THE IITG MONITOR

Indian Institute of Technology Guwahati

In this issue

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15th Convocation

The 15th Convocation of IIT Guwahati was held on 8 June 2013 at the Institute's auditorium. Dr. M. M. Pallam Raju, Union Minister of Human Resource Development, Government of India, was the Chief Guest and delivered the Convocation address. The Chairman of Board of Governors, IIT Guwahati, Dr. Rajendra Pratap Singh, was present at the Convocation and addressed the graduating students and guests. 940 students – including 431 BTech and BDes, 44 MA, 95 MSc, 305 MTech and MDes, and 65 PhD – were conferred their degrees at the Convocation. The number of degree recipients has increased by 9.56% compared to the 14th Convocation.

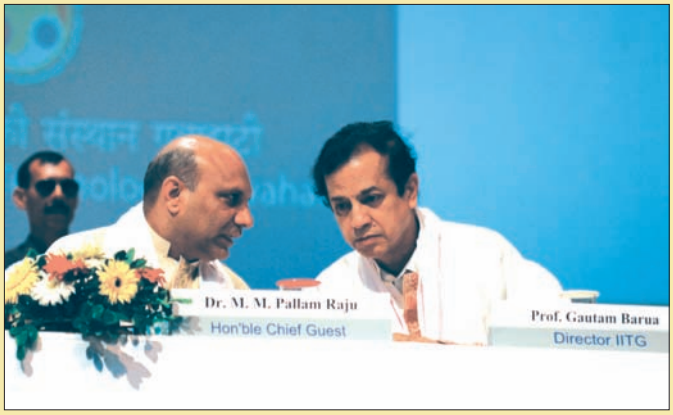
Dr. M. M. Pallam Raju addressing the audience

Degrees	13th Convocation (2011)	14th Convocation (2012)	15th Convocation (2013)
BTech/BDes	340	362	431
MA	13	42	44
MSc	87	114	95
MTech/MDes	230	269	305
PhD	60	71	65
Total	**737**	**858**	**940**

Delivering his Convocation speech, Dr. Raju stressed the need of quality education for development. Dr. Pallam Raju also highlighted the efforts of Government of India in establishing a number of technical and higher educational institutes in the north eastern region. Lauding the efforts of IIT Guwahati in various aspects of education and research, and appreciating various milestones that IIT Guwahati had achieved, Dr. Pallam Raju said, "In its short existence of nearly two decades, IIT Guwahati has achieved many milestones. It has been able to develop a state of the art infrastructure in this beautiful landscape. It has created advanced facilities for research and has regularly been getting a large number of sponsored research projects and consultancies. It was the first IIT to start a well subscribed undergraduate programme in design. The infrastructure and facilities created here have helped it to attract constantly good faculty".

Dr. R. P. Singh delivering his speech

While commenting on IIT Guwahati's important role as a pace setter, Dr. Raju said, "With the projected development of infrastructure and progressive industrialisation in wake of the Government's LOOK EAST policy, more institutions imparting technical and higher education are likely to come up in this region. IIT Guwahati, being the only IIT in the Northeast region, has to act as a pace setter and provide



Dr. M. M. Pallam Raju and Prof. Gautam Barua on the dias

academic, research and innovation leadership through active networking with all these existing and upcoming institutions".

He urged the Institute to work towards mitigating natural disasters, develop technology with low input costs, upgradation of infrastructure in NE region, using the

The Chief Guest along with the members of the Board of Governors and Senate

Brahmaputra more fruitfully, etc. Dr. Pallam Raju hoped that IIT Guwahati will soon act as regional hub of National Knowledge Commission and NP-TEL and will engage further with the educational institutes of South East Asia. He urged the graduating students to think about the nation, inculcate leadership qualities and take the country to greater heights.

The Chairman, Board of Governors, IIT Guwahati, Dr. R. P. Singh, addressed the gathering and stressed the need of fruitful amalgamation of industry and academia and take India forward.

Mandar Narsinh Kulkarni receives the President of India Gold Medal

Prof. Gautam Barua, Director, IIT Guwahati presented a report on the activities and achievements of the Institute during the year 2012–2013. Prof. Barua's report, filled with facts and figures, presented a picture of all round development of IIT Guwahati for the said year. The number of PhD students on campus is increasing every year, giving fillip to its continuous emphasis on research. Year 2012-2013 has seen a big jump

Prof. D. N. Buragohain (1R2), former Director, IIT Guwahati, Shri Alok Mishra (1R3), Director (IITs), MHRD and other invitees

in numbers of PhD students, growing from 895 students in 2011 to 1113 in 2012. The current faculty to PhD students' ratio stands at a satisfactory 3.43. During the year 2012-2013 over 350 research and development projects were in progress, having a total sanctioned value of ₹ 151 crores. In the same year, IIT Guwahati received new projects of about ₹ 42.6 crores.

Graduating students and guests

The faculty members of the Institute published 592 research journal papers and 548 conference proceedings during the year 2012–2013. While lauding this Prof. Barua also mentioned that the Institute fell short when it came to technology transfer and patenting but at the same time expressed his confidence that these areas would improve.

While concluding his report, Prof. Barua said that it was time for him to move on from his current responsibilities as the Director of the Institute as his term ends soon. Prof. Barua has been in the Institute from almost the beginning and he has been in various administrative roles for the last 18 years, including the last ten as Director. Prof. Barua posed his faith on the graduating students that like the previous batches they would do very well in whatever career they choose and make the Institute proud.

Kailash Atal receives Dr. Shankar Dayal Sharma Gold Medal


The academic procession of the Chief Guest with the members of the Board of Governors and Senate

Shri Mandar Narsinh Kulkarni, BTech, Electronics and Communication Engineering, received the President of India Gold Medal for securing the highest Cumulative Performance Index among all the students of the batch receiving the degrees of Bachelor of Technology and Bachelor of Design.


Dr. M. M. Pallam Raju, Dr. R. P. Singh and Prof. Gautam Barua along with the medal winners

Shri Kailash Atal, BTech, Electronics and Communication Engineering, received Dr. Shankar Dayal Sharma Gold Medal for the year 2013. The medal is awarded to a graduating student adjudged to be the best in terms of general proficiency including character, conduct, excellence in academic performance, extra-curricular activities and social service.

Course on Applications of Lasers in Manufacturing

A QIP short-term course on 'Applications of Lasers in Manufacturing' was organised by the Department of Mechanical Engineering during 24–28 June 2013. A well number of participants from academic institutions of various parts of the country attended the course. Numbers of lectures covering the fundamentals of lasers, applications of lasers to machining, forming, welding and surface treatment and modelling and optimisation of laser based manufacturing processes were delivered along with demonstration of software packages. The participants also got hands on training on the programming of 2.5 kW CO_2 laser cutting machine which was set up at IIT Guwahati under DST-FIST programme. The course was coordinated by Dr. M. Ravi Sankar, Assistant Professor and Prof. U. S. Dixit, Mechanical Engineering.


Prof. A. Srinivasan, Dean, Faculty Affairs, speaking at the valedictory function

Publications (Research Journal/Book/Book Chapter)

Research Journal

Chemical Engineering

V. Singh, P. K. Jain and C. Das, "Performance of spiral wound ultrafiltration membrane module for with and without permeate recycle: Experimental and theoretical consideration", *Desalination*, 322, 94–103, 2013

V. Singh and C. Das, "Clarification of synthetic juice through spiral wound ultrafiltartion module at turbulent flow regime", *World Academy of Science, Engineering and Technology*, 73, 1118–1123, 2013

A. K. Dasmahapatra and G. D. Reddy, "Conformational transition of telechelic star polymers", *Polymer*, 54, 2392, 2013

A. Dasari, A. B. Desamala, A. K. Dasmahapatra and T. K. Mandal, "Experimental studies and PNN prediction on flow pattern of viscous oil-water flow through a circular horizontal pipe", *Industrial and Engineering Chemistry Research*, 52 (23), 7975, 2013

S. Chakma and V. S. Moholkar, "Physical mechanism of sono-fenton process", *AIChE Journal*, 2013 (DOI: 10.1002/aic.14150)

J. B. Bhasarkar, S. Chakma and V. S. Moholkar, "Mechanistic features of oxidative desulfurisation using sono-fenton-peracetic acid (ultrasound/Fe^{2+}-CH_3COOH-H_2O_2) system", *Industrial and Engineering Chemistry Research*, 2013 (DOI: 10.1021/ie400879j)

Chemistry

N. B. Palakurthy, D. Dev, S. Rana, K. C. Nadimpally and B. Mandal, "Sulfonamide synthesis via oxyma-o-sulfonates – Compatibility to acid sensitive groups and solid-phase peptide synthesis", *European Journal of Organic Chemistry*, 2013 (13), 2627–2633, 2013

D. Dev, N. B. Palakurthy, N. Kumar and B. Mandal, "An unexpected involvement of ethyl-2-cyano-2-(hydroxyimino) acetate cleaved product in the promotion of the synthesis of nitriles from aldoximes: A mechanistic perception", *Tetrahedron Letters*, 2013 (DOI: 10.1016/j.tetlet.2013.05.149)

Civil Engineering

R. Prasad, J. Singh, A. S. Kalamdhad, "Assessment of nutrients and stability parameters during composting of water hyacinth mixed with cattle manure and sawdust", *Research Journal of Chemical Sciences (RJCS)*, 3 (4), 70–77, 2013

J. Singh, A. S. Kalamdhad, "Effects of lime on bioavailability and leachability of heavy metals during agitated pile composting of water hyacinth", *Bioresource Technology*, 128, 148–155, 2013

J. Singh, A. S. Kalamdhad, "Chemical speciation of heavy metals in compost and compost amended soil – A review", *International Journal of Environmental Engineering Research*, 2 (2), 27–37, 2013

J. Singh and A. S. Kalamdhad, "Bioavailability and leachability of heavy metals during composting – A review", *International Research Journal of Environmental Sciences*, 2 (4), 59–94, 2013

A. K. Nayak and A. S. Kalamdhad, "Composting of sewage sludge based on different C/N ratios", *Journal of Chemical, Biological and Physical Sciences*, 3 (3), 2251–2268, 2013

M. K. Goyal, B. Donald H. and C. S. P. Ojha, "Precipitation simulation based on k-nearest neighbour approach using gamma kernel", *ASCE-Journal of Hydrologic Engineering*, 18 (5), 481–487, 2013

Electronics and Electrical Engineering

K. Karthik, S. Kashyap, "Transparent hashing in the encrypted domain for privacy preserving image retrieval", *Springer Journal of Signal, Image and Video Processing, Special issue on Image and Video Processing for Security*, 7 (4), 647–664, 2013

D. Dixit and P. R. Sahu, "Performance of QAM signalling over TWDP fading channels", *IEEE Transactions on Wireless Communications*, 12 (4), 1794–1799, 2013

Humanities and Social Sciences

D. Hussain and K. Zhiman Singh, "Poverty, social exclusion and health: A case study on the Koutruk community of Manipur", *Journal of Exclusion Studies*, 3 (1), 34–44, 2013

P. Sharma and A. Barua, "Analytic vs. continental philosophy: Space for the lived experiences", *International Journal of Humanities and Social Science Invention*, 2 (6), 11–13, 2013

P. Sharma and A. Barua, "The conflicting 'Other' in Jean Paul Sartre's existentialism", *Quest International Multidisciplinary Research Journal*, 2 (1), 75–78, 2013

Mathematics

S. Saha and S. N. Bora, "Trapped modes in a two-layer fluid of finite depth bounded above by a rigid lid", *Wave Motion*, 50, 1050–1060, 2013

P. Das and S. Natesan, "Richardson extrapolation method for singularly perturbed convection-diffusion problems on adaptively generated mesh", *CMES: Computer Modelling in Engineering and Sciences*, 96 (6), 463–485, 2013

R. Acharyya, B. Manjanna and G. K. Das, "Unit disk cover problem in 2D", *Lecture Notes in Computer Science-7972*, 73–85, 2013

Mechanical Engineering

L. Roy and S. K. Kakoty, "Optimum groove location of hydrodynamic journal bearing using genetic algorithm", *Advances in Tribology*, Article ID: 580367, 1–13, 2013

D. Sharma, A. Trivedi, D. Srinivasan and L. Thillainathan, "Multi-agent modelling for solving profit based unit commitment problem", *Applied Soft Computing*, 13 (8), 3751–3761, 2013

A. Trivedi, D. Srinivasan, D. Sharma and C. Singh, "Evolutionary multi-objective day-ahead thermal generation scheduling in uncertain environment", *IEEE Transactions on Power Systems*, 28 (2), 1345–1354, 2013

P. Muthukumar and A. Satheesh, "Analysis of crossed van't hoff metal hydride based heat pump", *International Journal of Hydrogen Energy*, 2013 (DOI: 201310.1016/j.ijhydene.2013.06.070)

B. Satya Sekhar and P. Muthukumar, "Studies on metal hydride based single-stage heat transformer", *International Journal of Hydrogen Energy*, 2013 (DOI: 10.1016/j.ijhydene.2012.09.095)

Physics

B. Santara, P. K. Giri, K. Imakita and M. Fujii, "Evidence of oxygen vacancy induced room temperature ferromagnetism in solvothermally synthesized undoped TiO2 nanoribbons", *Nanoscale*, 5, 5476, 2013

S. Dhara and P. K. Giri, "ZnO nanowire heterostructures: Intriguing photophysics and emerging applications", *Reviews in Nanoscience and Nanotechnology*, 2, 1–24, 2013

Centre for Energy

H. A. Choudhury, S. Chakma and V. S. Moholkar, "Mechanistic insight into sonochemical biodiesel synthesis using heterogeneous base catalyst", *Ultrasonic Sonochemistry*, 2013 (DOI: 10.1016/j.ultsonch.2013.04.010)

S. Singh, V. S. Moholkar and A. Goyal, "Isolation, identification, and characterisation of a cellulolytic bacillus amyloliquefaciens strain SS35 from rhinoceros dung", *ISRN Microbiology*, Article ID 728134, 2013 (DOI: 10.1155/2013/728134)

S. Khanna, A. Goyal and V. S. Moholkar, "Effect of fermentation parameters on bio-alcohols production from glycerol using immobilized clostridium pasteurianum: An optimisation study", *Preparative Biochemistry and Biotechnology*, 2013 (DOI:10.1080/10826068.2013.805625)

P. Kalita, N. Golla, K. P. Vivek, U. K. Saha and P. Mahanta, "Design and charactrisation of a novel loose biomass feeding system", *Journal of Scientific and Industrial Research*, 72, 511–514, 2013

Centre for Nanotechnology

S. Banerjee, A. K. Sahoo, A. Chattopadhyay and S. S. Ghosh, "Hydrogel nanocarrier encapsulated recombinant IκBα as a novel anticancer protein therapeutics", *RSC Advances*, 2013 (DOI: 10.1039/c3ra23181j)

A. Mathew and M. K. Nandy, "Two electrons in a cylindrical quantum dot under constant magnetic field", *Physica B*, 421, 127, 2013

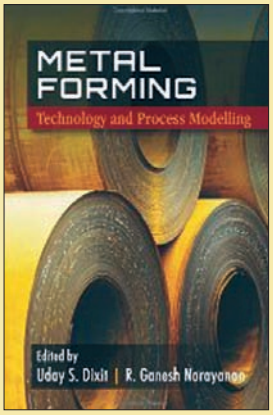
A. Mathew and M. K. Nandy, "Decoherence study of electron spin states in quantum dots using a simplistic model", *Modern Physics Letters B*, 27, 1350119, 2013

Book/Book Chapter

Civil Engineering

M. K. Goyal, C. S. P. Ojha, Burn Donald H. and Y. S. Rao, 'Statistical downscaling of precipitation and temperature for a lake basin', *Climate Change: Modelling, Mitigation and Adapting*, Eds. Y. Surampalli Rao, Zhang Tian, C. S. P. Ojha, R. D. Tyagi and C. M. Kao, American Society of Civil Engineers (ASCE), 215-246, 2013 (ISBN: 9780784412718)

Mechanical Engineering



U. S. Dixit and R. Ganesh Narayanan (Eds.), *Metal Forming: Technology and Process Modelling*, pp. 584, McGraw-Hill Education, Noida, 2013 (ISBN: 9781259058899)

R. Ganesh Narayanan and U. S. Dixit, 'Metal Forming Processes', *Metal Forming: Technology and Process Modelling*, Eds. U. S. Dixit and R. Ganesh Narayanan, McGraw-Hill Education, Noida, 2013

U. S. Dixit and R. Ganesh Narayanan, 'Modelling of Metal Forming Processes', *Metal Forming: Technology and Process Modelling*, Eds. U. S. Dixit and R. Ganesh Narayanan, McGraw-Hill Education, Noida, 2013

Newly constructed main gate of IIT Guwahati

A panoramic view of the campus

RuTAG-NE Exhibition

Prof. Gautam Barua at the exhibition

RuTAG-NE (Rural Technology Action Group-North-East), IIT Guwahati organised an exhibition under the theme, 'Gramya Prayukti: Technology for Improving Rural Life' was held recently at NEDFi Haat, Guwahati where technologies developed by RuTAG-NE were showcased for prospective entrepreneurs as well as general public. Some of the innovative technologies exhibited were mechanisation of weaving of plain *muga* silk fabric, modified bicycle for carrying heavy loads of fruits and vegetables for the benefit of farmers, kilns (bhattis) for making charcoal from bamboo, during the operation of which vinegar is also produced as a by-product, *eri* cocoon opener, etc. Prof. Pradyut Kumar Goswami, Vice Chancellor, Assam Science and Technology University, inaugurated the exhibition.

Awards and Honours

Dr. Piruthivi Sukumar, Assistant Professor, Biotechnology, was runner up in Young Research Workers Prize presentation at British Cardiovascular Society Annual Conference 2013 held in London, UK during 3–5 June 2013.

Dr. Manish Kumar Goyal, Assistant Professor, Civil Engineering, has been selected and appointed as editorial board member for the *American Journal of Water Resources*, Science and Education Publishing and for the *Open Journal of Modern Hydrology*, Scientific Research Publish.

Dr. Manas Kamal Bhuyan, Assistant Professor, Electronics and Electrical Engineering, received Fulbright-Nehru Senior Research Fellowship 2013–2014 (Fulbright-Nehru Academic and Professional Excellence Fellowship) to carry out a combination of teaching and research at School of Engineering and Technology, Purdue University, Indiana, USA. Moreover, he has been elevated to the grade of IEEE Senior Member.

Dr. Deepak Sharma, Assistant Professor, Mechanical Engineering received DAAD (German Academic Exchange Service) Research Stays fellowship for a research visit to Karlsruhe Institute of Technology, Germany to carry out research for a period of two months starting from 15 May 2013.

Shri Sarabjot Singh, President of India gold medallist, BTech, Electronics and Communication Engineering (2010 batch) and **Shri Harpreet Dhillon**, BTech, Electronics and Communication Engineering (2008 batch) received best paper award along with their advisor Prof. Jeffrey G. Andrews, at the IEEE International Conference on Communications held in Budapest, Hungary, June 2013. ICC is the flagship conference of the IEEE Communications Society.

Shri Padmanabh Baruah and **Shri Rabindra Pator**, BTech students of the Department of Mechanical Engineering received best oral presentation award in the 5th National Symposium for Materials Research Scholars, MR-13, held at IIT Bombay during 8–10 May 2013.

New Research Projects

Chemical Engineering

Title: Natural gas purification by CO_2-selective silica membrane; **Sponsor:** CSIR; **Duration:** 3 years; **Principal Investigator:** Bishnupada Mandal

Title: Concurrent electrochemical generation of hydroxyl radicals or its precursor H_2O_2 both at anode and cathode surfaces and its utilisation in pharmaceutical wastewater treatment; **Sponsor:** SERB; **Duration:** 3 years; **Principal Investigator:** Animes K. Golder

Chemistry

Title: Arresting pre fibriller aggregates of Alzheimer's amyloid by synthetic antibodies; **Sponsor:** DBT; **Duration:** 3 years; **Principal Investigator:** Bhubaneswar Mandal

Physics

Title: Development of semiconductor nanowire based advanced bio-sensors for biomedical applications; **Sponsor:** CSIR; **Duration:** 3 years; **Principal Investigator:** P. K. Giri

Centre for Energy

Title: 'Small-scale anaerobic digestion' under the "Rural Hybrid Energy-Enterprise Systems (RHEES)", Indo–UK Collaborative Research Initiative on 'Bridging the Urban and Rural Divide'; **Sponsor:** DST; **Duration:** 3 years; **Principal Investigator:** P. Mahanta

Title: Development of bioelectrodes for biofuel cell applications; **Sponsor:** Ministry of New and Renewable Energy, Govt. of India; **Duration:** 3 years; **Principal Investigator:** P. Goswami

Course on Biotechniques for Pollution Control and Resource Recovery

Participants and organisers of the course

A one-week QIP short-term course on Biotechniques for Pollution Control and Resource Recovery was organised by the Centre for the Environment during 1-5 July 2013. A total of twenty four teachers from AICTE recognised institutions participated in the programme. The participants were from diverse academic background, which included civil engineering, chemical engineering, mechanical engineering, environmental science, pharmacy and biotechnology. The primary goal of this short term course was to provide in depth understanding of recent advances made in the use of bioprocesses and bioenergy for solving the environmental problems that confront our society. In addition to regular class room lectures, laboratory as well as field visits were conducted for the participants. Dr. Kannan Pakshirajan, Associate Professor, Biotechnology, was the coordinator of the programme.

IEEE Students Branch at IIT Guwahati Organised Two Workshops


Inaugural session of the workshop on compressive sensing and technical writing

The IEEE students branch at IIT Guwahati organised two workshops – 1) IEEE Workshop on Compressive Sensing and Technical Writing on 6–7 April 2013; and 2) IEEE MATLAB Workshop 2013, 22–23 June 2013.

The workshop on Compressive Sensing and Technical Writing is the first ever workshop conducted by a IEEE students branch in the north-east region. Over 150 participants attended the workshop from various institutes of the north-east region. The workshop was well received by the participants. The workshop was inaugurated by Prof. Debatosh Guha, Chairman, IEEE Kolkata section.

The national level IEEE MATLAB Workshop 2013 was divided into five sessions to discuss the basics of MATLAB, theory and simulation aspects of signal processing, image processing, communication and control toolboxes of MATLAB. The workshop attracted 132 participants from different parts of the country making it a success for the IEEE student branch, IIT Guwahati.


A session in progress at the MATLAB workshop

PhDs Completed During April–June 2013

Department/Centre	No. of Students
Biotechnology	1
Chemistry	4
Chemical Engineering	1
Electronics and Electrical Engineering	1
Humanities and Social Sciences	3
Mathematics	1
Physics	1
Centre for Energy	2
Centre for the Environment	1
Total	**15**

Course on Role of Numerical Analysis in Scientific Computing

Participants and organisers of the course

A QIP short-term course on Role of Numerical Analysis in Scientific Computing was conducted by the Department of Mathematics during 20–24 May 2013. 25 teachers from various AICTE approved technical institutes took part in the programme. The programme was coordinated by Prof. S. Natesan, Mathematics.

New Joinings

R. Prasanna Venkatesh
Assistant Professor
Chemical Engineering

Prasad Subhasrao Onkar
Assistant Professor
Design

Kalpana Dhaka
Assistant Professor
Electronics and Electrical Engineering

Sangamesh Deepak R.
Assistant Professor
Mechanical Engineering

Sachin Singh Gautam
Assistant Professor
Mechanical Engineering

Guest Lecture/Seminar

Mathematics

Prof. S. Pattanayak , former Director, Institute of Mathematics and Applications, Bhubaneswar, Orissa, delivered a lecture on 'Random Fourier Series' on 8 April 2013.

Prof. A. K. Nandakumaran, Department of Mathematics, Indian Institute of Science, Bangalore, gave a lecture on 'Homogenisation of optimal control problem in a domain with oscillating boundary' on 31 May 2013.

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