



INDIAN INSTITUTE OF TECHNOLOGY
HYDERABAD

Fostering Innovation...



Annual Report 2013 - 14



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“Life is nothing if not a daring adventure.”

- Helen Keller



FROM THE DIRECTOR

IIT Hyderabad - Always Innovating

IIT Hyderabad has 1386 students and 126 full time faculty. Of the 1386 students, nearly half are post graduates; 325 Ph.D. and 330 M.Tech. and M.Phil. IITH has 13 academic departments covering all areas of engineering, sciences, liberal arts and design. IITH graduated 3 Ph.Ds. in Aug 2013 and will be graduating nearly 10 Ph.Ds. in Aug 2014.

In the new academic year that will commence from end July 2014, IITH will have nearly 1650 students of which nearly 400 will be Ph.D. students and 400 M.Tech. and M.Phil. students; moreover IITH will have 130 full time faculty members.

Faculty and students of IITH are at the forefront of innovations: Academic innovations, and innovative research. IITH has had 572 publications, 5 patents filed, and over 120 sponsored projects. Five students at IITH received the PM fellowship for doctoral research - significant testimony to excellence in research at IITH. Nearly 80% faculty have sponsored projects.

Moreover, IITH has strong industry collaboration - all the PM fellowship mentioned above are with industry collaboration. IITH has nearly 90 crs in sponsored research funding and nearly 10 crs of industrial research and consultancy.

On the academic front also, IITH is surging ahead: We have B.Tech. programs in eight engineering departments, MSc in Physics, Chemistry and Math, M.Phil. in Liberal Arts, M.Des. in Design, and Ph.D. in all 13 departments.

There is strong emphasis on interdisciplinary academics. IITH has implemented a very novel academic program, referred to as, *Fractal Academics* - the key idea is to atomize courses, provide breadth and depth, emphasize courses in liberal arts as well as creative arts, emphasize project work, and create an interactive learning ambience. In this approach the students will be well equipped to handle challenges of any job or challenges of post graduate education. IITH offers a Minor in Entrepreneurship to all students.

IITH has very active collaboration with Japan, and this collaboration is on all fronts - research, academics and infrastructure development. This is a unique collaboration which is helping propel IITH to be among the best in the world. Discussions are already underway to have active research collaboration in several areas - like nano-science and nano-technology, energy and environment, next generation communication technologies, sustainable development, and design and manufacturing.

At the infrastructure level, besides several academic buildings, Japanese architects have designed iconic structure to reflect the friendship between Japan and IIT Hyderabad - these are - Knowledge Center (library), Technology Incubation and Research Park, Convention Village, Guest House and Sports and Cultural Complex. As part of the Friendship Program, IITH and Japanese Universities have a very active student and faculty exchange program.

IITH has launched its technology business incubator and three companies have started functioning in the incubator.

IITH has MoUs and active collaboration with several leading US universities (e.g. Purdue, UIUC, USC, GeorgiaTech., etc.) and leading Japanese Universities (e.g. Univ. of Tokyo, Keio Univ., Osaka University, Tahoka Univ., etc.). IITH has had several visiting faculty from USA, France, and Canada who taught fractional credit courses.

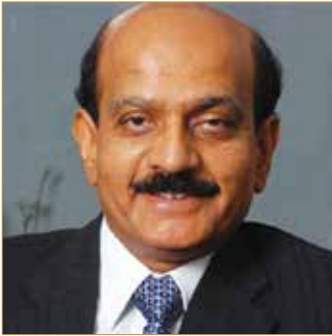
IITH is creating a unique holistic educational ecosystem that will foster interactive learning, cutting edge research, strong industry collaboration, and entrepreneurship. It is providing an environment wherein students and faculty are not afraid to experiment and celebrate their ideas.

Prof UB Desai



BOARD OF GOVERNORS

CHAIRMAN



Mr BVR Mohan Reddy
Chairman & Managing Director
Infotech Enterprises Limited

MEMBER



Mr Suresh Rajpal
Chairman and CEO
Visnova Solutions Private Limited

MEMBER



Mr GV Prasad
Chairman & CEO
Dr. Reddy's Laboratories Ltd

MEMBER



Mr Ajay Mishra
Principal Secretary (TE)
Higher Education Department

MEMBER



Mr TV Mohandas Pai
Director
Manipal Universal Learning

MEMBER



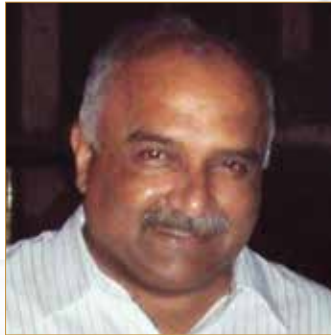
Ms Reema Gupta
Associate Director
Shri Raju Centre

EX-OFFICIO



Prof UB Desai
Director
Indian Institute of Technology
Hyderabad

SENATE NOMINEE



Prof Vinayak Eswaran
Department of
Mechanical Engineering
Indian Institute of Technology
Hyderabad

SENATE NOMINEE



Prof Faiz Khan
Department of Chemistry
Indian Institute of Technology
Hyderabad

SECRETARY

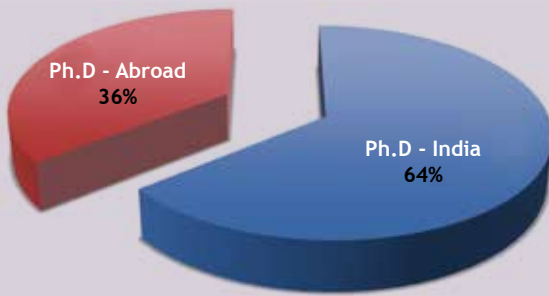


Mr N Jayaram
Registrar
Indian Institute of Technology
Hyderabad

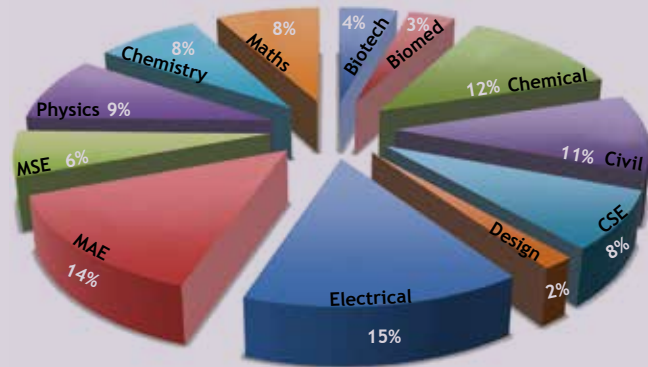


FACULTY STATISTICS

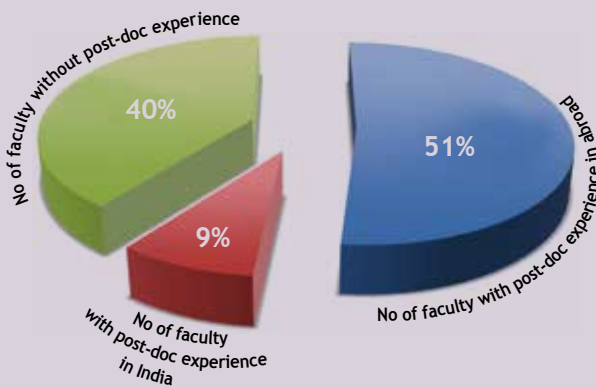
Although started in 2008, IITH started hiring faculty in late 2009. Today IITH has 126 faculty members spread across 13 academic departments. The rapid growth of IITH had attracted applicants with excellent academic and research record. In most of the departments 2 selections are done per year for permanent posts. However, most of the hiring have been at the level of Assistant Professors. 60% of the faculty members do possess extensive post-doctoral experience. The following charts show the distribution and experience of faculty members in various departments.



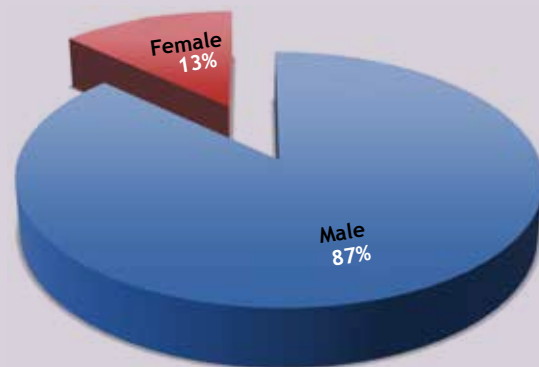
Ph.D of Faculty Members



Department-wise distribution of faculty



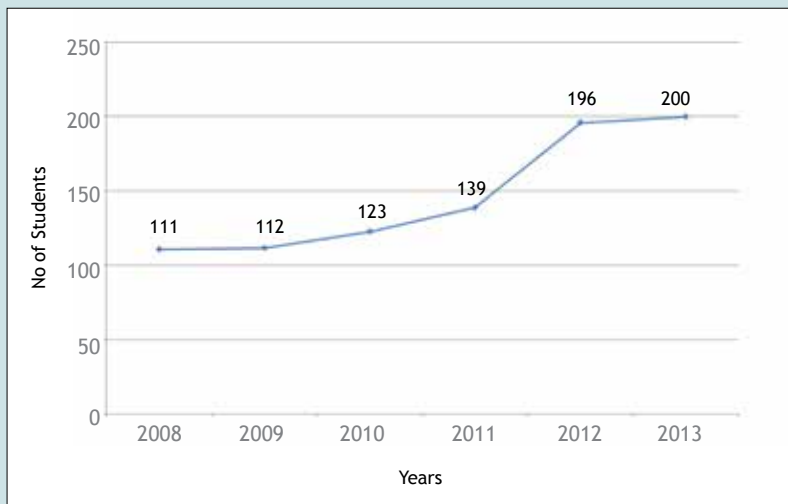
Post-doc experience of faculty



Gender-wise distribution of faculty

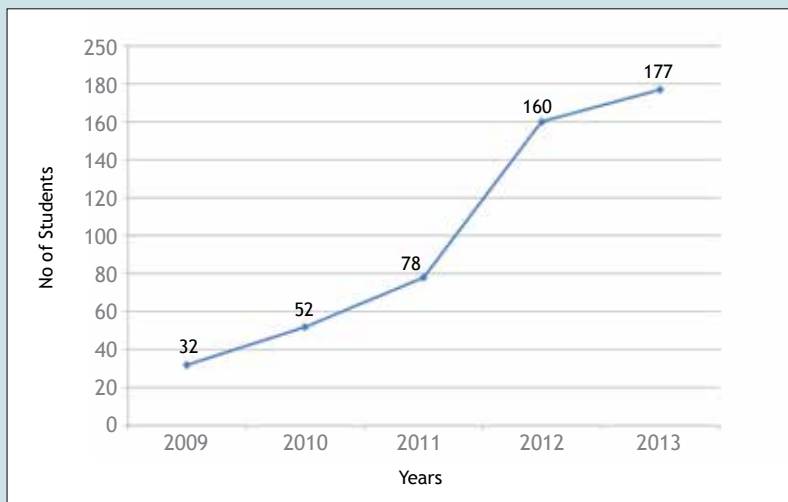
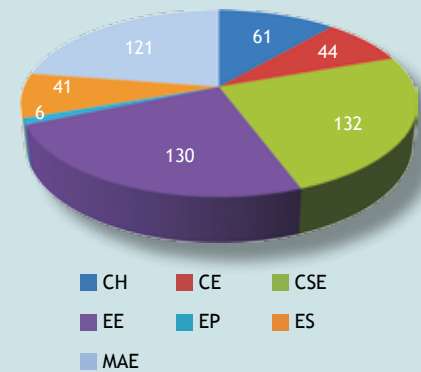
ACADEMICS

IIT Hyderabad started functioning in the year 2008 with 3 B.Tech programs; Computer Science and Engineering, Electrical Engineering, and Mechanical Engineering. Each of these programs had an intake of 40 students through JEE. In 2009 IITH started admitting PhD students in various departments and in 2010 almost all engineering departments started offering M.Tech programs. M.Sc programs started in the year 2010 with Chemistry Department and in the subsequent years, Physics and Mathematics started their M.Sc programs. M.Phil program was also started in the year 2012 by the Liberal Arts department. Today IITH offers 8 B.Tech programs, 16 M.Tech programs, 3 M.Sc programs, and 5 M.Phil programs.



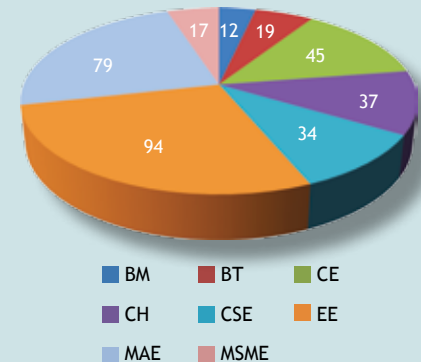
B. Tech

Department-wise distribution of total students

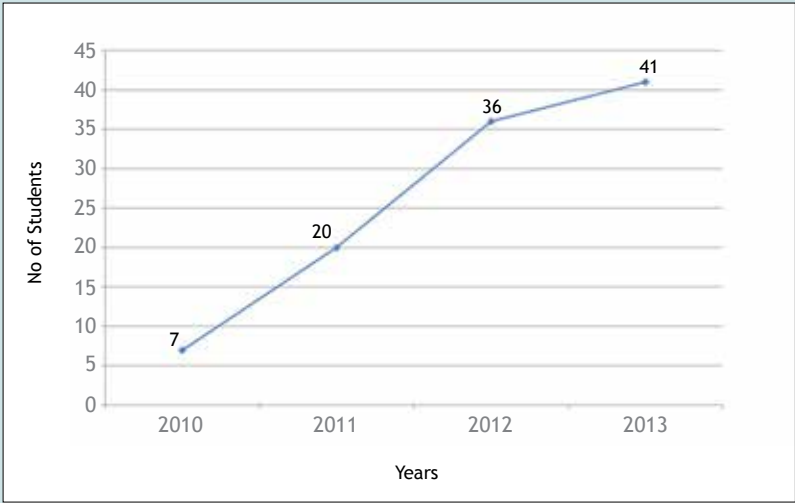


M. Tech

Department-wise distribution of total students

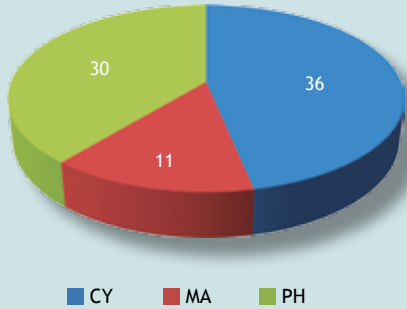


ACADEMICS



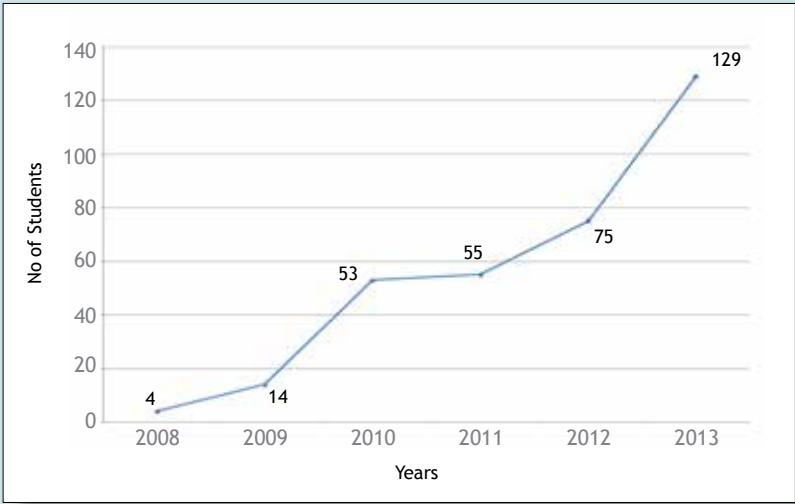
M.Sc.

Department-wise distribution of total students



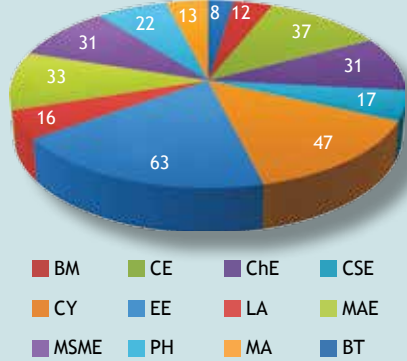
M.Phil

LA	
Year	No. of Students
2012	7
2013	4



PhD

Department-wise distribution of total students

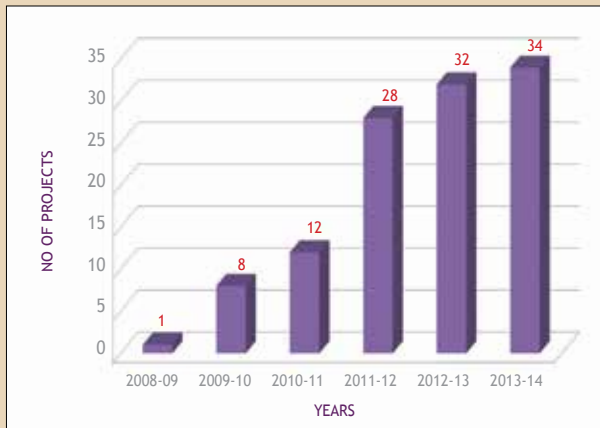


BM - Biomedical Engineering; BT - Biotechnology; CE - Civil Engineering; CH - Chemical Engineering; CSE - Computer Science & Engineering; CY - Chemistry; EE - Electrical Engineering; EP - Engineering Physics; ES - Engineering Science; LA - Liberal Arts; MA - Mathematics; MAE - Mechanical & Aerospace Engineering; MSME - Materials Science & Metallurgical Engineering; PH - Physics

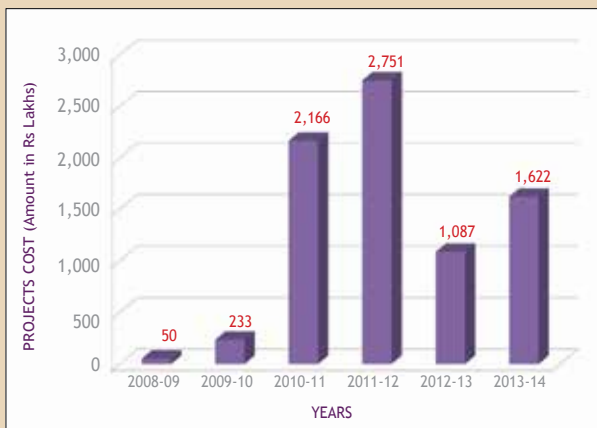
The vibrant research culture in IITH is evident from the large number of publications and the sponsored projects. Today IITH has more than 100 sponsored projects funded by national funding agencies and private companies. The sponsored projects in IITH over the last 5 years is shown in the charts below.

RESEARCH PROJECTS

No of Sponsored Research Projects



Funding from Sponsored Research Projects



CONSULTANCY PROJECTS

No of Consultancy Projects



Funding from Consultancy Projects



GLIMPSES OF CAMPUS CONSTRUCTION



As we start the new academic session, we are also looking forward to inaugurating our new campus with state-of-the-art buildings, facilities and infrastructure. The excitement of starting the new academic year will soon be amplified by the transition to our new 576 acre campus. The planning for the campus had started four years back and with the help of renowned architects and designers the blueprint of a green and smart campus was developed. Designs for the buildings currently under construction incorporate several innovative and 'first-of-its' kind' features. The entire campus conforms to very high environmental standards with considerations of energy and material usage. With the use of latest construction technology, we are planning to complete the construction to accommodate a student strength of 2000 and transition to the permanent campus in 2014.

We are currently also planning for the next phase of expansion to accommodate 5000 students and a total population of 6000 by July 2017. The architectural design of few iconic buildings, which will have a distinctive Japanese signature, are being performed by distinguished architects from Japan. With inspiring architecture and smart designs we aim to deliver a world-class campus which will promote a sense of excellence and one which will make IIT Hyderabad a truly world-class institution.

Kolluru VL Subramaniam
Dean - Planning



Academic Block



Student Hostel



Staff Housing



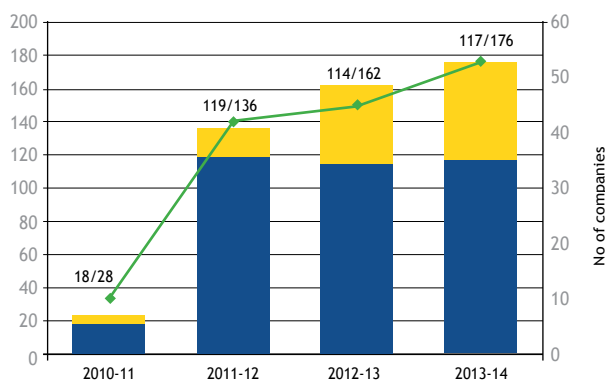
Dining Facility

PLACEMENT REPORT 2014

The placements of Indian Institute of Technology Hyderabad for the academic year 2013 - 2014 has yielded 119 offers for 253 registered students. A total of 72 companies registered for placements this year out of which 52 of them have made it to the campus and interacted with the students of B Tech, M Tech and MSc across 10 departments.

There were 20 new companies that have made its entrance to IITH this year. Reputed core companies like EATON, Hero Moto Corp, Indian Smart Grid Forum, Emulex, Tejas Networks, Nagarjuna Group, NFTDC, CA Technologies etc. were the names among the new comers. Companies like Amazon, Paypal, Eaton, Securifi Embedded Systems were the top paying companies. The highest salary offered this year is 22 LPA and the average salary is 7.8 LPA. A good number of UG and PG students opted for higher education. Also majority of the MSc graduates have opted for higher education overseas with scholarships.

IITH Placement Statistics
Students Placed / Total Students



GREEN OFFICE

The Green Office at IIT Hyderabad made a good beginning in its first year of operation, thanks to the concerted efforts of a team of motivated individuals (faculty, students, and staff). We took responsibility for the on-campus recycling program initiated earlier by Prakriti, the Nature Club of IITH, and improved collection of recyclable waste to 9.68 tons (from 5.68 tons in the previous fiscal). Revenue accrued from this activity went up ~25% over the previous fiscal year. We initiated procurement of native trees for the permanent campus, and tested our plantation procedure on 25 Bael tree (Aegle Marmelos) saplings: all saplings are healthy after 6 months in temporary bags, and they will be planted in the permanent campus once construction activity abates.



Energy conservation stickers were pasted at all offices, labs, and classrooms in the institute building to promote awareness. Further, two seminars were organized by eminent conservationists- Mr. Mohammed Dilawar & Dr. Anumakonda Jagadeesh - who addressed an interested audience on campus. A project assistant was hired to assist with the Green Audit, and we identified the experts who will guide us in this exercise: the Audit will be conducted in the upcoming fiscal. The Green Office website (greenoffice.iith.ac.in) developed by our Outreach team, is regularly updated with our activities and members names. We are grateful to the institute administration for granting and processing our expenditure for all activities: this came to Rs. 2.26 lakhs for FY 2013-14.

Biomedical Engineering



The **Biomedical Engineering (BM)** at IIT Hyderabad is where the boundaries between disciplines fade for defining excellence in research and education. The primary mission of the department is to foster interdisciplinary work of highest quality by bringing together a broad spectrum of faculty expertise under a single umbrella to focus on research in Biomedical engineering. By converging the engineering expertise in analytical and experimental methods to biological and medical sciences, BME aim at unveiling the unseen in biology and innovations in technology that can be translated to clinical health care.

Over the past year, Biomedical Engineering at Indian Institute of Technology Hyderabad has grown

to a total strength of twenty three with four assistant professors, seven doctorate students and twelve Masters of Technology students. BME has made substantial investments in strengthening the core research facilities and course curriculum. The department will continue to leverage its strengths in emerging as one of the leading centres of excellence in Biomedical engineering in the country.

FACULTY



Renu John

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Assistant Professor

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Harikrishnan Narayanan Unni

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Subha Narayan Rath

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Assistant Professor

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Jyotsnendu Giri

Ph.D - IIT Bombay
Assistant Professor

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Sikandar Shaikh

Adjunct Assistant Professor

Research Areas: Molecular imaging, CT-PET, SPECT, MRI imaging



Ramana Vinjamuri

Visiting Assistant Professor

Research Areas: Neuroengineering, brain machine interfaces



PUBLICATIONS

(In Peer-Reviewed Journals)

Subha N. Rath, Patcharakamon Nooeaid, Andreas Arkudas, Justus P. Beier, Leonie A. Strobel, Andreas Brandl, Judith A. Roether, Raymund E. Horch, Aldo R. Boccaccini, Ulrich Kneser. Adipose-Derived and Bone Marrow-Derived Mesenchymal Stem Cells Display Different Osteogenic Differentiation Patterns in 3D Bioactive Glass Based Scaffolds, *Journal for Tissue Engineering and Regenerative Medicine*. 2013 Dec 3. doi: 10.1002/term.1849.

Ulrike Rottensteiner, Bapi Sarker, Dominik Heusinger, Diana Dafinova, Subha N. Rath, Justus P. Beier, Ulrich Kneser, Raymund E. Horch, Rainer Detsch, Aldo R. Boccaccini, Andreas Arkudas. In vitro and in vivo biocompatibility of alginate dialdehyde/gelatin hydrogels with and without nanoscaled bioactive glass for bone tissue engineering applications, *Materials* 2014, 7(3), 1957-1974; doi:10.3390/ma7031957.

MA Ali, KK Reza, S Srivastava, VV Agrawal, Renu John, B D Malhotra, Lipid-Lipid Interactions in Aminated Reduced Graphene oxide Interface for Biosensing Application, *Langmuir*, 2014, 30 (14), pp 4192-4201.

MA Ali, S Srivastava, MK Pandey, VV Agrawal, Renu John, B D Malhotra Protein-Conjugated Quantum Dots Interface: Binding Kinetics and Label Free Lipid Detection, *Anal. Chem.*, 2014, 86 (3), pp 1710-1718.

MA Ali, S Srivastava, PR Solanki, V Reddy, VV Agrawal, CG Kim, Renu John, BD Malhotra, Highly Efficient Bionzyme Functionalized Nanocomposite-Based Microfluidics Biosensor Platform for Biomedical Application, *Nature Scientific reports* 3, 2661, doi:10.1038/srep02661.

S Kumar, S Kumar, M Ali, P Anand, VV Agrawal, Renu John, S Maji, BD Malhotra, Microfluidic-integrated biosensors: Prospects for point-of-care diagnostics, *Biotechnology journal* 2013, 8 (11), 1267-1279.

Renu John, Steven G Adie, EJ Chaney, M Marjanovic, KV Tangella, SA Boppart, Three-dimensional optical coherence tomography for optical biopsy of lymph nodes and assessment of metastatic disease, *Annals of surgical oncology* 2013, 20 (11), 3685-3693.

MA Ali, PR Solanki, MK Patel, H Dhayani, VV Agrawal, Renu John, BD Malhotra, A highly efficient

microfluidic nano biochip based on nanostructured nickel oxide, *Nanoscale* 2013, 5 (7), 2883-2891.

PUBLICATIONS

(In Peer-Reviewed Conferences)

Narendra Patel and Renu John, Intra-retinal layer segmentation of OCT image, International Conference on Photonics, VLSI and Signal Processing-ICPVS 2014, KU College of Engineering & Technology, Kakatiya University, Warangal, 28-29 March 2014.

P. Vimal Prabhu, Md. Azahar Ali, Renu John and Bansi D. Malhotra, Quantitative phase imaging of microfluidic devices using Digital holographic microscopy, India-Japan Workshop on Biomolecular Electronics & Organic Nanotechnology for Environment Preservation, IJWBME 2013, Delhi Technological University, Delhi, 13-15 December 2013.

P. Vimal Prabhu and Renu John, Quantitative phase visualization and aberration correction using digital holographic microscopy, workshop on Recent Advances in Photonics WRAP 2013, IIT Delhi, 17-18 December 2013.

P. Vimal Prabhu and Renu John, Characterisation of Microstructures using Digital Holographic Microscopy International conference on optics and Opto electronics ICO-2014, IRDE, Dehradun, 5-8 March 2014.

G Hanu Phani Ram, P. Vimal Prabhu and Renu John, Synthetic Aperture Digital Holographic Microscopy, International Conference on Photonics, VLSI and Signal Processing-ICPVS 2014, KU College of Engineering & Technology, Kakatiya University, Warangal, 28-29 March 2014.

Harikrishnan Narayanan Unni, Modeling of Dielectrophoretic Cell Concentration in a Parallel Plate Microfluidic Device, India Japan Workshop on Biomolecular Electronics and Organic Nanotechnology for Environment Preservation (IJWBME 2013), 13-15 December, Delhi, India.

FUNDED RESEARCH PROJECTS 2013-14

Renu John, 3-D Volumetric Imaging of Cells using Digital Holographic Microscopy with Nanometric Sensitivity, DST, 2012-15, Rs.35.00 Lakhs.



SEMINARS IN THE DEPARTMENT

Using transformative coarse-graining methods to unravel sub-cellular and cellular processes in biological systems at multiple length and time scales Dr Anand Srivastava, Research Associate, University of Chicago, USA, 20 Mar 2014.

Solving the Puzzle of Blast Trauma: The Mechanics of Traumatic Brain Injury (TBI) in Warfare Dr. Shailesh Ganpule, Research Associate, John Hopkins University, USA, 14 March 2014.

Probing Astrocytes with Carbon Nanotubes: Implications for Translational Medicine, Dr. Manoj K. Gottipati, Research Associate, University of Alabama, Birmingham, AL, USA, 6 March 2014.

Revealing neural mechanisms of information processing using a simple brain Dr Nitin Gupta, Post doctoral research associate, NIH, USA, 14 February 2014.

Regulation of Tau phosphorylation and toxicity: Insights from a Drosophila model of neurodegeneration and Insulin resistance as a risk factor for Alzheimer's Disease, Dr Shreyasi, Post doctoral research associate, University of Texas Medical Branch, Texas, USA, 22 January 2014.

Particle Engineering of Stem Cells using Surface Modified Drug Delivery Systems for Phenotype Control & Targeted Cancer Therapy Dr. Sudhir Ranganath, IUSSTF Postdoctoral Fellow at Brigham & Women's Hospital, Harvard Medical School, USA, 12 February 2014.

Integrative modelling of biological function: examples from the brain, circulation and lungs, Dr. Vinod Suresh, University of Michigan, USA, 29 November 2013.

Bio-engineering strategies for repair and regeneration of nervous system, Dr. Srinivas Madduri, Post doctoral research scientist, Department of Chemistry and applied biology, ETH Zurich, Switzerland, 13 November 2013.

Calcium phosphate based bioceramics for hard tissue engineering, Dr. Prakash Parthiban, Research Associate, Tohoku University, Japan, 17 June 2013.

A Zebrafish Model to Characterize von-Hippel Lindau Disease, Kiran Santhakumar, Research Associate, University of Sheffield, 28 June 2013.

Nanopore Biophysics: From Gene Sequencing to Gene Silencing, Gautam V. Soni, Research Scientist, Kavli Institute of Nanoscience, TuDelft 19 July 2013.

Translational Biomedical Engineering: Innovating at the Scale of Life Dr. Jonathan Pillai, Stanford Biodesign fellow 20 March 2013.

Cytoplasmic acto-myosin network determine nuclear shape Dr. Anoop V. Cherian, Max Planck Institute of Biochemistry, Germany, 5 February 2013.

TALKS GIVEN IN INTERNATIONAL / NATIONAL CONFERENCES

Renu John, Optical Molecular imaging, future and challenges, India-Japan Workshop on Biomolecular Electronics & Organic Nanotechnology for Environment Preservation, IJWBME 2013, Delhi Technological University, Delhi, 13-15 December 2013.

Renu John, Biomedical Engineering in India: Future perspectives, University College Of Engineering(A), Osmania University, MEDITECH 2013, 8-9 March 2013.

Subha N. Rath, Patcharakamon Nooeaid, Judith A. Roether, Raymund E. Horch, Aldo R. Boccaccini, Ulrich Kneser. Cell-based therapy of bone defects in wounds by MSC-seeded in 3D scaffolds: the success depends on MSC source. Wound Care Con 2013. 2nd International and 7th National Annual conference of Society for wound care and research, Pondicherry, India. ISBN No. 978-81-95686-3-0.

Subha N. Rath, Patcharakamon Nooeaid, Judith A. Roether, Raymund E. Horch, Aldo R. Boccaccini, Ulrich Kneser Osteogenic differentiation of MSCs in 3D Bioglass-based scaffolds depends on their source of origin, TERMIS-asia pacific 2013, Sanghai, China.



AWARDS / RECOGNITIONS

Best paper Award: Narendra Patel and Renu John, Intra-retinal layer segmentation of OCT image, International Conference on Photonics, VLSI and Signal Processing-ICPVS 2014, KU College of Engineering & Technology, Kakatiya University, Warangal, 28-29 March 2014.

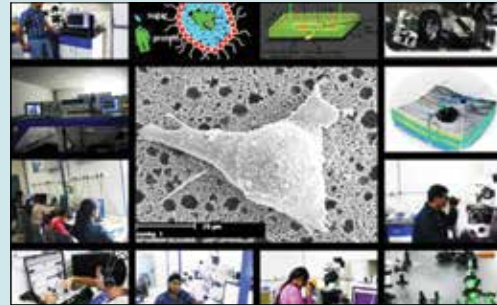
RESEARCH INFRASTRUCTURE

Over the last few years the department has developed state of the art research facilities. The department hosts a range of sophisticated instruments like:

Optical Microscope | OCT | Gel DOC | RT PCR | Cell Culture Hood | Digital Holographic Microscopy | PCS ELVIS Board Simulators | ECG | Biosafety Cabinet | CO₂ incubator | Centrifuge | Plasma Chamber



Inhouse-developed 3-D imaging system with nanometric precision



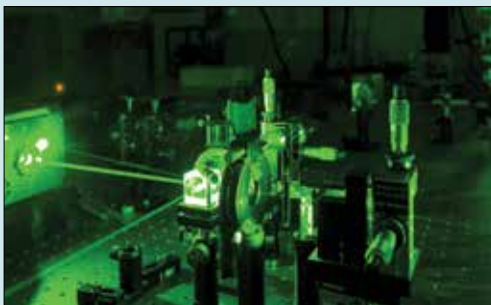
BME Research: A Snap shot



Biomicrofluidics Laboratory



Sensors and Transducers M.Tech Teaching Laboratory



Digital holographic microscopy system



Biomaterials Laboratory

Biotechnology



The department of **Biotechnology (BT)** has five faculty members with cutting-edge research expertise in areas encompassing: HIV integration, Cancer biology, NMR, Structural Biology, Epigenetics, DNA Repair, and Amyloids & Prion protein biology. Currently two post graduate degree programs are offered: M.Tech in Medical Biotechnology & PhD in Biotechnology. The department's laboratories are well-equipped with advance research infrastructure and equipment such as: Flow-cytometer, Fluorescence microscope, Multi-mode readers, High speed & Ultracentrifuges, Cluster, Spectrophotometer, Nano-drop reader, Cell & microbial culture facilities, Circular dichroism, FPLC system etc.

The M.Tech students take advance courses in the first two semesters followed by research work for thesis in any of the above mentioned research fields. Also, the M.Tech students are trained to improve their presentation skills through seminar courses and scientific writing skills through independent research proposal writing. The Ph.D program comprises of a mandatory rigorous course work followed by thesis work. Students carry out research in well-equipped above mentioned research laboratories.

FACULTY

BIOTECHNOLOGY

**Basant Kumar Patel**

Ph.D - Banaras Hindu University
Assistant Professor & HoD

Research Areas: Prion, Mad-cow and Amyloid diseases, Yeast genetics

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**Anindya Roy**

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**Thenmalarchelvi Rathinavelan**

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**Rajakumara Eerappa**

Ph.D - CCMB
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PUBLICATIONS

(In Peer-Reviewed Journals)

V. Gonzalez-Huici, B. Szakal, M. Urulangodi, I. Psakhye, F. Castellucci, D. Menolfi, E. Rajakumara, M. Fumasoni, R. Bermejo, S. Jentsch, D. Branzei, EMBO J, DNA bending facilitates the error-free DNA damage tolerance pathway and upholds genome integrity, 33(4), 327-40 (2014).

FUNDED RESEARCH PROJECTS

2013-14

Anindya Roy, Developing assay methods for UCHL1 using Gold nanoparticles for rapid detection of Brain injury, DBT, May 2013, Rs. 38.00 Lakhs.

N.K. Raghavendra, Molecular determinants of catalytically inactive variants, MMS2 and UEV1A, for specificity of UBC13-E3 ligase interaction in signaling innate immune response and post-replication DNA repair, DBT, June 2013, Rs. 26.68 Lakhs.

Thenmalarchelvi Rathinavelan, Probing the role of DNA triplex in cellular pathways: *Saccharomyces cerevisiae* Stm1 protein - triplex interaction, DBT, Aug 2013, Rs. 48.59 Lakhs.

Thenmalarchelvi Rathinavelan, Mechanisms of *E. coli* group 1 capsular polysaccharide translocation: An NMR and computational investigation, DBT, October 2013, Rs. 62.83 Lakhs.

Rajakumara Eerappa, Characterization of mammalian Polycomb Repressive Complexes 1 (PRC1), DBT, March 2014, Rs. 32.5 Lakhs.

TALKS GIVEN IN INTERNATIONAL / NATIONAL CONFERENCES

Anindya Roy, How Tpa1 prevents endogenous DNA damage in *S. cerevisiae* (invited speaker) at the 8th International Conference on Yeast Biology held at IMTECH, Chandigarh on 4-7 December, 2013.

AWARDS / RECOGNITIONS

Rajakumara Eerappa, Ramalingaswami, DBT Re-entry Fellowship (2014).

RESEARCH INFRASTRUCTURE

The department is in the process of establishing state of the art labs for performing cutting edge research. Over the last few years, a range of sophisticated instruments was installed in the laboratories. Some of them are listed below.

Gel DOC | Spectrophotometer | FPLC | Multimode Reader | Ultra Centrifuge | Biosafety Cabinet | NanoDrop | Electrophoresis | Realtime PCR | Fluorescence Microscope



Multimode reader



Spectrophotometer



Nanodrop



Gel Doc



FPLC in Cold Chamber



Bio Safety Cabinet

Chemical Engineering



The Department of **Chemical Engineering (CH)** at IITH offers B.Tech, M.Tech and Ph.D programs. Today the department has 15 faculty members, 32 Ph.D, 33 M.Tech, and 61 B.Tech students. Over the last 5 years the department acquired state-of-the-art infrastructure for performing research that cuts across the boundaries of conventional chemical engineering.

The department's research focus falls into six areas with numerous funded projects; each of them remarkable for

its sheer depth. Tremendous focus is given in shaping the curriculum that imparts our undergraduate students with strong theoretical foundation and hands on experience for solving real world problems. At the post-graduate level more emphasis is given to honing a student's research skill for practical applications.

FACULTY

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PUBLICATIONS

(In Peer-Reviewed Journals)

R. Govindarajan and K.C. Sahu, Instabilities in viscosity-stratified flow, *Annual Review of Fluid Mechanics*, 46, 331-353 (2014).

Sukhendu Ghosh, R. Usha and K.C. Sahu, Linear stability analysis of miscible two-fluid flow in a channel with velocity slip at the walls, *Physics of Fluids*, 26, 014107 (2014).

J.N. Kusuma, O.K. Matar and K.C. Sahu, Numerical simulations of miscible channel flow with chemical reactions, *Current Science*, 106 (6), 841-852 (2014).

G. Karapetsas, K.C. Sahu and O.K. Matar, Langmuir, Effect of contact line dynamics on the thermocapillary motion of a droplet on an inclined plate, 29 (28), 8892-8906 (2013).

P.R. Redapangu, K.C. Sahu and S.P. Vanka, A lattice Boltzmann simulation of three-dimensional displacement flow of two immiscible liquids in a square duct, *Journal of Fluid Engineering*, 135, 121202 (2013).

K.C. Sahu, Double diffusive effects on pressure-driven miscible channel flow: Influence of variable diffusivity, *International Journal of Multiphase Flow*, 55, 24-31 (2013).

M. Anand, J. Kwack, and A. Masud, A new generalized Oldroyd-B model for blood flow in complex geometries, *International Journal of Engineering Science*, 72, 78-88 (2013).

V. Dhanala, S.K. Maity, and D. Shee, Steam reforming of isobutanol for production of synthesis gas over Ni/ γ -Al₂O₃ Catalysts, *RSC Advances* 3, 24521-24529 (2013).

P. Kumar, S.R. Yenumala, S.K. Maity, and D. Shee, Kinetics of Hydrodeoxygenation of Stearic Acid Using Supported Nickel Catalysts: Effects of Supports, *Applied Catalysis A: General* 471, 28-38 (2014).

Arugonda Rakesh, Vakamalla T.S.R. Kumar Reddy, Mangadoddy Narasimha, Air-Core Size Measurement of Operating Hydrocyclone by Electrical Resistance Tomography, *Chemical Engineering Technology*, 2014, 37, No. 5, 1-12.

BVRSN Prasad, Vinod M. Janardhanan, Modeling Sulfur Poisoning of Ni-Based Anodes in Solid Oxide Fuel Cells. *J. Electrochem. Soc.*, 161, F208-F213 (2014).

Srinivas Appari, Vinod M. Janardhanan, Ranjit Bauri, Sreenivas Jayanti and Olaf Deutschmann, A Detailed Kinetic Model for Biogas Steam Reforming on Ni and Catalyst Deactivation due to Sulfur Poisoning. *Appl. Catal. A.*, 471, 118-125 (2014).

Srinivas Appari, Vinod M. Janardhanan, Ranjit Bauri, and Sreenivas Jayanti, Deactivation and Regeneration of Ni Catalyst During Steam Reforming of Model Biogas: An experimental investigation. *Int. J. Hydrogen. Energy*, 39, 297-304 (2014).

Viram Menon, Vinod. M. Janardhanan, and Olaf Deutschmann, A mathematical model to analyze solid oxide electrolyzer cells (SOECs) for hydrogen production, *Chem. Eng. Sci.*, 110, 83-93 (2014).

Prashil Lakhete, Vinod M. Janardhanan, Modeling process intensified catalytic plate reactor for synthesis gas production. *Chem. Eng. Sci.*, 110, 13-19 (2014).

Geetha Narasimhaiah, Vinod M. Janardhanan, Modeling CO₂ electrolysis in solid oxide electrolysis cell. *J Solid State Electrochemistry*, 17, 2361-2370 (2013).

K. Mitra, Evolutionary Surrogate Optimization of an Industrial Sintering Process, *Materials and Manufacturing Processes*, 28, 768-775 (2013).

K. Mitra, Parametric Sensitivity Through Optimization Under Uncertainty Approach, *Computer Methods in Materials Science*, 13, 107-112 (2013).

M. Anitha, T. Chugh, S. Majumdar, and K. Mitra, Multi-Objective Optimization of Bulk Vinyl Acetate Polymerization with Branching, *Materials and Manufacturing Processes*, 29, 210-217 (2014).

M. Anitha, K. Mitra, and S. Majumdar, Modeling of propylene polymerization with long chain branching, *Chemical Engineering Journal*, 246, 175-183 (2014).

H. Goel, R.P. Chandran, K. Mitra, S. Majumdar, and P. Ray, Estimation of Interfacial Tension for

Immiscible and Partially Miscible Liquid Systems by Dissipative Particle Dynamics, *Chemical Physics Letters*, 600, 62-67 (2014).

S. Mattaparthi and C. S. Sharma, Biomimicked high aspect ratio hierarchical superhydrophobic polymer surfaces, *Bioinspired, Biomimetic and Nanobiomaterials*, An ICE Journal, 3(1), 4-8 (2013).

A.K. Haridas, C. S. Sharma, T. N. Rao, V. Sriharan, Fabrication and surface functionalization of electrospun submicron PS fibers with controllable surface roughness, *RSC Advances*, 4, 12188-12197 (2014).

E.F. Hardjo, D. S. Monder, and K. Karan, An effective property model for infiltrated electrodes in solid oxide fuel cells, *Journal of the Electrochemical Society*, 161, F83-F93 (2014).

E.H. Reddy, D. S. Monder, S. Jayanti, Parametric study of an external coolant system for a high temperature polymer electrolyte membrane fuel cell, *Applied Thermal Engineering*, 58, 155-164 (2013).

PUBLICATIONS

(In Peer-Reviewed Conferences)

P.R. Redapangu and K.C. Sahu, Three-dimensional LBM simulations of buoyancy-driven flow using graphics processing units, 4th National Conference on Parallel Computing Technologies (PARCOMPTECH-2013), 22-23 February 2013, Bangalore, India.

A.K. Baghel, S. Naik, A. Rajagopal, M. Anand, Simulation of blood flow in the stenosed left coronary artery, *International Conference on Computational Systems in Engineering and Technology*, Chennai, 7-8 March 2014, ISBN: 978-1-4799-3812-4

Rakesh, A., VTSR Kumar, Narasimha, M., Measurement of air-core size and shape using the Electrical Resistance Tomography of operating hydrocyclone: Validation with CFD predictions, *13th European symposium on comminution and classification*, Braunschweig-Germany, 9-12 September 2013, 189-192.



Ravi Gujjula, Narasimha.M, CFD prediction of solid recirculation rate and solids volume fraction in an ICFB, *5th Asia pacific congress on computational mechanics & 4th international symposium on computational mechanics (APCOM 2013 / ISCOM 2013)*, 10-14 December 2013, Singapore.

V. Menon, V. M. Janardhanan, and O. Deutschmann, Modeling of solid oxide electrolyser cells: From H₂, CO electrolysis to co-electrolysis, *ECS Transactions*, 57 (1) 3207-3216 (2013).

V. Menon, V. M. Janardhanan, S. Tischer, and Olaf Deutschmann, Internal multi-physics phenomena of SOFC with direct internal reforming, *ECS Transactions* 57 (1) 2475-2484 (2013).

P. Jampana, K. Detroja, Continuous time identification in Laplace domain, *DYCOPS*, 2013.

D.S. Monder and K. Karan, Coverage dependent thermodynamics for sulfur poisoning of Ni based anodes, *ECS Transactions*, 57, 2449-2458 (2013).

H. Kohno, S. Liu, T. Ogura, T. Ishimoto, D.S. Monder, K. Karan, and M. Koyama, Detailed transport-reaction models for SOFC Ni-YSZ patterned anodes: a critical inquiry, *ECS Transactions*, 57, 2821-2830, (2013).

P R.O'Neill, L. Giri, W. K. Ajith Karunarathne, A. K. Patel., K.V. Venkatesh and N. Gautam, The structure of dynamic GPCR signaling networks, *WIRES Systems Biology and Medicine*, 6(1), 115-123 (2013).

FUNDED RESEARCH PROJECTS 2013-14

Dr Narasimha Mangadoddy, Scale-up and coarse coal partitioning performance prediction of TATA-JK dense medium cyclone by multi-phase CFD Simulations, TATA Steel, November 2013, Rs.5.11 Lakhs

Dr Vinod Janardhanan, Detailed kinetic studies of biogas reforming on Ni catalyst CSIR, March 2014, Rs. 3.86 Lakhs.

CEP COURSES

MEMS & NEMS: Fundamentals, Design and Applications, A Five Days Workshop, 16-20 December 2013, IIT Hyderabad.

SEMINARS IN THE DEPARTMENT

Flow structures in lid driven cavities, Prof. Abhijit Deshpande, IIT Madras, 4 March 2013.

Green Engineering, A borderless science, Prof. Pogaku Ravindra, University of Malaysia Sabah, 10 April 2013.

Electrolyte-insulator-semiconductor based microfluidic biosensor, Dr Siddhartha Panda, IIT Kanpur, 17 April 2013.

Experimental characterization of the transition region in a rotating disk boundary layer, Dr Benoit Pier, CNRS researcher, CNRS-Université de Lyon at École centrale de Lyon, France, 1 May 2013.

Multiphase modeling and simulation of complex multiphase flows, Dr Vivek Buwa, IIT Delhi, 22 May 2013.

Microscopic mechanism of strain localization in amorphous materials, Dr Ratul Dasgupta, Weizmann institute of Science, Israel, 29 July 2013.

Frontiers of Thin Films, Sub-micro and Nanostructures, Prof. Kajari Kargupta, Jadavpur University, 11 September 2013.

Innovation to Excellence, Balakrishnan Ganesan, Porus Laboratories Pvt. Ltd., 23 October 2013.

Mathematical modeling and optimization of large-scale nonlinear systems, Dr. Kedar Kulkarni, ABB, Bangalore, 30 October 2013.

What do we mean by fluids and Solids, and how do we model them?, Prof. K R Rajagopal, Texas A&M, 11 December 2013.

Insulator Based Dielectrophoresis and Electrokinetics for Particle Manipulation in Microfluidic Devices, Dr. Karuna Koppula, Rochester Institute of Technology, 12 December 2013.

Durability and Performance of Fuel Cell Catalyst Layers, Srikanth Arisetty, Argonne National Lab, 17 December 2013.

Process topology reconstruction from data, Dr. Arun Tangirala, IIT Madras, 30 December 2013.

Fuel reactor modelling in Chemical-Looping Combustion (CLC) using solid fuel, Panneer Selvam R, Cranfield University, 3 January 2014.

Swirls, Twirls, Whirls and Curls - Vortical motion in Blood flow, Kartik Venkat Bulusu, George Washington University (GWU), USA, 8 January 2014.

Innovation Management with an Entrepreneur Mindset, Banibrata Pandey, Nagarjuna Fertilizers, 15 January 2014.

Modeling the response of "dual cross-linked" nanoparticle networks to mechanical deformation, Balaji Iyer, University of Pittsburgh, 12 February 2014.

Core-Shell Nanocatalyst Design by Combining High-Throughput Experiments and First-Principles Simulations, Nageshwara Peela, University of Delaware, 12 March 2014.

Gas flow in complex microchannels, Amit Agrawal, IIT Bombay, 16 April 2014.

In situ Electrochemical and Mechanical Measurements in Lithium-battery Electrodes, Vijay Sethuraman, Brown University, Rhode Island, 5 May 2014.

TALKS GIVEN IN INTERNATIONAL / NATIONAL CONFERENCES

Kirti Chandra Sahu, Three-dimensional simulations of pressure-driven displacement flow of two immiscible liquids using a multiphase Lattice Boltzmann approach, 66th Annual Meeting of the APS Division of Fluid Dynamics, 23-26 November 2013; Pittsburgh, Pennsylvania.

Kirti Chandra Sahu, Thermocapillary-driven motion of a droplet on an inclined substrate: contact

line dynamics, and non-monotonic dependence of surface tension on temperature, 66th Annual Meeting of the APS Division of Fluid Dynamics, 23-26 November 2013; Pittsburgh, Pennsylvania.

Kirti Chandra Sahu, Numerical simulation of a bubble rising in an unconfined viscoplastic fluid with chemical reaction, 66th Annual Meeting of the APS Division of Fluid Dynamics, 23-26 November 2013; Pittsburgh, Pennsylvania.

Kirti Chandra Sahu, Instability in viscosity-stratified free shear layer, 66th Annual Meeting of the APS Division of Fluid Dynamics, 23-26 November 2013; Pittsburgh, Pennsylvania.

Kirti Chandra Sahu, Bubble rise in a non-isothermal channel with a non-monotonic dependence of the surface tension on temperature, 66th Annual Meeting of the APS Division of Fluid Dynamics, 23-26 November 2013; Pittsburgh, Pennsylvania.

Kirti Chandra Sahu, Pressure-driven displacement of a viscoplastic material by a Newtonian fluid, 66th Annual Meeting of the APS Division of Fluid Dynamics, 23-26 November 2013; Pittsburgh, Pennsylvania.

Anand Mohan, Theoretical and Computational Studies of Atherosclerosis, *Center for Interdisciplinary Sciences, Tata Institute of Fundamental Research (TIFR)*, Hyderabad, 20 February 2014.

Sunil K Maity, Steam reforming of isobutanol for production of synthesis gas: Effects of metals, World Congress on Petrochemistry and Chemical Engineering, Hilton San Antonio Airport, United States 78216, 18-20 November 2013.

Balraju Vadlakonda and Narasimha Mangadoddy, CFD modelling of column flotation: Prediction of two phase flow hydrodynamics, Proceedings of the XIII International Seminar on Mineral Processing Technology (MPT-2013), 10-12 December 2013, 257-264.

Kumar Reddy, Kedar S. Kumbhar and Narasimha Mangadoddy, Computational and Experimental Study of the Effect of Inclination on Hydrocyclone Performance V.T.S.R. Proceedings of the XIII



International Seminar on Mineral Processing Technology (MPT-2013), 10-12 December 2013, 265-273.

Narasimha Mangadoddy, Granular solids flow, theory and modelling: A few case studies, TEQUIP refresh course on “Physics of Bulk, Thin & Nano Size Materials”, Sponsored by University Grants Commission, JNTUH College of Engineering, Kukatpally, Hyderabad A.P., 12 August - 3 September, 2013.

Parametric Sensitivity Through Optimization Under Uncertainty Approach, 20th conference on Computer Methods in Materials Technology (KomPlasTech 2013), Zakopane, Poland, 13-16 January 2013.

Structural and Morphological Control of Electrospun Polymer and Carbon Nanofibers, IOP Meeting on Electrospinning: Practices and Possibilities, London (UK), 5-6 December 2013.

Canna Indica Seedpod: An Inspiration to Fabricate High Aspect Ratio Hierarchical Superhydrophobic Surfaces, 247th American Chemical Society National Meeting, Dallas, TX (USA), 16-20 March 2014.

Synthesis, Characterization and Application of Cellulose Acetate Derived Electrospun Carbon Nanofibers, 247th American Chemical Society National Meeting, Dallas, TX (USA), 16-20 March 2014.

D. S. Monder and K. Karan, Coverage dependent thermodynamics for sulfur poisoning of Ni based anodes, SOFC-XIII, Okinawa, Japan, October 2013 (This was published in ECS Transactions - see 1st paper under conference publications).

AWARDS / RECOGNITIONS

Kirti Chandra Sahu, Indian National Science Academy (INSA) - Medal for Young Scientist (2013).

Dr. Kishalay Mitra, Visiting Professor, Department of Energy, Environmental and Chemical Engineering, Washington University in St. Louis, July-August, 2013.

Dr. Kishalay Mitra, Workshop Chair in the 2013 IEEE Multi-Conference on Systems and Control (MSC 2013), Hyderabad, 28-30 August 2013.

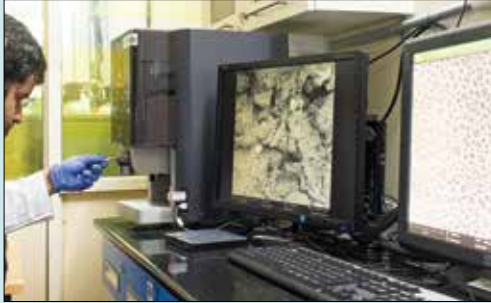
Dr. Kishalay Mitra, Invited Lecture, 20th conference on Computer Methods in Materials Technology (KomPlasTech 2013), Zakopane, Poland, 13-16 January 2013.

S. Mattaparthi and C.S. Sharma, Gandhian Young Technological Innovation Awards-2014 with Technological-Edge Award by Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), 29 March 2014.

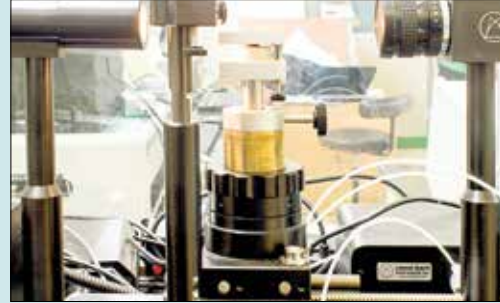
RESEARCH INFRASTRUCTURE

Over the last few years the department has developed state-of-the-art facilities for performing advanced research that cuts across the boundaries of conventional chemical engineering. The department hosts an array of sophisticated instruments, some of which are listed below.

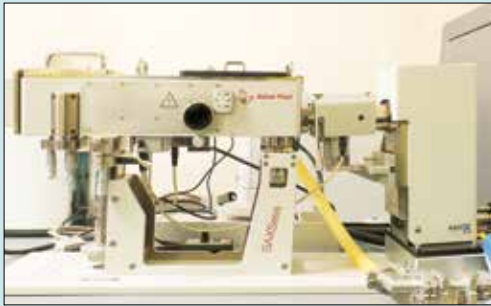
Dip coater | Thermo-gravimetric analyzer | Ultraviolet Visible Spectrometer | Fourier Transform Infrared Spectrometer | ZETA potentiometer | Scanning Electron Microscope | Graphitizing furnace | Plasma Enhanced Chemical Vapor Deposition | Optical microscope | Goniometer Maskless Lithography | Small Angle X-Ray scattering | GC-MS | Micro GC | CHNS-O Analyzer | BET Analyzer | Chemisorption Analyzer | Parr High Pressure Reactor | Flow Reactors | Auto Clave Rota Vapor Distillation Unit | Flow Cytometer | Rheometer | Inverted Microscope Refrigerated Centrifuge | CO₂ incubator | Deep Freezer | UV Visible Spectrophotometer



SEM



Gonio Meter



SAXS



Flow Cytometer



Inverted Microscope



FTIR

Chemistry



The Department of **Chemistry (CY)** is actively conducting research in cutting-edge areas of Organic, Inorganic and Physical Chemistry, as well as fulfilling the needs of the undergraduate program of IIT Hyderabad. At present, there are forty seven research scholars in the department, pursuing Ph.D, and thirty four students who are enrolled in the two year M.Sc program; they are mentored by nine faculty members. Our first batch of M.Sc students graduated in 2012 and the second batch in 2013. Many of our M.Sc students are currently pursuing Ph.D at universities in Japan and in Europe. The department also has several sponsored projects in diverse areas of Chemistry.

The department, has state of the art research facilities that include, a 400 MHz NMR, a BET analyser, HRMS, Single Crystal- and Powder-XRD, Fluorescence/lifetime and Raman spectrometers, Atomic force microscopy (with conductive, electrostatic force, magnetic force, surface potential, nanolithography modes), Gas chromatography-Mass Spectrometer, HPLC, Glove boxes, and many such sophisticated set-ups. The department is also equipped with necessary infrastructure, for carrying out wet chemical syntheses or related experimentation, at both undergraduate and postgraduate level. Our aim is to produce highly sought after and knowledgeable graduates for pursuing careers with academia, industry and government.

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PUBLICATIONS

(In Peer-Reviewed Journals)

- S. Vidyacharan, A. H. Shinde, B. Satpathi, and D.S. Sharada, A facile protocol for the synthesis of 3-aminoimidazo-fused Heterocycles via the Groebke-Blackburn-Bienayme reaction undercatalyst-free and solvent-free conditions, *Green Chem.*, 16, 1168-1175, (2014).
- A. H. Shinde, S. Vidyacharan, D.S. Sharada, Microwave-assisted facile synthesis of [a]-annelatedpyrazolopyrroloindoles via intramolecularazomethine imine 1,3-dipolar cycloaddition, *Tetrahedron Lett.*, 55, 3064-3069, (2014).
- K. Naktode, S. Anga, R. K. Kottalanka, H. P. Nayek and T. K. Panda, Reaction of Sterically Congested NHC-Zn(CH₂CH₃)₂ with Substituted Phenols Leading to Zincate Complexes, *Journal of Coordination Chemistry*, 67, 236-248 (2014).
- S. Anga, S. Biswas, R. K. Kottalanka, B. S. Mallik, and T. K. Panda, Structural and Mechanistic Study of Substituted Perimidine - An Experimental and Computational Study, *Canadian Chemical Transactions*, 2, 72-82 (2014).
- K. Naktode, J. Bhattacharjee, S. Das Gupta, H. P. Nayek, B. S. Mallik, and Tarun K. Panda, Unprecedented Calcium Metalla-macrocyclic Having Phosphinoselenoic Amide and Diphenylphosphinate in the Coordination Sphere, *Z. Anorg. Allg. Chem*, 640, 994-999 (2014).
- R. K. Kottalanka, K. Naktode, and T. K. Panda, Zirconium complexes of two different iminopyrrolyl ligands - syntheses and structures, *Z. Anorg. Allg. Chem*, 640, 114-117 (2014).
- R. K. Kottalanka, S. Anga, K. Naktode, P. Laskar, H.P. Nayek and T. K. Panda, Amidophosphine-Borane Complexes of Alkali metals and the Heavier Alkaline Earth Metals- Syntheses and Structural Studies, *Organometallics*, 32, 4473-4482 (2013).
- S. Anga, T. Pal, R. K. Kottalanka, M. Paul, and T.K. Panda, Synthesis and Structures of Dimeric Zinc Complexes Supported by Unsymmetrical Rigid BidentateImino-acenaphthenone Ligand, *Canadian Chemical Transactions*, 1, 21-31 (2013).
- R. K. Kottalanka, P. Laskar, K. Naktode, B.S. Mallik, and T. K. Panda, N- Versus P- Co-ordination for N-B and P-B bonded BH₃ Adducts for various Phosphinamine Ligands - An Experimental and Computational Study, *J. of Molecular Structure*, 1047, 302-309 (2013).
- R. K. Kottalanka, S. Anga, S. K. Jana, and T.K. Panda, Synthesis and Structure of Heavier Group 2 Metal Complexes with Diselenoimidodiphosphinato Ligand containing Sr-Se and Ba-Se direct bonds, *J. Organomet. Chem*, 740, 104-109(2013).
- K. Naktode, R. K. Kottalanka, S. K. Jana and T. K. Panda, Synthesis and Crystal Structure Study of Sodium and Calcium Complexes of N-(2, 6-dimethylphenyl)diphenylphosphinic amide Ligand, *Z. Anorg, Allg, Chem*, 639, 999-1003 (2013).
- D. Chakraborty, B. S. Mallik and A. Chandra, An *ab initio* Molecular Dynamics Study of Water-Carbon Tetrachloride Liquid-Liquid Interface: Nature of Interfacial Structure, Hydrogen Bonds and Dynamics, *Current Science*, 106, 1-5 (2014).
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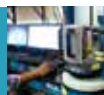
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Dr G. Satyanarayana, Design and development of inhibitors of human LEDGF/p75 and HIV-1 Integrase interaction for efficient reduction of viral gene expression, DBT, New-Delhi, 2012-2015, 36 months, 20 Lakhs.

TALKS GIVEN IN INTERNATIONAL / NATIONAL CONFERENCES

Tarun K. Panada, Novel Phosphinamine Ligands in Heavier Alkaline Earth Metal Chemistry, Modern Trends in Inorganic Chemistry (MTIC - XV), 13-16 December 2013, Indian Institute of Technology Roorkee, Uttarakhand, India. (**ShortInvited Lecture**)

M. Deepa and R. Narayanan, Quantum Dot Solar Cells: Novel Photoanode Architectures for Improved Performance, AP Science Congress 2013 Central University of Hyderabad, 14-16 November 2013.

G. Satyanarayana, Transition Metal Catalyzed Unprecedented Domino Transformations and the Synthesis of Novel Tetracyclic Alkaloid Systems via Domino One-pot Sequence, XVI NOST Conference, 4-7 April 2014, Agra, India.

C-H/O-H Activation: Transition Metal-Mediated Domino/Sequential Domino One-Pot Transformations, G. Satyanarayana, Prof. A. Srikrishna's Memorial Lecture, IISc, Bangalore, India, 20 January 2014.

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AWARDS / RECOGNITIONS

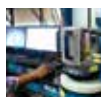
Alexander von Humboldt Fellowship, Germany (G. Prabusankar)

IIT Bombay Research Paper Award (G. Prabusankar)

RESEARCH INFRASTRUCTURE

The Department of Chemistry over the last few years has developed sophisticated research laboratories with state of the art analytical equipments. Some of the facilities available with the department are listed below.

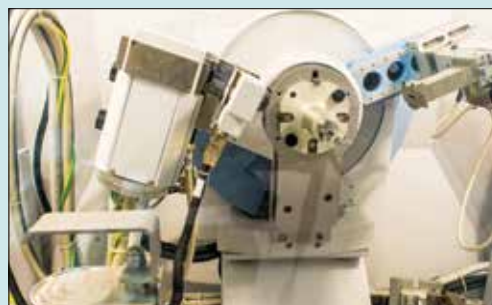
Inductively Coupled Plasma-Optical Emission Spectroscopy | 400 MHz Nuclear Magnetic Resonance | Single Crystal X-ray Diffraction | Powder X-ray Diffraction | High Resolution Mass Spectrometer | ESR | BET Analyzer | CD | Fluorescence Spectrometer with Lifetime | Class AAA Solar Simulator | UV-Visible-Near Infrared Spectrometer | Fourier Transform Infrared Spectrometer | CHN Analyzer | Total Organic Content Analyzer | Multimode Atomic Force Microscope | Raman Microscope | Differential Scanning Calorimetry / Differential Thermal Analysis / Thermogravimetric Analysis



CHEMISTRY



Chemisorption



Powder XRD



HRMS



Glove box



Atomic Force microscope



NMR Spectroscopy

Civil Engineering



Our vision is to be the frontrunners in addressing the current and future needs of society in “all things Civil”. That is, in developing and constructing advanced and robust structures, laid on better foundations, in satisfying the water needs of the country, and help develop a cleaner and healthier environment free from chemical and biological pollutants. The department will focus on both applied and basic research, provide solutions for immediate use, and generate new science that will help drive the future evolution of Civil Engineering. Industry interaction and academic exchanges will become an integral characteristic of our department.

The Department of **Civil Engineering (CE)** currently has 12 faculty members. The department offers a Bachelor of Technology (B.Tech) program in Civil Engineering, and two year and three year Master of Technology (M.Tech) programs in three specializations: Structural Engineering, Geotechnical Engineering, and Environmental and Water Resource Engineering. The three year program is “thesis-by-research” and allows students to gain in-depth research exposure. The department also offers a Doctor of Philosophy (Ph.D)

program in four specializations: Structural Engineering; Geotechnical Engineering; Water Resources Engineering; and Environmental Engineering.

The department is developing state-of-the-art laboratory facilities in each specialization. Key advanced equipment have already been procured and labs will be used both for research and undergraduate teaching. Current facilities include laboratories in Construction Materials, Structural Engineering, Advanced Cement-based Materials, High Performance Concrete, Structural Materials, Large Scale Structures, Computational Structural Mechanics, Advanced Geotechnical Testing, Large Scale testing, Geosynthetics, Advanced Soil Dynamics, Ground Characterization, Computational Geotechnical, Water Quality Analysis Water and Waste Water, Solid waste, Hazardous waste, Trace Contaminants, Microbiology, Air Quality Monitoring, Hydraulic Engineering, Hydrology, Geographic Information Systems (GIS).

With our current and evolving faculty strength, motivated community, and exceptional laboratory facilities, we have all the necessary ingredients in realizing our vision and are confident about it.

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B. Janaki Ramaiah., G. V. Ramana., and B. Munwar Basha, Preliminary geotechnical investigations of a municipal solid waste dump at Ghazipur, New Delhi, India. Fourth Young Indian Geotechnical Conference (4YIGEC-2013), 17-18 May 2013, IIT Madras.

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P. Srinivasa Rao, A. Lokesh Kumar, P.V.N. Gautam, S. Karthik, and T. Shashidar, Vertical Electrical Sounding for finding Groundwater potential zones in IIT Kandi Campus, Hyderabad, Andhra Pradesh, Two day National conference on water, environment & society (NCWES-2014) 30th June and 1 July 2014 at Hyderabad, India Organized by CWR, IST, JNTUH, Hyderabad.

FUNDED RESEARCH PROJECTS 2013-14

Kolluru V.L. Subramaniam, Development and evaluation of self-curing, User friendly geopolymers for structural applications, Department of Science and Technology, 3 Years (2013-2016), Rs. 79.57 Lakhs.

Amirtham Rajagopal, Multiscale Failure modeling of composites, AR&DB - DRDO, March 2014, Rs. 17.8 Lakhs.

Mahendrakumar Madhavan, Fatigue Behavior of CFRP Patched Sections, DST, Sep 2013, Rs. 10.72 Lakhs.

S. Suriya Prakash, Resilient and Sustainable Fiber Engineered Masonry Systems for Rural India, DST, 2012-2017, Rs. 35.00 Lakhs.

B Umashankar, Laboratory Study on the Stabilization of Haul Roads inside Open-Cast Mines, Neyveli Lignite Co. Ltd, July 2013.



Sireesh Saride, Evaluation of Fly ash Treated RAP for Pavement Base and Subbase Construction, Department of Science and Technology, Technology Systems Development Scheme, May 2014, Rs. 94.4 Lakhs.

K.B.V.N. Phanindra, ICT in Water and Pest / Disease Management for Yield Improvement in Horticulture (Citrus), IT Research Academy (ITRA-Water), Media Lab Asia, Ministry of Communication and Information Technology, Government of India, November 2013, Rs. 62.00 Lakhs.

K.B.V.N. Phanindra, An investigation into the fate and transport of non-point source pollution in a semi-arid tropical region using a physical process model, Ministry of Science and Technology (Fast Track Scheme), Government of India, June 2013, Rs. 8.12 Lakhs.

Debraj Bhattacharyya, Anaerobic Digestion as a Method of Managing Food and Garden Wastes Generated in the Campus of IIT Hyderabad Faculty Research Grant, June 2012, Rs. 5.00 Lakhs.

Asif Qureshi, Mercury Pollution in India: Regional and Global Implications Department of Science & Technology, November 01, 2013, Rs. 35.0 Lakhs.

Shashidhar, 'Enhancing the groundwater management capacity in Asian cities through the development and application of groundwater sustainability index in the context of global change', Asia-Pacific Network for Global Change Research (APN) 2013.

CEP COURSES

Short Course on Finite Element Method, BHEL R&D Head Quarters, New Delhi, 24-26 February 2014, New Delhi.

Short Course on Condition Assessment and Strengthening of Concrete Structures, CASTCON, 4-5 July 2013, IIT Hyderabad.

SEMINARS IN THE DEPARTMENT

Nonlocal elasticity Models and their inclusion in

structural theories for beams and plates, Prof J N Reddy, Department of Mechanical Engineering, Texas A&M University, USA, 15-01-2014.

Unsaturated Soil Mechanics in Geotechnical Engineering Practice, Prof Sai K Vanapalli, Professor and Chair, University of Ottawa, Canada, 19 December 2013.

Water Resources Planning and Management in Developing Countries: Challenges and Opportunities, by Dr. Bellie Sivakumar, Associate Professor and Australian Research Council (ARC) Future Fellow, The University of New South Wales, Sydney, NSW 2052, Australia.

Joy of Civil Engineering. Prof. M. Madhav, Visiting Faculty, IIT Hyderabad. Retired professor from IIT Kanpur.

Extension of Particle Discretization Scheme (PDS) and application of PDS to failure Analysis. Mr. Mahendra Kumar Pal, Department of Civil Engineering, University of Tokyo, Japan.

Conjunctive use possibilities in canal command areas in Andhra Pradesh. Dr. K. Venu Gopal, Joint Director in AP Ground Water Department.

Critical aspects of seismic wave propagation simulation. Prof. Mrinal Sen. Director, National Geophysical Research Institute (NGRI), and Professor, University of Texas-Austin, USA.

GLOBAL Applications of SWAT in Water Resource Management. Prof. Raghavan Srinivasan. Professor, Departments of Ecosystem Sciences and Management, and Biological and Agricultural Engineering, Director of Spatial Sciences Laboratory, Texas A&M University, USA.

Physics based Computational modeling of Nao- and Bio- Mechanical systems. Prof. Vinu Unnikrishnan. Professor, Department of Aerospace engineering and Mechanics, University of Alabama, USA.

Water Resources Planning and Management in Developing Countries: Challenges and Opportunities. Dr. Bellie Sivakumar. Associate Professor and Australian Research Council (ARC) Future Fellow, University of New South Wales, Sydney, Australia, and Associate, University of California, Davis, USA.

Unsteady flows in Pipelines. Dr. Prashanth Reddy. Assistant Professor, IIT Kharagpur.

Advancing Seismic Performance of Rectangular Concrete Walls. Dr. Sriram Aaleti. Assistant Professor, University of Alabama, USA.

Nonlocal elasticity Models and their inclusion in structural theories for beams and plates. Prof. J N Reddy, Department of Mechanical Engineering, Texas A&M University, College Station, USA.

Role of microbes in Civil Engineering. Prof. Sasikala, Head, Center for Environment, JNTU, Hyderabad.

Carbon based Hierarchical Structures as Adsorbents for Environmental Remedial Applications. Dr. Chandra Shekhar Sharma. Assistant Professor, Department of Chemical Engineering, IIT Hyderabad.

Multi-scale Modeling of Structural Cementitious Composites. Koichi Maekawa. Professor, Department of Civil Engineering, University of Tokyo, Japan.

TALKS GIVEN IN INTERNATIONAL / NATIONAL CONFERENCES

Kolluru V.L. Subramaniam, Precast Bridges Post-tensioned for continuity: Review and Case Study, at International Conference cum exhibition entitled Implementation Challenges in Precast Construction for Buildings and Infrastructure Projects ICICPC-2013, GVP College of Engineering, Visakhapatnam on the 22 -23 April 2013.

Kolluru V.L. Subramaniam, Cementing the Future: Sustainable Construction Materials, at National Conference on Sustainable Construction Materials and Technologies (SCMAT), National Institute of Technology Warangal, during 15-16 March 2013.

Amirtham Rajagopal, Parameterization in Isogeometric Analysis, *Asia Pacific Conference on Computational Mechanics*, Singapore, 23-26 December 2013.

Mahendrakumar Madhavan, Flange Compactness Definition for Horizontally Curved I-Girders, Pacific Structural Steel Conference, Singapore and 10 October 2013.

G. Srikar, B. Gopi, and S. Suriya Prakash, Effect of Temperature on Compression Behaviour of Polypropylene Fiber Reinforced Concrete, *Proceedings of International Conference on Structural Engineering and Mechanics*, 604-613 pp, 21-23 December 2013, Rourkela, India.

K.V.V. Sumanth, and S. Suriya Prakash, Effect of Tension Stiffening on Behavior of RC columns under Combined loading including Torsion, *Proceedings of International Conference on Structural Engineering and Mechanics*, 624-632 pp, 21-23 December 2013, Rourkela, India.

B. Umashankar, Scrap Tyres as a Geomaterial, One Day Workshop on Ground Improvement Techniques, Chalpathi Institute of Engineering & Technology, Guntur, Organized by IGS-Guntur Chapter, 29 June 2013.

B. Umashankar, Shredded Tyres-Sand Mixtures as a Geomaterial. Fourth Indian Young Geotechnical Engineers' Conference (4IYGEC), IIT Madras, Chennai, 16 May 2013.

B. Umashankar, Recyclable Materials in Geotechnical Engineering. One Day Workshop on Geotechnical Aspects in Civil Engineering, Vasavi College of Engineering, Department of Civil Engineering, Hyderabad, 13 February 2014.

Sireesh Saride, Prediction of Limit Bearing Capacity of Footings on Geocell Reinforced, *GeoCongress 2014: Geo-Characterization and Modeling for Sustainability*, Atlanta, Georgia, 23-26 February 2014.

Sireesh Saride, Elasto-Plastic Behavior of Jute-Geocell Reinforced Sand Subgrade, *GeoCongress 2014: Geo-Characterization and Modeling for Sustainability*, Atlanta, Georgia, 23-26 February 2014.

Sireesh Saride, Evaluation of Fly ash Treated RAP for Sustainable Design of Pavement Bases - An Indian Context, *GeoCongress 2014: Geo-Characterization and Modeling for Sustainability*, Atlanta, Georgia, 23-26 February 2014.

Sireesh Saride, Rutting Behavior of Geocell Reinforced Sand Subgrades under Traffic Loading, Department of Civil and Environmental Engineering, University of Illinois, Chicago, USA, 28 February, 2014.



Sireesh Saride, Geotechnical Aspects of Pavements, *Geotechnical and Materials Aspects of Pavements 2013*, Department of Civil Engineering, National Institute of Technology Warangal (NITW), 13-14 December 2013.

Sireesh Saride, Embankments on Soft Soils, *Geotechnical Engineering Challenges*, Faculty Development Program, TEQIP, Govt. Engg. College, Kozhikode, Kerala, 2-6 September 2013.

Sireesh Saride, Control of Embankment Settlements: A Case Study, *Geotechnical Engineering Challenges*, Faculty Development Program, TEQIP, Govt. Engg. College, Kozhikode, Kerala, 2-6 September 2013.

Sireesh Saride, Behavior of Geocell Reinforced Foundations: Model and Numerical Studies, In the proceedings of *International Symposium on Geosynthetics India -2013*, 23-25 October 2013, 199-210.

B. Munwar Basha, Invited by Indian Geotechnical Society Hyderabad Chapter for a presentation on Computation of Reliability based LRF for external seismic stability of reinforced soil walls, in the annual symposium GeoApps-2014 on 04 April 2014 held at JNTU Hyderabad.

B. Munwar Basha, Invited by Prof. D.N. Singh to participate and deliver a presentation on ASD to LRFD to Reliability based LRFD, in the brain storming session on Emerging Trends in Geotechnical Engineering under the aegis of Science and Engineering Research Board (SERB) of Department of Science and Technology (DST), India on 26 Mar 2014, at VMCC building, IIT Bombay.

B. Munwar Basha, Invited by Prof. Krishna R Reddy to deliver a Presentation on Load Resistance Factor Design of Mechanically Stabilized Earth Walls, on Feb 28, 2014 at Department of Civil and Materials Engineering, University of Illinois at Chicago UIC), Chicago, Illinois 60607, USA.

Debraj Bhattacharyya, Treatment of Harvested Water - Indian Practice, Workshop on Rainwater Harvesting, Ordnance Factory Estate, Medak, July 2013.

Basudev Biswal, Understanding subsurface flow mechanisms by studying recession flow curves, AGU

Fall Meeting, San Francisco, USA, December 2013 (poster).

Basudev Biswal, How much water does a basin hold?, AGU Fall Meeting, San Francisco, USA, December 2013 (poster).

Asif Qureshi, Impacts of Ecosystem Change on Mercury Bioaccumulation in a Coastal-Marine Food Web, The 11th International Conference on Mercury as a Global Pollutant. Edinburgh, Scotland. 28 July - 02 August 2013.

Asif Qureshi, Modeling Mercury Material flow in India and Potential Impact of emission Control Measures, Conference on Heavy Metals in the Environment (HME- 2013). Kottayam, India. 28-30 November 2013.

AWARDS / RECOGNITIONS

S. Suriya Prakash, Prestigious Ramanujan Fellowship, Department of Science and Technology.

Asif Qureshi, Prestigious INSPIRE Faculty Award, Department of Science & Technology, India, 2013.

RESEARCH INFRASTRUCTURE

The Department of Civil Engineering at IITH mainly has 3 different research streams and corresponding research facilities. The major facilities with the department are listed below.

ICP-MS | GC MS-MS | TOC Analyzer | Real Time PCR | Wire testing machine | Shear Table | Cyclic Triaxial | CBR Apparatus | Cyclic sample shear apparatus | Interface Shear Apparatus | Direct Shear Apparatus | Consolidation Apparatus | XRD | TGA | Deep freezer | UV Spectrophotometer | Mercury Analyzer | Temperature controlled centrifuge | Flame photometer | Gel electrophoresis system | Pan Mixer | LA Abrasion Testing Machine | Isothermal Calorimeter | Compression Testing Machine | 2000 kN Universal Testing Machine



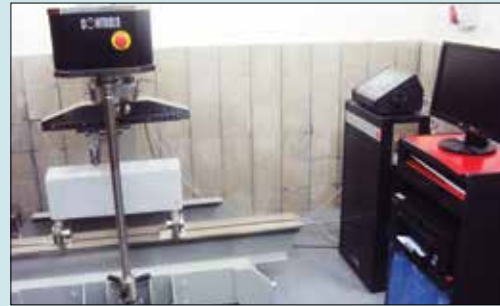
Resonant Column Apparatus



Wire Testing Machine



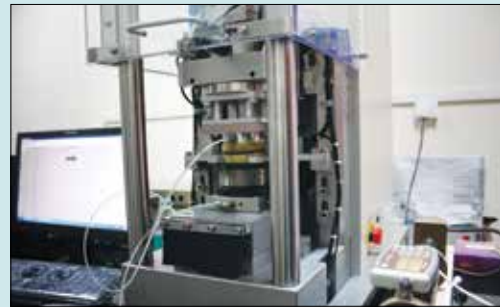
GC MS-MS



Flexure Testing Apparatus



High performance concrete Lab



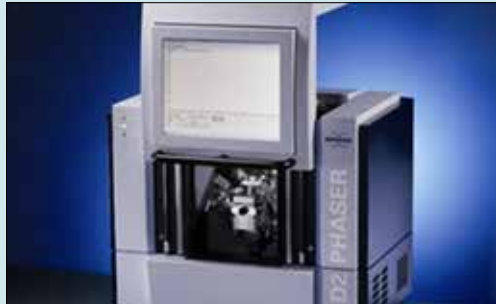
Cyclic Simple Shear Apparatus



Direct Shear Apparatus



Cyclic Triaxial



XRD



Large scale structural beam testing



Large scale structural testing frame



TGA / DSC

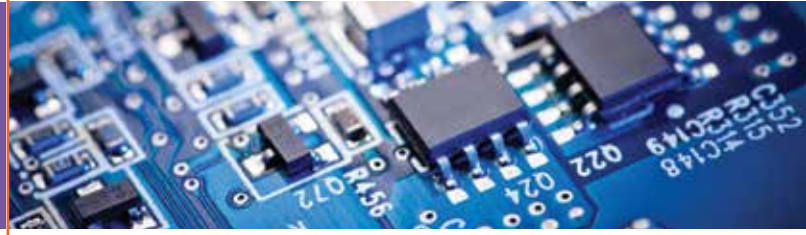


*500 kN (2m Clearance)
Fatigue Testing Machine*



*3000 kN (2m Clearance)
Compression Testing Machine*

Computer Science & Engineering



The Department of **Computer Science and Engineering (CSE)** at IIT, Hyderabad is poised for a giant leap through research in cutting-edge computing and technology, while imparting top-class education through innovative pedagogy. The department offers undergraduate (B.Tech) (current annual intake around 45 students), and postgraduate programs M.Tech and Ph.D (current annual intake around 30 students), including a new M.Tech program in Information Security, in collaboration with C.R. Rao Advanced Institute of Mathematics, Statistics and Computer Science, Hyderabad. Over the last few years, the department has also offered short courses (Continuing Education Programme) customized to the needs of industry. The department comprises ten young faculty members (with several adjunct faculty from reputed academic and industry backgrounds), who are actively engaged in research areas including theoretical computer science, algorithms, graph theory, networking, distributed systems, compilers, machine learning, and image/video processing. The faculty have large sponsored research projects

in the application domains of cyber-physical systems (Deity, Govt of India) and disaster management (in collaboration with Japan).

The department also has regular collaborators both in industry and academia, such as KDDI labs (Japan), Uurmi Systems, IISc (Bangalore), Tel Aviv University, NTU (Singapore), Royal Holloway University of London etc. The department has risen in stature over its short existence, evidenced by opening and closing JEE ranks of 635 and 1640 respectively in 2013. It also has a sound placement record with top hiring companies in recent years including Google, Amazon, Microsoft, IBM, etc. To know more about the department and research interests of the faculty, please visit <http://cse.iith.ac.in/>, or browse through the department brochure at <http://cse.iith.ac.in/IITH-CSE-Brochure2014.pdf>.



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PATENTS FILED

Vamshi Krishna K, Bheemarjuna Reddy Tamma, Manoj Kumar M and Nitesh Shah, Systems and Methods for Dynamic Wideband Channel Selection, filed for U.S. patent in January 2014.

PUBLICATIONS

(In Peer-Reviewed Journals)

Satya Trinadh, Seetal Potluri, Ch. Sobhan Babu and V. Kamakoti, An Efficient Heuristic for Peak Capture Power Minimization During Scan-Based Test, *J. Low Power Electronics* 9(2): 264-274 (2013).

L. Sunil Chandran, Mathew C. Francis, Naveen Sivadasan, Cubicity and Bandwidth, *Graphs and Combinatorics*, 29(1), 45-69 (2013).

S. Kalyanasundaram and A. Shapira, A Wowzer-Type Lower Bound for the Strong Regularity Lemma, *Proceedings of the London Mathematical Society*, Volume 106, Issue 3, pages 621-649, 2013.

S. Kalyanasundaram and A. Shapira, A Note on Even Cycles and Quasi-Random Tournaments, *Journal of Graph Theory*, Volume 73, Issue 3, pages 260-266, 2013.

N.R. Aravind and C.R. Subramanian, Forbidden subgraph colorings and the oriented chromatic number. *European Journal of Combinatorics*, 34(3), 620-631 (2013).

V. Balasubramanian, S. Chakraborty, S. Panchanathan, Conformal Predictions for Information Fusion, *Annals of Mathematics and Artificial Intelligence*, 1-21, 2014.

S. Chakraborty, V. Balasubramanian, S. Panchanathan, Generalized batch mode active learning for face-based biometric recognition, *Pattern Recognition*, 46:2, 2013.

PUBLICATIONS

(In Peer-Reviewed Conferences)

Shyju Wilson, M. Srinivas and C. Krishna Mohan, Sports Video Classification Using Online Dictionary

Learning and Weighted Sparse, *Communicated to International Conference on Acoustics, Speech and Signal Processing (ICASSP2014)*, Florence, Italy, MAY 4-9, 2014.

M. Srinivas and C. Krishna Mohan, Medical Image Indexing and Retrieval Using Multiple Features, *Proc. International Conference on Computational Intelligence and Information Technology (CIIT 2013)*, Mumbai, October 2013.

Tony Basil, Choudur Lakshminarayan, and C. Krishna Mohan, Detection of Classes of Heart Arrhythmias based on Heartbeat Morphology Patterns, *2nd International Workshop on Analytics for Cyber-Physical Systems*, Austin, USA 2013.

M. V. Panduranga Rao and Akhilesh Chaganti, Safety Verification of Floodgate Operation Protocols using Hybrid Automata, *Proc. 9th IMECS Conference*, pp. 201-205, 2014.

Satya Trinadh, Seetal Potluri, Ch. Sobhan Babu and V. Kamakoti, An Efficient Heuristic for Peak Capture Power Minimization During Scan-Based Test, *J. Low Power Electronics* 9(2): 264-274 (2013).

Mukesh Kumar Giluka, Sharath Kumar N, Nitish Rajoria and Bheemarjuna Reddy Tamma, Class Based Priority Scheduling to Support Machine to Machine Communications in LTE Systems, *National Conference on Communications*, Kanpur, India, February 2014.

Mukesh Kumar Giluka, Nitish Rajoria, Ashish C. Kulkarni, Vanlin Sathya and Bheemarjuna Reddy Tamma, Class Based Dynamic Priority Scheduling for Uplink to Support M2M Communications in LTE, *IEEE WF-IoT*, South Korea, March 2014.

Sudarshan Srinivasan, Rajan Prasad, Abhishek Kumar, Rahul Bhatia, and Bheemarjuna Reddy Tamma, Ubersleep: An innovative mechanism to save energy in IEEE 802.11 based WLANs, *IEEE CONECCT*, Bangalore, India, January 2014.

Bala Murali Krishna K, Madhuri S, Vanlin Sathya, and Bheemarjuna Reddy Tamma, A Dynamic Link Aggregation Scheme for Heterogeneous Wireless Networks, *IEEE CONECCT*, Bangalore, India, January 2014.



Aradhya Biswas, Goutham Pilla, and Bheemarjuna Reddy Tamma, Microsegmenting: An approach for precise distance calculation for GPS based ITS applications, IEEE Raics, December 2013.

Chaganti Ramaraju, R Vanlin Sathya, Shaik Asif Ahammed, A Riddhi Rex and Bheemarjuna Reddy Tamma, Efficient SON Handover Scheme for Enterprise Femtocell Networks, IEEE ANTS, Chennai, India, December 2013.

Mukesh Kumar Giluka, Aiswarya Prasannakumar, Nitish Rajoria and Bheemarjuna Reddy Tamma, Adaptive RACH Congestion Management to Support M2M Communication in 4G LTE Networks, IEEE ANTS, Chennai, India, December 2013.

Milind Tahalani, R Vanlin Sathya, Suhas U S, Chaganti Ramaraju and Bheemarjuna Reddy Tamma, Optimal Femto Placement in Enterprise Femtocell Networks, IEEE ANTS, Chennai, India, December 2013.

Vanlin Sathya, Harsha Vardhan G, Hemanth N, Bala Murali Krishna K, and Bheemarjuna Reddy Tamma, Enhanced Distributed Resource Allocation and Interference Management in LTE Femtocell Networks, IEEE WiMob, Leon, France, October 2013.

S. Chakraborty, J. Zhou, V. Balasubramanian, S. Panchanathan, I. Davidson, J. Ye, Active Matrix Completion, Proceedings of the IEEE International Conference on Data Mining (ICDM'13), Dallas, USA, pp 81-90, 2013.

P. Lade, V. Balasubramanian, S. Panchanathan, Probabilistic Topic Models for Human Emotion Analysis, Proceedings of the Workshop on Topic Models: Computation, Application and Evaluation at Neural Information Processing Systems (NIPS), Lake Tahoe, USA, 2013.

V. Balasubramanian, A. Baker, M. Yanez, S. Chakraborty, S. Panchanathan, PyCP: An Open-Source Conformal Predictions Toolkit, in Proceedings of Artificial Intelligence Applications and Innovations, (Workshop on Conformal Prediction and Its Applications), vol 412, pp 361-370, 2013.

P. Lade, V. Balasubramanian, S. Panchanathan, Detection of Changes in Human Affect Dimensions

using an Adaptive Temporal Topic Model, Proceedings of IEEE International Conference on Multimedia and Expo (ICME), pp 1-6, 2013.

H. Venkateswara, V. Balasubramanian, S. Panchanathan, Multiresolution Match Kernels for Gesture Video Classification, Proceedings of IEEE International Conference on Multimedia and Expo (ICME), pp 1-4, 2013.

P. Lade, V. Balasubramanian, S. Panchanathan, Latent Facial Topics for Affect Analysis, Proceedings of IEEE International Conference on Multimedia and Expo (ICME) Workshop on Affective Analysis in Multimedia, pp 1-6, San Jose, USA, Jul 2013.

Ramakrishna Upadrasta, Albert Cohen: Sub-Polyhedral Scheduling Using (Unit-)Two-Variable-Per-Inequality Polyhedra, published in 40th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (ACM-POPL-2013), Rome, Italy, January 2013.

SEMINARS IN THE DEPARTMENT

Data Rate Adaptation in Multi-Rate Mesh Networks Path: Path Length vs Network Contention, Mr. Sandip Chakraborty, IIT Guwahati on 9 April 2014.

Phase Ordering in Compilers and Distributed Virtual Machine Co-scheduling, Dr. Suresh Purini, IIIT Hyderabad on 2 April 2014

Analytics Driven Software Engineering -IoT Case Stud, Dr. Satya Sai Prakash, HCL on 19 March 2014.

Aspect Oriented Model Driven Development, Dr. Raghu Reddy, IIIT Hyderabad on 5 February 2014.

Towards flexible guarantees in Clouds: Adaptive bandwidth allocation and pricing, Dr. Dinil Mon Divakarn, National University of Singapore on 21 January 2014.

Free Software and Your Freedom, Mr. Richard Stallman, Free Software Foundation on 19 January 2014.



Sub-polyhedral compilation using two-variables per inequality polyhedral, Dr. Ramakrishna Upadrasta, Indian Institute of Science, Bangalore on 30 December 2013.

Fully Automated Learning for Application-Specific Web Video Classification, Mr. Chetan K Verma, University of California, San Diego on 18 November 2013.

Rich Media, Dr. Joseph Joy, Microsoft Research on 12 November 2013.

TALKS GIVEN IN INTERNATIONAL / NATIONAL CONFERENCES

M.V. Panduranga Rao, Safety Verification of Floodgate Operation Protocols using Hybrid Automata, 9th IMECS Conference, Hong Kong March, 2014.

Bheemarjuna Reddy Tamma, Enhanced Distributed Resource Allocation and Interference Management in LTE Femtocell Networks, IEEE WiMob Conference, Lyon, France, October 2013.

Vineeth Balasubramanian, Active Learning for Multimedia Content Analysis, IEEE International Conference on Multimedia and Expo (ICME), San Jose, CA, July 2013.

Vineeth Balasubramanian, PyCP: An Open-Source Conformal Predictions Toolkit, 9th IFIP International Conference on Artificial Intelligence Applications and Innovations, Workshop on Conformal Prediction and Its Applications, Paphos, Cyprus, October 2013.

Vineeth Balasubramanian, Basic Science and Applied Engineering in Intelligent Systems Research: Can the Twain Meet? Case Study of a Social Interaction Assistant for Individuals with Visual Impairments, International Symposium on Signal Processing and Intelligent Recognition Systems, Thiruvananthapuram, India, March 2014.

AWARDS / RECOGNITIONS

Ramakrishna Upadrasta, above POPL paper is recipient of a European Network of Excellence on High Performance and Embedded Architecture and Compilation (HiPEAC) paper award for 2013.

Design



Design is the youngest of academic disciplines to be hosted by IIT Hyderabad. It comes into being through post-graduate studies in the form of Master of Design (MDes) and PhD in Design. The MDes is a two year full-time program aiming to provide broad-based understanding of design along with student-driven specialization in varied domains. Beginning with an MDes in Visual Design (begins July 2014) focusing on experiencing the world based on what and how our eyes see, the post-graduate studies intend to diversify into other domains like user-interface design, moving images, contemporary photography, design education, design for well-being, collaborative design, urban environments, managing creative industries, and mobility design. Ph.D in Design (begins July 2014), provides

a platform to pursue practice based and practice led research in art, design, culture, creative practices and related areas.

The doctoral program aims to retain and bring the practice-oriented spirit into research in/through/on design, beside other more traditional modes of doing research in design. The department envisions to creatively engage in the space between technologies and people. This involves engaging in the key emergent areas such as: enabling of rights-based and equitable development work, user operated technologies, participatory and collaborative design, professional ethics/ sustainability, product systems and services, design and education, wellness and crowd sourced design.

FACULTY

DESIGN

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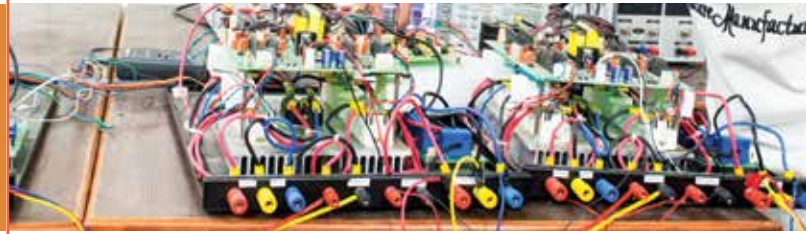
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Electrical Engineering



The Department of **Electrical Engineering (EE)** at IIT Hyderabad offers a vibrant environment for undergraduate, post graduate education and research in many areas of Electrical Engineering. This is one of the earliest department started in IITH. Faculty members of the department are engaged in cutting edge technology research and also very passionate about teaching. The department currently has 18 faculty, 3 staff and 328 (B.Tech - 178, M.Tech - 89 and Ph.D - 61) students. The broad areas of research which are the focus of the department are as follows:

- **Microelectronics and VLSI (Micro):** The main thrust of this group is on affordability, low power and portability. The goal is to push the limits of silicon in achieving the above as well as being on the frontier of new viable technologies. The research areas that are focused on are 3-D ICs, Analog/RF IC design, Micro scale Energy Harvesting, Pervasive Computing, Data acquisition systems, Biosensors development.

- **Communications and Signal Processing (CSP):** The main research areas of this group are Cooperative Communication, Speech and Multi-Media Signal Processing, Source Coding, Space-Time Coding, Information Theory, Cognitive Radio/Radar, Cyber Physical Systems, Image and Video Quality Assessment.
- **Power Electronics and Power Systems (PEPS):** The main research areas of this group are Smart Grids, Micro Grids, Power System Dynamics, Multilevel Inverters, Switched Mode Power Conversion, Wide Area Monitoring, Protection and Control, Information Technology Architectures, Common Information Model (CIM).
- **Systems and Control (Syscon):** The main research areas of this group are Identification and Estimation, Fault Diagnosis, Micro Grid/ Smart Grid, Advanced Control applications, Statistical Process Monitoring and Control.

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PATENTS FILED

Kathik K.S, Kiran Kuchi, B. Ramamurthi, An ordered reduced set successive detector for low-complexity, quasi-ML MIMO detection, PCT application was filed on January 18, 2013 as U.S. Application Serial No. 13/745,018.

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K.T.J. Apanacharya, A. K. Tatinati, H. K. Kunderu, S. K. Mohammad, S. S. Channappayya, A. Acharyya, S. Tripathy, A Low-cost Scalable Solution for Digitizing Analog X-rays with Applications to Rural Healthcare, *35th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, pp: 7496-7499; Japan, 3-7 July 2013.

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K. Kuchi, Real Interference Alignment with Opportunistic Scheduling, *The Tenth International Conference on Wireless Communication Systems 2013*, 803-807.

Sreejith T.V, K. Kuchi, R.Ganti, Coverage and Rate in Cellular Systems with Mult-User Spatial Multiplexing, *International Conference on Communications (ICC)*, 2013, 5855-5859.

K Vijayan, KSR Murty, Comparative study of spectral mapping techniques for enhancement of throat microphone speech, *Twentieth National Conference on Communications, NCC-2014*, IIT Kanpur, India.

K Vijayan and KSR Murty, Estimation of allpass transfer functions by introducing sparsity constraints to particle swarm optimization, *Twentieth National Conference on Communications, NCC-2014*, IIT Kanpur, India.

K Vijayan and KSR Murty, Epoch extraction from allpass residual of speech signals, *International conference on acoustics speech and signal processing, ICASSP - 2014*, Florence, Italy.

Karthika Vijayan, Vinay Kumar and K Sri Rama Murty, Allpass modelling of Fourier phase for speaker verification, *Odyssey - 2014: The speaker and language recognition workshop*, Joensuu, Finland.

K Vijayan and K S R Murty, Epoch Extraction From Allpass Residual Estimated Using Orthogonal Matching Pursuit, *International Conference on Signal Processing and Communications - SPCOM 2014*, IISc Bangalore, India.

P Raghavendra Reddy, Kallola Rout, K S R Murty, Query Word Retrieval From Continuous Speech Using GMM Posteriorgrams, *International Conference on Signal Processing and Communications - SPCOM 2014*, IISc Bangalore, India.

Rajavara Prasad, P Rajalakshmi, Analytical Model of Adaptive CSMA/CA MAC for Reliable and Timely Clustered Wireless Multi-hop Communication, *IEEE World Forum on Internet of Things, WF-IoT 2014*, Seoul, South Korea, 6-8 March 2014.

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Thejaswini M, P Rajalakshmi, U B Desai, Walk Based Multi-Hop Data Forwarding Protocol for Opportunistic Mobile Phone Sensor Networks, *International Conference on Information, Communications and Signal Processing (ICICS)*, Taiwan, 10-13 December 2013.

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Maaz Mohiuddin, T. Adityan, P Rajalakshmi, EEDF-MAC: An Energy Efficient MAC Protocol for Wireless Sensor Networks, *Green Networks and Distributed Systems GNDS 2013*, India, August 2013.

Mirza Sami Baig, Rajalakshmi P, CR Based WSN for Field Area Network in Smart Grid, *IEEE ICACCI 2013*, India, August 2013.

Rajavara Prasad, P Rajalakshmi, Context Aware Building Energy Management System with Heterogeneous Wireless Network, *International conference on Wireless and Mobile Networking Conference, WMNC-2013*, Dubai, April 2013.



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Kiran Kumar Munji and Ravikumar Bhimasingu, Temporary Overvoltages in Gas Insulated Substations Connected by long HV Cables, *Fifth International Conference on Power and Energy Systems*, Kathmandu, Nepal, 28-30 October, 2013.

Venkatesh Rokkam, Ravikumar Bhimasingu, An approach for optimal placement of Phasor Measurement Units considering fuzzy logic based critical buses, *Smart Energy Grid Engineering (SEGE), 2013 IEEE International Conference on*, 01/2013; DOI:10.1109/SEGE.2013.6707905 ISBN: 978-1-4799-2774-6.

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Madhukar Rao A., Umesh B.S., Sivakumar K., A fault tolerant dual inverter configuration for islanded mode photovoltaic generation system, *1st International Future Energy Electronics Conference (IFEEC), 2013*, vol., no., pp.816,821, 3-6 November 2013.

Manoranjan Sahoo, Sivakumar K, Bidirectional Switched Boost Converter for three phase AC-DC hybrid Microgrid, *6th National Power Electronics Conference 2013*, 20-23 December 2013, IIT Kanpur.

Manoranjan Sahoo, Sivakumar K, Bidirectional switched boost converter for ac-dc hybrid micro grid, *IEEE Applied power electronic conference 2014*, 16-20 March 2014.

K.V.S.N.L. Manasa Priya, K. Manasa, S. S. Channappayya, A Statistical Evaluation of Sparsity-based Distance Measure (SDM) as an Image Quality Assessment Algorithm, *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2014*, Florence, Italy, May 2014.

K. Abhishek, M. Haloi, S. S. Channappayya, S. Vanjari, D. Dendukuri, S. Swathy, T. Choudhary, P. Bhandari, An Enhanced Algorithm for the

Quantification of Human Chorionic Gonadotropin (hCG) Level in Commercially Available Home Pregnancy Test Kits, *Proc. of National Conference on Communications 2014*, Kanpur, India, February 2014.

S. Kakileti, S. S. Channappayya, A. Richhariya, J. Chhablani, An Automated Algorithm for the Identification of Choriocapillaris in 2D-OCT Images, *Proc. of SPIE Medical Imaging 2014*, San Diego, CA, USA, February 2014.

Hafeez KT, Ashudeb Dutta, Shiv Govind Singh, Sivakumar K, Krishna Kanth Avalur and Sai VH, Hybrid structured buck converter with ripple cancellation and improved efficiency, *IEEE INDICON-*, IIT Bombay 13-15 December 2013.

Pramod Kaddi, Basireddy Karunakar Reddy and Shiv Govind Singh, Active Cooling Technique for Efficient Heat Mitigation in 3D-ICs, *VLSI 2014 IIT Bombay*, in Mumbai India 7-9 January 2014.

Hafeez KT, Ashudeb Dutta, Shiv Govind Singh, Efficient use of solar power in micro scale solar energy harvesting through battery management, *VLSI 2014*, IIT Bombay, in Mumbai India 7-9 January 2014.

Abhimanyu Singh, Vijay S. Duryodhan, Shiv Govind Singh, Amit Agrawal, Study of liquid flow through spiral micro-channels of rectangular cross section, *FMFP*, NIT Hamirpur 12-14 December 2013.

Vijay S. Duryodhan, Shiv Govind Singh, Amit Agrawal, Comparative study of liquid flow through diverging and converging microchannel, *FMFP 2013*.

Durga Prakash, S. Ramakrishana, Asudeb Dutta, C.S Sharma, Shiv Govind Singh, Preparation and Physicochemical characterization of Multi Walled Carbon Nanotube embedded SU-8 electrospun, *SECTOR*, Dubai, 28-30 October 2013.

Durga Prakash, S. Ramakrishana, Asudeb Dutta, C.S Sharma, Shiv Govind Singh, Preparation and Electrical characterization of electrospun multi wall carbon nano tube embedded conductive Su8 nanofibers, *IWPSD, Amity Uni, IWPSD*, 10-13 December 2013.

Shabaz Basheer Patel, Tamal Ghosh, Asudeb Dutta, Shiv Govind Singh, Stress Analysis in 3D IC having Thermal Through Silicon Vias (TTSV), *IEEE, ECTC* May 2013.

Aditya Vikram Singh, Divanshu Chaturvedi, Zaffar Ali Khan, Shiv Govind Singh, Power Dissipation Analysis of Different Configurations of TSVs at High Frequencies (GHz), *IEEE, ECTC* May 2013.

Tamal Ghosh, Ashudeb Dutta, Shiv Govind Singh, Copper Protection by SAM and Low Temperature Bonding for 3-Dimensional Integration, *ICMST* April 2013.

Zafar Ali Khan, Yoshihiro Ohnari, Ashudeb Dutt, Shiv Govind Singh; Mitiko Miura Mattausch Hans Mattausch, Die to Die and Within Die Fabrication Variation of 65nm CMOS Technology PMOS Transistors, *IEEE CONECCT* January 2013.

FUNDED RESEARCH PROJECTS 2013-14

Kiran Kuchi, Performance Limits of Cloud Radio, Samsung USA, Dec-2012 till Dec 2014, Rs. 55.00 Lakhs.

Dr. P Rajalakshmi, Mobile Sensor Networks Technologies, KDDI Japan R&D, April 2013, USD 25000.

Dr. P Rajalakshmi, IoT for Smarter Healthcare, DeiTY, March 2013, Rs. 392.4 Lakhs.

Vaskar Sarkar, Comprehensive framework for the planning and energy management of microgrid, Hitachi India Limited, November 2013 - March 2013, Rs. 17.00 Lakhs.

Shiv Govind Singh, Low Temperature and Low Pressure Cu-Cu Fine Pitch Bonding for Vertical (3-D) Integration, Deity, 12 Dec 2013 to 11 Dec 2016, Rs. 279.3 Lakhs.

CEP COURSES

A Five Days Workshop MEMS & NEMS at IITH along with Phy, ME and CE.

SEMINARS IN THE DEPARTMENT

Digital Microfluidic Biochips: Towards Functional Diversity, More than Moore, and Cyberphysical Integration, Professor Krishnendu Chakrabarty,

FIEEE, Electrical and Computer Engineering at Duke University, USA; 13 August 2013.

Embedded Technology for Healthcare Systems, Dr. Amlan Chakrabarti, Associate Professor, A.K. Choudhury School of Information Technology, University of Calcutta; 20 August 2013.

Basic and Advanced FPGA/Zync based Verification using Xilinx Platform; by the team from industry Xilinx India Technology Services Private Limited, 18 September 2013.

Organized a presentation: Title: Electricity Trading and Renewable Energy Certificate (REC) Market in India, Speaker: Mr. Vishal Pandya, Director, REconnect Energy., 31 January 2014.

Planning and Analysis UHV/EHV Transmission System, Prof. D. Thukaram, Department of Electrical Engineering, Indian Institution of Science, Bangalore, India, 24 October 2013.

Robotic Compensation of Tremor in Microsurgery, Dr. Kalyana C. Veluvolu, Associate Professor at School of Electronics Engineering, College of IT Engineering, Kyungpook National University, South Korea, 7 March 2014.

TALKS GIVEN IN INTERNATIONAL / NATIONAL CONFERENCES

Amit Acharyya, Plenary talk, at IEEE third International Conference on Advances in Computing and Communications, Kochi, India on 29 August, 2013.

Amit Acharyya, Tutorial talk, on Systems on a chip for next generation healthcare systems at Research Centre Imarat (RCI), Defence Research Development Organization, Hyderabad, India on 10 January, 2014 as a part of the 5-days National workshop on VLSI and System on Chip, organized by HRDG, RCI, DRDO (6-10 January, 2014).

Arora E. & Detroja K. P., Online Monitoring for Uneven Length Batch Process using Function Space Principal Component Analysis, Proceeding of the International Symposium on Computer Applications in Biotechnology (CAB-2013), Mumbai, India, 16-18 December 2013.

Detroja K.P., Nearest Neighbour Based Algorithm for



Data Reduction and Fault Diagnosis, Proceedings of the IEEE Multi-conference on Systems and Control (MSC-2013), Hyderabad, India, 28-30 August 2013.

Kiran Kuchi, Real Interference Alignment with Opportunistic Scheduling, The Tenth International Conference on Wireless Communication Systems, 28 August 2013, Ilmenau, Germany.

P Rajalakshmi, Cyber Physical System - Smart Buildings, ICT for Smart Buildings with Low Carbon Emission, CDAC Chennai, 29 March 2014.

Pradeep Kumar Yemula, PSERC Industry-University Meeting, Univ. of Wisconsin, Madison, Title: Communication Architecture for Wide-Area Control and Protection of the Smart Grid (2.1), 29-31 May 2013.

Pradeep Kumar Yemula, IEEE Power & Energy Society General Meeting, 2013. PES '13. Vancouver, British Columbia, Canada. 21-25 July 2013, Title: CIM Oriented Database Level Topology Processing and Integrating Power System Applications.

Pradeep Kumar Yemula, Delivered lectures remotely over skype, in the CEP course on Implementation of Common Information Model for Power Systems, Organized by IIT Bombay, 11 June 2013.

Pradeep Kumar Yemula, Invited Talk on Introduction to Smart Grids, at Department of Electrical Engineering, Siddharth Institute Of Engineering & Technology, Tirupathi, AP, 11 December 2013.

Pradeep Kumar Yemula, Talk on Introduction to CIM and CIM Usecases for RLDC in India, in Workshop on CIM for Power Systems, organized at Western Regional Load Despatch Center (WRLDC), Mumbai, 13 May 2014.

Nallamekala K.K., Kalyan U. M., Sivakumar K., Harmonic reduction technique with a five-level inverter for four pole induction motor drive, *1st International Future Energy Electronics Conference (IFEEC), 2013*, vol., no., pp.482, 487, 3-6 November 2013.

Madhukar Rao A., Umesh B.S., Sivakumar K., A fault tolerant dual inverter configuration for islanded mode photovoltaic generation system, *1st International Future Energy Electronics Conference (IFEEC), 2013*, vol., no., pp.816, 821, 3-6 November 2013.

Manoranjan Sahoo, Sivakumar K, Bidirectional switched boost converter for ac-dc hybrid micro grid, *IEEE Applied power electronic conference 2014*, 16-20 March 2014.

Choroidal Imaging - An Image Analyst's Perspective, Sumohana Channappayya, at Asia ARVO 2013, New Delhi, India.

AWARDS / RECOGNITIONS

Dr. P Rajalakshmi, Awarded as an INDIA's Most Inspiring Women Engineer/Scientist for the year 2014 by Engineering Watch. <http://women.engineeringwatch.in>

Dr. Pradeep Kumar Yemula, POSOCO Power System Award (PPSA) 2013, Selected among the top 15 candidates in doctoral category. Award conferred by Foundation for Innovation and Technology Transfer (FITT) IIT Delhi along with Power system operation corporation of India (POSOCO).

Dr. Siva Kumar K, Excellence in Teaching award @ IIT Hyderabad for the year 2013.

Sumohana Channappayya, Excellence in Teaching Award for academic year 2013-2014.

RESEARCH INFRASTRUCTURE

The innovative nature of research in the department is evident from the number of patents filed in the last financial year alone. The department hosts state of the art research facilities for VLSI, communications and signal processing, power electronics and power systems, and systems and control. Some of the facilities are listed below.

Multilevel inverters | DC-DC Converters | Photovoltaic System | 4G LTE MIMO Test Bed | Cloud RAN Equipment, USRP KITS | Pollution Monitoring Sensors | Real time digital simulator | Phasor measurement unit | Phasor data concentrator, PXI System, GPS server | True-3D Lightfield Display | Medium-scale IP camera network | Solar Simulator | Zigbee MOTE | dSPACE ACE1104 | TMS320F2812 Evaluation board and TMS320F28335 DSP Evaluation board



Invertors



HoloGraphika HV72IRC light field display



DC-DC Convertors



Mymo-Next-gen communication



Smartgrid



Solar panels

Liberal Arts



The Department of **Liberal Arts (LA)** at IIT Hyderabad is a leading center for the study of a highly diverse range of subjects including Anthropology, Cultural Studies, Economics, English, Sociology and Fine Arts. Unique in its constitution and vision, the department of Liberal Arts at IIT Hyderabad strives to pursue excellence in teaching and research to benefit students, academics and the wider society.

The primary focus of the Department of Liberal Arts at IIT Hyderabad is to produce world-class research in the broad fields of humanities, social sciences. The broad areas of ongoing research in the department are Economic growth, Macroeconomics, Monetary economics, International

finance, Gender studies, Cultural studies, Clinical Psychology, Positive Psychology, Literary Theory, Rhetoric and Composition, Modernist Fiction, Literature and the Visual Arts, Health Psychology, Psycho-oncology, Cultural Psychology, Indigenous Healing, Medical Anthropology, Anthropology of the Media, Sculpture, Painting, and New Media Art.

With a congregation of excellent faculty having expertise on diverse range of subjects, Liberal Arts at IIT Hyderabad is devoted toward the development of teaching and research that has both academic and practical relevance. The department of Liberal Arts offers academic programs for Ph.D., M.Phil and Minor Economics. The department also offers LA electives to the B.Tech program.

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PUBLICATIONS

(In Peer-Reviewed Journals)

Arima Mishra and Suhita Chopra Chatterjee, Where there is no doctor: Narratives on biomedical healthcare practitioners in Chennai, South India, Haripriya Narasimhan, In Multiple Voices and Stories: Narratives of Health and Illness ed. New Delhi: Orient Blackswan. (2013)

Prabheesh K.P., Optimum International Reserves and Sovereign Risk: Evidence from India, Journal of Asian Economics, 28, 76-86 (2013).

Paresh Kumar Narayana, Seema Narayan and Prabheesh K.P, Stock returns, mutual fund flows and spillover shocks, Pacific-Basin Finance Journal, 29, 146-162 (2014).

S. Ranganathan, This Temple is Our Natal Home!: Women's Experiences of Marriage and Possession in Maharashtra, Psychological Studies, 58 (4), 437-445 (2013).

S. Ranganathan, The rationalist movement against quack healing: Critical questions, Economic & Political Weekly, XVIX (1), 13-15 (2014).

V. Neethi Alexander and Srirupa Chatterjee, Paul auster's Travels in the Scriptorium as a critique of the hyperreal, The Explicator, 72 (1), 53-56, (2014)

Nilanjana Ghosal and Srirupa Chatterjee, The Hysteric as a Chronicler in Margaret Atwood's The Handmaid's Tale, The IUP Journal of English Studies, 7(4) 32-40 (2013).

Girish G.P, Vijayalakshmi S, Ajaya Kumar Panda, Badri Narayan Rath, Forecasting Electricity Prices in Deregulated Wholesale Spot Electricity Market: A Review, International Journal of Energy Economics and Policy, 4 (1), 32-42, (2014).

Badri Narayan Rath, and Debi Prasad Bal, Do Public Investment and FDI Crowd out or Crowd in Private Domestic Investment in India?, Journal of Developing Areas, 48 (3), 269 - 284, (2014).

TALKS GIVEN IN INTERNATIONAL / NATIONAL CONFERENCES

Haripriya Narasimhan, Struggling with Nayisoch: Hindi TV serials today. Invited participation at The International Seminar on Locating Gender in the New Middle Class in South Asia, Indian Institute of Advanced Study, Shimla and Women's Studies and Development Centre, University of Delhi, at IIAS, Shimla, 2014.

Haripriya Narasimhan, Who will make all this food? Discourse on diet and diabetes in Chennai, South India. Paper presented at the Association of Asian Studies Annual Meeting, Philadelphia, USA, 27 March 2014.

Haripriya Narasimhan, Rice and Sugar: Food talk and diabetes in Chennai, Tamilnadu, South India. Talk at the Graduate School of Asian and African Studies, Kyoto University, Japan, 17 October 2013.

Haripriya Narasimhan, Talking about diabetes: Ethnographic observations- Invited lecture to students of P.G. Diploma course in Health Communications, Sarojini Naidu school of Media and Communications, University of Hyderabad, 25 October 2013.

Nandini Ramesh Sankar, Poetic Waste and the Broken Gift at Annual Convention of the American Comparative Literature Association, New York, 25 March 2014.

Prabheesh K.P., Stock Returns, Mutual Fund Flows and Spillover Shocks, India Finance Conference 2013, Indian Institute of Management Ahmadabad, 18-19 December 2013.

Shubha Ranganathan, Ritual medicine: Mental health encounters at a religious shrine, Annual Conference of the Association for Asian Studies, Philadelphia, PA, March 27-30, 2014.

Srirupa Chatterjee, The Methodology of Composition: Developing a Pedagogy for Academic Writing Across Disciplines. *Rethinking the Role of Humanities in Technical Education: Pedagogies and Possibilities*. Department of Languages and Humanities BITS Pilani, Hyderabad Campus. 18-19 October 2013.



Badri Narayan Rath, Did the Indian Premier League Cricket have an Impact on Indian Stock Market? India Finance Conference - 2013, Indian Institute of Management, Ahmedabad, 18-19 December 2013.

Badri Narayan Rath delivered lectures on Panel Data Analysis as a resource person for workshop on 'Research Methodology and Application of Econometrics in Social Science Research', sponsored by ICSSR, New Delhi, and organised by the Department of Economics, Karnataka University, Dharwad, 19-28 September 2013.

SEMINARS IN THE DEPARTMENT

Dr. Nimmi Rangaswamy, Adjunct Faculty, LA department, IITH, 'Anthropology, Development and ICTs: Slums, Youth and the Mobile Internet in Urban India', 21 August 2013.

Dr. Pushpesh Kumar, Associate Professor, Department of Sociology, University of Hyderabad, 'Configuring Gender and Sexuality in Marriage Practices of the Kolams of Western India', 18 September 2013.

Dr. Bidisha Som, Department of Humanities and Social Sciences, IIT-Guwahati, 'Where do you find women with 'bitter hands'? Metaphors at the crossroads of culture and cognition', 9 October 2013.

Prof. Naresh Sharma, Department of Economics, University of Hyderabad, 'Gandhi's Ideas on Economics', 18 October 2013.

Dr. Pramod Nayar, Department of English, University of Hyderabad, 'The Transnational Turn in English Studies'. 30 October 2013.

Dr. Subodh Kandamuthan, Economist, Administrative Staff College of India (ASCI), 'Financing Health Care in India: Role of Private Sector', 6 November 2013.

Dr. Parama Roy, Geography Department, University of Copenhagen, Denmark, 'Crisis of Citizens' Empowerment in Urban Planning: Stories from Atlanta, U.S. and Copenhagen, Denmark', 13 November 2013.

Pushpa Arabindoo, Lecturer in Geography and Urban Design, Department of Geography, University College, London, 'Constructed Ecologies and Imagined Communities: Politics of Adyar Eco-park in Chennai', 15 January 2013.

Dibyendu Maiti, Associate Professor, University of South Pacific Fiji Islands, 'Productivity Growth of Indian Economy: Measurement and Issues', 22 January 2014.

Sham Sunder, Practising artist and Professor in Fine Arts, S.N. School of Arts and Communication, University of Hyderabad, 'My Life as an Artist', 12 February 2014.

Kiranmayi, filmmaker and faculty in Ramoji Academy of Film and Television in Hyderabad, 'Documentary Screening of *Ishmael*', 19 February 2014.

Michele Friedner, Postdoctoral Fellow at MIT, 'Disability, Technology, Value: The Case of Deaf 'workers with disabilities' in Indian multinational corporations, 5 March 2014.

Shilpaa Anand, Assistant Professor, Department of English Maulana Azad National Urdu University, Hyderabad, 'Disability, Technology, Value: The Case of Deaf "workers with disabilities" in Indian multinational corporations, 5 March 2014.

Shilpaa Anand, Assistant Professor, Department of English Maulana Azad National Urdu University, Hyderabad, 'Literary Disability Studies and the Indian context', 12 March 2014.

Prof. VisakhaVarma, Retired Professor of Economics from Calicut University, Kerala, 'Easterlin Paradox and the Economics of Happiness', 19 March 2014.

Material Science & Metallurgical Engineering



The Department of **Materials Science and Metallurgical Engineering (MSME)** at IITH started 2008 with the vision “Atoms to Applications”, aiming to be a globally recognised centre of excellence in materials research, translating fundamental understanding into development of innovative, sustainable and environment-friendly technologies and products for social needs. Currently, MSME has 7 faculty members with research interests spanning across various disciplines of structural, functional and computational materials science. One of the recent focuses of the cumulative and collaborative effort of the department is to understand the materials genome by correlating composition, structure, processing, characterisation and properties (‘the MSME Pentagon’).

The MSME department at IITH offers unique innovative courses, which are

unparalleled with courses at other IITs. Research programs are closely designed with national research laboratories and industries. Currently, MSME has over 30 Ph.D and 14 M.Tech students working in fundamentals to advanced and emerging areas, some of which are thermo-mechanical processing, thin films and devices, nano-materials, soft matter, biomaterials, energy materials, and electron microscopy. The department publishes around 15 journals papers every year and has INR 3.1 Cr of project funding. The department is ready to start its bachelors program in July, 2014. It will have a unique curriculum comprised of fractal courses, which will facilitate expansion of the core subject acumen as well as personal skills. The department prepares its students for research roles as well as other professional roles by providing a conducive environment for all round development.

FACULTY

MATERIAL SCIENCE & METALLURGICAL ENGINEERING



Pinaki P. Bhattacharjee

Ph.D - IIT Kanpur
Assistant professor & HOD

Research Areas: Bulk ultrafine and nanostructured materials produced by severe plastic deformation processes and structure-property relationship in such materials, Crystallographic texture, Electron microscopy, Recrystallization behavior of metallic materials, Mechanical behaviour of materials, Development of Light metals (e.g. Al, Mg, Ti) alloys for novel applications, High entropy alloys

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Suhash R. Dey

Ph.D - University Paul-Verlaine - Metz, France
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Research Areas: Emerging alloys (Biomaterials, Solar Photovoltaics, Thermoelectric Materials) design through combinatorial approach, Materials processing (Friction Stir Welding/ Processing, Accumulative Roll Bonding) and testing, Improvement of properties of various Titanium alloys through thermomechanical processing and phase transformation-microstructure characterization studies.

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Ranjith Ramadurai

Ph.D - IISc Bangalore
Assistant professor

Research Areas: Multiferroic oxide thin films for fundamental science and functional device applications, Surfaces and Interfaces of oxide hetero structures on silicon and single crystalline oxide substrates, Influence of process conditions, Strain engineering and interface engineering on domains and domain dynamics of multiferroic thin films utilizing scanning probe microscope

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Bharat B. Panigrahi

Ph.D - IIT Kharagpur
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Research Areas: Powder Metallurgy Manufacturing, Sintering Mechanisms, Nanocrystalline materials, MAX Phases & Advanced Ceramics, Composites (MMCs & CMCs), Light Metals, Steels and Grain Boundary Engineering, Porous Implants & Biomaterials, Wear and Tribology.

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Atul S. Deshpande

Ph.D - Max-Planck Institute of Colloids and Interfaces - Potsdam, Germany
Assistant professor

Research Areas: Nanoparticle synthesis and self-assembly, Sol-gel processes, Templating techniques, Novel nanostructured materials for advanced applications including catalysis, solid oxide fuel cells (SOFC), Ferroelectric materials, Bone replacement materials and drug delivery systems

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Saswata Bhattacharya

Ph.D - IISc Bangalore
Assistant professor

Research Areas: Phase transformations in alloys and oxides, phase-field modelling of microstructural evolution, Microstructure-property correlations, Modelling deformation behaviour using discrete dislocation dynamics, Continuum crystal plasticity, Multiscale modelling of functional materials

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Mudrika Khandelwal

Ph.D - University of Cambridge, UK
Assistant professor

Research Areas: Natural materials - understanding structure, mechanism & applications, High performance green composites, Liquid crystals and self-assembly of rod-like entities, Fibre spinning, Strategies for developing anti-fouling and anti-microbial materials, Materials for tissue scaffolding

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PUBLICATIONS

(In Peer-Reviewed Journals)

P.P. Bhattacharjee, G.D. Sathiaraj, M. Zaid, J.R. Gatti, Chi Lee, Che-Wei Tsai, Jien-Wei Yeh, Microstructure and texture evolution during annealing of equiatomic CoCrFeMnNi high-entropy alloy. *Journal of Alloys and Compounds*, 587, 544-552(2014).

P.P. Bhattacharjee, S. Saha, J.R. Gatti, Effect of change in strain path during cold rolling on the evolution of microstructure and texture in Al and Al-2.5%Mg., *Journal of Materials Engineering and Performance*, 23.2, 458-468 (2014).

P.P. Bhattacharjee, M. Zaid, G.D. Sathiaraj, B. Bhadak, Evolution of Microstructure and Texture During Warm Rolling of a Duplex Steel, *Metallurgical and Materials Transactions A*, 45 (2014) 2180-2191.

Sreekanth Mandati, Bulusu V. Sarada, Suhash R. Dey and Shrikant V. Joshi, CuIn_{1-x}Ga_xSe₂ Thin-Film Absorber Layers for Solar Photovoltaics Fabricated by Two-stage Pulsed Current Electrodeposition, *Materials Letters*, 118, 2014, 158-160 (2014).

Suhash R. Dey, Lutz Hollang, Benoit Beausir, E Hieckmann and W Skrotzki, Shear banding in sub-microcrystalline nickel at 4K, *Mechanics of Materials*, 66,1-6 (2013).

Sreekanth Mandati, Sarada B.V., Suhash R. Dey and Shrikant V. Joshi, Improved photoelectrochemical performance of CIGS thin films deposited by pulsed electrodeposition, *Journal of Renewable and Sustainable energy*, 5,031602 (2013) (<http://dx.doi.org/10.1063/1.4807615>).

T. Durga Rao, Ranjith Ramadurai & Saket Asthana, Prominent improvement in the magnetic and electric properties of Eu substituted BiFeO₃, *Journal of Applied Physics*, 115 (2014).

Karthik Thangavelu, Ranjith Ramadurai & Saket Asthana, Evidence for the suppression of intermediate anti-ferroelectric ordering and observation of hardening mechanism in Na_{0.5}Bi_{0.5}TiO₃ ceramics through cobalt substitution, *AIP. Advances* 4, 017111 (2014).

Prabusankar Ganesan, Nagababu Chatla, Suresh Paladugu, Prasenjit Das, Sathyanarayana Arruri,

Ranjith Ramadurai & Sampath Natarajan, Synthesis, Crystal Structure and Spectral Properties of Copper(II) Monomer Decorated Copper(II) Coordination Polymer, *Journal of Molecular structure*, 1062, 141-146 (2014).

Y. Cao, S. Bhattacharya, J. Shen, C. A. Randall, and L. Q. Chen, Role of polaron hopping in leakage current behavior of a SrTiO₃ single crystal. *Journal of Applied Physics*, 114, 224102 (2013).

Lahiri, Arka, et al. Effect of Epitaxial Strain on Phase Separation in Thin Films, *arXiv preprint arXiv:1310.5899* (2013).

M. Khandelwal, and A. Windle, Origin of chiral interactions in cellulose supra-molecular microfibrils, *Carbohydrate Polymers*, 106, 128-131(2014).

M. Khandelwal, and A. Windle, Small angle x-ray study of cellulose macromolecules produced by tunicates and bacteria, *International journal of biological macromolecules, Int. J. Biological Macromolecules*, 68, 215-217 (2014).

PUBLICATIONS

(In Peer-Reviewed Conferences)

Manish Meshram and Suhash R. Dey, Friction stir welding of Ti-6Al-4V by PCBN tool and joint analyses. International Institute of Welding International Congress, New Delhi, Conference Proceedings, 2014, pp. 614-618 (2014).

Manish Meshram, Basanth Kumar Kodli and Suhash R. Dey, Mechanical properties and microstructural characterization of friction stir welded AISI 316 austenitic stainless steel, International Conference on Advances in Manufacturing and Materials Engineering, NIT Surathkal, Procedia Materials Science, Paper# MS-317, 2014.

Manish Meshram, Basanth Kumar Kodli and Suhash R. Dey, Friction stir welding of austenitic stainless steel by PCBN tool and its joint analyses, ICMPC 2014, 3rd Annual International Conference on Materials Processing and Characterization, GRIET Hyderabad, Procedia Materials Science, Paper# 834, 2014.

SEMINARS IN THE DEPARTMENT

Elevated temperature nanomechanics: understanding nanoindentation creep in fcc metals and micropillar strain rate jump tests in nanocrystalline nickel, Dr Gaurav Mohanty, from EMPA (Swiss Federal Laboratories for Materials Science and Technology), 1st May.

Engineering and Materials Challenges for Gas Turbine, Dr. K. Anand, Consulting Engineer and Technology Mentor - Materials, India Engg. Operations, BEC at GE Energy, Bangalore, 16 April.

Structural-stability, properties and processing and high-performance materials, Dr Soumyadipta Maiti, ETH, Zurich, 7 April.

Optimization of structure-property correlation in metallic systems, Dr. Suresh Neelakantan, University of Cambridge, 20 February.

Charge carriers functioning in organic solar cells, Dr. Chandramouli Kulshreshtha, Pohang Institute of Science Technology, S. Korea, 6 February.

TALKS GIVEN IN INTERNATIONAL / NATIONAL CONFERENCES

P.P. Bhattacharjee, M. Joshi, V.P. Chaudhary, J.R. Gatti, M. Zaid, Effect of strain path change during cold-rolling on the evolution of recrystallization texture and special boundaries in nickel, Processing and Fabrication of Advanced Materials (PFAM - XXII) Singapore, 18-20 December 2013. (*Invited Lecture*)

M. Zaid, G. Dan Sathiaraj, B. Bhadak, P.P. Bhattacharjee, International Conference on Processing and manufacturing of advanced materials, Thermec 2013, Las Vegas, USA, 2-6 December 2013.

Microstructure, microtexture and grain boundary character distribution in severely cold-rolled and annealed equiatomic high entropy alloy CoCrFeMnNi, NMD-ATM 2013, IIT BHU, Varanasi, India, 12-15 November 2013. (*Invited Lecture*)

B. Bhadak, M. Zaid, P.P. Bhattacharjee, Effect of warm-rolling on the evolution of Microstructure,

Microtexture and Mechanical Properties of a Commercial grade Duplex Steel, International Conference on Advances in Manufacturing and Materials Engineering (ICAMME 2014), NIT Surathkal, Surathkal, Karnataka, India, 27-29 March 2014.

P.P. Bhattacharjee, Materials Characterization by Electron Backscatter Diffraction: A case study with Duplex Steel, National level workshop on Materials Characterization, CMR Institute of Technology, Hyderabad, 30-31 August 2013. (*Invited Lecture*)

Suhash Ranjan Dey, Variations in crystallographic texture generated through friction stir welding of dissimilar Al-based alloys using different pin profiles, International Conference on Processing & Manufacturing of Advanced Materials (THERMEC 2013), Las Vegas (USA), 2-6 December 2013.

Suhash Ranjan Dey, Combinatorial materials development through electrodeposition, Innovations in Chemical Engineering (ICE 2013), BITS Hyderabad (India), 15-16 November 2013.

B. Mallesham, R. Ranjith, M. Manivel Raja, Effect of Sc Substitution on Local ordering, Ferroelectric phase transition temperature (T_{max}) of $Pb(Fe_{0.5}Nb_{0.5})O_3$ multiferroic relaxors, 2nd International Conference on Advanced Functional Materials (ICAFM- 2014), Thiruvananthapuram, Kerala (India), 19-21 February 2014.

M. Kumaraswamy, R. Ranjith, Deshpande, A. S, M. Manivel Raja, Role of surface defects on optical absorptional features of $BiFeO_3$ nano particles, 2nd International Conference on Advanced Functional Materials (ICAFM-2014), Thiruvananthapuram, Kerala (India), 19-21 February 2014.

Vasundhara G, Swapnilghodke, B. Mallesham and R. Ranjith, Enhancement of relaxor features in $Na_{0.5}Bi_{0.5}TiO_3$ a lead free piezo-ceramic, 2nd International Conference on Advanced Functional Materials (ICAFM-2014), Thiruvananthapuram, Kerala (India), 19-21 February 2014.

Y. Rajkumar, Saswata Bhattacharya, Bharat B. Panigrahi, Mechanically Activated Synthesis of Ultrafine Cr_2AlC Powders, International conference on Powder Metallurgy, Chennai, 23-25 January 2014.

Rahul B. Mane, Ankit M. Joshi, Y. Rajkumar, Bharat B. Panigrahi, Dilatometry study to understand



sintering kinetics of few MAX phase powders, International conference on Powder Metallurgy, Chennai, 23-25 January 2014.

Non-ferrous powder production technology, Powder Metallurgy Short Course, ARCI, Hyderabad, November 18 to 21, 2013.

Damodar D. Atul S. Deshpande, Synthesis of porous carbon by catalyst assisted soft templated method using sucrose, International Conference on Functional Materials (ICFM - 2014), Kharagpur West Bengal (India), February 5-7, 2014.

Usha rani, Deshpande, A.S., R. Ranjith, Effect of precipitating agents on Bismuth ferrite nanoparticles synthesized by coprecipitation method, 2nd International Conference on Advanced Functional Materials (ICAFM-2014), Thiruvananthapuram, Kerala (India), February 19-21, 2014.

M. Kumaraswamy, R.Ranjith, Deshpande, A. S, M. Manivel Raja, Role of surface defects on optical absorptional features of BiFeO₃ nano particles; 2nd International Conference on Advanced Functional Materials (ICAFM-2014), Thiruvananthapuram, Kerala (India), February 19-21, 2014

Phase-field modeling of phase transformations in polycrystalline systems, Tata Steel, Jamshedpur, March 28, 2014

Characterizing and tuning hierarchical organisation - A case study on bacterial cellulose, IPDO, Dr. Reddy's Laboratory, Hyderabad, May 7, 2014

AWARDS / RECOGNITIONS

Dr. Suhash R. Dey, Bhaskara Advanced Solar Energy (BASE) Fellowship 2014 from Department of Science and Technology (DST), India and the Indo-U.S. Science and Technology Forum (IUSSTF) - to spend some time at Dr. David Ginley's laboratory at National Renewable Laboratory (NREL), USA.

Dr. Suhash R. Dey, Bhaskara Advanced Solar Energy (BASE) Internship 2014 to Ph.D. student of

Dr. Suhash Ranjan Dey from Department of Science and Technology (DST), India and the Indo-U.S. Science and Technology Forum (IUSSTF) to spend six months at Professor Rakesh Agarwal's (Purdue University, USA) laboratory.

Dr. Suhash R. Dey, IEI Young Engineers Award 2013-14 from the Institution of Engineers (INDIA) in Metallurgical & Materials Engineering discipline. The award consists of INR 10,000/- and a Citation.

RESEARCH INFRASTRUCTURE

The department has sophisticated instruments in materials preparation and characterization. Some of the instruments available in the department facility are listed below.

Pulsed Laser Deposition Unit | Dilatometer | Thin film XRD | Surface Area Analyzer | Tensile Strength Testing Unit | Electric Discharge Machine | TEM Sample Preparation Unit | Field Emission Scanning Electron Microscopy | Physical Property Measurement System | Universal Testing Machine | Optical Microscope | Microhardness Testing Machine



PPMS



UTM



PLD deposition Chamber with RHEED



TEM Sample Preparation Unit



FESEM



EDM



Thermal and E-Beam Evaporation System



Dilatometer

Mathematics



Started in 2008, the Department is fast becoming a world class centre for theoretical, applicable and interdisciplinary research. The Department has young and dedicated faculty working both in pure and applied branches of Mathematics who actively collaborate with their counterparts from the other engineering departments. In the year 2013, the Department has started offering a post-graduate programme leading to an M.Sc. degree in 2 different streams, namely 'Mathematics' and 'Mathematics and Computing'. The structure of the programme is well balanced between theory and application with a lot of emphasis on thesis component which opens up a wide number of career options to the students.

The department has embraced the Fractal academic program by making all Mathematics courses it offers at B.Tech. level to one credit courses. With this the department contributes to creating a more customizable and individualistic B.Tech. programme which is the vision of the Institute. The Department at present has expertise in areas including Harmonic Analysis, Fuzzy Logic, Wavelets, Fluid Mechanics, Number Theory and Operator Theory and looking to actively expand into more varied disciplines. The department aims to become the destination of every bright minded researcher and academician in Mathematics and foster eclecticism and excellence in mathematical education and research which is well poised between abstraction and application.

FACULTY

**C. S. Sastry**

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Research Areas: Wavelets, Computed Tomography, Compressive Sampling Theory

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**D. Sukumar**

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PUBLICATIONS

(In Peer-Reviewed Journals)

Y.Chen, C. S. Sastry, V.Patel, J.Philips and R.Chellappa, In-Plane Rotation and Scale invariant simultaneous dictionary learning and clustering, *IEEE Trans. on Image Processing*, 22(6): 2166-2180, (2013).

B. Jayaram, M. Baczynski, and R. Mesiar, R-implications and the exchange principle: The case of border continuous t-norms, *Fuzzy Sets and Systems*, 224, 93-105 (2013).

M. Baczynski and B. Jayaram, in M. Baczynski et al. (Eds.), *Fuzzy Implications: Some Recently Solved Problems*, *Advances in Fuzzy Implication Functions, Studies in Fuzziness and Soft Computing Series*, Vol. 300, pp. 177 - 204 (2013).

Narasimha Kumar, A 2-adic control theorem for modular curves, *International J. Number Theory* 09 (2013), no. 6, 1605-1618.

Narasimha Kumar and S. Gun, A Note on Fourier-Jacobi coefficients of Siegel modular forms, *Archiv der Mathematik* 101 (2013), no. 6, 519-524.

Control theorems for ordinary 2-adic families of modular forms, Narasimha Kumar and E. Ghate, *Automorphic Representations and L-functions*, Hindustan Book Agency (2013), 231-261.

Sai Hareesh Anamandra, Prabhakar Akella, Relation between neutral element and annihilator in absorption equation, *Fuzzy Sets and Systems*, 228, 145-151 (2013)

McIntosh formula for the gap between regular operators, Ramesh G, *Banach J. Math. Anal.* 7 (2013), no. 1, 97-106.

PUBLICATIONS

(In Peer-Reviewed Conferences)

B.S. Chandra, C. S. Sastry and S. Jana, Telecardiology: Hurst exponent based anomaly detection in compressively sampled ECG Signals, 15th IEEE HealthCom, Lisbon, Portugal, October 2013.

M. Krone, F. Klawonn, B. Jayaram, RaCoCl: Robust rank correlation based clustering - An exploratory study for high-dimensional data, *IEEE International Conference on Fuzzy Systems*, Hyderabad, 7-10 July 2013, 10.1109/FUZZ-IEEE.2013.6622463

S. Mandal and B. Jayaram, Fuzzy Systems based on Similarity and Universal Approximation, *International Conference on Mathematics and Computing*, ICMC 2013, Haldia, India, 26-29 December 2013.

S. Mandal and B. Jayaram, Monotonicity of SISO Fuzzy Relational Inference Mechanisms with Yager's class of Fuzzy Implications, *5th International Conference on Pattern Recognition and Machine Intelligence*, PReMI 2013, Kolkata, India, 10-14 December 2013.

N.R. Vemuri and B. Jayaram, Homomorphisms on the monoid of Fuzzy Implications: A complete characterisation, 5th International Conference on Pattern Recognition and Machine Intelligence, PReMI 2013, Kolkata, India, 10 -14 December 2013.

Prabhakar Akella, Binary tree based construction of n-uninorm aggregation operators, *IEEE International Conference on Fuzzy Systems*, Hyderabad, 7-10 July 2013.

Homomorphisms on the set of Fuzzy Implications, N.R. Vemuri and B. Jayaram, *IEEE International Conference on Fuzzy Systems*, Hyderabad, India, 7-10 July 2013.

Approximation Capability of SISO Fuzzy Relational Inference systems based on Fuzzy Implications, S. Mandal and B. Jayaram, *IEEE International Conference on Fuzzy Systems*, Hyderabad, India, 7-10 July 2013.

FUNDED RESEARCH PROJECTS

2013-14

C.S. Sastry, Invariant and sparse Modeling: theory and applications, CSIR, 6 January 2014, Rs. 11 Lakhs.



D. Sukumar, Analytical and Computational Perspective of Condition Spectrum, DST SERC, Rs.10.00 Lakhs.

Tanmoy Paul, Approximation in Banach spaces and Mazur's intersection property, DST, January 2014, Rs. 8.5 Lakhs.

SEMINARS IN THE DEPARTMENT

Prof. Balamohan. V. Limaye, IIT Bombay, Uniformly conditioned approximate bases of a spectral subspace, 1 April 2013.

Prof. P. C. Das, NISER Bhubneswar, Existence theory for solution of highly nonlinear equations and Degree theory, 2 April 2013.

Prof. R. Usha, IIT Madras, Elliptic curves and CryptograInverse Problem relevant to gravity-driven thin film flows - steady solution and stability, 26 June 2013.

Dr. Dipramit Majumdar, ISI Bangalore, Geometry of the Eigencurve at critical Eisenstein series of weight 2, 1 October 2013.

Prof. Vasudeva Murthy, TIFR, Bangalore, On the string equation of Narasimha, 24 October 2013.

Dr. T Suman Kumar, Asst. Prof., University of Hyderabad, India, A nonlinear renewal equation with diffusion, 18 March 2014.

Dr. Ramakrishna Nanduri, University of Genova, Italy Free divisors, 7 March 2014.

TALKS GIVEN IN INTERNATIONAL / NATIONAL CONFERENCES

C. S. Sastry, Telecardiology: Hurst exponent based anomaly detection in compressively sampled ECG Signals, Lisbon, Portugal, 12 October 2013.

Balasubramaniam Jayaram, Data Analysis: A 3-D Perspective, 12th International Conference on Fuzzy

Set Theory and Applications, FSTA 2014, Liptovsky Jan, Slovak Republic, 26-31 January 2014.

P. A. Lakshmi Narayana, On linear and nonlinear Hadley flow in Maxwell fluids through Porous Media, Workshop on Mathematical Modeling in Engineering, NIT Warangal, 2-6 December 2013.

G. Ramesh, Laplace Transforms: A National Seminar on Recent Trends In Applied Science with Engineering Applications, Department of Applied Science, Government Engineering College Kozhikode, Kerala 27-29 June 2013.

Tanmoy Paul, Stability of some approximation properties in Banach spaces, IWOTA, IISc Bangalore. 16-20 December 2013.

D. Sukumar, Eigen values, eigen vectors and applications, A national Seminar on Recent Trends in Applied Science with Engineering Application, Government Engineering College Kozhikode, Kerala, 27-29 June, 2013.

Venku Naidu Dogga, Diagonalization of linear transforms on finite dimensional vector spaces, National Seminar on Linear Algebra, VadaKara (Kozhikode, Kerala), 16 December 2013.

Narasimha Kumar, On sign changes of q-exponents of generalized modular forms, Local Langlands Conjecture and Galois representations, TIFR Mumbai, 16 December 2013 - 3 January 2014.

Prabhakar Akella, Binary tree based construction of n-uniform aggregation operators, IEEE International Conference on Fuzzy Systems, Hyderabad, 10 July 2013.

Mechanical & Aerospace Engineering



The Department of **Mechanical & Aerospace Engineering (MAE)** has faculty members with specializations in the fields of solid mechanics, structural vibration and control, acoustics, robotics, materials, manufacturing, rapid-prototyping, fluid mechanics, heat transfer, combustion, computation fluid dynamics, etc. Currently, the Department has established many state-of-the-art teaching and research labs, and is offering undergraduate (B.Tech.) and post graduate (M.Tech and Ph.D.) programs in Mechanical Engineering.

The UG and M.Tech programs have a dual orientation towards a strong foundation in fundamentals coupled with a strong industry orientation. The latter results in hands-on experience on software tools for Computer-aided Design, Finite-Element Analysis, Computational Fluid Dynamics, Kinematic and Dynamics, Computational

Mathematics, etc., in the many project-oriented courses in the curriculum. This prepares the students to take up jobs in India's burgeoning Industrial R&D sectors after they graduate. The M.Tech program has one year in advanced course-work followed by one year of thesis work, in which research problems in either applied industrial or fundamental research areas can be taken up, on the choice of the student. The PhD program has a strong foundation of advanced course-work for one year, which is more rigorous than usual in most IITs, followed by research work in fundamental areas, where the focus is on developing the capacity for independent research and research leadership in the student. Because of the generous funding available through MHRD, very high-end research equipment has been installed at IITH to facilitate PhD research.

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PUBLICATIONS

(In Peer-Reviewed Journals)

B. Venkatesham, Mayank Tiwari and V. Aishwarya, Effect of Micro-Pitting on Gear Vibrations and Dynamic Excitation Source, *Journal of Vibration Engineering and Technologies*, 2 (1), (2014).

Rakesh Yadav, A. Kushari, Atul K. Verma and V. Eswaran, Weighted Sum of Gray Gas Modeling for Nongray Radiation in Combusting Environment Using the Hybrid Solution Methodology, *Journal of Numerical Heat transfer, Part B*, 64 (2), 174-192 (2013).

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T. Uchida, C.P. Vyasarayani, M. Smart, and J. McPhee, Parameter identification for multibody systems expressed in differential-algebraic form, *Multibody System Dynamics*, 31(4), 393-403, (2014).

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J.P. Srivastava, Abhay Sharma, Jitendra S. Sangwai, Production performance of water alternate gas injection techniques for enhanced oil recovery: effect of WAG ratio, number of WAG cycles and the type of injection gas, Jigar Bhatia, *Int. J. Oil, Gas and Coal Technology*, 7(2), 132-151 (2014).

Ashok Kumar Pandey, Effects of coupled modes on pull-in voltage and frequency tuning of a NEMS device, *IOP Journal of Micromechanics and Microengineering*, 23, 046605, 1-10 (2013).

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PUBLICATIONS

(In Peer-Reviewed Conferences)

B. Venkatesham, Acoustical Performance of a Circular Expansion Chamber with Yielding Walls, *ACOUSTIS2013*, New Delhi, India, 10-15 November 2013.

Vamshidhar Done, B. Venkatesham, Bhaskar Tamma, Kunal Soni, Subhrajit Dey, Shruti Angadi, Vishal G P, Muffler Design for a Refrigerator, Muffler Design for a Refrigerator, *Compressor Conference*, USA, 2014

V Jadon, G Agawane, A Baghel, Venkatesham Balide and R Banerjee A Getta, H Viswanathan and A Awasthi, An Experimental and Multiphysics Based Numerical Study to Predict Automotive Fuel Tank Sloshing Noise, *SAE International*, 2014.

B. Venkatesham, Acoustic-structural coupled analysis of a flexible rectangular duct, *ICSV20*, Bangkok, Thailand, 7-11 July 2013.

R. Harish, K. Venkatasubbaiah, Entrainment effects through horizontal and vertical vents on turbulent natural convection flows, *22nd National and 11th International ISHMT-ASME Heat and Mass Transfer Conference*, IIT Kharagpur, 28-31 December 2013.

R. Harish and K. Venkatasubbaiah, Numerical Simulation of fire spread in elevator shaft connected to adjacent lobby in tall building, *13th International conference on Fire Science and Engineering (Interflam2013)*, 24-26 June 2013, Royal Holloway College, University of London, UK. Vol: 1, pp: 175-184.

Narendra Laxman Gajbhiye, Vinayak Eswaran, Effect of a magnetic field on natural convection in a curved geometry, *ISHMT-ASME Heat and Mass Transfer Conference*, IIT Kharagpur, India, 28-31 December, 2013, Paper ID- HMTTC1300356.

Praveen T., Narendra Laxman Gajbhiye, Vinayak Eswaran, On the electromagnetic control of convection in low Prandtl number fluids, *ISHMT-ASME Heat and Mass Transfer Conference*, IIT Kharagpur, India, 28-31 December, 2013, Paper ID- HMTTC1300350.

Narendra Gajbhiye, Anoop Kumar, A. K. Saha, V. Eswaran, Numerical calculation of particle collection efficiency in an electrostatic precipitator, *Proceedings of the Fortieth National Conference on Fluid Mechanics and Fluid Power*, NIT Hamirpur, Himachal Pradesh, India, 12-14 December 2013, Paper ID-FMFP2013 140.

S. Suryakumar and M.A. Somashekara, Manufacture of Functionally Gradient Materials using Weld-deposition, *SFF Symposium (Twenty Forth Annual International Solid Freeform Fabrication Symposium - An Additive Manufacturing Conference)*, Austin, Texas, USA, 12-14 August 2013.

S. Suryakumar and M.A. Somashekara, Preliminary study of process parameters for weld-deposition using twin wire system, *AMSI-2013 (3rd International Conference & Exhibition on Additive Manufacturing Technologies)*, Nimhans Convention Centre, Bangalore, 7-8 October 2013.

S. Suryakumar and M.A. Somashekara, Manufacturing of functionally gradient materials by using weld-deposition, *IJS-JW 2013 (1st*



International Joint Symposium on Joining and Welding), Osaka University, Osaka, Japan, 6-8 November 2013.

J Asghar, R Lingam, N. V. Reddy, Tool Path Influence on Electric Pulse Aided Deformation during Incremental Sheet Metal Forming, Melhourne, January 6-10, NUMISHEET 2014

P. Murali Krishna, R. Prasanth Kumar, S. Srivastava, Level trot gait in quadruped robots, *International Conference on Advances in Robotics*, 4-6 July 2013.

P. Murali Krishna, R. Prasanth Kumar, S. Srivastava, Dynamic gaits and control in flexible body quadruped robot, *16thNational Conference on Machines and Mechanisms*, Roorkee, 18-20, December 2013.

V. Janardhan, and R. Prasanth Kumar, Kinematic analysis of biped robot forward jump for safe locomotion, *16thNational Conference on Machines and Mechanisms*, Roorkee, 18-20 December 2013.

Nitin Jayawant Panaskar and Abhay Sharma, On feasibility of friction stir processing of cylindrical hole, *IJS-JW2013, International symposium on Friction Based Welding and Processing*, Osaka, 6-8 November 2013.

Sathish Kumar Garala, Prashant N. Kambali, and Ashok Kumar Pandey, A hybrid approach for the modal analysis of graphene and carbon nanotubes, *17th IWPSD -2013*, Noida India, Abstract ID-175, 347-349, 10-13 December 2013.

Gyanadutta Swain and Ashok Kumar Pandey, Nonlinear response of coupled transverse modes of a nanoresonator, *17th IWPSD -2013*, Noida India, Abstract ID-261, 29-31, 10-13 December 2013.

Santhosh Doreswamy Vishwakarma, Rudra Pratap, Ashok Kumar Pandey, Jeevak M. Parpia, Darren Robert Southworth, Robert Anthony Barton, Harold G. Craighead, Estimation of acoustic losses in the quality factor of a micromechanical 2D resonator, *ICSV-20*, Bangkok, Thailand, 7-11 July 2013.

FUNDED RESEARCH PROJECTS 2013-14

Surya S, Manufacture of Functionally Gradient Objects through Weld-Deposition, DST, Sep 2013, Rs. 20.64 Lakhs.

N. V. Reddy, Incremental Forming, Boeing, Oct 2013, Rs. 32.00 Lakhs.

B. Venkatesham, Noise & Vibration Study of Mixer, Preethi Kitchen Appliance Pvt. Ltd, Feb 2014, Rs. 9.5 Lakhs.

Abhay Sharma, Development of magnetic pulse welding technology for joining dissimilar materials: stainless steel and aluminum alloys, DRDO, Jan 2014, Rs. 9.79 Lakhs.

CEP COURSES

A 3-days Short course on FEA, C. Viswanath and A. Rajagopal, BHEL R&D Delhi, 24-26 February 2014.

A 3-days course on MATLAB for Mechanical System, Ashok Kumar Pandey, BHEL R&D Hyderabad, 25-27 November 2013.

SEMINARS IN THE DEPARTMENT

Nonlinear ultrasonic guided waves in plates, Vamsi Krishna Chillara, Engineering Science and Mechanics, The Pennsylvania State University, USA, 14 May 2013.

Optical Diagnostics in Turbulent Jets and Sprays, Pankaj S. Kolhe, University of Alabama, Tuscaloosa, USA, 14 August 2013.

Studies on the CNG-Hydrogen Operated Spark Ignition Engine, R. T. Naik, Department of Mechanical Engineering, Indian Institute of Science, Bangalore, India, 11 September 2013.

Design and prediction of thermodynamic and kinetic behavior of energy storage materials through atomic and bulk scale computation, Jishnu Bhattacharya, Northwestern University, USA, 9 October 2013.

Reactionless Manipulation of a Satellite Mounted Robot for Autonomous On-orbit Services, Suril Shah, IIIT Hyderabad, 6 November 2013.

Radiative Heat Transfer and its Modeling Through FLUENT, Pradeep Kumar, ANSYS Fluent India Pvt. Ltd., 13 November 2013.

Nature-inspired micro-fluidic propulsion using artificial cilia, Syed NizamuddinKhaderi, Department of Engineering, University of Cambridge, 15 January 2014.

Fatigue Behavior of Polymer Nanocomposites, C.M. Manjunatha, CSIR-National Aerospace Laboratories, Bangalore, 31 January 2014.

In-Cylinder engine flow measurement using stereoscopic molecular tagging velocimetry, Mayank Mittal, Generac Power Systems, Waukesha, Wisconsin, USA, 19 March 2014.

Automatic Platooning and ITS Systems for Ground Vehicle, NAKANO Kimihiko et al., IIS, University of Tokyo, Japan, 28 March 2014.

TALKS GIVEN IN INTERNATIONAL / NATIONAL CONFERENCES

S. Suryakumar and Robin Mathews, Effect of Area-Filling Path on the Residual Stresses Developed During Weld-Deposition Based Additive Manufacturing, JWRI-INDO workshop 2013, Osaka University, Osaka, Japan, 11 November 2013.

N.V. Reddy, Key note lecture on Digital Manufacturing: Recent Trends and Challenges, International Conference on Advances in Mechanical Sciences 2014, Hyderabad, 9-11 January 2014.

N.V. Reddy, Developments in Metal Forming, Green Initiatives in Mechanical Engineering, Hyderabad, 13-14 November 2013 Hyderabad

B. Venkatesham, Designing for quietness, Proceedings of the 4th National Conference on Advances in Mechanical Engineering, VCE, Ibrahimbagh, Hyderabad, AP, India, 7-8 November 2013.

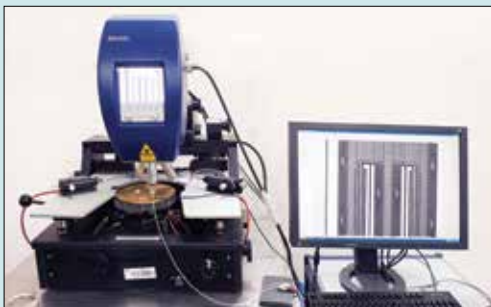
Ashok Kumar Pandey, Academic experimentation at IIT Hyderabad, First International Conference on Transformations in Engineering Education (ICTIEE 2014), Hubli, Karnataka, 18 January 2014.

Ashok Kumar Pandey, Consequences of a low power and ultra fast micro/nanoscaleopto-electro-mechanical system, 4th trilateral symposium on nanotechnology, Singapore, 5-7 December 2013.

RESEARCH INFRASTRUCTURE

The department has state-of-the-art infrastructure for performing research in various facets of mechanical engineering, particularly design, thermal and manufacturing aspects. Some of the instruments available within the department research labs are listed below.

Polytech scanning vibrometer for microstructures | Vibration isolator | Instron m/c with photo elasticity set up | Small UTM 20 kN | Magnetic Levitation Set up | Snake Robot | Robo Welding Station | 3D printer | XRD | SEM | 3D scanner | Microhardness tester | Coordinate Measuring Machine | EDM Wire Cut | MTS Fatigue test Machine



Polytec Scanning Vibrometer for micro structures



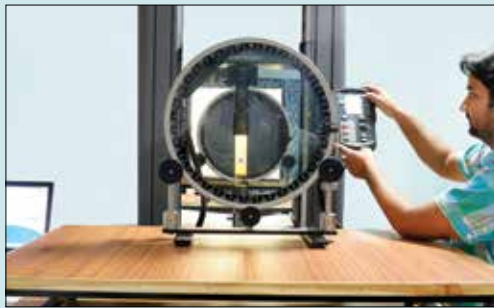
XRD



SEM



Robo welding



INSTRON



Rapid Prototyping Machine



Engine



Sheet Metal C



Optical Setup



Vibrometer

Physics



The Department of Physics is one of the most vibrant centers of learning in the campus. The theme of the department is to focus research at smaller scales and become an outstanding center for Physics in the next decade. At present the department has 10 faculty members (expected to go up to 12 by summer 2014) in the areas of High Energy Physics, Condensed Matter Physics, Micro-Electro-Mechanical Systems (MEMS), Atomic, Molecular and Optical Physics, Statistical and Biological Physics.

The department offers Ph.D., M.Sc. and B.Tech (Engineering Physics) programs. It has already established several research labs (Advanced Functional Materials Lab, MEMS Lab, Micromagnetism lab, Advanced Detector lab, Materials design and simulations lab) apart from the B.Tech and M.Sc. labs, and plans to establish a Computational Nano-Science Lab, a Physics -at-Small- Scales Lab and a Laser & Photonics lab. It plans to offer an integrated Ph.D. program in Physics and an interdisciplinary M.Tech program in Nano-Science & Technology.



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PUBLICATIONS

(In Peer-Reviewed Journals)

R Dutta, A. Bhol and A K Giri, Effective theory approach to new physics in b to c and b to u leptonic and semileptonic decays, *Phys. Rev. D* 88, 114023 (2013).

Swetarekha Ram, V. Kanchana and M. C. Valsakumar, Skutterudites under pressure: An ab initio study, *Journal of Applied Physics*, 115, 093903-1-8(2014).

Ravhi S. Kumar, Yi Zhang, Arumugam Thamizhavel, A. Svane, G. Vaitheeswaran, V. Kanchana, Yuming Xiao, Paul Chow, Changfeng Chen and Yusheng Zhao, Pressure induced valence change of Eu in EuFe_2As_2 at low temperature and high pressures probed by resonant inelastic x-ray scattering, *Applied Physics Letters*, 104, 042601-1-4 (2014).

G. Shwetha, V. Kanchana, K. Ramesh Babu, G. Vaitheeswaran, and M. C. Valsakumar, High-Pressure Structural Stability and Optical Properties of Scheelite-type ZrGeO_4 and HfGeO_4 X-ray Phosphor Hosts, *Journal of Physical Chemistry C*, 118(8), 4325-4333(2014).

Swetarekha Ram and V. Kanchana, Lattice dynamics and superconducting properties of antiperovskite La_3InZ ($\text{Z}=\text{N},\text{O}$), *Solid state communications*, 181, 54-59(2014).

Vijay Kumar Gudelli, V. Kanchana, G. Vaitheeswaran, M. C. Valsakumar and S. D. Mahant, Thermoelectric properties of marcasite and pyrite FeX_2 ($\text{X}=\text{Se},\text{Te}$): A first principle study, *RSC Advances*, 4, 9424-9431(2014).

Vijay Kumar Gudelli, V. Kanchana, G. Vaitheeswaran, A. Svane, and N.E. Christensen, Thermoelectric properties of chalcopyrite type CuGaTe_2 and chalcostibite CuSbS_2 , *Journal of Applied Physics*, 114, 223707-1-8(2013).

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A. Waskowska, L. Gerward, J. Staun Olsen, A. Svane, G. Vaitheeswaran, and V. Kanchana, High-pressure structural behaviour of $\text{Cu}_{0.5}\text{Fe}_{0.5}\text{Cr}_2\text{S}_4$: An experimental and theoretical study, *J. Alloys and Compds.*, 578, 202-207(2013).

Ashok Akarapu and Prem Pal, Growth and etch rate study of low temperature anodic silicon dioxide thin films, *The Scientific World Journal*, 2014, 106029 (9pp) (2014).

Prem Pal and Sajal Sagar Singh, A new model for the etching characteristics of corners formed by $\text{Si}\{111\}$ planes on $\text{Si}\{110\}$ wafer surface, *Engineering*, 5, 1-8 (2013).

Prem Pal and Sajal Sagar Singh, A simple and robust model to explain convex corner undercutting in wet bulk micromachining, *Micro and Nano Systems Letters*, 1, 1-6 (2013).

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Karthik Thangavelu, Ranjith Ramadurai, and Saket Asthana, Evidence for the suppression of intermediate anti-ferroelectric ordering and observation of hardening mechanism in $\text{Na}_{1/2}\text{Bi}_{1/2}\text{TiO}_3$ ceramics through cobalt substitution, *AIP Advances*, 4, 017111 (2014).



J. Paul Praveen, Kranti Kumar, A.R. James, T. Karthik, Saket Asthana, Dibakar Das, Large piezoelectric strain observed in sol-gel derived BZT-BCT ceramics, *Current Applied Physics*, 14, 396 (2014).

T. Karthik, Saket Asthana, Evolution of multifunctional behavior in site specific cation substituted $\text{Na}_{0.5}\text{Bi}_{0.45}\text{Gd}_{0.05}\text{Ti}_{0.95}\text{Mn}_{0.05}\text{O}_3$ ceramics, *J. Korean Phys Soc.*, 62, 1979 (2013).

T. Durga Rao, T. Karthik, Saket Asthana, Investigation of structural, magnetic and optical properties of rare earth substituted bismuth ferrite, *J. Rare Earths*, 31, 370 (2013).

Sudarshan Vadnala, Saket Asthana, Prem Pal, and S. Srinath, Influence of Nd Substitution by La in $\text{Nd}_{0.7}\text{Sr}_{0.3}\text{MnO}_3$ on Structural and Transport Properties for Sensing Applications, *ISRN Materials Science*, Article ID 728195 (2013).

C. Arina, R.N. Mohapatra and Narendra Sahu, Cogenesis of matter and dark matter with vector-like Fourth generation leptons, *Physics. Lett. B*, 720, 130 (2013).

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PUBLICATIONS

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Ashok Akarapu and Prem Pal, Optical Characterization of Anodically Grown Silicon Dioxide Thin Films, XVII International Workshop on Physics of Semiconductor Devices (IWPSD-2013), Amity University, Noida, India, 10-13 December 2013.

Sajal Sagar Singh, Yuan Li, Yan Xing and Prem Pal, The Application of Level Set Method for Simulation of PECVD/LPCVD Processes, XVII International Workshop on Physics of Semiconductor Devices (IWPSD-2013), Amity University, Noida, India, 10-13 December 2013.

Sudarshan Vadnala, Saket Asthana, and Prem Pal, Study of structural effect on Eu-substituted LSMO manganite for high temperature coefficient of resistance, International conference on magnetic materials and applications (MAGMA-2013), IIT Guhawati, India, 5-7 December 2013.

Sudarshan Vadnala, Saket Asthana, and Prem Pal, Enhanced TCR with room temperature TMI for potential application in microbolometer, XVII International Workshop on Physics of Semiconductor Devices (IWPSD-2013), Amity University, Noida, India, 10-13 December 2013.

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FUNDED RESEARCH PROJECTS 2013-14

Narendra Sahu, Asymmetric dark matter (DM) and its probe at ongoing and future DM search experiments, Department of Science and Technology (DST), May 2013, Rs. 13.80 Lakhs.

Jammalamadaka Suryanarayana, Development of R-TM (R=rare earth and TM= transition metal) hybrid multilayers for biological sensor applications Department of Science and Technology (DST), November 2013, Rs. 21.84 Lakhs.

CEP COURSES

A Five Days Workshop cum Certificate Course on MEMS & NEMS: Fundamentals, Design and Application.

SEMINARS IN THE DEPARTMENT

Collapse transition in protein-L, Dr. Himadri Sekhar Samanta, University of Maryland, 9 April 2014.

Two Dimensional Nanomaterials: Present and Future challenges, Dr. V. Eswaraiyah, CRANN and School of Physics, Trinity College Dublin, Dublin, Ireland, 13 March 2014.

Charge carriers functioning in Organic solar cells, Dr. Chandramouli Kulshreshtha, Pohang Institute of Science Technology, S. Korea, 6 February 2014.

Nanostructured Metal Oxides based Microfluidic Biosensors for Point-of-Care Diagnostics, Md Azahar Ali, 31 January 2014.

Fermi surface properties of binary and ternary Superconductors, Ms. Swetarekha Ram, IITH, 21 January 2014.

Resonant and non-resonant x-ray scattering studies on the rare earth iron borate multiferroics and on the iron chalcogenides, Dr. Dinesh, Deutsches Elektronen-Synchrotron (DESY), Notkestrasse 85, Hamburg, 8 April 2013.

TALKS GIVEN IN INTERNATIONAL / NATIONAL CONFERENCES

Anjan Giri, Flavour Physics in the era of Belle-II, Belle Analysis Workshop 2014, IIT Guwahati, February 2014.

V. Kanchana, Fermi surface and superconductivity on intermetallic compounds: An Abinitio study, 58th DAE Solid State Physics Symposium (DAE-SSPS 2013), Thapar University, Patiala, Punjab, during 17-21 December 2013.

V. Kanchana, Fermi surface topology for AX_3 (A=La, Y; X= Sn, Pb, In, Tl) and A_3X (A=La; X=In, Tl, Sn) superconducting intermetallic: Effect of compression, the seventh International conference of the Asian consortium on Computational Material science (ACCMS-7), Suranree University of Technology, Thailand, which is held during 23-28 July 2013.

V. Kanchana, Cu_3Au type Superconducting Intermetallics under pressure, State Key Lab of Superhard Materials, Jilin University, Changchun, China on 6 June 2013.

Narendra Sahu, Asymmetric dark matter in light of Higgs-like signature at LHC, SUSY & DM, held at HEP, IISc. Bangalore, during 3-5 October 2013.

Debasish Chaudhuri, Stochastic pump of interacting particles, Workshop on Soft-Matter: Self Assembly and Dynamics, HCU & TIFR-Hyderabad, on 9 January 2014.

Debasish Chaudhuri, Entropic forces in bacterial nucleoid, YIM-Soft matter, Pondicherry, 6 January 2014.

Debasish Chaudhuri, Fluctuation theorem for active particles, Indian Statistical Physics community meeting, IISc, Bangalore, 2 February 2014.

Stochastic pump of interacting particles, PCMCE, SN Bose National Center for Basic Sciences, Kolkata, 24 February 2014.

Vandana Sharma, Attosecond-correlated dynamics of two electrons in argon, National Laser Symposium, BARC, Mumbai, 6-9 February 2013.



Vandana Sharma, Wavelength dependence of rescattering electron spectra of CO₂ molecule, TC2013, IPR, Gandhi Nagar, 18-20 November 2013.

Vandana Sharma, Ultrafast electron Diffraction Imaging, SPARC-FAIR Meet, TIFR-Mumbai, 28-29 January 2014.

Jammalamadaka Suryanarayana, Magnetization Dynamics of Graphene Nanoribbons. ICMAT - 2013, Singapore, 30 June - 5 July 2013.

Jyoti Ranjan Mohanty, Magnetic domain dynamics in magnetic multilayer, International conference on physics at surfaces and interfaces, PSI 2014, Puri, India, 24-28 February 2014.

Jyoti Ranjan Mohanty, Magnetism at nanoscale: Nano-small meets Ultra-fast, International conference on nano, bio and material sciences, ICONBMS 2014, Hyderabad, India, 8-10 January 2014.

Jyoti Ranjan Mohanty, Direct observation of frozen moments in NiFe/FeMn exchange bias system, International conference on magnetic materials and applications, MagMA 2013, IIT, Guwahati, 5-7 December 2013.

Jyoti Ranjan Mohanty Direct observation of frozen moments in NiFe/FeMn exchange bias system, International conference on materials for advanced technologies, ICMAT 2013, SUNTEC, Singapore, 30 June to 5 July 2013.

AWARDS / RECOGNITIONS

Saket Asthana, Best Poster Award in MagMa 2013, IIT Guwahati, India

Jammalamadaka Suryanarayana, IIT-DAAD exchange guest scientist award (2014)

Empaneled in Directory of Experts of BHEL(R&D) - Magnetic Nano Materials

Jyoti Ranjan Mohanty, IIT-DAAD Guest scientist award 2014

RESEARCH INFRASTRUCTURE

Over the last few years the department has put in great efforts in building state of the art research labs. Some of the instruments available with in the department research facilities are listed below

Ferro / Piezoelectric Testing Module | Impedance Analyzer | Electromagnet and CCR with electrical characterization Testing Module | Ellipsometry | 3D scanning microscope | RF & DC Sputtering System | Reactive Ion Etching System (RIE) | Mask Aligner | DSC | FTIR



Ellipsometer



RF&DC sputtering



PHYSICS



Ferro Piezoelectric testing module



3D Scanning Microscope



Indigenous ultrashort electron source



Optical microscope



RIE



Mask aligner

Workshops and Symposiums conducted @ IITH

Workshop on biomedical instrumentation: interfacing and development using labview by National Instruments Inc, 13-14 September 2013.

TEQUIP in the presence of the then Honorable minister for HRD Dr Pallam Raju, 30-31 August 2013.

One day symposium on Landfill Engineering: Perspectives and Practices, 7 August 2013.

TECON Industry academia interaction held on 22 January 2014.

Indo-Japanese collaboration on science held on 4 October 2013.

I-School workshop with Tokyo University from 7-8 January 2014.

Short course on condition assessment and strengthening of concrete structures from 4-5 July 2013

Science Workshop organized at IIT Hyderabad jointly with Ritsumeikan University, Japan on 10 February 2014.

MEMS & NEMS: Fundamentals, Design, and Applications, A five day workshop, 16-20 December 2013

MEMS based on sensors and actuators in healthcare and automobiles: One day symposium, 13 March 2014.

Next generation healthcare systems jointly organized by IIT Hyderabad and IISc Bangalore on 16 December 2013.

IEEE Multi-conference on systems and control, 28-30 August 2013.

Hitachi-IITH workshop on Smart grid, Big data and IT industry, 29 November 2013.

A Symposium on Landfill Engineering: Perspectives and Practices, organized by ASCE India Section, Southern Region in association with IGS Hyderabad Chapter and IIT Hyderabad, 6 August 2013.

One-day seminar organized on 'Health practices and engagements in India: Multidisciplinary perspectives, 5 April 2014.

Ramanujan Memorial Symposium in Mathematics and its Applications on 22 December 2013.

One-day symposium on sensors and actuators in healthcare and automobile, 13 March 2014.

One Day Indo-Japan Workshop on Digital Fabrication, 4 March 2014.

JWRI-Indo Workshop on Welding, Co-organizer- Welding Research Institute, Trichi and Joining and Welding Research Institute - Osaka University, Osaka University, 11 November 2013.

IITH - Japan Collaboration



Based on the commitment in August 2007 between both Prime Ministers of India and Japan, collaboration between IIT Hyderabad (IITH) and Japan has started. This collaboration assists IITH for research and studies in identified areas, construction of certain buildings and purchase of identified equipment for high-end research. As a result of promise for grant assistance 'The Project for Future Researchers at Indian Institute of Technology Hyderabad to Enhance Network Development with Scholarship of Japan' (FRIENDSHIP Project) was initiated from 2 January 2011 for a period of 8 years till 31 March 2020.



Signing MoU with Ritsumeikan University

Purpose & Main Activities

The overall goal of the Project is to contribute to the further development in the educational and research activities of IITH through the world-class research network between IITH and higher education institutions & industrial clusters of Japan. Academic experts from both countries identified the following five areas where India's needs match Japan's strengths.

- Environment & Energy
- Digital Communication
- Design & Manufacturing
- Nano-technology & Nano-science
- Civil Engineering

The project promotes interaction of human resources between the two countries at educational and industrial levels. Moreover, IITH graduates will get the opportunity to pursue PhD degree in Japanese universities,

Activities carried out

As part of the proposed activities of the project, the following activities have been carried out during the past 3 years from the commencement of the project.

- A total of 6 students visited various Japanese Universities during the year 2012 followed by 9 students in the year 2013. For the year 2014, total number of students expected to go to various Japanese universities is about 15.
- The program received about 23 missions during the past 2 years spanning into various fields like Japanese Industry, Japanese Universities, Japanese University students, Japanese professors and also Japanese Media and Government officials.
- Prof. Anzai, who is president of JSPS and also president of Japanese Advisory Committee on IIT Hyderabad has visited IITH and interacted with director, faculties, deans, researchers and students to understand the requirement of IITH and has extended his full cooperation both as president of Japanese Advisory Committee and also JSPS in furthering high quality research at IITH.
- Another eminent personality who visited IITH is Prof. Jun Murai also known as 'Father of Japanese Internet'. He visited IITH in 2013 and has identified the area of 'Digital Fabrication' as the research area where he will be contributing to IITH.
- During the past 2 years several workshops/ lectures and few seminars were conducted coinciding with the visit of professors and researchers from various Universities of Japan.



IITH-Japan Collaboration Fair 4 October 2013 with participation from Embassy of Japan, Japanese Universities, Japanese companies and scholarship students.

- The project side has organised Japanese Academic Fair in the month of October, 2013 to promote Japanese Universities to IITH students and also to announce scholarships to IITH students for the year 2014. About 300+ students and faculty members participated in the event.
- During the past 2 years IITH has signed MoU with The University of Tokyo, Ritsumeikan University, and Osaka University.
- The Project has supported few Japanese media for making documentaries on IITH and also articles in Japanese newspapers.
- In October 2013, a mission with 12 members headed by Director of IITH, Prof. U.B. Desai visited 7 Universities in Japan to further the collaboration in the field of research, academics and related activities.
- Apart from the mission which went along with Director, IITH individually about 20 IITH faculty have visited during FY 2013-2014 their research counterparts or visited various universities designated to find research counterparts to further their research activities.

DISANET

DISANET is short for the Indo-Japanese project on 'Information Network for Natural Disaster Mitigation and Recovery'. The purpose of the DISANET project, which started from July 2010 as a five year joint research and development project between India and Japan, is to establish infrastructure for continuous data collection on earthquake and weather and to develop a rapidly deployable, robust communications system that can be deployed during / after a natural disaster to provide critical information for emergency communications and relief work. More than 30 researchers in India and Japan from approximately 10 research institutes formed 4 groups to research on the following: i) Earthquake Disaster Mitigation, ii) Weather Monitoring Platform, iii) Sustainable Communication Infrastructure, and iv) ICT Platform and Resource Development for Emergency and Disaster Mitigation. The project is funded by Japan Science and Technology Agency (JST) and Japan International Cooperation Agency (JICA). The institutes involved are: Indian Institute of Technology, Hyderabad (IITH), National Geophysical Research Institute, Hyderabad (NGRI), India Meteorological Department (IMD), Indian Institute of Technology, Madras (IITM), Indian Institute of Technology, Kanpur (IITK), and International Institute of Information Technology, Hyderabad (IITH) from India and Keio University, The University of Tokyo, Nara Institute of Science and Technology (NAIST), and Hiroshima University from Japan. Faculty members and students of IITH are involved in Groups 2 (weather monitoring) and 4 (ICT platform).



Interaction with TOSHIBA

Campus Events

2ND CONVOCATION

Indian Institute of Technology Hyderabad held its Second Annual Convocation function on Wednesday, the 7 August, 2013 in its existing premises located in Ordnance Factory Campus, Yeddumailaram - 502205, Medak District, Telangana. Mr. NR Narayana Murthy, Executive Chairman, Infosys, graced the occasion as Chief Guest and delivered the Convocation Address. Sri BVR Mohan Reddy, Chairman & MD, Infotech Enterprises and Chairman, Board of Governors, IIT Hyderabad also presided over the ceremony.

In the second convocation, a total of 195 students were awarded the degree. This included the Doctoral Degree awarded to the first batch of 3 Ph.D students. Among others 113 B.Tech, 20 M.Sc, and 59 M.Tech students were awarded their degrees.

During the convocation, the President of India Gold Medal was awarded to Ms Namrata Jampani for the highest overall CGPA in B.Tech, Institute Gold Medal for highest CGPA in M.Sc was awarded to Ms Chandrima Ganguly, Institute Gold Medal for highest CGPA in M.Tech was awarded to Mr Pinakinarayan Swain, and Gold Medal for excellence in academics and co-curricular activities was awarded to Aditya Srinivas.



6TH FOUNDATION DAY



Indian Institute of Technology Hyderabad (IITH) held its sixth foundation day on 5 March 2014 in its existing premises located in Ordnance factory campus, Yeddumailaram 502 205, Medak District, Telangana, with a feeling of excitement and reviving commitment to invention and innovation in teaching as well as in research.

The programme started by lighting the lamp by Dr. R. Chidambaram Principal Scientific adviser to the Government of India and Chairman, SAC - C, who graced the occasion as chief guest. He addressed the gathering on 'Research, Innovation & the Knowledge Economy'.

WOMEN'S CELL, IIT HYDERABAD



The women's cell, IIT Hyderabad was established to ensure safe and peaceful studying / working environment for all women in IIT Hyderabad.

Taking into account of the recent events where atrocities against women got increased throughout India, the women's cell had conducted a training session on self defense for female students of IIT Hyderabad. A two day training camp on Jukaado was conducted on 31 August and 1 September of 2013. Jukaado is a practical way of self defense using only bare hands designed to protect oneself from attacks particularly on streets. The training was offered by Mr. Farzaan Merchant and his assistant from Jukaado academy of martial arts, Hyderabad.



ELAN CULTURAL FEST



ELAN 2k14, one of the biggest techno cultural fests of India concluded on 2 February after a three day fun filled extravaganza. As a build up to the fest, three technical workshops were conducted across the year. Book donation was

conducted in local schools including DPS, Bhavans Vidya Mandir as a part of our social cause events. ELAN kicked off in the evening of 31 January with a hot air balloon lighting ceremony by the Director of IIT Hyderabad, Prof. U.B. Desai. It was followed by the finals of a classical dance event which witnesses some of the finest Indian classical performances.

HINDI DIVAS

Hindi cell at IIT Hyderabad plays an active role not only in organizing different programs but also involves the staffs, students and faculties of the institute so as to increase its awareness among the people. We, at IIT Hyderabad, organized Hindi Diwas on 14 September 2013. We had organized many programs on this day including essay writing competition on "SAMAAJ KE UTHAN ME RASHTRIYA EKIKRIT BHASHA KA YOGDAN". In this program, many students, staffs and faculty took part. The winner of the essay competition was awarded prize on Republic Day.



To facilitate Hindi as an official language at the work place, we also send our staffs, faculties, etc., to attend the annual workshop or conference in Hindi language organized by MHRD or other Institutes over the year. Dr. Chandra Sekhar Sharma and Dr. Ashok Kumar Pandey attended two days Hindi conference organized by MHRD and National Hindi Institute, Agra, in Vishakhapatnam from 22-23 May 2014.

FRIENDSHIP RACE

A friendship race was conducted on 3 August 2013. Hundreds of participants including students, staff and faculty of IITH participated in the 5 km run in the host campus of ordinance factory. The even was fun filled and the prizes were distributed to the winners during Independence Day celebrations.



REPUBLIC DAY

The 64th republic day of India was celebrated with much participation from students, staff, and faculty. The program started with flag hosting and republic day message by the director. The cultural programs performed by the students made the event more colorful.



I-SCHOOL WORKSHOP

The i-School workshop between IITH and Tokyo University was very unique opportunity for the students of IITH. As part of the workshop the students of IITH and Tokyo University sent out their ideas on addressing social issues and during the workshop, a software tool developed at Tokyo University was used to identify ideas that revolve around the same theme. This was the second iSchool workshop organized by Tokyo University at IITH. The event spanned over two days from 7 to 8 January 2014.



INDEPENDENCE DAY CELEBRATIONS

66th Independence Day of India was celebrated with much participation from student, staff, and faculty. The Independence Day celebrations started with flag hosting and address by director to the staff and students of IITH. This was followed by cultural program by students and staff. The freshmen projects were displayed after the cultural program.



ONAM



The students with exciting cultural programs and games celebrated Onam. A flower carpet, typical for Onam celebration welcomes all the guests. The guests were entertained with classical dance and skit performance by the students.

PAN-IIT MEET



Pan-IIT sports-cum-cultural meet was held at IITH. IIT alumni with families and gathered on the campus for a fun filled day. The day witnesses the alumni participating in various games. There was plenty of amusement for the children too.

GIRLS' NITE

The 'Girls' Nite' was a fun event organized in IIT Hyderabad on the 16th January, 2014 in the Girls' hostel premises by the Student Gymkhana. It was the first of its kind. There were dancing and singing competitions. Also welcomed on stage were impromptu performances by all girls. It was a great evening exclusively for girl students, irrespective of which stream, year or degree they belong to. The hosts also conducted games on stage and many girls won prizes. The winners of all competitions for the evening were given

away certificates on the annual 'Gymkhana Day' celebrations.



TEQIP

Knowledge Incubation for Technical Education (KITE) under TEQIP-II activities at IIT Hyderabad have started from August 2013 by conducting a conclave on Electrical and computer Sciences (30-31 August 2013) and 56 participants from various TEQIP supported colleges have attended. The objective of KITE is to improve quality of technical education through institutional and systemic reforms and enhance efforts to prepare more post graduate students to reduce the shortage of qualified faculty and to produce more research and development in collaboration with other institutions and industry in 45 Institutes allotted by NPIU. Mechanical and Aerospace Engineering department of IITH conducted a two-day conclave during 7-8 March 2014 and 73 participants from various TEQIP colleges have participated. Faculty members from Chemical, Materials Science and Engineering and Biomedical Engineering have organized a two-day workshop on 'Fundamentals and Applications of Nanofibers' during 4-5 July 2014 and 43 participants have attended. A Two-day workshop on 'Additive/ Generative Manufacturing Technologies' for TEQIP college faculty is organized during 7-8 July 2014 at IITH with 16 participants from TEQIP supported colleges



Student Activities

STUDENT GYMKHANA

Student Gymkhana is a student body which aims to bring the students together for their mutual all-round development. All the students of IIT Hyderabad are members of the Student Gymkhana and they are bounded by the Student Gymkhana Constitution and functions through its Executive Council.

These members manage all the activities in their respective areas with the Gymkhana President coordinating them all. They are selected through the general elections which are held at the end of each academic year. Each area has its own Council which helps the Secretaries in conducting various activities throughout the year. Some important

councils being Science and technology council, cultural and literary council, sports council, hostel council and academic affairs council. It oversees all the student festivals held at IITH as well. Student Gymkhana is a body created to help the students to develop themselves and excel in any field that they wish to. It is a body constituted to foster a sense of unity among the students. It oversees all the aspects of the students' life during their stay at IIT Hyderabad and is constantly trying to improve their life here. It also acts as a link between the administration and the students. It is a body whose aim is to make the students responsible and better citizens of the world.

SPORTS @ IITH

IIT Hyderabad gives significant importance to sporting activities of its students and staff. A number of events were organized in the campus for staff. Some highlights are given below

The 5th Annual Friendship Race (5K run) was conducted on 3 August 2013 with hundreds of participants, including students, staff and faculty. The winners received their prizes from the Director on Independence Day (15 August 2013). As part of freshmen interaction various sport competitions were conducted in the month of August 2013. The students of IIT Hyderabad participated in the 49th Inter IIT Sports Meet held at IIT Guwahati. In addition Inter branch sports meet were conducted in the month of February and March and Dr Shiv Govind Singh (Chairman Sports) distributed the prizes on Gymkhana Day celebration (4 April 2014).

Badminton



Students participating in inter-department badminton league

ICL



Inter-department cricket league



Football



Inter department football league



IDL



Inter-department hockey league

IITH students at Inter-IIT sports meet held at IIT Guwahati



STUDENT ACTIVITIES



NSS - IITH



NSS chapter of IIT Hyderabad works with the motto 'NOT ME BUT YOU'. It is a body of students, guided by faculty and staff, who are driven by the spirit of social service, selflessly strive to improve the education, health and standard of living of the underprivileged. It is aimed at efforts to improve the social status of our nation. It encourages activities which empower the society to respect the nature, education and nation. Plantation activity helps to promote awareness about the nature among the youth. Open day program initiated by NSS-IITH is aimed at inspiring the young generation to excel in the field of science and technology. In this program, huge number of students from the different schools of nearby villages participate. They interact with IITH students and explore the research laboratories

and workshops where they are exposed to the latest technology. The volunteers undertake teaching activity at schools in suburban areas regularly to provide academic assistance to the students. Blood donation and cloth donation are actively taken up by the NSS. The scale of these activities is increasing every year by leaps and bounds. Innovative ideas are implemented every year by NSS like 'Each One Give One' where the students from various corporate schools in urban areas are encouraged to donate books, which are distributed among the less privileged children. The NSSites visit orphanages and old age homes and organize fun activities bringing smiles on the faces of many. By increasing the scale of these activities and undertaking novel projects, NSS-IITH works with a vision to make a huge difference to the society.





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