eminent engineering luminaries elected from Industry category under Rule37(g) were.



- 1 Dr. Naushad Forbes, Co-Chairman, Forbes Marshall Pvt. Ltd., Pune.



- 2 Mr. Atul Sobti, Chairman & Managing Director, Bharat Heavy Electricals Ltd., New Delhi



- 3 Mr VVR Sastry, Adjunct Professor, National Institute of Advanced Studies (NIAS), Bangalore and Former Chairman and Managing Director, BEL Bangalore.



- 4 Mr. Narayanaswamy Venkataramani, CMD, India Pistons Ltd., Chennai.



- 5 Mr. Prakash Kumar Singh, Chairman, Steel Authority of India Ltd., New Delhi



Honours and Awards

The details of awards received by INAE Fellows during the year are given below.

1.	Dr BN Suresh, FNAE, President, INAE and Honorary Distinguished Professor, ISRO Headquarters, Bangalore was awarded the “Life Time Contribution Award” from Indian Space Research Organization for the year 2016-17.
2.	Dr Baldev Raj, FNAE, Immediate Past President -INAE and Director, National Institute of Advanced Studies, Bangalore and formerly Distinguished Scientist and Director, IGCAR Kalpakkam and Formerly President-Research, PSG Institutions, Coimbatore was conferred the GM Modi Science Award by Gujar Mal Modi Foundation. He was conferred the award by Shri YS Chowdhury, Hon’ble Minister of State for Science and Technology and Earth Sciences, the Chief Guest of the Award Function held on Aug 9, 2017 at New Delhi.
3.	Prof Prem Vrat, FNAE, Pro-Chancellor; Professor of Eminence and Chief Mentor, The NorthCap University, Gurgaon and Formerly: Director, IIT Roorkee; Director In-charge, IIT Delhi; Vice Chancellor, UPTU, Lucknow and Vice Chancellor, ITM University, Gurgaon was conferred the Life Time Achievement Award of the Indian Institution of Industrial Engineering (IIIE) at the 59th National Convention of IIIE held at Aurangabad (Maharashtra) on the 14th September, 2017.
4.	Mr Rakesh Bakshi, FNAE, CMD, RRB Energy Limited, New Delhi was conferred with “Cross of the Order of Merit of the Federal Republic of Germany” by the Hon’ble President of the Federal Republic of Germany, Mr. Frank-Walter Steinmeier on 17 July 2017. The Award was bestowed upon him on 20 September 2017 at New Delhi by His Excellency, Dr. Martin Ney, Ambassador of the Federal Republic of Germany to India.
5.	Prof. Sankar K. Pal, FNAE, Distinguished Scientist and former Director, Indian Statistical Institute, Kolkata was conferred the Jawaharlal Nehru Birth Centenary Lecture Award from Indian National Science Academy (INSA) for the year 2017. He was elected as Fellow of International Rough Set Society (FIRSS), Poland and also selected as an IEEE Rhino-Bird International Expert.
6.	Dr S Venkata Mohan, FNAE, CSIR-IICT, Hyderabad has been conferred with Environmental Engineering Design Award 2017 by the National Design and Research Forum (NDRF) of the Institute of Engineers, India (IEI) for his outstanding contributions in the field of Engineering Design during the 32nd Indian Engineering Congress on 21st December 2017 held at Chennai. He has also been conferred with SERB-IGCW 2017 Award for the technology developed to produce sustainable Biohydrogen from waste (with a cash prize of Rs.1.00 Lakhs) by Science and Engineering Research Board (SERB), Department of Science and Technology (DST) & Green ChemisTree Foundation during a function organized on 5th October 2017 in Mumbai.
7.	Dr. Ing. B.V.A.Rao, FNAE, Adjunct Faculty, NIAS, National President, IIPE was conferred the 2017 Medal of Excellence in Engineering Education by World Federation of Engineering Organizations (WFEO) . This Medal was received by him at the Indian Engineering Congress of IEI held at Chennai on 22nd Dec 2017 directly from the hands of Dr. Marlene Kanga, President of WFEO.

8.	Dr. Sanjit K. Mitra, FNAE, Research Professor of Electrical & Computer Engineering University of California Santa Barbara, USA received the 2017 IEEE Educational Activities Board Vice President's Recognition Award "for outstanding contributions in analog and digital signal processing and image processing, and authoring pioneering textbooks that inspire and educate students worldwide."
9.	Dr TSR Prasada Rao, FNAE former Director, Indian Institute of Petroleum, Dehradun was bestowed the Life Time Achievement by Catalysis Society of India on 18th January 2018 at the 23rd Annual Catalysis Symposium held at Bangalore. Dr TSR Prasada Rao was also felicitated by Hon'ble Vice-President of India Shri. Venkaiah Naidu on Dec 9, 2017 at the Annual Meet of Andhra University Alumni Association (AAA) held at Andhra University, Visakhapatnam.
10.	Dr CR Prasad, FNAE, Chairman & Managing Director, Everest Power Private Limited, Gurgaon was felicitated as "Illustrious Alumnus" by Sri Venkateswara College of Engineering Alumni Association at Tirupati on Jan 26, 2018.

News of Fellows

1.	Dr BN Suresh, FNAE, President, INAE and Honorary Distinguished Professor, ISRO Headquarters, Bangalore has been appointed as Chancellor, Indian Institute of Space Science and Technology (IIST). He has earlier served as the founder Director of IIST and he assumed charge as Chancellor, IIST on 6th November 2017. Dr BN Suresh has also been elected as a Fellow of Indian National Science Academy (INSA).
2.	Professor Kalyanmoy Deb, FNAE, Koenig Endowed Chair Professor at Michigan State University and Formerly Professor, Mechanical Engineering Department of IIT Kanpur, has now crossed 100,000 mark on Google Citations with an h-index of 102. More information about his citation record can be found at: https://scholar.google.com/citations?user=paTAXiIAAAAJ&hl=en According to Google Scholar, he is also #1 in "Evolutionary Computation", #4 in "Optimization", and #8 in "Artificial Intelligence" areas. Prof Deb started his academic career at IIT Kanpur in 1992 as an Assistant Professor. Most of his highly-cited studies were conducted during his 20 years of stay at IIT Kanpur.
3.	Prof. N. Raghavan, FNAE, Professor of Practice IIT Madras is the Co-Chair of the "Indian Lean Construction Conference: Continuing on the Lean Journey for Indian Construction- ILCC 2017" being held on July 27-29, 2017 at IIT Madras, Chennai. Further details regarding the conference may be viewed at the link www.web.iitm.ac.in/ilcc2017/
4.	Prof. Sanjit K. Mitra, FNAE, Research Professor of Electrical & Computer Engineering, University of California Santa Barbara was recognized as a pioneer in the area of circuits & systems and presented a talk in the special session on "Pioneers of Circuits & Systems II" held during the 50th IEEE International Symposium on Circuits & Systems at Baltimore, Maryland, USA on May 28-31, 2017. Two special sessions entitled "50 Years of Circuits, Systems & Signals: A Session in Honour of Prof. Sanjit K. Mitra, FNAE," (Parts I and II) were also conducted. Nine papers by authors from Brazil, India, Italy, Singapore, and USA were presented in these two sessions.
5.	Prof. K. Bhanu Sankara Rao Ministry of Steel Chair Professor at MGIT Hyderabad has been elected as Fellow of Telangana Academy of Sciences.
6.	Prof Mahesh Tandon, FNAE, Managing Director, Tandon Consultants Pvt Ltd, New Delhi has delivered a webinar on July 20, 2017 on the topic "Structures for Spectacular Sports Arenas".
7.	Dr U. Kamachi Mudali, FNAE, Outstanding Scientist and Director, Materials Chemistry & Metal Fuel Cycle Group, Indira Gandhi Centre for Atomic Research, Kalpakkam has assumed charge as Chief Executive of Heavy Water Board (HWB), one of the prime units of Department of Atomic Energy at Mumbai. HWB has seven plants in the country producing heavy water required for pressurised heavy water reactors (PHWRs) operating in India, and also involved in developing many useful materials of relevance to DAE and society (Boron, Sodium, Potassium, Organic Solvents, etc.)
8.	Prof Debabrata Das, FNAE, Department of Biotechnology, Indian Institute of Technology Kharagpur and Dr Shantonu Roy have authored a book on "Biohythane: Fuel for the Future" published by Pan Stanford Publishing Pte. Ltd., Singapore. Prof Debabrata Das has also edited a book on "Microbial Fuel Cell: A bioelectrochemical system that convert wastes to Watts"

	published by Capital Publishing Company Ltd., New Delhi. In addition, a pilot plant has been commissioned at IIT Kharagpur under his guidance, which is a 10,000 L reactor for the continuous biohydrogen production from the organic wastes. The video has of the operation of the plant has been uploaded in the YOUTUBE and can be viewed at the link https://www.youtube.com/watch?v=MfoDj_VfIww
9.	Dr S Venkata Mohan, FNAE, Principal Scientist, Bioengineering and Environmental Sciences Lab, EEFF Department, CSIR-Indian Institute of Chemical Technology (CSIR-IICT), Hyderabad and his team have recently commissioned and successfully operated a biohydrogen pilot plant at CSIR-IICT, Hyderabad integrated with waste biorefinery facility. The Biohydrogen Pilot Plant video may be viewed at the link given below https://youtu.be/Eve2ddj9PCY
10.	Prof. Sankar K. Pal, FNAE, Distinguished Scientist and former Director, Indian Statistical Institute, Kolkata delivered the following talks/address: Keynote speech at 2017 IEEE International Conference on Imaging, Vision and Pattern Recognition, February 13-14, 2017, University of Dhaka, Bangladesh; Keynote speech at the Int. Conference on Electrical, Computer and Communication Engineering February 16-18, 2017, Cox's Bazar, Bangladesh; Plenary address at the Int. Conference on Big Data Analysis, La Trobe University, Melbourne, March 13-15, 2017; Distinguished Lecture in the Department of Computer Science, Hong Kong Baptist University, Hong Kong, May 15, 2017 and Keynote talk at the 2017 Int. Joint Conf. on Rough Sets, Olsztyn, Poland, July 3-7, 2017.
11.	Prof B Bandyopadhyay, FNAE, IDP in Systems and Control Engineering, Indian Institute of Technology Bombay, Mumbai has been elected as IEEE Fellow effective from Jan 1, 2018 for his contributions to discrete-time, multi-rate, output feedback sliding -mode control.
12.	Prof. S.N. Mukhopadhyay, FNAE, Adjunct Professor, Department of Biological Sciences, BITS, Pilani, Rajasthan has reviewed the Indian Edition of the book Biochemistry written by T.A. Brown of University of Manchester, UK. He has written the Preamble and contributed chapter-wise practice tutorial numerical problems with solutions of the book published by Viva Books, New Delhi by arrangement with Scion Publishing Ltd., UK. He delivered invited lectures at IMS Engineering College, Ghaziabad on 4th August, 2017. The Fourth Edition of his book "Process Biotechnology Fundamentals" was published by Viva Books, New Delhi in Feb. 2018."
13.	Mr Ajay Narayan Deshpande, FNAE, who is Director (Technical) in Engineers India Limited, a Navratna PSE, has taken over as Chairman & Managing Director (additional charge) of EIL from 1st November, 2017. Mr Deshpande, who joined the company as a Management Trainee in 1979, has achieved the unique distinction of making a career progression from the entry level to the highest level in the company's hierarchy. Mr Deshpande has also been elected as Fellow by the Indian Institute of Chemical Engineers in this year (2017)
14.	Dr S Venkata Mohan, FNAE, BEES, CSIR-IICT, Hyderabad has been elected as Fellow of Andhra Pradesh Akademi of Sciences (FAPAS) effective from Nov 7, 2017 for his contributions to Environmental Engineering.

15.	Prof. Prem Vrat, PhD, FNAE, FNASc., Pro-Chancellor; Professor of Eminence and Chief Mentor, The NorthCap University, Gurgaon participated in a panel discussion during the Pulse Program of DD Rajya Sabha TV on the issue of the Engineering Education Crisis. The program may be viewed at the link given below https://youtu.be/MXGKqlXgLJk
16.	Dr. Vishweshwaraiah Prakash, FINAE, Director Research, Innovation and Development at JSS MVP, Mysore and Formerly Director, CFTRI, Mysore has been elected as the Vice President of International Union of Nutritional Sciences (IUNS) for the period 2017 – 2021 in the IUNS Congress held at Buenos Aires during October 2017. He has also been elected as Scientific Chair for the International Union of Food Science & Technology (IUFoST) for the period 2018 – 2020”.
17.	Prof JN Roy, FNAE, Visiting Professor (ATDC & SESE), School of Energy Science and Engineering, Indian Institute of Technology Kharagpur has co-authored a book on "Photovoltaic Science and Technology", published by Cambridge University Press
18.	Prof DN Singh, FNAE, Department of Civil Engineering, Indian Institute of Technology, Bombay, organized a IUSSTF supported workshop related to Environmental Geotechnics, during December 1-2, 2017. The major themes covered during the workshop were: Energy Geotechnics (topics on geothermal, gas hydrates, carbon sequestration, Nuclear energy etc.), Sustainability (industrial waste utilization, mining issues and general themes); Instrumentation and Sensing and Cold Region Geomechanics; Bio-geo Interface, and Remediation of contamination in the geoenvironment. The proceedings of the workshop are available on http://www.cdeep.iitb.ac.in/events.php (search for event with the name "IUSSTF Supported workshop on Environmental Geotechnics" where Day 1 and day 2 videos are uploaded).
19.	Dr CR Prasad, FNAE, Chairman & Managing Director, Everest Power Private Limited, Gurgaon has been felicitated by Shri Venkateswara College of Engineering Alumni Association on 26th Jan 2018 at Tirupathi. The college is 58 years old and he belonged to the First batch of the college.
20.	Dr C. Ranganayakulu, FNAE, Scientist ‘H’/Outstanding Scientist (OS) and Group Director (ECS), Aeronautical Development Agency (ADA), Bangalore and Prof. K.N. Seetharamu, FNAE, Chair Professor in Thermal Engineering, Department of Mechanical Engineering, PES Institute of Technology, Bangalore have written a book on “Compact Heat Exchangers: Analysis, Design and Optimization using FEM and CFD Approach” which was published by ASME-Wiley, UK Publishers and released in March 2018.
21.	Dr. V Narayanan, FNAE, Member Governing Council, INAE, Outstanding Scientist-ISRO has been appointed as Director of Liquid Propulsion Systems Centre (LPSC), ISRO w.e.f. 22nd Jan 2018.

Fellows Deceased in Last one Year

During the year 2017-2018, it was learnt about the sad demise of the following INAE Fellows.

1. Dr. Baldev Raj, Director, National Institute of Advanced Studies, Bangalore and formerly Distinguished Scientist and Director, IGCAR Kalpakkam and Formerly President-Research, PSG Institutions, Coimbatore was President, INAE during the years 2011 to 2014. He had made outstanding contributions in the areas of Metallurgy and Non-Destructive Evaluation of Materials. He was elected as President, International Council of Academies of Engineering and Technological Sciences (CAETS) for the year 2015, the first such honour to be bestowed upon an Indian.
2. Dr. KV Raghavan, INAE Distinguished Professor, Indian Institute of Chemical Technology, Hyderabad and formerly Director, IICT Hyderabad and formerly Chairman, Recruitment and Assessment Centre, DRDO, New Delhi expired during his tenure as Vice-President, INAE. He had made outstanding research contributions in the areas of simulation of complex reactions in Fixed Bed Reactors, hydrodynamics of multiphase reaction systems, and modeling of chemical accidents.
3. Mr. VP Sandlas, Formerly Distinguished Scientist and Chief Controller R&D, DRDO, New Delhi had made outstanding contributions in the review and management of Electronics, Instrumentation, Computer Science and Systems Group of DRDO Laboratories.
4. Prof. UR Rao, Chairman, PRL Council, Department of Space, Bangalore and formerly Secretary, Department of Space and Chairman & Member, Space Commission had made outstanding contributions in the development of the Indian Space Programme and played a leadership role in the applications of Space Technology to several spheres of national importance.
5. Prof. Yash Pal, Formerly Chairman, UGC had made outstanding contributions as a globally renowned physicist, academician and higher education reformer in the country. He was internationally acclaimed for his pathbreaking research in the fields of cosmic rays, high energy physics, astrophysics, space technology and communication.
6. Dr. Debabrata Basu, Scientist, Central Glass and Ceramic Research Institute, Kolkata had made significant research contributions in the areas of Bio-Ceramics and Biomedical Engineering.
7. Prof. VC Kulandaiswamy, Chairman, Tamil Virtual University, Chennai and formerly Vice-Chancellor, Anna University had made significant research contributions in the areas of Hydrology and Water Resources Engineering.
8. Prof. MAL Thathachar, Formerly Professor, Department of Electrical Engineering, Indian Institute of Science, Bangalore had made significant research contributions in the areas of Electrical Engineering and Systems Engineering.
9. Prof. CA Murthy, Head, Machine Intelligence Unit, Indian Statistical Institute, Kolkata had made significant research contributions in the areas of Pattern Recognition, Computer Vision, Image Processing, Machine Learning, Neural Networks, Fuzzy Logic, and Data Mining.



INAE Annual Convention

INAE has endeavoured to increase its engagement with the Industry since it is essential being an Engineering Academy. This was discussed in one of the Governing Council meetings and Mr. K Ananth Krishnan, FNAE, Executive Vice-President and CTO, TCS and member of Governing Council volunteered to explore the possibility for hosting the event at TCS, Chennai.

Thereafter, at the initiative of Mr. K Ananth Krishnan, TCS confirmed to host the INAE Annual Convention at its SIPCOT IT Park, Siruseri, Chennai from 15th to 17th Dec 2017. TCS developed an App for the Annual Convention and set up a Cell to engage with the INAE Fellowship whereby the Annual Convention was attended by around 200 Fellows. Dr. BN Suresh, President, INAE requested Mr. N Chandrasekaran, Chairman, Tata Sons, Mumbai to be the Chief Guest in the Inaugural Session to which he kindly consented.

The Annual Convention commenced with the Inaugural Session on Dec 15, 2017 during which Mr. K Ananth Krishnan, Executive Vice-President and Chief Technology Officer, TCS, Chennai delivered the Welcome Address. This was followed by the Presidential Address by Dr BN Suresh, President, INAE. The highlight of the event was the Address by the Chief Guest, Mr. N Chandrasekaran, Chairman, Tata Sons, Mumbai who with his enlightening and inspiring words enthralled the august audience comprising of Fellows of INAE, awardees, special invitees and delegates from TCS, Chennai. The Key-note Address was delivered by Mr. Rajesh Gopinathan, CEO, TCS.

Since a large number of senior Fellows from Industry elected during the current year under Rule 37(g) had consented to attend the Inaugural Function, a special Induction Ceremony was held immediately after the Inaugural Session. During this Session, the following senior eminent persons from Industry were formally inducted into the Academy as Fellows.

- (i) Mr. N Chandrasekaran, Chairman, Tata Sons, Mumbai.
- (ii) Mr. Atul Sobti, Chairman & Managing Director, Bharat Heavy Electricals Ltd., New Delhi
- (iii) Mr. Narayanaswamy Venkataramani, CMD, India Pistons Ltd., Chennai.
- (iv) Mr. Prakash Kumar Singh, Chairman, Steel Authority of India Ltd., New Delhi

The new INAE website designed and developed was then launched jointly by Mr. N Chandrasekaran, Chairman, Tata Sons, Mumbai and Dr. BN Suresh, President, INAE.

The major scientific and engineering highlights of the Convention were the presentations by newly elected Fellows and Young Engineer Awardees/INAE Innovator Entrepreneur Awardees which were held in two Parallel Sessions on Dec 15-16, 2017. The list of the technical presentations by Fellows and Young Engineers/INAE Innovator Entrepreneur Awardees are given below.

Presentations by Newly Elected Fellows on Dec 15-16, 2017

- ❖ Dr. Jayanta Chattopadhyay - Full scale component to miniature specimen tests and analysis – Some research findings on material and fracture mechanics issues
- ❖ Prof. Ashok M Raichur - Towards development of better therapeutic delivery systems using engineered nanostructured materials

- ❖ Mr. P Kunhikrishnan - Launch Complex System – The Way Forward
- ❖ Prof. CS Desai - Mechanics, Physics and Philosophy of Materials: Constitutive Modeling with the Disturbed State Concept (DSC)
- ❖ Prof. R Rengasamy - Process Systems Engineering - A key to Many Locks
- ❖ Dr. SC Sharma - Indigenous Capacity Building for High Temperature Materials for Space
- ❖ Dr. J Nayak - Indigenous Development and Commercialization of Fiber Optic Gyroscopes for Control and Navigation Applications- A Success Story
- ❖ Prof. AR Mohanty - Acoustical Materials for Noise Control
- ❖ Mr SK Soonee - Challenges of Evolving Indian Power Grid
- ❖ Prof. Rangan Banerjee - Modelling of Energy Systems
- ❖ Mr VVR Sastry - ABCD Technologies for career growth
- ❖ Prof. Anil D Sahasrabudhe - Transformation of engineering education in India
- ❖ Prof. Mahesh Kumar - Role of Microgrids in Current Energy Scenario of India and the World
- ❖ Prof. Ravi Shankar - Engineering a supply chains for growth of our nation
- ❖ Prof. GA Kottantharayil - Performance Losses in Photovoltaic Modules Operating in the Field
- ❖ Mr. S Pandian - Indigenous design and development of state of the art industrial Hypersonic Wind Tunnel and Shock Tunnel
- ❖ Mr. JD Patil - Contribution to development of Indigenous Defence Industry
- ❖ Prof. PK Tewari - Low Carbon Desalination and Water Purification
- ❖ Prof. P P Mujumdar - Urban Floods : An Evolving Engineering Challenge
- ❖ Prof. Ligy Philip - Remediation of Contaminated Water, Soil and Aquifers
- ❖ Dr. Indranil Chattoraj - Hydrogen effects in material degradation
- ❖ Dr. Sriram K. Rajamani - Designing Robust Software: From Theory To Practice
- ❖ Prof. Sunil Nath - An Engineering Approach to Biology at the Molecular Level
- ❖ Prof. Laxmidhar Behera - The Robotic Intelligence - Challenges and Opportunities
- ❖ Dr. Archana Sharma - Indigenous Development of Multi-Gigawatt Pulsed Power System and Applications



- ❖ Dr. Akhilesh Gupta - Climate Change and Extreme Weather Events in India
- ❖ Dr. Manav Bhatnagar - Feedback-Based Free-Space Optical Communication
- ❖ Prof. Hema A Murthy - The importance of group delay functions in speech synthesis

Presentations by INAE Young Engineer Awardees/ INAE Innovator Entrepreneur Awardee on Dec 15-16, 2017

- ❖ Dr. Praveen Kumar - Effect of Electric Field on Time-Dependent and Time-Independent Mechanical Properties of CNT Forests
- ❖ Mr. Naimesh R Patel - Design and Development of Refocusing System For Indian High Resolution Imaging Satellites
- ❖ Dr. Supreet Saini - 'Predicting evolution of antibiotic resistance
- ❖ Dr. Sandeep Anand - Non-invasive Techniques for Health Monitoring of Capacitor in Single Phase Solar Inverter
- ❖ Dr. Aritra Hazra - Leveraging Formal Methods For Design Certification of Integrated Circuits: Beyond Functional Correctness
- ❖ Dr. Sushmee Badhulika - Nanomaterials based low cost flexible and wearable electronics for healthcare
- ❖ Dr. Arpita Patra - Multi-party Computation
- ❖ Dr. Poonam Kumari - Three-Dimensional Solutions for Hybrid laminates Subjected to Arbitrary Boundary Conditions using Extended Kantorovich Method
- ❖ Dr. Samaresh Das - Silicon Based Efficient Scalable Photodetectors and Gas Sensors
- ❖ Mr. Tanuj Jhunjhunwala (INAE Innovator Entrep. Awardee) - India's first Commercial and Indigenous Underwater Robotic inspection and Survey Solutions

Award Function on Dec 15, 2017

The Grand Award Ceremony was held on the evening of December 15, 2017. During this Ceremony, INAE awardees of Life Time Contribution Award; Professor Jai Krishna and Prof. SN Mitra Memorial Awards; and Outstanding Teacher Award were felicitated, besides the award winners of Innovative Student Projects Award at Doctoral (five), Master's (five) and Bachelor levels (ten); INAE Young Engineer Award 2017 (ten) and INAE Innovator Entrepreneur Awards 2017. These awardees were invited along with their families.

The following awards were conferred during this Ceremony.

Outstanding Teachers Award 2017

1. Prof. (Dr.) Ganapati Panda, Professor and Deputy Director, Indian Institute of Technology Bhubaneswar, Bhubaneswar was conferred the award in recognition of his contributions in the areas of Electronics and Communication Engineering through his pathbreaking academic research, teaching and professional leadership.



Prof Ganapati Panda being conferred the INAE Outstanding Teachers Award 2017 by Dr BN Suresh, President, INAE

2. Prof. S Narayanan, Professor Emeritus(Adjunct), Indian Institute of Information Technology (Design and Manufacturing), Chennai was conferred the award in recognition of his outstanding teaching and seminal research contributions in the areas of Vibration, Acoustics and Noise Control and for mentoring students to excel in their professional life.



Prof S Narayanan being conferred the INAE Outstanding Teachers Award 2017 by Dr BN Suresh, President, INAE

Prof Jai Krishna Memorial Award 2017

Prof. K Chattopadhyay, INAE Distinguished Professor, Department of Materials Engineering, Indian Institute of Science, Bangalore was conferred the award in recognition of his outstanding research contributions in the field of quasicrystals and nanomaterials research and pioneering work on embedded nanoparticles and their transformation behaviour.



Prof K Chattopadhyay being conferred the Prof Jai Krishna Memorial Award 2017 by Dr BN Suresh, President, INAE

Prof SN Mitra Memorial Award 2017

Prof. SC Dutta Roy, Formerly Professor of Electrical Engineering, IIT Delhi was conferred the award in recognition of his outstanding contributions as a researcher and educationist in the areas of Radio Physics and Electronics and for mentoring students through virtual teaching and video courses.



Prof SC Dutta Roy being conferred the Prof SN Mitra Memorial Award 2017 by Dr BN Suresh, President, INAE

Life Time Contribution Award in Engineering Award 2017

1. Mr. Azim Hasham Premji, Chairman & Managing Director, Wipro Limited, Bangalore was conferred the award in recognition of his outstanding contributions and key role in the growth of the Information Technology (IT) industry in the country and as business leader for commitment towards philanthropic work.



Mr Azim Hasham Premji



2. Prof. TK Ghose, Founding Chair, Biochemical Engineering and Biotechnology, IIT Delhi was conferred the award in recognition of his outstanding contributions as an academician and for his pioneering role in creating awareness of the discipline of Biochemical Engineering and Biotechnology in the Country.



Prof TK Ghose

Innovative Student Projects Award and National Online Essay Competition as INAE Student-Members

The winners of Innovative Student Projects Award at Doctoral, Master's and Bachelor level and National online Essay Competition were felicitated as "INAE Student-Members" and presented a Certificate specifying the period of student membership of five years along with an Identity Card.

Annual General Meeting of Fellows on Dec 16, 2017

The 27th Annual General Meeting of Fellows was held on Dec 16, 2017. During the Induction Ceremony, besides the formal induction of newly elected Fellows, who also signed the Admission Register, the winners of INAE Young Engineer Award were also inducted formally as "INAE Young Associates" so as to encourage, motivate and involve them in the INAE activities. The details of the Fellows and INAE Young Associates who were formally admitted into the Academy by the President, INAE are given below.

Fellows/Foreign Fellows

Prof. PP Mujumdar, Prof. Ligy Philip, Prof. CS Desai, Prof. Hema A Murthy, Dr. Sriram K Rajamani, Prof. L Sunil Chandran, Prof. AR Mohanty, Prof. R Gnanamoorthy, Dr. Jayanta Chattopadhyay, Mr. Jayant Damodar Patil, Dr. Dasharath Ram, Dr. N Ravichandran, Prof. Sushanta Mitra, Prof. GD Yadav, Prof. Raghunathan Rengasamy, Prof. PK Tewari, Dr. NV Choudary, Mr. AN Deshpande, Prof. Mahesh Kumar, Prof. Laxmidhar Behera, Dr. Archana Sharma, Mr. SK Soonee, Prof. R. Sarathi, Prof. Anil Kottantharayil, Dr. Manav Bhatnagar, Mr VVR Sastry, Prof. PR Kumar, Mr. S Pandian, Dr. Jagannath Nayak, Mr. P Kunhikrishnan, Prof. Ashok M Raichur, Dr. Indranil Chattoraj, Dr. SC Sharma, Prof. Rangan Banerjee, Mr. Kuljit Singh Popli, Prof. Ravi Shankar, Prof. Sunil Nath, Prof. Anil D Sahasrabudhe, Dr. Akhilesh Gupta and Prof. JN Reddy.

INAE Young Associates

Mr. Naimesh R Patel, Dr. Supreet Saini, Dr. Poonam Kumari, Dr. Aritra Hazra, Dr. Arpita Patra, Dr. Sandeep Anand, Dr. Mayank Shrivastava and Dr. Samaresh Das.

Dr. BN Suresh then briefed the House on some of the important activities carried out by INAE since the last General Body Meeting. During the Brainstorming Session, Dr. BN Suresh, President, INAE requested the Fellows to give their suggestions. This was followed by the Presentations by Conveners of Sectional Committees highlighting the activities planned for the next one year. The presentations by Conveners/ Members of the Sectional Committee-V (Electrical Engineering) and Sectional Committee-VII (Aerospace Engineering) on the activities planned during the year 2018 by Sectional Committees were made.

Sideline Meetings held on Dec 15-16, 2017

A Round Table Discussion meeting of selected Fellows was held on Dec 15, 2017 at TCS chaired by Dr. PS Goel, Past-President, INAE during which a Concept Paper on “Outcome of Engineer’s Conclave” and “Make in India: How to make it happen” were discussed and deliberated.

Plenary Talks

Two enlightening Plenary talks were delivered during the INAE Annual Convention 2017. The First Plenary Talk was delivered by Padma Vibhushan Sangita Kalanidhi Dr Umayalpuram K Sivaraman on “Voyage of Mrudangam” who also gave a brief demonstration on the Mrudangam. The Second Plenary Talk was delivered by Shri S Somanath, Director, LPSC, Trivandrum on “Engineering Challenges in Development of High Thrust Cryogenic Engine”

Special Talk

A Special Talk was delivered by Mr. K Ananth Krishnan, Executive Vice-President & CTO, TCS on “TCS Research and Innovation Highlights” on Dec 15, 2017 wherein he gave a brief overview of the research and innovation activities undertaken by TCS, Chennai.

Cultural Programme

There was an entertaining musical cultural programme on Dec 15, 2017 during which engineers of TCS sang entertaining songs and played instrumental music which was appreciated by all.

Industry Session

An Industry Session was held on Dec 16, 2017 which featured Lectures by winners of INAE Innovator Entrepreneur Award as under

Dr. Vinay Kumar	Next Generation Bio-sensing for Diabetes, Chronic Kidney Disease, Anaemia & Malnutrition
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Dr. Mandava Mohana Rao	Design and Development of 420 kV Gas Insulated Switchgear (GIS)
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Sideline Meetings of INAE Forums

The meetings of the INAE Forum on Energy Chaired by Dr Ajay Mathur and Forum on Engineering Education, chaired by Prof Prem Vrat were held on Dec 16, 2017 on the sidelines of the INAE Annual Convention. The meetings were attended by the Members of the Forums and the special invitees.



Digital Knowledge Resource Centre

INAE had set up a Digital Knowledge Resource Centre (DKRC) at 6th floor, Vishwakarma Bhawan, Shaheed Jeet Singh Marg, New Delhi to establish digital services in INAE.

DKRC Expert Pool

INAE Fellowship represents India's most accomplished and distinguished pool of engineers, engineer-scientists and technologists covering the entire spectrum of engineering disciplines. INAE is the apex body to promote and advance the practice of engineering and technology and the related scientific disciplines in the country and facilitate their expertise to address the issues and problems of national importance. To facilitate government agencies, engineering consultancies and other engineering bodies to find an expert in a concerned engineering field, INAE has launched a web based directory - EXPERT POOL in ENGINEERING.

The EXPERT POOL hosts profiles of INAE Fellows and INAE young associates which is accessible through INAE website. This directory provides the name of Engineering Expert, contact details, Qualification, Major Professional Contributions, Specialization, Sectors Associated with, Sectors Interested to Offer Service and Areas of Interest.

DKRC e- remote access

INAE has restricted access to publications from international databases like IEEE Xplore, Emerald Insight, Royal Society of Chemistry, Taylor & Francis and Wiley which are provided by National Knowledge Resource Consortium, an e-consortium of CSIR-DST Labs for the purpose of sharing knowledge.

The databases provide INAE with engineering journals, Science journals and management journals. To extend the access to all INAE Fellows at their place of convenience, **e-remote access** facility was created by installing a Dell Power Edge Server at INAE DKRC. Each INAE Fellow has been assigned a unique user id and a corresponding password so that they can avail read only facility of the existing journals.

Online remote access to e-resources has been enabled through a user friendly web and is available 24hrs, 7 days a week.

Articles from the databases can also be downloaded at INAE DKRC on request sent by Fellows.

DKRC Online Repository

An institutional repository of Research work / Engineering contributions including abstracts of publications of individual INAE Fellows is being created in DKRC. This internal Repository would be used only for sharing of content within INAE Fellows.

The published research works pertaining to various INAE Fellows who are in academia and research have been extracted from respective institutional websites and other open public domain. Till date 379 profiles of Fellows have been prepared and are being uploaded through Knimbus platform. Presently 176 profiles have been uploaded. The platform has provision for self uploading facilities for INAE Fellows.

The following features have been incorporated in the repository:

- a) **Search based on Author's name:** Any INAE Fellow may be able to search the research publications of another INAE Fellow by using author's name.
- b) **Search based on Engineering Discipline:** Any Fellow would also be able to search for research publication based on engineering discipline (e.g. electrical engineering, chemical engineering etc.).
- c) **Single Window Search:** Single window facility for searching based on topic, keyword, title of paper, subject or author name so that any INAE Fellow can get the desired research publication by using any of the criteria mentioned above.
- d) **Two blocks:** In the repository section, separate blocks have been provided to access the research work – one block pertaining to research publications of INAE Fellows and the other block pertaining to CAETS Academies.

INAE Digital Platform

INAE Digital Committee has been proposed to be set up by Dr. Pradip, Vice President, INAE to comprise of 7 members as below:

- a. Mr. K Ananth Krishnan, TCS
- b. Dr. Pradip, TCS
- c. Dr. Manish Gupta , VideoKen Software
- d. Prof. Hema A Murthy, IIT Madras
- e. Dr. Sriram K Rajamani, Microsoft Research
- f. Dr. Krithivasan Ramamritham, IIT Bombay
- g. Mr. Vinay Vasant Kulkarni, TCS

The Committee had the first V Con meeting held on Apr 20, 2018. The Digital Platform Committee members proposed to restructure the existing system. The Committee suggested that in the new Digital Platform, INAE data maintenance by multiple vendors will be replaced by a single vendor and Cloud Platform will be used to store INAE data replacing any physical server which is being used presently.

The transition to new platform will take place in three phases including Transactional Activities, Information Downloads and User generated Content and sharing of Information.

The proposed plans for the activities are as under:

1. **Transactional Activities** –These will include
 - Fellow Nomination, Essay Review,
 - Ticket and Accommodation requisition,
 - Any resource sharing (e –resource, etc).
 - Publishing Minutes of Meeting
 - Registration for INAE Particular event (eg Annual Convention, Outstation Meetings etc)

The entry to information will be restricted to INAE Fellows and authorized through secure login credentials.



2. **Information and Downloads-** These will include activities essentially to disburse information to a web user.
 - INAE Expert Pool
 - These can include INAE downloadable publications and reports
 - INAE Activity Schedule, brochure
 - INAE Videos having interactions of INAE Presidents and INAE Fellows on latest development in Engineering Arena both national and international and can be named as “ **INAE Eminence**”
 - Videos on INAE Youth Forum Activities
 - INAE Chapter Activity Reports
3. **User generated Content and sharing of Information-** This phase envisages engaging engineering fraternity of the country by creating
 - INAE Blogs
 - INAE Webinars

Conversion of INAE publications in e book

INAE Publications were available as hyperlinks on website and were downloadable on clicking the hyperlinks until 2017. Since INAE Fellows wanted readable format., a software, FlipBook Creator Windows version (4.3.24) of Flippagemaker was purchased to convert publications into flip book (e-book) format.

Presently most of INAE Publications are available online in easy readable and downloadable format. The publications have been categorized into INAE Publications, Annual reports, e-News letter and Research Studies. All the categories are accessible from homepage under the tab “Publications” through the link <https://inae.in/publications/>.

Publications of the Academy

Research Journal -INAE Letters

INAE had launched a quarterly journal “INAE Letters” published by M/s Springer in the year 2016. The objective of the journal is to provide a medium for rapid publication of new research results and invited short review articles across different domains of engineering science and technology. Four issues of the journal INAE Letters were brought out during the year 2017. The journal INAE Letters was originally instituted to ensure the speedy publications of short communications of maximum 3-4 pages. However, during the meeting of the INAE Editorial Committee and Committee constituted for publication of the journal INAE Letters held on Feb 1, 2018, it was expressed that there is a need to improve the quality of the publication and increase its outreach in the engineering fora. With the objective of soliciting a larger number of high quality papers and to gain wider presence at national and international domains, it was decided that the scope of journal INAE Letters be expanded and the existing format be changed to include papers besides short communications. To facilitate this the name of the publication will soon be changed from “INAE Letters” to “INAE Journal”.

The “INAE Journal” will now accommodate three formats of submissions as given below.

- (i) Review articles of length upto 12,000 words
- (ii) Original research articles of upto 6000 words
- (iii) Technical Notes of approximately 3500 words.

Efforts are also ongoing to obtain a Scopus Index for the journal so as to expand its online presence, improve article content, and build a reputation as a high-quality publication. For the first two years the journal was not priced by M/s Springer and was available in Open Access format. However, from the third year onwards there would be closed access to the Journal and the issues would be priced even for downloading e-issues. Improving the content of the journal and also increasing the number of high quality submissions are a top priorities and efforts are in progress to achieve these objectives.

Research Study Report on “S&T Trends and Alerts in Heterocyclic Chemistry & Engineering”

INAE undertook a Research Study on “S&T Trends and Alerts in Heterocyclic Chemistry & Engineering” which was jointly carried out with CSIR-IICT, Hyderabad. Late Dr KV Raghavan, FNAE was the Coordinator of the study. This study was initiated as a follow -up activity emanating from the recommendations of the study on “R&D Impact on Indian Chemical Industry” undertaken by INAE at the behest of the Office of the PSA to GoI during 2009-11. The major focus of the study on “S&T Trends and Alerts in Heterocyclic Chemistry & Engineering” is to trace the S&T trends in chemistry, catalysis, material science and engineering of heterocyclic products and processes related to pharmaceuticals,



agrochemicals and advanced materials. The outcome of the project was to provide a viable information search methodology which could serve as a model for developing a National Technology Alert System in chemical and allied industrial sectors. It was suggested that the search methodology developed in the chemical sector with an illustrative example of heterocyclic chemistry could help facilitate scientists to create S&T Alert Systems in other domain areas of scientific and engineering interest. The goal of this exercise would be to develop an academic research-industry support mechanism and sensitize all concerned with a view to keep the country ahead in selected S&T fields at the global level. The Research Study report was published in March 2018 and copies of the report were forwarded to the PSA to Government of India, Secretary, DST and all concerned stakeholders from the industry and Government agencies for further follow-up actions.

Statement of Accounts

2017-18



Indian National Academy of Engineering



JAIN PRAMOD JAIN & CO..
CHARTERED ACCOUNTANTS

Phone : 41401901
Email : jainpjco@gmail.com
F-591, Sarita Vihar
New Delhi - 110076

THE MEMBERS
INDIAN NATIONAL ACADEMY OF ENGINEERING
NEW DELHI – 110 016

AUDITOR'S REPORT

We report that we have audited the Balance Sheet of **INDIAN NATIONAL ACADEMY OF ENGINEERING** as at March 31st, 2018 and also the Income and Expenditure Account for the year ended on that day annexed thereto. These Financial statements are the responsibility of the Academy's Management. Our responsibility is to express an opinion on these financial statements based on our Audit.

We conducted our Audit in accordance with auditing standards generally accepted in India. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An Audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An Audit also includes assessing the accounting principles used and significant estimates made by the management, as well as evaluating the overall financial statement presentation. We believe that our Audit provides a reasonable basis for our opinion.

We report that;

- (i) We have obtained all that information and explanations which to the best of our knowledge and belief were necessary for the purpose of our audit.
- (ii) In our opinion, proper books of account as required by the law have been kept by the Academy so far as appears from our examination of those books.
- (iii) The Balance Sheet and the Income and Expenditure Account dealt with by this report are in agreement with the books of account.
- (iv) In our opinion, the Balance Sheet and Income and expenditure Account dealt with by this report comply with the accounting standards.
- (v) In our opinion and to the best of our information and according to the explanations given to us, the said accounts, read with accounting policies and Notes to Accounts thereon, give a true and fair view in conformity with accounting principles generally accepted in India :
 - a) In the case of Balance Sheet, of the state of affairs of the Academy as at March 31, 2018 and
 - b) In the case of Income and Expenditure Account, of the surplus of Income over Expenditure of the Academy for the year ended on March 31, 2018.

Place: New Delhi
Dated: 21 June, 2018

For Jain Pramod Jain & Co.
Chartered Accountants
(Firm Registration No. 016746N)

(P.K. Jain)
Partner

(Membership No. 010479)

BALANCE SHEET AS AT 31ST MARCH, 2018

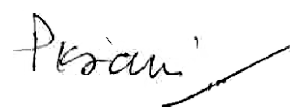
(Amt in Rs)

	Current Year 2017-18	Previous Year 2016-17
CORPUS/CAPITAL FUND AND LIABILITIES		
CORPUS/GENERAL FUND	11,41,54,005	10,92,93,882
EARMARKED ENDOWMENT FUNDS	1,06,99,402	99,16,986
CURRENT LIABILITIES AND PROVISIONS	4,52,68,353	3,98,41,688
TOTAL	17,01,21,760	15,90,52,556
ASSETS		
FIXED ASSETS	3,12,83,033	3,49,55,398
INVESTMENTS - FROM EARMARKED/ENDOWMENTT FUNDS	1,14,36,392	1,00,00,000
INVESTMENTS - OTHERS	10,87,30,131	9,54,75,208
CURRENT ASSETS, LOANS, ADVANCES ETC.	1,86,72,204	1,86,21,950
TOTAL	17,01,21,760	15,90,52,556

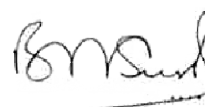
As per our report of even date

On behalf of the Council:

FOR JAIN PRAMOD JAIN & CO
CHARTERED ACCOUNTANTS
(Firm Reg. No. - 016746N)



(P.K. Jain)
Partner
(Membership No. 010479)



(Dr BN Suresh)
President



(Brigadier Rajan Minocha)
Executive Director



(Bhuwan Adhlakha)
Manager (F & A)

Place : New Delhi
Dated : 21 June, 2018



INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2018

(Amt in Rs)

	Current Year 2017-18	Previous Year 2016-17
INCOME		
Grants / Subsidies	6,43,03,746	4,89,20,513
Fees/ Subscriptions	-	25,000
Income from Investments	41,62,671	35,10,337
Income from Royalty, Publication etc.	18,430	1,24,756
Interest Earned	51,31,538	45,30,590
Other Income	3,30,594	2,61,410
TOTAL (A)	7,39,46,979	5,73,72,606
EXPENDITURE		
Establishment Expenses	1,35,47,004	1,34,24,656
Other Administrative Expenses etc.	39,87,605	39,71,984
Expenditure on Engineering Programmes and Activities		
i) Seminars / Conferences / Symposia / Workshops	41,38,882	52,15,360
ii) INAE Chair, Distinguished Professors & Mentoring Schemes	80,93,362	59,76,677
iii) Research Studies/ Projects	18,27,548	34,34,745
iv) INAE Awards	45,87,502	36,51,055
v) Academia-Industry Interaction	3,33,340	2,89,949
vi) INAE Forums	2,53,167	1,84,643
vii) Academy Meetings	35,25,940	25,91,186
viii) Annual Convention	25,87,366	21,52,535
ix) International Affairs	16,46,392	20,44,505
x) INAE Publications	8,19,754	15,52,494
xi) Financial Assistance for Engineering Activities	4,60,000	9,00,000
xii) SERB-INAE Abdul Kalam Technology Innovation National Fellowship	59,33,717	-
xiii) INAE Digital Knowledge & Research Centre Repository	4,34,364	2,63,656
Depreciation (Net Total at the year end - corresponding to Schedule 4)	36,68,592	42,22,193
Total (B)	5,58,44,535	4,98,75,638
Balance being excess of Income over expenditure (A-B)	1,81,02,444	74,96,968
Transfer to DKRC Development Fund	7,82,416	4,99,386
Transfer to Corpus Fund	33,80,255	34,04,059
Transfer to Fixed Assets (Grant utilised for Capital Assets)	1,23,92,904	17,8731
BALANCE BEING SURPLUS / (DEFICIT) CARRIED TO GENERAL FUND	15,46,869	34,14,792

As per our report of even date

For JAIN PRAMOD JAIN & CO
CHARTERED ACCOUNTANTS
(Firm Reg. No. : 016746N)

(P.K. Jain)
Partner
(Membership No. 010479)

Place : New Delhi
Dated : 21 June, 2018

On behalf of the Council:

(Dr BN Suresh)
President

(Brigadier Rajan Minocha)
Executive Director

(Bhuwan Adhlakha)
Manager (F & A)

INDIAN NATIONAL ACADEMY OF ENGINEERING

SCHEDULE-17

ACCOUNTING POLICIES

1. **Basis of Accounting**

These accounts are prepared on the basis of historical cost convention and on the accrual method of accounting.

2. **Grant-in-aid**

Grant received from the Department of Science & Technology and others are accounted to the extent utilized and unspent grant has been shown under current liabilities. Grants relating to fixed assets have been shown under Income and Expenditure Account and its utilization has been transferred to fixed assets under section 11(1) of The Income Tax Act, 1961.

3. **Fixed Assets**

Fixed Assets are stated at cost of acquisition including inward freight, duties and taxes and direct expenses related to acquisition.

4. **Depreciation on Furniture and Office Equipments**

Fixed Assets are depreciated on written down value method of depreciation as per following rate prescribed in Income Tax Rules

Building	- 10%	Office Furniture	- 10%
Office Equipments	- 15%	Computers	- 60%

However no depreciation has been provided on assets purchased from 01.04.2017 and applied u/s 11 (1) of The Income Tax Act 1961, and in fixed assets schedule it has been shown as utilization under section 11 (1) of Income Tax Act 1961.

5. **Interest on Investment**

There are two types of Investments, one against Corpus and General Fund and the other against Earmarked Funds which have been included in Income and Expenditure account and transferred to respective fund.

6. **Gratuity & Leave Encashment**

Provision for Gratuity is made as per The payment of Gratuity Act, 1972 and provision for accumulated leave and encashment has been made on the basis of no. of days of leave accumulated for employee. Actuarial valuation is not made to ascertain such liability.



SCHEDULE-18

CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS

1. Contingent Liabilities claims against the entity not acknowledged as debts Rs. NIL (Previous year Rs. NIL).
2. Balance Sheet and Income and Expenditure account from the current year has been prepared as per uniform format of accounts for Central Autonomous Bodies prescribed by the committee of expert constituted with the approval of Honable Finance Minister Accordingly figures of previous year's Balance Sheet and Income and Expenditure Account has been regrouped/reclassified.
3. Interest Income of Rs. 41,37,482/- and Foreign Grant Fund of Rs. 65,800/- which was credited to general fund as on 31.03.2017 has been included in Income and Expenditure Accounts and transferred to General Fund.
4. Figures in Balance Sheet and Income and Expenditure Account have been given as applicable to INAE as per uniform format except Expenditure on Engineering programme and activities have been included in Income and Expenditure Account. Schedule given in uniform format not applicable to INAE has not been given.
5. During the year ended March 31, 2018 a sum of Rs. 43,40,000/- has been received from DST and a sum of Rs. 86,97,967/- had been brought forward from previous year for Grant-in-aid towards capital asset creation. Out of the said grant a sum of Rs. 1,23,92,904/- has been utilized towards procurement of Fixed Assets and the balance amount has been carried forward for utilization/surrender during the next financial year.
6. The balance of security deposits and advances are subject to confirmation/reconciliation.
7. INAE corpus fund was created in the financial year 2015-16 as approved in governing council meeting held on December 09, 2015 by transfer of Rs. 3,62,00,000/- from the balance available in the general fund as on April 01, 2015 and surplus Rs. 45,00,000/- of financial 2015-16. Interest on corpus fund investment has also been credited to such fund.
8. Figures are rounded off to Rupees.

As per our report of even date

For JAIN PRAMOD JAIN & CO
CHARTERED ACCOUNTANTS
(Reg. No. : 016746N)

(P.K. Jain)
Partner
(Membership No. 010479)

Place : New Delhi
Dated : 21 June, 2018

On behalf of the Council:

(Dr BN Suresh)
President

(Brigadier Rajan Minocha)
Executive Director

(Bhuwan Adhlakha)
Manager (F & A)

INAE OFFICE and DKRC

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