



भारतीय प्रौद्योगिकी संस्थान हैदराबाद  
Indian Institute of Technology Hyderabad

ANNUAL REPORT 2017-18

# INDIAN INSTITUTE OF TECHNOLOGY HYDERABAD

10

A DECADE OF  
EXCELLENCE

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# Board of Governors



## CHAIRMAN

**Mr BVR Mohan Reddy**  
Executive Chairman  
Cyient Limited



## MEMBER

**Prof Vinod Krishan**  
Senior Professor & Dean  
Indian Institute of Astrophysics



## MEMBER

**Dr Prema Ramachandran**  
Director  
Nutrition Foundation of India



## MEMBER

**Prof M Lakshmi Kantam**  
Department of Chemical  
Engineering  
Institute of Chemical  
Technology



## MEMBER

**Mr R Subrahmanyam**  
Additional Secretary  
Ministry of Human Resource  
Development



## MEMBER

**Ms Ranjeev R Acharya**  
Principal Secretary to Governor  
Higher Education Department



## SENATE NOMINEE

**Prof Anjan Kumar Giri**  
HoD, Physics Department  
Indian Institute of Technology  
Hyderabad



## SENATE NOMINEE

**Prof KVL Subramaniam**  
Dean (Planning)  
Indian Institute of Technology  
Hyderabad



## EX-OFFICIO

**Prof UB Desai**  
Director  
Indian Institute of Technology  
Hyderabad



## SECRETARY

**Mr N Jayaram**  
Registrar  
Indian Institute of Technology  
Hyderabad

# A Decade @ IITH



*"Only those who will risk  
going too far can possibly  
find out how far one can go."*

– T. S. Elliot

## *From the Director*

In July 2018 IIT Hyderabad completed 10 years. It has been a decade of innovations, growth and acquiring a national and an international stature. Academically, we are at the forefront of developing new curricula and new programs. We are also at the forefront of research and development. Our faculty student ratio is best among all IITs – 1:13. We have a very strong PG program. The rough ratio among Ph.D. students, Masters students and undergraduate students is 30:25:45.

By Aug 2018, IITH will have nearly 2500 students with almost 20% women students, and 190 faculty members. IITH's sanctioned research funding will be to the tune of Rs.350 crs. from nearly 320 plus sponsored projects. In 2017-2018 IITH had 104 research projects with an outlay of 104 crs, and 62 consultancy projects with an outlay of 4.25 crs. IITH's Scopus indexed publications will stand at around 1800 with nearly 50 filed patents. IITH has strong industry collaboration – we collaborate with nearly 50 plus industries.

Our Japan collaboration is in full swing with Japanese faculty visiting us and IITH faculty visiting leading Japanese university on a regular basis. There is a strong student exchange program with Japan. Building the infrastructure with Japanese support will start this year.

IITH has MOUs with at least 50 universities globally, most of them in Japan, USA, Australia, Canada, Europe and Taiwan.

IITH has three technology incubators – iTIC, Center for Healthcare Entrepreneurship and Fabless Chip Design Incubator. Moreover, there are 6 research centers – most notable being Nano-technology, Teaching and Learning Center, and Design Innovations Center.

On the academic front IITH is innovating and scaling while maintaining quality: We have B.Tech. programs in 9 engineering departments, MSc in Physics, Chemistry and Mathematics, 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 also offers a double major. Students at IITH can enrich their knowledge by opting for a minor and/or an honors program. IITH has several other interesting minors, some of them being, minor in Design, minor in AI and Humanity, and minor in Economics. IITH is the only institution to offer a course DigiFab (3D-printing) to all first year students.

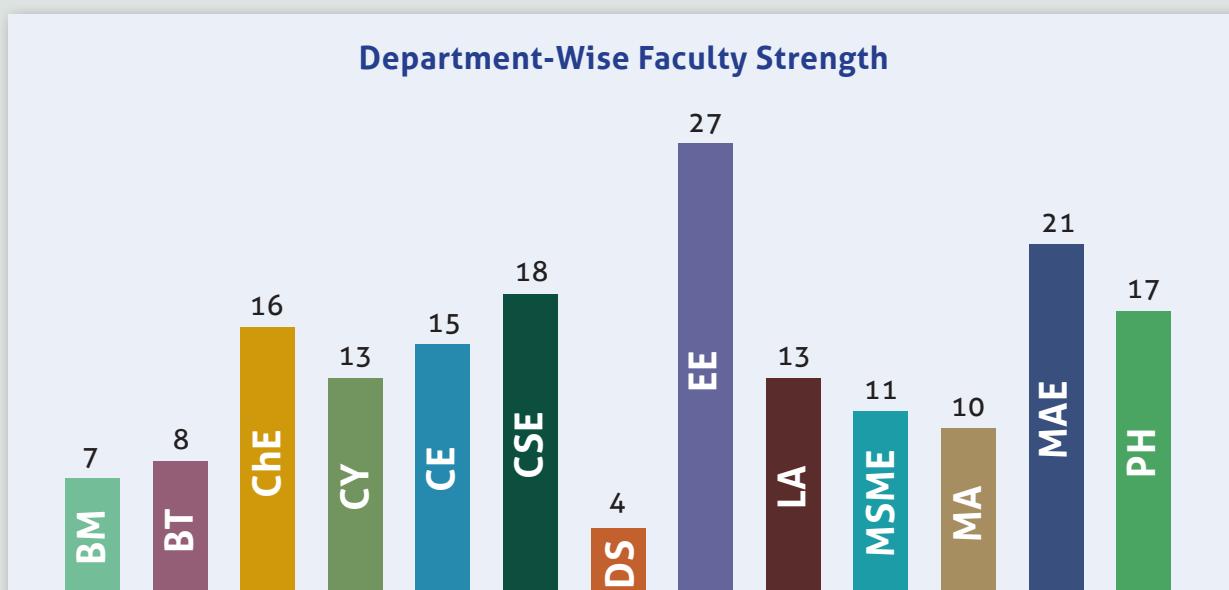
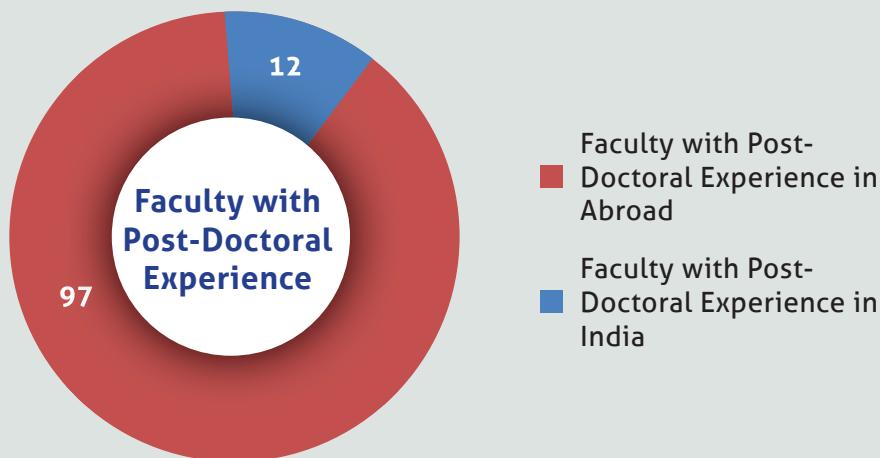
IITH is the first institute to start an executive M.Tech. program in Data Science for working professionals. IITH also has all course M.Tech. program.

IITH is creating a unique holistic educational ecosystem that offers interactive learning, a highly, flexible academic structure, cutting edge research, strong industry collaboration, and entrepreneurship. It is providing an environment wherein students and faculty are not afraid to translate their dreams to realities.

**Prof UB Desai**

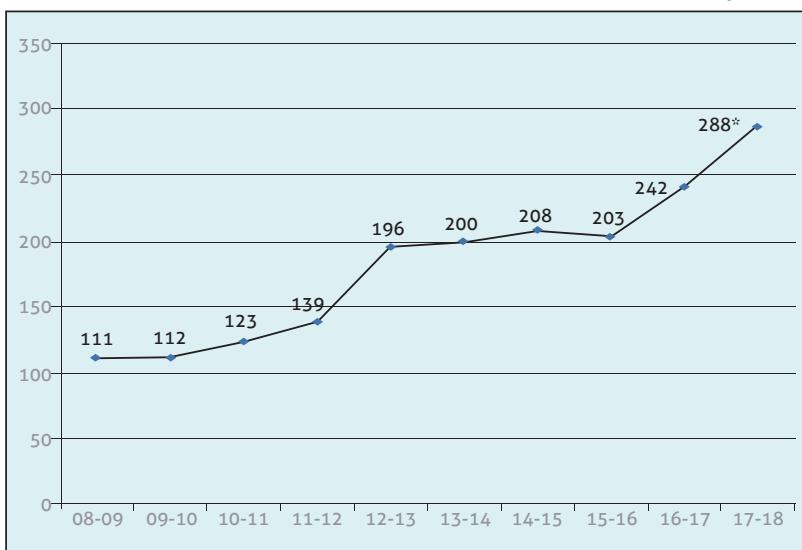
# Faculty Statistics

As on 31 March 2018, IITH is having 180 faculty members on its roll, making a student to faculty ratio of 11.5. 60% of IITH's faculty strength are assistant professors, 37% are associate professors and only 6% are full professors. 11% of the total faculty are women and the department of liberal arts leads the chart with 66% women faculty. 35% of the faculty members obtained their PhD from universities abroad and 54% possess post doctoral research experience from leading universities abroad.



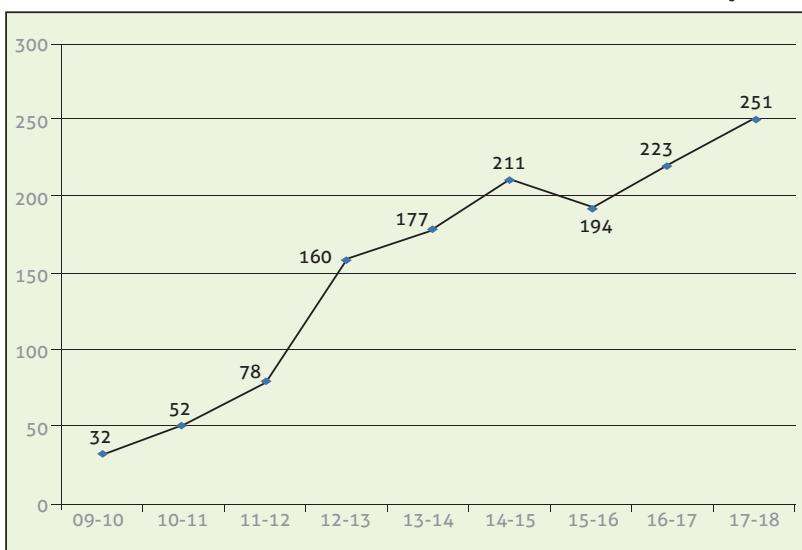
# Academics

Total number of B.Tech students admitted in each academic year

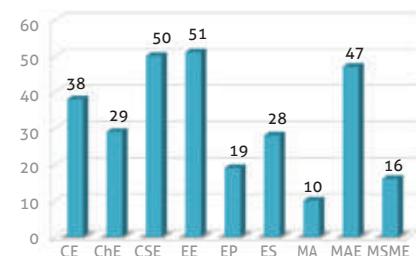


\* Two students transferred from other IITs

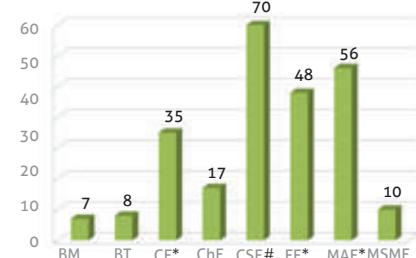
Total number of M.Tech students admitted in each academic year



Department-wise Distribution of B.Tech. Students (17-18)



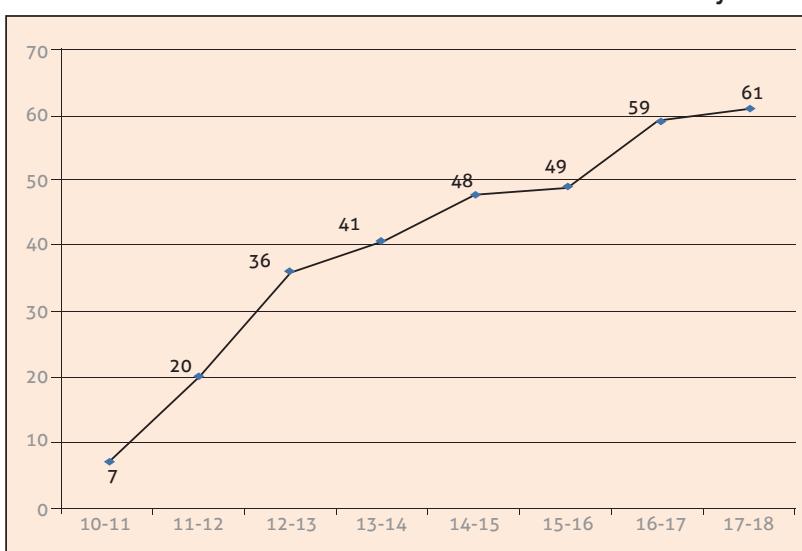
Department-wise Distribution of M.Tech. Students (17-18)



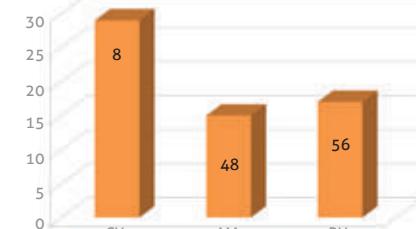
\*Including all Courses of M.Tech

#Including EMDS candidates

Total number of M.Sc students admitted in each academic year

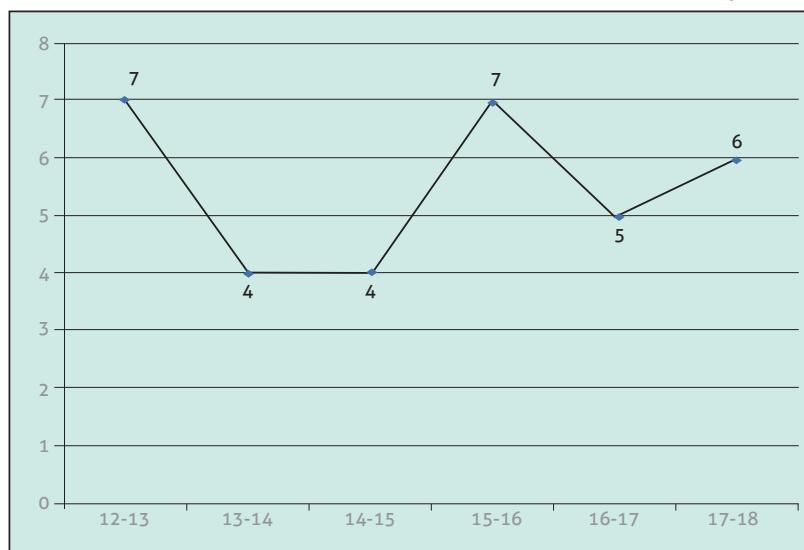


Department-wise Distribution of M.Sc. Students (17-18)



# ...Academics

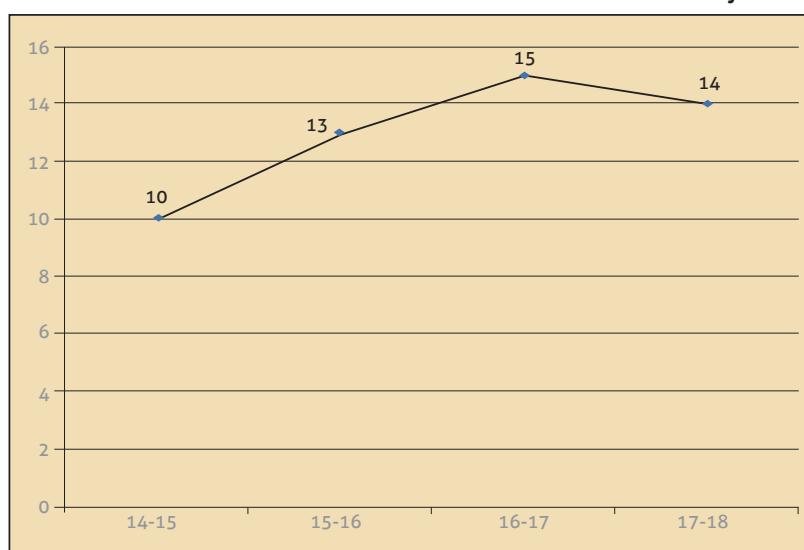
Total number of M.Phil students admitted in each academic year



**Total number of M.Phil students (17-18)**

**6**

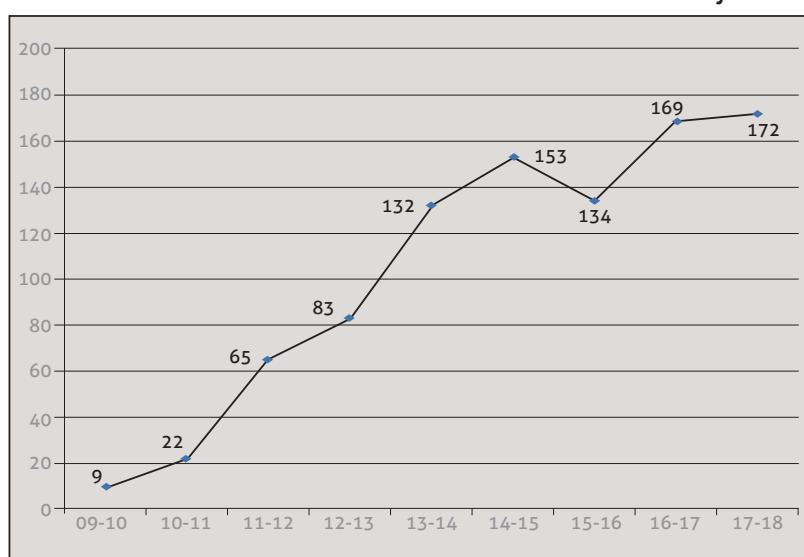
Total number of M.Des students admitted in each academic year



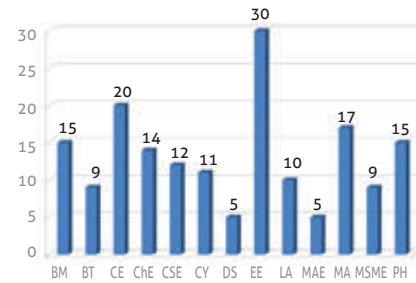
**Total number of M.Des students (17-18)**

**14**

Total number of PhD students admitted in each academic year



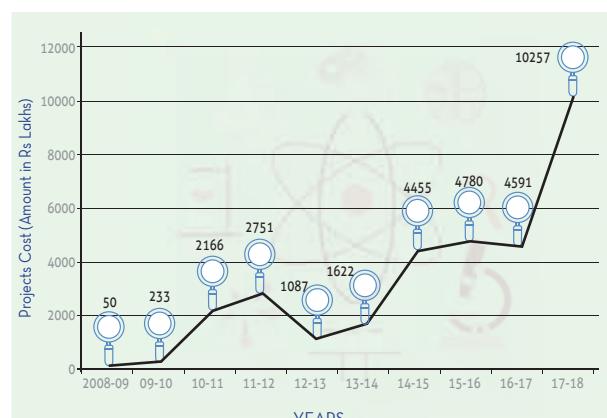
**Department-wise Distribution of PhD Students (17-18)**



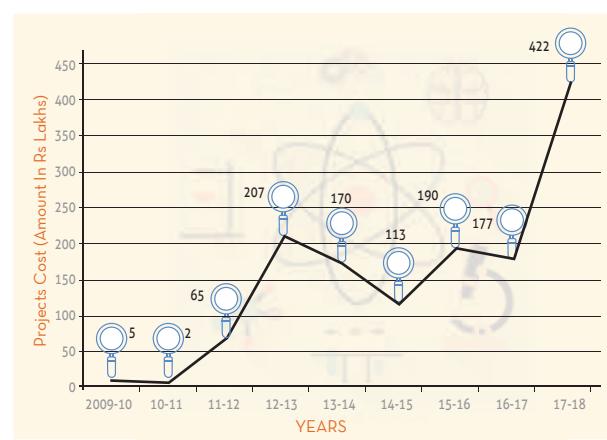
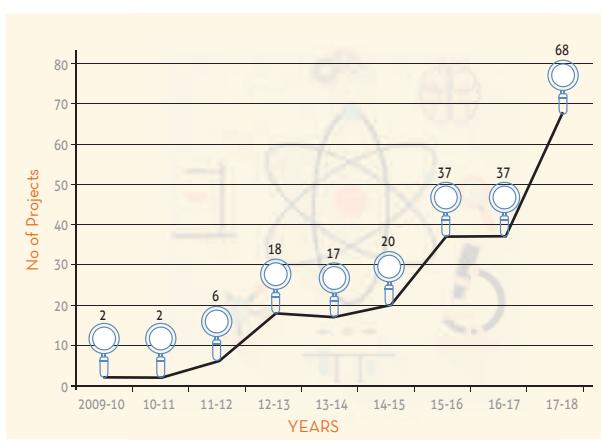
# Research & Development

The vibrant research culture in IITH is evident from the large number of publications and the sponsored projects. In the financial year 2017-18 IITH had secured more than 100 sponsored projects from national funding agencies and private companies. The trends in sponsored projects in IITH over the last 10 years are shown in the charts below.

## Research Projects



## Consultancy Projects



# Placement Report

## FY 2017-18

Placements at Indian Institute of Technology Hyderabad for the academic year **2017-18** have yielded **258** offers for **424** registered students. More than **220** companies have registered for the placement process out of which **96** companies have completed the placement process.

The top paying companies were Rakuten, Yahoo Japan and SMS Data Tech. The highest salary offered for the last season was **Rs.40 LPA** and the average salary was **Rs.11.5 LPA**. There were **eight** international offers.

A good number of students from UG, PG and M.Sc. have opted for higher education in India and abroad. Mentioned below are some of the universities that the students opted for graduate studies:

- Nagoya University, Japan
- KTH, Sweden
- TOHOKU University, Japan
- NEW YORK University
- PURDUE University, USA
- HOKKAIDO University, Japan
- University of Illinois
- Ohio State University
- Keio University
- Yokohama National University
- University of California
- University of Massachusetts, Amherst
- Columbia University
- University of Tokyo
- National University of Singapore
- University of Florida
- University Della Svizzera Italiana
- Carnegie Mellon University
- University of Dallas
- George Washington University DC
- University of Minnesota
- University of Maryland
- University of Cincinnati

## Summer Internships

At IIT Hyderabad, 3<sup>rd</sup> year B.Tech students participate actively in the summer internship program during May to July 2017-18 to a maximum of 8 weeks. This includes opportunities in both industries and research organizations. An average of more than 65% students have shown a keen interest in the internships. Some of the organizations that offer internship opportunity for our students are:

- Arcesium • DE Shaw • EA Games • Goldman Sachs • Cyient Limited • Microsoft • Philips
- Codenation • Boston Scientific • Mathworks • RADISE • Direct I • Apexplus • Innovaccer Analytics
- Tata Research Development and Design Center • Swiggy • Commvault • Arista Networks • Egnify Technologies • LASTEC DRDO • Greatfour Systems • TCS • Cisco • Mentor Graphics • AIESEC
- SMS DataTech Co. • SATVEN • EdGE Networks • Pulse Secure • Murata Electronics • Schlumberger
- Aganitha Cognitive • Investo Sure • General Motors • TheRightDoctors • ValueLabs • Transweb Educational • ChalkStreet • Edvizo Media • Vibrant Energy Holdings

# TEQIP Programs



- Faculty Induction Program - Batch I & Batch II (15-19 and 20-24 January 2018)
- Faculty Induction Program - Batch III & Batch IV (25-29 January 2018 30 January - 3 February 2018)
- Concepts & Applications of the Finite Element Method (26 February - 3 March 2018)
- Nanomaterials based low cost sensor design for application in IoT (Internet of Things) (2-6 April, 2018)



# GIAN Courses Conducted from April 2017 to March 2018

S. No.	Course Title	Course Coordinator	Expert Faculty	Course Dates
1	Programming Multicores, GPUs and Accelerators: A Principled, Quantitative Approach	Dr. Ramakrishna Upadrasta	Prof. Sanjay Rajopadhye <i>Colorado State University, USA</i>	5-9 March 2018
2	Organic Solar Cells	Dr. Swati Gupta	Prof. Barry Rand <i>Princeton University, USA</i>	8-12 January 2018
3	Open-Prototyping Methodologies for 5G Systems	Dr. Bheemarjuna Reddy Tamma	Prof. Raymond Knopp <i>Eurecom, France</i>	26-30 December 2017
4	Advances in Geotechnical Earthquake Engineering	Dr. Sireesh Saride	Prof. Ikuo Towhata <i>University of Tokyo, Japan</i>	18-29 December 2017
5	Diffusion in Social and Information Networks: Problems, Models and Machine Learning Methods	Dr. Srijith P. K.	Dr. Manuel Gomez Rodriguez <i>Max Planck Institute for Software Systems, Germany</i>	11-14 December 2017
6	Digital Chip Design for futuristic Cardio-vascular health Monitoring	Dr. Amit Acharyya	Prof. Paolo Emilio Puddu <i>Sapienza University of Rome, Italy</i>	5-10 December 2017
7	The Infrared Structure of Perturbative Gauge Theories	Dr. Anurag Tripathi	Prof. Lorenzo Magnea <i>University of Torino, Italy</i>	4-13 December 2017



# IIT Hyderabad – Japan Collaboration

IIT Hyderabad has strong collaboration with Japan. This collaboration is across a wide spectrum of activities which spans academics, research and development, campus development and exchange of students and faculty.

For campus development, Japanese architects Prof. Ohno and Prof. Kawazoe of University of Tokyo, Japan have designed six world-class structures, which includes Knowledge Centre, Sports and Cultural Complex, Research Centre Complex, Convention Centre, Guest House, and Technology Incubation Park. These will stand as a testimony to IITH-Japan collaboration. Moreover, some departments building and facilities for student amenities including student hostels, health care center will be built with Japanese support. All this will go towards making IITH Hyderabad a world leading futuristic campus.

The Friendship Program under the IITH-Japan collaboration facilitates travel of IITH faculty to leading Japanese universities and Japanese faculty from leading Japanese universities to IIT Hyderabad. The Friendship Program also facilitates exchange of students.

On the research front we have two major collaborative projects. A STAREPS project on *Smart Cities for Emerging Countries based on Sensing, Network and Big Data Analysis of Multimodal Regional Transport System*. This is a joint research project involving IIT Hyderabad, Nihon University, Nagoya Electric Works Co. Ltd, and Tokyo Institute of Technology. The main objective of the project is to create a low carbon scenario

for Indian transportation by exploiting sensing, networking, and big data analysis technologies and promoting multimodal mobility in Indian cities. Specifically, the project investigates development of technologies for collecting, processing, modelling and providing traffic information using various sensing technologies, wireless communication technologies and big data analysis.

Another project is on "Data Science-based Farming Support System for Sustainable Crop Production under Climatic Change (DSFS)". In this project, we aim to develop data science based approaches using both high-end integrated information technologies like IoT, AI and agricultural science technologies for crop modelling and omics to support high performance and sustainable agriculture in semi-arid areas of India. The Joint Laboratory (JL), which will be established in IITH during the first stage, will be composed of interdisciplinary scientists from five different graduate schools: University of Tokyo, IIT Hyderabad, IIT Bombay, Prof. Jai Shankar Telangana State Agriculture University and IIIT Hyderabad. The project is expected to create a new interdisciplinary science to solve difficult and complex issues for achieving sustainable crop production by providing efficient crop breeding, optimized crop management and efficient knowledge transfer systems/platforms.

There are three kick-start project supported by JICA for promoting joint research between IIT Hyderabad and leading Japanese Universities.



# Incubators from IITH

Incubatee Name	Promoters	Business Domain
<b>SKIoT Technologies Pvt. Ltd.</b>	<ul style="list-style-type: none"> <li>M. Sai Kiran and R. Bharath <i>Students – Electrical Engineering</i></li> </ul>	Internet of Things, Smart automation and monitoring solutions
<b>Lemon Flip Solutions Pvt. Ltd.</b>	<ul style="list-style-type: none"> <li>Dr. Asudeb Dutta <i>Faculty – Electrical Engineering</i></li> <li>Dr. Sobhan Babu <i>Faculty – Computer Science and Engineering</i></li> </ul>	VLSI RFIC design
<b>Plianto Technologies Pvt. Ltd.</b>	<ul style="list-style-type: none"> <li>Dr. Sobhan Babu <i>Faculty – Computer Science and Engineering</i></li> <li>Dr. Asudeb Dutta <i>Faculty – Electrical Engineering</i></li> </ul>	ERP Development & Data Analytics
<b>PuREnergy Pvt. Ltd.</b>	<ul style="list-style-type: none"> <li>Dr. Nishanth Dongari <i>Faculty – Mechanical Engineering</i></li> </ul>	Smart IoT Enabled Hybrid Renewable Energy Solutions
<b>Restyro Technologies Pvt. Ltd.</b>	<ul style="list-style-type: none"> <li>Dr. C.S. Sharma <i>Faculty – Chemical Engineering</i></li> <li>Dr. Mudrika Khandelwal <i>Faculty – Materials Science and Metallurgical Engineering</i></li> <li>Srinadh Mattaparthi <i>Student – Chemical Engineering</i></li> <li>Shital Yadav <i>Student – Chemical Engineering</i></li> <li>Aditya Aagare <i>Alumnus – Chemical Engineering</i></li> </ul>	Waste Management; Fabric
<b>WiSig Networks Pvt. Ltd.</b>	<ul style="list-style-type: none"> <li>Dr. Kiran Kuchi <i>Faculty – Electrical Engineering</i></li> </ul>	Wireless Communication and 5G
<b>SenseHealth Technologies Pvt. Ltd.</b>	<ul style="list-style-type: none"> <li>Dr. Amit Acharyya <i>Faculty – Electrical Engineering</i></li> <li>Dr. Asudeb Dutta <i>Faculty – Electrical Engineering</i></li> </ul>	Medical Devices
<b>GlicTech Pvt. Ltd.</b>	<ul style="list-style-type: none"> <li>Dr. Vikas Sahu <i>Alumnus – Biomedical</i></li> <li>Salman Khan <i>Alumnus – Biomedical</i></li> </ul>	Medical Database Management System
<b>OsureCare Pvt. Ltd.</b>	Dr. Vandana Sharma <i>Faculty – Physics</i>	Medical Devices

# Standard Essential Patents in 5G

**D**r Kiran Kuchi, Associate Professor, Department of Electrical Engineering, IIT Hyderabad has tabled India's first set of standards essential patents (SEP) in 5G technology before the international body that sets the standards.

The patented technology was presented at a conference held in Spokane, US on 13 April 2017 by 3GPP - Third Generation Partnership Project, the international body that defines global cellular radio standards including 2G, 3G, 4G and now 5G. The Indian delegation, led by Prof Kiran Kuchi introduced an indigenously developed wave form technology that forms the backbone feature in the uplink of 5G networks. The wave form was developed by principal inventor Prof Kuchi and co-inventor Dr J Klutto Mulleth, Chief Technologist, Centre of Excellence in Wireless Technology (CEWIT), and R&D society under IIT Madras. The research was founded by Union Ministry of Electronics and Information Technology.

Explaining the invention in detail, Dr Kuchi adds "Normally in wireless communication, content is converted to bits and transmitted in a wave form. This occupies band width which is scarce and consumes power that is precious. The invention synthesizes a constant envelope signal without band width expansion. Typical OFDM transmission currently used in 4G uplink is not a power efficient method, especially for battery operated devices. The patented technology is expected provide upto two-fold increase in cell coverage and significantly increase the battery life of 5G handsets and IoT devices as well wave form changes typically happen once in decade specially when cellular technologies to through a generational change. India bagged this opportunity and started leading the development of 5G standards in a big way.

India at present pays a significant amount of telecommunication product costs in patent royalties. Indigenous patent creation also helps in reducing the outflow of patent royalties drastically. Indian start-up companies, base stations and handset manufacturing industry standards will profit from the current 5G efforts led by Dr Kuchi in a big way.





# International Women's Day Celebrations



Women's Cell, IIT Hyderabad, celebrated the International Women's Day on 8 March 2018. Ms. Soumya Kidambi, Director, Society for Social Audit, Accountability and Transparency (SSAAT) and Ms. Shikha Goel, IPS, IG were the chief guests. Ms. Goel talked about her experiences being in the police service and about how women should be more empowered. Ms. Kidambi urged women to take more interest in social issues and provide technologically relevant solutions. They had an interactive session with the students wherein they shared their experiences of being public servants.

This was followed by cultural performances by students and staff. Poetry reading, dance, a short skit, a quiz on some remarkable Indian women, and singing made the day eventful for all. The event was addressed by director Prof. U.B. Desai who mentioned efforts made by IITH to make the campus environment more equitable for female students.

On the same day, submissions for poetry, painting and photography competitions were displayed in the ground floor of the academic block. Prizes were awarded to students based on feedback from a jury of selected faculty and senior students.

Women's Cell has created awareness among IITH community about the Sexual Harassment Act and appropriate behaviour to be expected in an educational institution.

On 28 March 2018, Women's Cell organised an interactive session with Dr. Ameeta Jaiswal-Dale, Associate Professor, Finance, University of St. Thomas, USA, on her business ventures and encouraging Women in STEM about entrepreneurship. Many female faculty and students attended this session and also spoke to her individually.





## Spicmacay @ IITH

List of events held from April 2017 to March 2018

**7 August 2017**

**Shehnai Recital**

by Sri Sanjeevani Shankar and  
Sri Ashwani Shankar

**16 August 2017**

**Veena Recital**

by Smt. Punya Srinivas

**17 August 2017**

**Sattriya Dance**

by Sri Ghanakanta Bhora  
Venue: Auditorium

**23 August 2017**

**Classical Movie screening**

**23 November 2017**

**Hindustani Vocal Recital**

by Sri Jayateerth Mevundi

**18 January 2018**

**Flute Recital**

by Pt. Hariprasad Chaurasia

**11 April 2018**

**Harikatha**

by Sri Simhachala Sastry

### Spic Macay highlight

Spicmacay IIT Hyderabad Sub-chapter hosted the legendary flautist Pandit Hariprasad Chaurasia on 18 January at its campus in Kandi. Pandit Chaurasia was accompanied by his disciple Shri Vivek Sonar on the Flute and by Pandit Shubankar Banerjee on the Tabla. The event was attended by a very large gathering comprising of students, staff and faculty of IIT Hyderabad as well as guests from the city. Prof. Kiran Seth, founder of Spicmacay, was the guest of honour.

On the request of the audience, Pandit Chaurasia began the concert with a serene and meditative alaap in raag Yaman, followed by mellifluous jor. This was followed by a bandish in jhaptal, followed by another short bandish in the same raag in teentaal, which culminated in a crescendo. The audience then requested Pandit Chaurasia to play raag pahadi. Panditji mesmerised the audience evoking in them a visual image of a playful Krishna frolicking with gopikas in vrindavan. The concert ended with a slow and deliberate bajan, vaishnava janato.

Shri Vivek Sonar followed Panditji like a shadow throughout the concert resulting in a beautiful blend of harmony and melody. The concert would not have been successful if not for the wonderful rhythmic accompaniment of Pandit Shubankar Banerjee on the tabla. At various instances during the concert, Pandit Banerjee's fingers appeared to produce sound on the tabla without making physical contact.

The audience got a taste of Panditji's wonderful sense of humour during a short Q&A session after the concert. When he was asked as to what goes through his mind when he closes his eyes and plays the flute, Panditji's pithy response "I don't know/remember" gave the audience a glimpse of his years of training, dedication and commitment to his art.

# BIOMEDICAL ENGINEERING

The Biomedical Engineering Department (BME) at IIT Hyderabad is the place where boundaries between engineering and science disciplines fade in order to focus on research and education targeted for ongoing and future technology. 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. BME has made substantial investments in strengthening the core research facilities and course curriculum. Faculty members of the department have several external research projects including IMPRINT. The BME minor program of 12 credits is designed for undergraduates to gain interdisciplinary knowledge in areas of Bioengineering. Faculty in the department of BME undertake research in broad spectrum of areas related to Biomedical Engineering/Bioengineering such as Biophotonics, Lab on a Chip Biosensors, Biophysics, Biomechanics, Neuroscience, Tissue Engineering, 3D Bioprinting and Nanomedicine. The department will continue to leverage its core strengths in emerging as one of the leading centers of excellence in Bioengineering in the country.



## FACULTY



**Renu John**

Ph.D – IIT Delhi

*Associate Professor & HoD*

*Research Areas:* Biomedical optical imaging, quantitative phase microscopy, biosensors



**Subha Narayan Rath**

Ph.D – NUS, Singapore

*Associate Professor*

*Research Areas:* Biomimicking, 3D bio-printing, angiogenesis, osteogenesis, nature-inspired biomaterials, decellularized tissues, organ-on-chip, cell therapy



**Harikrishnan Narayanan Unni**

Ph.D – NTU, Singapore

*Assistant Professor*

*Research Areas:* Lab on Chip Microfluidics and Nanofluidics, Biophysics, Biomechanics



**Jyotsnendu Giri**

Ph.D – IIT Bombay

*Assistant Professor*

*Research Areas:* Nanomedicine, Regenerative medicine, Drug delivery, Therapeutics and diagnostics



**Mohan Raghavan**

Ph.D – IISc., Bangalore

*Assistant Professor*

*Research Areas:* Computational Neuroscience, Motor system, Spinal cord, Bionics, Assistive devices, Rehabilitation



**Falguni Pati**

Ph.D – IIT Kharagpur

*Assistant Professor*

*Research Areas:* Biomaterials, Tissue Engineering, 3D Bioprinting, In Vitro Tissue/Organ Models



**Aravind Kumar Rengan**

Ph.D – IIT Bombay

*Assistant Professor*

*Research Areas:* Nanomedicine, Bio-Nanotechnology, Photothermal Therapy, Nanotoxicology, Cancer Theranostics

## Patents Filed

Renu John and Praveen Kumar Poola, *Apparatus and Methods for Label-Free Morphological Evaluation of Human Sperm*, 6 April 2018, Indian Provisional Patent Application No.: 201841013261.

Shibu Chameettachal and Falguni Pati, *Decellularized Corneal Matrix Basedhydrogel, Bioink Formulation and Methods Thereof*, 17 March 2018, TEMP/E-1/10328/2018-CHE.

Mohan Raghavan and Madhav Vinod, *Neuromechanical Simulator System*, January 2018, Indian Provisional Patent Application No.: 201842000689.

Jyotsnendu Giri, *Platelet-Rich Plasma-Based Formulations for Treating Chronic Wounds and A Method Thereof*, 25 August 2017, Patent Application No.: 201741030200.

Jyotsnendu Giri, Poulomi Polly, *Biopolymer-Based Nanoparticles and A Method of Preparing the Same*; 7 August 2017, Patent Application No.: 20171027986.

Jyotsnendu Giri, Ruby Singh, *A Device for Fabricating Micro and Nano Fibers and Particles*, 20 May 2017, Patent Application No.: 201741017782.

Jyotsnendu Giri, Sunil Kumar Yadava, *Silk FibroinBasedLipidNanoscapsuleandAMethod of Manufacturing the Same*, 4 May 2017, Patent Application No.: 201741015739.

Jyotsnendu Giri, Sunil Kumar Yadava, *A Method of Producing Lipid-Based Nanocapsules without Temperature Cycling and the Product Thereof*, 7 April 2017, patentno-201741012592.

## Book & Book Chapters

Prashanth Panta, Chih-Wei-Lu, Piyush Kumar, Tuan-Shu Ho, Sheng-Lung Huang, Pawan Kumar, C. Murali Krishna, K. Divakar Rao, and Renu John, *Optical Coherence Tomography: Emerging in Vivo Optical Biopsy Technique for Oral Cancer*, P. Panta (ed.), Oral Cancer

Detection, Springer International (2018), 10.1007/978-3-319-61255-3\_11

Falguni Pati and Dong-Woo Cho, *Bioprinting of 3D Tissue Models Using Decellularized Extracellular Matrix Bioink* (2017), 3-D Cell Culture: Methods and Protocols, Zuzana Koledova (Editor), Springer, Clifton, NJ. ISBN 978-1-4939-7021-6

Shibu Chameettachal and Falguni Pati, *3D Printed in Vitro Disease Models, 3D Printing in Medicine*, Deepak Kalaskar (Editor), Woodhead Publishing, UK, 2017, 115-138, ISBN: 9780081007266.

## Publications (in peer reviewed journals)

M.A. Ali, N. Singh, S. Srivasta, V.V. Agrawal, R. John, B.D. Malhotra, and M. Onoda, A Study on Heterogeneous Electron Charge-Transfer Processes at Redox-Active Chitosan Modified Carbon Nanotubes Film-Coated Electrodes Using AC Impedance technique, EFM 2018 (1), 27-32.

S. Sankar, M. Kakunuri, D.S. Eswaramoorthy, C.S. Sharma, S.N. Rath SN, Effect of patterned electrospun hierarchical structures on alignment and differentiation of mesenchymal stem cells: Biomimicking bone. Journal of Tissue Engineering and Regenerative Medicine, 12(4), 2018, 1-12.

D.E. Sindhuja, Sundeep Bethapudi, Shahdab I. Almelkar, and Subha N. Rath, Regional Differentiation of Adipose-Derived Stem Cells Proves the Role of Constant Electric Potential in Enhancing Bone Healing, Journal of Medical and Biological Engineering, 2018, 1-12.

S.P. Singh, S.B. Alvi, D. Pemmaraju, A.D. Singh, S.V. Manda, R. Srivastava, and A.K. Rengan, NIR triggered liposome gold nanoparticles entrapping curcumin as in situ adjuvant for photothermal treatment of skin cancer, Int J Biol Macromol, 110, 2018, 375–382.

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synergistic approach for cancer theranostics, *Int J Biol Macromol* 110, 2018, 383–391.

A.K. Rengan, A. Shanavas, D. Chauhan, L. George, M. Vats, and N.K. Samra, et al. Glycol Chitosan assisted in situ Reduction of Gold on Polymeric Template for Anti-cancer Theranostics, *Int J Biol Macromol* 110, 2018, 392-398.

S.P. Singh, P. Yadav, A.K. Rengan, A. Shanavas, and R. Srivastava, Gold laced biomacromolecules for theranostics application, *Int J Biol Macromol* 110, 2018, 39-53.

P.K. Poola and Renu John, Label-free nanoscale characterization of red blood cell structure and dynamics using single-shot transport of intensity equation, *Journal of Biomedical Optics*, 22(10), 2017, 106001.

N. Singh, M.A. Ali, P. Rai, A. Sharma, B.D. Malhotra, and Renu John, Microporous Nanocomposite Enabled Microfluidic Biochip for Cardiac Biomarker DetectionACS applied materials & interfaces, 9(39), 2017, 33576-33588.

V.P. Pandiyan, K. Khare, and Renu John, High resolution near on-axis digital holography using constrained optimization approach with faster convergence, *Optical Engineering* 56(9), 2017, 093103.

Md Azahar Ali, Chandan Singh, Saurabh Srivastava, Prasad Admane, Ved V. Agrawal, Gajjala Sumana, Renu John, Amulya Panda, Liang Dong, and Bansi D. Malhotra, Graphene oxide–metal nanocomposites for cancer biomarker detection, *RSC Advances*, 7(57), 2017, 35982-35991

Sharanya Sankar, Chandra S. Sharma, Subha N. Rath, and Seeram Ramakrishna, Electrospun fibers for recruitment and differentiation of stem cells in regenerative medicine, *Biotechnology Journal*, 12(12), 2017.

Bapi Sarker, Tobias Zehnder, Subha Narayan Rath, Raymund E Horch, Ulrich Kneser, Rainer Detsch, and Aldo R. Boccaccini, Oxidized Alginate-Gelatin Hydrogel: A Favorable Matrix for Growth and Osteogenic Differentiation of Adipose-Derived Stem Cells in 3D, *ACS Biomaterials Science & Engineering*, 3(8), 2017, 1730.

## Publications (in peer reviewed conferences)

Tony Thomas and Harikrishnan Narayanan Unni, LED based Optowetting Platforms for Micromixing, *SPIE Microfluidic, BioMEMS and Medical Microsystems*, 10491, 2018, 10.1117/12.2290107.

R. Sivakumar, V. Veena, and Renu John, A Curvature Based Approach for the Automated Screening of Retinopathy of Prematurity in Preterm Infants, *13<sup>th</sup> International Conference on Signal-Image Technology & Internet-Based Systems (SITIS) 2017*, 503-508, 10.1109/SITIS.2017.88.

Renu John and J. Sivaraman, Effects of Sinus Rhythm on Atrial ECG Components Using Modified Limb Lead System, *Signal Processing, Computing and Control (ISPCC) 4<sup>th</sup> International Conference, 2017*, [10.1109/ISPCC.2017.8269735](https://doi.org/10.1109/ISPCC.2017.8269735).

## Funded Research Projects 2017-18

Renu John, *Development of OCT Platforms for Clinical Applications*, DST TDP Program, 2017, Rs. 95.0 Lakhs.

Aravind Kumar Rengan, *Affordable Detection Kit for Cervical Cancer*, BIRAC SRISTI Grant, May 2017, Rs. 15.0 Lakhs.

Aravind Kumar Rengan, *Affordable and Cost Effective Cancer Diagnosis / Treatment using Gold Based Biodegradable Nanoparticles*, MHRD – IMPRINT Grant, August 2017, Rs. 154.0 Lakhs.

Renu John, *Low Coherence Optical Microscopy for Microfluidics Applications*, DST SERB, 2018, Rs. 34.0 Lakhs.

## Talks Given in National / International Conferences

Aravind Kumar Rengan, *Metallic Nanomedicine: A Novel Prospectus in Cancer*

*Theranostics*, Indo-UK Kanpur Conference, 8 November 2017.

Aravind Kumar Rengan, *In Vitro & In Vivo Analysis of Bio-Degradable and Disintegrable Nanosystems for cancer theranostics*, Indo-UK IISER Kolkata Conference, 15 December 2017.

Aravind Kumar Rengan, *Bio-Nanomaterials: Choosing the Right Nanosystem for Drug Delivery and Theranostic Application!* Thiagarajar Engineering College, Guest Lecture – AICTE RAMS2017, 18 December, 2017.

Harikrishnan Narayanan Unni, *Paper based Microfluidic Devices (muPADs)*, *SELECTBIO Microfluidics and Lab on Chip Conference*, Mumbai, 17-18 January 2018.

Falguni Pati, *Biomimetic 3D Tissue Printing: A Game Changer for Functional Tissue/Organ Fabrication*, Bio-Interaction-2018: National Seminar on Translational Applications, Hyderabad, 2-3 February 2018.

Falguni Pati, *Biomimetic 3D Tissue/Organ Printing*, in India-Portugal Bilateral workshop on 'Tissue Engineering', IIT Kharagpur, 22-24 February 2018.

Aravind Kumar Rengan, *Nanomaterials as Drugs* – CCMB – CSIR Training Program, 28 February 2018.

Renu John, Low Coherence Optical Microscopy: Clinical Applications, National Photonics Symposium (NPS-2018), 27 February - 1 March 2018.

Aravind Kumar Rengan, *Switching on Light to*

*induce Darkness within Cancer cells* – Golden Jubilee Seminar, University of Calicut, 16 March 2018.

Renu John, *Low Coherence Optical Imaging: Clinical Applications*, International Symposium on Advances in Biomedical Optics and Applications, Manipal Institute of Technology School of Life Sciences, 22 March 2018.

## Workshops / Symposia

International conference on digital fabrication, Hyderabad, 16-17 March 2018 (Co-organization).

## Awards / Recognitions

Shibu Chameettachal (PhD student), GYTI 2018 award.

Aravind Kumar Rengan, Indian National Science Academy (INSA) - Young Scientist Medal 2017.

Tejaswini Appidi, Innovation Scholar In Residence Program for young innovators for Development of affordable cervical cancer detection kit – presented in Rashtrapathi Bhavan, New Delhi March 2018.

## RESEARCH HIGHLIGHT

The research focus of Biomedical Engineering department spans on to diversified areas in translational medicine and healthcare. The research labs in the department are very active in areas of Biophotonics, Microfluidics based Lab on Chip sensors, Stem Cell engineering and Nanomedicine. Following are some of the research highlights from the department:

The focus of **Biophotonics Lab** is the development of imaging techniques for studying biological cells and macromolecules. Different optical techniques such as phase contrast microscopy, digital holography etc. are investigated in detail for development of novel bioimaging applications. Phase image of sperm cells (to nanoscale resolution) are depicted in Figure 1. This research has serious implications in guiding the success rate of In Vitro Fertilization (IVF) treatment.

The focus of **Biomicrofluidics Lab** (BML) is the development of chip scale analytic devices for biological/biomedical applications. Recently, the lab has developed paper based microfluidic platforms for diagnosis of Osteoporosis markers (Figure 2). In addition, an active area of BML is the design and development of droplet microfluidic platforms for biological micromixing (Figure 3 – ITO electrodes patterned on Glass wafer).

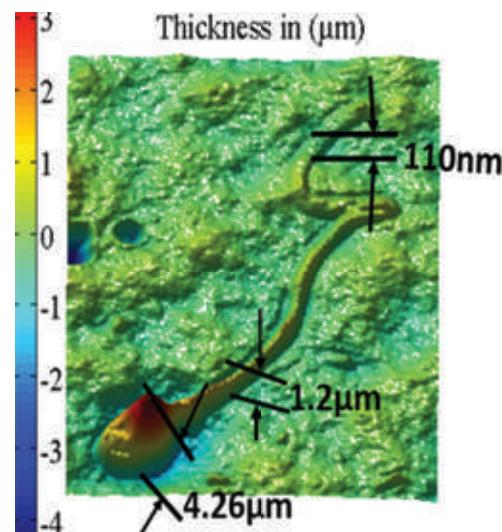


Figure 1

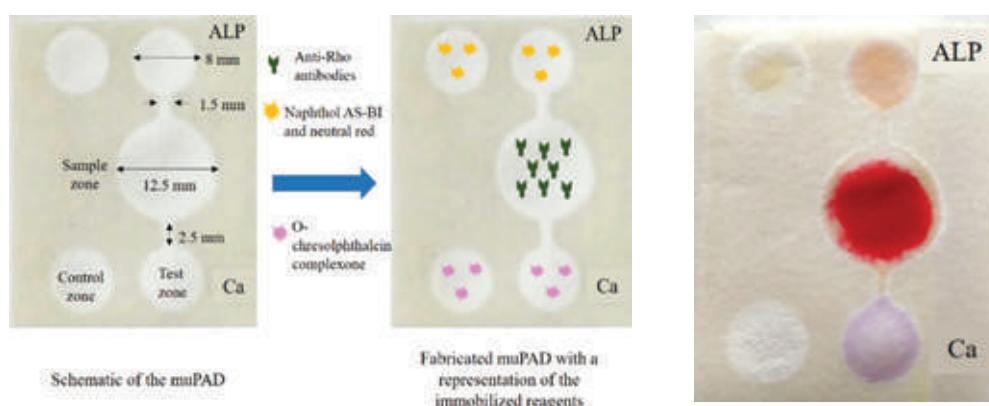


Figure 2 (MicroTAS, 2017)

## ...RESEARCH HIGHLIGHT

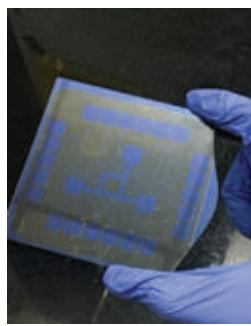


Figure 3

**Biofabrication Lab** is dedicated to developing 3D printed materials/scaffolds for biomedical/biological applications. The lab has developed a novel cornea matrix (Figure 4) hydrogel, useful in ophthalmological applications.

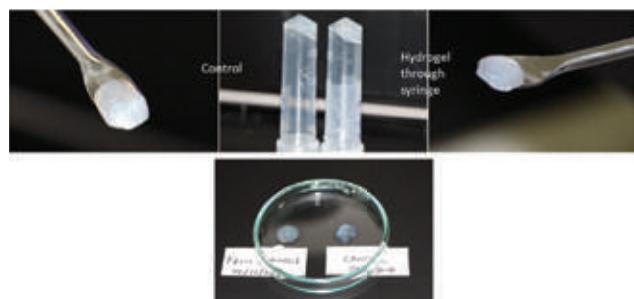


Figure 4

**Computational Neuroscience lab** is very active in developing computational models for neural firing patterns in brain and spinal cord in an effort to understand and solve neurobiological problems. People in the lab are actively engaged in clinical collaborations for validation of the developed models. A screenshot from NEUROiD (Neuro Motor integration and design environment) created by Spine Labs is presented in Figure 5. The screenshot shows a freeze of a Spinal cord at L4/L5 with neurons embedded in anatomical locations, recording and stimulating electrodes in red and blue, cellular electrophysiology and a representation of lower limb mechanics in response to stimulation.

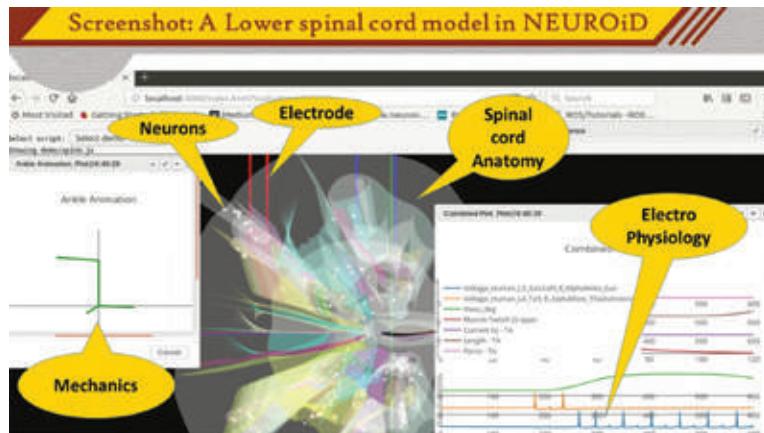


Figure 5

# BIOTECHNOLOGY

The faculty members in the department published 14 research and review articles in leading international journals like Nucleic acid research, scientific reports (Nature publications), Journals of biological chemistry, Journal of molecular biology etc. Eight M.Tech in Medical Biotechnology degrees were awarded in the department. The faculty members in the department received more than 1.26 crore in research funding from various national funding agencies. PhD students Ponoop Prasad Patro, Abhishek Kumar, and Narendra Kolimi and Dr. Thenmalarchelvi Rathinavelan has been awarded the BIRAC GYTI Appreciation, Honey Bee Network award. Our PhD student Narendra Kolimi was the runner-up 1 in biology category for Dr.KV Rao Research Award, Hyderabad, India (Advisor: Thenmalarchelvi Rathinavelan). Our MTech students got: placed in Cognizant Technologies and Akash Institute, internship in Biocon and PhD positions in Japan Universities, NCBS (India) and NUS (Singapore).



## FACULTY



### Thenmalarchelvi Rathinavelan

Ph.D – University of Madras

*Assistant Professor & HoD*

*Research Areas:* Computational Biology, Biophysics, NMR



### Basant Kumar Patel

Ph.D – Banaras Hindu University

*Associate Professor*

*Research Areas:* Protein Misfolding in Diseases



### Anindya Roy

Ph.D – IISc, Bangalore

*Associate Professor*

*Research Areas:* Cancer Biology, DNA repair



### Anamika Bhargava

Ph.D – Innsbruck Medical University, Austria

*Assistant Professor*

*Research Areas:* Voltage-gated calcium channels, electrophysiology, channelopathies, structure-function relationship, imaging of ion channels, zebrafish animal model



### Rajakumara Eerappa

Ph.D – CCMB, Hyderabad

*Assistant Professor*

*Research Areas:* Structural Biology, X-ray crystallography, Biophysics, Epigenetic, DNA repair, Protein/enzyme engineering for Pharmaceutical Industry or for Agriculture applications, and Structure based drug design



### Ashish Misra

Ph.D – IISc, Bangalore

*Assistant Professor*

*Research Areas:* RNA Biology, Cancer Genomics and Biomarker discovery, Neurodegenerative diseases, Epitranscriptomics



### N K Raghavendra

Ph.D – IISc, Bangalore

*Assistant Professor*

*Research Areas:* DNA, Protein, interaction, HIV, Integrase, human, p75



### Sandeep K Singh

Ph.D – Virginia Commonwealth University, USA

*Assistant Professor*

*Research Areas:* Cell and Molecular Neuroscience, Neuron-glia interaction, cell biology of glioma

## Patents Filed

Anindya Roy as inventor in collaboration with AIIMS, Composition, *method and kit for rapid risk stratification of traumatic brain injury*, October 2017, Indian Patent Application No.: PCT/201741042270.

## Book & Book Chapters

Alexey V. Glukhov, Anamika Bhargava and Julia Gorelik, Distribution and Regulation of L-type  $\text{Ca}^{2+}$  channels in cardiomyocyte microdomains, Microdomains in the cardiovascular system, *Cardiac and vascular biology*, Springer international publishing, August 2017 ISSN: 2509-7830.

A. Misra and M.R. Green, Fluorescence reporter-based genome-wide RNA interference screening to identify alternative splicing regulators, *Methods in Molecular Biology*, 2017, 1507:1-12.

## Publications (in peer reviewed journals)

N. Kolimi, Y. Ajjugal and T. Rathinavelan, A B-Z junction induced by an A...A mismatch in GAC repeats in the gene for cartilage oligomeric matrix protein promotes binding with the hZ $\alpha$ <sub>ADAR1</sub> protein, *J. Biol. Chem.*, 292, 2017, 18732, [10.1074/jbc.M117.796235](https://doi.org/10.1074/jbc.M117.796235).

L.P.P. Patro, A. Kumar, N. Kolimi, and T. Rathinavelan, 3D-NuS: A Web Server for Automated Modeling and Visualization of non-canonical 3-Dimensional Nucleic Acid Structures, *J. Mol. Biol.*, 429, 2017, 2438-2448.

A. George, and N.K. Raghavendra, L368F/V408F double mutant of IBD of LEDGF/p75 retains interaction with M178I mutant of HIV-1 integrase, *Biochem Biophys Res Commun.*, 490, 2017, 271-275.

S.K. Park, J.Y. Hong, F. Arslan, V. Kanneganti, Patel Basant, A. Tietsort, Tank EMH, X. Li, S.J. Barmada, and S.W. Lieberman, Overexpression of the essential Sis1 chaperone reduces TDP-43 effects on toxicity and proteolysis, *PLOS Genetics*, 13(5), 22 May 2017, e1006805, [10.1371/journal.pgen.1006805](https://doi.org/10.1371/journal.pgen.1006805) PMID: 28531192.

S. Schobesberger, P. Wright, S. Tokar, A. Bhargava, C. Mansfield, A.V. Glukhov, C. Poulet, A. Buzuk, A. Monszpart, M. Sikkel, S.E. Harding, V.O. Nikolaev, A.R. Lyon, and J. Gorelik, T-tubule remodelling disturbs localized 2-adrenergic signalling in rat ventricular myocytes during the progression of heart failure, *Cardiovasc Res.*, 113(7), 1 June 2017, 770-782.

V. Bharathi, A. Girdhar, and Patel Basant, A Protocol of Using White/Red Color Assay to Measure Amyloid-induced Oxidative Stress in *Saccharomyces cerevisiae*, *BioProtocols*, 7(15), 5 August 2017, 10.21769/BioProtoc.2440.

S. Abhishek, M.A. Nivya, N.K. Nakarakanti, W. Deeksha, S. Khosla, and E. Rajakumara, Biochemical and dynamic basis for combinatorial recognition of H<sub>3</sub>R<sub>2</sub>K<sub>9</sub>me<sub>2</sub>

by dual domains of UHRF1, *Biochimie*, [10.1016/j.biochi.2018.04.010](https://doi.org/10.1016/j.biochi.2018.04.010).

M. Satish, M.A. Nivya, S. Abhishek, N.K. Nakarakanti, D. Shivani, V.M. Vani, and E. Rajakumara, Computational characterization of substrate and product specificities, and functionality of SAM binding pocket in histone lysine methyltransferases from *Arabidopsis*, *Rice and Maize, Proteins: Structure, Function, and Bioinformatics*, 86(1), 2018, 21-34 [10.1002/prot.25399](https://doi.org/10.1002/prot.25399).

A. George, A. Gopi Krishna Reddy, G. Satyanarayana, and N.K. Raghavendra, 1,2,3,4-Tetrahydroisoquinolines as inhibitors of HIV-1 integrase and human LEDGF/p75 interaction, *Chem Biol Drug Des.*, 2018, 10.1111/cbdd.13175.

A. Deepa, K. Naveena, and R. Anindya, DNA repair activity of Fe(II)/2OG-dependent dioxygenases affected by low iron level in *Saccharomyces cerevisiae*, *FEMS Yeast Research* 18(2), 2018, 1-8.

R. Nigam and R. Anindya, Escherichia coli single-stranded DNA binding protein SSB promotes AlkB-mediated DNA dealkylation repair, *Biochemical and Biophysical Research Communications*, 496(2), 2018, 274-79.

N. Kumari, H. Gaur, and A. Bhargava, Cardiac voltage gated calcium channels and their regulation by - adrenergic signalling, *Life Sci.*, 194, 1 February 2018, 139-149.

H. Gaur, N. Pullaguri, S. Nema, S. Purushothaman, Y. Bhargava, and Bhargava A. Zebra Pace, An Open-Source Method for Cardiac-Rhythm Estimation in Untethered Zebrafish Larvae, *Zebrafish*, 13 March 2018, [10.1089/zeb.2017.1545](https://doi.org/10.1089/zeb.2017.1545).

M. Verma, A. Girdhar, Patel Basant, N.K. Ganguly, R. Kukreti, and Taneja Vibha, Q-Rich Yeast Prion [PSI<sub>+</sub>] Accelerates Aggregation of Transthyretin, a Non-Q-Rich Human Protein, *Front Mol Neurosci*, 13 March 2018, 11-75, [10.3389/fnmol.2018.00075](https://doi.org/10.3389/fnmol.2018.00075). eCollection 2018, PMID: 29593496.

## Funded Research Projects 2017-18

Anindya Roy, *Molecular Mechanism underlying DNA alkylation repair*, SERB, January 2018, Rs. 45.3 Lakhs.

Sandeep K Singh, *Development of a novel approach, M-TRAP (Multi-tagged Translating Ribosome Affinity Purification), to profile cell-cell interactions in central nervous system cells by secreted glycoprotein YKL-40 (CHI<sub>3</sub>L<sub>1</sub>: Chitinase 3-like 1)*, SERB-DST, 8 March 2018, Rs. 30.0 Lakhs.

Basant Kumar Patel, *Investigation of mechanism of mitochondrial localization & mitotoxicity of C-terminal fragments of TDP-43 implicated in Amyotrophic Lateral Sclerosis (ALS) and search for effective small molecule rescuers against TDP-43-induced mitotoxicity*, DST-SERB, 22 March 2018, Rs. 51.28 Lakhs.

Dr. Sudipta Mondal, Department of Biotechnology and Microbiology, Tel Aviv University, Israel, *Minimalistic Peptide Self-Assembly as A Model for Protein Aggregation and A Novel Nanobiotechnology Paradigm*, 2 February 2018.

Dr. Anirban Polley, Department of Chemical Engineering, Columbia University, New York, USA, *Multiscale Modeling to Unravel Cellular and Subcellular Process in Biological Systems*, 6 February 2018.

Dr. Renu Mohan, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, Kerala, *Microtubules and Cancer*, 7 February 2018.

Dr. Tusar T. Saha, Department of Entomology, University of California, *Juvenile Hormone Signaling in the Dengue Fever Mosquito, Aedes aegypti*, 9 February 2018.

Dr. Amar Singh, Schulze Diabetes Institute, Department of Surgery University of Minnesota, Minneapolis, MN 55455, USA, *T and B Cell Signatures in Preclinical Islet Transplant Studies in Non-human Primate Preclinical Models*, 28 March 2018.

## Talks Given in National / International Conferences

Ashish Misra, Merav Socolovsky and Michael R. Green, *PTBP3-Regulated Splicing Network Is Critical For Self-Renewal of Erythroid Progenitor Cells*, 9<sup>th</sup> RNA Group Meeting, Banaras Hindu University, 26-28 October 2017.

Thenmalarchelvi Rathinavelan, *Accelerating Biology 2018, Digitizing Life*, CDAC-Pune, 9-11 January 2018.

## Seminars Conducted

Dr. Sanjay Premi, Department of Therapeutic Radiology, Yale University School of Medicine, USA, *UV-signature DNA Damage without UV and its Implications in Skin Cancer*, 7 September 2017.

Dr. Amit Jean Gupta, Support Application Specialist, NanoTemper Technologies, Germany, *Biomolecular Interaction Analytics Using MicroScale Thermophoresis*, 17 January 2018.

Dr. Suchi Goel, Department of Biology, IISER Tirupati, *Multigene Families are Central to Severe Malaria*, 23 January 2018.

Dr. Dhermendra K. Tiwari, Ramanujan DST-Fellow & Ramalingaswami DBT-Fellow Goa University, Goa, India, *Development of Fast Photoswitchable Fluorescent Protein For Live Cell Superresolution Imaging And Nano-Probe*, 31 January 2018.

## Workshops / Symposiums

Thenmalarchelvi Rathinavelan, *National Level Workshop on Essential programming for life sciences*, 12-13 July 2017.

Organized workshop on *Molecular Docking, Virtual Screening & Biologics Discovery*, 28-29 November 2017.

National Science Day In-house symposium, 28 February 2018.

## Awards / Recognitions

Ponoop Prasad Patro, Abhishek Kumar, Narendar Kolimi and Thenmalarchelvi Rathinavelan, *BIRAC GYTI Appreciation, Honey Bee Network*.

Narendar Kolimi, *Dr. KV Rao Research Award (Runner-up 1, Biology)*, Hyderabad, India (Advisor: Thenmalarchelvi Rathinavelan).

# CHEMICAL ENGINEERING

The Department of Chemical Engineering, IITH houses 16 faculty members and 177 students of which 55 are PhD students indicating our focus on research. The department's research focus falls into the following broad areas: Energy storage and conversion, Fluid Mechanics, Mineral Processing, Catalysis, Molecular & Cellular Bioengineering, Biochemical and Bioprocess Technology and Drug Delivery, Polymers, Nanosciences & Nanotechnology and Process / Stochastic Control. The faculty actively seek research funding in all areas of research. We have state-of-the-art infrastructure and research facilities that cover both theoretical and experimental aspects of all core research areas. The B.Tech program encompasses a wide variety of courses which prepares a student for both industry as well as research. Despite being a young department, 75% of the class students are actively participating in internship program. In addition, 50% of the students seek jobs, 30% of them seek a graduate program and the rest of them go on for other opportunities.



## FACULTY



**Narasimha Mangadoddy**  
Ph.D – University of Queensland - Australia  
*Associate Professor & HoD*  
*Research Areas:* Mineral Processing, CFD, Multiphase Flows Fluidization, Particulate Technology



**Kirti Chandra Sahu**  
Ph.D – JNCASR, Bangalore  
*Professor*  
*Research Areas:* Cloud and raindrops, Bubbles, Multiphase flows, Linear Stability Analysis



**Vinod Janardhanan**  
Ph.D – KIT, Germany  
*Associate Professor*  
*Research Areas:* Fuel Cells, Heterogeneous Catalysis



**Sunil K. Maity**  
Ph.D – IIT Kharagpur  
*Associate Professor*  
*Research Areas:* Catalysis, Reaction Engineering, and Biorefinery



**Saptarshi Majumdar**  
Ph.D – IIT Kharagpur  
*Associate Professor*  
*Research Areas:* Catalysis, Reaction Engineering, and Biorefinery



**Parag D. Pawar**  
Ph.D – Johns Hopkins, USA  
*Assistant Professor*  
*Research Areas:* Biophysics, Polymicrobial Biofilms, Intercellular Interactions, Bacterial Infections



**Chandra Shekhar Sharma**  
Ph.D – IIT Kanpur  
*Associate Professor*  
*Research Areas:* Hierarchical Nanostructured Carbon Materials, Carbon-MEMS, Electrospun Polymer and Carbon Nanofibers, Nature Inspired Functional Surfaces



**Anand Mohan**  
Ph.D – Texas A&M, USA  
*Associate Professor*  
*Research Areas:* Cardiovascular Mechanics, Complex Fluid Rheology



**Debaprasad Shee**  
Ph.D – IIT Kanpur  
*Associate Professor*  
*Research Areas:* Metal and metal oxide catalysts, Fuels and chemicals from renewables, Multifunctional catalytic material



**Kishalay Mitra**  
Ph.D – IIT Bombay  
*Associate Professor*  
*Research Areas:* Optimal control under uncertainty, Bio-energy supply chain design, Surrogate multi-objective optimization, Data science in biology, Battery management system, Wind farm micro-siting / control



**Phanindra Varma Jampana**  
Ph.D – University of Alberta, Canada  
*Assistant Professor*  
*Research Areas:* System Identification, Compressed Sensing, Fuel Cell Systems



**Lopamudra Giri**  
Ph.D – University of Iowa, USA  
*Assistant Professor*  
*Research Areas:* Bioimaging, Medical/Biological data analysis, Systems biology

**Devarai Santhosh Kumar**

Ph.D – IIT Madras

*Assistant Professor*

*Research Areas:* Biochemical and Bioprocess development of therapeutic enzymes, Industrial fermentation Engineering

**Balaji Iyer Vaidyanathan****Shantha**

Ph.D – IIT Bombay

*Assistant Professor*

*Research Areas:* Biomimetics, Hybrid Materials, Multiscale Simulation

**Praveen Meduri**

Ph.D – University of Louisville, USA

*Assistant Professor*

*Research Areas:* Nanomaterials, Energy storage, Batteries (Lithium-ion, Lithium-sulfur, metal-air), Supercapacitors, Electrochemistry of materials

**Satyavrata Samavedi**

Ph.D – Virginia Polytechnic Institute and State University, USA

*Assistant Professor*

*Research Areas:* Polymeric Biomaterials, Drug Delivery, Stem Cell Differentiation, Immunomodulation

**Patents Filed**

Chandra Shekhar Sharma, Shital Yadav, *Process of Fabrication of Submicron Aligned Hydrophobic and Oleophilic Fibre from Polystyrene waste with Controllable Geometry using Citrus Peel Extract as Solvent*, 24 May 2017, Chinese Patent Application No.: 2015800639569.7.

Chandra Shekhar Sharma, Shital Yadav, *Process of Fabrication of Submicron Aligned Hydrophobic and Oleophilic Fibre from Polystyrene Waste with Controllable Geometry using Citrus Peel Extract as Solvent*, 25 May 2017, US National Phase Application No.: 15/529837.

**Book & Book Chapters**

N. Virivinti and K. Mitra, *Handling Optimization under Uncertainty using Intuitionistic Fuzzy Logic Based Expected Value Model in Handbook of Research on Emergent Applications of Optimization Algorithms*, Editors: Pandian Vasant, Sirma Zeynep Alparslan-Gok and Gerhard-Wilhelm Weber, IGI Global.

M.S. Soumitri and K. Mitra, *A Proposal for Parameter Free Surrogate Building Algorithm Using Artificial Neural Networks in Handbook of Research on Emergent Applications of Optimization Algorithms*, Editors: Pandian Vasant, Sirma Zeynep Alparslan-Gok and Gerhard-Wilhelm Weber, IGI Global.

P. Mittal and K. Mitra, *Decomposition Based Multi-objective Optimization of Energy Noise Trade-off in a Wind Farm* in *Handbook of Research on Emergent Applications of Optimization Algorithms*, Editors: Pandian Vasant, Sirma Zeynep Alparslan-Gok and Gerhard-Wilhelm Weber, IGI Global.

D.P. Pantula, M.S. Soumitri, and K. Mitra, *Efficient Optimization Formulation through Variable Reduction for Clustering Algorithms* in *Handbook of Research on Emergent Applications of Optimization Algorithms*, Editors: Pandian Vasant, Sirma Zeynep Alparslan-Gok and Gerhard-Wilhelm Weber, Publisher: IGI Global.

## Publications (in peer reviewed journals)

Y.S. Kannan, B. Karri, and K.C. Sahu, Entrapment and interaction of an air bubble with an oscillating cavitation bubble, *Phys. Fluids*, 30, 2018, 041701.

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Doriya Kruthi and Devarai Santhosh Kumar, Evaluation of L-Asparaginase Production in Flask, Tray Bioreactor and In-House Designed Rotary Bioreactor Using Isolated *Aspergillus* sp. *ACS National Meeting*, New Orleans, LA, 2018.

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## Funded Research Projects 2017-18

Chandra Shekhar Sharma, *Extreme Point of Care Diagnostics on a CD-IMPRINT*, MHRD & ICMR, April 2017, Rs. 370.81 Lakhs.

Lopamudra Giri, *Development of Computational Software Integrating Multilevel Image Data Analysis: Towards Efficient Clinical Practices and Advanced Biomolecular Research in Ophthalmology*, DBT, 22 June 2017, Rs. 54.0 Lakhs.

Chandra Shekhar Sharma, *Hierarchical Micro-/Nano-Textured Monocrystalline Silicon and Polymer Anti-Reflective Surfaces for High Efficiency Solar Cells*, SERB, December 2017, Rs. 25.69 Lakhs.

Narasimha Mangadoddy, *CFD Modelling of Fluid Flow in Air Pollution Control Equipment*, Clair Engineering Pvt. Ltd, 1 December 2017, Rs. 29.0 Lakhs.

Satyavrata Samavedi, Lopamudra Giri (Co-PI), *The Role of Intracellular Calcium Signalling in Matrix-Mediated Differentiation of Mesenchymal Stem Cells*, DBT, 30 December 2017, Rs. 39.9745 Lakhs.

Kirti Chandra Sahu, *Linear Stability Analyses of Interfacial Flows of Fluids with Complex Rheology*, Mathematical Research Impact Centric Support (MATRICS), DST, 2018, Rs. 6 Lakhs.

Debaprasad Shee, *Conversion of Lignin to Aromatic based Chemicals using Supported Metal Catalysts*, CSIR, March 2018, Rs. 30 Lakhs.

Narasimha Mangadoddy, *Improving the efficiency of spiral concentrator separating the multi-component chromite ore particles using CFD and experimental methods*, UAY-II, 2017, Rs. 99.98 Lakhs.

Dr. Lopamudra Giri, *Miniaturized bio-imaging Device with Embedded Nanosensor for Real, Time Oxygen Sensing*, DBT, 27 December, 2017, Rs. 65.104 Lakhs.

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K. Mitra and M.S. Soumitri, *Surrogates can Make Optimization Possible for High Fidelity Models*, *2<sup>nd</sup> World Congress on Engineering & Applications (WCEA - 2017)*, Pattaya, 15-16 December 2017.

Chandra S. Sharma, *Nanostructured Polymer and Carbon Materials: Application in Energy and Healthcare*, *GW4 Sandpit on Global Challenges in Energy and Healthcare*, Bath, UK, 20-21 April 2017.

Mamidi Suresh, Manohar Kakunuri, and Chandra Shekhar Sharma, *Resorcinol Formaldehyde based Carbon Fibers as Anode for Lithium ion Batteries*, *231<sup>st</sup> ECS Meeting*, New Orleans, USA, 28 May – 1 June 2017.

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Manohar Kakunuri, Mudrika Khandelwal, Chandra Shekhar Sharma, and Stephen J. Eichorn, *Template Assisted Micro-patterned Electrospun Nanofibrous Mats As a Potential Carrier for Controlled Drug Release*, *AICHE Annual Meeting*, Minneapolis, MN, USA, 29 October – 3 November 2017.

Anindita Laha, Chandra Shekhar Sharma, and Saptarshi Majumdar, *Electrospun Gelatin Nanofibers as Carrier for Controlled and Sustained Release of a Hydrophobic Drug*, *AICHE Annual Meeting*, Minneapolis, MN, USA, 29 October – 3 November 2017.

Shital Yadav and Chandra S. Sharma, *Green Processes to use Extract from Citrus Peel Waste for Novel Applications (Direct Polystyrene Recycling to Natural Solvent to Source of Carbon)*, *AICHE Annual Meeting*, Minneapolis, MN, USA, 29 October – 3 November 2017.

Chandra Shekhar Sharma, *Integration of Electrospun Nanofibers with C-MEMS as Ultrasensitive Label-free Biosensor Platform*, *2<sup>nd</sup> International Conference for Innovations in Biomedical Engineering and Life Sciences*, Penang, Malaysia, 10-13 December 2017.

## Talks Given in National / International Conferences

M. Anand, *Blood Flow in Multiply-Stenosed Arteries: Insights From A CFD Study*, *30<sup>th</sup> Annual*

K.H. Anulekha, Tata N. Rao, and Chandra Shekhar Sharma, Full Cell Electrochemical Performance of Nanostructured Lithium Titanate (LTO) (Anode)-Lithium Nickel Manganese Oxide (LNMO)(Cathode), *12<sup>th</sup> National Conference on Solid State Ionics*, BITS Pilani, 21-23 December 2017.

Chandra Shekhar Sharma, Translational Research: From Laboratory to Commercialization, *National IICHE Seminar on Chemical Industry: Growth and Sustainability*, RVR& JC College of Engineering, Guntur, 23 January 2018.

Chandra Shekhar Sharma, Translational Research (From Laboratory to Commercialization): Challenges and Opportunities, *National Program on Managing Innovation and Technology for Competitiveness*, Administrative Staff College of India, Hyderabad, 29 January 29 2018.

Mandakini Padhi and M. Narasimha, A Study on Multicomponent Particle Classification in a Hydrocyclone: An Experimental and CFD Approach, *ESCC-2017*, Izmir, Turkey, 11-14 September 2017.

K. Mayank, I. Govender, and Narasimha M, Developing DEM-CFD Two-Way Coupled Model for Charge Motion in a Tumbling Mill: Validation against PEPT, *ESCC-2017*, Izmir, Turkey, 11-14 September 2017.

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Balraju Vadlakonda and Narasimha Mangadoddy, Study on Gas Dispersion Characteristics in a Column Flotation using Electrical Resistance Tomography Coupled with Pressure Transducers, Cape Town, South Africa, 13-16 November 2017.

Lopamudra Giri, Confocal microscopy, *National Workshop of NEMS/MEMS and Theranostic Devices*, Center for Nanotechnology, IIT Guwahati, 23 February 2017.

Lopamudra Giri, Miniaturized Biodevices and Imaging in Healthcare, *National Frontiers of Engineering (NatFOE 11)*, IIT Bombay, Mumbai, 1 July 2017.

## Seminars

Prof Amit Agrawal, IIT Bombay, *Development of Innovative Point-of-Care Microdevices*, 22 February 2018.

Prof D. Phaneswara Rao, IIT Delhi, Computer simulation of micromixing in turbulent tubular reactors with unmixed feed using Fluent generated 3D velocity profiles and Monte Carlo coalescence redispersion model of Rao and Dunn, 4 April, 2018.

Dr Manan Pathak, University of Washington, Seattle, BattGenie Inc, *Model-based Battery Management Systems: From Theory to Practice*, 11 April, 2018.

## Awards / Recognitions

Chandra Shekhar Sharma, *NASI Young Scientist Platinum Jubilee Award 2017*.

Chandra Shekhar Sharma, *Core Committee Member, Indian National Young Academy of Sciences (INYAS) (2018-20)*.

Shital Yadav and Chandra Shekhar Sharma, *Best Presentation in AIChE 2017*.

Satyavrata Samavedi, Corneas damaged by trauma, disease and infection, jointly organized by the University of Sheffield, LVPEI and British Council in Hyderabad, April 2017, (Newton-Bhabha Fund) UK-India Researcher Links Workshop on (Invited delegate).

Kishaly Mitra, *Visiting Professor*, April-July, 2017, Department of Chemical Engineering, University of Washington, Seattle.

Kishaly Mitra, *Joint Secretary*, Control

Society, Organizing body of Indian Control Conference.

Chandra Shekhar Sharma, Shital Yadav, and Illa Mani Pujitha, *Gold Medal for the Innovation: Electrospun Nanofibers based Sanitary Napkins*, India International Innovation Fair, Vishakhapatnam, 9-11 September 2017.

Chandra Shekhar Sharma, Shital Yadav, Srinadh Mattaparthi, and Mudrika Khandelwal, Restyro Technologies Pvt. Ltd., *Gold Medal for the Technology, Direct Recycling of Polystyrene Waste using Citrus Peel Extract*, India International Innovation Fair, Vishakhapatnam, 9-11 September 2017.

Chandra Shekhar Sharma, Shital Yadav, and Illa Mani Pujitha, *Silver Medal for the Innovation: Electrospun Nanofibers based Sanitary Napkins*, 2<sup>nd</sup> World Invention and Innovation Forum, China, 23-25 November 2017.

Chandra Shekhar Sharma, Shital Yadav, Srinadh Mattaparthi, and Mudrika Khandelwal, Restyro Technologies Pvt. Ltd., *Gold Medal for the Technology, Direct Recycling of Polystyrene Waste using Citrus Peel Extract*, iENA International Trade Fair, Germany, 2-5 November 2017.

Chandra Shekhar Sharma, Shital Yadav, and Illa Mani Pujitha, *Gold Medal for the Innovation: Electrospun Nanofibers based Sanitary Napkins*, iENA International Trade Fair, Germany, 2-5 November 2017.

Chandra Shekhar Sharma, Shital Yadav, Srinadh Mattaparthi, and Mudrika Khandelwal, Restyro Technologies Pvt. Ltd., *Gold Medal for the Technology, Direct Recycling of Polystyrene Waste using Citrus Peel Extract*, 2<sup>nd</sup> World Invention and Innovation Forum, China, 23-25 November 2017.

## RESEARCH HIGHLIGHT

### Fluorine Free Drinking Water

In India, the major source of drinking water is groundwater and excess fluoride content of ground water is a major problem. A research team led by Dr. Chandra Shekhar Sharma of Chemical Engineering Department had demonstrated that jamun seed derived activated carbon can be used as an adsorbent for fluoride removal from groundwater. In Dr Sharma's group activated carbon was prepared by KOH activation of jamun seed powder and subsequent pyrolysis at 900 °C. The unique feature of this research is the first time use of jamun seed derived activated carbon as defluoridating agent. Jamun seed powder is commonly used in ayurvedic formulations for treatment of various ailments because of its unique medical properties. However in this work, they have utilized the hydroxyl groups of prepared activated charcoal for fluoride adsorption from contaminated aqueous solutions. The innovation not only offers a novel fluoride adsorbent but also low-cost and efficient material. The preparation of activated carbon from jamun seed powder involves very low cost when compared to commercial adsorbent that are being used for defluoridation purpose.

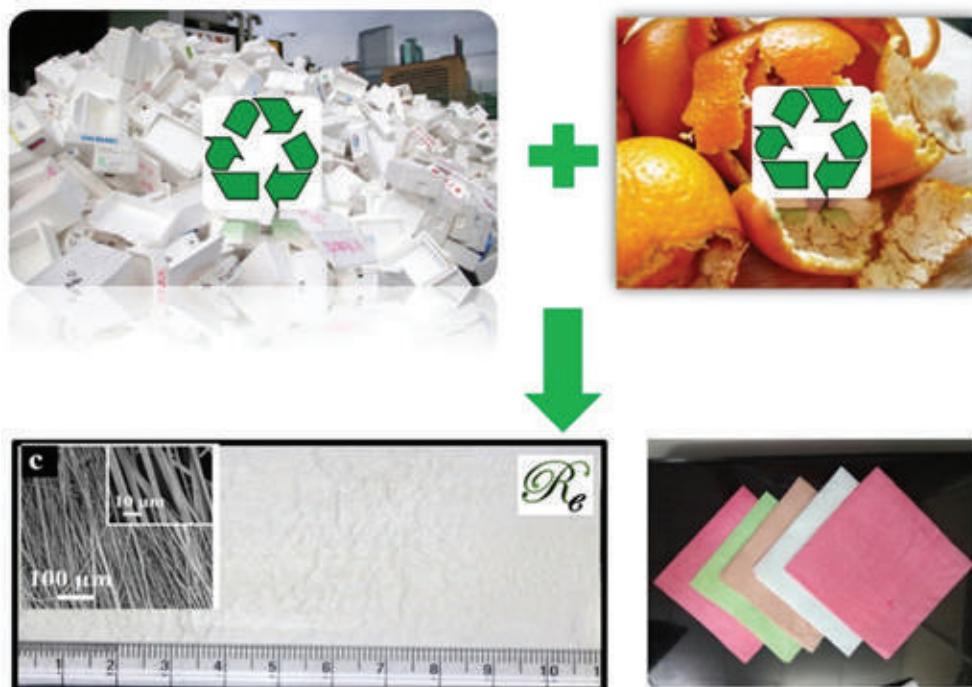


### Novel Technology for Polystyrene Recycling

Polystyrene (PS) is an integral part of global plastic market and a highly valued thermoplastic. The major applications of PS and expanded PS (EPS) include packaging, construction, appliances and electronics. The global demand for PS and EPS increased from 13 million tons in year 2000 to around 14.9 million tons in 2010; which is expected to further grow to approximately 23.5 million tons by year 2020. However, this increase in usage results in proportional increase in the PS waste, which is non-biodegradable and thus leads to a serious impact on health and environment. Also, disposal of the low density Styrofoam (a popular form of EPS) becomes unmanageable as gets easily littered. PS waste management is a serious concern. PS wastes are usually discarded in dumps and landfills or incinerated. The desirable solution for PS waste management is the recycling of PS. However, they are quite labour- and/or energy-intensive. According to a 2004 study by California Integrated Waste Management Board, only 0.8% of PS produced is recycled in the USA. Dr. Chandra Shekhar Sharma and his team have developed a novel and innovative way to recycle PS waste, directly into sub-micron, aligned PS fibers by using extracts from peels of citrus fruits. The citrus peels are generally discarded while processing/using fruit and thus, process developed in this work will also help in managing this agricultural

**...RESEARCH HIGHLIGHT**

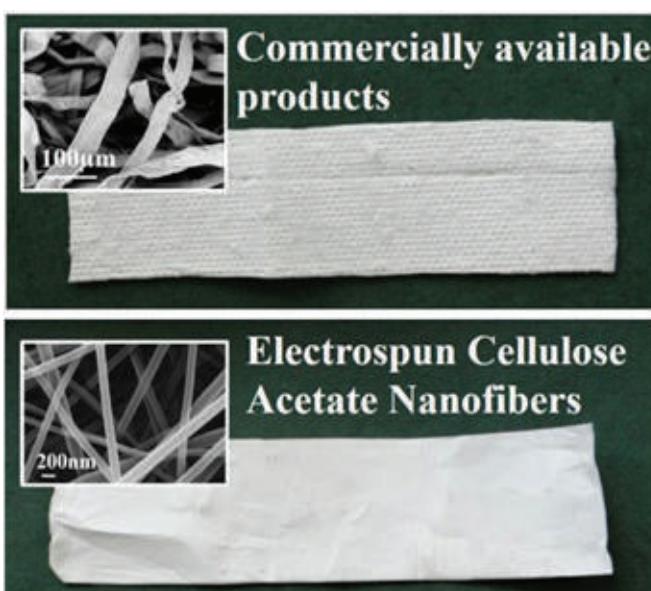
waste. Worldwide, citrus fruits production is more than 31 million tons annually, out of which nearly 50% is waste in form of peel. The process developed to directly recycle waste PS into non-woven fabric using extract from citrus peel waste is clearly an illustration of novel, green, low-energy and cost effective scalable process. Moreover, the fabric obtained is hydrophobic and can selectively absorb oil from water and thus the team has demonstrated its use for oil-water separations leading to applications from day to day household cleaning, waste water treatment, packaging to global requirement of oil spillage remediation.



*Recycling of Polystyrene (thermocol) using citrus peel extract and producing fabric for oil spills remediation*

### Eco-friendly Nanofibers Based Safer Sanitary Napkins

The feminine sanitary napkin is an important disposable absorbent hygiene product. Superabsorbent polymers (SAPs) are added in the absorbent core of sanitary napkins in order to improve their absorption capacity. However, they are found to have certain adverse effects on the health of user and also on environment. IITH researchers lead by Dr. Chandra Shekhar Sharma proposed to replace micron sized fibrils as found in commercial sanitary napkins with electrospun nanofabric due to its large specific surface area and controllable porosity and thus to eliminate the use of SAPs and other chemicals and that too without compromising the performance. Dr Sharma's research group tested electrospun nanofiber based matrix with and without adding superabsorbent polymers for their potential use in female hygiene applications and evaluated their performance in terms of free and equilibrium absorbency, absorbency under load, residue tests and mechanical properties. Results were then compared with commercially available products and they concluded that use of SAPs can be eliminated by considering electrospun nanofibers based matrix as female hygiene products, which may potentially address the related health concerns as well apart from solving disposal problem.



*A pictorial comparison of nanofibers based absorbent core to commercial sanitary napkin*

Considering the large surface area and porosity, it was found that the electrospun nanofibers provide a better alternative to achieve even higher absorbency that too without adding SAP. Sanitary napkins without SAP can be a solution for its safe disposal therefore, can have global impact in near future. This innovation has won several recognition at several National and International forums such as, Gandhian Young

Technological Innovation Award (2015), Gold Medal at iENA International Trade Fair, Germany (2017), Gold Medal, India International Innovation Fair, Vishakhapatnam, and Silver Medal, 2nd World Invention and Innovation Forum, China (2017).

# CHEMISTRY

The Department of Chemistry housed 13 faculty members, 65 research scholars and 55 two-year M.Sc. students. The department has been conducting cutting-edge research in contemporary topics in Physical, Organic and Inorganic Chemistry. Various state-of-the-art research facilities such as 400 MHz NMR, ESR, HRMS, Single Crystal - and Powder - XRD, CD, Fluorescence/lifetime and Raman spectrometers, Atomic force microscopy (with conductive, electrostatic force, magnetic force, surface potential, nanolithography modes), Gas Chromatography-Mass Spectrometer, HPLC, high resolution lasers etc. are available in the department.



## FACULTY



**Melepurath Deepa**  
Ph.D – Delhi University  
*Associate Professor & HoD*  
Research Areas: Applied Electrochemistry



**Tarun K. Panda**  
Ph.D – Free University - Berlin, Germany  
*Associate Professor*  
Research Areas: Main group chemistry, Coordination chemistry, Lanthanide chemistry, Homogeneous catalysis, X-ray Crystallography and structure analysis



**Faiz Ahmed Khan**  
Ph.D – University of Hyderabad  
*Professor*  
Research Areas: Transition Metal-mediated reactions in organic synthesis, Discovery of New Methodologies and Control of Stereochemistry in organic synthesis, Chemical Synthesis in Ionic Liquids, and Supported Catalysts, Synthesis of Natural and aesthetically pleasing



**Bhabani S. Mallik**  
Ph.D – IIT Kanpur  
*Associate Professor*  
Research Areas: Computational Chemistry, Molecular Dynamics, Statistical Mechanics



**Ch. Subrahmanyam**  
Ph.D – IIT Madras  
*Professor*  
Research Areas: Catalysis, Nanomaterials and Energy Systems



**D.S. Sharada**  
Ph.D – University of Hyderabad  
*Associate Professor*  
Research Areas: C-H activation, CDC & atom insertion, Bio-inspired organic transformation, Benign & sustainable chemistry



**G. Satyanarayana**  
Ph.D – IISc, Bangalore  
*Associate Professor*  
Research Areas: Transition-metal catalysis, Development of new methodology and Total synthesis and drug diversity oriented synthesis



**Surendra K. Martha**  
Ph.D – IISc, Bangalore  
*Assistant Professor*  
Research Areas: Materials Electrochemistry with special emphasis on Lead-acid, Li-ion, Sodium ion batteries and Supercapacitors



**G Prabusankar**  
Ph.D – IIT Bombay  
*Associate Professor*  
Research Areas: Organometallic Synthesis, Late Transition Metal Chemistry, Heavier Main Group P-Block Chemistry, Molecular Activation, Molecules to Materials, Molecules for Medicines



**Somnath Maji**  
Ph.D – IIT Bombay  
*Assistant Professor*  
Research Areas: Synthetic Coordination/Bio-Inorganic/ Organometallic Chemistry. Metal catalyzed Water Splitting/Carbon Dioxide Reduction/Hydrogen Generation. Applications of molecular catalysts in functional devices for production of solar fuels

**Jai Prakash**

Ph.D – IIT Delhi

*Assistant Professor*

*Research Areas:* Inorganic Chemistry, Strongly Correlated Materials for Thermoelectric & Superconducting Applications, Small Molecule Crystallography, Metal Chalcogenides & Intermetallics

**Ashutosh Kumar Mishra**

Ph.D – .....

*Assistant Professor*

*Research Areas:* Bioorganic Chemistry

**Surajit Maity**

Ph.D – IIT Bombay

*Assistant Professor*

*Research Areas:* Physical Chemistry, Spectroscopy and Dynamics of molecules, ions and radicals

## Publications (in peer reviewed journals)

Madhan Ramesh, Ganesan Prabusankar, and Galmar Venkatachalam, Ru(II) mediated C H activation of 1-(biphenylazo)naphthol: Synthesis and catalytic evaluation for transfer hydrogenation of ketones, *Inorganic Chemistry Communications*, 79, 2017, 89-94.

Ganesan Prabusankar, Chatla Naga Babu, Gembali Raju and Natarajan Sampath, Silver(I) and copper(II)-imidazolium carboxylates: Efficient catalysts in Ullmann coupling reactions, *Journal of Chemical Sciences*, 129, 2017, 553-559.

Ganesan Prabusankar, Arruri Sathyaranayana, Gembali Raju, and Chatla Nagababu, Methanol as a Hydrogen Source in Pd(II)-Bis-N-Heterocyclic Carbenes Mediated Catalytic Semi-reduction of Alkyne Under Mild Condition, *Asian Journal of Organic Chemistry*, 6, 2017, 1451-1459.

Raja Nandhini, Madhan Ramesh, Ganesan Prabusankar, and Galmar Venkatachalam, Synthesis, crystal structure of copper(II)

complexes comprising 2-(biphenylazo) phenol and 1-(biphenylazo)naphthol ligands and their catalytic activity in nitroaldol reaction, *Inorganic Chemistry Communications*, 85, 2017, 84-88.

Ganesan Prabusankar, Arruri Sathyaranayana, Katam Srinivas, Paladugu Suresh and Ipsita Nath, A Facile Access to Sterically Less Crowded to More Crowded Organo Triselones, *Chemistry Select*, 6(10), 2017, 1451-1459.

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Katam Srinivas and Ganesan Prabusankar, Large Cu(I)8 Chalcogenone Cubic Cages with Non-interacting Counter Ion, *Dalton Transactions*, 46, 2017, 16615-16622.

S. Das, S. Anga, A. Harinath, H. P. Nayek, and T. K. Panda, Synthesis and Structure of Unprecedented Samarium Complex with Bulky Bis-iminopyrrolyl Ligand via Intramolecular C=N Bond Activation, *Z. Anorg. Allg. Chem.*, 643, 2017, 2144-2148.

Harinath, K. Bano, S. Ahmed and T. K. Panda, 2-Picolylamino(diphenylphosphinoselenoic)

amide Supported Zinc Complexes: Efficient Catalyst for Insertion of N–H bond into Carbodiimides, Isocyanates, and Isothiocyanate, Phosphorus, Sulfur, and Silicon and the Related Elements, 193, 2017, 23-32.

S. Saha, A. Sarkar, S. Das, T. K. Panda, K. Harms and H. P. Nayek, The Missing Link in Ni(II)-Ln(III) System: Design and Synthesis of a Dinuclear [Ni<sub>2</sub>] and Three Pentanuclear [Ni<sub>3</sub>Ln<sub>2</sub>] (Ln = La, Ce, Eu) Complexes of a Schiff Base Ligand, *ChemistrySelect*, 2, 2017, 7865–7872.

J. Bhattacharjee, A. Harinath, H. P. Nayek, A. Sarkar, and T. K. Panda, Highly Active and Iso-selective Catalysts for ROP of Cyclic Esters Using Group 2 Metal Initiators, *Chemistry - A European Journal*, 23, 2017, 9319–9331.

C. A. Kumar and T. K. Panda, Recent Development of Aminophosphine Chalcogenides and Boranes as Ligands in s-Block Metal Chemistry, Phosphorus, Sulfur, and Silicon and the Related Elements, 192, 2017, 1084–1101.

J. Bhattacharjee and T. K. Panda, C-H Bond Activation Induced by Group 4 Metal Nitrogen Bond to form Acetimidamide Metal Complexes, *Chemistry Select*, 2, 2017, 3231–3235.

K. Naktode, S. Das, H. P. Nayek, and T. K. Panda, Syntheses and Structures of Imidazolin-2-iminato Ligand Supported Titanium(IV) Aryloxo Complexes, *Inorganica Chimica Acta*, 456, 2017, 24–33.

Harinath, J. Bhattacharjee, S. Anga and T. K. Panda, Alkali Metal Mediated Dehydrogenative Coupling of Hydrosilanes and Alcohols for Facile Synthesis of Silyl Ethers, *Aus. J. Chemistry*, 70, 2017, 727–730.

Sohag Biswas and Bhabani S. Mallik, Time-dependent Vibrational Spectral Analysis of First Principles Trajectory of Methylamine with Wavelet Transform, *Phys. Chem. Chem. Phys.*, 19, 2017, 9912–9922.

Th. Dhileep N. Reddy and Bhabani S. Mallik, Protic Ammonium Carboxylate Ionic Liquids: Insight into Structure, Dynamics and Thermophysical Properties by Alkyl Group Functionalization, *Phys. Chem. Chem. Phys.*, 19, 2017, 10358–10370.

Th. Dhileep N. Reddy and Bhabani S. Mallik,

Structure and Dynamics of Hydroxyl-functionalized Protic Ammonium Carboxylate Ionic Liquids, *J. Phys. Chem. A*, 121, 2017, 8097–8107.

Sagar Areppally, Venkata Nagarjuna Babu, Manickam Bakhadoss and Duddu S. Sharada, A Direct Cycloaminative Approach to Imidazole Derivatives via Dual C-H Functionalization. *Org lett.* 19, 2017, 5014–5017.

Arumugavel Murugan, Shinde Vidyacharan, Ruma Ghosh and Duddu S. Sharada, Metal-Free Regioselective Dual C-H Functionalization in Cascade Fashion: Access to Isocryptolepine Alkaloid Analogues. *Chem. Select.*, 2, 2017, 3511–3515.

Prateek Dongare, Annabell G. Bonn, Somnath Maji, and Leif Hammarström, Analysis of Hydrogen-Bonding Effects on Excited-State Proton-Coupled Electron Transfer from a Series of Phenols to a Re (I) Polypyridyl Complex, *J. Phys. Chem. C*, 121, 2017, 12569–12576.

Ganesan Prabusankar, Arruri Sathyanarayana, Katam Srinivas, Paladugu Suresh and Ipsita Nath A Facile Access to Sterically Less Crowded to More Crowded Organo Triselones, *Chemistry Select*, 3, 2018, 1294–1299.

Marappan Dinesh, Palanisamy Maadeswaran, Velappan Kavitha, Nirmala Muthukumaran and Ganesan Prabusankar, First Luminescent Triphenyl Silanol Enabled by Non-Innocent Acridine Orange, *Inorganic Chemistry Communications*, 92, 2018, 101–105.

Harinath, J. Bhattacharjee, A. Sarkar, H. P. Nayek, and T. K. Panda, Ring Opening Polymerization and Copolymerization of Cyclic Esters Catalyzed by Group 2 Metal Complexes Supported by Functionalized P–N Ligands, *Inorg. Chem.*, 57, 2018, 2503–2516

Sohag Biswas, Debashree Chakraborty and Bhabani S. Mallik, Interstitial Voids and Resultant Density of Liquid Water: A First Principles Molecular Dynamics Study; *ACS Omega*, 3, 2018, 2, 2010–2017

Srilaxmi M. Patel, Kuntal Pal, P. Naresh Kumar, Melepurath Deepa, Duddu S. Sharada, Design and Synthesis of Novel Indole and Carbazole Based Organic Dyes for Dye-Sensitized Solar Cells: Theoretical Studies by DFT/TDDFT. *Chem. Select.*, 3, 2018, 1623–1628

## Funded Research Projects 2017-18

G. Prabusankar, *CNC and ENE Pincer Type Carbene Metal Derivatives for C-C and C-X Bond Formation Reactions*, CSIR, 19 July 2017, Rs. 9.00 Lakhs.

G. Prabusankar, *Investigation of mechanism of mitochondrial localization & mitotoxicity of C-terminal fragments of TDP-43 implicated in Amyotrophic Lateral Sclerosis (ALS) and search for effective small molecule rescuers against TDP-43-induced mitotoxicity*, DST-SERB, 1 March 2018, Rs. 51.27 Lakhs.

## Talks Given in National / International Conferences

Tarun K. Panda, *Highly Active and Iso-selective Catalysts For ROP of Cyclic Esters using Group 2 Metal Initiators*, Osaka University, Osaka, Japan, 19 June, 2017.

Tarun K. Panda, *Homogeneous Catalysis using Abundant Metals in Earth*, Graduate School of Pharmaceutical Sciences, Kyushu University, Japan, 22 June, 2017.

Tarun K. Panda, *Highly Active and Iso-selective Catalysts For ROP of Cyclic Esters using Group 2 Metal Initiators*, Graduate School of Engineering, Nagoya University, Japan, 28 June, 2017.

Ganesan Prabusankar, *Soluble Metal-Chalcogenones: Synthesis, Characterization and Catalytic Applications, Modern Trends in Inorganic Chemistry (MTIC)-XVII*, NCL Pune, India, 11–14 December 2017.

Somnath Maji, *Mechanistic Approaches to*

*Molecular Ruthenium Catalysts for Water Oxidation, Design, Synthesis, Characterization, Reactivity, Theoretical Study and Applications of Different Advanced Functional Materials*, University of Burdwan, 23 December 2017.

Ganesan Prabusankar, *Single Molecule with Versatile Applications: Importance of Analytical Techniques*, 2<sup>nd</sup> International Conference On Recent Trends In Analytical Chemistry (ICORTAC-2018), Department of Analytical Chemistry, University of Madras, India, 15-17 March 2018.

Ganesan Prabusankar and Gembali Raju, *Non-Innocent Chromophore as Spacer with Versatile Applications, The 7<sup>th</sup> International Symposium on Functionalization and Applications of Soft/Hard Materials (Soft/Hard 2018)*, Ritsumeikan University, Kusatsu, Japan, 2-3 March 2018.

## Seminars

SERB PAC meeting, 8-9 August 2017.

Open day for school children, 26 February 2018.

## Workshops / Symposiums

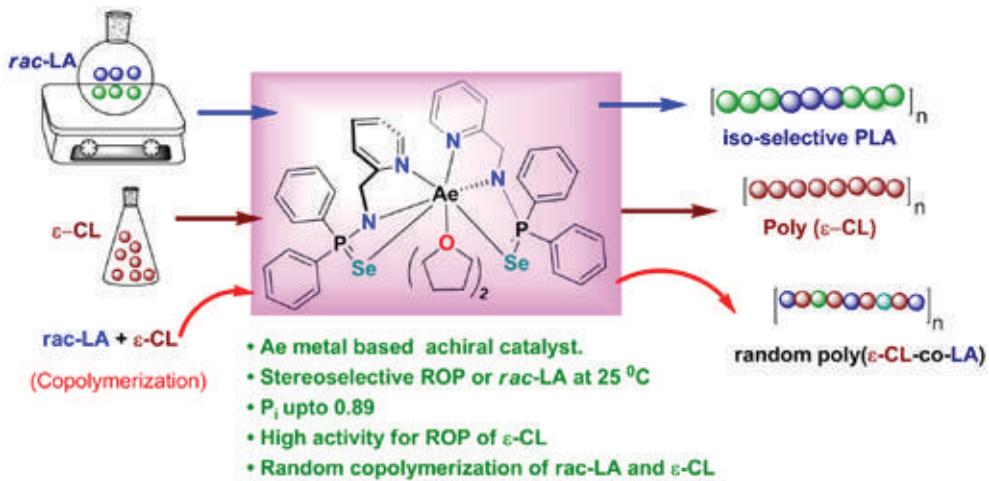
In-House Symposium 2018 at the Department of Chemistry, IIT Hyderabad (IHS2018), on 10 March 2018

## Awards / Recognitions

G Prabusankar, Member of Royal Society, The Royal Society of Chemistry, Cambridge, UK

## RESEARCH HIGHLIGHT

We reported a series of alkali metal and alkaline earth metal complexes using tridentate ligand. The calcium complex displayed remarkable isoselectivity for the ring-opening polymerization of rac-lactide with  $P_i = 0.89$  at room temperature, whereas the Ba complex exhibited better activity for copolymerization of rac-LA and -CL.



Research Group of Dr. Tarun K. Panda

# CIVIL ENGINEERING

Civil Engineering department has graduated 3 PhD Students, 20 MTech students, 1 MS Student, and 21 BTech students in the FY 17-18. Dr. Suriya Prakash has been appointed as an Associate Editor of Journal of Bridge Engineering, ASCE. Dr. Shashidhar was selected as a Guest Editor of the journal Sustainability for a special issue on 'Sustainable Use of the Environment and Resources'. Dr. Sireesh S has been elected as a Member of Committee on Geosynthetics (AFS70), Transportation Research Board (TRB) for the period 2018-21. Dr. Sireesh S has also been elected as a Member of Technical Committee on Stabilization, International Geosynthetics Society (IGS) for the period 2018-21. Dr. Shashidhar received Swacchata Award from MHRD in recognition of the role of IITH in uplifting the villages under Unnat Bharat Abhiyan initiative. Our faculty have also excelled in teaching with Dr. Sireesh and Dr. Suriya bagging the Excellence in Teaching Awards given by IITH. In addition, our department received Rs. 21,646,000/- as research funding through various new projects, funded by MHRD (UchchatarAvishkarYojana), Ministry of Urban Development, Ministry of Earth Sciences, Andhra Pradesh Pollution Control Board, Japan International Cooperation Agency, Toyota ITC, and TechFab India Pvt. Ltd. We also organized an International conference on composite materials and structures "ICCMS 2017" held in December 27-29, 2018. Dr. Shashidhar has been appointed as an Expert witness for Krishna Water Dispute Tribunal-II on behalf of the state of Telangana. The first installment for a project, 'Developing Computational and Laboratory Facilities for Earth Sciences, Transportation, and Environmental Studies' under FIST program, funded by DST, has been released in this financial year. The department has started a new academic program called All Course M.Tech from August 2017 onwards in three specializations: Environmental and Water Resources Engineering, Geotechnical Engineering and Structural Engineering.



## FACULTY



### B Umashankar

Ph.D – Purdue University, USA

*Associate Professor & HoD*

**Research Areas:** Foundation Engineering, Reinforced Soil, Soil-Structure Interaction, Recyclable Materials in Geotechnics



### K.V.L. Subramaniam

Ph.D – Northwestern University, USA

*Professor*

**Research Areas:** Concrete and Geopolymer Materials, Behavior of Reinforced Concrete, Rheology of cementitious materials, Rapid Construction Methods, Low energy Materials



### Shashidhar

Ph.D – IIT Madras

*Associate Professor*

**Research Areas:** Bioremediation, Contaminant Hydrology, Hydraulic Transients, Hydroclimate, Hazardous Waste Management, Wastewater treatment, Remote sensing and GIS applications



### Amirtham Rajagopal

Ph.D – IIT Madras

*Associate Professor*

**Research Areas:** Damage and Fracture Mechanics, Mechanics of Composites, Linear and Nonlinear Finite element and meshless methods, multiscale modeling



### Mahendrakumar Madhavan

Ph.D – University of Alabama - Birmingham, USA

*Associate Professor*

**Research Areas:** Affordable Housing, Cold-Formed Steel, Geometric imperfection, Wall Panels, CFRP retrofitting, Connection Design, Composite (steel-concrete) construction



### S. Sireesh

Ph.D – IISc Bangalore

*Associate Professor*

**Research Areas:** Pavement Geotechnics, Ground Improvement, Recycled materials, Foundation Engineering, Soil and Rock Instrumentation



### S. Suriya Prakash

Ph.D – Missouri University of Science & Technology - Rolla, USA

*Associate Professor*

**Research Areas:** Precast Systems, Prestressed Concrete, Structural Concrete Behavior, Structural Strengthening



### Anil Agarwal

Ph.D – Purdue University, USA

*Assistant Professor*

**Research Areas:** Structural Engineering, Structural Fire Engineering, Steel Structures, Structural Stability, Design for extreme events



### Asif Qureshi

Ph.D – Swiss Federal Institute of Technology, Switzerland

*Assistant Professor*

**Research Areas:** Trace contaminants, biogeochemical cycling, environmental health



### B. Munwar Basha

Ph.D – IISc Bangalore

*Assistant Professor*

**Research Areas:** Unsaturated soil mechanics, Reliability Based Design, Geotechnical & Geoenvironmental Engineering, Unsaturated soil mechanics, Computational Geomechanics, Municipal Solid Waste Landfills, Soil Dynamics and Earthquake Resistant Design, Retaining Structures, Reliability analysis of pavement Geotechnics, Rock Mechanics



### Debraj Bhattacharyya

Ph.D – University of New Brunswick, Canada

*Assistant Professor*

**Research Areas:** Water/wastewater treatment, solid waste management, renewable energy (biofuel)

 <p><b>K.B.V.N. Phanindra</b> Ph.D – New Mexico State University, USA <i>Assistant Professor</i> <i>Research Areas:</i> Hydrogeologic characterization, groundwater modeling, soil-water-crop interactions, RS and GIS in groundwater</p>	 <p><b>Seetha N</b> Ph.D – IISc Bangalore <i>Assistant Professor</i> <i>Research Areas:</i> Colloid transport in porous media, nanoparticles, multiple-scale modeling, pore-scale modeling, upscaling, co-transport of multiple colloids in porous media</p>
 <p><b>Digvijay S. Pawar</b> Ph.D – IIT Bombay <i>Assistant Professor</i> <i>Research Areas:</i> Driver and Pedestrian Behavioral Modeling, Traffic Safety and Accident Analysis, Traffic Operation and Simulation, Intelligent Transportation Systems, Statistical Modelling and Classification Techniques, Human Factors</p>	 <p><b>Surendra Nadh Somala</b> Ph.D – California Institute of Technology, USA <i>Assistant Professor</i> <i>Research Areas:</i> Earthquake Resistant Design of Structures, Inversion and Imaging of Seismic Source &amp; Structure, Probabilistic Seismic &amp; Tsunami Hazard Assessment, Seismology, Computational Fracture Mechanics, Reservoir Induced Microseismicity, Structural Health Monitoring, Performance Based Seismic Design, Earthquake Early Warning, Perturbation in Gravity field due to Seismic Activity</p>
 <p><b>Satish Regonda</b> Ph.D – University of Colorado at Boulder, U.S.A <i>Assistant Professor</i> <i>Research Areas:</i> Urban hydroclimatology, Urban and Riverine flood modeling, Climate change, Hydrologic forecasting techniques/systems, Water awareness, Hydrologic database in India, R and Shiny</p>	 <p><b>D. Chandrasekharam</b> Ph.D – IIT Bombay <i>Visiting Professor</i> <i>Research Areas:</i> Geothermal energy resources; Hydrogeology and groundwater pollution</p>

## Patents Filed

V.V. Rangarao, K.V.L. Subramaniam and S. Suriya Prakash, *Lateral Reinforcement System and Method for Concrete Structures*, 1 August 2017, US Patent No.9719245 B1.

## Book & Book Chapters

Sireesh Saride, Anu M. George, A. Deepti and B.M. Basha, Chapter 6: Sustainable Design of Indian Rural Roads with Reclaimed Asphalt Pavements, Sustainability Issues in Civil Engineering, *Springer Transactions in Civil and Environmental Engineering Series*, 2017, ISBN: 978-981-10-1928-9 (Print) 978-981-10-1930-2 (Online).

B. Munwar Basha and K.V.N.S. Raviteja, Meethotamulla Landfill Failure Analysis: A Probabilistic Approach. In: A. Krishna, A. Dey, S. Sreedeep (eds) Geotechnics for Natural and Engineered Sustainable Technologies, *Developments in Geotechnical Engineering*, 2018, Springer, Singapore.

D. Chandrasekharam, A. Lashin, N. Al Arifi, and A.M. Al-Bassam, Desalination of Seawater using Geothermal Energy for food and water security: Arab and Sub-Sahara countries, Chapter 5, 54p., in G. Gnaneswar (Edt), *Handbook on Sustainable Desalination Handbook – Process Design and Implementation Strategies*, Elsevier Pub., 2018, 597.

G.L. Sivakumar Babu, Sireesh Saride and B. Munwar Basha (eds.), *Sustainability Issues in Civil Engineering*, Springer Transactions in Civil and Environmental Engineering Series, 2017, ISBN: 978-981-10-1928-9 (Print) 978-981-10-1930-2 (Online).

J. Bundschuh, J. Piechocki, D. Chandrasekharam and G. Chen., Geothermal, *Wind and Solar Energy Applications in Agriculture and Aquaculture*, 2017, CRC Press, 475.

## Publications (in peer reviewed journals)

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## Funded Research Projects 2017-18

Dr. S. Sireesh, Dr. B. Umashankar and Dr. M.R. Madhav, *Evaluation of Geogrids for Reduction in Base Course Thickness*, TechFab India Pvt. Ltd., 2017, Rs. 11.57 Lakhs.

Dr. S. Sireesh, *Utilization of Fly Ash as grout/stabilization material to improve marginal soils with reference to Amaravati City, Andhra Pradesh Pollution Control Board (APPCB)*, 2017, Rs. 12.5 Lakhs.

Dr. Mahendrakumar Madhavan, *Evaluation of Light Gage steel framed structures (LGSF) with cladding and insulation system*, Building Materials And Technology Promotion Council, Ministry of Urban Development, Government of India, May 2017, Rs. 3.50 Lakhs.

Dr. Amirtham Rajagopal, *Nonlocal approach to modeling damage in quasi brittle materials*, DST-RFBR, August 2017, Rs. 35.8 Lakhs.

Dr. Digvijay S. Pawar, *Surrogate Safety Measures at Unsignalized Crossings and its Applications in V2X Technology for Asian Mix Traffic*, Toyota ITC, Japan, October 2017, Rs. 12.20 Lakhs.

Dr. Surendra Nadh Somalia, *Dynamic Slip Inversion for Earthquakes with available data*, Ministry of Earth Sciences, 1 November 2017, Rs. 14.82 Lakhs.

## Talks Given in National / International Conferences

Invited speaker at the *3rd International Conference on Water Resource and Environment (WRE 2017)*, Qingdao, China, 26-29 June 2017.

M.P. Gundupalli and D. Bhattacharyya, Dilute Sulphuric Acid Hydrolysis of Coconut Coir: Process Optimization for Recovery of Reducing Sugar, *The European Conference on*

*Sustainability, Energy & the Environment*, Brighton, 6-9 July 2017.

K. Katam and D. Bhattacharyya, Comparing and evaluating the kinetics of mixed micro-algal system with aerobic bacterial system in treating kitchen wastewater: Biodiesel Production, *The European Conference on Sustainability, Energy & the Environment 2017*, Brighton, 6-9 July 2017.

S. Selvaraj and M. Madhavan, Geometric imperfection measurements on cold-formed steel channels: An approach using 3D non-contact laser scanner, *the 8th European Conference on Steel and Composite Structures*, Copenhagen, Denmark, 13-15 September 2017.

S. Selvaraj, M. Madhavan, A.G.V. Gopalan, A.K. Jayabalan, and P.K. Arumugam, Behaviour of CFS strengthened hot-rolled structural steel beams under flexure, *the 8th European Conference on Steel and Composite Structures*, Copenhagen, Denmark, 13-15 September 2017.

Invited speaker at the *10th GEOSS Asia-Pacific symposium*, Vietnam Academy of Science and Technology, Hanoi, Vietnam, 18-20 September 2017.

Invited speaker at the *10th GEOSS Asia-Pacific symposium*, Vietnam Academy of Science and Technology, Hanoi, Vietnam, 18-20 September 2017.

A. Ramachandruni, V.G. Chadari and S.N. Somalia, Behavior of tunnels crossing active step-over faults, *Seventh Indian Rock Conference (INDOROCK 2017)*, New Delhi, India, October 2017.

Chanda and S. N. Somalia, Source Inversion Validation for the ICDP project: Drilling into Seismogenic Zone (DSeis) of Earthquakes in South African Gold Mines, *Workshop on Frontiers in Studies of Earthquakes and Faults*, Shenzhen, China, November 2017.

Contaminant Transport Modelling in Aquatic Environment, Present Scenarios of Treatment of Waste in India, *Challenges, Issues and New Techniques of Treatment*, Sanjivani College of Engineering Kopargaon, 13-25 November 2017.

M.C. Raghucharan and S. N. Somalia, Generating site-specific ground motions for Delhi region for seismic vulnerability assessment of buildings, *American Society of Civil Engineers (ASCE) India*, New Delhi, December 2017.

M.C. Raghucharan, D. Srinagesh, and S. N. Somala, Seismic Hazard Evaluation in Central Indo-Gangetic Plains, *54<sup>th</sup> Indian Geophysical Union (IGU) Convention*, NGRI, Hyderabad, India, December 2017.

B. Umashankar, Challenges in Foundation Design, Short term course on Site-Specific *Geotechnical Investigations for Buildings & Critical Structures*, IIT BHU, 7-9 December 2017.

M.P. Gundupalli, P. Sharma, and D. Bhattacharyya, Hydrothermal Pretreatment of Tender Coconut Coir and Optimization of Process Parameters Using Response Surface Methodology, *ASCE India Conference 2017 – Urbanization Challenges in Emerging Economies Moving Towards Resilient Sustainable Cities and Infrastructure*, New Delhi, 13-14 December 2017.

K. Katam, M.P. Gundupalli, and D. Bhattacharyya, Production of biofuel from a kitchen wastewater by using a mixed culture of diatoms: Treatment, kinetic evaluation, and lipid analysis, *ASCE India Conference 2017 – Urbanization Challenges in Emerging Economies Moving Towards Resilient Sustainable Cities and Infrastructure*, New Delhi, 13-14 December 2017.

P. Modi, K. Katam, and D. Bhattacharyya, Aerobic Biological Treatment of Pesticide Industry Effluent: A Kinetic Evaluation, *ASCE Indian Conference 2017 – Urbanization Challenges in Emerging Economies Moving Towards Resilient Sustainable Cities and Infrastructure*, New Delhi, 13-14 December 2017.

D. Damaraju, D. Bhattacharyya, T.K. Panda, and K.K. Kurilla, Enhancement of the performance of a Continuous Bipolar-mode Electrocoagulation (CBME) system treating palm oil mill effluent through modification of process parameters and reactor configuration, *ASCE India Conference 2017 – Urbanization Challenges in Emerging Economies Moving Towards Resilient Sustainable Cities and Infrastructure*, New Delhi, 13-14 December 2017.

A. Lokesh and D. Bhattacharyya, Clear Water Hydrodynamic Behaviour and Mixing Pattern in a Novel Sequenced Anaerobic-Aerobic Baffled Membrane Bioreactor, *ASCE India Conference 2017 – Urbanization Challenges in Emerging Economies Moving Towards Resilient Sustainable Cities and Infrastructure*, New Delhi, 13-14 December 2017.

D. Chandrasekharam, Evolution of Geothermal systems around the Red Sea: An over view, Key Note Address, International Geological Congress 12, *Saudi Geological Survey*, Jeddah, Saudi Arabia, 4-7 February 2018.

## Seminars

Pradeep Mandapaka, Institute of Catastrophe Risk Management, Nanyang Technological University (NTU) Singapore, *Flood risk assessment under intensifying rainfall extremes and rapid urbanization: Southeast Asia experience and challenges*, 24 August 2017.

Gourabananda Pahar, IIT Kharagpur, *Modelling of incompressible fluid flow interaction with deformable porous media using particle methods*, 17 November 2017.

B.P. Naveen, Associate Professor, Amity University Gurgaon, *Geotechnical characterization of a municipal solid waste landfill*, 20 November 2017.

V. Agilan, Research Associate, IISc Bangalore, *Modelling non-linear trend in the extreme rainfall series*, 20 November 2017.

Mithun Mohan, Assistant Professor, MES College of Engineering, Kuttippuram, Kerala, Analysis of Mixed Traffic Flow at Uncontrolled Intersections, 27 November 2017.

Anil Kumar Bachu, Senior Project Officer, IIT Madras, *Use of Vehicle Location Data for Advanced Public Transportation Systems Applications*, 29 November 2017.

Hari Narayan Tiwari, Director, Research and Project Consultant, FloodKon, Hydraulic & turbulence characteristics near Piano Key Weir, 7 December 2017.

Anindya Pain, Scientist, CSIR- Central Building Research Institute (CBRI), Roorkee, Modified pseudo-dynamic method for seismic design of geotechnical structure, 11 December 2017.

Lok Priya Srivastava, Research Consultant, Accendere Knowledge Management Service, Delhi, Shear Strength Behaviour of Blocky Rock Mass Reinforced with Passive Bolts, 12 December 2017.

Samim Mustafa, Assistant Professor, JIS

college of engineering, An analytical framework for vibration-based structural health monitoring (SHM) of steel truss bridges using an energy based damping evaluation (EBDE) and Bayesian model updating, 12 December 2017.

K. Srinivasa Raju, Professor, *Birla Institute of Technology and Science, Pilani - Hyderabad Campus, India*, Urban floods under changing climate: Case Study of Hyderabad, 15 December 2017.

Reopal Shah, Research Associate IIT Gandhinagar, *Drought Monitoring and Prediction in India*, 20 December 2017.

Deepak, Research Associate, IISc Bangalore, *Influence of chemo-mechanical factors on engineering behaviour of soft clays*, 21 December 2017.

T.M. Rahul, Assistant Professor, Amrita School of Engineering, Coimbatore, *Acceptable trip distances and built environment management as sustainability tools in transportation planning*, 21 December 2017.

Sat Kumar, Technical Director, Aapah Innovation Ltd., *Remote sensing applications in the Water Resources engineering*, 23 January 2018.

Pritha Chatterjee, Post-doctoral researcher, Tampere University of Technology, Finland, *Decentralized wastewater treatment plants as a sustainable impact mitigation unit*, 30 January 2018.

Mohsen A. Issa, Professor, Civil and Materials Engineering, University of Illinois at Chicago (UIC), *Optimum Bridge Deck System for Rehabilitation and New Bridges*, 5 March 2018.

Krishna R Reddy, Professor, Civil and Materials Engineering, University of Illinois at Chicago (UIC), *Waste Management and Landfill Engineering*, 5 March 2018.

## Workshops / Symposia

*International conference on composite materials and structures (ICCMS 2017)*, IIT Hyderabad, 27-29 December 2017.

*National conference on Geotechnical Applications*, JNTU Hyderabad, 24 Mar 2018.

## Awards / Recognitions

Shashidhar, *Swachchata Award from MHRD* for the contribution towards development of villages, Kowdipalli Mandal of Medak District.

S. Sireesh, *Excellence in Teaching Award - 2017*, IIT Hyderabad.

Suriya Prakash, *Excellence in Teaching Award - 2017*, IIT Hyderabad.

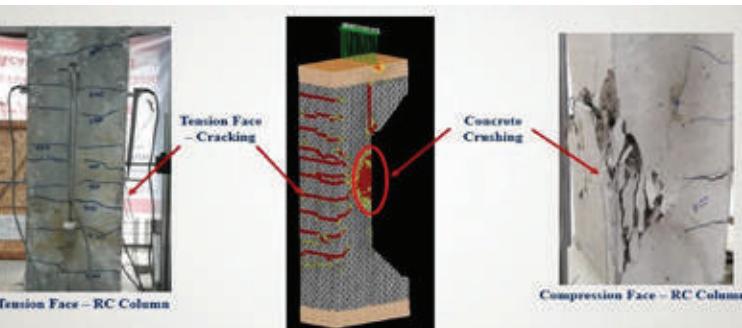
S. Sireesh, *Member of Committee on Geosynthetics (AFS70)*, Transportation Research Board (TRB): 2018-21.

S. Sireesh, *Member of International Geosynthetics Society (IGS) Technical Committee on Stabilization*: 2018-21.

S. Suriya Prakash, *DAAD Fellowship*, Sponsored by Federal Republic of Germany.

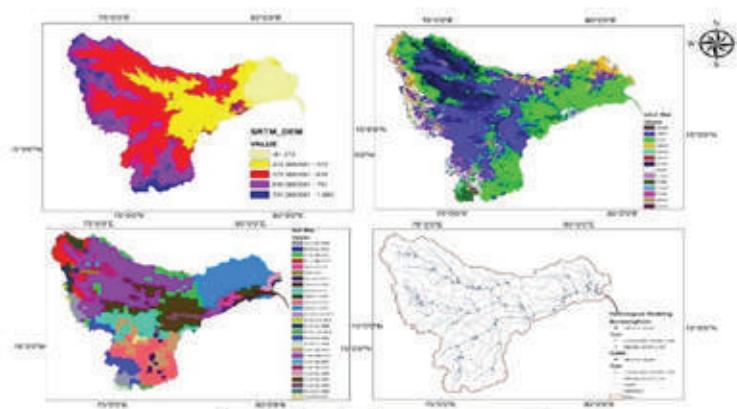
Digvijay S. Pawar, *Best PhD Thesis on urban mobility in cities of developing countries* from CODATU-2017.

## RESEARCH HIGHLIGHT

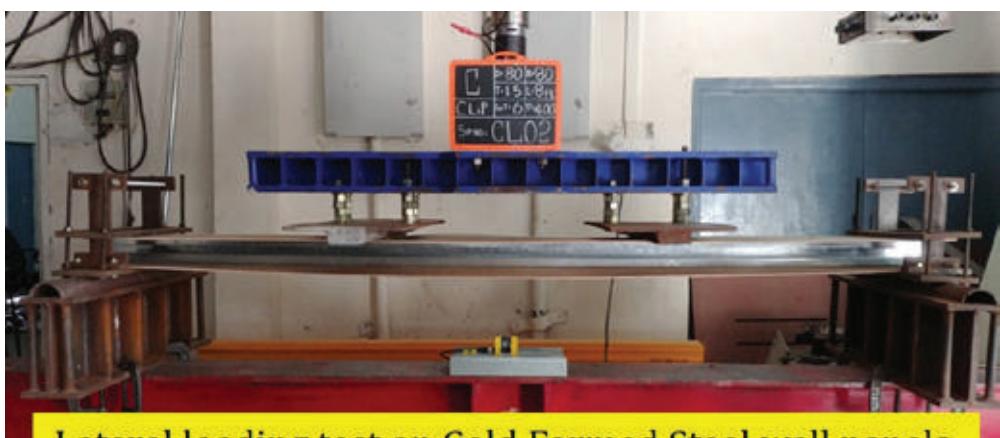


**Failure mode  
of reinforced  
concrete  
columns under  
eccentric  
compression  
loading**

**Behavior of RC  
columns in post-  
earthquake fire  
conditions**



**Seasonal  
hydrological  
predictions  
based on  
regional  
forecasts of  
Krishna river  
basin**



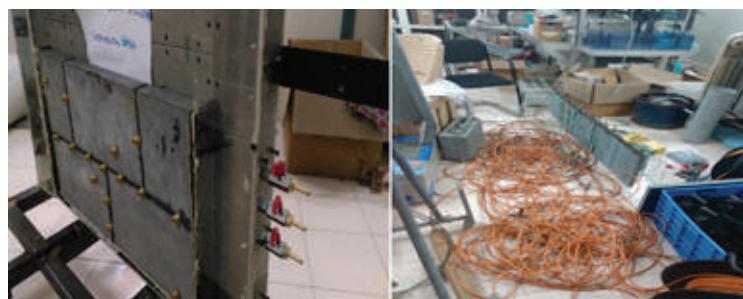
**Lateral loading test on Cold Formed Steel wall panels**

**...RESEARCH HIGHLIGHT**

**Monitoring soil-water-disease interactions in citrus trees of Vidarbha region in central India**



**Analysis of flow through fractured rock blocks using sandbox experiments**



**Wastewater treatment using microalgae**



**Modeling signalized intersection and elevated rotary cum grade separator**



# COMPUTER SCIENCE & ENGINEERING

As IITH completes the tenth year of its existence, the department of Computer Science and Engineering (CSE) has made rapid progress and is continuing to establish itself through state-of-the-art research and teaching. The department comprises of twenty faculty members, with expertise in various research areas including theoretical computer science, algorithms, graph theory, networking, distributed systems, compilers, machine learning, architecture, formal methods, constraint programming and image/video processing. In addition to the regular B.Tech, M.Tech and Ph.D programs, the CSE department has been successfully running the EMDS program for working professionals, and was actively involved in mentoring the CSE department of IIT Bhilai. The department faculty members are recipients of substantial research grants from government agencies like SERB/DST/MHRD, DST-JST, JICA and industry partners such as Intel, IBM, Redpine Signals, and AMD. The department also secured DST-FIST grant of Rs. 2 Crores to further augment R&D infrastructure. Students and faculty members of the CSE department published papers in top-tier venues e.g., ICML, STOC, CVPR and won best paper and academic demo awards at IEEE ANTS and COMSNETS. Individual accolades include Karteek Sreenivasaiah receiving the INSPIRE fellowship, Saurabh Joshi winning medals in the MaxSAT 2017 evaluations and Vineeth Balasubramanian receiving the excellence in teaching award. The department hosted several events, the most prominent of which was the 24<sup>th</sup> edition of National Conference on Communications (NCC 2018) at IITH campus (jointly with the department of EE). The students and alumni of CSE have continued to excel. The alumni of CSE have secured admissions in graduate programs at top universities such as MIT, Princeton and CMU. Students have also received prestigious competitive awards such as Facebook AI Residency fellowship, Google AI Residency fellowship program, S.N. Bose Fellowship, Honda Young Engineer and Scientist Award, and TCS scholarship.



## FACULTY

 <p><b>M.V.P. Rao</b> Ph.D – IISc Bangalore <i>Associate Professor &amp; HoD</i> <i>Research Areas:</i> Algorithms, Formal Methods</p>	 <p><b>Sathya Peri</b> Ph.D – University of Texas at Dallas <i>Associate Professor</i> <i>Research Areas:</i> Parallel Systems: Software Transactional Memory, Concurrent Data-Structures, Database Concurrency Control. Distributed Systems: Blockchains – Ethereum &amp; Bitcoin network, Peer-to-Peer Computing, Grid Computing. Algorithm analysis, Networking algorithms</p>
 <p><b>Bheemarjuna Reddy Tamma</b> Ph.D – IIT Madras <i>Associate Professor</i> <i>Research Areas:</i> Converged radio access networks (LTE/Wi-Fi), SDN/NFV in 5G, M2M/IoT, Mobile Social Networks in Proximity, Multimedia over Wireless, Green ICT and Network Security</p>	 <p><b>Ch. Sobhan Babu</b> Ph.D – IIT Bombay <i>Associate Professor</i> <i>Research Areas:</i> Big Data Analytics, Social Networks Analysis</p>
 <p><b>N.R. Aravind</b> Ph.D – Institute of Mathematical Sciences, Chennai <i>Associate Professor</i> <i>Research Areas:</i> Algorithms, parameterized complexity, graph theory, combinatorics</p>	 <p><b>J. Saketha Nath</b> Ph.D – IISc Bangalore <i>Associate Professor</i> <i>Research Areas:</i> Machine Learning</p>
 <p><b>Subrahmanyam Kalyanasundaram</b> Ph.D – Georgia Tech, USA <i>Associate Professor</i> <i>Research Areas:</i> Theoretical Computer Science, Algorithms, Complexity theory, Algebra, Graph Theory</p>	 <p><b>Sparsh Mittal</b> Ph.D – Iowa State University, USA <i>Assistant professor</i> <i>Research Areas:</i> Computer architecture, architectures for deep learning, GPU, accelerators for machine learning</p>
 <p><b>Vineeth N Balasubramanian</b> Ph.D – Arizona State University, USA <i>Associate Professor</i> <i>Research Areas:</i> Machine Learning, Deep Learning, Computer Vision</p>	 <p><b>Saurabh Joshi</b> Ph.D – IIT Kanpur <i>Assistant Professor</i> <i>Research Areas:</i> Program Analysis, Formal Verification, Formal Methods, Constraint Solving,</p>
 <p><b>C. Krishna Mohan</b> Ph.D – IIT Madras <i>Associate Professor</i> <i>Research Areas:</i> Video Content Analysis, Machine Learning</p>	 <p><b>Srijiit P K</b> Ph.D – IISc Bangalore <i>Assistant Professor</i> <i>Research Areas:</i> Machine learning : Bayesian learning, Deep learning, Bayesian nonparametrics, social media and text analysis</p>

## FACULTY

**Manish Singh**

Ph.D – University of Michigan, USA

*Assistant Professor*

**Research Areas:** Databases, Data Mining, Text Mining, Social Network Analysis, Information Retrieval

**A. Antony Franklin**

Ph.D – IIT Madras

*Assistant Professor*

**Research Areas:** 5G, Cloud Radio Access Networks, SDN/NFV, Mobile Edge Computing

**Maunendra Sankar Desarkar**

Ph.D – IIT Kharagpur

*Assistant Professor*

**Research Areas:** Recommendation Systems, Information retrieval, Social Network Analysis, Data Mining, Machine Learning

**Kotaro Kataoka**

Ph.D – Keio University, Japan

*Visiting Associate Professor*

**Research Areas:** Software-Defined Networking, Network Function Virtualization, Blockchain

**Karteek Sreenivasaiah**

Ph.D – The Institute of Mathematical Sciences, Chennai

*Assistant Professor*

**Research Areas:** Computational Complexity, Theoretical Computer Science

**Ramakrishna Upadrasta**

Ph.D – University of Paris and INRIA, Paris

*Assistant Professor*

**Research Areas:** Compilers, Compiler Optimizations, Automatic Parallelization, Vectorization, LLVM

**Manohar Kaul**

Ph.D – Aarhus University, Denmark

*Assistant Professor*

**Research Areas:** Applied Algebraic Topology, Topological Data Analysis, Machine Learning, Spatial Databases, Computational Geometry

## Patents Filed

Raghu S. Iyengar and Vineeth N. Balasubramanian, *Shuffling of Input Data for Mini-Batch Gradient Descent Based Methods*, April 2017, US Patent Application No.: 15/486,787.

Debaditya Roy, Dinesh Singh, C. Vishnu and C. Krishna Mohan, *A method and system for detection of crime events in surveillance videos*, Intellectual Property India, 1 November 2017, Indian Complete Patent Application No.: 201741041239.

C. Krishna Mohan, Dinesh Singh, C. Vishnu, and Debaditya Roy, *A method and system for real time detection of traffic violation by two-wheeled riders*, Intellectual Property India, 17 November 2017, Indian Complete Patent Application No.: 201741038813.

C. Krishna Mohan, Dinesh Singh, C. Vishnu, and Debaditya Roy, *Method and system for detection of accident in traffic surveillance video*, Intellectual Property India, 31 January 2018, Indian Complete Patent Application No.: 201841003604.

## Patents Granted

K. Vamshi Krishna, Bheemarjuna Reddy Tamma, M. Manoj Kumar and Nitesh Shah, *Systems and Methods for Dynamic Wideband Channel Selection*, April 2017, Publication Nto. US9622252B2.

## Book & Book Chapters

Earnest Paul Ijjina and C. Krishna Mohan, Human behavioural analysis using evolutionary algorithms and deep learning, *Hybrid Intelligence for Image Analysis and Understanding*, John Wiley, UK, August 2017, 165-186, ISBN101119242924, ISBN13 9781119242925.

## Publications (in peer reviewed journals)

Thomas Valerian Pasca, Sumanta Patro, Bheemarjuna Reddy Tamma and A. Antony Franklin, Network Coordination Function for Uplink Traffic Steering in Tightly Coupled LTE Wi-Fi Networks, *Elsevier Computer Networks*, 127, 2017, 296-316.

Anil Kumar Rangisetti and Bheemarjuna Reddy Tamma, Software Defined Wireless Networks: A Survey of Issues and Solutions, *Springer Wireless Personal Communications*, 97, 2017, 6019-6053.

Shreshta Ghosh, Vanlin Sathya, Arun Ramamurthy, B. Akikesh and Bheemarjuna Reddy Tamma, A Novel Resource Allocation and Power Control Mechanism for Hybrid Access Femtocells, *Elsevier Computer Communications*, 109, 2017, 53-75.

N.R. Aravind, R.B. Sandeep and Naveen Sivadasan, On polynomial kernelization of H-free edge deletion, *Algorithmica*, 79(3), 2017, 654-666.

Earnest Paul Ijjina and C. Krishna Mohan, Human action recognition in RGB-D using motion sequence and deep learning, *Pattern Recognition (Elsevier)*, 72, December 2017, 504-516, 10.1016/j.patcog.2017.07.013.

Shyju Wilson and C. Krishna Mohan, Coherent and non-coherent dictionaries for action recognition, *IEEE Signal Processing Letters*, 24(5), 2017, 698-702, 10.1109/LSP.2017.2690461.

Dinesh Singh and C. Krishna Mohan, Graph formulation of video activities for abnormal activity recognition, *Pattern Recognition (Elsevier)*, 65, 2017, 265-273, 10.1016/j.patcog.2017.01.001.

Petr Kouznetsov and Sathya Peri, Non-Interference and Local Correctness in Transactional Memory, *Theoretical Computer Science* 688, 2017, 103-116.

Guoliang Zhu, Kai Lu, Xiaoping Wang, Yiming Zhang, Pengfei Zhang, and Sparsh Mittal, SwapX: An NVM-based hierarchical swapping framework, *IEEE Access*, 5, 2017.

Sparsh Mittal, A Survey of Value Prediction Techniques for Leveraging Value Locality, *Concurrency and Computation: Practice and Experience*, 29, 2017, e4250.

Sparsh Mittal, A Survey of Techniques for Cache Partitioning in Multicore Processors, *ACM Computing Surveys*, 50(2), 2017, 27:1-27:39.

Vojtech Forejt, Saurabh Joshi, Daniel Kroening, Ganesh Narayanaswamy, and Subodh Sharma, Precise Predictive Analysis for Discovering Communication Deadlocks in MPI Programs, *ACM Transactions on Programming Languages and Systems (TOPLAS)*, 39, 2017, 15:1-15:27.

Thomas Valerian Pasca, Sumanta Patro, Bheemarjuna Reddy Tamma and A. Antony Franklin, Network Coordination Function for Uplink Traffic Steering in Tightly Coupled LTE Wi-Fi Networks, *Computer Networks*, 127, 2017, 296-316.

Samujjwal Ghosh, P.K. SriJith and Maunendra Sankar Desarkar, Using Social Media for Classifying Actionable Insights in Disaster Scenario, *International Journal of Advances in Engineering Sciences*, 9(4), 224-237, ISSN 0975-0770.

Chen Xu, Markus Holzemer, Manohar Kaul, Juan Soto, and Volker Markl, On Fault Tolerance for Distributed Iterative Dataflow Processing, *IEEE Transactions on Knowledge and Data Engineering (TKDE)*, 2017, 1709-1722, 10.1109/TKDE.2017.2690431.

Anshu S. Anand, R. K. Shyamasundar and Sathya Peri, STMs in Practice: Partial Rollback vs Pure Abort Mechanisms, *Concurrency and Computation: Practice and Experience*, 2018, <https://doi.org/10.1002/cpe.4465>.

Sparsh Mittal and Ahmed Alsalibi, A Survey of Techniques for Improving Security of Non-volatile Memories, *Journal of Hardware and Systems Security*, 2018, 10.1007/s41635-018-0034-5.

Ahmed I. Alsalibi, Sparsh Mittal, Mohammed Azmi Al-betar and Putra Bin Sumari, A Survey of Techniques for Architecting SLC/MLC/TLC Hybrid Flash Memory based SSDs, *Concurrency and Computation Practice and Experience*, 2018, 10.1002/cpe.4420.

Sparsh Mittal, Ruija Wang, and Jeffrey Vetter, DESTINY: A Comprehensive Tool with 3D and Multi-level Cell Memory Modeling

Capability, *Journal of Low Power Electronics and Applications*, 7(3), 2018, 23.

Nagendra Kumar, Gopi Ande, Jessu Shirish Kumar, and Manish Singh, Toward maximizing the visibility of content in social media brand pages: a temporal analysis, *Springer Social Network Analysis and Mining*, 8, 2018.

Shyju Wilson and C. Krishna Mohan, An information bottleneck approach to optimize the dictionary of visual data, *IEEE Transactions on Multimedia*, 20(1), 2018, 96-106 [10.1109/TMM.2017.2716835](https://doi.org/10.1109/TMM.2017.2716835).

Debaditya Roy and C. Krishna Mohan, Snatch Theft Detection in Unconstrained Surveillance Videos Using Action Attribute Modeling, *Pattern Recognition Letters (Elsevier)*, 2018, [10.1016/j.patrec.2018.03.004](https://doi.org/10.1016/j.patrec.2018.03.004).

## Publications (in peer reviewed conferences)

Thomas Valerian Pasca, Adharsh Srivats Rangarajan, Bheemarjuna Reddy Tamma and A. Antony Franklin, Optimal Placement of Colocated and Non-Colocated LWA Nodes in Dense Deployments, *IEEE ANTS*, 2017.

Tulja Vamshi Kiran Buyakar, Anil Kumar Rangisetti, A. Antony Franklin and Bheemarjuna Reddy Tamma, Auto Scaling of Data Plane VNFs in 5G Networks, *IEEE CNSM*, 2017.

Thomas Valerian Pasca, Sumanta Patro, Bheemarjuna Reddy Tamma, A. Antony Franklin, A Real-Time Performance Evaluation of Tightly Coupled LTE Wi-Fi Radio Access Networks, *IEEE ANTS*, 2017.

Anand M. Baswade, M.R. ShashiKiran, Bheemarjuna Reddy Tamma and A. Antony Franklin, On Placement and Efficient Resource Allocation of LAA/LTE-U Base Stations in HetNet, *IEEE ANTS*, 2017.

Thomas Valerian Pasca, Bheemarjuna Reddy Tamma, and A. Antony Franklin, VISIBLE: Virtual Congestion Control with Boost ACKs for Packet Level Steering in LWIP Networks, *IEEE GLOBECOM*, 2017, [10.1109/GLOCOM.2017.8254981](https://doi.org/10.1109/GLOCOM.2017.8254981).

Thomas Valerian Pasca, Himank Gupta, Bheemarjuna Reddy Tamma and A. Antony Franklin, PRECISE: Power Aware Dynamic

- Traffic Steering in Tightly Coupled LTE Wi-Fi Networks, *IEEE PIMRC*, 2017.
- P.C. Amogh, Goutham Veeramachaneni, Anil Kumar Rangisetti, Bheemarjuna Reddy Tamma, and A. Antony Franklin, A Cloud Native Solution for Dynamic Auto Scaling of MME in LTE, *IEEE PIMRC*, 2017.
- N.R. Aravind, Subrahmanyam Kalyanasundaram and Anjeneya Swami Kare, On Structural Parameterizations of the Matching Cut Problem, *COCOA 2017*, 475-482.
- Anshu S. Anand, R.K. Shyamasundar and Sathya Peri, STMs in Practice: Partial Rollback vs Pure Abort Mechanisms, *10<sup>th</sup> International Symposium on High-Level Parallel Programming and Applications*, Valladolid, Spain, 2017.
- Ajay Singh, Sathya Peri, G. Monika, and Anila Kumari, Performance comparison of various STM concurrency control protocols using Synchrobench, *Parallel Computing Technologies (PARCOMPTECH)*, Bangalore, India, 2017.
- Nandini Singhal, Sathya Peri, and Subrahmanyam Kalyanasundaram, Practical Multi-threaded Graph Coloring Algorithms for Shared Memory Architecture, *1<sup>st</sup> International Workshop on Algorithms & Architectures for Distributed Data Analytics (AADDA)*, in conjunction with ICDCN 2017, Hyderabad, India.
- Priya Mehta, Jithin Mathews, S.V. Kasi Visweswara Rao, K. Sandeep Kumar, and Ch. Sobhan Babu, A Graph Theoretical Approach for Identifying Fraudulent Transactions in Circular Trading, *Proceeding of the Sixth International Conference on Data Analytics*, 2017.
- Guoliang Zhu, Kai Lu, Pengfei Zhang, Xiaoping Wang, and Sparsh Mittal, Architecting NVM in Virtualized Memory Systems, *Design Automation Conference (DAC)* (work-in-progress), 2017.
- P.K. SriJith, Michal Lukasik, Kalina Bontcheva, and Trevor Cohn, Longitudinal Modeling of Social Media with Hawkes Process based on Users and Networks, *IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*, 2017.
- Nagendra Kumar, Rahul Utkoor, Bharath KR Appareddy, and Manish Singh, Generating Topics of Interests for Research Communities, *Springer AMDA*, 2017, 488-501.
- Nagendra Kumar, Yash Chandarana, Konjengbam Anand, and Manish Singh, Using Social Media for Word-of-Mouth Marketing, *Springer DaWaK*, 2017.
- Thomas Valerian Pasca, Adharsh Srivats Rangarajan, Bheemarjuna Reddy Tamma and A. Antony Franklin, Optimal Placement of Colocated and Non-Colocated LWA Nodes in Dense Deployments, *IEEE ANTS*, 2017.
- Thomas Valerian Pasca, Sumanta Patro, Bheemarjuna Reddy Tamma, A. Antony Franklin, A Real-Time Performance Evaluation of Tightly Coupled LTE Wi-Fi Radio Access Networks, 2017.
- Shashwat Kumar and A. Antony Franklin, Consolidated Caching with Cache Splitting and Trans-rating in Mobile Edge Computing Networks, *IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS)* 2017.
- Shashwat Kumar, Himank Gupta, and A. Antony Franklin, Experimental Evaluation of YouTube Performance on MPTCP-based LTE-WLAN Integration, *IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS)* 2017.
- Anand M. Baswade, M.R. ShashiKiran, Bheemarjuna Reddy Tamma and A. Antony Franklin, On Placement and Efficient Resource Allocation of LAA/LTE-U Base Stations in HetNet, *IEEE ANTS*, 2017.
- T.V.K. Buyakar, A.K. Rangisetti, A. Antony Franklin, and B.R. Tamma, Auto scaling of data plane VNFs in 5G networks, *International Workshop on Management of SDN and NFV Systems co-located with International Conference on Network and Service Management*, 2017, 1-4.
- Thomas Valerian Pasca, Bheemarjuna Reddy Tamma, and A. Antony Franklin, VISIBLE: Virtual Congestion Control with Boost ACKs for Packet Level Steering in LWIP Networks, *IEEE GLOBECOM*, 2017.
- Thomas Valerian Pasca, Himank Gupta, Bheemarjuna Reddy Tamma, and A. Antony Franklin, PRECISE: Power Aware Dynamic Traffic Steering in Tightly Coupled LTE Wi-Fi Networks, *IEEE PIMRC*, 2017.

P.C. Amogh, Goutham Veeramachaneni, Anil Kumar Rangisetti, Bheemarjuna Reddy Tamma, and A. Antony Franklin, A Cloud Native Solution for Dynamic Auto Scaling of MME in LTE, *IEEE PIMRC*, 2017.

S. Thomas Valerian Pasca, Siva Sairam Prasad Kodali and Kotaro Kataoka, AMPS: Application aware multipath flow routing using machine learning in SDN, *Proceedings of Twenty-third National Conference on Communications (NCC)*, 2017.

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Hrishikesh Vaidya, B. Akilesh, Abhishek Patwardhan and Ramakrishna Upadrasta, When Polyhedral Optimizations Meet Deep Learning Kernels, *HiPC 2017* [One of the 3 top rated posters out of 60 submissions].

Annanay Agarwal, Michael Kruse, Brian Retford, Tobias Grosser and Ramakrishna Upadrasta, Enabling Polyhedral optimizations in TensorFlow through Polly, Poster, *US LLVM Developers' Meeting 2017*, <https://llvm.org/devmtg/2017-10/>.

Dangeti Tharun Kumar, Utpal Bora, Santanu Das, Tobias Grosser and Ramakrishna Upadrasta, Improved Loop Distribution in LLVM using Polyhedral Dependences, *The Fourth Workshop on the LLVM Compiler Infrastructure in HPC*, <https://llvm-hpc4-workshop.github.io/>

Keyur Joshi, Ramakrishna Upadrasta and Albert Cohen, Implementation of a Cache Miss Calculator in LLVM/Polly, *The Fourth Workshop on the LLVM Compiler Infrastructure in HPC*, <https://llvm-hpc4-workshop.github.io/>

Shalini Jain, Kamlesh Kumar, Suresh Purini, Dibyendu Das and Ramakrishna Upadrasta, An LLVM based Loop Profiler, *US LLVM Developers' Meeting 2017* <https://llvm.org/devmtg/2017-10/>

Manohar Kaul, Elementary, dear Watson! *Conference on Innovative Data Systems Research (CIDR)*, 2017.

Radhiya Arsekar, Durga Keerthi Mandarapu,

and M.V. Panduranga Rao, EpiStrat: A Tool for Comparing Strategies for Tackling Urban Epidemic Outbreaks, *ICSH 2017, LNCS 10347, Springer*, 256-267.

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Sreekanth Madisetty and Maunendra Sankar Desarkar, NSEmo at EmoInt-2017: An Ensemble to Predict Emotion Intensity in Tweets, *8<sup>th</sup> Workshop on Computational Approaches to Subjectivity, Sentiment & Social Media Analysis (WASSA) 2017* at EMNLP 2017, Copenhagen, Denmark, 7–11 September 2017.

Sreekanth Madisetty and Maunendra Sankar Desarkar, IITH at CLEF 2017: Finding Relevant Tweets for Cultural Events. Experimental IR Meets Multilinguality, Multimodality, and Interaction, *8<sup>th</sup> International Conference of the CLEF Association, CLEF 2017*, Dublin, Ireland, 11-14 September 2017.

T. Marwah, G. Mittal and V. Balasubramanian, Sync-DRAW, Automatic Video Generation using Deep Recurrent Attentive Architectures, *Proceedings of ACM International Conference on Multimedia (ACM MM'17)*, October 2017, 1096-1104.

G. Mittal, T. Marwah, and V. Balasubramanian, Attentive Semantic Video Generation using Captions, *Proceedings of IEEE International Conference on Computer Vision (ICCV'17)*, October 2017, 1435-1443.

S. Swetha, V. Balasubramanian and C. V. Jawahar, Sequence to Sequence learning for Pose Correction in Videos, *Proceedings of 4<sup>th</sup> Asian Conference on Pattern Recognition (ACPR'17)*, November 2017.

Sreekanth Madisetty and Maunendra Sankar Desarkar, Exploiting Meta Attributes for Identifying Event Related Hashtags, *9<sup>th</sup> International Conference on Knowledge Discovery and Information Retrieval (KDIR*

- 2017), Madeira, Portugal, 1-3 November 2017.
- Sreekanth Madisetty and Maunendra Sankar Desarkar, An Ensemble Based Method for Predicting Emotion Intensity of Tweets, *5<sup>th</sup> International Conference on Mining Intelligence and Knowledge Exploration (MIKE) 2017*, Hyderabad, India, 13-15 December 2017.
- Mukesh Kumar Giluka, Tathagat Priyadarshi, Shakti Kumar, A. Antony Franklin, and Bheemarjuna Reddy Tamma, An Enhanced EAB Algorithm to Reduce RACH Congestion Due to IoT Traffic in LTE-A Networks, *IEEE WF-IoT*, 2018.
- Sumanta Patro, Thomas Valerian Pasca, Bheemarjuna Reddy Tamma, A. Antony Franklin, INCARNATE: An Interference Aware Spatial Scheme for Tightly Coupled LTE-Wi-Fi Networks, *IEEE COMSNETS*, 2018.
- Anand M. Baswade, Touheed Atif, Bheemarjuna Reddy Tamma and A. Antony Franklin, LTE-U and Wi-Fi Hidden Terminal Problem: How Serious is it for Deployment Considerations?, *IEEE COMSNETS*, 2018.
- Anand M. Baswade, M.R. ShashiKiran, Bheemarjuna Reddy Tamma and A. Antony Franklin, On Placement of LAA/LTE-U Base Stations in Heterogeneous Wireless Networks, *ACM ICDCN*, 2018.
- Priya Mehta, Jithin Mathews, S.V. Kasi Visweswara Rao, K. Sandeep Kumar, and Ch. Sobhan Babu, A Collusion Set Detection in Value added Tax using Benford's Analysis, *Proceedings of IEEE Computing Conference*, 2018.
- Jithin Mathews, Priya Mehta, S.V. Kasi Visweswara Rao, K. Sandeep Kumar, and Ch. Sobhan Babu, An Algorithmic Approach to Handle Circular Trading in Commercial Taxation System, *Proceedings of ICBDA*, 2018.
- Jithin Mathews, Priya Mehta, S.V. Kasi Visweswara Rao, K. Sandeep Kumar, and Ch. Sobhan Babu, Clustering Collusive Dealers in Commercial Taxation Systems, *Proceedings of IEEE Intelligent Systems*, 2018.
- Sparsh Mittal and others, Architecting SOT-RAM Based GPU Register File, *Proceedings of IEEE Computer Society Annual Symposium on VLSI (ISVLSI)*, 2018.
- Lei Jiang, Sparsh Mittal, and Wujie Wen, Building a Fast and Power Efficient Inductive Charge Pump System for 3D Stacked Phase Change Memories, *Proceedings of ACM Great Lakes Symposium on VLSI (GLSVLSI)*, 2018.
- Saurabh Joshi, Subramanyam Kalyanasundaram, Anjeneya Swami Kare, and Bhyravarapu Sriram, On the tractability of (k,i)-coloring, *Conference on Algorithms and Discrete Applied Mathematics*, LNCS, 10743, 2018, 188-198.
- Samujjwal Ghosh, P.K. Srijith, and Maunendra Sankar Desarkar, Using Social Media for Classifying Actionable Insights in Disaster Scenario, *International Journal of Advances in Engineering Sciences*, 2018.
- Ashwin R. Ravi, P.K. Srijith, Accelerating Hawkes Process for Modelling Event History Data, *International Conference on Communication Systems and Networks*, 2018.
- Subrata Ghosh, Konjengbam Anand, Sailaja Rajanala, A Bharath Reddy, and Manish Singh, Unsupervised stance classification in online debates, *ACM CODS-COMAD*, 2018, 30-36.
- B Akilesh, Nagendra Kumar, Bharath Reddy, and Manish Singh, TRAFAN: Road traffic analysis using social media web pages, *IEEE COMSNET*, 2018, 655-659.
- Nagendra Kumar, Anusha Yadandla, K. Suryamukhi, Neha Ranabothu, Sravani Boya, and Manish Singh, Arousal Prediction of News Articles in Social Media, *Springer MIKE*, 308-319.
- Mukesh Kumar Giluka, Tathagat Priyadarshi, Shakti Kumar, A. Antony Franklin, and Bheemarjuna Reddy Tamma, An Enhanced EAB Algorithm to Reduce RACH Congestion Due to IoT Traffic in LTE-A Networks, *IEEE WF-IoT*, 2018.
- Sumanta Patro, Thomas Valerian Pasca, Bheemarjuna Reddy Tamma, and A. Antony Franklin, INCARNATE: An Interference Aware Spatial Scheme for Tightly Coupled LTE-Wi-Fi Networks, *IEEE COMSNETS*, 2018.
- Anand M. Baswade, Touheed Atif, Bheemarjuna Reddy Tamma and A. Antony Franklin, LTE-U and Wi-Fi Hidden Terminal Problem: How Serious is it for Deployment Considerations?, *IEEE COMSNETS*, 2018.

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Prashanth Podili and Kotaro Kataoka, Effective Resource Provisioning for QoS-aware Virtual Networks in SDN, Proceedings of IEEE/IFIP Network Operations and Management Symposium (NOMS), 2018.

Kotaro Kataoka, Saurabh Gangwar and Prashanth Podili, Trust List: Internet-wide and Distributed IoT Traffic Management Using Blockchain and SDN, *Proceedings of IEEE 4<sup>th</sup> World Forum on Internet of Things (WF-IoT)*, 2018.

Supriya Pandhare, Himangi Mittal, Manish Gupta, and V. Balasubramanian, STWalk: Learning Trajectory Representations in Temporal Graphs, *Proceedings of the ACM India Joint International Conference on Data Science and Management of Data (CoDS-COMAD'18)*, January 2018, 210-219.

A. Ravi Sankar and V. Balasubramanian, Are Saddles Good Enough for Deep Learning, *arXiv:1706.02052*, Proceedings of the ACM India Joint International Conference on Data Science and Management of Data (CoDS-COMAD'18), January 2018.

S. Vishwak, A. Ravi Sankar, and V. Balasubramanian, ADINE: An Adaptive Momentum Method for Stochastic Gradient Descent, *Proceedings of the ACM India Joint International Conference on Data Science and Management of Data (CoDS-COMAD'18)*, January 2018, 249-256.

S. Joshi, S. Kalyanasundaram, A. S. Kare and B. Sriram, On the Tractability of  $(k, i)$ -Coloring, *Proceedings of the 4<sup>th</sup> International Conference on Algorithms and Discrete Applied Mathematics - CALDAM 2018*, Guwahati, India, February 2018, 188-198.

S. Kalyanasundaram and K. W. Regan, Exact computation of the number of accepting paths of an NTM, *Proceedings of the 4<sup>th</sup> International Conference on Algorithms and Discrete Applied Mathematics - CALDAM 2018*, Guwahati, India, February 2018, 105-117.

Anirban Sarkar, Aditya Chattopadhyay, Prantik Howlader and V. Balasubramanian, *Grad-CAM++: Generalized Gradient-based Visual Explanations for Deep Convolutional Networks*, *Proceedings of IEEE Winter Conference on Applications of Computer Vision (WACV'18)*, March 2018.

## Funded Research Projects 2017-18

N.R. Aravind, *Thresholds for random graph models*, SERB, Rs. 6.0 Lakhs.

Ch. Sobhan Babu, *Big Data Analytics on Value Added Tax Data*, Telangana Government, Rs. 60.00 Lakhs.

P.K. Srijith, *Towards Understanding the Diffusion of Misinformation in Online Social Networks*, SERB, 3 June 2017, Rs. 22.5 Lakhs.

Sathya Peri, *An Efficient Software Framework for developing Reliable Multi-threaded Applications for Multi-Core Architectures*, MHRD & MEITY, August 2017, Rs. 60.00 Lakhs.

Sparsh Mittal, *Secure and Reliable Non-volatile Memories for Ultra-low Power Applications*, SERB, 1 August 2017, Rs. 44.00 Lakhs.

Saurabh Joshi, *Scope Enrichment of Verification Technologies*, SERB, 30 August 2017, Rs. 22.5 Lakhs.

Maunendra Sankar Desarkar, *Semantic Analysis of Banking Regulatory Documents*, Parabole India Private Limited, September 2017, Rs. 10.35 Lakhs.

A. Antony Franklin, *Collaboration between Indian and Sweden to Investigate Ultra-Reliable Low-Latency Protocols for 5G Wireless Networks*, The Swedish Foundation for International Cooperation in Research and Higher Education (STINT), 148,000 swedish krona, December 2017, Rs. 11.5 Lakhs.

Kotaro Kataoka, *Blockchain*, chaintope Inc, 27 December 2017, Rs. 12.0 Lakhs.

Vineeth N. Balasubramanian, *Understanding*

*Error Surfaces of Deep Neural Networks*, SERB/DST MATRICS, January 2018, Rs. 6.60 Lakhs.

Vineeth N. Balasubramanian, *Detection and Prediction of Anomalous Aerial Vehicle Behaviour using Explainable Artificial Intelligence*, MHRD Uchhatar Avishkar Yojana (UAY) Program (jointly sponsored by Honeywell, January 2018, Rs. 60.00 Lakhs.

Vineeth N. Balasubramanian, *Taking Vision to the Skies: Understanding Humans from Unmanned Aerial Vehicles (Drones)*, IBM Shared University, January 2018, USD 10,000.

Sparsh Mittal, *Designing efficient accelerators for ANN and SNN architectures*, Intel, 1 January 2018, Rs. 22.50 Lakhs.

### Talks Given in National / International Conferences

P.C. Amogh, Goutham Veeramachaneni, Anil Kumar Rangisetti, Bheemarjuna Reddy Tamma, and A. Antony Franklin, *A Cloud Native Solution for Dynamic Auto Scaling of MME in LTE*, IEEE PIMRC, 2017.

Sparsh Mittal, *Towards addressing memory bottlenecks in hardware accelerators for machine learning*, Intel India Research Colloquium, Bengaluru, 9 October 2017.

A. Antony Franklin, *Cloud Radio Access Networks (C-RAN)*, invited talk at One Day Workshop on 5G, C-DOT, Delhi, 16 November 2017.

A. Antony Franklin, *Auto scaling of data plane VNFs in 5G networks*, the International Workshop on Management of SDN and NFV Systems, Tokyo, 26-30 November 2017.

Vineeth N. Balasubramanian, *From Recognition to Generation using VAEs*, Keynote Talk, ICC3 Conference, Coimbatore, December 2017.

Vineeth N. Balasubramanian, *Deep Learning: A Review*, Invited Talk, ACM-MSR Academic Summit on AI, Hyderabad, January 2018.

Vineeth N. Balasubramanian, *Deep Generative Models for Video Creation*, NVIDIA GPU

Technology Conference (GTC), San Jose, CA, USA, March 2018.

Vineeth N. Balasubramanian, *Explainability in Deep Learning: Grad-CAM++*, Google AI/ML Workshop, Bangalore, March 2018.

### Seminars

Dr. P. Sajith, Indian Institute of Technology Bombay, *Symmetry breaking, Proper coloring and List coloring of Graphs*, 24 April 2017.

Prof. Sriram V. Pemmaraju, University of Iowa, *Designing Distributed Algorithms for the Congested Clique*, 14 June 2017.

Michal Lukasik, University of Sheffield, *Modeling temporal dynamics of rumours in social media*, 28 July 2017.

Mr. Sankar Raj, Prompt InfoTech, *Ethical Hacking & Cyber Security*, 9 August 2017.

Dr. Satish Srirama, University of Tartu, Estonia, *Mobile and Cloud Centric IoT*, 17 August 2017.

Prof. Kishore Kothapalli, International Institute of Information Technology Hyderabad, *Ear Decomposition of Graphs with Application to Path-based Problems*, 6 September 2017.

Dr. N.V. Narendra Kumar, IDRBT, *Blockchain Technology and Cryptocurrency*, 14 September 2017.

Dr. Matjaz Kovse, Indian Institute of Technology Bhubaneswar, *Distance matrices of partial cubes*, 28 November 2017.

Dr. R. Inkulu, IIT Guwahati, *A polynomial time algorithm for finding an approximate shortest path amid weighted regions*, 4 December 2017.

Dr. Niloy Ganguly, Indian Institute of Technology Kharagpur, *Extracting and Utilizing Information from Microblogs during Disaster*, 14 December 2017.

Dr. Balagopal Komarath, Saarland University, *the complexity of hazard-free circuits*, 12 December 2017.

Dr. Souvik Ray, Oracle, California, *Micro-services and Streaming data pipelines*, 15 December 2017.

Dr. Sushmita Gupta, the University of Bergen, Norway, *Multivariate Analysis of Hard Variants of Stable Marriage Problem*, 5 January 2018.

Dr. R Krithika, Institute of Mathematical Sciences, Chennai, *The Parameterized Complexity of Cycle Packing: Indifference is Not an Issue*, 2 January 2018.

Mr. Hamim Zafar, Rice University, Houston, USA, *Probabilistic Models and Inference Algorithms for Single-cell Genomics: Applications in Cancer Evolution*, 11 January 2018.

Dr. Maria Francis, Institute for Algebra at the Johannes Kepler University (JKU), *Polynomial Rings over Commutative Rings - Algorithmic techniques and Applications*, 12 January 2018.

Dr. Ramesh Karri, New York University, *Is Hardware the Next Frontier in Cybersecurity?*, 15 January 2018.

Dr. Rahul Thakur, BITS Goa, *An Energy Efficient Resource Allocation Technique for Femtocell, Device-to-Device, and IoT Networks*, 24 January 2018.

Prof. Ponnurangam Kumaraguru, IIIT Delhi, *Social Complexity and Computing on Online Networks*, 15 February 2018.

Dr. Emtiyaz Khan, Riken Centre for Advanced Intelligence Project, Tokyo, *Inference through the Optimizer: Bayesian deep learning via perturbed adaptive learning-rate methods*, 8 March 2018.

Prof. Sanjay Rajopadhye, Colorado State University, USA, *What is the Polyhedral Model (& Why Should I Care)*, 14 March 2018.

## Workshops / Symposiums

GCCS workshop on *Cyber Security at IITH campus* on 4 November 2017

24<sup>th</sup> edition of National Conference on Communications (NCC 2018) at IITH campus, 25-28 February 2018. It was organized jointly with EE dept of IITH.

## Awards / Recognitions

Thomas Valerian Pasca, Sumanta Patro, Bheemarjuna Reddy Tamma, A. Antony Franklin, *Second Best Paper Award* for the paper for A Real-Time Performance Evaluation of Tightly Coupled LTE Wi-Fi Radio Access Networks, IEEE ANTS, December 2017

Saurabh Joshi, *Early Career Research Award 2017*.

Saurabh Joshi, MaxSAT evaluations 2017: 2 gold medals, 1 silver medal.

P.K. Srijith, *Early Career Research Award 2017*.

Karteek Sreenivasaiah, *INSPIRE Fellowship*.

Ramakrishna Upadrasta, *Google Summer of Code in LLVM*, Annanay Agarwal, Malhar Thakkar.

Jayashree Poujagendy, *TCS PhD Scholarship*.

Thomas Valerian Pasca, Himank Gupta, Sumanta Patro, Bheemarjuna Reddy Tamma, and Antony Franklin, *Best Academic Demo Award* to the demo LTE WiFi Radio Level Integration at RLC layer: A Demo of LWIR, IEEE COMSNETS, January 2018.

# DESIGN

The Department of Design currently offers Master of Design (M.Des), Ph.D in Design along with a new addition in the list – Minor Program in Design for the B.Tech students. The departmental approach has been to encourage and engage its immediate community of users. Both faculty and student teams have been actively involved in providing design support to the institute community through various design initiatives like convocation gown, furniture, interior design, architectural design, institute website, promo material for various events, logos for campus centres, photography of campus and events held – for archival purposes.

The Design Innovation Centre which is funded by Ministry of Human Resource and Development displayed and presented the progress of the projects on Digital Preservation, Design for Education, 360 Degree Virtual Reality Animation, Smart Dustbin and Start Up India at the All India DIC MeetUp on 9 and 10 February 2018 organised by Banaras Hindu University and IIT BHU.

Department of Design for the first time, actively hosted & assisted in organising the jury for the 17<sup>th</sup> CII-NID India Design Summit held in December 2017. Joseph Tsukka (Research Scholar), Priyarata Rautray (Research Scholar) & Aparna RT (M.Des), Anupam Sarkar (M.Des), Deepak Baxla (M.Des), Prakash Kumar (M.Des), Sumit Baswaraj Yempalle (M.Des) under the guidance of Professor Dr. Deepak John Mathew and Neelakantan PK in collaboration with Jayachandran Palazhy, dancer choreographer from Attakkalari, Bangalore, installed an interactive 3D Art Installation titled Hayat - Shadows of Time in April 2017.



**Deepak John Mathew**

Ph.D – MS University of Baroda

*Professor & HoD**Research Areas:* Photography, Elements of design, Aesthetics, History of Design**P.K. Neelakantan**

Ph.D ongoing at IIT Bombay

*Assistant Professor**Research Areas:* Material Culture, Architecture, Performance**Prasad S. Onkar**

Ph.D – IISc Bangalore

*Assistant Professor**Research Areas:* Product Design, Computer Aided Conceptual Design, 3D Sketching, Virtual Reality, Haptics, Interaction Design**Delwyn Jude Remedios***Assistant Professor**Research Areas:* Animation, Film, Children Story Books, Graphic Novels, Illustrations, e-Learning**Publications**

(in peer reviewed conferences)

R. Maniyarasan, Impact of intangible heritage on the built environment, *St. Paul, Minnesota, by Society of Architectural Historians*, 2018.

Priyabrata Rautray, Affordable and sustainable disaster relief shelter, *Metagreen Dimensions International Convention on Performance of Built Environment*, College of Architecture Trivandrum, 2018.

Priyabrata Rautray, From Design to Product, *International Conference on Digital Fabrication (ICDF)*, IIT Hyderabad, 2018.

R. Vimal Krishnan and Prasad S. Onkar, Virtual Reality References in Design Thinking: Towards an Understanding of Affect-Cognition interaction in Conceptual Design, *4<sup>th</sup> International AR & VR Conference The Power of AR & VR for Business*, 2018.

**Invited Presentations**

Ruchi Saxena, *Anticipatory Design*, September 2017.

D.J. Murthy, *Music Composition*, November 2017.

Dr. Yogesh Velankar, *Designing Effective Teaching - Learning Environments*, January 2018.

Design seminar with Honeywell Design Team, March 2018.

P.C. Sanath, *VFX Supervisor of the movie 'Bahubali'*, March 2018.

Lakshmi Shewale, *How depression changed my life*, March 2018.

C.R. Anand, *Automotive Design – Processes & Roles*, March 2018.

## Talks Given in National / International Conferences

Deepak John Mathew, *XR for Heritage preservation and Teaching learning tool for Millennials*, UX India, Bengaluru, India, 2017.

Deepak John Mathew, *Panel Discussion on Industry + Academia Fusion*, UX India, Bengaluru, India, 2017.

Prasad Onkar, *Design Thinking and Innovation: Tools and methods for Competitive Engineering*, Cyient Technologies, Hyderabad, 2017.

Delwyn Jude Remedios, *Animation Principles Workshop*, National Institute of Design, Ahmedabad, 2017.

## Awards / Recognitions

Rudrani Santape and Miksham Lal, *Climature, Semifinalists*, MIT Climate CoLab, 2017.

V.P. Shijith, Directed the film – *Nakusa 'Unwanted' Is My Name*, screened at the 15<sup>th</sup> Mumbai International Film Festival, 2017.

K.G. Sreehari, *Selected & Participated for Indo-French - 24H Chrono Entrepreneurship Challenge India - 2017*.

KG. Sreehari, *Junior Master Award - Sigma Academy of Photography 2017*.

Pratikesh Pundkar and Dyaneshwar Muley, NASA Space Apps competition, *Selected in top three teams from Hyderabad for National level competition*, May 2017.

Rudrani Santape and Miksham Lal, Kahaani - An interactive storytelling experience for kids, *Semifinalists, Adobe Design Achievement Awards, 2017*.

R.M. Udhyan, Pranavasthitha Tandra, Soham Rakshit, Ambreesh Arya and Raj Narayanan, guided by Dr. Delwyn Jude Remedios, AMMA - *Student Animation Short Film, selected for screening at Chitrakatha'17 – International Animation Film Festival, National Institute of Design, Ahmedabad, 2017*.

R. Maniyarasan, *Selected as one of the eight participants for the fully funded workshop on Conservation of wall paintings at Nagaur Fort, conducted by Courtauld Institute of Arts, University of London, February-March 2018*.

## Workshops / Symposia

Prof. G.V. Sreekumar, *HOD Communication Design*, IDC, IIT Bombay, Typography workshop, September 2017.

Jagruti Datta, *Clay workshop*, Ceramic Artist, October 2017.

D.J. Murthy, *Music Composition Workshop*, November 2017.

Palazhy Jayachandran, Creative Director, 'Attakkalari' Bangalore, Physical Wisdom and Dance, February 2018.

Vaibhav Kumares, Founder of Vaibhav Studios, Animation Workshop, February 2018.

# ELECTRICAL ENGINEERING

The Department of Electrical Engineering is the largest department of IIT Hyderabad. The department research expertise lies in the field microelectronic and VLSI, communication and signal processing, power electronics and power systems, systems and control, and Machine learning. The department is actively involved in important collaborative research activities with Ministry of Electronics and Information Technology (MEITY), Ministry of Science and Technology, Japan Science and Technology Agency (JST), and Japan International Cooperation Agency (JICA). The faculty members are highly dedicated and ambitious in providing excellent teaching and pursuing high-end research.



## FACULTY



### Sri Rama Murty Kodukula

Ph.D – IIT Madras

*Associate Professor & HoD*

*Research Areas:* Signal Processing, Speech Analysis, Recognition and Synthesis, Phase processing and modelling, Pattern Recognition and Deep Learning



### Soumya Jana

Ph.D – UIUC, USA

*Associate Professor*

*Research Areas:* Biomedical Signal and Image Processing, Statistical Modeling, Multimedia signal processing and compression, Network Information Theory



### U. B. Desai

Ph.D - Johns Hopkins University, USA

*Professor & Director*

*Research Areas:* Cyber Physical Systems, Cognitive Radio Intra and Inter Vehicular Communication, Wireless Sensor Networks, Pervasive Sensor Environment, Multihop Cellular Communication, Vehicular Communication, Mesh networking, Image and Video Fusion, Dim and single pixel target tracking in IR video, Technologies for enabling fast Rural Credit, Applications on Smart phones, Remote patient monitoring



### Siva Kumar K

Ph.D – IISc Bangalore

*Associate Professor*

*Research Areas:* Multilevel inverters, open-end winding induction motor drives, Switched Mode Power Conversion, microgrids, Power quality and control



### P. Rajalakshmi

Ph.D – IIT Madras

*Associate Professor*

*Research Areas:* Wireless Communications, Networking, IoT, CPS



### Mohammed Zafar Ali Khan

Ph.D – IISc Bangalore

*Professor*

*Research Areas:* Cognitive Radio, cyber physical systems, MIMO and signal processing for communications



### Vaskar Sarkar

Ph.D – IIT Bombay

*Associate Professor*

*Research Areas:* Power market, microgrid, DSM, WAMPAC, grid-integration of PV



### Kiran Kuchi

Ph.D – University of Texas at Arlington, USA

*Professor*

*Research Areas:* Wireless Communications, Signal Processing



### G. V. V. Sharma

Ph.D – IIT Bombay

*Associate Professor*

*Research Areas:* Visible Light Communication, Teaching Methodologies



### Amit Acharyya

Ph.D – University of Southampton, UK

*Associate Professor*

*Research Areas:* Signal Processing Algorithm and VLSI Architectures, VLSI systems for next generation healthcare systems, Low Power Design Techniques, Electronic Aspects of Pervasive Computing, Bio-informatics, Digital Arithmetic, Linear Algebra, Numerical Analysis, Computer-aided designs, VLSI for Communication systems, Genomic and Proteomic Signal Processing, VLSI in Proteomics and genomics



### Shiv Govind Singh

Ph.D – IIT Bombay

*Professor*

*Research Areas:* 3D IC, Lab on Chip, Bio/Sensors, MEMS/NEMS, Thermal Imaging

## FACULTY



**Siva Rama Krishna Vanjari**  
Ph.D – IISc, Bangalore  
*Associate Professor*  
*Research Areas:* Nanobiosensors, MEMS, CMOS Sensors



**Ashudeb Dutta**  
Ph.D – IIT Kharagpur  
*Associate Professor*  
*Research Areas:* Analog and Radio Frequency Circuit design



**Ketan P Detroja**  
Ph.D – IIT Bombay  
*Associate Professor*  
*Research Areas:* State Estimation, Fault Diagnosis, Controller Design, Microgrid design and operation



**Sushmee Badhulika**  
Ph.D – University of California, USA  
*Associate Professor*  
*Research Areas:* Flexible and wearable nanoelectronics, nanomaterials based devices and circuits, Eco-friendly electronics, Paper electronics, Electrochemical sensors and supercapacitors



**Ravikumar Bhimasingu**  
Ph.D – IISc Bangalore  
*Associate Professor*  
*Research Areas:* Renewable Energy Integration, Power System Protection, Protection aspects in Grid Integrated microgrids, Distribution system analysis and Improvements



**Sumohana S. Channappayya**  
Ph.D – The University of Texas at Austin, USA  
*Associate Professor*  
*Research Areas:* Image and Video Quality Assessment, Biomedical Image Processing



**Swati Gupta**  
Ph.D – University of Strathclyde, UK  
*Assistant Professor*  
*Research Areas:* Thin-Film Devices, Organic Electronics, Flexible Electronics



**Ch. Gajendranath Chaudhury**  
Ph.D – IIT Delhi  
*Assistant Professor*  
*Research Areas:* Analog and Mixed Signal Circuit Design.



**Abhinav Kumar**  
Ph.D – IIT Delhi  
*Assistant Professor*  
*Research Areas:* Wireless communications and networking, green cellular networks, user network selection, device to device communications, and radio resource management in heterogeneous wireless access networks.



**Shishir Kumar**  
Ph.D – Trinity College, Dublin  
*Assistant Professor*  
*Research Areas:* 2D materials, Nanocarbons, Micro-nanofluidics, Nanopores, Sensors



**Kaushik Nayak**  
Ph.D – IIT Bombay  
*Assistant Professor*  
*Research Areas:* Nanoelectronic Device Physics, Carrier Transport, Physical and Wave Electronics



**Lakshmi Prasad Natarajan**  
Ph.D – IISc Bangalore  
*Assistant Professor*  
*Research Areas:* Broadcast channels, coding techniques, index coding, lattice codes, space-time codes, network coding, information theory, wireless communications, multiple-input multiple-output (MIMO)



**Pradeep Kumar Yemula**  
Ph.D – IIT Bombay  
Assistant Professor  
*Research Areas:* Smart Grids, Demand Response, Micro Grids, Common Information Model for Power Systems



**V. Seshadri Sravan Kumar**  
Ph.D – IISc, Bangalore  
Assistant Professor  
*Research Areas:* Renewable Energy Systems, Power Systems, Micro Grids, Wide Area Monitoring and Control



**Emani Naresh Kumar**  
Ph.D – Purdue University, West Lafayette Campus, USA  
Assistant Professor  
*Research Areas:* Nanophotonics, Plasmonics and Metamaterials, Semiconductor Optoelectronic Devices, On-chip mid-infrared devices



**Aditya Siripuram**  
Ph.D – Stanford University, USA  
*Assistant Professor*  
Signal processing, Sparse representations, Sampling techniques

## Patents Filed

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Suryasnata Tripathy, Arun Naithani, Siva Vanjari, and Shiv Govind Singh, IEEE Sensors, A Electrospun polyaniline nanofiber based chemiresistive nanobiosensor platform for DNA Hybridization detection, Glasgow. Best paper award, November 2017.

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R.R. Tamboli, B. Appina, S.S. Channappayya, and S. Jana, Achieving high angular resolution via view synthesis: Quality assessment of 3D content on super multiview lightfield display, *International Conference on 3D Immersion (IC3D), Brussels, Belgium, December 2017, 1-8*

B.S. Chandra, C.S. Sastry, Soumya Jana, and S. Patidar, Atrial Fibrillation Detection Using Convolutional Neural Networks, *Computing in Cardiology (CinC), Rennes, France, 44(1), September 2017, 1-4.*

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Kunal K. Dansingani, Surya Teja Devarakonda, Kiran Vupparaboina, Soumya Jana, Jay Chhablani, K. Bailey Freund, Orly Gal-Or, Sarra Gattousi, Classification of macular lesions using optical coherence tomography and an artificial neural network, *Investigative Ophthalmology & Visual Science, ARVO Annual Meeting, Washington DC, USA 58(8), June 2017, 823.*

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Sarpras Swain, Sathish Ande, Ravutla Suryateja, Soumya Jana, Lopamudra Giri, Spatially resolved calcium spiking in hippocampal neurons: Estimation via confocal imaging and model-based simulation, Neural Engineering (NER), 2017 8<sup>th</sup> International IEEE/EMBS Conference on, Shanghai, China, May 2017, 279-283.

### Funded Research Projects 2017-18

*M2Smart Project*, JICA, Japan, 2017, Rs. 1652 Lakhs.

*Approximate Computing and its real-time application on Artificial intelligence*, RedPine Signals, April 2017, Rs. 53.0 Lakhs.

*Development of conductive nanowire-based Biosensor for detection of Genetic Changes (BRNS)*, 1 April 2017, Rs. 34.9 Lakhs.

*Development of computational software integrating multilevel image data analysis: Towards efficient clinical practices and advanced biomolecular research in ophthalmology*, DBT, June 2017, Rs. 51.96 Lakhs.

*Development of Ternary Organic Solar Cells on Low-Cost Flexible Substrates*, DST, July 2017, Rs. 50.0 Lakhs.

*National Post-Doctoral Fellowship for Dr. Chandrajit Pal under supervision of Dr. Amit Acharyya*, SERB, DST, August 2017, Rs. 19.20 Lakhs.

*Inspire Faculty Award-Modelling and coordination of grid connected renewable energy systems*, DST, September 2017, Rs. 35.0 Lakhs.

*Development of robust algorithms for detection and classification of ships based on*

*ultrasound wake signature*, Naval Research Board, September 2017, Rs. 32.85 Lakhs.

*Deep Neural Network Model Improvisation Targeting Resource Constrained Embedded Platform for Defense Application*, October 2017, Rs. 9.99926 Lakhs.

*Miniaturized bio-imaging device with embedded nano-sensor for real time oxygen sensing*, DBT, 28 December 2017, Rs. 65.14 Lakhs.

*Indigenous 5G Test Bed (Building an end-to-end 5G Test Bed)*, Ministry of Communications, Department of Telecommunications, Gol, March 2018, Rs. 6466.43 Lakhs.

### Talks Given in National / International Conferences

S. Badhulika, *Emerging flexible and wearable electronic sensors based on nanomaterials*, King Abdullah University of Science and Technology, Jeddah, Saudi Arabia, 21 May 2017.

Naresh Emani, Egor Khaidarov, Ramon Paniagua-Dominguez, Yuan Hsing Fu, Vytautas Valuckas, Shunpeng Lu, Xueliang Zhang, Swee-Tiam Tan, Hilmi Volkan Demir and Arseniy I. Kuznetsov, *III-V Material Platforms for Active Dielectric Metasurfaces*, International Conference on Materials for Advanced Technologies, Materials Society of Singapore, June 2017.

Shiv Govind Singh, *Dual Damascene compatible, copper rich alloy based surface passivation mechanism for achieving Cu-Cu bonding at 150 °C for 3D IC integration*, ECTC, Florida on May 31<sup>st</sup>, USA, 2017.

Shiv Govind Singh, *Milk Adulteration Detection: A Portable Device Perspective*, NatFOE, IIT Bombay, 29 June 2017.

L. Natarajan, Y. Hong and E. Viterbo, *Capacity optimality of lattice codes in common message Gaussian broadcast channels with coded side information*, 2017 IEEE International Symposium on Information Theory (ISIT), Aachen, Germany, 29 June 2017.

Shiv Govind Singh, *Electrospun Zinc Oxide Nanowires for Point of Care (POC) diagnostics: from Material synthesis to Devices* ISSS-2017: 5-7 July.

Shiv Govind Singh, *Electrochemical transducers and Electrical Impedance based transducers for biosensor applications*, one-day workshop on Biosensors - Biosensors'17, IIT Madras.

Abhinav Kumar, *Convolutional codes, Channel Coding Workshop*, IEEE, IIIT Hyderabad.

S. Badhulika, *High performance, eco-friendly electronics based on paper substrate*, Ritsumeikan University, Kyoto, Japan, 4 December 2017.

S. Badhulika, *Nanomaterials based sensors in emerging flexible and wearable electronics applications*, University of Tokyo, Japan, 6 December 2017.

S. Badhulika, *Workshop on Flexible Electronics Technology (WFET 2018), Fabrication of flexible nanoelectronic devices and their applications in broadband photodetector and wearable electronics*, CSIR-CEERI Pilani, Rajasthan, India, 23 March 2018.

*Emerging Wireless Networks and Systems*, 30 August 2017.

Prof. Toshiro Ohashi, Hokkaido University, *Mechanical Characterization of Cells and Development of Bio-MEMS Devices for Cell Culture Study*, 30 October 2017.

Dr. Prabhu Babu, IIT Delhi, *Majorization-Minimization Algorithms in Machine Learning, Signal Processing, and Communications*, 21 December 2017.

Dr. Parv Venkitasubramaniam, Lehigh University, Pennsylvania, USA, *Information Security in Cyber Physical Systems: Trading Performance for Security*, 5 December 2017.

Dr. Abhishek Jha, The Czech Academy of Sciences, Prague, Czech Republic, *Microwave Sensors and their Applications*, 21 December 2017.

Dr. Abhishek Dutta, Electrical and computer engineering, University of Connecticut, USA, *Model-based Control*, 27 December 2017.

Dr. Naqueeb Warsi, National University of Singapore, *A uniform approach for designing quantum information theoretic protocols*, 8 January 2018.

Prof. Muhammed M. Hussain, Professor, Electrical Engineering, Computer Electrical Mathematical Science and Engineering Division, King Abdullah University of Science and Technology (KAUST), Saudi Arabia, *IEEE Distinguished Lecture*, 9 January 2018.

Prof. Baltasar Beferull Lozano, Wisenet lab., University of Agder, Norway, *WiseNet*, 11 January 2018.

Dr. Anup Aprem, University of British Columbia, Canada, *Cyber-physical-social systems: Applications in online social media*, 15 January 2018.

Dr. Biplab Sarkar, NC State University, USA, *The development of III-nitride wide bandgap semiconductor devices*, 17 January 2018.

Dr. Kushmanda Saurav, Department of Electrical Engineering, IIT Jammu, *Studies on Printed Antennas for Wireless Communication Systems*, 17 January 2018.

Dr. Shashank Vatedka, Chinese University of Hong Kong, *Computationally efficient lattice codes for secret key generation*, 17 January 2018.

## Seminars

Dr. Mahesh Illindala, Department of Electrical and Computer Engineering, The Ohio State University, Columbus, OH, USA, *Modeling of Distributed Energy Resources and Their Limiting Conditions*, 9 June 2017.

Dr. Linga Reddy Cenkeramaddi, Department of Information and Communication Technology, University of Agder, Norway, *WISENET/UiA (Norway) Research Activities and Self-powered IoT Devices*, 4 August 2017.

Dr. Daniel Romero, Department of Information and Communication Technology, University of Agder, Norway, *Distributed subspace projection via graph filters and Cartography*, 4 August 2017.

Dr. Harish N. Swaha Krishnamoorthy, Centre for Disruptive Photonic Technologies, Nanyang Technological University, Singapore, *Novel material paradigms for nanophotonics - from topological insulators and perovskites to chalcogenides*, 17 August 2017.

Dr. Sundaram Vanka, Principal R & D Engineer, Broadcom Ltd, *Interference Management in*

Dr. Chiranjeevi Pojala, Bosch Research, *Interval-Valued Model Level Fuzzy Aggregation-Based Background Subtraction*, 17 January 2018.

Dr. Sarang Pendharker, University of Alberta, Canada, *Photonic Topology of Moving-media and Negative-frequency Modes*, 18 January 2018.

Prof. Frank Allgower, University of Stuttgart, Germany, *Introduction and overview of model predictive control*, 20 February 2018.

Dr. Umesh Vaidya, Department of Electrical and Computer Engineering at Iowa State University, Ames IA, USA, *Analysis and Synthesis Methods for Network Power System with Renewable Uncertainty*, 26 March 2018.

## Workshops / Symposia

24<sup>th</sup> edition of the National Conference on Communications (NCC) from 25-28 February 2018. It is the flagship conference of India in the area of Communications, Signal Processing, and Networks organized every year by the Joint Telematics Group (JTG) of the Indian Institutes of Technology and the Indian Institute of Science. The conference was attended by more than 200 participants.

## Awards / Recognitions

Sushmee Badhulika, Young Engineer Award, 2017 by Indian National Academy of Engineering, Government of India.

Sushmee Badhulika, Associateship of the Indian Academy of Sciences, 2017.

Sushmee Badhulika, Award for Best project's Principal Investigator (PI) by Indian Nanoelectronics Users Program (INUP), Department of Electronics & Information Technology (DeitY); Ministry of communication and Information technology.

Emani Naresh Kumar, Ramanujan Fellowship awarded by SERB, DST, Govt. of India.

Amit Acharyya, Visiting research Fellow in the University of Southampton, UK from 2017-2018.

Shiv Govind Singh, A Low-Cost Disposable Microfluidic Biochip for malaria diagnosis has been selected for Gandhian Young Technological Innovation (GYTI) Award 2018. Hon'ble President of India Shri Ram Nath Kovind presented the award to the team at Rashtrapati Bhavan on 19 March 2018.

Brince Paul and Dr Asisa Panigrahi, Dr. Shiv Govind Singh, Best Paper award IEEE sensors at November 2017, Glasgow. Suryasnata Tripathi, PhD student received cash money with certificate.

Shiv Govind Singh, Best Paper award IEEE IWPSD, at IIT Hyderabad December 2017. Mr Hemant, PhD student received cash money with certificate.

T. Uday, A. Kumar, and Dr. L. Natarajan, Best Poster Award in COMSNETS 2018.

## RESEARCH HIGHLIGHT

### 'Indigenous 5G Test Bed'(Building an end to end 5G Test Bed) in India



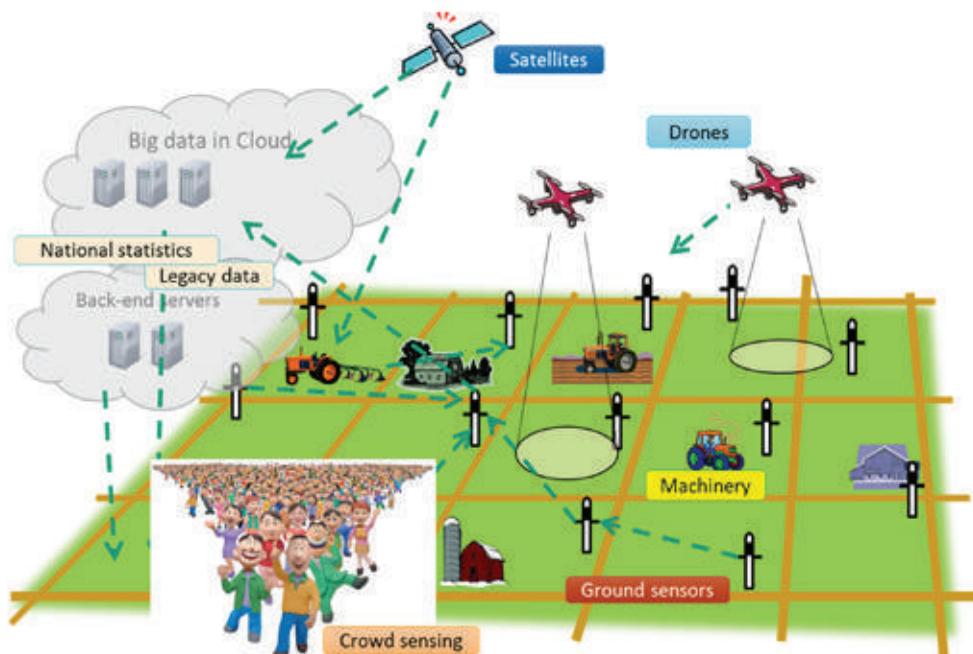
This is a one of its kind 5G project with total cost of Rs 22401.66 Lakh. The implementing agencies include IIT Hyderabad, IIT Bombay, IIT Delhi, IIT Madras, IIT Kanpur, IISc Bangalore, SAMEER and CEWiT. The main Goals of the Project are to provide an open 5G test bed that can enable R&D teams in Indian academia and industry to validate their products, prototypes and algorithms. To develop an end to end test bed that can enable Indian industry and academia develop and demonstrate various services. To provide a test bed with complete access for research teams to work on new novel concepts/ ideas holding potential for standardization in India and on global scale. Make a test bed available for Indian operators to understand the working of 5G technologies and plan their future networks. Provide the facilities of 5G networks for experimenting and demonstrating applications/use cases of importance to Indian society like rural broadband, smart city applications and intelligent transport system (ITS). Implement and demonstrate IoT based systems and services. Implement and demonstrate security and privacy aspects of 5G networks.

The department has already made several contributions to the 5G standards. This includes more than 40 patents and 200+ contributions in past two years. A new waveform pi/2 BPSK with spectrum shaping has been proposed. IITH is a key driver for narrow band Internet-of-Things (NB-IoT) in 3GPP. The department has one of its kind world class Massive MIMO and Cloud RAN testbed facility with 48 beams/users in 360 degrees and upto 8 Gbps data rates. The work of Prof. Kiran Kuchi has resulted in incubation of WiSig Networks Pvt. Ltd at IITH. It is one of the leading IP developer for NB-IoT and 5G NR BS and UE. The highest reported massive MIMO gain till date has been at IITH.

## ...RESEARCH HIGHLIGHT

### Data science-based Farming Support system for Sustainable Crop Production under Climatic change (DSFS)

Big Data collection & utilization for crop production by multi-layer IOT



This is an Indo-Japan Joint-Lab Proposal with IIT Hyderabad, IIT Bombay, IIIT Hyderabad, Prof. Jayshankar Telangana State Agriculture University, Hyderabad, as Indian collaborators with University of Tokyo as the collaborator from the Japanese side. The project goal is to develop data science based approaches using high-end integrated information and agricultural sciences such as IoT, big data analytics, deep learning, crop modeling and omics (Genomics/Phenomics) to support high performance and sustainable agriculture. The major research focus is on IT platform for Big Data based Smart Farming Support and Applications for Farmer & Agriculture Stakeholder and Breeders.

# LIBERAL ARTS

The Department of Liberal Arts at IIT Hyderabad is a leading center for the study of a diverse range of subjects including Cultural Studies, Economics, English, Linguistics, Psychology, Sociology / Anthropology. Academic programs such as Media and Fine Arts are soon to be integrated into the existing structure. The department is also actively involved in putting together Creative Arts courses for students throughout IITH, which offer students a window into the world of Arts, through courses in music, painting, theatre, photography, dance, etc. There are also interdisciplinary courses that bring together the social sciences and engineering disciplines.

The department aspires to enrich the academic and creative life of the institute, encourage cutting-edge scholarship, and cultivate a deeper understanding of humanity at large. Apart from the regular department seminars conducted weekly, there are workshops and conferences on various topics. While its primary focus remains world class research in the fields of humanities and social sciences, the department is also deeply committed to teaching innovative and intellectually stimulating courses to undergraduate and post graduate students of the institute. In addition, the Department of Liberal Arts at IIT Hyderabad places a lot of importance on interdisciplinary collaborations resulting in academic and financial development through projects of national and international importance. Currently, the department offers undergraduate courses at the institute and also has a strong post graduate program that confers research degrees, namely M.Phil. and Ph.D.



## FACULTY

**Haripriya Narasimhan**

Ph.D – Syracuse University - NY, USA  
*Assistant Professor*

*Research Areas:* Medical Anthropology, Media, Globalisation, Gender

**Badri Narayan Rath**

Ph.D – ISEC, Bangalore  
*Associate Professor*

*Research Areas:* Economic Growth, Industrial Economics, International Economics, Energy Economics, and Applied Econometrics

**Indira Jalli**

Ph.D – Hyderabad Central University  
*Associate Professor*

*Research Areas:* Nation and culture

**Amrita Deb**

Ph.D – BHU, Varanasi  
*Assistant Professor of Psychology*

*Research Areas:* Positive psychology, clinical psychology, personality psychology

**Prakash Mondal**

Ph.D – IIT Delhi  
*Assistant Professor*

*Research Areas:* Theoretical Linguistics, Philosophy of Language, Language and Cognition, Language and Computation

**Srirupa Chatterjee**

Ph.D – IIT Kanpur  
*Assistant Professor*

*Research Areas:* Contemporary and Multiethnic American Fiction, Literary Theory, and Gender and Body Studies, Academic Writing

**Mahati Chittem**

Ph.D – University of Sheffield, UK  
*Assistant Professor*

*Research Areas:* health psychology; medical psychology; chronic disease management; preventive health

**Anindita Majumdar**

Ph.D – IIT Delhi

*Assistant Professor*

*Research Areas:* Medical Anthropology, Anthropology of Kinship, Gender and Society, Reproduction, Infertility Studies, South Asia, Science, Technology and Society Studies, Sexuality

**M.P. Ganesh**

Ph.D – IIT Bombay

*Assistant Professor*

*Research Areas:* Cross-Cultural Collaborations, Team Dynamics, Bullying in Workplace, Mentoring and Coaching in work Place, Teacher Leadership

**Shubha Ranganathan**

Ph.D – IIT Bombay

*Assistant Professor*

*Research Areas:* Cultural psychology, culture and mental health, gender, qualitative research methods

**Nandini Ramesh Sankar**

Ph.D – Cornell University, USA

*Assistant Professor*

*Research Areas:* Anglo-American Poetry after 1900, Modernism, Word and Image

**Aalok Khandekar**

Ph.D – Rensselaer Polytechnic Institute

*Assistant Professor*

*Research Areas:* Globalization, Contemporary India, Sustainability, Environmental Governance, Urban Studies, Digital Humanities, Cultural Anthropology, Science and Technology Studies

**K.P. Prabheesh**

Ph.D – IIT Madras

*Assistant Professor*

*Research Areas:* Macroeconomics, International Finance and Applied Econometrics

## Book & Book Chapters

H. Narasimhan, Struggling with Nayi Soch: Hindi Television Serials Today, Manjeet Bhatia (ed) *Locating Gender in the New Middle Class in India*, 2017, Indian Institute of Advanced Studies: Shimla.

Nilanjana Ghosal and Srirupa Chatterjee, Cultural Assimilation and the Politics of Beauty in Postwar American Fiction by Ethnic Women Writers, *English Paradigm in India: Essays in Language, Literature and Culture*. NY: Palgrave Macmillan, 2017, 139-152.

N. Sarojini and Anindita Majumdar, Recruiting to Give Birth: Agent-Facilitators and the Commercial Surrogacy Arrangement in India', in Miranda Davies (Ed.), *Babies for Sale? Transnational Surrogacy, Human Rights and the Politics of Reproduction*, UK: Zed Books, 2017.

N. Sarojini and Anindita Majumdar, Researching Assisted Conception from a Feminist Lens' (with N. Sarojini), in Padmini Swaminathan and Kalpana Kannabiran (Eds), *Re-presenting Feminist Methodologies: Interdisciplinary Explorations*, New Delhi: Routledge, 2017.

S. Ganesh and M.P. Ganesh, The role of work-family support factors in helping individuals achieve work-family balance in India, *Work and health in India*, edited by Hyde, Chungkha and Ladusingh, Policy Press, Bristol, UK, 2018, 191-212.

S. Ranganathan, God's hospitals with No Superstition! On the place of healing shrines in contemporary India, B.V. Sharma (Ed.). *Medical anthropology: Tradition and change*, New Delhi: Concept., 2018.

S. Ranganathan, Re-thinking the 'medical' through 'indigenous healing': Reflections from Mahanubhav healing practices in Maharashtra, India, G. Attewell & R.D. Roy (Eds.). *Locating the medical: Explorations in South Asian history*, Oxford University Press: New Delhi.

Khandekar, Aalok, Koen Beumer, Annapurna Mamidipudi, Pankaj Sekhsaria, and Wiebe E. Bijker, STS for Development, Felt Ulrike, Rayvon Fouché, Clark Miller, and Laurel Smith-

Doerr (eds.), *The Handbook of Science and Technology Studies*, 4<sup>th</sup> edition, Cambridge, MA: MIT Press, 665-694.

## Books Published

Anindita Majumdar, *Transnational Commercial Surrogacy and the (Un) Making of Kin in India*, New Delhi, 2017, Oxford University Press.

## Publications (in peer reviewed journals)

Malepati Jayashankar and Badri Narayan Rath, The dynamic linkage between exchange rate, stock price and interest rate in India, *Studies in Economics and Finance*, 34, 2017, 383-406.

Vaseem Akram and Badri Narayan Rath, Exchange rate misalignment and economic growth in India, *Journal of Financial Economic Policy*, 9, 2017, 414-434.

K. Seenaiah and Badri Narayan Rath, Obstacles to Innovation in Selected Indian Manufacturing Firms, *International Journal of Technological Learning, Innovation and Development*, 9, 2017, 379-398.

A. Ghosh and A. Deb, Positive psychology interventions for chronic physical illnesses: A systematic review, *Psychological Studies*, 62(3), 2017, 213-232 [10.1007/s12646-017-0421-y](https://doi.org/10.1007/s12646-017-0421-y).

A. Ghosh and A. Deb, An exploration of gratitude themes and suggestions for future interventions, *Journal of Human Behavior in the Social Environment*, 27(7), 2017, 678-693, [10.1080/10911359.2017.1323068](https://doi.org/10.1080/10911359.2017.1323068).

S. Krishna, Swathi and Srirupa Chatterjee, Apocalyptic Imagery in Marilynne Robinson's Housekeeping, *The Explicator*, 75(4), 2017, 234-38.

Anand, Aswathi Velayathikode and Srirupa Chatterjee, From Naturalistic Savagery to Humanistic Redemption: Artistic Transformations in Joyce Carol Oates's Short Stories, *The IUP Journal of English Studies*, 12(2), 2017, 81-89.

- Debi Prasad Bal and Badri Narayan Rath, Do macroeconomics channels matter for examining relationship between public debt and economic growth in India?, *Journal of Quantitative Economics*, 2017, [10.1007/s40953-017-0094-3](https://doi.org/10.1007/s40953-017-0094-3).
- C. Dey and M.P. Ganesh, Team boundary activity: a review and directions for future research, *Team Performance Management: An International Journal*, 23(5/6), 2017, 273-292.
- S. Kottai and S. Ranganathan, Book review [Review of the book Eating Drugs: Psychopharmaceutical Pluralism in India, by S. Ecks], *Psychology and Developing Societies*, 29(2), 2017, 301-305.
- K.P. Prabheesh and C.T. Vidya, Do Business Cycles, Investment-Specific Technology Shocks Matter for Stock Returns? *Economic Modelling*, 70, 2017, 511-524.
- B. Garg and K.P. Prabheesh, Drivers of India's current account deficits, with implications for ameliorating them, *Journal of Asian Economics*, 51, 2017, 23-32.
- Prakash Mondal, Grammar is NOT a computer of the human mind/brain, *Journal of Cognition and Neuroethics*, 5(1) 2018, 85-100.
- Badri Narayan Rath, Productivity growth and efficiency change: comparing manufacturing- and service-based firms in India, *Economic Modelling*, 70, 2018, 447-457.
- K. Seenaiah and Badri Narayan Rath, Determinants of innovation in selected manufacturing in India: role of R&D and exports, *Science, Technology and Society*, 23, 2018, 65-84.
- G.P Girish, Badri Narayan Rath, and Vaseem Akram, Spot electricity price discovery in Indian electricity market, *Renewable and Sustainable Energy Reviews*, 82, 2018, 73-79.
- Pradipta Kumar Sahoo and Badri Narayan Rath, Productivity growth, efficiency change and source of inefficiency: evidence from the Indian automobile industry, *International Journal of Automotive Technology and Management*, 18, 2018, 59-74.
- A. Broom, K. Kenny, V. Bowden, N. Muppavaram, and M. Chittem, Cultural Ontologies of Cancer in India, *Critical Public Health* 28(1), 2018, 48-58.
- A. Majumdar, ARTs and the Problematic Conceptualisation of Declining Reproduction, *Indian Journal of Medical Ethics*, 3(2), 2018, 119-24, [10.20529/IJmE.2018.032](https://doi.org/10.20529/IJmE.2018.032).
- S. Kottai and S. Ranganathan, Reimagining Schizophrenia: New Voices from the Margins [Book review], *Economic & Political Weekly*, LIII (4), 2018, 31-34.
- K.P. Prabheesh and B. Garg, Capital-enhanced Equilibrium Exchange Rate: evidence from India, *Applied Economics Letters*, 2018, [10.1080/13504851.2017.1422592](https://doi.org/10.1080/13504851.2017.1422592).

## Funded Research Projects 2017-18

Srirupa Chatterjee, *Body Image and Female Identity: Popular Perceptions, Theoretical Interventions and Possible Implications*, Indian Council of Social Science Research, April 2017, Rs. 7.0 Lakhs.

Anindita Majumdar, *Post-Menopausal Conception: Ageing, Family and Assisted Reproduction in India*, Indian Council of Social Science Research, 12 January 2018, Rs. 3.00 Lakhs.

## Talks Given in National / International Conferences

H. Narasimhan, *Mapping the Region on the Small Screen: Language and Place in Hindi Television Soap Operas*, American Anthropological Association 116<sup>th</sup> Annual Meetings, Washington DC, USA, 2017.

H. Narasimhan, 'Work-Life Balance' Workshop for Female Faculty in Colleges, Telangana Academy of Skill and Knowledge (TASK), Hyderabad, 2017.

H. Narasimhan, Session on 'Pedagogic Techniques and Teaching and Learning Methods', Faculty Development Programme workshop, Teaching and Learning Centre, IIT Hyderabad, 2017.

H. Narasimhan, *Work-Life balance, TEQIP workshop on Teacher Effectiveness for Women Teachers*, March, IIT Hyderabad, 2017.

Badri Narayan Rath, *Productivity Growth and*

*Efficiency Change: Comparing Manufacturing-and Service-Based Firms in India*, Economic Modelling Special Issue Conference, Deakin University, Melbourne, June 2017.

Badri Narayan Rath, Vaseem Akram, Debi Prasad Bal, and Mantu Mahalik, *Does Energy Consumption Fuel Long-Run Productivity Growth? Panel Evidence from Global Data With New Policy Insights*, The 8<sup>th</sup> RMUTP International Conference, Bangkok, Thailand, June 2017.

K.P.Prabheesh, *Do Business Cycles, Investment-Specific Technology Shocks Matter for Stock Returns?*, Economic Modelling Special Issueconference, Deakin University, Australia, 12-13 June 2017.

K.P. Prabheesh, Capital-enhanced Equilibrium Exchange Rate in the presence of structural breaks: evidence from Emerging Economies, 7<sup>th</sup> RMUTP International Conference on Science, Technology and Innovation for Sustainable Development, Rajamangala University of Technology Phra Nakhon, Bangkok, Thailand, 23-24 June 2017.

Anindita Majumdar, *Infertility as Inevitable: The Nature of Chronicity in Assisted Reproduction in India*, Tata Institute of Social Sciences Hyderabad, 6 July 2017.

Anindita Majumdar, *The Marketing of Babies: Gendered Implications of Assisted Reproductive Technologies and the Surrogacy Industry in India*, XXIII Indian Social Studies Trust-Heinrich Boll Foundation Gender and Economic Policy Discussion Forum, New Delhi, 3 August 2017.

Prakash Mondal, *Grammar is NOT a computer of the human mind/brain, Mind and Brain Annual Conference*, Insight Institute of Neuroscience and Neurosurgery, Flint, USA, 14-15 September 2017.

Badri Narayan Rath, *Regression Analysis*, Tata Institute of Social Sciences, Hyderabad, 23 September 2017.

Aalok Khandekar, *STS and Collaboration*, Workshop on Recent Trends in STS, University of Hyderabad, Hyderabad, India, September 2017.

Aalok Khandekar, *The First Technology Foresight Meeting on the Future of Work in India*, Tandem Research & International Labor Organization, Goa, India, September 2017.

Aalok Khandekar, *STS for Development, International Conference on Responsible Innovation in Biogas*, Indian Institute of Technology Delhi, Delhi, India, September 2017.

Aalok Khandekar, *An Indian Summer: Corruption, Class, and the Lokpal Protests*, Department of Liberal Arts, Indian Institute of Technology Hyderabad (IITH), Hyderabad, India, October 2017.

K.P. Prabheesh, *Oil Price shocks, Trade Intensity and Business Cycle Synchronization*, 3<sup>rd</sup> Applied Financial Modelling Conference on the Importance of Commodity Markets in Financial and Macroeconomic Stability, UTAR, Malaysia, 8-9 November 2017.

Badri Narayan Rath, *Production, Costs and Profit Maximization under Different Market Structure to officers of All India Services and Central Civil Services*, Dr. MCR Human Resource of Development Institute Telangana, 17 November 2017.

*The Second Technology Foresight Meeting on the Future of Work in India*, Tandem Research & GIZ, Goa, India, January 2018.

Nandini Ramesh Sankar, *The Grammar of the Gift in JH Prynne, Poetics of the Gift*, The Annual Convention of the Modern Language Association, New York, 7 January 2018.

Srirupa Chatterjee, *Academic Writing and Pedagogy in Globalized India, National seminar on Globalization: Emerging Trends in English Language and Literature*, Osmania University Center for International Programmes, Osmania University, Hyderabad, 18-20 January 2018.

Anindita Majumdar, *The Health of Indian Health System*, Hyderabad Literary Festival, 26 January 2018.

Anindita Majumdar, *Transnational Surrogacy and the (Un)Making of Kin in India*, Invited Lecture, BITS-Pilani Hyderabad, 14 February 2018.

Shubha Ranganathan, *Gender in Academia* delivered at the TEQIP 'Teacher effectiveness workshop for Women Teachers' held in IIT Hyderabad on 3 March 2017.

Badri Narayan Rath and Vaseem Akram, *Export diversification, growth and convergence: new global evidence*, 54<sup>th</sup> Annual Conference of the Indian Econometric Society, Shri Mata Vishnudevi University, Jammu, March 2018.

## Seminars

*Gayatri Nair, The Other Half of the Pink Revolution; Koli Women's Labour in the Fisheries of Mumbai, Tata Institute of Social Sciences, Hyderabad, 2 August 2017.*

*Mohan Krishna, Why Have You Chosen Filmmaking When You Are So Educated? - The Increasing Agony And The Decreasing Ecstasy of the Educated Telugu Filmmaker, Independent filmmaker, 9 August 2017.*

*Pankaj Sekhsaria, The Great Cataclysm – Great Andamanese stories of creation and the giant tsunami of December 2004, Kalpvriksh Environment Action Group, 16 August 2017.*

*Saloka Sengupta, If you allow yourself to shoot a video, your career as a dancer is over: digital Media, economy and the political documentation of the Nachnis in Purulia, Indian Institute of Technology, Hyderabad, 23 August 2017.*

*Annapurna Mamidipudi, Weaving Trajectories of Hope: Handloom Weaving as Innovative Socio-Technology, Maastricht University, 30 August 2017.*

*Vegitha Reddy, Philosophical Arguments: A Meta-analysis, Mahindra Ecole Centrale-Hyderabad, 6 September 2017.*

*Raghuram Raju, Metaphysical Assumptions of Modernity and its Reception in India, University of Hyderabad, 13 September 2017.*

*T. Sreekumar, The Cyborg and the Human: Some Thoughts on the Posthuman Approaches, The English and Foreign Languages University Hyderabad, 20 September 2017.*

*Phanindra Goyari, The Efficiency of Summer Paddy Cultivation in BTAD Region of Assam: A Non-Parametric Approach, University of Hyderabad, 4 October 2017.*

*Aalok Khandekar, An Indian Summer: Corruption, Class, and the Lokpal Protests, Department of Liberal Arts, Indian Institute of Technology Hyderabad, 11 October 2017.*

*Rekha Pande, Women in Deccani Miniatures, 15<sup>th</sup> to 18<sup>th</sup> centuries, University of Hyderabad, 1 November 2017.*

*Prof. Shruti Sircar, Akshara-phonology mappings: Learning to read and spell Bangla, English and Foreign Languages University, Hyderabad, 8 November 2017.*

*Kim Fortun, Air Pollution Governance in 6+ Cities, Rensselaer Polytechnic Institute, 15 November 2017.*

*Lavanya Suresh, Perspectives on Gender Equality in the Context of Environmental Sustainability, BITS-Pilani, Hyderabad, 22 November 2017.*

*K. Chandrashekhar, Telangana State government's initiatives in providing educational facilities for the children of Rohingya refugees in Hyderabad city-A case study, Centre for Economic and Social Studies (CESS) Hyderabad, 3 January 2018.*

*T. Latha, Handloom weaving - Industry, technology & livelihood, Dastakari Andhra Marketing Association (DAMA), 10 January 2018.*

*Ipshita Chanda, Working with Words, Department of Comparative Literature, English and Foreign Languages University (EFLU), 17 January 2018.*

*Amitabha Das Gupta, On the Possibility of Non-Scientific Mode of Knowing, Department of Philosophy, University of Hyderabad, 24 January 2018.*

*B.R. Shamanna, Implementation Research in Health Sciences – From Science to Practice, School of Medical Sciences, University of Hyderabad, 14 February 2018.*

*Badri Narayan Rath, Productivity Growth and Efficiency Change: Comparing Manufacturing- and Service-Based Firms in India, Department of Liberal Arts, IIT Hyderabad, 21 February 2018.*

*Poulomi Bhattacharya, Migration and Urban Informal Labour Market: A Study of LabourAddas in the City of Hyderabad, India, School of Livelihoods and Development, TISS Hyderabad, 7 March 2018.*

*Vinod Pavarala, Other Voices: Some Conceptual Entry Points to the Study of Community Media, UNESCO Chair on Community Media, Department of Communications, University of Hyderabad, 14 March 2018.*

*Jaideep Undurti and Fabian Stoltz, How to Destroy a City in 6 Panels: Building & Unbuilding Worlds through Graphic Novels, Graphic Novelists, Goethe-Institut*

/ Max Mueller Bhavan New Delhi, Goethe-Zentrum Hyderabad, Senat der Freien und Hansestadt Hamburg, 21 March 2018.

Swathi Agarwal, *Academic Optimism of Teachers, School Engagement and Educational Aspirations of Students*, St Francis Degree College for Women, Hyderabad, 28 March 2018.

## Workshops / Symposia

Malika Hajiani, Chairperson, Aga Khan Youth and Sports Board, Secunderabad, *Let's Stress Less*, 4 November 2017.

R. Vimal Krishnan, Department of Design, IITH, Word and Immersion: Designing a VR Experience of a Mythical Space, Shalini Srinivasan, Department of English, University of Hyderabad: Clothes Maketh the Man: Clothes in Joe Sacco's Safe Area Gorazde, S.K. Anandakrishnan, Department of Design, IITH, Narratives behind Image, Utsab Ray, Department of Liberal Arts, IITH, Ekphrastic Literature in Colonial Bengal, Word and Image, 22 November 2017.

Dr. M.P. Ganesh, in collaboration with Telangana Academy for Skill and Knowledge organized a two-day workshop for working professions titled *Emerging Leaders* program on 16-17 February 2018.

*Japanese Film Festival*, January 2018.

Examining the 'New' in Kinship and Family in South Asia, Funded by the Centre for Innovations in Public Systems, Govt. of India including over 30 international paper presenters from US, Japan and Europe, 1-2 February 2018.

## Awards / Recognitions

Badri Narayan Rath, *Associate Editor*, Journal of Economic and Administrative Sciences (Emerald Publication, UK).

Badri Narayan Rath, *Treasurer*, Asia-Pacific

Applied Economics Association (APAEA), Melbourne, Australia.

Badri Narayan Rath, *Executive Council Member*, Indian Econometric Society, 2018.

Badri Narayan Rath, *Member in the Scientific Committee*, 3<sup>rd</sup> Applied Financial Modelling Conference, UTAR, Malaysia, November 2017.

Badri Narayan Rath, *Member in the Scientific Committee*, 4<sup>th</sup> Applied Financial Modelling Conference, Deakin University, Melbourne, February 2018.

Badri Narayan Rath, *Member in the Scientific Committee*, International Conference in Economics and Finance (ICEF-2018), BITS Pilani, Goa Campus, February 2018.

Badri Narayan Rath, *Chaired a session on Industrial Economics*, 54<sup>th</sup> Annual Conference of the Indian Econometric Society, Shri Mata Vishnudevi University, Jammu, March 2018.

Badri Narayan Rath, *Outstanding Reviewer Award* from the journal, Energy Policy (Elsevier), 2018.

Badri Narayan Rath, *Outstanding Reviewer Award* from the journal, Economic Modelling (Elsevier), 2017.

Anagha, won the best paper award in the session titled Dynamics of Interpersonal Relationship, in the 50<sup>th</sup> Indian Academy of Applied Psychology conference, 16 to 18 February 2018 (working under the guidance of Dr. M.P. Ganesh)

Aalok, Member, Conference Program Committee, Annual Meeting of the Society for the Social Studies of Science (4S), Sydney 2018.

Aalok, Managing Editor, STS Across Borders (Society for the Social Studies of Science (4S)): <http://stsinfrastructures.org>.

Aalok, Associate Editor, Engineering Studies (Taylor & Francis: <https://www.tandfonline.com/toc/test20/current>).

# MATERIALS SCIENCE & METALLURGICAL ENGINEERING

DST-FIST award of Rs.2.75 Crores in the year 2017.

Research on bacterial cellulose and novel drug delivery devices by Dr. Mudrika Khandelwal and her group have appeared as special features on The Hindu and The Tribune

Dr. Pinaki Prasad Bhattacharjee was invited to be the Guest Editor for a special issue of Elsevier Materials Chemistry and Physics Journal on High Entropy Materials

Research by Dr. Pinaki Prasad Bhattacharjee and his group on High Entropy Alloys was covered by The Hindu Business Line, Japanese Media, and JICA.



## FACULTY



### Bharat B. Panigrahi

Ph.D – IIT Kharagpur

*Associate Professor & HoD*

**Research Areas:** Powder Metallurgy, Sintering, Advanced Alloys, Ceramics and Composites, Biomaterials



### Suhash Ranjan Dey

Ph.D – University Paul-Verlaine - Metz, France

*Associate Professor*

**Research Areas:** Titanium alloys – CIGS/ CZTS solar cells - Electrodeposition



### Pinaki Prasad Bhattacharjee

Ph.D – IIT Kanpur

*Associate Professor*

**Research Areas:** High Entropy and Complex Concentrated Alloys, Thermomechanical Processing, Mechanical Behavior



### Shourya Dutta Gupta

Ph.D – Swiss Federal Institute of Technology Lausanne

*Assistant Professor*

**Research Areas:** Plasmonics, Nanofabrication, lab-on-a-chip devices, Bio-sensing, Nano-optics



### Atul Suresh Deshpande

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

*Assistant Professor*

**Research Areas:** Material Synthesis, battery materials, solid state chemistry



### Subhradeep Chatterjee

Ph.D – IISc, Bangalore

*Assistant Professor*

**Research Areas:** Phase Transformations, Weld Processing, Microstructural Modelling



### Ranjith Ramadurai

Ph.D – IISc Bangalore

*Associate Professor*

**Research Areas:** Multifunctional oxides, thin films and devices, sensor materials



### Saswata Bhattacharya

Ph.D – IISc Bangalore

*Assistant Professor*

**Research Areas:** Solid-to-solid phase transformations - Phase-field modeling - Discrete dislocation plasticity



### Mudrika Khandelwal

Ph.D – University of Cambridge, UK

*Assistant Professor*



### Rajesh Korla

Ph.D – University of Cambridge, UK

*Assistant Professor*

**Research Areas:** Deformation at room temperature, creep and superplasticity, micromechanical deformation, molecular dynamic simulations, nano indentation.



### Sai Rama Krishna Malladi

Ph.D – Technische Universiteit Delft, The Netherlands

*Assistant Professor*

**Research Areas:** in situ Transmission Electron Microscopy, MEMS devices for in situ studies, Electrochemistry, Corrosion

## Book & Book Chapters

Sreekanth Mandati, Bulusu V. Sarada, Suhash Ranjan Dey and Shrikant V. Joshi, Pulsed electrochemical deposition of  $\text{CuInSe}_2$  and  $\text{Cu}(\text{In},\text{Ga})\text{Se}_2$  semiconductor thin films, Semiconductors-Electrochemical growth and characterization, *Intechopen*, 2017, ISBN 978-953-51-5589-8.

## Publications (in peer reviewed journals)

T.S. Reddy, I.S. Wani, T. Bhattacharjee, S.R. Reddy, R. Saha, and Pinaki Prasad Bhattacharjee, Severe Plastic Deformation Driven Nanostructure and Phase Evolution in a  $\text{Al}_{0.5}\text{CoCrFeMnNi}$  Dual Phase High Entropy Alloy, *Intermetallics*, 91, 2017, 150-157.

R.R. Eleti, V. Raju, M. Veerasham, S.R. Reddy, and P.P. Bhattacharjee, Influence of Strain on the Formation of Cold-Rolling and Grain Growth Textures of an Equiatomic  $\text{HfZrTiTaNb}$  Refractory High Entropy Alloy, *Materials Characterization*, 136, 2017, 286-292.

S.R. Reddy, S. Bapari, Pinaki Prasad Bhattacharjee, and A.H. Chokshi, Superplastic-like flow in a Fine-Grained Equiatomic  $\text{CoCrFeMnNi}$  High-Entropy Alloy, *Materials Research Letters*, 5, 2017, 408-414.

K. Chadha, D. Shahriari, R. Tremblay, P.P. Bhattacharjee, and M. Jahazi, Deformation and Recrystallization Behavior of the Cast Structure in Large Size, High Strength Steel Ingots: Experimentation and Modeling, *Metallurgical and Materials Transactions A*, 48, 2017, 4297-4313.

S.R. Reddy, M.Z. Ahmed, G.D. Sathiaraj, and Pinaki Prasad Bhattacharjee, Effect of Strain Path on Microstructure and Texture Formation in Cold-Rolled and Annealed FCC Equiatomic  $\text{CoCrFeMnNi}$  High Entropy Alloy, *Intermetallics*, 87, 2017, 94-103.

S.S. Satheesh Kumar, T. Raghu, Pinaki P. Bhattacharjee, G. Appa Rao, and Utpal Borah, Work Hardening Characteristics

and Microstructural Evolution During Hot Deformation of a Nickel Superalloy at Moderate Strain Rates, *Journal of Alloys and Compounds*, 709, 2017, 394-409.

Tilak Bhattacharjee, Ruixiao Zheng, Yan Chong, Saad Sheikh, Sheng Guo, Ian Thomas Clark, Toshiro Okawa, Irfan Samad Wani, Pinaki Prasad Bhattacharjee, Akinobu Shibata, and Nobuhiro Tsuji, Effect of Low Temperature on Tensile Properties of  $\text{AlCoCrFeNi}_{2.1}$  Eutectic High Entropy Alloy, *Materials Chemistry and Physics*, 210, 2017, 207-212.

I.S. Wani, T. Bhattacharjee, S. Sheikh, Y. Lu, S. Chatterjee, S. Guo, Pinaki Prasad Bhattacharjee, and N. Tsuji, Effect of Severe Cold-Rolling and Annealing on Microstructure and Mechanical Properties of  $\text{AlCoCrFeNi}_{2.1}$  Eutectic High Entropy Alloy, *IOP Conference Series: Materials Science and Engineering*, 194, 2017, 012018.

I.S. Wani, T. Bhattacharjee, S. Sheikh, I.T. Clark, M.H. Park, T. Okawa, S. Guo, Pinaki Prasad Bhattacharjee, and N. Tsuji, Cold-Rolling and Recrystallization Textures of a Nano-Lamellar  $\text{AlCoCrFeNi}_{2.1}$  Eutectic High Entropy Alloy, *Intermetallics*, 84, 2017, 42-51.

K. Rajamallu, Manish K. Niranjan, Kei Ameyama and Suhash R. Dey, Phase stability and elastic properties of  $\text{Ti-Nb-X}$  ( $X=\text{Zr, Sn}$ ) alloys: An ab-initio density functional study, *Modelling and Simulation in Materials Science and Engineering*, 2017, 10.1088/1361-651X/aa93c1.

P. Srinivas and Suhash R. Dey, Theoretical and Experimental Studies of Electrodeposition of Binary Ni-Cu Thin Film Material library, *Physica Status Solidi (A)*, 2017, 1700084, 10.1002/pssa.201700084.

K. Basanth Kumar, K. Rajamallu, Kuldeep K. Saxena, Vivek Pancholi, Suhash R. Dey and Amit Bhattacharjee, Flow behaviour of TiHy 600 alloy under hot deformation using Gleebel 3800, *Advances in Materials and Processing Technologies*, 3(4), 2017, 490-510 10.1080/2374068X.2017.1342065.

Sushmita Chaudhari, P.K. Kannan and Suhash R. Dey, Influence of stabilizing agent on dip coating of  $\text{Cu}_2\text{ZnSnS}_4$  thin film, *Thin Solid Films*, 636, 2017, 144-149.

Rahul B. Mane and B. B. Panigrahi, Grain

boundary sliding assisted densification during initial sintering stage of mechanically alloyed CoFeNi powders, *Trans. of PMAI*, 43, 2017, 13-19.

H. Prasad, S. Singh, and B.B. Panigrahi, Mechanical activated synthesis of alumina dispersed FeNiCoCrAlMn high entropy alloy, *Journal of Alloys and Compounds*, 692, 2017, 720-726.

Y.RajkumarandB.B.Panigrahi, Thermodynamic Assessments and Mechanically Activated Synthesis of Ultrafine Cr<sub>2</sub>AlC MAX Phase Powders, *Advanced Powder Technology*, 28, 2017, 732-739.

Y. Rajkumar, B.M. Rahul, P.A. Akash, B.B. Panigrahi, Non- Isothermal Sintering of Cr<sub>2</sub>AlC Powder, *Int. Journal of Applied Ceramic Technology*, 14, 2017, 63-67.

V.R. Manneppalli, R. Raghunathan, R. Ramadurai, A. David, and W. Prellier, Local structural distortion and interrelated phonon mode studies in yttrium chromite, *Journal of Materials Research* 32(8), 2017, 1541-1547.

K. Prabahar, R. Ranjith, A. Srinivas, S.V. Kamat, B. Mallesham, and V.L. Niranjan, Effect of deposition temperature on the microstructure, ferroelectric and mechanical properties of lead free BCZT ceramic thin films, *Ceramics International* 43(6), 2017, 5356-5361.

V.R. Manneppalli, M.M.S. Mohan, and R. Ranjith, Tailoring the bandgap and magnetic properties by bismuth substitution in neodymium chromite, *Bulletin of Materials Science*, 40(7), 2017, 1503-1511.

V.R. Manneppalli and R. Ramadurai, Structural and electrical transport studies in Bi-substituted Yttrium Chromite, *Journal of Materials Science: Materials in Electronics* 28(11), 2017, 8087-8092

S. K. Makineni, S. Sandeep, S. Meher, R. Banerjee, Saswata Bhattacharya, S. Kumar and K. Chattopadhyay, Enhancing elevated temperature strength of copper containing aluminium alloys by forming L<sub>12</sub> Al<sub>3</sub>Zr precipitates and nucleating precipitates on them, *Scientific Reports*, 7, 2017, 11154.

Shivakalyani Adepu and Mudrika Khandelwal, Broad-spectrum antimicrobial activity of bacterial cellulose silver nanocomposites

with sustained release, *Journal of Materials Science*, 53(3), 2017, 1596-1609.

Shiva Kalyani, Nandini Dhiman, Anindita Laha, Chandra S. Sharma, Seeram Ramakrishna, and Mudrika Khandelwal, Three-Dimensional Bioprinting for Bone Tissue Regeneration, *Current Opinion in Biomedical Engineering*, 2, 2017, 22-28.

M. Kakunuri, N.D. Wanasekara, C.S. Sharma, M. Khandelwal, and S.J. Eichhorn, Three dimensional electrospun micropatterned cellulose acetate nanofiber surfaces with tunable wettability, *Journal of Applied Polymer Science*, 134(15), 2017.

M. Kakunuri, M.Khandelwal, C.S. Sharma, and S.J. Eichhorn, Fabrication of bio-inspired hydrophobic self-assembled electrospun nanofiber based hierarchical structure, *Materials Letters*, 196, 2017, 339-342.

Mrunalini K. Gaydhane, Urbashi Mahanta, Chandra S. Sharma, Mudrika Khandelwal, and Seeram Ramakrishna, Cultured meat: state of the art and future, *Biomanufacturing Reviews*, 3(1), 2018.

A. Patel, I. Wani, S.R. Reddy, S. Narayanaswamy, A. Lozinko, R. Saha, S. Guo, and Pinaki Prasad Bhattacharjee, Strain-path controlled microstructure, texture and hardness evolution in cryo-deformed AlCoCrFeNi 2.1 eutectic high entropy alloy, *Intermetallics*, 97, 2018, 12-21.

T. Bhattacharjee, I.S. Wani, S. Sheikh, I.T. Clark, T. Okawa, S. Guo, Pinaki Prasad Bhattacharjee, and N. Tsuji, Simultaneous strength-ductility enhancement of a nano-lamellar AlCoCrFeNi 2.1 Eutectic high entropy alloy by cryo-rolling and annealing, *Scientific Reports*, 8, 2018, 3276-3283.

Rajeshwar R. Eleti, Tilak Bhattacharjee, Lijia Zhao, Pinaki P. Bhattacharjee, and Nobuhiro Tsuji, Hot Deformation Behavior of CoCrFeMnNi FCC High Entropy Alloy, *Materials Chemistry and Physics*, 210, 2018, 176-186.

P.K. Kannan, Sushmita Chaudhari and Suhash R. Dey, Detailed investigation of influence of precursor stacking and sulfurization on the formation of CZTS films, *Thin Film Solids*, 649, 2018, 81-88.

Manish P. Meshram, Rameez R. Tamboli, Basanth K. Kodli, Sushil G. Yebaji and Suhash R. Dey, Texture analyses of friction stir welded austenitic stainless steel AISI-316L, *Advances in Materials and Processing Technologies*, 4(2), 2018, 244-254 [10.1080/2374068X.2017.1414558](https://doi.org/10.1080/2374068X.2017.1414558).

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Rahul B. Mane and Bharat B. Panigrahi, Effect of alloying order on non-isothermal sintering kinetics of mechanically alloyed high entropy alloy powders, *Materials Letters*, 217, 2018, 131-134.

Rahul B. Mane and Bharat B. Panigrahi, Comparative study on sintering kinetics of as-milled and annealed CoCrFeNi high entropy alloy powders, *Materials Chemistry and Physics*, 210, 2018, 49-56.

Rahul B. Mane, Ampolu Hari babu, and B. B. Panigrahi, Synthesis and sintering of  $Ti_3GeC_2$  MAX phase powders, *Ceramics International*, 44, 2018, 890-893.

Deepak Davis, Meenu Srivastava, M. Malathi, Bharat B. Panigrahi, and S. Singh, Effect of Cr<sub>2</sub>AlC MAX phase addition on strengthening of Ni-Mo-Al alloy coating on piston ring: Tribological and twist-fatigue life assessment, *Applied Surface Science*, 2018, [10.1016/j.apsusc.2018.01.146](https://doi.org/10.1016/j.apsusc.2018.01.146).

Kabiri, Yoones, Adithya N. Ananth, Jaco van der Torre, Allard Katan, Jin Yong Hong, Sairam Malladi, Jing Kong, Henny Zandbergen, and Cees Dekker, Distortion of DNA Origami on Graphene Imaged with Advanced TEM Techniques, *Small* 13(31), 2017.

## Publications (in peer reviewed conferences)

Kumaraswamy Miriyala and Ranjith Ramadurai, Microstructure influence on Piezoelectric Properties and DC Leakage Behavior of  $Na_{0.5}Bi_{0.5}TiO_3$  Thin Films, *International Symposium for Integrated Ferroelectrics, ISIF-2017*, Delhi

Godbole Kirtiratan, B.B. Panigrahi, and C. Das, Tailoring of mechanical properties of AISI 410 martensitic stainless steel through tempering, *Proceeding of METAL-2017*, Tanger Ltd., Ostrava, Czech Republic, 2018, 705-710

M.M. Sajmohan and Ranjith Ramadurai, Template assisted strain tuning and phase stabilization in epitaxial  $BiFeO_3$  thin films, *AIP conference proceedings*, 1942, 2018, 080040.

Raghav Soni, Uday Roopavath, Urbashi Mahanta, Atul S. Deshpande, S.N. Rath, Sodium alginate/gelatin with Silica nanoparticles a Novel Hydrogel for 3D-Printing, *International Conference on Inventive Research in Material Science and Technology*, Coimbatore, India (ICIRMCT 2018) Paper ID: ICIRMCT-120, 23-24 March 2018.

## Funded Research Projects 2017-18

Dr. Saswata Bhattacharya, Effect of Electromechanical Forces on Domain Evolution in Ferroelectric and Multiferroic Thin Films: Phase-Field Modeling and Simulations, DST-SERB, 29 August 2017, Rs. 54.83 Lakhs.

Dr. Ranjith Ramadurai, Synthesis of novel multifunctional nano composites and study the influence of size, shape, strain and organizational behavior at nano scale for magneto-dielectric device applications, DRDO-ERIPR, February 2018, Rs. 48.0 Lakhs.

## Talks Given in National / International Conferences

Godbole Kirtiratan, B. Panigrahi Bharat, and Das Chittaranjan, Tailoring of mechanical properties of AISI 410 martensitic stainless steel through tempering, *METAL 2017*, Brno Czech Republic EU, 24-26 May 2017.

Pinaki Prasad Bhattacharjee, Tailoring microstructure for achieving ultrahigh strength and ductility in a novel nanolamellar AlCoCrFeNi<sub>2.1</sub> eutectic high entropy

alloy, *Microstructure 2017*, IIT Mumbai, India, 20-21 August 2017 (Invited).

Pinaki Prasad Bhattacharjee, Microstructural engineering for developing AlCoCrFeNi<sub>2.1</sub> eutectic high entropy alloy with outstanding strength-ductility combination, *IUMRS-ICA 2017*, Taipei, Taiwan 5-9 November 2017 (Invited)

Pinaki Prasad Bhattacharjee, Thermo-mechanical processing strategies for developing AlCoCrFeNi<sub>2.1</sub> eutectic high entropy alloy with outstanding strength-ductility balance, *NM-ATM 2017*, BITS Pilani, Goa, India, 11-14 November 2017, (invited).

Shourya Dutta Gupta, Fast and non-destructive diagnosis using plasmon enhanced IR spectroscopy, *CoOpt 2017*, IISER Kolkata, 18-19 December 2017.

Harendra Kumar, K. Rajamallu, Rameez R. Tamboli and Suhash R. Dey, Fabrication of beta Ti<sub>29</sub>Nb<sub>13</sub>Ta<sub>4.6</sub>Zr alloy through powder metallurgy route for biomedical applications, *PM 18, International Conference on Powder Metallurgy and Particulate Materials*, Bombay, India, 21-23 February 2018.

B.B. Panigrahi, High Entropy Alloys: Scopes in Powder Metallurgy and Additive Manufacturing, *International Conference on Powder Metallurgy*, Mumbai, 21-23 February 2018 (Invited Talk).

Rahul B. Mane and B.B. Panigrahi, Effect of configurational entropy on sintering behavior of high entropy alloy powders, *International Conference on Powder Metallurgy*, Mumbai, 21-23 February 2018.

Sahil Rohila, Rahul B. Mane, and B.B. Panigrahi, Transient Liquid Phase Sintering of AlCoCrFeNi HEA, *International Conference on Powder Metallurgy*, Mumbai, 21-23 February 2018.

Anshul Patel, Sahil Rohila, Rahul B. Mane, and B.B. Panigrahi, Sintering of FeAl Intermetallics reinforced Steel Metal Matrix Composites, *International Conference on Powder Metallurgy*, Mumbai, 21-23 February 2018.

Ranjith Ramadurai, Tunability of polarization components and electric field induced

crystallization in poly-vinylidene fluoride (PVDF); a piezo polymer for flexural sensing and energy harvesting, *5<sup>th</sup> International conference on Nano Materials and Nano Composites (5<sup>th</sup> ICNN-2018)*, VIT Chennai, 8-10 February 2018 (Invited talk).

Shivakalyani Adepu and Mudrika Khandelwal, *MRS 2017*, Boston.

Sairam K Malladi, In-situ TEM for Energy Materials: Technique development and Applications, *The 4<sup>th</sup> workshop on Environment and Energy*, Osaka University, Japan, 3<sup>rd</sup> March 2018.

Sairam K Malladi, TEM as a micro-laboratory: in situ Transmission Electron Microscopy using MEMS based devices, Kyoto University, Japan, 5<sup>th</sup> March 2018.

Rahul B. Mane and B. B. Panigrahi, High Entropy Alloy Powders For Near Net Shape Components, *International Conference on Digital Fabrication*, Hyderabad, 16-17 March 2018.

Eswar Prasad Korimalli, Rajesh Korla, Full-field strain measurements in single crystal Magnesium using digital image correlation, *NMD-ATM 2017*, Bits Pilani, Goa.

Eswara Prasad Korimilli, TM. Pavan, P. Agarwal, K. Rajesh, V. Aubin, Orientation dependent nanoindentation response of single crystal Magnesium (poster), *NMD-ATM 2017*, Bits Pilani, Goa.

## Workshops / Symposia

Dr. Pinaki Prasad Bhattacharjee co-organized (along with Scientists from Taiwan, South Korea and China) the special symposium on High Entropy Alloys and Bulk Metallic Glasses at the 18<sup>th</sup> International Union of Materials Research Societies, International Conference in Asia (IUMRS-ICA, 2017), Taipei, Taiwan during 5-9 November 2017.

Lecture on Research in Higher Education as a part of workshop conducted by Teaching Learning Center of IIT Hyderabad, 17 December 2017.

Lecture on Scientific paper writing and review writing as a part of workshop conducted by Teaching Learning Center of IIT Hyderabad, 20 January 2018.

One day workshop on Pedagogical techniques - Teaching and Learning methods as a part of workshop conducted by Teaching Learning Center of IIT Hyderabad, 28 February 2018.

Saswata Bhattacharya, *Best Poster Award* by Soumya Bandyopadhyay for Phase-field modelling of domain dynamics in  $x\text{Ba}(\text{Zr}_{0.2}\text{Ti}_{0.8})\text{O}_3$  &  $-(1-x)\text{Ba}_{0.7}\text{Ca}_{0.3}\text{TiO}_3$  (BZT-BCT) ferroelectric solid solution: composition and strain effects, 55<sup>th</sup> National Metallurgists Day and 71<sup>st</sup> Annual Technical Meeting (NMD-ATM 2017), BITS Pilani, Goa, November, 2017.

Mudrika Khandelwal, *INYAS membership*.

Mudrika Khandelwal, Illa Mani Pujitha - *Best Poster*, APA 2017, New Delhi.

Sai Rama Krishna Malladi, Associate fellow, Andhra Pradesh Akademi of Sciences, November 2017.

Shourya Dutta Gupta, *Ramanujan Fellowship 2018* (DST-SERB).

Bharat B. Panigrahi, *Promising Young Powder Metallurgy Professional Award*, by Powder Metallurgy Association of India, 2018.

Bharat B. Panigrahi, *Best Reviewer Award*, by Springer & Transaction of Indian Institute of Metals.

Rahul Mane, *Best Paper Award*, International Conference on Powder Metallurgy, Mumbai, 21-23 February, 2018.

## Other Events

Four 5 day workshops on Faculty Induction as a part of TEQIP-KITE Center of IIT Hyderabad, 15 January - 3 February 2018, IIITH, Kandi. It was attended by total around 200 participants.

## Awards / Recognitions

Ranjith Ramadurai, *Best poster award* by Mr. Kumaraswamy Miriyala for Microstructure influence on Piezoelectric Properties and DC Leakage Behavior of  $\text{Na}_{0.5}\text{Bi}_{0.5}\text{TiO}_3$  Thin Films, International Symposium for Integrated Ferroelectrics, ISIF-2017-Delhi.

# MATHEMATICS

As a dynamic initiative from the director, Professor U. B. Desai, a new Bachelor's degree program in Mathematics was introduced at IIT-Hyderabad in August, 2017. The Mathematics department now offers a B.Tech program in Math and Computing. The program is envisioned to equip the students with the mathematical foundations required to excel in various applied and computational streams where Math plays a major role. In the early stages, the students will be introduced to different fields of math that form the basis for different engineering streams. In the higher semesters, the program envisages to offer different baskets of electives, viz., Theoretical Math, Computational Intelligence and Data Sciences, Coding and Cryptography, Computational Mechanics, Mathematical Finance.



## FACULTY

	<b>Jayaram Balasubramaniam</b> Ph.D – Sri Satyasaai Institute of Higher Learning <i>Associate Professor &amp; HoD</i> <i>Research Areas:</i> Connectives in Multi-valued Logic, Approximate Reasoning, Issues in High Dimensional Data Analysis		<b>Venku Naidu Dogga</b> Ph.D – IIT Madras <i>Assistant Professor</i> <i>Research Areas:</i> Harmonic Analysis, Functional Analysis
	<b>G Ramesh</b> Ph.D – IIT Madras <i>Associate Professor</i> <i>Research Areas:</i> Functional Analysis, Operator Algebras		<b>Narasimha Kumar</b> Ph.D – TIFR Bombay <i>Assistant Professor</i> <i>Research Areas:</i> Algebraic Number Theory, modular forms, Galois representations
	<b>C. S. Sastry</b> Ph.D – IIT Kanpur <i>Associate Professor</i> <i>Research Areas:</i> Wavelets, Sparse representation theory and inverse problems		<b>Pradipto Banerjee</b> Ph.D – University of South Carolina <i>Assistant Professor</i> <i>Research Areas:</i> Number Theory
	<b>P. A. L. Narayana</b> Ph.D – IIT Kharagpur <i>Associate Professor</i> <i>Research Areas:</i> Fluid Mechanics		<b>Bhakti Bhusan Manna</b> PhD – TIFR CAM <i>Assistant Professor</i> <i>Research Areas:</i> Partial Differential Equations, Geometric Analysis, Non-local Operators.
	<b>D. Sukumar</b> Ph.D – IIT Madras <i>Assistant Professor</i> <i>Research Areas:</i> Functional Analysis, Banach Algebra, Numerical Linear Algebra		<b>Tanmoy Paul</b> Ph.D – ISI Calcutta <i>Assistant Professor</i> <i>Research Areas:</i> Functional Analysis

## Publications (in peer reviewed journals)

- B. Jayaram, T-subnorms with Strong Associated Negation: Some Properties, *Fuzzy Sets and Systems*, 323, 2017, 94-102.
- G. Ramesh and P. Santhosh Kumar, Spectral Theorem for Compact Normal Operators on Quaternionic Hilbert Spaces, *The Journal of Analysis*, 25, 2017, 65-81.
- G. Ramesh, The Numerical Radius of Quaternionic Normal Operator, *Advances in Operator Theory*, 2, 2017, 78-86.
- G. Ramesh and P. Santhosh Kumar, Borel Functional Calculus for Quaternionic Normal Operators, *J. Math. Phys.*, 58, 2017, 65-81.
- D. Venku Naidu, D. Sukumar, and C. Sivaramakrishnan, The Images of Dunk-Sobolev Spaces Under Schrodinger Semigroup Associated to Dunkl Operators, *J. Pseudo-Differ. Oper. Appl.*, 2017, (online).
- D. Venku Naidu, D. Sukumar and C. Sivaramakrishnan, The Images of Dunk-Sobolev Spaces Under Schrodinger Semigroup Associated to Dunkl Operators, *J. Pseudo-Differ. Oper. Appl.*, 2017 (online).
- D. Venku Naidu, D. Sukumar and C. Sivaramakrishnan, The Images of Sobolev Spaces Under Schrodinger Semigroup, *Adv. Pure Appl. Math.*, (online).
- D. Sukumar and S. Veeramani, Level Sets of The Condition Spectrum, *Ann. Funct. Anal.*, 8, 2017, 314-328.
- Ganesh Jadav, G. Ramesh and Sukumar Daniel, Perturbation of Minimum Attaining Operators, *Adv. Oper. Theory*, 3, 2018, 473-490.
- Ganesh Jadav, Ramesh Golla and Sukumar Daniel, Perturbation of Minimum Attaining Operators, *Adv. Oper. Theory*, 3, 2018, 473-490.
- Geethika Sebastian and D. Sukumar, The Open Ball Centered at an Invertible Element of a Banach Algebra, *Operators and Matrices*, 12, 2018, 19-25.
- D. Venku Naidu, Partha Sarathi Patra and C. Sivaramakrishnan, Benedicks' Theorem for the Weyl Transform Associated with the

Heisenberg Group, *Integral Transforms and Special Functions*, 29, 2018, 442-449.

D. Venku Naidu, D. Sukumar, and C. Sivaramakrishnan, The Images of Sobolev Spaces Under Schrodinger Semigroup, *Adv. Pure Appl. Math.*, (online).

Kumar Narasimha, The Gaps Between Non-Zero Fourier Coefficients of Cusp Forms of Higher Weight, *The Ramanujan Journal*, 45, 2018, 95-109.

Kaushik, Surjeet and Kumar Narasimha, The Gaps Between Non-Zero Fourier Coefficients of Eigenforms with CM, *International Journal of Number Theory*, 14, 2018, 95-101.

Kashik Surjeet, Kumar Narasimha and Tanabe Naomi, Equidistribution of Signs for Hilbert Modular Forms of Half-Integral Weight, *Research in Number Theory*, 4, 2018, 4-13.

P. Banerjee, Galois Groups of A One-Parameter Family of Orthogonal Polynomials, *Acta Arithmetica*, 183, 2018, 1-34.

## Publications (in peer reviewed conferences)

- D. Sukumar and S. Veeramani, Level Sets of (p,e-p) Outer Generalized Pseudo Spectrum, *Journal of Analysis, ICMAA*, May 2017, (online).

## Talks Given in National / International Conferences

G. Ramesh, Absolutely norm attaining paranormal operators, *International Workshop on Operator Theory and Applications*, Chemnitz University, Chemnitz, Germany, 14-18 August 2017.

D. Venku Naidu, Absolutely norm attaining operators, *International Workshop on Operator Theory and Applications*, Chemnitz University, Chemnitz, Germany, 14-18 August 2017.

Bhakti Bhusan Manna, The Sign-Changing Solutions to A Singularly Perturbed Elliptic Equations, *Recent Developments in PDE*, TIFR-CAM Bangalore, 18-19 August 2017.

G. Ramesh, Absolutely Norm Attaining Paranormal Operators, *Conference on Functional Analysis@ IIT Bombay, 12-15 October 2017.*

D. Sukumar, Banach Algebras with Natural Optimal Radius of Open Ball at Each Invertible Element, *Conference on Functional Analysis@ IIT Bombay, 12-15 October 2017.*

G. Ramesh, Absolutely Norm Attaining Paranormal Operators, *International Conference on Linear Algebra and Its Applications, Manipal University, Manipal, 11-15 December 2017.*

Narasimha Kumar, A Variant of Multiplicity One Theorem for Half-Integral Weight Modular Forms, Number theory: Arithmetic, Diophantine and Transcendence, IIT Ropar, 22-25 December, 2017.

G. Ramesh, Maps Preserving An - Operators, Conference on Quantum Groups and Non Commutative Geometry, *NISER Bhubaneswar, 15-19 January 2018.*

Dr. Soumya Bhattacharya, Vivekananda University, Kolkata, *Finiteness Results on A Certain Class of Modular Forms and Applications, 17 November 2017.*

Dr. Biswajyoti Saha, TIFR, Mumbai, *Multiple Stieltjes Constants, 10 January 2018.*

Dr. Pradip Kundu, NIT, Raipur, *Reliability Study of Systems with General Standby Components and Constrained Optimization Problem with Interval Type-2 Fuzzy Parameters, 17 January 2018.*

Dr. Ramij Rahaman, University of Allahabad, UP, *Detection of True Entangled State Vector of Joint Hilbert Spaces and its Applications in Secure Communication, 20 January 2018.*

Dr. Arindam Banerjee, Vivekananda University, Kolkata, *Homological Algebra of Ideals Related to Graph Theory, 20 January 2018.*

Dr. G. Kasi Viswanatham, Institute of Mathematical Sciences, Chennai), *Discrepancy Estimates for Generalized Polynomials, 20 January 2018.*

Dr. Amit Tripathi, NISER, Bhubaneswar, *Vector Bundles over Hypersurfaces, 3 February 2018.*

Dr. Ananya Lahiri, Chennai Mathematical Institute, Chennai, *Application of Statistics In Signal Processing, Finance and Environment Model, 3 February 2018.*

Dr. Deepmala, PDPM IIIT, Design and Manufacturing, Jabalpur, *Existence of Solution of Functional Equations Arising in Dynamic Programming of Multistage Decision Processes with Applications, 3 February 2018.*

Dr. Dipti Dubey, ISI, Delhi, *Hidden Z-Matrices and the Linear Complementarity Problem, 3 February 2018.*

## Seminars

Dr. Narasimha Kumar, IIT Hyderabad, *A variant of multiplicity one theorems for half integral weight modular forms, 29 September 2017.*

Dr. Aboubacar Marcos, University of Abomey-Calavi, Benin, *Multiplicities of solutions for a sub-linear Dirichlet problem involving  $p(x)$ -Laplacian, 3 November 2017.*

Dr. Guy Degla, University of Abomey-Calavi, Benin, *Positivity - Cone theoretic methods and applications, 3 November 2017.*

# MECHANICAL & AEROSPACE ENGINEERING

The Department of Mechanical & Aerospace Engineering had a very productive year in terms of academics and research. The department started a new minor program in Aerospace Engineering. This program is open for undergraduate students of IIT Hyderabad and to get a minor in Aerospace Engineering, a student needs to take 12 credits from the basket of courses offered under this program. The currently list of courses that is offered under this program are: Introduction to Aerospace Vehicles, Aerodynamics, Flight Mechanics, Aerospace Structures, Aircraft propulsion and Rocket propulsion. Additionally, the department also started an All Course MTech program where a student can obtain an MTech in Mechanical Engineering by pursuing 36-39 credits of coursework and can complete the degree requirements in 3 semesters. The department offers this program in three specializations: Mechanics & Design, Thermo-Fluids Engineering and Integrated Design and Manufacturing. Department has embarked on a significant upgrade of research infrastructure through institute support and funding through JICA. The department co-hosted the 24<sup>th</sup> National and 2<sup>nd</sup> International ISHMT-ASTFE Heat and Mass Transfer Conference (IHMTC 2017). IHMTC series of conferences is one of the largest conferences in Mechanical Engineering that is organized in India. It is a biennial conference that aims to bring leading national and international experts to a common platform to discuss and share their vision on research in the frontier areas of heat and mass transfer.



## FACULTY

 <p><b>Raja Banerjee</b> Ph.D – University of Missouri Rolla - USA <i>Associate Professor &amp; HoD</i> <i>Research Areas:</i> High fidelity CFD, Multiphase flow with Heat and Mass Transfer, spray &amp; atomization, Lattice Boltzmann Method</p>	 <p><b>Chandrika Prakash Vyasarayani</b> Ph.D – University of Waterloo, Canada <i>Associate Professor</i> <i>Research Areas:</i> Stability, time delay systems, optimization, and control</p>
 <p><b>Vinayak Eswaran</b> Ph.D - State University of NY at Stony Brook <i>Professor</i></p>	 <p><b>R. Prasanth Kumar</b> Ph.D – IIT Kharagpur <i>Associate Professor</i> <i>Research Areas:</i> Humanoid robots, mobile robots, dynamic walkers, vehicle suspension systems</p>
 <p><b>N. Venkata Reddy</b> Ph.D – IIT Kanpur <i>Professor</i> <i>Research Areas:</i> Digital Fabrication and Predictive Modeling of Manufacturing Processes</p>	 <p><b>Ashok Kumar Pandey</b> Ph.D – IISc, Bangalore <i>Associate Professor</i> <i>Research Areas:</i> Linear and Nonlinear Vibrations, Vehicle Dynamics, MEMS</p>
 <p><b>Abhay Sharma</b> Ph.D – IIT Roorkee <i>Associate Professor</i> <i>Research Areas:</i> Welding Engineering, Sustainable Manufacturing, Additive Manufacturing</p>	 <p><b>M. Ramji</b> Ph.D – IIT Madras <i>Associate Professor</i> <i>Research Areas:</i> Composite structures, Fracture mechanics and Experimental mechanics</p>
 <p><b>K. Venkatasubbaiah</b> Ph.D – IIT Kanpur <i>Associate Professor</i> <i>Research Areas:</i> Computational Heat Transfer and Hypersonic Flows</p>	 <p><b>S Suryakumar</b> Ph.D – IIT Bombay <i>Associate Professor</i> <i>Research Areas:</i> Additive Manufacturing, Metal AM, CAD/CAM, Functionally Gradient Materials</p>
 <p><b>B. Venkatesham</b> Ph.D – IISc, Bangalore <i>Associate Professor</i> <i>Research Areas:</i> Acoustics &amp; Vibration</p>	 <p><b>Badarinath Karri</b> Ph.D - National University of Singapore <i>Assistant Professor</i> <i>Research Areas:</i> Experimental fluid mechanics, high-speed imaging, cavitation, bubble dynamics</p>

## FACULTY



**Pankaj Sharadchandra Kolhe**  
Ph.D - The University of Alabama, USA

Assistant Professor

**Research Areas:** IC Engines, Gas Turbine Engines, Alternative Fuels, Combustion Diagnostics



**Gangadharan Raju**  
Ph.D - IISc, Bangalore

Assistant Professor

**Research Areas:** Variable angle tow composites, Buckling and Postbuckling analysis, Non-destructive testing and Evaluation



**Nishanth Dongari**  
Ph.D - University of Strathclyde, UK

Assistant Professor

**Research Areas:** Microfluidics, Rarefied Gas Dynamics, Compressible Gas Flows, Thin Film Coatings, Molecular Dynamics, Direct Simulation Monte Carlo and Extended Hydrodynamics



**Harish N Dixit**  
Ph.D – Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore

Assistant Professor

**Research Areas:** Moving contact lines, drops, thin films, vortex dynamics



**Syed Nizamuddin Khaderi**  
Ph.D - University of Groningen, Netherlands

Assistant Professor

**Research Areas:** Solid mechanics, impact mechanics, fluid structure interaction



**M.S. Mahesh**

Ph.D – UIUC, USA

Assistant Professor

**Research Areas:** Vibroacoustics, Aeroelasticity



**Prashant Saxena**

Ph.D - University of Glasgow, Scotland, UK

Assistant Professor

**Research Areas:** Electromagnetic interactions in solids; Instability analysis; Nonlinear Continuum Mechanics



**Saravanan Balusamy**

Ph.D - University of INSA of Rouen, France

Assistant Professor

**Research Areas:** Combustion, Laser diagnostics, IC Engines



**Viswanath R. Chinthapenta**

Ph.D – Brown University, USA

Assistant Professor

**Research Areas:** Computational Solid Mechanics

## Patents Filed

P. Mastanaiah, A. Sharma, G.M. Reddy, and C.V.S. Murthy, *Friction Stir Welding Tool*, Patent No.201711033370.

P. Mastanaiah, A. Sharma, G.M. Reddy, and C.V.S. Murthy, *Friction Stir Welding Tool pin profile-Hybrid triangular*, Design Application No.298035.

P. Mastanaiah, A. Sharma, G.M. Reddy, and C.V.S. Murthy, *Friction Stir Welding Tool pin profile-Conical threaded*, Design Application No.298695.

R. Prasanth Kumar, *An airborne vacuum cleaner*, 26 March 2018, Application No.201841011114 (provisional).

Noise in a Partially Filled Rectangular Tank, *SAE International Journal of Passenger Cars-Mechanical Systems*, 10, 2017, 2017-01-9678.

R. Banerjee and G. Saritha, Numerical Study of Cavitation and Bubble Growth Using a High Density Ratio Pseudo-potential Lattice Boltzmann Method, *ISME Journal of Thermofluids*, 3(1), 2017, 40-54.

Arnab K. De, Vinayak Eswaran, and Pankaj K. Mishra, Scalings of heat transport and energy spectra of turbulent Rayleigh-Bénard convection in a large-aspect-ratio box, *International Journal of Heat and Fluid Flow*, 67, 2017, 111-124.

T. Praveen and V. Eswaran, Transition to asymmetric flow in a symmetric sudden expansion: Hydrodynamics and MHD cases, *Computers & Fluids*, 148, 2017, 103-120.

Narendra Laxman Gajbhiye, Praveen Throvagunta, and Vinayak Eswaran, Validation and verification of a robust 3-D MHD code, *Fusion Engineering and Design*, 128, 2018, 7-22.

A. Assam, N. Kalkote, V. Sharma, and V. Eswaran V, An Automatic Wall Treatment for Spalart-Allmaras Turbulence Model, *ASME. J. Fluids Eng*, 2018, 10.1115/1.4039087.

A. Bansal, R. Lingam, S.K. Yadav, and N.V. Reddy, Prediction of Forming Forces in Single Point Incremental Forming, *Journal of Manufacturing Processes (SME Journal)*, 28, 2017, 486-493.

R. Lingam, A. Bansal, Om Prakash, and N.V. Reddy, Mechanics Based Integrated Product and Process Design for Incremental Forming, *ASME Journal of Manufacturing Science and Engineering*, 140(2), 2018, 021016.

P. Mastanaiah, Abhay Sharma, and G. Madhusudhan Reddy, Role of hybrid tool pin profile on enhancing welding speed and mechanical properties of AA2219-T6 friction stir welds, *Journal of Materials Processing Technology*, 257, 2018, 257-269.

Abhay Sharma, A fundamental study on qualitatively viable sustainable welding process maps. *Journal of Manufacturing Systems*, 46, 2018, 221-230.

P. Mastanaiah, Abhay Sharma, and G. Madhusudhan Reddy, Process parameters-weld bead geometry interactions and their

## Book & Book Chapters

Yashdeep P. Nimje and Gangadharan Raju, *Partial delamination detection and quantification in composite laminates using Laser Doppler vibrometer*, Springer-Singapore

N.K. Muhammad Shuaib, M. Ramji, Naresh Reddy Kolanu, and Gangadharan Raju, *FEA and Experimental Analysis on Buckling and Post-buckling Behavior of CFRP Composite Panel Using Digital Image Correlation Technique*, Springer- Singapore.

Sukanta Das, Naresh Reddy, and Gangadharan Raju, *Damage Growth Study in Unidirectional CFRP Composites Using Infrared Thermography*, Springer-Singapore.

T.C. Sagar and V. Chintha, *Lower and Upper Bound Estimates of Material Properties of Pristine Graphene: Using Quantum Espresso*, Advances in Structural Integrity, 2018, 253-265, Springer, Singapore.

## Publications (in peer reviewed journals)

G. Agawane, V. Jadon, V. Balide, and R. Banerjee, An Experimental Study of Sloshing

- influence on mechanical properties: A case of dissimilar aluminium alloy electron beam welds, *Defence Technology*, 14, 2018, 137-150.
- S. Choudhury, A. Sharma, U.K. Mohanty, R. Kasai, M. Komura, M. Tanaka, and T. Suga, Mathematical model of complex weld penetration profile: A case of square AC waveform arc welding, *Journal of Manufacturing Processes*, 30, 2017, 483-491.
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## Publications (in peer reviewed conferences)

S. Miriyala, P. Jadhav, R. Banerjee, and K. Mitra, Surrogate Based Optimization of CFD Model Simulating Supersonic Flow of Missile Body Under Uncertainty Using Artificial Neural Network, Paper ID 99, in Asian Symposium on Computational Heat Transfer and Fluid Flow (ASCHT2017), Chennai, India, 2017

P. Jadhav, S. Miriyala, K. Mitra, and R. Banerjee, Uncertainty estimations in external flow using Computational Fluid Dynamics (CFD), Paper ID 104, in Asian Symposium on Computational Heat Transfer and Fluid Flow (ASCHT2017), Chennai, India, 2017.

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A.B. Wakale, S.S. Kaira, and R. Banerjee, Numerical Simulation of Split Injection using 105 Species Based n-dodecane Chemical Kinetic Flamelet Model for Direct Injection CI Engine, IHMTC2017-04-1214, Proceedings of the 24th National and 2nd International ISHMT-ASTFE Heat and Mass Transfer

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R. Kale and R. Banerjee, Experimental Investigation of Abnormal Combustion (Knocking) in SI Engine using GDI Strategy, IHMTC2017-04-0140, Proceedings of the 24<sup>th</sup> National and 2<sup>nd</sup> International ISHMT-ASTFE Heat and Mass Transfer Conference (IHMTC-2017), Hyderabad, India, 2017.

M. Kumar, R. Banerjee, and M. Narasimha, Development of GPU Parallel Multiphase Solver for Turbulent Slurry Flows in Cyclone, 12th International Conference on CFD in Oil & Gas, Metallurgical and Process Industries, Trondheim, Norway, 2017.

A. Assam, N.N. Kalkote, N. Dongari, and V. Eswaran, Computation of Rarefied Gas Flows in Nano/micro Devices using an Indigenous developed Computational Fluid Dynamics Solver, Proceedings of the International Conference on Nanotechnology: Ideas, Innovations & Initiatives (ICN:3I), IITR, India, 2017, 649.

A. Assam, V. Sharma, and V. Eswaran, Automatic Wall Treatment For Spalart-Allmaras Turbulence Model, IHMTC2017, 2017.

V. Sharma, A. Assam, and V. Eswaran, Numerical Simulation of Turbulent High Speed Plane Jets- A validation with Experiment results, IHMTC2017, 2017.

A. Chandra, V. Sharma, A. Assam, and V. Eswaran, Performance of Convective Scheme in Density Based Solver, IHMTC2017, 2017

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Nikhil Kalkote and Vinayak Eswaran, Unsteady computations of all speed flows with modified gear's method on unstructured hybrid grid, 24<sup>th</sup> National and 2<sup>nd</sup> International ISHMT-ASTFE Heat and Mass Transfer Conference, 2017.

A. Bansal, R. Lingam, S.K. Yadav, and N.V. Reddy, Prediction of Forming Forces in

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- A. Subrahmanyam, K. Praveen, Rahul Verma, and N.V. Reddy, A review on electric pulse aided plastic deformation, Asia Steel (International Conference) 2018, Bhuvaneshwar, India 6-9 February 2018.
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- Aparna Gangele, Satish Kumar Garala and Ashok Kumar Pandey, Elastic and buckling analysis of vertically aligned carbon nanotube arrays using finite element methods, International conference on composite material and structures (ICCMS 2017), Hyderabad, India, 1, 27-29 December 2017, 1682-1692.
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- Matta Seshadri and M. Ramji, Progressive Damage Modeling of Open hole CFRP Specimen under Flexural Loading, Proceedings of ICCMS 2017, Hyderabad, India, 27-29 December 2017.
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- Jobin, Syed N. Khaderi and M. Ramji, Elastic stress fields near rigid line inclusions, Proceedings of ICCMS 2017, Hyderabad, India, 27-29 December 2017.
- Shiv Chandra, Naresh Reddy Kolanu, R.Gangadharan and M. Ramji, Experimental Studies on the Stability Behaviour of Curved CFRP Panels under Axial Compression, Proceedings of ICCMS 2017, Hyderabad, India, 27-29 December 2017.
- B. Karri, A.R. Premlata, M. Tripathi, and K. Sahu, Numerical and experimental investigations of an air-bubble rising in a Carreau-Yasuda shear thinning fluid, APS DFD annual meeting, November 2017.
- P.A. Ram, D. Sharaf, M. Tripathi, B. Karri, and K. Sahu, Shapes and paths of an air bubble rising in quiescent liquids, APS DFD annual meeting, November 2017.
- K. Sahu, M. Agrawal, P.A.R.M Tripathi, and B. Karri, Non-spherical liquid droplet falling in air, APS DFD annual meeting, November 2017.
- Y.S. Kannan, S. Balusamy, B. Karri, and K.C. Sahu, Effect of viscosity on the dynamics of a spark-generated non-equilibrium bubble in free-field and near a free-surface, APS DFD annual meeting, November 2017.

L. Hoskoti, A. Misra and M. Sucheendran, Interaction of nonlinear normal modes of a cantilever beam, 24th International Congress on Sound and Vibration, London, 2017.

M. Tripathi, A. Misra and M. Sucheendran, Effect of Rectangular and Airfoil Planar Member Cross-section on Cascade Fin Aerodynamics, 2018 AIAA Atmospheric Flight Mechanics Conference.

D. Aravindh, P. Shinde, A. Misra, M. Sucheendran and H. Ganji, Dynamic Aeroelasticity of a Trapezoidal Wing Using Enhanced Piston Theory 2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference

MeenatchideviMurugesan, Saravanan Balusamy, Simone Hochgreb, Larry K.B. Li, Recurrence analysis of forced synchronization in a self-excited thermoacoustic system, Proceedings of ICSV24, London, 23-27 July 2017.

Pankaj Pandya and Viswanath Chinthapenta, Analysis of Fiber Fragmentation in Single Fiber Composite, INCAM, 3rd Indian Conference on Applied Mechanics, MNNIT, Allahabad, 5-7 July 2017.

Srimaya Padhi and Viswanath Chinthapenta, Dynamic Interface Separation in Anisotropic Bi-material, INCAM, 3rd Indian Conference on Applied Mechanics, MNNIT, Allahabad 5-7 July 2017.

T. Chaitanya Sagar and Viswanath Chinthapenta, Second order elastic constants of Stanene, Advanced Materials World Congress 2017, Singapore, 04-08 February, [10.5185/amwc.2017](http://10.5185/amwc.2017).

## Funded Research Projects 2017-18

B. Venkatesham, Acoustic Characterization of Functionally Engineered Materials, The Boeing Company, May 2017, Rs. 30.0 Lakhs.

Viswanath R. Chinthapenta, Characterization of Bio-Synthetic Cornea, LVPEI, 1 January 2018, Rs. 79.0 Lakhs.

M.S. Mahesh, Development of analytical model for multi-layered fragment separation due to high explosive loading, ARDE, March 2018, Rs. 9.77 Lakhs.

Raja Banerjee, Experimental and Numerical Investigation of Doublet Jet-on-Jet Impinging Atomizer, DST, R.24,18,680, 14 June 2017.

Raja Banerjee, CFD Solver Development for Hybrid CPU-GPU Architecture, Microsoft Azure Research Award, USD5,000.00, 24 May 2017.

N Venkata Reddy, Forming of Thermoplastic Composites using Reconfigurable Tooling, Boeing, USD 50,000 for one year, September 2017.

## Talks Given in National / International Conferences

N.H. Reddy, P. Saxena, Limit points in the free inflation of a toroidal magnetoelastic membrane, 3rd Indian Conference on Applied Mechanics, Allahabad, July 2017.

Ashok Kumar Pandey, Frequency tuning due to non-uniform cantilever based systems, 8th ISSS Internal Conference on Smart Materials, Structures and Systems, IISc Bangalore, 5-7 July 2017.

Ashok Kumar Pandey, Overview of research in MEMS and Vehicle Dynamics, Invited talk SVERI Pandharpur, 21 July 2017.

Ashok Kumar Pandey, Modeling and simulations of MEMS Devices, One day workshop in MEMS/NEMS, RGM CET, Nandyal, Andhra Pradesh, 19th September 2017.

Ashok Kumar Pandey, Linear and nonlinear dynamics of small to large structures, AICTE Faculty Development Program on Fault Diagnosis, Condition Monitoring, and Structural Dynamics, AITAM, Nandyal, Andhra Pradesh, India, 6-19 November 2017.

P. Saxena Analysis of instabilities in magnetoelastic solids, International Conference on Composite Materials and Structures, Hyderabad, India, December 2017

N.V. Reddy, Key Note, Mass Production Vs Mass Customization, International Conference on Recent Innovations in Engineering and Technology (ICRIEAT 2017), Hyderabad, India, 21 & 22 December 2017.

Application of DIC in Composite Research, International Conference on composite structures, Hyderabad, India, 27-29 December 2017.

N.V. Reddy, Key Note, Electric Pulse Aided Plastic Deformation, ASIASTEEL (International Conference) 2018, Bhuvaneshwar, India, 6-9 February 2018.

P. Saxena, Instabilities in the deformation of magnetoelastic membranes, Indo-German workshop on new challenges in Mechanics, IIT Delhi, March 2018.

P. Saxena, Instabilities in the deformation of magnetoelastic membranes, 16th European Mechanics of Materials Conference, Nantes, France, March 2018.

## Workshops / Symposiums

Dr. Prashant Saxena organized the second IITH Solid Mechanics Symposium on 19-20 June 2017, Talks were given by leading researchers from all over India and a poster presentation event was held for postgraduate students. <http://www.iith.ac.in/~mechanics/>

Dr. S. Suryakumar organized an International Conference on Digital Fabrication at IITH, 16-17 March 2018.

Ashok Kumar Pandey, A three-day workshop on Modeling and Simulation of Road Vehicles, at Mercedes Benz, Bangalore, India, 28 February 2018 to 2 March 2018.

## Other Events

Dr. Viswanath R Chinthapenta, TEQIP course on Finite element method: Theory and Programming, 26 February – 3 March 2018.

# PHYSICS

The Department of Physics at IIT Hyderabad is a rapidly growing department, presently we have 17 permanent faculty members, 6 technical staff, 49 PhD and a large number of M.Sc and B.Tech (Engineering Physics) students. The department had significant success at academic as well as research fronts during the FY 17-18. Department has been successfully mentoring IIT Bhilai. In academics, 1<sup>st</sup> batch of B.Tech in Engineering Physics graduated with strength of 6 students. Apart from that, department also graduated 17 M.Sc and 1 PhD students. The department has included several advanced teaching experiments. The department has several groups pursuing research in diverse areas of physics. Presently their efforts are concentrated mainly in the area of High Energy Physics, Optics, Spectroscopy, Laser-Plasma Physics, Computational Condensed Matter Physics and Experimental Condensed Matter Physics. The department is in the process of establishing state of art research laboratories from the sponsored (DST, FIST, DSIR, DAE and CSIR) and institute supported projects. The faculty of the department have published in nearly 80 international journals and also delivered several talks at prestigious national/international workshops/conferences.



## FACULTY

 <p><b>Saket Asthana</b> Ph.D – IIT Bombay <i>Associate Professor &amp; HoD</i> <i>Research Areas:</i> Ferroelectrics, Multiferroics, Energy harvesting, electrocaloric, piezochromic</p>	 <p><b>Narendra Sahu</b> Ph.D – IIT Bombay <i>Associate Professor</i> <i>Research Areas:</i> Physics beyond the SM, neutrino mass, dark matter phenomenology,</p>
 <p><b>Anjan Kumar Giri</b> Ph.D – Utkal University <i>Professor</i> <i>Research Areas:</i> Flavor Physics and CP violation, Neutrino Physics</p>	 <p><b>Suryanarayana Jammalamadaka</b> Ph.D – IIT Madras <i>Associate Professor</i> <i>Research Areas:</i> Magnetic materials, spintronics, mesoscopic physics, thinfilms /device physics, magnetic nanoparticles, Graphene, magnetostrictive sensors, photovoltaics, non-volatile memory</p>
 <p><b>Prem Pal</b> Ph.D – IIT Delhi <i>Associate Professor</i> <i>Research Areas:</i> MEMS technology, Silicon wet bulk micromachining, MEMS-based sensors, Thin films for MEMS, In-situ observation of semiconductor processes</p>	 <p><b>Vandana Sharma</b> Ph.D – PRL, Ahmedabad <i>Assistant Professor</i> <i>Research Areas:</i> Ultrafast atomic and molecular dynamics, Particle X-ray Generation, Nanoparticle beam Generation, Table top light source Generation, Ultrashort electron generation, diffraction imaging</p>
 <p><b>Venkatakrishnan Kanchana</b> Ph.D – Anna University <i>Associate Professor</i> <i>Research Areas:</i> Exploring thermoelectric materials, Scintillators, Magnetism in solids, Superconductivity, Elastic and mechanical properties of Solids, Materials under extreme conditions.</p>	 <p><b>Jyoti Ranjan Mohanty</b> Ph.D – Humboldt University, Germany <i>Assistant Professor</i> <i>Research Areas:</i> Nanomagnetism, Magnetic Microscopy, Ultrafast magnetism, Multiferroics, Magnetic thin films and multilayers, X-ray microscopy, Tera Hertz Spectroscopy</p>
 <p><b>Manish K. Niranjan</b> Ph.D – University of Texas at Austin, USA <i>Associate Professor</i> <i>Research Areas:</i> Theoretical condensed matter Physics, Electronic Structure, Surface and interface Physics, Quantum Transport</p>	 <p><b>Raghavendra Srikanth Hundt</b> Ph.D – Harish Chandra Research Institute <i>Assistant Professor</i> <i>Research Areas:</i> Physics Beyond Standard Model, Neutrino Masses</p>
 <p><b>Shantanu Desai</b> Ph.D – Boston University, USA <i>Associate Professor</i> <i>Research Areas:</i> Astrophysics and Cosmology; Astrostatistics</p>	 <p><b>Raavi Sai Santosh Kumar</b> Ph.D – University of Hyderabad <i>Assistant Professor</i> <i>Research Areas:</i> Optical spectroscopy of Energy harvesting materials</p>

## FACULTY



**Bhuvanesh Ramakrishna**  
Ph.D – The Queen's University of Belfast, UK

*Assistant Professor*

*Research Areas:* Laser plasma interaction



**Priyotosh Bandyopadhyay**  
Ph.D – Harish-Chandra Research Institute, Allahabad

*Assistant Professor*

*Research Areas:* High Energy particle Physics, LHC, CERN



**Anurag Tripathi**  
Ph.D - Harish-Chandra Research Institute

*Assistant Professor*

*Research Areas:* High Energy Physics, Perturbative Quantum Chromodynamics, Infrared Structure of Gauge Field Theories



**Arabinda Haldar**  
Ph.D – IIT Bombay

*Assistant Professor*

*Research Areas:* Magnon spintronics, Nanomagnetic devices, Thin film nanofabrication (Lithography)



**Shubho R. Roy**  
Ph.D – Brown University, USA

*Assistant Professor*

*Research Areas:* Nonperturbative string theory, AdS/CFT, Quantum Field Theory, Quantum Black Holes

## Books Published

Prem Pal and Kazuo Sato, Silicon Wet Bulk Micromachining for MEMS, Pan Stanford Publishing, Singapore, 2017, 412.

G. Shimon, A. Haldar, A. O. Adeyeye, Chapter 4: Magnetization Dynamics of Reconfigurable 2D Magnonic Crystals, Book: Spin Wave Confinement (Second edition). New York: Pan Stanford. Edited by S. O. Demokritov, S. (2017).

## Publications (in peer reviewed journals)

A. Haldar, C. Tian and A. O. Adeyeye, Isotropic transmission of magnon spin information without a magnetic field, *Science Advances*, 3, 2017, e1700638.

Kumara Raja Kandula, Krishnarjun Banerjee, Sai Santosh Kumar Raavi, and Saket Asthana, Enhanced Electrocaloric Effect and Energy Storage Density of Nd-Substituted 0.92NBT-0.08BT Lead Free Ceramic Phys. Status Solidi A, 2018, 1700915.

Krishnarjun Banerjee, Saket Asthana, P. Karuna Kumari and Manish K Niranjan, Optimum discharge energy density at room temperature in relaxor  $K_{1/2}Bi_{1/2}TiO_3$  for green energy harvesting, *J. Phys. D: Appl. Phys.*, 51, 2018, 115501.

Kumara Raja Kandula, Sai Santosh Kumar Raavi, and Saket Asthana, Correlation between structural, ferroelectric and luminescence properties through compositional dependence of Nd +ion in lead free  $Na_{0.5}Bi_{0.5}TiO_3$ , *J. Alloys and Comp.*, 732, 2018, 233.

T. Karthik, Dhanya Radhakrishnan, Chandrabhas Narayana, and Saket Asthana, Nature of electric field driven ferroelectric phase transition in lead-free  $Na_{1/2}Bi_{1/2}TiO_3$ : In-situ temperature dependent ferroelectric hysteresis and Raman scattering studies, *J. Alloys and Comp.*, 732, 2018, 945.

Sudarshan Vadnala and Saket Asthana Magnetocaloric effect and critical field analysis

in Eu substituted  $La_{0.7-x}Eu_xSr_{0.3}MnO_3$  ( $x = 0.0, 0.1, 0.2, 0.3$ ) manganites, *J. Magn. Magn. Mater.*, 446, 2018, 68.

Siva Shankar Kimidi, C. Mallikarjuna, and Saket Asthana, Research Archive of Indian Institute of Technology Hyderabad (RAIITH) Informatics Studies, 5, 2018, 52.

T. Durga Rao and Saket Asthana, Observation of bond enthalpy dependence of insulating character in rare earth substituted  $BiFeO_3$ , *Mater. Res. Express*, 4, 2017, 126305.

G. Thirupathi, Kumara Raja Kandula, Sai Santosh Kumar Raavi, and Saket Asthana, The effect on electrical and luminescent properties in nanocrystalline  $Na_{0.5}Bi_{0.5-x}Nd_xTiO_3$ , *Mater. Res. Express*, 4, 2017, 095019.

Kumara Raja Kandula, Sai Santosh Kumar Raavi, and Saket Asthana, Enhancement in electrical and optical properties by substitution of lanthanides ( $Nd^{3+}$  and  $Eu^{3+}$ ) in lead free  $Na_{0.5}Bi_{0.5}TiO_3$  ceramics Ferroelectrics, 518, 2017, 23.

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## Funded Research Projects 2017-18

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Vandana Sharma, Designing and fabrication of Laser Phasemeter, DAE-BRNS, 1 April 2017, Rs. 35.0 Lakhs.

Jyoti Ranjan Mohanty, Role of nano-structuring on the magneto-structural properties of magnetic thin films and multilayers for data storage application, DST-DAAD, 19 July 2017, Rs. 5.9 Lakhs.

Jyoti Ranjan Mohanty, Study of non-collinear spintextures in asymmetric antiferromagnetic & ferromagnetic multilayer nanostructures with the Dzyaloshinskii-Moriya interaction enhanced by interface engineering, DST-RFBR, 26 July 2017, Rs. 18.224 Lakhs.

Prem Pal, Hierarchical Hybrid Micro/Nano-Textured Monocrystalline Silicon and Polymer Anti-reflective Surfaces for High Efficiency Solar Cells, DST, December 2017, Rs. 28.0 lakhs.

Jyoti Ranjan Mohanty, Depth Resolved Magnetism in Magnetic Heterostructure using Polarized Neutron Reflectivity, UGC-DAE-CSIR, 19 December 2017, Rs. 1.35 Lakhs.

S. Narayana Jammalamadaka, Probing spin structure in HoFeO<sub>3</sub> compounds, UGC -DAE, 1 January 2018, Rs. 1.35 Lakhs.

Jyoti Ranjan Mohanty, Anisotropy Engineering in Magnetic Thin Films and Multilayer for Possible Applications, SERB, 17 March 2018, Rs. 58.2 Lakhs.

Arabinda Halder, Smart magnetic media for spin wave based devices, Funding agency: Early Career Research Award, SERB, DST, 20 March 2018, Rs. 50.4 Lakhs.

R.S. Hundt,  $\mu$  e in a supersymmetric radiative neutrino mass model, Candles of Darkness, ICTS-Bengaluru, 5 June 2017.

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Shantanu Desai, Astrophysical implications of gravitational wave observations from LIGO, Ether Symposium, Univ. of Hyderabad, Hyderabad, India, October 2017.

B. Ramakrishna, Laser drive Ion Acceleration, Ultrafast Science Meeting (UFS-2017), University of Hyderabad, 2-4 November 2017

Vandana Sharma, Ultrafast dynamics from angstroms to nano, Ultrafast Science – 2017, Hyderabad, 4 November 2017.

Priyotosh Bandyopadhyay, Invited speaker, Charged Higgs bosons in the extended Higgs sectors at the LHC, 7th KIAS Workshop on Particle Physics and Cosmology and The 2<sup>nd</sup> NCTS-KEK-KIAS Workshop on Particle Physics Phenomenology, KIAS, Seoul, South Korea, 4-12 November 2017.

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Radha Yanamandra, Kumara Raja Kandula, Posidevi Bandi, Saket Asthana and Tirupathi Patri, Enhanced Energy Storage density in lead free (Na<sub>0.5</sub>Bi<sub>0.48</sub>Eu<sub>0.02</sub>)Ti<sub>1-x</sub>Nb<sub>x</sub>O<sub>3</sub>(x=0.00, 0.01 & 0.02) ceramics International Conference Condensed Matter Physics & Applied Physics (ICC-2017), Bikaner, Rajasthan, India, 24-25 November 2017.

Shubho R. Roy, Universal features of Complexity of (bulk) Singularities at the Natl. Strings Meeting 2017, NISER, Bhubaneswar, 6 December 2017.

S. Narayana Jammalamadaka, Conductance switching and tunneling of electrons in magnetostriction based nanocontacts (Invited), International conference on nanotechnology, IIT Roorkee 6-8December 2017.

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- B. Krishna and A. Haldar, Tunable magnetic and microwave properties in multilayer rhomboid nanomagnet, International Symposium on Integrated Functionalities (ISIF), New Delhi, India, 10-13 December 2017.
- V. Swarnalatha, A.V. Narasimha Rao and Prem Pal, Silicon Etching Characteristics in Modified TMAH Solution, 19th International Workshop on Physics of Semiconductor Devices (IWPSD-2017), IIT Delhi, India, 11 December 2017.
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- Narendra Sahu, Dark matter assisted Dirac leptogenesis and neutrino mass, SUSY 2017, held at TIFR Mumbai, India, during 11-15 December 2017.
- Sai Santosh Kumar Raavi, Unravelling the role of D/A interface in excitonic solar cells by ultrafast transient absorption spectroscopy, Newton Bhabha Researcher Links Workshop (NMSB - 2017), IISER Kolkata, India, 14-16 December 2017.
- Narendra Sahu, Exotic models of neutrino mass and dark matter, Workshop in High Energy Physics Phenomenology 2017, IISER, Bhopal, India, 14-23 December 2017.
- S. Narayana Jammalamadaka, Remote control of resistive random access memory (Invited) talk at ICAF M IIIT Basara, 18-20 December 2017.
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- V. Kanchana, Predicted superconductivity of  $\text{Ni}_2\text{VAL}$  and enhanced superconductivity in SnAs and SnSb under pressure NCES conference at IISER Bhopal, India, 26 December 2017.
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- B. Krishna and A. Haldar, Tunable magnetic and microwave properties in multilayer rhomboid nanomagnet, 62<sup>nd</sup> DAE Solid State Physics Symposium (DAE SSPS), BARC, Mumbai, India, 26-30 December 2017.
- Vandana Sharma, A three-dimensional ion imaging spectrometer for studying photo-induced fragmentation in small molecules, Topical Conference (National conference on atomic and molecular Physics) – 2018, Tirupathi, 7 January 2018.
- V. Kanchana, Promising thermoelectric materials India – UK workshop on thermoelectric materials for waste heat harvesting, at JNCASR, Bangalore, India, 8-10 January 2018.
- Priyotosh Bandyopadhyay, The extended Higgs sectors in supersymmetric scenarios at the LHC, Top@IISERK, IISER Kolkata, 27-30 January 2018.
- B. Ramakrishna, Invited talk, 38<sup>th</sup> International Workshop on High Energy Density Physics with Intense Ion and Laser Beams Hirschegg, Austria, 28 January - 2 February 2018.
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ceramics, International Conference on Advanced Materials World Congress (AMWC-2018), Singapore, 4-8 February 2018.

Shantanu Desai, Limit on graviton mass from galaxy cluster Abell 1689, 36<sup>th</sup> annual meeting of Astronomical Society of India, Osmania University, Hyderabad, India, 5-9 February 2018.

S. Bethapudi and S. Desai, Separation of pulsar signals from noise using supervised machine learning, 36<sup>th</sup> annual meeting of Astronomical Society of India, Osmania University, Hyderabad, India, 5-9 February 2018.

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Sai Santosh Kumar Raavi, New Fucshin based aqueous Dye Sensitized Solar Cells, 4<sup>th</sup> Workshop on Environment and Energy, Osaka University, Japan, 2-3 March 2018.

Priyotosh Bandyopadhyay, Perspective of extended Higgs sectors in beyond Standard Model scenarios, Sangam@HRI, Harish-Chandra Research Institute, Allahabad, 5-9 March 2018.

J. Mohanty, Exploring Spin Dynamics in Perpendicularly Magnetized Thin Film System with X-FEL and their THz Perspectives, International School on Electron accelerator, Free Electron Laser and Application of Electron beam/THz radiation, IUAC Delhi, 6-9 March 2018.

Ranjan Laha, Stanford University, Two new avenues in dark matter indirect detection, 21 April 2017.

Dr. Bhaskar Sen Gupta, Max Planck Institute for Polymer Research, Mainz, Germany, Amorphous Materials with Magnetic Degrees of Freedom, 24 April 2017.

Dr. P. Phani Kumar, Nanyang Technological University, Singapore, Magnetic and force sensing applications of optically addressable nitrogen-vacancy spins in diamond, 25 April 2017.

Dr. Sabareesh, K.P. Velu, Bilkent University, Ankara, Turkey, Optical Manipulation with Speckle Light Fields: Application to Control Active Crowds, 17 May 2017.

Dr. Laxmi Narayan Tripathi, Universitat Würzburg, Germany, Quantum light emission from metal – monolayer hybrid structures, 30 May 2017.

Leonardo Vernazza, University of Edinburgh, Two parton scattering in the high-energy limit, 25 July 2017.

Dr. Harish N. Swaha Krishnamoorthy, Centre for Disruptive Photonic Technologies, Nanyang Technological University, Singapore, Novel material paradigms for nanophotonics - from topological insulators and perovskites to chalcogenides, 17 August 2017.

Dr. Rajeev Paramel Pattathil, Rutherford Appleton Laboratory, UK, Reaching light-speed in a centimeter, 22 August 2017.

Dr. Pavan K. Aluri, KIAS, Seoul, Estimating hidden signals violating isotropy underlying CMB maps, 22 September 2017.

Dr. Mani Chandra, Quazar Tech., The Electron Fluid in Solid State Devices, 24 October 2017.

Prof. Prasad A. Naik, Raja Ramanna Centre for Advanced Technology (RRCAT), Confluence of Synchrotron and Laser light sources, 2 November 2017.

Giulio Falcioni, Nikhef Theory Group, Amsterdam, Global infrared rearrangements and the renormalisation of QCD, 20 November 2017.

Ben Hoyle, Ludwig Maximilians University, Machine learning in Astrophysics and Cosmology, 23 November 2017.

## Seminars

Dr. S. Pradhan, IPR, Gandhinagar, Refurbishment and realisation of SST-1: The first Superconducting Tokamak of India, 4 April 2017.

Prof. EungJin Chun, Korea Institute for Advanced Study, Seoul, South Korea, Two-Higgs-Doublet-Model in view of Muong-2, 19 December 2017.

Dr. Nishiwaki, Korea Institute for Advanced Study, Seoul, South Korea Title: Vector like confinement addresses R\_K(\*) flavor anomalies and more, 20 December 2017.

Dr. Kenji Nishiwaki, Korea Institute for Advanced Study, Seoul, South Korea, Vector like confinement addresses R\_K(\*) flavor anomalies and more', 20 December 2017.

Dr. Manjari Bagchi, Institute of Mathematical Sciences, Chennai, Radio pulsars as celestial laboratories for basic physics, 4 January 2018.

Dr. Azusa N. Hattori, Osaka University, Japan, Metal-insulator transition properties of electric nanodomains in the strongly electron correlated metal oxide nanowall wire, 24 January 2018.

Prof. Pravabati Chingangbam, Indian Institute of Astrophysics, The shape of quantum fluctuations, 8 February 2018.

Dr. Yalla Ramachandra Rao, Project Assistant Professor in the University of Electro-Communications at Tokyo, Optical Nanofibers: a versatile platform for Quantum Photonics, 22 February 2018.

Giancarlo Ferrera, University of Milan, Anexto-to-next-to-leading order QCD study of di-photon production at the LHC, 1 March 2018.

Francesco Tramontano, University of Naples, Higgs boson decay to bottom quarks in VH associated production at the LHC, 22 March 2018.

Dr. K. Rama Koteswara Rao, City College of New York, New York city, USA, Towards nano-scale optical NMR using Nitrogen-Vacancy centres in Diamond, 22 March 2018.

Dr. Tamoghna Das, Physics and Applied Maths Unit, Indian Statistical Institute, Kolkata, India, What is the structure of a simple liquid? 26 March 2018.

Prof. Mustansir Barma, TIFR Center for Interdisciplinary Sciences at Hyderabad, Order from Disorder, 28 March 2018.

## Awards / Recognitions

Raavi Sai Santosh Kumar, FAPESP visiting researcher fellowship during June-July 2017 to visit Institute of Physics, University of Sao Paulo, Sao Carlos, Brazil.

Priyotosh Bandyopadhyay, International Travel grant and support from Korea Institute for Advanced study, Seoul, South Korea to attend 7<sup>th</sup> KIAS Workshop on Particle Physics and Cosmology and The 2nd NCTS-KEK-KIAS Workshop on Particle Physics Phenomenology, Seoul, South Korea, 4-12 November 2017 and research collaboration visit till 2 December 2017

Ph.D scholar Abhishek Talapatra, Jyoti Ranjan Mohanty, Travel award for attending 62<sup>nd</sup> Annual Conference on Magnetism and Magnetic Materials (MMM) 2017, held during November 6-10, 2017 at Pittsburgh, USA

Bhuvanesh Ramakrishna, Elected as member of the UKRI International Development Peer Review College.

S. Narayana Jammalamadaka, Bilateral exchange of academics, DAAD award 2018.

Ph.D scholar Abhishek Talapatra, Jyoti Ranjan Mohanty, Dr. K.V. Rao Young scientist award 2018.

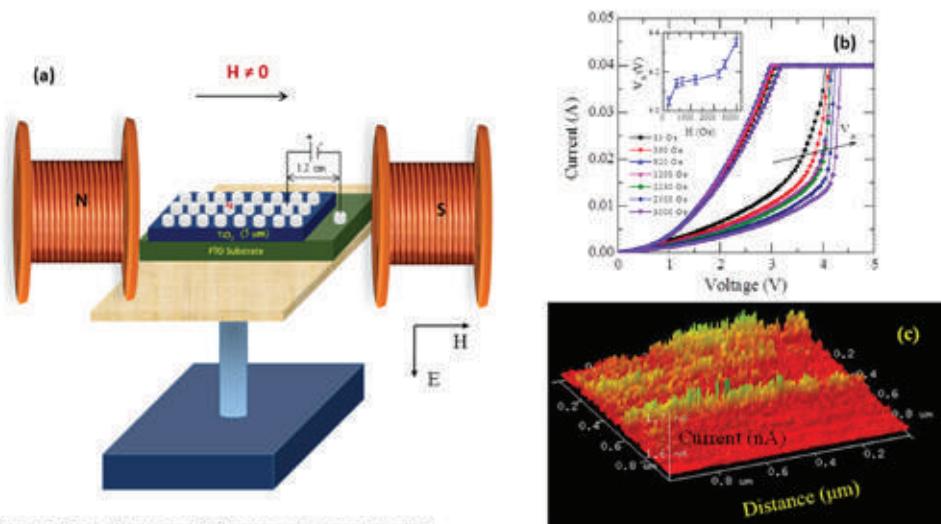
Ph.D scholar Abhishek Talapatra, Jyoti Ranjan Mohanty, Best oral presentation award at Research Scholar Day 2017, February 7, 2017 at IIT Hyderabad, India

Ph.D scholar Abhishek Talapatra, Jyoti Ranjan Mohanty, Best poster award at DAE-BRNS Symposium on Two Decades of Ion Beam Analysis at 3 MV Tandetron, 23-24 March 2017 at NCCCM, BARC, Hyderabad, India

## RESEARCH HIGHLIGHT

### Remote control of resistive switching in $\text{TiO}_2$ based resistive random access memory

Dr. S. Narayana Jammalamadaka's research group report on a 'nonvolatile memory' (NVM) storage device whose 'on' and 'off' states are remotely controlled by varying the magnetic field, which may help future memory devices operated by magnetic fields. Proposed NVM technology is based on 'Resistive Random Access Memory' or RRAM. RRAM exploits a phenomenon called resistive switching in which the resistance across a dielectric solid-state material can be altered between high resistance state and low resistance state corresponding to the 0s and 1s. RRAM device is developed using titanium dioxide ( $\text{TiO}_2$ ) as the dielectric material with a thin layer of conducting silver (Ag) as the top electrode and fluorine-doped tin oxide (FTO) as the substrate. The device – Ag/ $\text{TiO}_2$ /FTO – thus created was then subjected to varying magnetic field to study its effect on the resistive switching ability of this device.



Dwipak Prasad Sahu and S. Narayana Jammalamadaka  
Scientific Reports 7, 17224 (2017)

Schematic diagram of the measurement performed on  $\text{TiO}_2$  based RRAM device where the magnetic field is applied perpendicular to the direction of the current. Keithley 2400 is used to source the voltage and sense the current respectively (b) I-V curve of Ag/ $\text{TiO}_2$ /FTO device at different magnetic fields. It is evident from the figure that the abrupt voltage ( $V_A$ ) shifts to higher voltages with magnetic field due to residual Lorentz force. Inset shows of variation of abrupt voltage ( $V_A$ ) with magnetic field. (c) 3D conducting surface atomic force (C - AFM) images scanned in an area of  $1 \times 1 \mu\text{m}^2$  by applying a voltage bias of  $-8 \text{ V}$  respectively.

# Student Activities

The students of IIT Hyderabad initiate and participate in several cultural and scientific events throughout the year outside of their core academic activities. These events provide a platform for the students to nurture and showcase their creative side, add immense color to the IIT Hyderabad community, and give the students a first-hand experience in independently organizing large-scale events. The following is a brief report on the various events conducted by the students in 2017-18.

## NASA Space Apps Competition



Space Apps is an international hackathon that occurs over 48 hours in cities around the world. Coders, scientists, designers, storytellers, makers, builders, technologists and everyone enthusiastic about space come together to address challenges we face on earth and in space.

Team of IIT Hyderabad - Dhyaneshwar Mulley, Pratikesh Pundkar, Sandeep Chandra Manoj

Sanker participated in this hackathon tool place at T-Hub in IIT Hyderabad. There were many challenges given to participant. They chose ideate and create with theme 1D, 2D, 3D go!

This challenge was to create tools that visualise Earth science missions and their data in three dimensions!

In this team made web tool to see 3D visualisation of live data from Earth science missions. This tool is made for students, teachers and scientists where they can aware, educate and take action on global issues related to Earth.

Team from Department of Design got selected in top three teams for the national level from Hyderabad among 70 teams that participated in the contest.

## Gymkhana Day

Gymkhana Day was organized by the students of IIT Hyderabad on 11 April 2017. The day marks the official ceremony wherein the newly elected student Gymkhana members are sworn in and conferred the authority. This is also a day that the tireless efforts put in by the student communities and clubs in the development of various student interests would be officially recognized and honored.



## Farewell Day

Farewell to the graduating students: The gymkhana and the faculty members of IIT Hyderabad organized the farewell party for the graduating students on 13 April 2017. An evening full of emotions and mixed feelings for the graduating students. Representatives from the undergraduate and graduate students shared their memories. The director and other faculty members addressed the graduating students and wished them all success in their future endeavours.



## Freshman Orientations

From 25-30 July 2017 a series of orientation events were conducted to make the freshers accustomed with the culture and working at IIT Hyderabad. These included club orientations by the Cultural Council, the Sci-Tech Council and an Informals Session by the Gymkhana to help the new students break the ice, open up and enjoy themselves. An Institute orientation program was also conducted.



# Activities of Cultural Council 2017-18

## Bonfire

All the students, along with the freshers, were invited to the first cultural event of the academic session on 27 July 2017 which included a bonfire and some cultural performances.

The event saw people volunteering to come up on stage and showcase their talents before the crowd.



## Ethnic Day

Held as a part of the Ek Bharat Shreshtha Bharat campaign launched recently by the MHRD, the event was about highlighting and appreciating the traditional attires in different parts of India. In an era when most people have adopted Western style as their everyday attires, the initiative was welcomed with huge participation by all the students and faculty members who wore their traditional dresses to classes for the entire day.

For the first time ever, the student community at IIT Hyderabad came together to celebrate 7 November 2017 as Ethnic Day. The students attended classes, dressed up in the traditional attires of their respective home states the entire day. Even the professors were invited to be a part of the event and show up in their ethnic best.



## Open Mic

The last cultural event of the semester was organized on 19 April 2018 to give all students a chance to overcome stage-fright and exhibit their unique talents before the college community. Students turned up in large numbers to perform music, dance, drama, poetry, shayari and the like.



## Freshers Night

The event was conducted with the help of organizing teams with students from sophomore batches. Freshers were given an entire evening to relax and have fun on 19 September 2018. Cultural activities and competitions, like Mr./Ms. Fresher, were arranged along with dinner and DJ.Ice-Cream and DJ night. Students were in for a treat with the event which saw an excellent DJ party along with assorted ice-creams in 12 different flavors.



## Folk Night

This event was organized on 19 January 2018 as a part of the Ek Bharat Shreshtha Bharat campaign. The event started with a bonfire and went on to witness mesmerizing, and intriguing stage performances by students, showcasing some native art forms of India. Tamil and Hindi poetry and musical performances in Hindi and Marathi, were the highlights of the evening.

The event was meant to follow the objective of the initiative Ek Bharat Shreshtha Bharat i.e. to celebrate, promote and showcase the Unity in Diversity of our Nation, to maintain and strengthen the fabric of traditionally existing emotional bonds between the people of our country. The program aims to establish long-term engagements and to create an environment which promotes learning between states by sharing their best practices and experiences.



# Activities of Scitech Council 2017-18

SciTech council, in this academic year, has shown a tremendous progress in terms of the number of projects completed, the number of events and session conducted. The council this year has also shown an active participation in Inter IIT Tech Meet-2k18, IIT Madras and also had bagged sixth and seventh position in two of its major events Soldier support and Exoplanet Detection. All the sessions, events conducted by the council witnessed great participation from the student community when compared to any other academic year. Through the SciTech Council's annual event there has also been a good amount of exposure of the year-long club projects to the faculty fraternity of IITH including the Director. The council has received immense support from its faculty advisors in terms of budget sanctioning and acceptance of various new initiatives planned.

## IITH students @ BAJA Competition

IITH students preparing for All India Off Road Designing and Racing Competition (BAJA) Department of Mechanical and Aerospace Engineering

A team of students from IIT Hyderabad has participated in the competition for the past 3 years, every year since 2014. The team works round the year, designing and building their race car. The car is then self-fabricated by students with critical inputs from faculty members of MAE and team alumni who still support the team in one way or other.

The team has been performing well every year and has a target to win the competition in the 6th year of its participation (i.e., by 2019). With each car that has been built, the team is producing results in the right direction towards achieving its target. Most of the car assemblers are designed and fabricated by students themselves, exposing them to the practical side of mechanical engineering. Right from choosing the bolt and nut to the roll-cage design, everything is done hands-on. The team develops a CAD model, analyzes it using various CAE tool and the cycle continues, till it satisfies the targets for the competition. With unconditional support from the department in every form, the facilities in central workshop is utilized for fabrication. An added benefit is that the students team management of resources, time, discipline, honesty, while excelling in academics and placements.



# HYDERABAD AUDITION

HIP HOP  
STYLING  
INDIA

SEASON II



The 8<sup>th</sup> edition of Elan, the cultural festival of IITH and 5<sup>th</sup> edition of nVision, the technical festival of IITH were conducted on a grand scale from 20 to 22 January. This year Elan and nVision were complementarily themed as 'Medieval Rampage' and 'The Future Tech' respectively in addition to the spectacular cultural programs, a program for cultural awareness and career guidance for the students of ZPH School and cloth donation by the NSS Team of IITH were also organized.

This year's program had a spectrum of events such as Manthan (fusion competition), Nitranjali, Walk the Ramp (auditions for Femina Miss India beauty pageant), Vibrazione, Octave, Robo Quidditch, Robo Soccer and quizzing. The highlight of the cultural show was the pro-nite and EDM nit with Benny Dayal and Nikhil Chinnappa.



# Extra Mural Lectures (EML) – 2017-18

With the lecture sessions from diversified speakers like Dr SP Balasubramaniam, Dr Shashi Tharoor, Ms Amala Akkineni and others in the past, EML IIT Hyderabad stepped up during the year 2017-18 yet maintaining the same essence and purpose. The newly formed team was active in inviting esteemed personalities from different walks of the life.

The first EML session for the year was arranged on 6 March 2018. Dr GV Ramanjaneyulu, Agricultural Scientist, delivered a lecture on Food, Farmers and Environment. He spoke in detail about the crisis in Indian agriculture

and its practices, change in food habits and food safety, environmental impact and economic impact on farmers,

The second session by Ms Chandana Deepthi IPS, SP, Medak Dist. was arranged on 11 April 2018. Science and Civil Service, as a session theme, speaker shared her views and experiences to the questions posed by audience. She also shared her thoughts on life as IPS after graduating from IIT Delhi, challenges faced during the service, role of engineers and technology to reduce crime and to maintain order in society, and exam preparation strategies.





## Research Scholars Day – 2018

**R**esearch Scholars Day, conducted on 19 Feb 2018, started with the oral presentations at 09:30 AM in Academic Block-A wherein twelve research scholars from various departments actively presented their research work. This event completed around 11:30 AM on the same day. This was followed by, poster presentations which started at 11:30 AM and concluded by 1:00 PM. Ten Ph.D. students presented their posters in the event. Three research scholars each for oral and poster presentations got the award for best oral and poster presentations respectively.

In the afternoon, the formal event started with an inaugural address by the, Director Prof. U.B. Desai. Prof. M. Vidyasagar from The University of Texas, Dallas was invited Chief Guest and his talk was on "How to achieve your potential in research.". Dr. Pravin Bhagwat Founder and CTO Mojo Network was invited as a Special Guest and he gave a talk on "Confessions of an Accidental Entrepreneur."

After the speeches by the guests, panel discussion were held in two topics namely "Why is research not converted to Technology" and "How to increase the research collaboration among IISc, IITs, and other reputed institutes in India." The Chief Guest, Prof. M. Vidyasagar, Dr. M.V. Panduranga Rao Associate Professor (Computer Science Department, IIT Hyderabad), Dr. Sumohana S Channapayya, Associate Professor (Electrical Engineering Department, IIT Hyderabad) and Dr. Ranjith Ramadurai, Associate Professor (Materials Science and Metallurgical Engineering Department, IIT Hyderabad) were the panel member for the discussion. Research scholars' day came to an end with the cultural programs and a delicious dinner.

As a part of research scholars day, we had organized sports events as well in January 2018. The various events for sports like Badminton, Table Tennis, Tug of War, Chess, Volleyball, Kabaddi, Athletics, and Cricket had been conducted over a four-day period. The winners and runner-ups were awarded in the prize distribution ceremony on the Research Scholars Day.



**D**uring the academic year 2017-18, NSS IIT-Hyderabad (NSS IITH) dedicated itself towards several initiatives towards community development. Under the guidance of the Faculty-in-charge Dr. Prem Pal, NSS IITH resolved to devote its best efforts for the betterment of society with emphasis on nearby village communities. The major activities, which are conducted across the year, were Blood donation camp, Clean India Campaign, Cloth donation, Vidyadaan, and Open Day cum one-day workshop for technological awareness among rural children. Blood Donation Camps are organized twice in a year as the part of the celebrations of Independence Day and Republic Day. To support the mission Clean India, NSS IITH organized Swachh Bharath Abhiyan inside institute's campus at least once in each semester. In remembrance of our freedom fighters, NSS IITH also celebrated Gandhi Jayanti and Ekta Diwas sharing the vision of those leaders for Developed India. Celebrating 75 years of Quit India Movement, a brain storming session to discuss ideas that shape future of India was organized by the name 'New India Manthan'. NSS IITH

organized a fire fighting demonstration for the students with the help of the institute security department and explained about safety measures handling fire and about first aid to be taken in the case of fire accidents. Following the motto Not Me But You to the truest sense, in orphan home and old age home visits, NSS IITH stood firmly in assuring the destitute children and senior citizens in old age home a hope of togetherness and happiness. In cloth collection drive followed by cloth donation, old clothes were collected from IITH students, staff, faculty and were distributed in six slums of Hyderabad.

A total of 25 vidyadaans were organized in government schools nearby focusing on their mainstream subjects, computer education, and also all-round development of students. NSS IIT Hyderabad organized "Fifth Open Day cum one-day workshop for technological awareness among rural children" on Monday, 26 Feb 2018 to encourage and inspire the students towards Science & Technology. Around 350 students from the government schools of nearby villages participated. The participants visited various laboratories including physics, chemistry and design, interacted with several professors, and last but not the least, interacted with the technological geeks of IITH, the Sci-tech clubs. NSS IITH student body and volunteers had made the year 2017-18 remarkable by organizing various activities and paved a right way for successors.





### **Friendship Race**

It was conducted on 5 August 2017 as a part of freshmen interaction on eve of the International Friendship day-2017. It had a huge participation of around 600 from students, staff and faculty with their family members. Prizes for the event were distributed on 15 August on the eve of Independence Day.



### **Interaction Matches**

As major part of freshmen interaction program, football, cricket, volleyball, basketball, badminton etc. were conducted from the date of registration till 15 August 2017.

### **NSO**

Our first NSO interaction with freshmen was conducted on 27 July. The main aim of NSO, IIT Hyderabad is to inculcate sportive spirit in the students. With six coaches in total for various events and sports equipment for about eight team events and athletics, it has been and is functioning smooth. New

With strength of around 700 students, the National Sports Organization started its full-fledged schedule for the academic year 2017-18 in the month of August. The list of events goes as follows:

registrations for NSO were invited from the freshmen. After enrolment, NSO hours have been conducted on every Wednesday and Friday for all the NSO registered B.Techs.

### **Inter-IIT Sports Meet 2017**

Camp for Inter-IIT Sports Meet 2017 started on 3 December with a total participants of 110 in various events like Badminton (M&W), Basketball (M&W), Cricket, Football, Hockey, Lawn Tennis (M&W), Table Tennis (M&W), Volleyball (M&W) and athletic events. Inter IIT Sports meet 2017 held at IIT Madras from 14-23 December.





### Run for Unity

It was organized on 31 October 2017 on the eve of Rashtriya Ekta Diwas. It had huge participation from students, faculty and staff.

### Friendly Tournaments

Students of IIT Hyderabad have played friendly practice matches with institutes like BITS Hyderabad, GITAMS Hyderabad, Medak district teams and BHEL township teams.

Students also participated in friendly tournaments with CBIT, IIIT Hyderabad, BITS Hyderabad etc.

### Intramural Sports

Informal leagues for badminton, basketball, cricket, hockey, volleyball, table tennis and football were conducted. The 10<sup>th</sup> annual sports meet was Inter year. We organised Inter Year Sports Meet in which UG, PG, faculty and staff participated better than ever and made Students compete in the same level as in Inter IIT Sports Meet. It covered all the team events along with athletic events as that of the Inter IIT sports meet. Prizes were distributed on Gymkhana day.





## International Day of Yoga

Sports department of IIT Hyderabad organized third international day of yoga fest 2017 from 16-21 June. On 16 June started with the lightning of lamp by Director Prof. U B Desai along with faculty, staff and students at academic block. It was followed by yoga practice with meditation and pranayama. From 17-20 June daily at D block terrace between 8:00 to 9:00 AM the yoga experts demonstrated different yoga asanas to all the participants regularly. On 21 June, 3<sup>rd</sup> International Day of Yoga celebrations, started at UDDH by Prof. U B Desai, Director IITH along with Dr. Prem Pal, Dean Students a speech about yoga and its

uses in practicing on a daily basis. It followed by practicing of yoga asanas and meditation demonstrated by yoga experts. Later there was short speech followed by vote of thanks by Dr S G Singh, Chairman Sports.





Kandi, Sanga Reddy - 502285, Telangana, India  
Phone: +91-40-2301-6033 Fax: +91-40-2301-6032  
URL: [www.iith.ac.in](http://www.iith.ac.in) Email: [info@iith.ac.in](mailto:info@iith.ac.in)