ANNUAL REPORT 2018-19

ALWAYS INNOVATING

भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

INDIAN INSTITUTE OF TECHNOLOGY
HYDERABAD

CONTENTS

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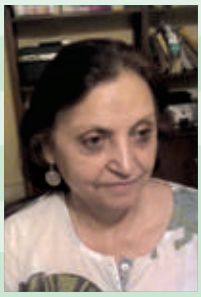

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THE NEXT DECADE OF IIT HYDERABAD

IITH entered its next decade in July 2018. The first year of the new decade was as exciting or even more so than any of the previous years. As always, IITH has been at the forefront of academics. Top JEE (advanced) and GATE ranking students are opting for IITH. In the academic year starting in August 2019 IITH is starting several new programs: B.Tech. in AI, Minor in AI, B.Des. in the Design Department, M.Tech. in Climate Change and several other initiatives. 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. Overall IITH offers 10 B.Tech programs, 16 M.Tech programs, 3 M.Sc. programs, MA Program, M.Des program and PhD programs in all branches of engineering, science, liberal arts and design.

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.

IITH is the first institute to start an M.Tech. program in Data Science for working

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

– T. S. ELLIOT

professionals; this is a completely a video-based course. IITH also has All Course M.Tech. Program in almost all engineering departments.

By Aug 2019, IITH will have nearly 2750 students with more than 20% women students, and 205 full time faculty members. IITH's sanctioned research funding will be to the tune of Rs.350 crs. from nearly 350 plus sponsored projects. Our overall citation is 24,492 and we have an H-Index of 50.

Our Japan collaboration is in full swing with Japanese faculty visiting us and IITH faculty visiting leading Japanese university on a regular basis. There are several active R&D projects having Japanese collaboration. There is a strong student exchange program with Japan. All the infrastructure development with Japanese collaboration has started, and soon IITH will be among the best campuses in the country and possibly the world.

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. This year IITH will start a new Center of Excellence in AI. Fourteen companies have been incubated, three are already making a profit, two have received funding from Bill and Melinda Gates Foundation, four have received funding from BIRAC-DBT, and three companies employ more than 40 people. The center for health care entrepreneurship, funded by two IIT Bombay alumni, is a feather in the cap for the entrepreneurial efforts taken by IITH.

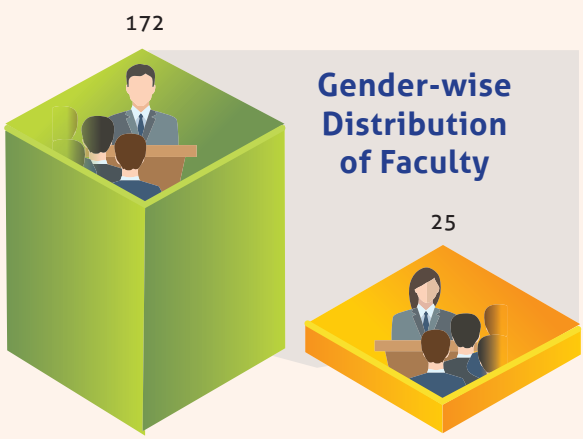
IITH has been consistently ranked in top 10 engineering institutions in the National Institutional Ranking Framework (NIRF). Furthermore, it has achieved 196 and 100 position in QS Asia pacific and QS BRICS ranking respectively. IITH also features at 600 position in Times Higher Education World University ranking. IITH also features at 10th position in the first edition of ARIIA ranking for publically funded institutes.

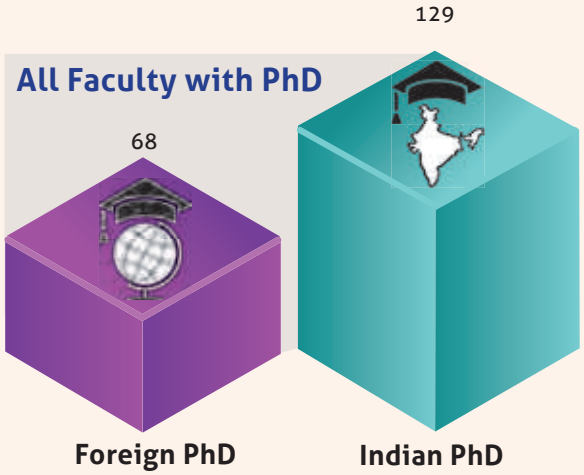
IITH is creating a unique holistic educational ecosystem that offers interactive learning, a highly, flexible academic structure, cutting edge research, strong industry collaboration, and entrepreneurship. It is providing an environment wherein students and faculty are not afraid to translate their dreams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

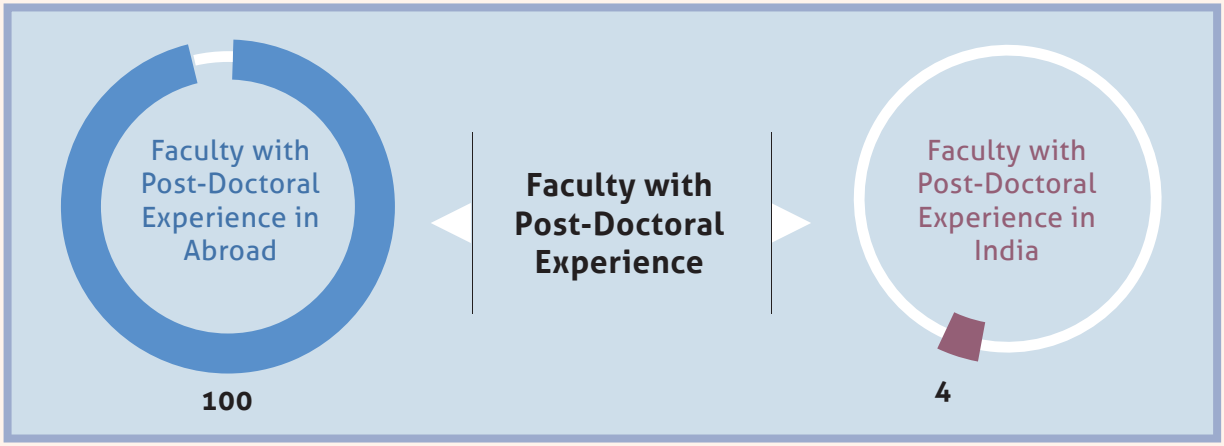
Prof UB Desai

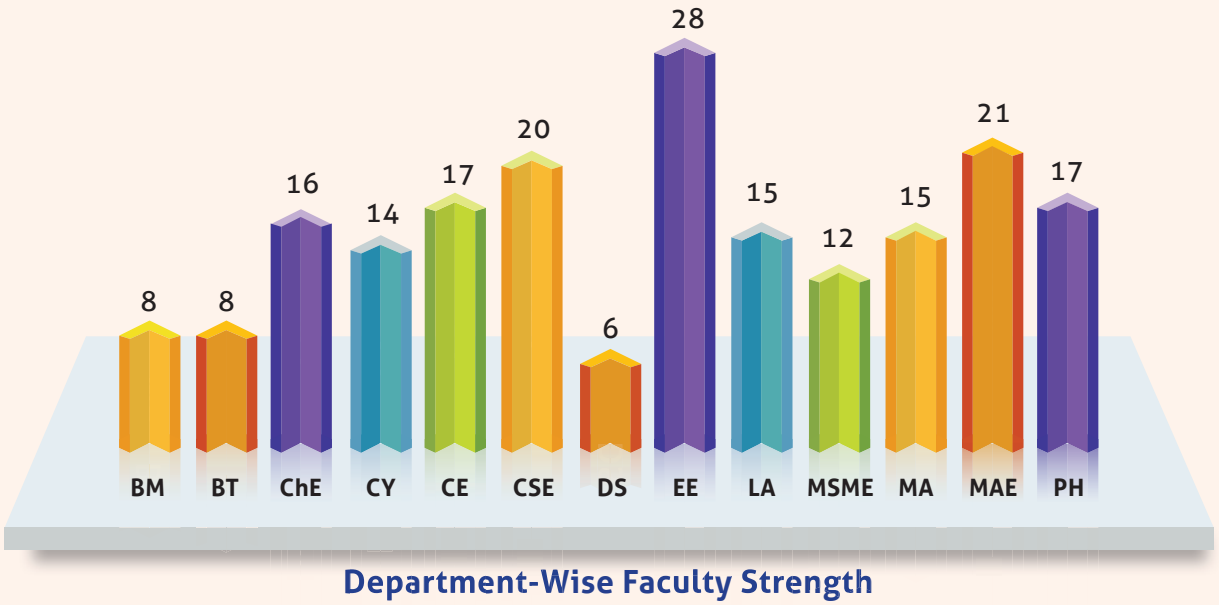
FACULTY STATISTICS

As on 31 March 2019, IITH is having 197 faculty members on its roll. 12% of the total faculty are women. 35% of the faculty members obtained their PhD from universities abroad and 50% possess post doctoral research experience from leading universities abroad.





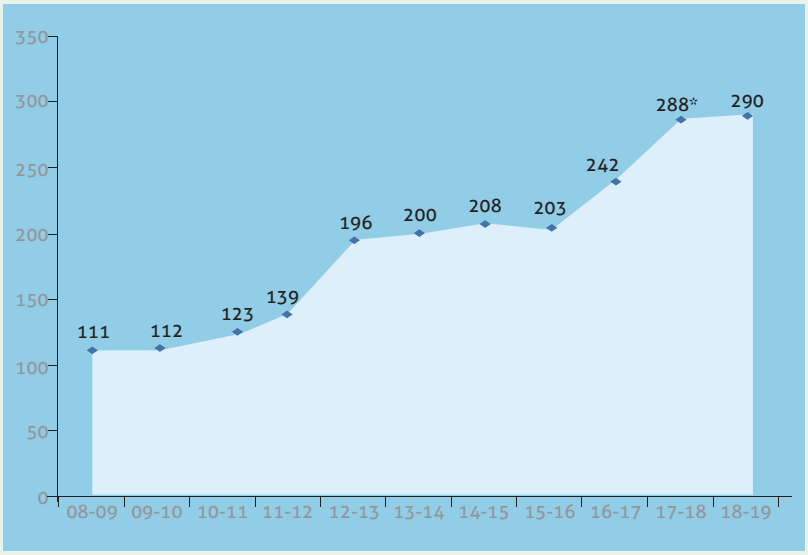




Department-Wise Faculty Strength

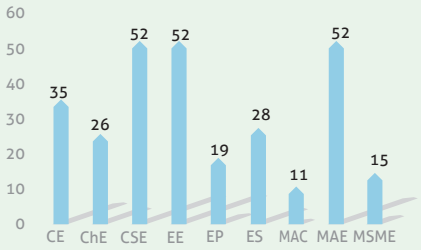
ACADEMICS

TOTAL NUMBER OF B.TECH STUDENTS ADMITTED IN EACH ACADEMIC YEAR

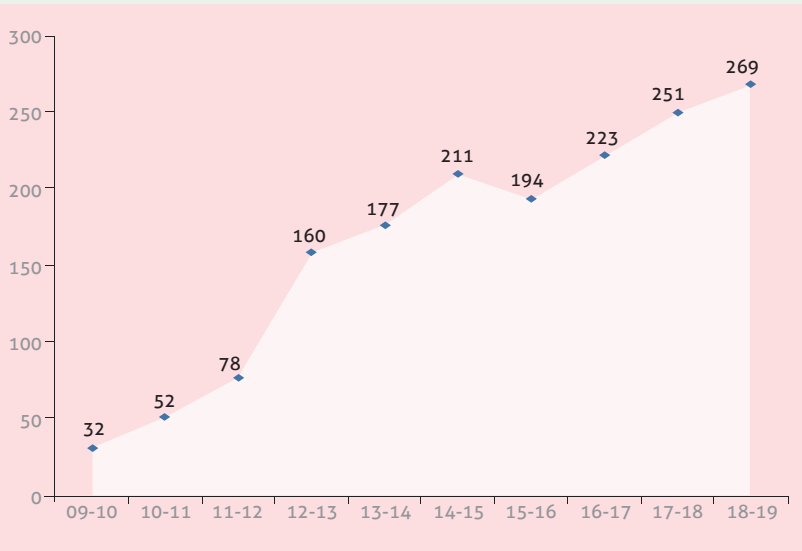


* Two students transferred from other IITs

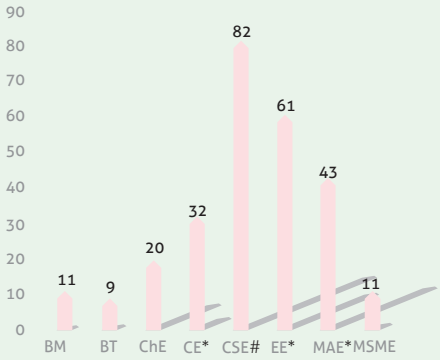
Department-wise Distribution of B.Tech students (18-19)



TOTAL NUMBER OF M.TECH STUDENTS ADMITTED IN EACH ACADEMIC YEAR



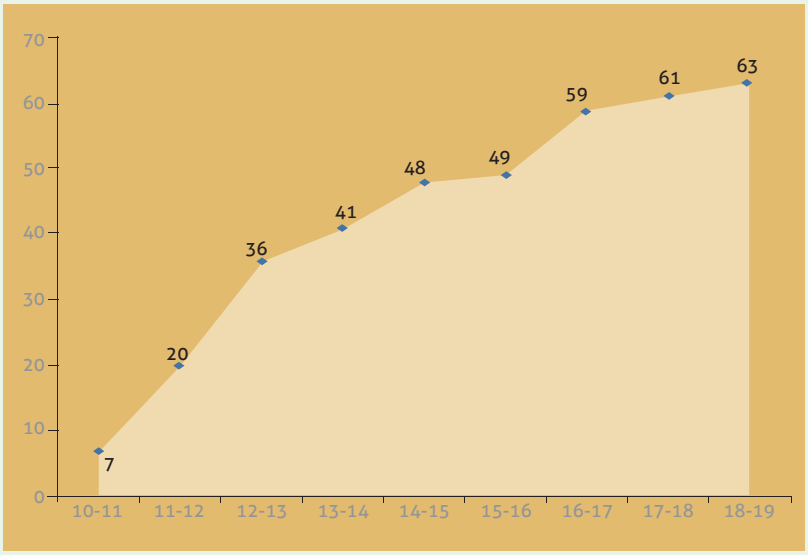
Department-wise Distribution of M.Tech students (18-19)



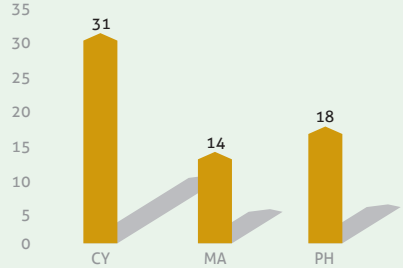
*Including all Courses of M.Tech

#Including EMDS candidates

TOTAL NUMBER OF M.SC STUDENTS ADMITTED IN EACH ACADEMIC YEAR

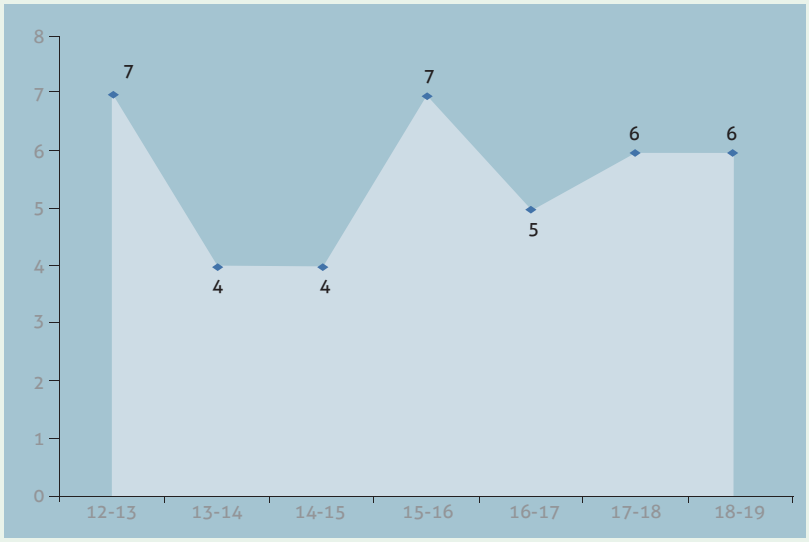


Department-wise Distribution of M.Sc students (18-19)



...ACADEMICS

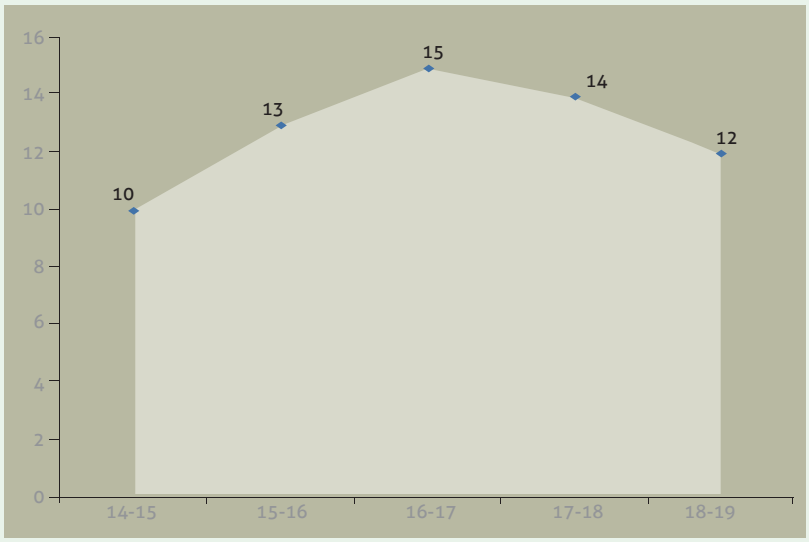
TOTAL NUMBER OF M.PHIL STUDENTS ADMITTED IN EACH ACADEMIC YEAR



Total number of M.Phil students (18-19)

6

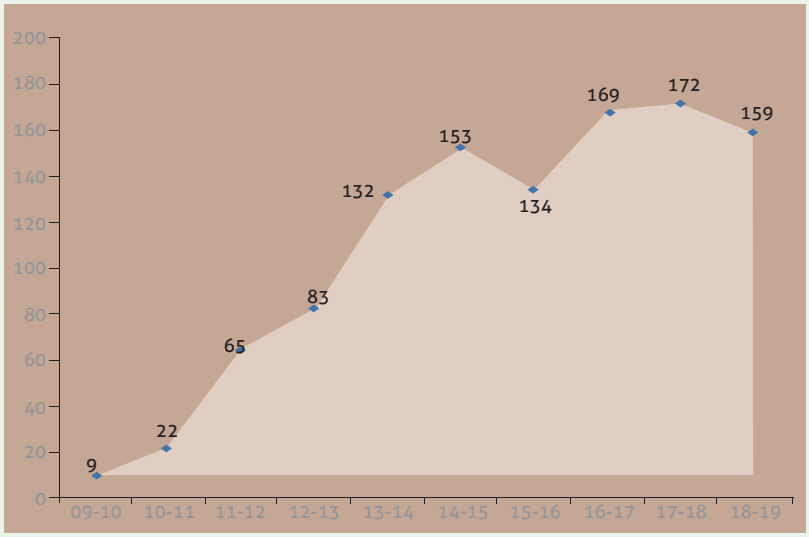
TOTAL NUMBER OF M.DES STUDENTS ADMITTED IN EACH ACADEMIC YEAR



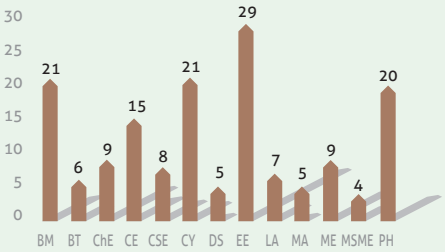
Total number of M.Des students (18-19)

12

TOTAL NUMBER OF PHD STUDENTS ADMITTED IN EACH ACADEMIC YEAR



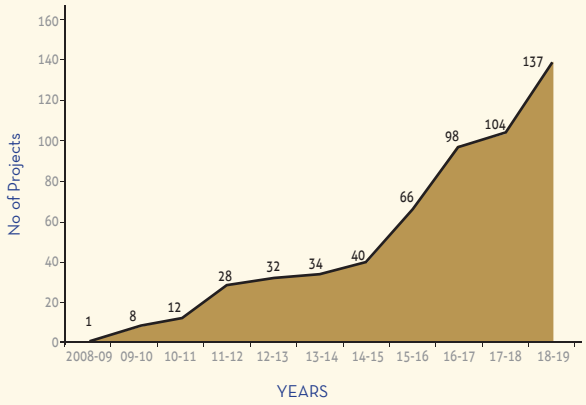
Department-wise Distribution of PhD students (18-19)



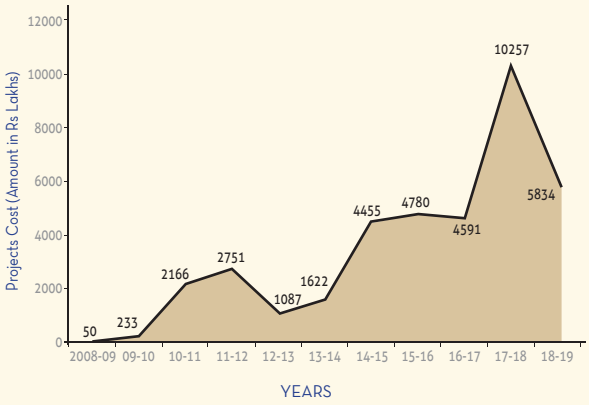
RESEARCH & DEVELOPMENT

The vibrant research culture in IITH is evident from the large number of publications and the sponsored projects. In the financial year 2018-19 IITH had secured more than 100 sponsored projects from national funding agencies and private companies. The trend in the number and quantum of sponsored projects in IITH over the past is shown in the charts below.

Research Projects

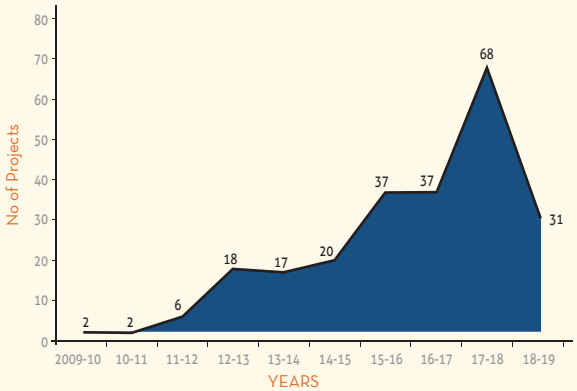


NO OF SPONSORED RESEARCH PROJECTS APPROVED IN EACH FINANCIAL YEAR

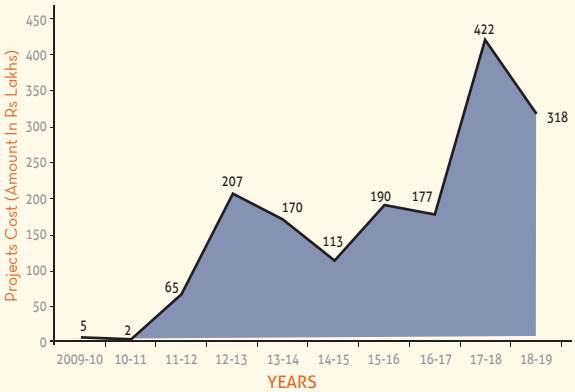


FUNDING FROM SPONSORED RESEARCH PROJECTS

Consultancy Projects



NO OF CONSULTANCY PROJECTS APPROVED IN EACH FINANCIAL YEAR



FUNDING FROM CONSULTANCY PROJECTS

PLACEMENT REPORT FY 2018-19

Placements at Indian Institute of Technology Hyderabad for the academic year 2018-19 have yielded 261 offers for 418 registered students. More than 252 companies have registered for the placement process out of which around 107 companies have completed the placement process till date.

The top paying companies are Mercari, Toyota Research Institute-Advanced Development, Works Application and SMS Data Tech. The highest salary offered for this year is Rs.53.79 LPA and the average salary is Rs.16.74 LPA. There were 22 international offers.

A good number of students from UG, PG and M.Sc. have opted for higher education in India and abroad. Mentioned below few Universities opted for higher education:

- University of Tokyo
- University of Minnesota
- University of Texas, USA
- Carnegie Mellon University
- 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
- National University of Singapore
- University of Florida
- University Della Svizzera Italiana
- University of Dallas
- George Washington University DC
- University of Maryland
- University of Cincinnati

SUMMER INTERNSHIPS

At IIT Hyderabad 3rd year B.Tech students participated actively in the summer internship program during May to July 2018-19 to a maximum of 8 weeks. Which includes both Industrial & Research oriented opportunities for students, the following are the companies registered for 2018-19 internship process.

• Adobe • AIESEC • Amazon • Arcesium • Arista Networks • Awesome Firms India • Boston Scientific • Coromandel • Cotzero Energy • DE SHAW • Doubtnut • EA Games • EarlySalary • Edvizo • Embibe • Equilibrium Solutions • Evelyn Learning System • EY • Frugal Testing • Futures First • Goldman Sachs • Hexagon • Host Analytics • Kahan Technologies • KPIT • Makexhappen • Microsoft • Model N Software • Murata • My Home Constructions • My-healthconnect • Paninian • Pegasystems • Philips • Qrius • Rakshak Foundation • Raphe mPhibr Pvt Ltd • Reckitt Benckiser (RB) • Salseforce • Samsung Bangaluru • Samsung Delhi • Saven Technologies • Smartron India Pvt. Ltd., • SMS Data Tech • Suzuki Japan • Svaya Robotics • TCS • Texas Instruments • Thence • TheRightDoctors • TRDCC • Triginta Technologies • Truebil • UTC • Verizon Media • XMACHINES • XYZ Innovations.

TEQIP PROGRAMS DURING 2018-19

Sl. No.	Type	Program Title	Program Held on	Activity Coordinator's Name
1	Faculty Training Program	Faculty Induction Program – Batch I & Batch II	15-19 & 20-24 January 2018 (100 TEQIP Faculty)	Dr. Suhash Ranjan Dey
2	Faculty Training Program	Faculty Induction Program – Batch III & Batch IV	25-29 January & 30 January - 3 February 2018 (98 TEQIP faculty)	Dr. Suhash Ranjan Dey
3	Short Course	Concepts & Applications of the Finite Element Method	26 February - 3 March 2018	Dr. Viswanath Chinthapenta
4	Workshop	Nanomaterials based low cost sensor design for application in IoT (Internet of Things)	2-6 April 2018	Dr. Amit Acharyya & Dr. Sushmee Badhulika
5	Workshop	Python, Arduino Platform and its programming using C	3-7 April 2018	Dr. G.V.V. Sharma
6	Faculty Training Program	Summer Training Program on Active learning	14 May - 8 June 2018 (229 Faculty in 6 Batches)	Dr. Suhash Ranjan Dey
7	Workshop	Thermal Analysis of Materials using DSC, TG, and Dilatometer	25-30 June 2018	Dr. Bharat B. Panigrahi
8	Workshop	Biomimetics and Biological Soft Materials	27-30 June 2018	Dr. Satyavarta Samavedi & Dr. Balaji Iyer
9	Workshop	3-D Printing in Medicine	16-21 July 2018	Dr. Falguni Pati
10	Workshop	MEMS & NEMS: Fundamentals, Design and Fabrication	17-22 December 2018	Dr. Prem Pal, Dr. Ashok Kumar Pandey & Dr. Chandra Shekar Sharma
11	Workshop	Theory & Applications of Computational Fluid Dynamics	11-15 February 2019	Dr. Raja Banerjee
12	Workshop	Radiation Physics & Application	17-22 February 2019	Dr. B. Ramakrishna, Dr. J. Mohanty & Prof. Anjan Giri
13	Internship	Student Summer Internship - 2018 (34 students from 16 various TEQIP Institutes)	1-30 June 2018	IIT Hyderabad Faculty (17 different faculty)
14	Internship	Faculty Summer Internship - 2018	1-20 June 2018	Dr. Gajendranath Chaudhary
15	Internship	Faculty Winter Internship - 2018	17-26 December 2018	Prof. C Krishna Mohan

GIAN COURSES CONDUCTED FROM BEACH APRIL 2018 TO MARCH 2019

Course Title	Course Coordinator	Foreign Expert Faculty	Course Dates
Seismic Performance Assessment of Structures through Numerical and Hybrid Simulations	Dr. S. Suriya Prakash	**Prof. Oh-Sung Kwon** *University of Toronto, Canada*	2 -12 July 2018
Nanostructured Polymer Thin Film Properties	Dr. Chandra Shekhar Sharma	**Prof. Alamgir Karim** *University of Houston, United States of America*	9-13 July 2018
Clinically applied anthropology I: Critical perspectives on mental health theory and practice in India	Dr. Shubha Ranganathan	**Dr. Sushrut Jadhav** *University College of London, United Kingdom*	1-8 November 2018
Fluidics on a Compact Disc- A Short Course for Academia and Industry	Dr. Chandra Shekhar Sharma	**Prof. Marc J Madou** *University of California, Irvine, USA*	26 November - 4 December 2018
Constitutive modelling of unsaturated soils and its practical applications for critical infrastructure	Dr. B Umashankar	**Dr. Sivakumar** *Vinayagamoothy, Queen's University Belfast, United Kingdom*	17-21 December 2018

INCUBATORS FROM IITH

The list of startups incubated in FY 18-19 is as follows:

Name of the startup	Promoters	Business Domain
Acausal Automation Pvt. Ltd.	Dr. Ramesh Reddy Dr. Prasanth Kumar Ms. Hemalatha Mallarapu	Robotics & Automation Solutions and Products
Skelregen Pvt. Ltd.	Dr. Subha Narayan Rath Dr. Nellore Vijay Kumar Mr. Shibu Chameettachal	Polymer & bio-active ceramic products
Eaffocare Innovation Pvt. Ltd.	Dr. Jyotsnendu Giri Dr. Baishakhi Chandra	Human Healthcare and products

REPUBLIC DAY CELEBRATIONS

At IIT Hyderabad, 26th of January is celebrated as Republic day every year as the Constitution of India came into force on this day in 1956. It is celebrated as the national festival of India. The Republic Day celebration starts with the hoisting of national flag by the Director of IIT Hyderabad followed by various cultural programmes. Students participate in these programmes with great zeal and enthusiasm.

INTERNATIONAL WOMEN'S DAY

Women's Cell, IIT Hyderabad, celebrated the International Women's Day on 8 March 2019. Dr. Anuradha Udumudi, Founder and Director, Gene Tech, Hyderabad was the chief guest for the event. Prior to the Women's Day event, there was a tree plantation activity in IITH campus by Dr. Udumudi.

The event began with a solo vocal performance followed by an inspiring talk by the chief guest. Dr. Udumudi talked about her journey from being in academia to entrepreneurship and experiences in the area of performing genetic tests before childbirth in the Indian scenario. Also she mentioned that how women should be allowed to express themselves the way they are and requested women to come forward as an entrepreneur in the area of healthcare.

There were cultural programmes such as singing, dance and poetry recital. On the same day, an exhibition on the theme 'Breaking the Barriers' showcased poems, painting and photography submitted by students. Prizes were awarded based on feedback from a panel of judges. The event as a whole provided a forum for female students, faculty and staff to share their thoughts. A 2K run was also organised on the occasion, for students, faculty and staff.

In the year 2018-19, Women's Cell received complaints of stalking, passing sexually coloured remarks and defaming. All the complaints were resolved through taking initiatives in generating awareness on gender issues through arranging several workshops for faculty and students in 2018 and 2019. Women's Cell created an awareness on Sexual Harassment Act and appropriate behaviour to be expected in an educational institution.

The Women's Cell also organized a self-defence program for the female students in September-November 2018. The program included an introduction to KravMaga, general safety in public places and transport, importance of self-defence training for girls, countering eve-teasing and countering violent attacks.

Women's Cell has taken initiative in formulating and designing a mobile app for the safety and security of all the female students travelling in the night. The app will help in sending a message to IITH main security in case of emergency, by pressing a button.

In order to address harassment in laboratories and safety of female students working during late hours in campus, a feasibility study of installing CCTV camera in laboratories is under progress. Steps are being undertaken to make all streetlights functioning.

Women's Cell, IIT Hyderabad has also taken initiative in organizing a series of lectures under 'Women in STEM' program in October and November 2018. As a part of this Ms. Charumathy Srinivasan, Partner Group Engineering Manager, Microsoft India Development Center, Hyderabad delivered a talk titled 'Tour through the Current and Future Trends in Computing – Cloud & Edge'. Moreover, an inspirational lecture was given by Dr. Jugnu Jain, CEO and co-founder of Sapien Biosciences who shared her journey as a woman scientist in India, UK and USA, moving from academia to industry and becoming an entrepreneur. Specifically, she discussed about her role-models, mentors, inspiration and the challenges involved in this journey. This was to encourage female students to know more about experience of being women entrepreneurs and professionals in industry today. These talks were attended by a large number of students, and received good feedback.

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

Jyotsnendu Giri
Ph.D – IIT Bombay
Assistant Professor
Research Areas: Nanomedicine; Regenerative Medicine; Drug Delivery; Therapeutics and Diagnostics

Falguni Pati
Ph.D – IIT Kharagpur
Assistant Professor
Research Areas: Biomaterials; Tissue Engineering; 3D Bioprinting; InVitro Tissue/Organ Models

Harikrishnan Narayanan Unni
Ph.D – NTU, Singapore
Assistant Professor
Research Areas: Lab on Chip Microfluidics and Nanofluidics; Biophysics; Biomechanics

Mohan Raghavan
Ph.D – IISc., Bangalore
Assistant Professor
Research Areas: Computational Neuroscience; Motor System; Spinal Cord; Bionics; Assistive Devices; Rehabilitation

Aravind Kumar Rengan
Ph.D – IIT Bombay
Assistant Professor
Research Areas: Nanomedicine; Bio-Nanotechnology; Photothermal Therapy; Nanotoxicology; Cancer Theranostics

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

Patents Filed

Renu John and Praveen Kumar Poola, 'Apparatus and Methods for Label-Free Morphological Evaluation of Human Sperm', Indian Provisional Patent Application No. 201841013261 (applied).

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

'Neuromechanical Simulator System', Indian Provisional Patent Application No. 201842000689.

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). https://doi.org/10.1007/978-3-319-61255-3_11.

Falguni Pati and Dong-Woo Cho (Invited Book Chapter), 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 (Invited Book Chapter), 3D printed in vitro disease models, 3D Printing in Medicine, Deepak Kalaskar (Editor), Woodhead Publishing, UK pp.115-138, (2017), ISBN: 9780081007266.

Publications

(in peer reviewed journals)

MMA Ali, N Singh, S Srivasta, VV Agrawal, R John, BD Malhotra, 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.

Sankar S, Kakunuri M, D. Eswaramoorthy S, Sharma CS, 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.

Sindhuja D E, Sundeep Bethapudi, Shahdab I Almelkar, 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.

Singh SP, Alvi SB, Pemmaraju D, Singh AD, Manda SV, Srivastava R, Rengan AK. 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.

Pemmaraju D, Appidi T, Minhas G, Singh SP, Khan N, Pal M, Srivastava R, Rengan A K. Chlorophyll rich biomolecular fraction of A. cadamba loaded into polymeric nanosystem coupled with Photothermal Therapy: A synergistic approach for cancer theranostics. *Int J Biol Macromol* 110 (2018) 383-391.

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Singh SP, Yadav P, Rengan AK, Shanavas A, Srivastava R. Gold laced biomacromolecules for theranostics application. *Int J Biol Macromol* 110 (2018) 39-53.

P K Poola, 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, MA Ali, P Rai, A Sharma, BD Malhotra, Renu John, Microporous Nanocomposite Enabled Microfluidic Biochip for Cardiac Biomarker Detection *ACS Applied Materials & Interfaces 9 (39), 2017, 33576-33588.*

VP Pandiyan, K Khare, 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, 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, Seeram Ramakrishna, Electrospun fibers for recruitment and differentiation of stem cells in regenerative medicine. *Biotechnology Journal*, 12(12), 2017.

BapiSarker, Tobias Zehnder, Subha Narayan Rath, Raymund E Horch, Ulrich Kneser, Rainer Detsch, 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, Harikrishnan Narayanan Unni, LED based Optowetting Platforms for Micromixing, SPIE Microfluidic, *BioMEMS and Medical Microsystems, 10491 (2018), doi: 10.1117/12.2290107.*

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

Renu John, J Sivaraman, Effects of sinus rhythm on atrial ECG components using modified limb lead system, *Signal Processing, Computing and Control (ISPCC) 4th International Conference, 2017, doi: 10.1109/ISPCC.2017.8269735.*

Funded Research Projects 2018-19

Renu John, *Development of OCT platforms for clinical applications*, DST TDP Program 2017-2019, Rs. 95 Lakhs.

Renu John, *Low Coherence Optical Microscopy for Microfluidics Applications*, DST SERB, 2018-2020, Rs. 34 Lakhs.

Affordable and cost effective cancer diagnosis/treatment using gold based biodegradable nanoparticles – MHRD-IMPRINT Grant, Aug 2017 Rs. 154 Lakhs.

Affordable Detection Kit for Cervical Cancer – BIRAC SRISTI Grant, May 2017, Rs. 15 Lakhs.

Talks Given in National / International Conferences

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.

Aravind Kumar Rengan, *Switching on Light to induce Darkness within Cancer cells* – Invited Talk – Golden Jubilee Seminar, University of Calicut, 16 March 2018.

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

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

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

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

Aravind Kumar Rengan, *Bio-Nanomaterials: Choosing the right nanosystem for drug delivery and theranostic application!* Thiagarajar Engineering College: Guest Lecture – AICTE RAMS 2017 - 18 December 2017.

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

Aravind Kumar Rengan, *Metallic Nanomedicine : A Novel Prospectus in Cancer Theranostics,* Indo-UK Kanpur Conference – Invited YI talk – 8 November 2017.

Workshops / Symposiums

International Conference on Digital Fabrication, Hyderabad, 16-17 March 2018 (Co-organization).

Awards / Recognitions

Shibu Chameettachal (PhD student) - *GYTI 2018 Award.*

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

Tejaswini Appidi (PhD student), *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.

Reconstructed Cells

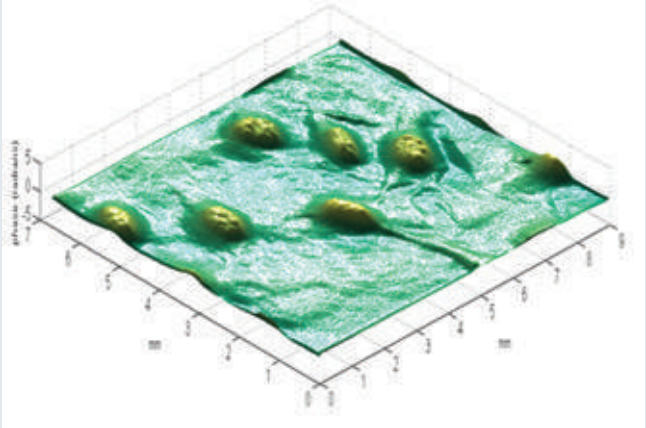


Figure 1

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).

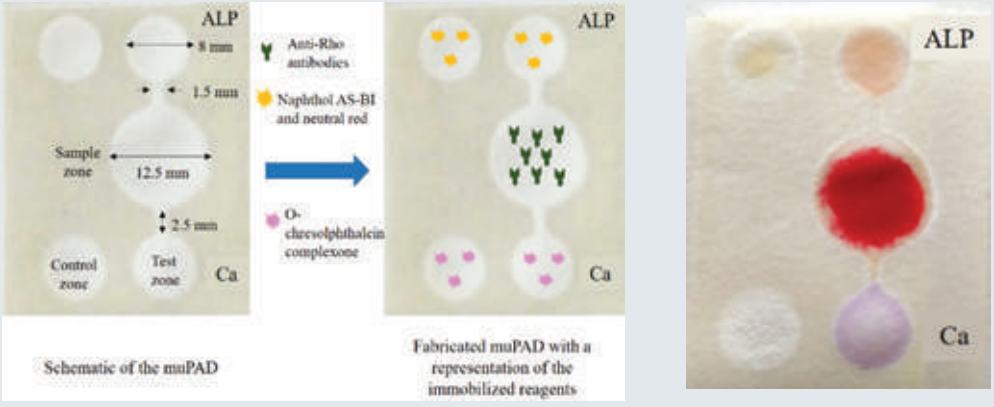


Figure 2

RESEARCH

HIGHLIGHT

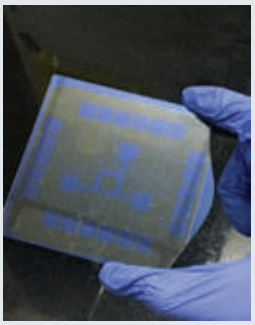


Figure 3

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.

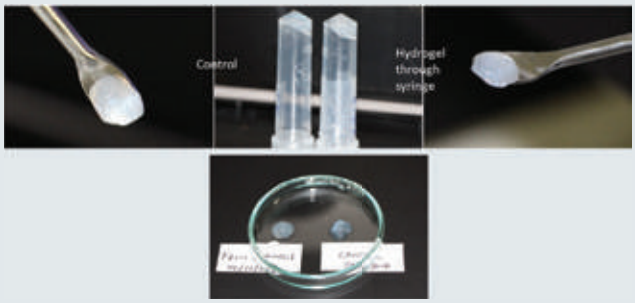


Figure 4

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 in 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.

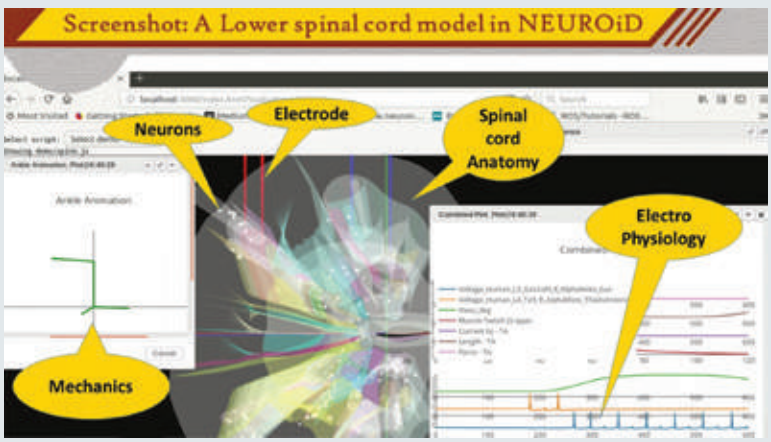


Figure 5

BIOTECHNOLOGY

In the new era of precision medicine, the Department of Biotechnology at IITH focuses on various cutting-edge medical biotechnology research areas with the expertise of 8 faculty members who had versatile research training in US and Europe. The department offers MTech (Medical Biotechnology) and PhD (Biotechnology) programs to train students to meet the international standards. The department graduated eight MTech students and five PhD students during the year 18-19. MTech students of the department got placed in Medgenome labs, Bangalore, International Max Planck Research School-LS LMU University of Munich, Germany and The University of Tokyo, Japan for PhD. One of the graduated PhD student is pursing postdoc in Clemson University, South Carolina, USA and another one is employed as a scientist in Dr Reddy's Labs.

The faculty members in the department published thirteen research and review articles in the leading peer-reviewed, international journals in the year 18-19. The faculty members in the department received around 1 crore in research funding from DST-SERB. The department conducted several brain storming seminars inviting faculty and researchers from the leading institutions around the world. The department celebrated National science day on 28 February 2019 in the esteemed presence of Dr Aravind Kumar, CCMB, Hyderabad India and Dr Debajyoti Dutta, University of Alberta, Canada.

PhD student Yogeeshwar Ajjugal under the guidance of Dr Thenmalarchelvi Rathinavelan received Dr. KV Rao Research Award, Hyderabad, India. A team led by Dr Thenmalarchelvi Rathinavelan comprising of Yogeeshwar Ajjugal and Narendar Kolimi received the Gandhian Young Technological Innovation Award (2019).

FACULTY

Thenmalarchelvi Rathinavelan
Ph.D – University of Madras
Associate Professor & HoD
Research Areas: Computational Biology; Biophysics; Biomolecular NMR

N K Raghavendra
Ph.D – IISc, Bangalore
Associate Professor
Research Areas: HIV-1 Biology

Sandeep K Singh
Ph.D – Virginia Commonwealth University, USA
Assistant Professor
Research Areas: Cell and Molecular Neuroscience; Neuron-Glia Interactions; Cell Biology of Glioma

Basant Kumar Patel
Ph.D – Banaras Hindu University
Associate Professor
Research Areas: Protein Misfolding in Neurodegenerative Diseases

Rajakumara Eerappa
Ph.D – CCMB, Hyderabad
Associate Professor
Research Areas: Epigenetic; Enzyme Engineering for Asymmetric Synthesis and for Catalytic Efficiency; Structure Based Drug Design and Dna Repair; and Structural Biology; X-Ray Crystallography; Biophysics and Biochemistry and Computational Biology

Ashish Misra
Ph.D – IISc, Bangalore
Assistant Professor
Research Areas: Genomics; Epitranscriptomics; Cancer; RNA Biology; Alternative Splicing

Anindya Roy
Ph.D – IISc, Bangalore
Associate Professor
Research Areas: DNA Repair

Anamika Bhargava
Ph.D – Innsbruck Medical University, Austria
Assistant Professor
Research Areas: Voltage-Gated Calcium Channels; Electrophysiology; Channelopathies; Imaging of Ion Channels; Zebrafish Animal Model

Book & Book Chapters

Anamika Bhargava, Julia Gorelik. Studying Structure and Function of the Heart Cells Using Scanning Ion Conductance Microscopy. In: Kaestner L., Lipp P. (eds) Microscopy of the Heart. Springer, Cham, 2018.

Uzma Hasan and Sandeep K. Singh. The Astrocyte-Neuron Interface: An Overview on Molecular and Cellular Dynamics Controlling Formation and Maintenance of the Tripartite Synapse. 2019, Methods in Molecular Biology (Astrocytes), 1938:3-18.

Publications
(in peer reviewed journals)

Gaur H, Purushothaman S, Pullaguri N, Bhargava Y, **Bhargava A**. Sodium benzoate induced developmental defects, oxidative stress and anxiety-like behaviour in

zebrafish larva. Biochem Biophys Res Commun. 502, 2018, 364-369.

M Sharma, D Akula, M Mohan, R Nigam, M Das, **Anindya Roy.** Heteroexpression of *Mycobacterium leprae* hypothetical protein ML0190 provides protection against DNA-alkylating agent methyl methanesulfonate. Biochemical & Biophysical Research Communications, 509(3), 2018, 779-783.

G.S. Tomar, G.P. Singh, D. Lahkar, K. Sengar, R. Nigam, M. Mohan, **Anindya Roy.** New biomarkers in brain trauma. Clinica Chimica Acta, 487, 2018, 325-329.

G.P. Singh, R. Nigam, G.S. Tomar, M. Monisha, S.K. Bhoi, A. S, K. Sengar, D. Akula, P. Panta, **Anindya Roy.** Early and rapid detection of UCHL1 in the serum of brain-trauma patients: a novel gold nanoparticle-based method for diagnosing the severity of brain injury. Analyst, 143(14), 2018, 3366-3373.

M. Sharma, M. Das, D. Diana, A. Wedderburn, **Anindya Roy**. Identification of novel open reading frames in the intergenic regions of *Mycobacterium leprae* genome and detection of transcript by qRT-PCR. Microbial Pathogenesis, 124, 2018, 316-321.

R. Nigam, M. Mohan, G. Shivange, P.K. Dewangan, **Anindya Roy.** Escherichia coli AlkB interacts with single-stranded DNA binding protein SSB by an intrinsically disordered region of SSB. Molecular Biology Reports 45(5), 2018, 865-870.

R. Nigam, K.R. Babu, T. Ghosh, B. Kumari, D. Akula, S.N. Rath, P. Das, **Anindya Roy.** F.A. Khan, Indenone derivatives as inhibitor of human DNA dealkylation repair enzyme AlkBH3. Bioorganic & Medicinal Chemistry, 26(14), 2018, 4100-4112.

M. Mohan, V. Pandya, **Anindya Roy**. *Escherichia coli* AlkB and single-stranded DNA binding protein SSB interaction explored by Molecular Dynamics Simulation. Journal of Molecular Graphics & Modeling, 84, 2018, 29-35.

R. Nigam, M. Mohan, **Anindya Roy.** *Escherichia coli* single-stranded DNA binding protein SSB binds to AlkB and promotes DNA repair. FEBS Open Bio, 8, 2018, 28135.

Archana Prasad, Vishwanath Sivalingam, Vidhya Bharathi, Amandeep Girdhar, and **Basant K Patel**. The amyloidogenicity of a C-terminal region of TDP-43 implicated in Amyotrophic Lateral Sclerosis can be affected by anions, acetylation and homodimerization. Biochimie, Vol 150, 2018, 76-87.

Abhishek S, Nivya MA, Nakarakanti NK, Deeksha W, Khosla S, **Rajakumara E.** Biochemical and dynamic basis for combinatorial recognition of H3R2K9me2 by dual domains of UHRF1. Biochimie. 149, 2018, 105-114.

Bhargava A, Saha S. T-Type voltage gated calcium channels: a target in breast cancer? Breast Cancer Res Treat. 173, 2019, 11-21.

Archana Prasad, Vidhya Bharathi, Vishwanath Sivalingam, Amandeep Girdhar and **Basant K Patel**. Molecular mechanism of TDP-43 misfolding and pathology in Amyotrophic Lateral Sclerosis. Front Mol Neurosci. Vol 12, 2019, 25.

Funded Research Projects 2018-19

Anamika Bhargava, Effect of estrogen on T-type voltage gated calcium channels: implications for breast cancer therapy and future directions, SERB-DST, 48.88 lakhs, 6 August 2018.

Ashish Misra, Determining the role of N6-methyladenosine reader, YTHDC2 in alternative pre-mRNA splicing, SERB, 49,50,000 INR, 28 October 2018.

Talks Given in National / International Conferences

Rajakumara Eerappa, Characterization of Ligand-Receptors Interactions, Teaching and Learning of Molecular Biology and Enzymology through Hands-on Experience (MBE-2018), Department of Biotechnology, NIT Warangal, 22 September 2018.

Yogeeshwar Ajjugal, Narendar Kolimi and Thenmalarchelvi Rathinavelan, Structural perspectives of trinucleotide repeat expansions associated with human diseases: An integrated computational and experimental approach, Fifth Annual BSBE Winter Meeting – computational biology in disease mechanisms, Department of Biological Sciences and Bioengineering, Indian Institute of Technology Kanpur, December 7-9, 2018.

N. K. Raghavendra, Hierarchy of interactions at the interface between HIV-1 integrase and human LEDGF/p75, based on docking and site-directed mutagenesis, International Conference On Biology And Therapeutics of HIV & Associated Infections, University of Hyderabad, 19-21 January, 2019.

Shivangi Sachdeva, Sanjana Anilkumar Nair, Narendar Kolimi, Raghuvamsi Venkata Palur,

L Ponoop Prasad Patro, Karpagam Uma Sudhakar and Thenmalarchelvi Rathinavelan, Wzi, an outer membrane lecto-aquaporin can be a universal drug target for Gram-negative bacteria, Indo-US conference on Multiscale Simulations and Mathematical Modelling of Complex Biological Systems, Center for Computational Biology and Bioinformatics, School of Computational & Integrative Sciences (SCIS), Jawaharlal Nehru University - Golden jubilee celebration, New Delhi, January 30-February 01, 2019.

Anamika Bhargava, Calcium channels: Function to dysfunction, One-day seminar on "Innovations in Biotechnology", Loyola Academic Degree and PG College, Hyderabad, 21 February 2019.

L Ponoop Prasad Patro, C Sathyaseelan, Kripi Tomar and Thenmalarchelvi Rathinavelan, A pattern recognition approach to predict a protein's like or dislike when it meets a metal, International Conference "OPENTOX ASIA 2019", CSIR-IICT Platinum Jubilee Celebration Conference, CSIR - Indian Institute of Chemical Technology Hyderabad, March 1-3, 2019.

Seminars Conducted

Prof. Ranga Udaykumar, Molecular Biology and Genetics Unit, Jawaharlal Nehru Centre for Advanced Scientific Research, Jakkur, Bangalore, India, The emerging promoter variations of HIV-1 and its impact on viral transcriptional silencing, 20 April 2018.

Prof. S.N. Byrareddy, Dept. of Pharmacology & Experimental Neurosciences, Univ. of Nebraska Medical Center, Omaha. USA. Targeting Gut Homing Molecules to Cure HIV/AIDS, 25 April 2018.

Prof. Paike J Bhat, Department of Biosciences and Bioengineering, IIT Bombay, From protein dynamics to phenotype, 27 August 2018.

Dr. Sourav Datta, Assistant Professor, Department of Biological Sciences, IISER Bhopal. Regulation of plant responses to signals from the environment, 28 August 2018.

Dr. Pavan Kumar Agrawal, Janelia Research Campus, Helix Drive, Ashburn, VA-20147, USA, Feeling Lonely: Transcriptional and Epigenetic Signatures of Social Isolation in Drosophila Brain, 15 October 2018.

Dr. Raushan Kumar Singh, Postdoctoral Associate, University of Massachusetts Medical School, Worcester, USA, SWR1C: A nucleosome editing machine, 9 November 2018.

Dr. Manoj Saxena, Post-Doctoral Scholar, Department of Radiation Oncology, University of California Davis Sacramento, USA, Transferrin structure and function; Unraveling the mystery of titanium transport in humans, 26 December 2018.

Harsha Doddapaneni, Assistant Professor, Department of Molecular and Human Genetics, Baylor College of Medicine, Human Genome Sequencing Center, Houston, USA, NextGen Sequencing: Current and Future Trends, 11 January 2019.

Dr. Ganesh Bagler, Assistant Professor, Center for Computational Biology, Indraprastha Institute of Information Technology Delhi (IIIT-D), Computational Gastronomy: The emerging data science of food, flavors and health, 24 January 2019.

Dr. Ashish Ranjan, Postdoctoral research Associate, University of Wisconsin - Madison, USA, Understanding Soybean resistance mechanism to Sclerotinia stem rot, 28 January 2019.

Awards / Recognitions

Yogeeshwar Ajjugal, First Runner up Biology, Dr K. V. Rao Scientific Society 18th Annual Research Awards (PI: Dr Thenmalarchelvi Rathinavelan).

Yogeeshwar Ajjugal, Narendar Kolimi and Thenmalarchelvi Rathinavelan, Gandhian Young Technological Innovation Awards/ Appreciations 2019.

National Science Day at IITH at Biotechnology Department

Prof. K Vijay Raghavan's (Principal Scientific Advisor to the Govt. of India) visit to Biotechnology labs

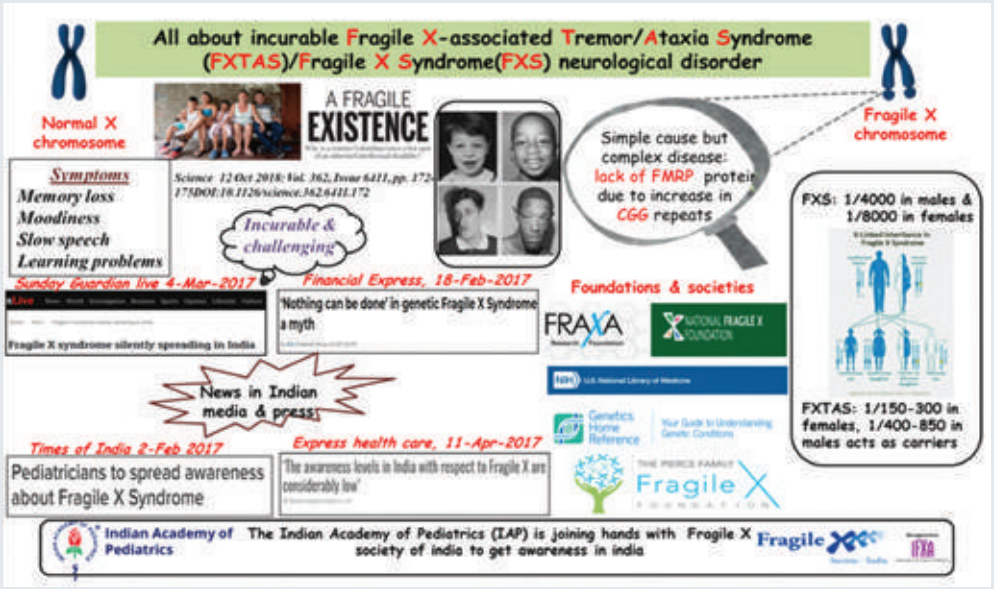
RESEARCH

HIGHLIGHT

Molecular biophysics lab explores the molecular basis for the biological phenomena by using in silico/in vitro techniques in the perspective of therapeutics. Currently, the lab is working towards the understanding two major global healthcare problems: trinucleotide repeat expansion disorders (TREDs) and antimicrobial resistance (AMR).

Trinucleotide Repeat Expansion Disorders (TREDs)

The trinucleotide repeat expansion is one of the major causes for several neurological disorders. Trinucleotide repeats belong to the family of microsatellites (a tract of 1 to 6 repetitive nucleotides) that are commonly observed in eukaryotes and exhibit repeat length polymorphism. The inherent ability of trinucleotide repeats to undergo abnormal expansion leads to many incurable genetic disorders. The lab explores the secondary structural traits of various trinucleotide repeat expansions using molecular dynamics simulations (MD), circular dichroism (CD), electrophoretic mobility shift assay (EMSA) and nuclear magnetic resonance (NMR) techniques. A case in point is CCG (C...C mismatch) & CGG repeat (G...G) expansions that lead to a neurological disorder FXTAS (Figure 1). Based on the outcomes, a neurotoxic mechanism has been proposed to explain the role of unusual secondary structures that may be responsible for the increased R-loop stability, bidirectional transcription, RNA foci formation and repeat associated non-AUG translation for monopolypeptide aggregates in FXTAS, a major neurodegenerative disorder. The results suggest that G-quadruplex structure observed in FXTAS associated with fmr1 gene and its transcript can be a potential drug target. This innovation has been recognized with Gandhian Young Technological Innovation Award (2019).



To serve the scientific community that are involved in nucleic acid research, the lab has developed a user-friendly web-server, namely, 3D-NuS (https://iith.ac.in/3dnus/) (Figure 2A), for the modeling and visualization of a variety of 3-dimensional nucleic acids structures. As of 01-May-2019, 3D-NuS has

RESEARCH
HIGHLIGHT

1142 new users from 423 cities of 58 countries (Figure 2(D)) and it has also been felicitated with GYTI-2018 appreciation award.

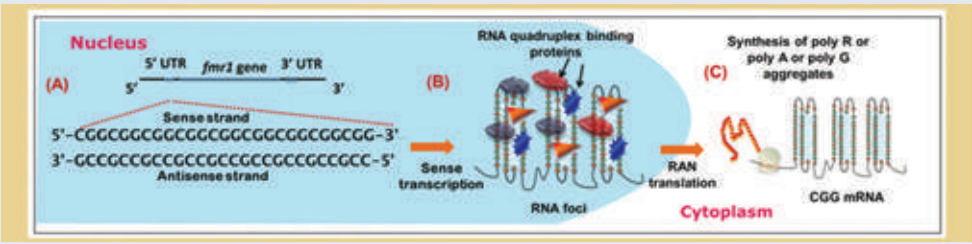


Figure 1. Overview of fragile X associated tremor/ataxia syndrome (FXTAS) and fragile X syndrome (FXS) neurological disorder (Top) and the proposed neurotoxic mechanism (Bottom).

Anti-Microbial Resistance (AMR)

Towards the antimicrobial resistance research, an in silico diagnostic tool, namely, K-PAM (https://iith.ac.in/K-PAM/) (Figure 2B) is developed to identify the Klebsiella species serotype during the seroepidemiological and pathophysiological investigations. The laboratory also hosts a public repository of modeled E. coli K-antigens structures (https://www.iith.ac.in/EK3D/) (Figure 2C) to facilitate anti-E. coli vaccine studies. Since January 2016, it has 2425 new users from 439 cities (70 different countries) (Figure 2E). As Klebsiella species and E. coli has developed extreme drug resistance, World Health Organization (WHO) has a global call for the development of next generation antibiotics and vaccine developments. Thus, both K-PAM and EK3D can be helpful in solving the purpose.

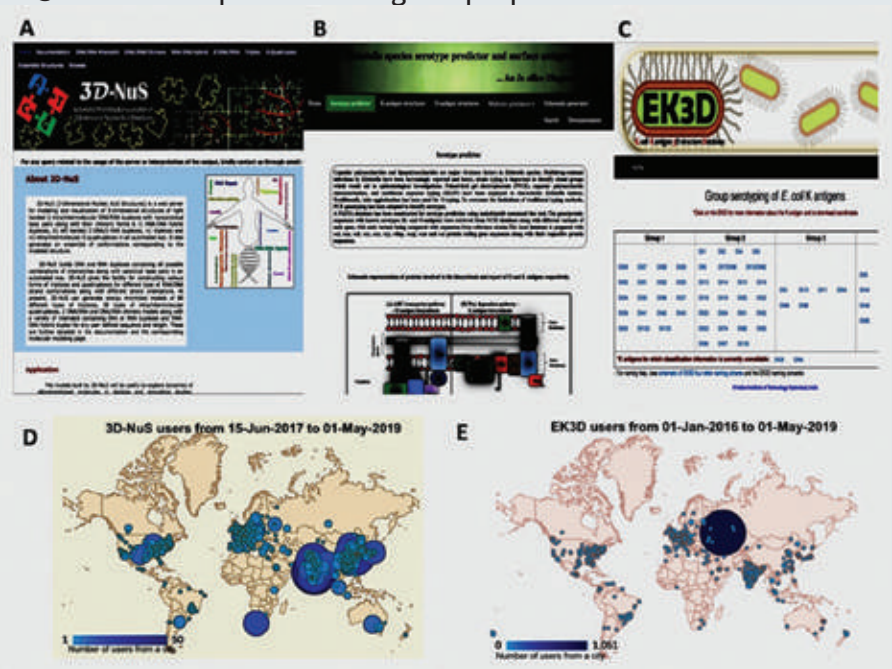


Figure 2. (Top) Front page of: (A) 3D-Nus, (B) K-PAM and (C) EK3D. (Bottom) Google analytics map showing global usage of 3D-NuS (D) and EK3D (E) webserver from the date of publication. The circles are city specific and size and color depicts the number of new users from a particular city. The color scale for number of new users has been given at the bottom of the world-map.

CHEMICAL ENGINEERING

The main objective of the department is to prepare the next generation of chemical engineers to address a broad spectrum of problems that are central to sustainability and economic growth of the country. With more and more inter and multidisciplinary research that is required to solve today's socio economic problems, collaborations that cut across conventional research paradigm is indispensable. Chemical Engineering department at IITH encompasses both B.Tech and M.Tech programs that features a curriculum that is both comprehensive and flexible. Department also hosts 55 PhD students. Departments strong commitment to research is evidenced by INR 30 crores extramural funding that faculties have obtained. Faculty from the department are actively involved in hosting conferences and outreach workshops benefitting the students and faculty across several institutes in India. Department also houses state-of-the-art research teaching equipment. Chemical Engineering department at IITH conducts research in a wide variety of exciting areas such as fluid flow, mineral processing, catalysis, materials for energy and biological applications, nanotechnology, bioengineering, process control and optimization.

FACULTY

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

Kishalay Mitra
Ph.D – IIT Bombay
Associate Professor
Research Areas: Machine Learning; Artificial Intelligence; Optimal Control; System Identification; Uncertainty Modeling; Supply Chain; Systems Biology; Wind and Solar Farm Design

Saptarshi Majumdar
Ph.D – IIT Kharagpur
Associate Professor
Research Areas: Multi-Scale Modeling; Bio-Materials Design; Industrial Process Analysis

Kirti Chandra Sahu
Ph.D – JNCASR, Bangalore
Professor
Research Areas: Raindrops; Bubbles and Drops; Multiphase Flows; Flow Instability

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

Phanindra Varma Jampana
Ph.D – University of Alberta, Canada
Associate Professor
Research Areas: System Identification; Compressed Sensing

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

Sunil K. Maity
Ph.D – IIT Kharagpur
Associate Professor
Research Areas: Hydrodeoxygenation of Vegetable Oils and Oxygenated Compounds; Steam Reforming and Oxidative Steam Reforming of Bio-butanol; Process Design using Aspen Plus and Techno-economic Analysis; Hydroxyalkylation-alkylation Reaction (HAR) followed by HDO of HAR product; Oligomerization of Butylene, Production of Butyl Levulinate by Butanolysis of Furfuryl Alcohol

Chandra Shekhar Sharma
Ph.D – IIT Kanpur
Associate Professor
Research Areas: Polymer and Carbon Nanomaterials; Carbon-MEMS; Electrospun Nanofibers; Nature inspired Functional Surfaces; Drug Delivery; Waste Management; Li-ion batteries and Supercapacitors

Parag D. Pawar
Ph.D – Johns Hopkins, USA
Associate Professor
Research Areas: Bacterial Infections; Biofilms; Cellular Automata; Antibiotic Resistance

Debaprasad Shee
Ph.D – IIT Kanpur
Associate Professor
Research Areas: Catalysis Over Supported Metals and Metal Oxides; Structure Property Correlations; Fuels and Chemicals from Renewable Sources; Reaction Kinetics

Devarai Santhosh Kumar
Ph.D – IIT Madras
Associate Professor
Research Areas: Solid State Fermentation; Submerged Fermentation; Lipase; Biodiesel; Edible Mushroom; Statistical Design of Experiments; Microbial Enzyme Production; Hybrid Biosensor

FACULTY

Lopamudra Giri
Ph.D – University of Iowa, USA
Associate Professor
Research Areas: Bioimaging; Systems Biology; Confocal Microscopy; Live Cell Imaging; Neuroscience; Neurodegeneration; Statistical Modeling; Data Analysis

Satyavrata Samavedi
Ph.D – Virginia Polytechnic Institute and State University, USA
Assistant Professor
Research Areas: Biomaterials; Polymer Physics/Characterization; Drug Delivery; Stem Cell Differentiation; Inflammation

Praveen Meduri
Ph.D – University of Louisville, USA
Assistant Professor
Research Areas: Photoelectrochemical Water Splitting; Photocatalysis; Lithium Sulfur Batteries

Balaji Iyer Vaidyanathan Shantha
Ph.D – IIT Bombay
Assistant Professor
Research Areas: Biomimetics; Polymer Brushes; Structure-Property Relations; Biological Soft Matter; Multiscale Simulations

Patents Filed

Narasimha Mangadoddy, Teja Reddy Vakamalla, Mayank Kumar, Aketi Veera Asha Kumari, Narendra K. Nanda, Rajan Kumar, R. Siva Kumar, and G. E. Sreedha, Dense medium cyclone for near gravity coal fraction separation, 22 June 2018 Patent No.201841023467.

Book & Book Chapters

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Funded Research Projects 2018-19

Kinetic Modeling of Iron Oxide Reduction, TATA Steel, 7.67 Lakhs.

Co-Principal Investigator, A Collaborative Project with L.V. Prasad Eye Hospital on *Improving the efficiency of spiral concentrator separating the multi-component chromite ore particles using CFD and experimental methods*, UAY-Phase II, 99.98 Lakhs, MHRD and TATA Steel, Duration 2018-2021, Start date - Oct 2018, SERB, 2018-2021, 40.00 Lakhs.

Co-Principal Investigator, *Production of high cell density edible mushrooms by submerged fermentation and development of high protein nutrition*, DST-SERB, 2018, 38.69 Lakhs.

Co-Principal Investigator, *Linear stability analyses of interfacial flows of fluids with complex rheolog*, DST- MATRICS, 2018-2020, 6.6 Lakhs.

Co-Principal Investigator, *Development of ERT Reconstruction Algorithms for Accurate Estimation of Phase Concentration in Multi-phase flows*, 2019, 16.72 Lakhs.

Co-Principal investigator, Academic partner, IBM Research, India under Open Science Collaboration Program (OSCP), January 2019, 5.00 Lakhs.

Co-Principal Investigator, *Wind farm layout optimization under uncertainty using wind speed forecasting through probabilistic models and comparison with machine learning algorithms*, MHRD - SPARC, March, 2019, 47.50 Lakhs.

Co-investigator, *Bacterial cellulose derived tunable nanostructured Carbon as High performance Anode for Lithium ion battery*, SERB, 28 March 2019, 49.2 Lakhs.

Co-investigator, *Investigation on role of neuron-glial activation leading to neuronal*

loss as an early marker of diabetic retinopathy using transcriptomics and high-resolution imaging based approaches.

Talks Given in National / International Conferences

N. Joy, P. Tripathi, and S. Samavedi, *The role of matrix properties in controlling the release of an anti-inflammatory drug from electrospun matrices*, International Conference on Functional Nanomaterials meeting, Varanasi, February 2019.

S. Mailaram and S.K. Maity, *Hydrodeoxygenation of karanja oil for the production of green diesel: process design with heat integration and economic analysis*, AIChE Annual Meeting, Pittsburg, PA, 28 October – 2 November 2018.

M. Varkolu, S.A.K. Jinnala, A. Kunamalla, S.K. Maity, and D. Shee, *Steam reforming of bio-butanol over mesoporous Ni-CeO_2-ZrO_2-SiO_2 composite catalysts. International,* Conference on Catalysis Science, Engineering & Technology, Stockholm, Sweden, 4-7 November 2018.

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Debaprasad Shee, *Tuning of Activity of Modified Supported Nickel Catalysts for Hydrodeoxygenation of Guaiacol*, Advanced Materials for Energy and Environmental Applications (AMEEA-2018), NIT Rourkela, 12-14 December 2018.

Saptarshi Majumdar, *Natural Biopolymer: Science to Engineering*, CompFlu 2018, IIT-Roorkee, Roorkee, 8 December 2018.

Balaji V.S. Iyer and S.M. Athira, *Computational Study of Pair Interaction Between Functionalized Polymer Grafted Nanoparticles*, 3rd International conference on Soft Materials, MNIT Jaipur, 9-14 December 2018.

Narasimha Mangadoddy, *Understanding the NGM Particle Dynamics Inside a DM Cyclone Using Positron Emission Particle Tracking (PEPT) and CFD Techniques*, NMD ATM 2018, Kolkata, India 14-16 November 2018.

Narasimha Mangadoddy, *Multiphase CFD modelling of mineral separators performance: Validation against imaging and tomography*, Indo-German Symposium on Advanced Measurements and Multiscale CFD Simulations for Intensification of Multiphase Flow Processes, IIT Delhi, 3-5 October 2018.

Narasimha Mangadoddy, *Multiphase CFD modelling of mineral separators performance: Validation against imaging and tomography*, Work-shop on Integration of sustainability in chemical engineering education, ICT Mumbai, India, 16 March 2019.

Prof. Kirti Chandra Sahu, *Non-Isothermal Bubble Rise Dynamics in a Self-Rewetting Fluid*, Symposium on Patterns and Dynamics in Multiphase and Interface Flows, University of Florida, Gainesville, Florida, 15-16 November 2018.

Prof. Kirti Chandra Sahu, *Dynamics of bubble in isothermal and non-isothermal systems*, National Conference on Computational Modeling of Fluid Dynamics Problems (CMFDP-2019), NIT Warangal, Telangana, India, 18-20 January 2019.

Prof. Kirti Chandra Sahu, *Fluid dynamics of a bubble/droplet*, Indo-German Symposium on Advanced Measurements and Multi-Scale CFD Simulations for Intensification of Multiphase Flow Processes, IIT Delhi, India, 3-5 October 2018.

Chandra S. Sharma, *Nature Inspired Novel Approaches for Tunable Wettability,* One day workshop on Wetting of Surfaces, CSIR-IMMT, Bhubaneswar, 9 April 2018.

Chandra S. Sharma, *Direct recycling of polystyrene based waste objects using orange peel extract for oil spills remediation*, DST Swachhta Pakhwada, New Delhi, 1 May 2018.

M. Gaikwad, M. Kakunuri, and C.S. Sharma, *Catalytically graphitized nanostructured carbon xerogels as high performance anode material for lithium ion battery*, 233rd ECS Meeting, Seattle, WA, 13-17 May 2018.

M. Suresh, M. Kakunuri, and C.S. Sharma, *Fabrication of SU-8 derived Three-dimensional Carbon microelectrodes as high capacity anodes for lithium-ion batteries*, 233rd ECS Meeting, Seattle, WA, 13-17 May 2018.

I.M. Pujitha, M. Khandelwal, and C.S. Sharma, *Bacterial Cellulose Derived Carbon*

Nanofibers As High Capacity Anode for Lithium-Ion Batteries, 233rd ECS Meeting, Seattle, WA, 13-17 May 2018.

C.S. Sharma, *Hierarchical Carbon-MEMS: An Integrated Platform for Energy Storage*, International conference on expanding Frontiers of Carbon MEMS (C-MEMS 2018), San Diego, CA, USA, 10-12 June 2018.

Chandra S. Sharma, *Carbon and Polymer based Novel Adsorbents for the removal of Fluoride from Aqueous Solution*, Workshop on Naturally occurring Pollutants affecting Water quality in India, Divecha Centre for Climate Change, IISc, Banglore, 20-21 June 2018.

Chandra S. Sharma, *Waste to Wealth: Towards Environmental Sustainability*, INYAS symposium on Life in a Changing Environment, Mysore, 27 June 2018.

Chandra S. Sharma, *Nanostructured Carbon Materials to Power Future Electric and Plug-in Hybrid Vehicles*, Inaugural lecture for Academic and Industrial Nano Society (AINS), VIT-AP University, 3 November 2018.

Chandra S. Sharma, *Electrospun Nanofibers for Controlled Drug Release*, First INYAS-Frontiers of Science Brainstorming Meeting, Hyderabad, 9-11 December 2018.

Chandra S. Sharma, *Electrospinning and Lithography*, Keynote Address in CEP program on Advanced Soft Materials: Synthesis and Applications at NIT Warangal, 17-21 December 2018.

Chandra S. Sharma, *Polymer and Carbon based MEMS and NEMS*, a six-day workshop on MEMS & NEMS (Fundamental, Design and Fabrication), IIT Hyderabad, India 17-22 December 2018.

Chandra S. Sharma, *Direct Recycling of Polystyrene Waste for Oil Spills Remediation*, Sensitization Workshop on Thrust Area: Urban and Rural Solid Waste including Plastic Waste, CIPET, Chennai, India, 28 February-1 March 2019.

Seminars Conducted

Professor Prabir Basu, Dalhousie University, Halifax, Canada, Advances in Fluidized bed combustion and its future direction, 6 February 2019.

Workshops / Symposiums

International Conference on Carbon-MEMS, 5-7 December 2018 @ Pragati Resorts, Hyderabad (Convener: Dr. Chandra Shekhar Sharma).

First INYAS-Frontiers of Science Brainstorming Meeting, 9-11 December 2018 @ Pragati Resorts, Hyderabad (Convener: Dr. Chandra Shekhar Sharma).

Other Events

Convener/Organizer (along with Dr. Balaji Iyer): TEQUIP workshop on Biomimetics and Biological Soft Matter, organized at IIT Hyderabad, June 2018.

Invited speaker: ICT-based teaching methods & Technical presentations for Faculty Induction Program organized by Teaching Learning Center, IIT Hyderabad, November 2018.

Awards / Recognitions

Inducted member, Indian National Young Academy of Sciences (2019-23), INYAS.

Visiting Professor, June - August 2018, Department of Chemical Engineering, University of Washington, Seattle, USA.

Appointed Finance Co-Chair, 6th IEEE Indian Control Conference, 18-20 December 2019, IIT Hyderabad (http://icc.org.in/dec-2019/).

Appointed Joint Secretary, Control Society, Organizing committee of the IEEE Indian Control Conference.

Selected Member of Executive Council of Asian Society for Research in Engineering Sciences (ASRES).

Selected as Associate Editor, Journal of The Institution of Engineers (India): Series E, Springer.

Selected as Member, International Program Committee, Indian Control Conference, an IEEE event.

Selected as Member, International Advisory Committee, International Conference

on Power, Control and Communication Infrastructure (ICPCCI 2019).

Selected as Member, International Program Committee, Genetic and Evolutionary Computation Conference (GECCO 2019).

Become member for International Advisory Committee of the IMPC (International Mineral Processing Congress) to represent India.

Kirti Chandra Sahu, Member of External Affairs Committee - American Physical Society's Division of Fluid Dynamics (DFD) (2019-2021).

Kirti Chandra Sahu, Associate Editor, Journal of Engineering Mathematics (2018-2021).

Chandra Shekhar Sharma, Guest Editor, Special Edition on Carbon-MEMS in Nature's Microsystems and NanoEngineering Journal.

Chandra Shekhar Sharma, As Director of Restyro Technologies Pvt. Ltd., wins two Gold Medals @ International Innovation Fare, TESLA FEST @ Sweden. Our project on Direct Recycling of Polystyrene is featured in DST Annual Report 2017-18 as a success story.

Mamidi Suresh, Best Oral Presentation Award, ChEmference 2018, A National Level Symposium of Chemical Engineering Research Scholars, IIT Bombay, 19-20 May 2018.

Mayur M. Gaikwad, Best Poster Presentation, International Conference on Carbon-MEMS, Hyderabad, 9-11 December 2018.

Inaugural Ceremony of International Conference on Carbon MEMS: New Horizons

CHEMISTRY

The Department of Chemistry housed 14 faculty members, 73 research scholars and 58 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
Professor & HoD
Research Areas: Applied Electrochemistry

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.

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

G. Satyanarayana
Ph.D – IISc, Bangalore
Professor
Research Areas: Transition-metal Catalysis; Development of New Methodology and Total Synthesis and Drug Diversity Oriented Synthesis

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

Tarun K. Panda
Ph.D – Free University - Berlin, Germany
Professor
Research Areas: Main Group Chemistry; Coordination Chemistry; Lanthanide Chemistry; Homogeneous Catalysis; X-Ray Crystallography and Structure Analysis

D.S. Sharada
Ph.D – University of Hyderabad
Associate Professor
Research Areas: Organo/Bio/ Photoredox Catalysis; Asymmetric Synthesis and Chemical Biology

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

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

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

Surajit Maity
Ph.D – IIT Bombay
Assistant Professor
Research Areas: Physical Chemistry; Spectroscopy and Dynamics of Molecules Ions and Radicals

Jai Prakash
Ph.D – IIT Delhi
Assistant Professor
Research Areas: inorganic Chemistry; Crystallography; Metal Chalcogenides and Intermetallics

Ashutosh Kumar Mishra
Ph.D – IIT Kanpur
Assistant Professor
Research Areas: Bioorganic Chemistry

Venkata Rao Kotagiri
Ph.D – JNCASR, Bangalore
Assistant Professor
Research Areas: Functional Organic Materials; Supramolecular Chemistry; Organic Semiconductors

Publications
(in peer reviewed journals)

D. MaityKolay, P. Ghosal, M. Deepa, Selenium nanoparticles decorated silicon nanowires with enhanced liquid junction photoelectrochemical solar cell performance, *The Journal of Physical Chemistry C*, 123, 2019, 8614-8622.

M. Ojha, M. Deepa, Molybdenum selenide nanotubes decorated carbon net for a high performance supercapacitor, *Chemical Engineering Journal*, 368, 2019, 772-783

S. Deshagani, X. Liu, B. Wu, M. Deepa, Nickel cobaltite@poly(3,4-ethylenedioxypyrrole) and carbon nanofiber interlayer based flexible supercapacitors, Nanoscale, 11, 2019, 2742-2756.

A. Kolay, N.T.Z. Potts, K. Sardar, E.A. Gibson, M. Deepa, A dual-function photoelectrochemical solar cell which assimilates light-harvesting, charge-transport and photoelectrochromic nanomaterials in a tandem design, Sustainable Energy & Fuels, 3, 2019, 514-528.

R. Mukkabla, Kuldeep K. Krushnamurty, S. M. Shivaprasad, M. Deepa, Metal oxide interlayer in a long-lived lithium-selenium batteries, *Chemistry A European Journal*, 24, 2018, 17327-17338.

R. Mukkabla, Kuldeep, M. Deepa, Poly(carbazole) Coated selenium@conical carbon nanofibers hybrid for lithium-selenium batteries with enhanced lifespan, ACS Applied Energy Materials, 1, 2018, 6964-6976.

A. Das, S. Deshagani, R. Kumar, M. Deepa, Bifunctional photo-supercapacitor with a new architecture converts and stores solar energy as charge, ACS Applied Materials & Interfaces, 10, 2018, 35932-35945.

S. Deshagani, K. Krushnamurty, M. Deepa, High energy density, robust and economical supercapacitor with poly(3,4-ethylenedioxythiophene)-CO_2 activated rice husk derived carbon hybrid electrodes, Materials Today Energy, 9, 2018, 137-153.

Karu Ramesh, Basuli Suchand, and G. Satyanarayana, Microwave Assisted Domino [Pd] Catalysis in Water: A Diversified Synthesis of 3,3'-Disubstituted Heterocyclic Compounds: *Eur. J. Org. Chem.* 2018, 2171.

Basuli Suchand and G. Satyanarayana, Palladium-Catalyzed Acylations: A One-Pot Diversified Synthesis of Phthalazines, Phthalazinones and Benzoxazinones: *Eur. J. Org. Chem,* 2018, 2233.

Chinnabattigalla Sreenivasulu and G. Satyanarayana, Zinc Chloride Promoted Domino Reaction of Phenols with Terminal Alkynes under Solvent Free Conditions: An Efficient Synthesis of Chromenes: *Eur. J. Org. Chem.*, 2018, 2846.

B. Lakshminarayana, L. Mahendar, J. Chakraborthy, G. Satyanarayana, and Ch. Subrahmanyam, Organic transformations catalyzed by palladium nanoparticles on carbon nanomaterials: *J. Chem. Sci.* 2018, https://doi.org/10.1007/s12039-018-1449-9

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. Druges, 2018, 91, 1133.

Karu Ramesh and G. Satyanarayana, An Approach to One-Pot Regioselective Synthesis of Indenones through Palladium-Catalyzed Annulation in Water: *Eur. J. Org. Chem*. 2018, 4135.

B. Lakshminarayana, L. Mahendar, J. Chakraborthy, G. Satyanarayana and Ch. Subrahmanyam, Recyclable Pd/$CuFe_2O_4$ nanowires: a highly active catalyst for C–C couplings and synthesis of benzofuran derivatives: RSC Adv., 8, 2018, 21030.

Devarapalli Ravi Kumar, G. Satyanarayana, Palladium Catalysis: One-Pot Synthesis of Fluorenones: ChemistrySelect 2018, 3, 7867.

Devarapalli Ravi Kumar, Dakoju Ravi Kishore, G. Satyanarayana, Palladium-Catalysed Coupling and Acid-Mediated Cyclisation: Synthesis of Fluorenones and Fluorenes: SynOpen, 2018, 2, 268.

Bhairi Lakshminarayana, Gedu Satyanarayana, and Challapalli Subrahmanyam, Bimetallic Pd–Au/TiO_2 Nanoparticles: An Efficient and Sustainable Heterogeneous Catalyst for Rapid Catalytic Hydrogen Transfer Reduction of Nitroarenes: ACS Omega 2018, 3, 13065-13072.

Basuli Suchand and G. Satyanarayana, Palladium-Catalyzed Direct Acylation: One-Pot Relay Synthesis of Anthraquinones: Synthesis, 2019, 51, 769-779.

Ramesh Karupnaswamy and Ganesan Prabusankar, Three Atropisomers of Biphenyl: Twist by Tunable Para Substituents, *Journal of Chemical Sciences*, 130(7), 2018, 1-7.

Sathyanarayana Arruri, Nakamura Shin-ya, Hisano Kyohei, Tsutsumi Osamu, Srinivas Katam and Ganesan Prabusankar, Controlling the solid-state luminescence of gold(I) N-heterocyclic carbene complexes through changes in the structure of molecular aggregates, Science China Chemistry, 61(8), 2018, 957-965.

Muthukumaran Nirmala, Mannem Adinarayana, Karupnaswamy Ramesh, Mannarsamy Maruthupandi, Moulali Vaddamanu, Gembali Raju, Ganesan Prabusankar, Water-soluble Superbulky (p-cymene) Ruthenium(II) Amine: Active Catalyst in Oxidative Homocoupling of Arylboronic Acids and Hydration of Organonitriles, *New Journal of Chemistry*, 42, 2018, 15221-15230.

Katam Srinivas and Ganesan Prabusankar, Role of C, S, Se and P Donor Ligands in Copper(I) Mediated C-N and C-Si Bond Formation Reactions, RSC Advances, 8, 2018, 32269-32282.

Nirmala Muthukumaran, Arruri Sathyanarayana, Moulali Vaddamanu, Karupnaswamy Ramesh, Mannarsamy Maruthupandi, Mannaem Adinarayana, and Ganesan Prabusankar, Highly Active Homoleptic Nickel(II) Bis-N-heterocyclic Carbene Catalyst for Suzuki-Miyaura and Heck Cross-coupling Reactions, Polyhedron, 158, 2018, 125-134.

Nirmala Muthukumaran, Kavitha Velappan, Kritika Gour and Ganesan Prabusankar, N-Heterocyclic Carbene Supported Halosilylenes: New Frontiers in an Emerging Field, Coordination Chemistry Review, 377, 2018, 1-43

Ganesan Prabusankar, Adinarayana Mannem, and Nirmala Muthukumaran, Anionic Bismuth(III) Chloride Cluster with Diselenide Countercations: Application in C-S Cross Coupling Reactions, *Journal of Organometallic Chemistry*, 884, 2019, 29-35.

Ganesan Prabusankar, Nirmala Muthukumaran, Moulali Vaddamanu, Gembali Raju, Kavitha Velappan, Arruri Sathyanarayana, Yamane Masaya, Shohei Sugiyama, Kyohei Hisano, and Osamu Tsutsumi Blue Emitting Acridine Tagged Silver(I)-bis-N-heterocyclic Carbene, RSC Advances, 9, 2019,7543-7550.

Yuki Kuroda, Shin-ya Nakamura, Katam Srinivas, Arruri Sathyanarayana, Ganesan Prabusankar, Kyohei Hisano and Osamu Tsutsumi.,Thermochemically Stable Liquid-Crystalline Gold(I) Complexes Showing Enhanced Room Temperature Phosphorescence, Crystals. 9(5), 2019, 227.

A. Harinath, J. Bhattacharjee, and T. K. Panda, Facile Reduction of Carboxylic Acids to Primary Alcohols under Metal-free and Solvent-free Conditions, Chemical Communications, 55, 2019, 1386-1389.

A. Harinath, J. Bhattacharjee, and T. K. Panda, Catalytic Hydroboration of Organic Nitriles Promoted by Aluminum Complex, Advanced Synthesis & Catalysis, 361, 2018, 850-857.

K. Naktode, S. Das, H. P. Nayek, and T. K. Panda, Reactivity of Titanium Imidazolin-2-iminato Complexes with 2, 6-Diisopropylaniline and 2-{(2,6-Diisopropylphenyl)-iminomethyl} Pyrrole, *Journal of Coordination Chemistry*, 71, 2018, 4148-4163.

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A. Harinath, J. Bhattcharjee, K. R. Gorantla, B. S. Mallik, and T. K. Panda, Hydroboration, Cyanosilylation, and Sequential Cyanosilylation-Hydroboration of Carbonyl Compounds using Ti(IV) Amido Complex as an Efficient Catalyst, *Eur. J. Org. Chem,* 2018, 3180 -3192.

S. Sengupta, B. N. Mongal, S. Das, T. K. Panda, T. K. Mandal, M. Fleck, S. K. Chattopadhyay, S. Naskar, Mn(III) and Cu(II) complexes of 1-((3-(dimethylamino)propylimino)methyl) naphthalen-2-ol): Synthesis, Characterization, Catecholase and Phenoxazinone synthase activity and DFT-TDDFT study, *J. Coord. Chem.,* 71, 2018, 1214-1233

Arumugavel Murugan, Koteswar Rao Gorantla, Bhabani S. Mallik, Duddu S. Sharada, Iron Promoted C3-H Nitration of 2H-Indazole: Direct access to 3- Nitro-2H-Indazoles. Org. Biomol. Chem., 16, 2018, 5113-5118.

Sagar Arepally, Venkata Nagarjuna Babu, Ashok Polu, Duddu S. Sharada, PIDA/TBAB-Promoted Oxidative Geminal Dibromofunctionalization of Alkynes: Direct Synthesis of Geminal Diazides, Eur. *J. Org. Chem.,* 2018, 41, 5700-5705.

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Sagar Arepally, Arumugavel Murugan, Narenderreddy Katta, Mamata Ojha, Duddu, S. Sharada, Visible light-Catalyzed Photoredox C-C Triple Bond Oxidative Cleavage via Hydroamination; Direct Oxamates Synthesis from Amines and Activated Alkynes, 2018, 10.26434/chemrxiv.7322402.

Manickam Bakthadoss, Srinivasan Jayakumar, Selavakumar Raman, Anthonisamy Devaraj, and Duddu, S. Sharada, A Novel Multicomponent Quadruple/Double Quadruple Domino Reaction: Highly Efficient Synthesis of Polyheterocyclic Architectures Org. Biomol. Chem., 2019, 17, 3884-3893.

Sagar Arepally, Narenderreddy Katta, Ajoy Chamuah, Duddu, S. Sharada*. Stereoselective Aminoiodination of Activated Alkynes with Organoiodine(III) Reagents and Amines via Multiple-Site Functionalization: Access to Iodinated Enamines and N-Aryl Indoles, *Eur. J. Org. Chem.,* 7, 2019, 1542-1547

Srilaxmi M. Patel, Harika Ch. Sonali Biswal, Sonika Sharma and Duddu, S. Sharada, Copper-Catalyzed Intramolecular -C H Amination via Ring-Opening Cyclization Strategy to Quinazolin-4-ones: Development and Application in Rutaecarpine Synthesis Synthesis, 2019 10.1055/s-0037-1611575.

J. Foehlinger, S. Maji, A. Brown, E. Mijangos, S. Ott and L. Hammarstrom, Self-Quenching and Slow Hole Injection May Limit the Efficiency in NiO-Based Dye Sensi tized Solar Cells, *J. Phys. Chem. C.* 1 22, 2018, 13902-13910.

S. Pullen, S. Maji, M. Stein, and S. Ott, Restricted rotation of an $Fe(CO)_2(PL_3)$ - subunit in [FeFe] - hydrogenase active site mimics by intramol ec ular ligation, Dalt on Transactions, 48, 2019, 5933-5939.

R. Knochenmuss, S. M aity, F. Balmer, C.

Muller, and S. Leu tw yler, Intermolecular dissociation energ ie s of 1-naphthol·n-alkane complexes, *J. Chem. Phys.*, 149, 2018, 034306.

Adel Mesbah, Jai Prakash, Sébastien Lebègue, Jessica C. Beard, Christos D. Malliakas, James A. Ibers, $Ag_5U(PS_4)_3$: A Transition-Metal Actinide Phosphochalcogenide, Inorganic Chemistry, 58, 2019, 535.

Adel Mesbah, Jai Prakash, Jessica C. Beard, Christos D. Malliakas, Sébastien Lebègue, James A. Ibers, Syntheses, Modulated Crystal Structures of $Ba_{6-2x}U_{2+x}Ag_4Se_{12}$ (x = 0 and 0.5), and Crystal Structure and Spectroscopy of $Sr_4Th_3Cu_4S_{12}$, *Journal of Solid State Chemistry*, 268, 2018, 30.

Adel Mesbah, Jai Prakash, Jessica Beard, Sébastien Lebègue, James A. Ibers, Synthesis and Crystal Structure of $Cs_2U_2(P_2Se_9)(Se_2)_2$, Zeitschrift für anorganische und allgemeine Chemie, 644, 2018, 1480.

Adel Mesbah, Jai Prakash, Jessica Beard, Christos D. Malliakas, James A. Ibers, $K(Th_{0.75}Sr_{0.25})_2Se_6$: Structure Change Resulting from Disorder of Differently Charged Cations, Inorganic Chemistry, 57, 2018, 7877.

Funded Research Projects 2018-19

D. S. Sharada, *Metal-Free Direct Oxidative Cyclizations via C-H Functionalization Leading to Diverse Heterocyclic Frameworks*, CSIR, 2018-2021, 30.21 Lakhs.

Venkata Rao Kotagiri, *Self-organization of linearly fused polycyclic heteroaromatic compounds into ordered functional materials via 'hydrophobic amphiphilic' approach: Rational design, synthesis, and utilization for optoelectronics, energy storage, and conversion*', Early Career Research Award, SERB, 8 February 2019, 35.31 Lakhs.

Tarun K Panda, *Developing a Diatom Algae-based Biological Treatment System for Simultaneous Removal of Organic Carbon, Nutrient, and Micropollutants from Domestic Wastewater: Pilot-scale Demonstration, (as Co-PI)*, IMPRINT2, SERB, 26 February 2019, 60.93 Lakhs.

Talks Given in National / International Conferences

NG. Satyanarayana, *Transition Metal Catalysis: Concise One-pot Synthesis of Carbo-/Hetero-cyclic Products, Emerging Trends in Chemical Sciences*, Department of Chemistry, Christ University, Bangalore, Karnataka.

G. Satyanarayana, *Mass Spectrometry, Chemistry for Sustainable Future*, Palamuru University, Mahabubnagar, Telangana.

M. Deepa, *Energy Saving and Harvesting Photoelectrochromic Devices with Tungsten Oxide Hybrid or Molybdenum Oxide Films*, Asia-Pacific Conference on Energy Storage and Conversion (APEnergy 2018) Nanyang Technical University, Singapore, 18-20 July 2018.

Surajit Maity, *Advanced Spectroscopic Methods in Materials Chemistry, Frontiers in Materials Chemistry*, University of Hyderabad, 14 September 2018.

Ganesan Prabu Sankar, *Discrete Metal Chalcogenones and their Catalytic Applications*, international symposium on Main-group Molecules to Materials (MMM, IISc Bangalore, 28-31 October 2018.

Tarun K. Panda, *Role of Alkali and Alkaline Earth metal Complexes for Catalytic Functionalization of Small Molecules and ROP of Cyclic Ester*, 1st International Symposium on Main-group Molecules to Materials (MMM), IISC Bangalore, India, 28-31 October 2018.

Duddu S. Sharada and Venkata Nagarjuna Babu, *PIDA/TBAB-Promoted Oxidative Geminal Dibromofunctionalization of Alkynes: Direct Synthesis of Geminal Diazides*, XIV J-NOST Conference on Organic Chemistry, CSIR-IICT Hyderabad, India 28 November -1 December 2018.

Duddu S. Sharada, *Trends in Asymmetric Synthesis, Faculty Development Programme (FDP) in Chemistry*, Department of Chemistry, Osmania University, Hyderabad, India, 13-18 December 2018.

Duddu S. Sharada, *Bioinspired Sustainable Chemistry: Access to New Chemical Space*, International Conference On Frontiers at the Chemistry-Allied Sciences Interface,

Department of Chemistry, University of Rajasthan, Jaipur, India, 21-22 December 2018.

Duddu S. Sharada, *Organohypervalent Iodine Compounds as Synthons & Reagents: Access to New Chemical Space Through Functionalization Chemistry*, Organic Molecules as Synthons and Reagents for Innovations Conference on Organic Chemistry, Indian Institute of Technology Roorkee, India 7-9 February 2019.

Tarun K. Panda, *Early Transition Metal Complex as Efficient Catalysts for Functionalization of Small Molecules*, International Conference on Structural and Inorganic Chemistry (ICSIC)-II, IISER Pune, India, 18-19 March 2019.

Duddu S. Sharada, *The Journey of Hypervalent Iodine Chemistry: From Reagents to Valuable Synthons,* invited Lecture on Current Issues and Challenges in Chemical Research, Organized by Department of Chemistry, Kakatiya University, Warangal, India 18-19 March 2019.

Seminars Conducted

Prof. R. Graham Cooks, Department of Chemistry, Purdue University, West Lafayette, Indiana US, Organic Synthesis and Chemical Analysis by Mass Spectrometry, 12 December 2018.

Prof. Michael Gozin, Ph.D. School of Chemistry, Faculty of Exact Science, Tel Aviv University, Israel, Development of Promoters for Hypergolic Reactions, 1 February 2019.

Prof. David Scheschkewitz, General and Inorganic Chemistry, Saarland University, Germany, Unsaturated Maingroup Species: Beyond the Carbon Copy, 15 February 2019.

Prof. Sambasivarao Kotha, Pramod Chaudhari Chair Professor, Indian Institute of Technology Bombay, Development of new synthetic strategies and tactics: Their impact, implications and applications, 28 March 2019.

Prof. S. Baskaran, Institute Chair Professor, Indian Institute of Technology Madras, Reversal of Polarity by SET Oxidation: Novel Synthesis of Heterocyclic Ring Systems, 28 March 2019.

Prof. Janine Cossy, Director of the Organic Chemistry Laboratory, ESPCI Paris, France, Transition Metal Catalysts: Construction And Functionalization Of Heterocycles, 14 December 2018.

Workshops / Symposiums

In-House Symposium 2018 at the Department of Chemistry, IIT Hyderabad (IHS2019), 30 March 2019.

The Workshop on Light Emitting Gold Molecules and Nano Materials 2019 (LEGNM19), 8 March 2019.

Awards / Recognitions

Ramesh K Kokal (PhD student), Awarded the DST-IUSSTF-BASE Student Internship during Apr-Sep 2018, and worked with Dr Farnum at Auburn University, USA.

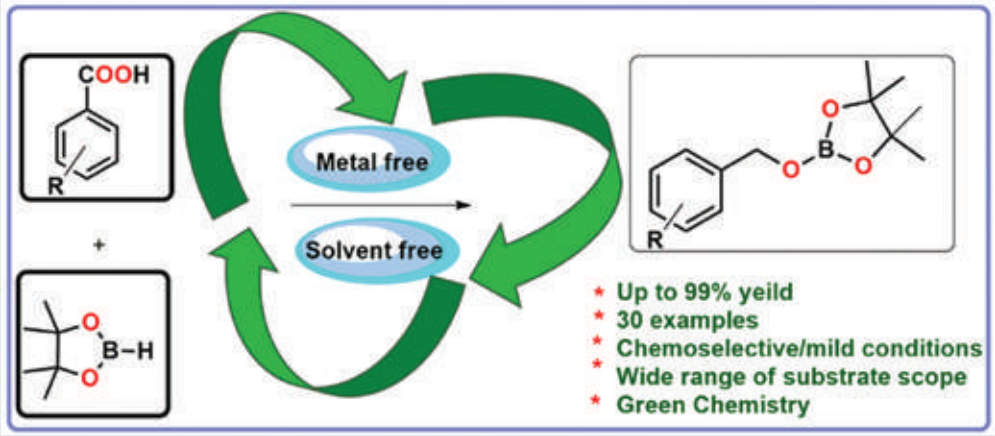
The Best Poster Award in National Symposium on Materials in Healthcare, 6-8 September 2018, GITAM, Hyderabad, India

Indrani Banerjee is (PhD student under Prof. Tarun K. Panda research group) Awarded with best poster in Frontiers in Chemical Sciences (FICS – 2018), IIT Guwahati, 2018

RESEARCH

HIGHLIGHT

Research Group of Dr. Tarun K. Panda: We demonstrate the development of a facile protocol for the deoxygenative hydroboration of aliphatic and aryl carboxylic acids to afford corresponding primary alcohols under solvent-free and catalyst-free conditions. The reaction proceeds under ambient temperature exhibits good tolerance towards various functional groups and generates quantitative yields. The plausible mechanism involves the formation of Lewis acid–base adducts as well as the liberation of hydrogen gas.



CIVIL ENGINEERING

Civil Engineering department has graduated 4 PhD Students, 21 M.Tech students, 9 All Course M.Tech Students, and 22 B.Tech students in the FY 18-19. Dr. Shashidhar T has been appointed as Associate Editor of Journal of Hazardous, toxic and radioactive waste, ASCE. Prof. Sireesh S has been appointed as Editorial Board Member, Indian Geotechnical Journal. Dr. Shashidhar T has been appointed as members of Board of Studies at JNTU Hyderabad and NIT Warangal. Dr. Umashankar B has been appointed as member of Board of Studies at JNTU Hyderabad. Dr. Pritha C has been appointed as Associate Editor of Journal of Hazardous, toxic and radioactive waste, ASCE. In addition, the department received Rs. 4.70 Crores as research funding through various new projects, funded by Defence Research and Development Organisation (DRDO), Impacting Research, Innovation and Technology (IMPRINT)-2, Science and Engineering Research Board (SERB), Asia-Pacific Network for Global Change Research, Scheme for Promotion of Academic and Research Collaboration (SPARC), Department of Science and Technology, Ministry of Earth Sciences (MoES) and Inter-University Centre for Astronomy and Astrophysics (IUCAA). Dr. Shashidhar T has been appointed as a CFE Committee member of Telangana State Pollution Control Board and an expert member of Amaravathi Capital City Development.

FACULTY

Shashidhar
Ph.D – IIT Madras
Associate Professor & HoD
Research Areas: Bioremediation; Contaminant Hydrology; Hydraulic Transients; Hydroclimate; Hazardous Waste Management, Wastewater treatment; Remote sensing and GIS applications

Asif Qureshi
Ph.D – Swiss Federal Institute of Technology, Switzerland
Associate Professor
Research Areas: Environmental Science and Public Health

K.B.V.N. Phanindra
Ph.D – New Mexico State University, USA
Associate Professor
Research Areas: Groundwater Modeling; Soil-Water-Plant Interactions; Remote Sensing & GIS, Eco-Hydrological Processes

K.V.L. Subramaniam
Ph.D – Northwestern University, USA
Professor
Research Areas: Concrete Material and Structures; Structural Health Monitoring; Material Characterization

B. Munwar Basha
Ph.D – IISc Bangalore
Associate 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
Associate Professor
Research Areas: Water & Wastewater Treatment; Solid Waste Management; Renewable Energy (Biofuel)

S. Sireesh
Ph.D – IISc Bangalore
Professor
Research Areas: Pavement Geotechnics; Geosynthetics; Recycled Materials; Ground Improvement

Mahendrakumar Madhavan
Ph.D – University of Alabama - Birmingham, USA
Associate Professor
Research Areas: Affordable Housing; Sustainable Materials; Cold-formed Steel; Structural Steel Design; Cold-Formed Steel Wall Panels; CFRP Retrofitting of Steel Structures; Cold-formed Steel (CFS) Connections; Composite (steel-concrete) Construction

Amirtham Rajagopal
Ph.D – IIT Madras
Associate Professor
Research Areas: Damage Mechanics; Fracture Mechanics; Finite Element and Mesh Free Methods

B Umashankar
Ph.D – Purdue University, USA
Associate Professor
Research Areas: Foundation Engineering; Reinforced Soil; Soil-Structure Interaction; Recyclable Materials in Geotechnics

FACULTY

S. Suriya Prakash
Ph.D – Missori University of Science & Technology - Rolla, USA
Associate Professor
Research Areas: Precast Systems; Prestressed Concrete; Structural Concrete Behavior; Structural Strengthening

Pritha Chatterjee
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Sivaganesh Selvaraj and Mahendrakumar Madhavan, Cold-Formed Steel Built of columns: Experimental Investigation, *9th International Conference on Advances in Steel Structures (ICASS), Hong Kong, l, 553-560, 168, 5-7 December 201810.18057/ICASS2018.P.168.*

Sivaganesh Selvaraj, Mahendrakumar Madhavan, and Gaurav Chobe, Design approach for steel channels retrofitted with Cold formed steel, *International Conference on Engineering Research and Practice for Steel Construction, Hong Kong, 5-7 September 2018, 691-701.*

Sivaganesh Selvaraj and Mahendrakumar Madhavan, Design methods for metallic beams strengthened with low modulus carbon fiber reinforced polymers, *International Conference on Engineering Research and Practice for Steel Construction, Hong Kong, 5-7 September 2018, 411-423.*

Sivaganesh Selvaraj and Mahendrakumar Madhavan, Behavior of Cold-Formed Steel Built-Up Beams: Experimental Investigation, *8th International Conference on Thin-Walled Structures (ICTWS), Lisbon, Portugal, 175, 24-27 July 2018.*

Sivaganesh Selvaraj and Mahendrakumar Madhavan, Effect of Gypsum Sheathings on Cold-Formed Steel Panels: Flexural Test Results, *8th International Conference on Thin-Walled Structures (ICTWS), Lisbon, Portugal, 60, 24-27 July 2018.*

M. Chellapandian and S.S. Prakash, 'Behavior of FRP strengthened reinforced concrete columns under pure compression – Experimental and numerical studies'. Recent Advances in Structural Engineering: *Select Proceedings of SEC 2016, Springer, Singapore, 2, 2019, 663-673, 10.1007/978-981-13-0365-4_56,*

M. Chellapandian, S. Jain, and S.S. Prakash, Rapid repair of Pre-damaged RC square columns using hybrid FRP strengthening under axial compression, *3rd R.N. Raikar Memorial International Conference: Gettu-Kodur International Symposium, ACI (India Chapter), Mumbai, India, 1, 2018, 431-436.*

M. Chellapandian and S.S. Prakash, Axial compression – bending interaction behavior of severely damaged RC columns repaired using Hybrid FRP composites, *Structural Engineering Convention (SEC-2018), Kolkata, India.*

A. Mani, M. Chellapandian, and S.S. Prakash, Effect of synthetic fiber reinforcement on flexural behaviour of GFRP reinforced beams, *Structural Engineering Convention (SEC-2018), Kolkata, India.*

M. Chellapandian, S.S. Prakash, and A. Sharma, Axial compression - bending interaction behavior of Hybrid FRP strengthened RC column elements, *9th International Conference on FRP Composites in Civil Engineering (CICE 2018), Paris, France, 1, 492-499.*

H.K. Chinthapalli, A. Agarwal, Study of Fire Resistance of RC Columns with Varying Shear Reinforcement, *Structures in Fire Conference 2018, Belfast, UK.*

M.C. Raghucharan and S.N. Somala, Generating Site-Specific Ground Motions for Delhi Region for Seismic Vulnerability Assessment of Buildings – Promoting

Disaster Resilient Communities, 290-299, *ASCE India Conference 2017, New Delhi, India, 12–14 December 2017 10.1061/9780784482032.030*.

M.C. Raghucharan, S.N. Somala, and G.V. Kishor, Synthetic ground motions for Mw6.5 hypothetical earthquake and comparison of structural response with combination rules of IS1893-Part 1, *16th Symposium on Earthquake Engineering (16SEE), Roorkee, December 2018*.

D. Chandrasekharam, K. Bankher, and P. Ranjith, High heat generating granites of Saudi Arabian shield: Prospect for CO_2 emissions reduction and climate mitigation, 289-299, Deep Rock Mechanics: From Research to Engineering (eds) Xie Z and P Ranjith, Taylor & Francis Group, London, 2019978-1-138-48761-1289.

Funded Research Projects 2018-19

Digvijay S. Pawar, *Subtract Uneasy and Dangerous Scene Related Traffic Accident and Congestion in Asia*, Toyota ITC, 20 September 2018, 19.00 Lakhs.

Digvijay S. Pawar, *Evaluation of Road Traffic Accident data and assessment of potential for ITS VsX Safety Applications in India*, Toyota ITC, 15 November 2018, 13.00 Lakhs.

Seetha N., *Upscaling nanoparticle transport in porous media in the presence of biofilm, Water Innovation Center: Technology, Research and Education*, IIT Bombay, DST, 5 December 2018, 25,00 Lakhs.

Surendra Nadh Somala, *IUCAA (2018) Seismic studies for LIGO-India site to reduce low frequency noise*, 17 December 2018, 30.00 Lakhs.

Amirtham Rajagopal, *Nonlocal approach to modeling damage in quasi brittle materials*, DRDO, 6 January 2019, 30.59 Lakhs.

S. Suriya Prakash, *Development of Innovative and Sustainable Low-Cost Lightweight Precast Hollow Core Structural (LWPHCS) Systems for Affordable Housing*, IMPRINT-MHRD, 21 January 2019, 70.00 Lakhs.

Satish Regonda, *Urban Flood Modeling - A Web-based decision tool, Climate Change Programme, (a collaborative project with IIT Bhubaneswar, India)*, DST, SPLICE, February 2019, 35.03 Lakhs.

Surendra Nadh Somala, *Collision Tectonics and Seismicity in Alpine-Himalayan belt: A comparative study between the Great Caucasus (Russia) and the Himalaya (India)*, DST-RFBR, 7 February 2019, 27.46 Lakhs.

Debraj Bhattacharyya, *Developing a Diatom Algae-based Biological Treatment System for Simultaneous Removal of Organic Carbon, Nutrient, and Micropollutants from Domestic Wastewater: Pilot-scale Demonstration*, IMPRINT-2, MHRD, 26 February 2019, 60.93 Lakhs.

S. Suriya Prakash, *Teachers Associateship for Research Excellence (TARE)*, SERB, 27 February 2019, 18.30 Lkahs.

Digvijay S. Pawar, *Modeling driver behaviour profiles using naturalistic driving data for road safety analysis*, DST SERB, 12 March 2019, 27.00 Lakhs.

S. Suriya Prakash, *Smart Hybrid Fiber Reinforced Polymer Composite Strengthening System for Civil Infrastructure, Collaboration with University of Stuttgart, Germany*, SPARC-MHRD, 15 March 2019, 71.00 Lakhs.

Satish Regonda, *Understanding space-time variability of climate extremes for societal resiliency in Indonesia and India, Asia-Pacific Network for Global Change Research (APN)*, USD 72000 (2-years), Role: Co-PI, IITH component is USD 28035-00, January 2019, This is a collaborative project with Jenderal Soedirman University,Purwokerto, Indonesia, and University of Colorado at Boulder, USA.

Satish Regonda, *An Experimental Operational Hydrologic Modeling and Forecasting System for River Basin Hydrology and Extremes for India, Monsoon Mission of Indian Institute of Tropical Meteorology (IITM)*, Earth System Sciences Organization (ESSO) (a collaborative project with University of Colorado at Boulder, USA and IIT Gandhinagar, India), 23.26 Lakhs.

Talks Given in National / International Conferences

Shashidhar, Two week Faculty Development Programme (FDP) on Applications of

Geomatics for Disaster Management (AGDM-2017), Centre for Water Resources, Institute of Science and Technology, JNTU Hyderabad, Kukatpally Hyderabad, 13-25 November 2017.

Shashidhar, Workshop on Water Quality Models at Gurunanak Engineering College, Bidar, Karnataka, 9 March 2019.

S. Sireesh, Performance of a Low Calcium Fly ash-Geopolymer Stabilized RAP Bases, International Symposium on Geotechnics of Transportation Infrastructure, ISGTI-2018, New Delhi, 7-8 April 2018.

Devi Priyanka Darisi, Beeram Ajay Reddy, and Sireesh Saride, Effect of gradation on the dynamic response of sands, International conference on Sustainable Civil Infrastructures: (GeoMEast), Cairo, Egypt, 24-28 November 2018.

Maheshbabu Jallu and Sireesh Saride, Evaluation of Strength and Resilient Modulus Characteristics of Fly Ash Geopolymer Stabilized Reclaimed Asphalt Pavement Material, International conference on Sustainable Civil Infrastructures: (GeoMEast), Cairo, Egypt, 24-28 November 2018.

V. Vinay Kumar and Sireesh Saride, Flexural and Shear Characterization of Geosynthetic Reinforced Asphalt Overlays, International conference on Sustainable Civil Infrastructures: (GeoMEast), Cairo, Egypt, 24-28 November 2018.

P.R.T. Peddinti, B.M. Basha, and S. Saride, Evaluation of flexible pavement distress using non-linear regression analysis, International symposium on Geotechnics of transportation infrastructure 2018 (ISGTI 2018), IIT Delhi, India.

V. Vinay Kumar and Sireesh Saride, Influence of crack depth on the performance of geosynthetic reinforced asphalt overlays, Proceedings of International symposium on Geotechnics of transportation infrastructure 2018 (ISGTI 2018), IIT Delhi, India.

B. Umashankar, Sustainable Materials in Geotechnics. Symposium on Sustainable Construction Materials and Techniques, Sreenidhi Institute of Science and Technology, Ghatkesar, Hyderabad, 29-30 June 2018.

B. Umashankar, Foundation Design of Critical Barrage Structures, Industrial Lecture, IIT Tirupathi, India, 9 November 2018.

M.P. Gundupalli, N. Senthilkumar, and D. Bhattacharyya, RSM Based Modelling for Mineral and Organic Acid Pretreatment of Coconut Pith using High Pressure Batch Reactor (HPBR), 7th International Conference on Renewable Energy Research and Applications (ICRERA), Paris, 14-17 October 2018.

M. Damaraju, D. Bhattacharyya, T.K. Panda, and K.K. Kurilla, Application of a Continuous Bipolar Mode Electrocoagulation (CBME) system for polishing distillery wastewater, International Conference on Green Energy and Environment Engineering (CGEEE 2018), Kitahiroshima, Japan, 27-29 August 2018.

M.P. Gundupalli, N. Senthilkumar, and D. Bhattacharyya, Process Optimization for Recovery of Reducing Sugar from Coconut Pith Using Sequential Hydrothermal Pretreatment and Enzymatic Saccharification, International Conference on Green Energy and Environment Engineering (CGEEE 2018), Kitahiroshima, Japan, 27-29 August 2018.

K. Katam, T. Shimizu, D. Bhattacharyya, and S. Soda, Removal of Linear Alkyl-benzene Sulphonate and Caffeine from Domestic Wastewater in Trickling Filters Using Algal-bacterial Consortia. International Conference on Green Energy and Environment Engineering, Kitahiroshima, Japan, 27-29 August 2018.

Mahendrakumar Madhavan, Cold-Formed Steel Built of columns: Experimental Investigation, 9th International Conference on Advances in Steel Structures (ICASS), Hong Kong, 5-7 December 2018.

Mahendrakumar Madhavan, Design approach for steel channels retrofitted with Cold formed steel, International Conference on Engineering Research and Practice for Steel Construction, Hong Kong, 5-7 September 2018.

Mahendrakumar Madhavan, Design methods for metallic beams strengthened with low modulus carbon fiber reinforced polymers, International Conference on Engineering Research and Practice for Steel Construction, Hong Kong, 5-7 September 2018.

Mahendrakumar Madhavan, Behavior of Cold-Formed Steel Built-Up Beams: Experimental Investigation, 8th International Conference on Thin-Walled Structures (ICTWS), Lisbon, Portugal, 24-27 July 2018.

Mahendrakumar Madhavan, Effect of Gypsum Sheathings on Cold-Formed Steel Panels: Flexural Test Results, Proceedings of the Eighth International Conference on Thin-Walled Structures (ICTWS), Lisbon, Portugal, 60, 24-27 July 2018.

S. Jain, M. Chellapandian, and S.S. Prakash, Pure compression behavior of Hybrid FRP composite strengthened RC columns after severe damage, 9th International Conference on FRP Composites in Civil Engineering (CICE 2018), Paris, France, 2, 2018, 453-459.

M. Chellapandian, S.S. Prakash, A. Sharma, Numerical Modeling of Hybrid FRP Strengthened Short Columns under Eccentric Compression, National conference on Computing Applications in Civil Engineering, Aug 2018, Osmania University, Hyderabad, India, 2018.

Sharma and et al., Comparison between radar-, rain gauge- and satellite-based rainfall for the Hyderabad region, 3rd conference on India Radar Meteorology, IITM Pune, 2019.

R. Parla and S.N. Somala, Multi-modal response spectra due to sedimentary basins and their implications for hazard, 15th Annual Meeting Asia Oceania Geosciences Society (AOGS), SE22-35-A069, Honolulu, Hawaii, June 2018.

Seminars Conducted

Dr. Mitesh Surana, Seismic Fragility Analysis of Hill-Side Buildings, 6 April 2018.

Dr. Subhamoy Sen, Bayesian filtering based health monitoring techniques and input force reconstruction, 7 April 2018.

Dr. Deendayal Rathod, Analysis of laterally loaded piles in clayey soils with sloping ground, 9 April 2018.

Dr. Manabendra Saharia, Characterization and Forecasting of Floods, 9 April 2018.

Dr. Somenath Mondal, Investigations on Heat Migration in Soil Mass, 10 April 2018.

Dr. Janaki Ramaiah, Static and Dynamic Properties of Municipal Solid Waste for Stability Analysis of Open Dumps, 10 April 2018.

Prof. Balaji Rajagopalan, University of Colorado at Boulder, USA, A 10,000 Year Story of Equatorial Pacific Sea Surface Temperatures, Indian Summer Monsoon Climate and Civilizations, on Thursday, 14 June 2018.

Prof. Vikas Thakur, Rainfall induced landslide: Norwegian perspectives, 11 July 2018.

Prof. J.R. Kayal, Recent Large and Great Earthquakes in the Himalayas: A Review of the Tectonic Model, 27 July 2018.

Prof. Kirti Sahu, Different dynamics of micron to cm sized bubbles and droplets, 26 September 2018.

Dr. Nagaraja Rao Harshadeep (Harsh), World Bank, Washington DC, USA, A New World of Disruptive Technologies for HydroInformatics, 3 October 2018.

Y.K. Reddy, Scientist-F, India Meteorological Department (IMD) Hyderabad, Doppler Weather Radar - A sophisticated electronic gadget for meteorological and hydrological applications,15 October 2018.

Dr. Pandith Madhnure, Director, Telangana State Ground Water Department, Status of groundwater resources availability, its utilization and groundwater quality in the Telangana state, 25 October 2018.

Dr. Hridya Lal, Reduced Order Modelling of Stochastically Parametered Vibrating Fluid–Structure Interaction Systems, 28 January 2019.

Dr. Dipankana Bhattacherjee, Centrifuge and Numerical Model Studies on the Performance of Hybrid Geosynthetic Reinforced Slopes with Poorly Draining Soil Subjected to Rainfall, 23 January 2019.

Dr. Surender Singh, Can Flexible Pavements be converted to Rigid Pavements?, 28 January 2019.

Dr. Aniket Kataware, Investigation on Effectiveness of Warm Mix Asphalt Additives for Modified and Unmodified Asphalt Binders, 28 January 2019.

Dr. Shiju Josesh, Hydration and microstructural development of cementitious materials, 28 January 2019.

Dr. Souvik Chakraborty, Topology Optimization under Uncertainty, 28 January 2019.

Dr. Marisamynathan S, Modeling Pedestrian Crossing Behavior and Perceptions Based Safety Level at Signalized Intersections, 29 January 2019.

Prof. Ranjith Pathegama, Enhanced Geothermal Energy prospects in Australia: Field and laboratory observations, 29 January 2019.

Prof. Rao Y. Surampalli, Emerging Contaminants in the Environment, 8 February 2019.

Prof. Rao Y. Surampalli, Sustainable Infrastructure Management: Resource Recovery and Reuse in Landfills, 8 February 2019.

Madukhar Karnati PE, CFM, CPESC, EXP, Chicago, USA, Civil engineering in the U.S. - a perspective from a practicing civil engineer, 8 February 2019.

Madukhar Karnati, Civil engineering in the U.S. – a perspective from a practicing Civil Engineer, 8 February 2019.

Dr. Jothi Saravanan, Structural Health Monitoring of Intelligent Infrastructure, 11 March 2019.

Prof. S. Majid Hassanizadeh, Colloid transport in porous media under partially saturated conditions, 12 March 2019.

Mr. B.G.K. Murthy, Structures and Foundations: An Engineer's Six Decade Journey, 28 March 2019.

Workshops / Symposiums

Surge Analysis and Design of Surge Protection Systems 20-22 July 2018.

One day Workshop on Affordable Housing for all using sustainable constructional materials, 27 October 2018, https://sites.google.com/view/housingforall-iithyderabad

Recent Advances in Waste and Wastewater Engineering, Sponsored by Japan International Cooperation Agency, 3 March 2019.

Symposium on Challenges in Flow and Transport in Porous Media, IIT Hyderabad, 11 March 2019.

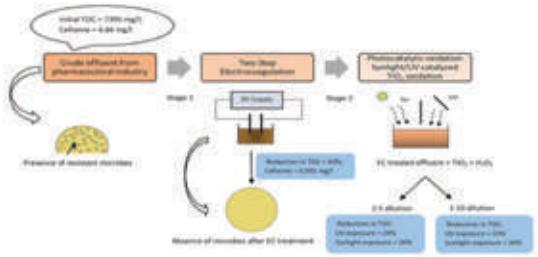
Two day Short course and Workshop on Cold-formed Steel Structures, 22-23 March 2019 https://sites.google.com/view/iithcfscourse

GeoApps 2019: National Conference on Geotechnical Engineering Applications, IIT Hyderabad, Kandi, Sangareddy, 30 March 2019.

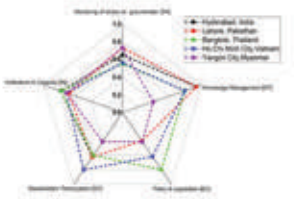
RESEARCH

HIGHLIGHT

Developed Non-biological treatment system for drug effluents to prevent microbial drug resistance in environment

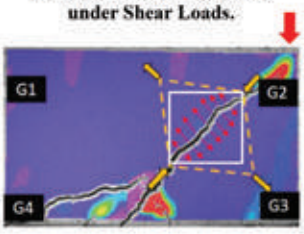


Developing Fuzzy based Groundwater Sustainability Index

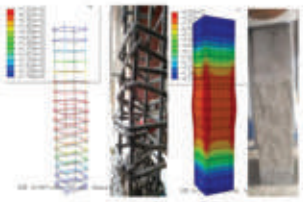


Fuzzy-based groundwater sustainability index (FGSI) values of Asian cities such as Hyderabad of India, Ho Chi Minh City of Vietnam, Bangkok of Thailand, Lahore of Pakistan, and Yangon city of Myanmar.

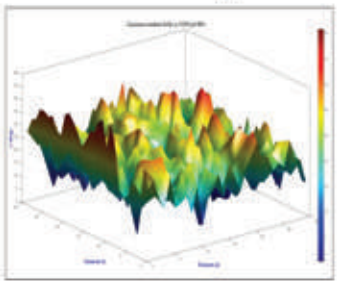
Analysis of Failure Crack Patterns and Strain Distributions in Steel Fiber Reinforced Prestressed Concrete Beams under Shear Loads.



The role of shear reinforcement in fire response of RC columns

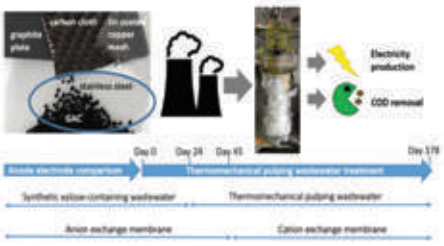


Reliability Analysis of Spatially variable MSW slopes



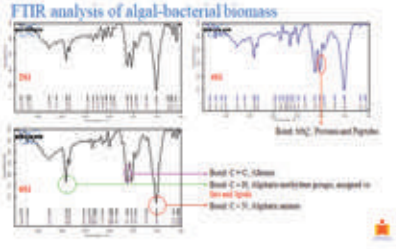
Smart Cities for Emerging Countries based on Sensing, Network and Big Data Analysis of Multimodal Regional Transport System

Bio electrochemical system



Design of Cold-formed Steel Built-up beam

FTIR analysis of algal-bacterial biomass



COMPUTER SCIENCE AND ENGINEERING

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-one faculty members, with expertise in various research areas including theoretical computer science, algorithms, graph theory, networking, distributed systems, compilers, formal methods, machine learning, architecture 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 MDS and EMDS programs for working professionals. 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, Honeywell, Redpine Signals, SRC and AMD. Faculty members of the CSE department published papers in top-tier venues e.g., IJCAI, ICML, STOC, CVPR, ICS and CP. The research papers of faculty members were covered by technical news websites such as Inside HPC, The Memory Guy and Storage Search. Individual accolades include C Krishna Mohan and Karteek Sreenivasaiah receiving Excellence in Teaching awards. Research submissions from CSE have won several awards and recognitions, in venues such as MaxSAT evaluations 2018, SVCOMP 2019, Honeywell AI and ML Hackathon, IDRBT Doctoral Colloquium 2018, SSS 2018 and ICDCN 2019. PhD students of the department were selected in IDRBT-IITH joint PhD program and IITH-Swinburne University of Technology (Australia) joint PhD program. The department hosted several events and visitors, including the Indoquant 2019 workshop as well as the IITH-RIKEN AI Workshop. The students and alumni of CSE have continued to excel, securing internships and graduate admissions at prestigious places.

FACULTY

M. V. Panduranga Rao
Ph.D – IISc Bangalore
Associate Professor & HoD
Research Areas: Applications of Formal Methods

Manohar Kaul
Ph.D – Aarhus University, Denmark
Assistant Professor
Research Areas: Applied Algebraic Topology; Topological Data Analysis; Machine Learning; Spatial Databases; Computational Geometry

Saurabh Joshi
Ph.D – IIT Kanpur
Assistant Professor
Research Areas: Formal Methods; Formal Verification; Constraint Programming; Software Verification; Program Analysis

Bheemarjuna Reddy Tamma
Ph.D – IIT Madras
Associate Professor
Research Areas: 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

Maunendra Sankar Desarkar
Ph.D – IIT Kharagpur
Assistant Professor
Research Areas: Machine Learning; Recommendation Systems; Information Retrieval; Social Network Analysis

Sparsh Mittal
Ph.D – Iowa State University, USA
Assistant professor
Research Areas: Computer Architecture; Architectures for Deep Learning; GPU; Accelerators for Machine Learning

J. Saketha Nath
Ph.D – IISc Bangalore
Associate Professor
Research Areas: Machine Learning

Rakesh Venkat
Ph.D – IIT Bombay
Assistant Professor
Research Areas: Approximation Algorithms; Complexity Theory

Subrahmanyam Kalyanasundaram
Ph.D – Georgia Tech, USA
Associate Professor
Research Areas: Theoretical Computer Science; Graph Algorithms

Kotaro Kataoka
Ph.D – Keio University, Japan
Visiting Associate Professor
Research Areas: Networks; Blockchain

Rogers Mathew
Ph.D – IISc Bangalore
Assistant Professor
Research Areas: Combinatorics; Graph Theory; Graph Algorithms

A. Antony Franklin
Ph.D – IIT Madras
Associate Professor
Research Areas: 5G; Cloud Radio Access Networks; SDN/NFV; Mobile Edge Computing

FACULTY

C. Krishna Mohan
Ph.D – IIT Madras
Professor
Research Areas: Video Content Analysis, Machine Learning

N.R. Aravind
Ph.D – Institute of Mathematical Sciences, Chennai
Associate Professor
Research Areas: Algorithms; Parameterized Complexity; Graph Theory; Combinatorics

Srijith P K
Ph.D – IISc Bangalore
Assistant Professor
Research Areas: Machine Learning; Bayesian Learning; Deep Learning; Bayesian Nonparametrics, Social Media and Text Analysis

Karteek Sreenivasaiah
Ph.D – The Institute of Mathematical Sciences, Chennai
Assistant Professor
Research Areas: Theoretical Computer Science; Computational Complexity

Ramakrishna Upadrasta
Ph.D – University of Paris and INRIA, Paris
Assistant Professor
Research Areas: Compilers; Program Analysis; Optimization; Polyhedral Compilation; Programming Languages and Domain Specific Languages

Vineeth N Balasubramanian
Ph.D – Arizona State University, USA
Associate Professor
Research Areas: Machine Learning; Deep Learning; Computer Vision

Manish Singh
Ph.D – University of Michigan, USA
Assistant Professor
Research Areas: Databases; Data Mining; Text Mining; Social Network Analysis; Information Retrieval

Sathya Peri
Ph.D – University of Texas at Dallas
Associate Professor
Research Areas: Parallel & Distributed Systems

Maria Francis
Ph.D – IISc Bangalore
Assistant Professor
Research Areas: Computational Algebra; Symbolic Computation; Lattice Cryptography

Ch. Sobhan Babu
Ph.D – IIT Bombay
Associate Professor
Research Areas: Big Data Analytics; Social Networks Analysis

Patents Filed

Vineeth N. Balasubramanian, Thirumaran Ekambaram, Sivaram Annadurai, and Sathiyanarayanan Sampath, Method and Electronic Device for Gender Detection of Humans in One or more Images, April, 2018, Indian Patent Appl No.201841015128.

Antony Franklin, Bheemarjuna Reddy Tamma, Prashant Sharma, Thomas Valerrian Pasca, Method for scheduling data by network node aggregated with lte and wi-fi protocol stacks, US Patent ApplNo.15661428.

Publications

(in peer reviewed journals)

Sreekanth Madisetty and Maunendra Sankar Desarkar, Identification of Relevant Hashtags for Planned Events Using Learning to Rank. Revised Selected Papers from KDIR 2017, Springer Nature Switzerland AG, 2019.

Smita Roy, Samrat Mondal, Asif Ekbal, and Maunendra Sankar Desarkar, Dispersion Ratio based Decision Tree Model for Classification, Expert Syst. Appl., 2019, 116:1-9.

Sreekanth Madisetty and Maunendra Sankar Desarkar, A Neural Network-Based Ensemble Approach for Spam Detection in Twitter. IEEE Trans. Comput. Social Systems, 5(4), 2018, 973-984.

Sparsh Mittal, A Survey on Optimized Implementation of Deep Learning Models on the NVIDIA Jetson Platform, *Journal of Systems Architecture,* 2019, 10.1016/j.sysarc.2019.01.011.

Sparsh Mittal and Venkat Mattela, A Survey of Techniques for Improving Efficiency of Mobile Web Browsing, Concurrency and Computation: Practice and Experience, 2019, 10.1002/cpe.5126.

Sumanth Umesh and Sparsh Mittal, A Survey of Spintronic Architectures for Processing-in-Memory and Neural Networks, *Journal of Systems Architecture*, 2018, 10.1016/j.sysarc.2018.11.005.

Sparsh Mittal and Subhrajit Nag, A Survey of Encoding Techniques for Reducing Data-Movement Energy, *Journal of Systems Architecture*, 2018, 10.1016/j.sysarc.2018.11.001

Sparsh Mittal, A Survey of FPGA-based Accelerators for Convolutional Neural Networks, Neural computing and applications, 2018, 1-31, 10.1007/s00521-018-3761-1.

Sparsh Mittal and Maruthi S Inukonda, A Survey of Techniques for Improving Error-Resilience of DRAM, *Journal of Systems Architecture,* 91, 2018, 11-40 10.1016/j.sysarc.2018.09.004.

Sparsh Mittal, S.B. Abhinaya, Manish Reddy, and Irfan Ali, A Survey of Techniques for Improving Security of GPUs, *Hardware and Systems Security Journal,* 2, 2018, 266-285 10.1007/s41635-018-0039-0.

Sparsh Mittal, A Survey of ReRAM-based Architectures for Processing-in-memory and Neural Networks, Machine learning and knowledge extraction, 1, 2018, 75-114, 10.3390/make1010005.

Sparsh Mittal, A Survey of Techniques for Dynamic Branch Prediction, Concurrency and Computation: Practice and Experience, 31, 2018, e4666,

N. Agarwal, V. Balasubramanian, and C.V. Jawahar, Improving Multiclass Classification by Deep Networks using DAGSVM and Triplet Loss, Pattern Recognition Letters, 112, 1 September 2018, 184-190, 10.1016/j.patrec.2018.06.034.

L. Chum, A. Subramanian, V. Balasubramanian, and C.V. Jawahar, Beyond Supervised Learning: A Computer Vision Perspective. *Journal of the Indian Institute of Science*, 2019, 1-23, 10.1007/s41745-019-0099-3.

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

Arun ramamurthy, vanlin Sathya, Shrestha ghosh, Antony franklin, and Bheemarjuna reddy Tamma, *Dynamic Power Control and Scheduling in Full Duplex Cellular Network with D2D,* Springer Wireless Personal Communications, 104(2), january 2019, 695-726.

Anand M. Baswade, *Touheed Anwar Atif, Bheemarjuna Reddy Tamma, and Antony Franklin, LAW: A Novel Mechanism for Addressing Hidden Terminal Problem in LTE-U*

and Wi-Fi Networks, iEEE Communications Letter, 22(6), june 2018.

Anand M. Baswade, Touheed Anwar Atif, Bheemarjuna reddy Tamma, and Antony franklin, *A novel coexistence scheme for IEEE 802.11 for user fairness and efficient spectrum utilization in the presence of LTE-U*, Computer Networks, 139, july 2018, 1-18.

Anand M. Baswade, Touheed Atif, Bheemarjuna reddy Tamma, and A. Antony franklin, *On theImpact of Duty Cycled LTE-U on Wi-Fi Users: An Experimental Study, Lecture Notes in Computer Science (LNCS)*, Chapter 9, LNCS 11227, Springer, 2019.

Publications

(in peer reviewed conferences)

Christian Ikenmeyer, Balagopal Komarath, Christoph Lenzen, Vladimir Lysikov, Andrey Mokhov, and Karteek Sreenivasaiah, On the complexity of hazard-free circuits, 50th Annual ACM SIGACT Symposium on Theory of Computing, STOC 2018, 2018, 878-889, 10.1145/3188745.3188912.

Markus Bläser, Balagopal Komarath, and Karteek Sreenivasaiah, Graph Pattern Polynomials, 38th IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS) 2018, 122, 2018, 18:1--18:13, 10.4230/LIPIcs.FSTTCS.2018.18.

Shamik Kundu, P.K. Srijith, and Maunendra Sankar Desarkar, Classification of Short-Texts Generated During Disasters: A Deep Neural Network Based Approach, ASONAM 2018, 790-793.

Rohan Tondulkar, Manisha Dubey, and Maunendra Sankar Desarkar: Get me the best: predicting best answerers in community question answering sites, RecSys 2018, 251-259.

Sreekanth Madisetty and Maunendra Sankar Desarkar, Aggression Detection in Social Media using Deep Neural Networks, TRAC@COLING 2018, 2018, 120-127.

Joshi, Prateek Kumar, Ruben Martins and Sukrut Rao, Approximation Strategies for Incomplete MaxSAT, 24th International Conference on Principles and Practice of Constraint Programming (CP), 2018, LNCS, 11008, 2018, 219-228.

Debashisha Mishra, Himank Gupta, Bheemarjuna Reddy Tamma, and A. Antony Franklin, KORA: A Framework for Dynamic Consolidation & Relocation of Control Units in Virtualized 5G RAN, IEEE ICC, May 2018.

Sathya Peri, Ajay Singh, and Archit Somani, Efficient means of Achieving Composability using Object based Semantics in Transactional Memory Systems, 6th International Conference on Networked Systems (NETYS), ESSAOUIRA, MOROCCO, May 2018.

Arghya Pal and V. Balasubramanian, Adversarial Data Programming: Using GANs to Relax the Bottleneck of Curated Labeled Data, IEEE/CVF International Conference on Computer Vision and Pattern Recognition (CVPR'18), June 2018, 1556-1565.

A. Ravi Sankar, S. Vishwak, and V. Balasubramanian, On the Analysis of Trajectories of Gradient Descent in the Optimization of Deep Neural Networks, Workshop on Theory of Deep Learning and Workshop on Non-Convex Optimization at International Conference on Machine Learning (ICML), Stockholm, Sweden, July 2018.

Priyanka Choudhary and Maunendra Sankar Desarkar, PReFacTO: Preference Relations Based Factor Model with Topic Awareness and Offset. ECommerce Workshop in SIGIR 2018, Michigan, USA, 8-12 July 2018.

H.T.I. Rashmi and Maunendra Sankar Desarkar, Personalized Tourist Package Recommendation using Graph Based Approach, Late Breaking Results in User Modelling Adaptation and Personalization (UMAP) 2018, Singapore, 8-12 July 2018.

Vaibhav Sinha, Sukrut Rao, and V. Balasubramanian, Fast Dawid-Skene: A Fast Vote Aggregation Scheme for Sentiment Classification, Workshop on Issues of Sentiment Discovery and Opinion Mining at ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD), London, UK, August 2018.

S. Parikshit, V. Balasubramanian, and P.J. Narayanan, RefocusGAN: Scene Refocusing using a Single Image, European Conference on Computer Vision (ECCV'18), September 2018, 497-512.

K.J. Joseph, R. Patel, U. Gupta, A. Srivastava, and V. Balasubramanian, MASON: A Model AgnoStic ObjectNess Framework,

Workshop On Autonomous Navigation in Unconstrained Environments, European Conference on Computer Vision, (ECCV-W), September 2018.

Zhu Pengfei, Wen Longyin, Du Dawei, M. Nehal, Naveen Kumar, K.J. Joseph, and V. Balasubramanian, et al, VisDrone-DET2018: The Vision Meets Drone Object Detection in Image Challenge Results, European Conference on Computer Vision, Workshop Proceedings (ECCV-W), September 2018.

G. Nagendar, V. Balasubramanian, and C.V. Jawahar, Neuro-IoU: Learning a Surrogate Loss for Semantic Segmentation, British Machine Vision Conference (BMVC'18), September 2018.

Anand Bawade, Luca Beltramelli, and A. Antony Franklin, Mikael Gidlund, Bheemarjuna Reddy Tamma, and Lakshmikanth Guntupalli, Modelling and Analysis of Wi-Fi and LAA Coexistence with Priority Classes, WiMob, October 2018.

C. Juyal, S. Kulkarni, S. Kumari, S. Peri, and A. Somani, An Innovative Approach to Achieve Compositionality Efficiently using Multi-Version Object Based Transactional Systems, 20th International Conference Safety Security and Stabilization (SSS), Tokyo, Japan, November 2018.

Shashwat Kumar, Sai Vineeth Doddala, and A. Antony Franklin, Edge Assisted DASH Video Caching Mechanism for Multi-access Edge Computing, IEEE ANTS, December 2018

Anand Baswade, A. Antony Franklin, and Bheemarjuna Reddy Tamma, WiFi User's Video QoE in the Presence of Duty Cycled LTE-U, Mohit Kumar Singh, ACM Mobicom Poster, December 2018.

Tulja Vamshi Kiran Buyakar, P.C. Amogh, Bheemarjuna Reddy Tamma, and A. Antony Franklin, Scalable Network Slicing Architecture for 5G, ACM Mobicom Poster, December 2018.

Bapi Chatterjee, Sathya Peri, Muktikanta Sa, and Nandini Singhal, A Simple and Practical Concurrent Non-blocking Unbounded Graph with Reachability Queries, 20th International Conference on Distributed Computing and Networking (ICDCN), Bangalore, India, January 2019.

K. Tejaswi, G. Nagendar, Guruprasad Hegde, V. Balasubramanian, and C.V. Jawahar, Region-Based Active Learning for Efficient Labeling in Semantic Segmentation, IEEE Winter Conference on Applications of Computer Vision (WACV'19), January 2019.

Uddipta Bhattacharjee, P.K. Srijith, and Maunendra Sankar Desarkar, Term Specific TF-IDF Boosting for Detection of Rumours in Social Networks, Social Networking Workshop, 11th International Conference on COMmunication Systems & NETworkS (COMSNETS), Bengaluru, India, 7-11 January 2019.

Uddipta Bhattacharjee, P.K. Srijith, and Maunendra Sankar Desarkar, Leveraging Social Media Towards Understanding Anti-Vaccination Campaigns, NetHealth Workshop, 11th International Conference on COMmunication Systems & NETworkS (COMSNETS), Bengaluru, India, 7-11 January 2019.

Parwat Singh Anjana, Sweta Kumari, Sathya Peri, Sachin Rathor, and Archit Somani, An Efficient Framework for Concurrent Execution of Smart Contracts, 27th Euromicro International Conference on Parallel, Distributed, and Network-Based Processing (PDP), Pavia Italy, February 2019.

N.R. Aravind and Subrahmanyam Kalyanasundaram, Anjeneya Swami Kare, H-Free Coloring on Graphs with Bounded Tree-Width, 5th International Conference on Algorithms and Discrete Applied Mathematics - CALDAM 2019, Kharagpur, India, February 2019.

B. Thamilselvam, Subrahmanyam Kalyanasundaram, and M.V. Panduranga Rao,Coordinated Intelligent Traffic Light using Uppaal Stratego, COMSNETS ITS Workshop, 2019.

Thomas Valerrian Pasca Santhappan, Nabhasmita Sen, Venkatarami Reddy, Bheemarjuna Reddy Tamma, and Antony Franklin, A Framework for Integrating MPTCP over LWA: A Testbed Evaluation, 12th ACM International Workshop on Wireless Network Testbeds, Experimental Evaluation & Characterization (WiNTECH '18).

Shiraj Arora, Abhishek Jain, Yenda Ramesh, and M. V. Panduranga Rao, Specialist Cops Catching Robbers on Complex Networks, Proc. Complex Networks, 2018: 731-742

Studies in Computational Intelligence 812, Springer 2019, ISBN 978-3-030-05410-6.

Nikhil Anand, Ramesh Yenda, and M.V. Panduranga Rao, Statistical Model Checking for Dynamical Processes on Networks: A Healthcare Application, COMSNETS Social Networking Workshop, 2019.

B. Thamilselvam, Subrahmanyam Kalyanasundaram, M.V. Panduranga Rao, Coordinated Intelligent Traffic Light using Uppaal Stratego, COMSNETS ITS Workshop, 2019.

K.J. Joseph, Arghya Pal, S. Rajanala, and V. Balasubramanian, C4Synth: Cross-Caption Cycle-Consistent Text-to-Image Synthesis, IEEE Winter Conference on Applications of Computer Vision (WACV'19), 2019, 358-366.

Eti Chaudhary and Saurabh Joshi, Pinaka: Symbolic Execution meets Incremental Solving (Competition Contribution, Tools and Algorithms for Construction and Analysis of Systems, 25 years of TACAS, TOOLympics, ETAPS 2019, LNCS, 11429, 2019, 234-238.

Nandan Kumar Jha, Sparsh Mittal, and Govardhan Mattela, The Ramifications of Making Deep Neural Networks Compact, IEEE International Conference on VLSI Design, 32, 2019.

Anish Hirwe, Mrinal Aich, and Kotaro Kataoka, 'Dynamic Network Function (DNF): Service Chain Placement and Bottleneck Removal for Edge-Fog-Cloud Interplay', In Proceedings of ACM Asian Internet Engineering Conference (AINTEC 2018), 2018, pp.46-53.

Kotaro Kataoka, Saurabh Gangwar, Karthik Yadav Mudda, and Souraj Mandal, 'A Smartphone- based Probe Data Platform for Road Management and Safety in Developing Countries', Workshop on Data-Driven Intelligent Transportation (DIT2018) in IEEE International Conference on Data Mininng Workshops, 2018, pp.612-615.

Thammineni Prathyusha, Vipul Jindal, Saurabh Gangwar, Anand Konjengbam, and Kotaro Kataoka, 'SPACE: An Empirical Approach towards a User-Centric Smart Campus', IARIA UBICOMM2018, 2018, pp.35-41.

Mohd Saalim Jamal, Venkata Keerthy S, Hideya Ochiai, Hiroshi Esaki, and Kotaro Kataoka, 'IN-STRUCT: A Clustering Based Identification of Valid Communications in IoT Networks', The First International Conference on Future Cyber Security Technologies (FCST 2018), 2018, pp.228-233.

Mohd Saalim Jamal, Anish Hirwe, and Kotaro Kataoka, 'VIBHAJAN: A Lightweight and Scalable Control Plane Management for Multi-Controller SDN', 2018 IEEE Conference on Network Function Virtualization and Software Defined Networks (NFV-SDN), 2018.

Yuka Shori, Achmad Husni Thamrin, Jun Murai, and Kotaro Kataoka, 'Effective Use of Learning Management System for Large-scale Japanese Language Education', 10th International Conference on Education Technology and Computers (ICETC), 2018, pp.49-56.

Pragati Shrivastava and Kotaro Kataoka, 'LEGION: Lightweight & Distributed Mobility Management for MSDN based Large-scale WiFi', IEEE Conference on Network Softwarization (NetSoft 2018), 2018, pp.232-236.

Prashanth Podili and Kotaro Kataoka, 'Effective Resource Provisioning for QoS-aware Virtual Networks in SDN', IEEE/IFIP Network Operations and Management Symposium (NOMS 2018), 2018, pp.1-9.

Funded Research Projects 2018-19

Vineeth N Balasubramanian, *Vision and Learning with Limited-to-No Supervision: Applications to Autonomous Navigation and Beyond*, Intel India, 2018, 91.0 Lakhs.

Vineeth N Balasubramanian, *Passenger Drone Project*, MEITY, 980.00 Lakhs.

Bheemarjuna R. Tamma and Antony Franklin, *CCRAN: Energy Efficiency in Converged Cloud Radio Next Generation Access Network*, Intel India, 2018, 116.00 Lakhs.

Bheemarjuna R. Tamma and Antony Franklin, *DNS/IPv6 for IoT Security*, NASSCOM, India, 2018, 25.00 Lakhs.

Sathya Peri, *Tools for Large-Scale Graph Analytics*, Intel, USA, June 2018, USD 60,000.

Sparsh Mittal, *Designing Efficient Hardware Accelerators for Autonomous Driving Vehicles*, Semiconductor Research, Corporation, Oct 2018, $36,000.

Vineeth N Balasubramanian, *Thermal Image Processing and Deep Learning Algorithms for*

Human Detection, DRDO CARS, 2019, 8.94 Lakhs.

Vineeth N Balasubramanian, *Towards Next-Generation Deep Learning: Faster, Smaller, and Easier*, DST ICPS Data Science Program, 2019, 57.00 Lakhs.

Antony Franklin, *Network Slice Life-cycle Management for 5G Mobile Network*, SPARC, MHRD, March 2019, 80.00 Lakhs.

Talks Given in National / International Conferences

Vineeth N. Balasubramanian, Going beyond what and asking why: Explainability in Machine/Deep Learning, Anthill Inside 2018, Bangalore, July 2018.

Vineeth N. Balasubramanian, Optimization Methods in Deep Learning, 3rd Indian Workshop on Machine Learning, IIT-BHU, July 2018.

Saurabh Joshi, Approximation Strategies for Incomplete MaxSAT, 24th International Conference on Principles and Practice of Constraint Programming, (CP), Lille, France, 29 August 2019.

Vineeth N. Balasubramanian, Towards Solving Next-Gen ML Problems: Learning with Weak Supervision, NVIDIA DevConnect, Hyderabad, September 2018.

Vineeth N. Balasubramanian, Adversarial Data Programming: Using GANs to Relax the Bottleneck of Curated Labeled Data, ACCV Area Chairs Workshop, Nanyang Technological University, September 2018.

Tharun Kumar Dangeti, S. Venkata Keerthy, and Ramakrishna Upadrasta, P4LLVM: An LLVM based P4 Compiler, P4EU Workshop, In conjunction with ICNP 2018, Cambridge, UK, 24 September 2018.

Vineeth N. Balasubramanian, Machine Learning for Agriculture, International Workshop on Machine Learning for Cyber-Agricultural Systems (MLCAS2018), Keynote Talk, Mumbai, October 2018.

Maunendra Sankar Desarkar, Get me the best: predicting best answerers in community question answering sites, RecSys 2018, Vancouver, Canada, 5 October 2018.

Vineeth N. Balasubramanian, Towards Solving Next-Gen ML Problems: Learning with Weak Supervision, Intel ICTAI Workshop, Bangalore, November 2018.

Abhishek Patwardhan and Ramakrishna Upadrasta, Some Efficient Algorithms for the Tightest UTVPI Polyhedral Over-Approximation Problem, 9th International Workshop on Polyhedral Compilation Techniques, In conjunction with HiPEAC 2019, Valencia, Spain, January 23, 2019.

Vineeth N. Balasubramanian, Towards Explainable Deep Learning, AIST AIRC International Workshop, Tokyo, February 2019.

Vineeth N. Balasubramanian, Towards Explainable Deep Learning, NVIDIA AI Workshop, Bangalore, February 2019.

Abhishek Patwardhan and Ramakrishna Upadrasta, Polyhedral Model Guided Automatic GPU Cache Exploitation Framework, OMASE (Optimization, Modeling, Analysis and Space Exploration) 2019 (Co-located with CGO-2019).

Kotaro Kataoka, Saurabh Gangwar, and Prashanth Podili, 'Trust List: Internet-wide and Distributed IoT Traffic Management using Blockchain and SDN', International Conference on Intelligent Computing and Communication Technologies (ICICCT-2019), BVRIT Hyderabad, 11 January 2019.

Seminars Conducted

Dr. Raghava Mutharaju, GE global research, Distributed Rule-Based Ontology Reasoning, 10 April 2018.

Dr. Suryajith Chillara, IIT Bombay, Small-depth Multilinear Formula Lower Bounds for Iterated Matrix, 12 April 2018.

Dr. Bamdev Mishra, Microsoft R&D, A unified framework for structured low-rank matrix learning, 6 June 2018.

Mr. Sanjeev Sharma, Swaayatt Robots, Self-Driving Technology for Indian Environments, on 20 June 2018.

Dr. Rakesh Venkat, IIT Hyderabad, Graph Partitioning for Low Threshold-Rank and Semi-Random Instances, 4 July 2018.

Dr. Vikas Raykar, IBM Research, Evolving Predictive Models: How to not be an

overzealous data scientist, 13 July 2018.

Prof. Aditya Akella, UW-Madison, Putting Networks on a Firm Footing- Revolutionizing Network Management, 6 August 2018.

Dr. Pramod Ganapathi, IIT Indore, Automatic Discovery of Efficient Divide-&-Conquer Algorithms for Dynamic Programming Problems, 9 August 2018.

Dr. Prabuchandran K J, IISc Bangalore, Sequential Decision Making under Uncertainty, 9 August 2018.

Dr. Prakash Saivasan, TU Keiserslautern, Regular abstractions with applications to Infinite state verification, 21 August 2018.

Ms. Merike Kaeo, Double Shot Security, Managing Security Risks In Today's Complex Landscape, 23 August 2018.

Dr. Nikhil Balaji, Ulm university, Decision problems on linear recurrence sequences, 23 August 2018.

Dr. Shweta Jain, IIT Bhubaneshwar, Mechanism Design for Stochastic Multi-armed Bandit Problems, 23 August 2018.

Dr. Maneesh Singh, Verisk R&D, Unsupervised Representation Learning, 29 November 2018.

Mr. Shriphani Palakodety, Onai, Automatic Neural Network Architecture Discovery, 2 January 2019.

Dr. Sanket Tavarageri, Intel Labs, Building Systems Technology for Deep Learning, 12 February 2019.

Mr. Alain Durand, Internet Corporation,DNS Object Exchange or Draft Durand Object Exchange, 13 February 2019.

Mr. Samiran Gupta, ICANN, The Internet - Technology, Business and Governance, 13 February 2019.

Mr. Soumith Chintala, Facebook AI Research, Stories from Deep Learning: Open-Source as a Catalyst, 25 February 2019.

Workshops / Symposiums

IndoSys-2018@IITH: A two-day workshop on Indian Symposium on Computer Systems, IndoSys 2018, was organized at IITH, 8-9 September 2018. It was attended from academicians and industry researchers from various organizations.

IndoQuant-2019: A two-day workshop on quantum computing and communication was organized on 12-13 January 2019. It was attended by academicians (faculty, students, researchers), industry and representatives from the government.

IITH-RIKEN AI Workshop-2019: A two-day workshop including researchers from IIT-Hyderabad and RIKEN AIP, Japan, as well as other leading researchers in AI and ML from India, was organized on 15-16 March 2019. It was attended by researchers from both organizations, students from other educational institutions in India, as well as representatives/diplomats from Japan.

Awards / Recognitions

Dr. Saurabh Joshi, Prateek Kumar and Sukrut Rao, 1st Place in 60 second and 2nd place in 300 second timeout subcategories in the incomplete MaxSAT track of MaxSAT evaluations 2018 for Open-WBO-Inc.

Eti Chaudhary and Dr. Saurabh Joshi, 2nd place in ReachSafety-Floats subcategory in SVCOMP 2019 for Pinaka.

Subhrajit Nag under Dr. Sparsh Mittal, Selected for IITH-Swinburne University of Technology (Australia) joint PhD program. Papers have been covered by technical news websites, e.g., InsideHPC (1,2), TheMemoryGuy, StorageSearch and HPCWire.

Dr. Karteek Sreenivasaiah, *INSPIRE Fellowship* from Sept 2018 for 5 years.

Dr. Vineeth N Balasubramanian, *Verisk AI Faculty Research Award*, Sept 2018.

Parwat Singh Anjana, Sweta Kumari, Sathya Peri, Sachin Rathor, Archit Somani, An Efficient Framework for Concurrent Execution of Smart Contracts, received the Best Poster award in the Ph.D symposium of ICDCN 2019.

Chirag Juyal, Sandeep Kulkarni, Shweta Kumari, Sathya Peri, Archit Somani, An Innovative Approach to Achieve Compositionality Efficiently using Multi-Version Object Based Transactional Systems, Recipient of Best Student Paper Award at SSS 2018. The poster version of this paper received *Best Poster Award* at Netys 2018.

DESIGN

The Department of Design currently offers Master of Design (M.Des), and Ph.D in Design along with a new addition in the list – Minor Program in Design for the B.Tech students. The department is about to launch Bachelor of Design (B.Des) program from next academic session. The departmental approach has been to encourage and engage its immediate community of users. The faculty are involved in academic as well as research in various domains of design spanning virtual reality, architecture, product design, UI/UX, communication & media design, experience design, animation, films and design for sustainability, etc.

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 centers, photography of campus and events held – for archival purposes. Department is involved in question paper setting and evaluation of UCEED and CEED entrance test. The Design Innovation Centre which is funded by Ministry of Human Resource and Development displayed and presented the progress on the projects at SPA New Delhi. The department has been actively involved in creating new narratives in Indian context through future ready virtual reality tools.

The Department of Design at IIT-Hyderabad offers a vibrant environment for learning, practicing and exploring several facets of design. The department envisions to creatively engage in the space between technologies and people. This involves facilitating innovation in the key emergent areas such as Participatory and collaborative Design, Professional Ethics/ Sustainability, Product Systems and Services, Design and education, Wellness, Crowd sourced Design.

FACULTY

Deepak John Mathew
Ph.D – MS University of Baroda
Professor & HoD
Research Areas: Photography; Elements of Design; Aesthetics; History of Design

Prasad S. Onkar
Ph.D – IISc Bangalore
Assistant Professor
Research Areas: Product Design; Computer Aided Conceptual Design; 3D Sketching; Virtual Reality; Haptics; Interaction Design

Neelakantan P K
Ph.D – IIT Bombay
Assistant Professor
Research Areas: Architectural Design; Early Stage Design Process; Aesthetics; Experiential Installations; Urban Planning; Art and Performance Studies

Delwyn Jude Remedios
Assistant Professor
Research Areas: Animation; Film; Virtual Reality; Children Story Books; Graphic Novels; Illustrations; e-Learning

Seema Krishnakumar
Assistant Professor
Research Areas: Information Design; Data Visualization; Interactive Storytelling; Journalism Design; Photodocumentary; Multimedia Storytelling

Shiva Ji
Assistant Professor
Research Areas: Design for Sustainability; Sustainability Assessment Methods; LCA; Environmental Planning and Design; Virtual Reality Applications in Architecture

Book Chapters

Shiva Ji,R.M. Punekar, The Ethno-Cultural Influences on Assam Type Building Typology-A Case of Barduwa, Assam, In: Chakrabarti A. (eds) Research into Design for a Connected World. Smart Innovation, Systems and Technologies, Springer, Singapore, 134, 2019, 15-26, 10.1007/978-981-13-5974-3_2.

Shiva Ji,R.M. Punekar, A Critical Study of Choke Point in Sustainable Recycling of Household Waste in an Assamese Village Setting, In: Chakrabarti A. (eds) Research into Design for a Connected World. Smart Innovation, Systems and Technologies, Springer, Singapore, 135, 2019, 165-173, 10.1007/978-981-13-5977-4_14.

R. Vimal Krishnan, P.S. Onkar, Virtual Reality References in Design Problem Solving: Towards an Understanding of Affect-Cognition Interaction in Conceptual Design, In: tom Dieck M., Jung T. (eds) Augmented Reality and Virtual Reality. Progress in IS. Springer, Cham, 2019.

D.S. Lokku, P.S. Onkar, D.J. Mathew, Leveraging Design Innovation for Ensuring Creation of Value: An Approach to Identify the Corresponding Design Concerns Towards Enabling the Design Practice, In: Chakrabarti A. (eds) Research into Design for a Connected World, Smart Innovation, Systems and Technologies, Springer, Singapore, 135, 2019.

Seema Krishnakumar, Ammachi in Justin, Babitha and Sriram, Abhirami (ed), Salt and Pepper and Silver linings. readme books, 139-142, 2019,ISBN 978-8193915820.

Seema Krishnakumar, Narrating human conditions has been highly satisfying, The Hindu,Kerala, 8 March 2019.

K.V. Rakhin, Prasad S. Onkar, Predicting Haptic Perception of Textile Texture and Analysis Between Smooth-Rough Preferences through Images. Proceedings of the twelfth International Symposium on Tools and Methods of Competitive Engineering (TMCE 2018), (Ed) Horváth, I., Rivero, S., & Castellano, H. Las Palmas de Gran Canaria, Gran Canaria, Spain, 7 -11 May 2018, 647-655, ISBN 978-94-6186-910-4.

I. Saha, U. Bhandari, and D.J. Mathew, A Study on Consumer Awareness Towards Green Fashion in India, in Research into Design for a Connected World. Springer, 483–494, 2019.

I. Saha and D.J. Mathew, Ethical Ideologies in Purchasing Attitudes Towards Counterfeit Fashion Brands, in Research into Design for a Connected World, Springer, 211–222, 2019.

Upasna Bhandari, Deepak John Mathew, Mismatch of Education and Job-A study on Design Professionals in India; Research into Design for a Connected World, Proceedings of ICoRD 2019, 2, 2019, 947-957.

Parthiban Rajukalidoss, Deepak John Mathew; Pedarapu Chenna Reddy (eds.). 2018, The Monolithic Temples of South India: Architectural Proto-Types in History, Culture and Archaeological Studies, Commemoration Volume to Prof. MLK Murty, New Delhi, BR Publishing Corporation, New Delhi.

Publications
(in peer reviewed journals)

Shiva Ji, R.M. Punekar, Exploring Attributes of Vernacular Assam Type House Design Techniques in Contemporary Setting. In: Reddy B., Mani M., Walker P. (eds) Earthen Dwellings and Structures. Springer Transactions in Civil and Environmental Engineering, Springer, Singapore, 2019, 419-433, 10.1007/978-981-13-5883-8_3.

Publications
(in peer reviewed conference)

Shiva Ji, M. Ravi Punekar, Assessment of Impact of Infrastructural Growth and Development on Bio-Diversity in Indian Context, CESDOC 2018, *2nd International Conference on Sustainability, Assam Engineering College, Guwahati, 2018.*

Vimal Krishnan R., Onkar P.S., 'The influence of affect - cognition interaction in conceptual design', *Eighth International Design, Computing and Cognition Conference, Politecnico Di Milano, Lecco, Italy, 2018.*

Talks Given in National / International Conferences

Ji Shiva., *Exploring Attributes of Vernacular Assam Type House Design Techniques in Contemporary Setting*. International Symposium on Earthen Structures. IISc Bangalore, 22 August 2018.

Ji, Shiva., *Industry 4.0 and Design with Empathy: Integration of Technology and Inclusive Design – Emerging Contexts*; Conduent Labs India (Formerly Xerox Research), Bangalore, 21 August 2018.

Ji, Shiva., *Paradox of Intensive Orographic Rainfall and Challenges of Water Scarcity in North-East India – A Participatory Planning Approach for Sustainable Community*. 9th International Conference on Sustainable Built Environment 2018 (ICSBE2018), University of Peradeniya, Kandy, Sri Lanka, 13 December 2018.

Ji, Shiva., Punekar, Ravi M., 2018. *Assessment of Impact of Infrastructural Growth and Development on Bio-Diversity in Indian Context*. CESDOC 2018, 2*nd* International Conference on Sustainability, Assam Engineering College, Guwahati, 18 December 2018.

Prasad S. Onkar, *Design Innovation: Emerging research and technologies*, Design Innovation Workshop and Interface, National Institute of Technology Karnataka, Surathkal. 21 November 2018.

Delwyn Jude Remedios, *Experimental Animation Workshop*, Satyajit Ray Film and Television Institute (SRFTI), May 2018.

Priyabrata Rautray and Avik Roy, *Affordable and Sustainable Disaster Relief Shelter, Metagreen Dimensions*, International Convention on Performance of Built Environment College of Architecture Trivandrum, 7 February 2018.

Priyabrata Rautray, Prasad Onkar and Avik Roy, *Digital Artisans - Evolution of new age artisans in Industry 4.0*, ICDF-2018 (International Conference on Digital Fabrication) IIT Hyderabad, 16 March 2018.

Seminars Conducted

Ketham Santosh Kumar, Founder architect of Ketham's Atelier Architects, Self-initiated design projects by Ketham Santosh Kumar studio, 24 August 2018.

Namisha Naidu, Founder, Principal designer, Design educator at Root Red Design, Design and The Elephant in the Room, 5 September 2018.

Alipta Ballav, Design Manager at Cerner Corporation-Half day workshop on Design Thinking, 10 October 2018.

Sharbendu De, Visual story teller and academic-Imagined Homeland – A counterpose to the colonial anthropological representation of tribes and communities, 10 November 2018.

Smruti Umredkar, Singhania Group, A peek into textile design and craft, 30 January 2019.

Sumit Saini, Microsoft, Hyderabad, Project Handling from Customer and user perspective, 20 February 2019.

Jagruti Datta, Ceramic and Pottery Workshop, March 2019.

Shipra Bhutada, User Connect Consultancy, Role of empathy in design, 6 March 2019.

Awards / Recognitions

KN Viswatej, NIRF Trophy Design – winner.

Manasi Deshpande, *Design X Award* – Special Jury award.

Manasi Deshpande, *Best Design Student (in top 5 contestants)* at UX India.

K Devi Meghana, *Hult Prize – Entrepreneur of the week*.

Saahil Sagar, Nupur Chowdhary, Sumit Yempalle & Dikshit Sharma, Project Guide: Delwyn J. Remedios, Short experimental animation film 'Ankahi // Untold' was screened at the 11th IDSFFK, Trivandrum.

Upasna Bhandar, Indranil Saha, Deepak John Mathew, Distinguished paper at ICoRD 2019

Seema Krishnakumar, photodocumentary work was featured on 8 March in Women's Day special edition of The Hindu, Kerala edition.

K Devi Meghana, Kreayotoo Solutions (won in a team), *CIDC – Best Startup Award*.

RESEARCH

HIGHLIGHT

Design Innovation Centre (DIC) funded by (MHRD) at IIT Hyderabad is engaged in innovation through design and technology. The Department of Design along with partnering institutions engages in mutually beneficial innovation activities. DIC aims at creating a holistic and inter-disciplinary nature of design to cut across research and move projects from research to development. Diverse range of projects in domains such as cultural heritage, architecture, digital humanities, pedagogy etc. Design practices are embedded in active social contexts and humanistic endeavours. Innovative projects and new modes of design thinking that encourages designers also appreciate the idea of design praxis as a convergence of multiple interests. Contemporary design practice across diverse contexts including the macro scenarios. Our innovation hub and our partnering spokes incubate meaningful projects which are in line with contemporary trends in the design discipline. Lead by Deepak John Mathew (Professor) and Delwyn Remedios (Assistant Professor) along with team.

As part of this research on the role of emotional arousal in design cognition, a respondent sketches on a digital tablet to generate conceptual solutions for a graphic design problem. Through a VR Mood board, the emotions of a respondent are aroused and the influence of such arousal on the design outcomes is observed. A wearable wrist band which records Electrodermal Activity and Blood Volume Pulse is used to record physiological markers of emotional arousal. A snapshot of the VR environment used in the mood board. Lead by Prasad Onkar (Assistant Professor) and team of Vimal and Rakhin.

A short narrative of the life of Hayad Bakshi Begum in the form of 360 degree virtual reality animation which aims to give an immersive visual experience of folktales for the viewer. The objective of the project is to preserve culture through the use of computer generated animation. Lead by Delwyn Remedios (Assistant Professor) and team of Pravin J, Manoj Malviya, Prakash Kumar, Saahil Sagar, Dhanashree Hindlekar, Veena Thakre and Mark Andrew Charles.

Ancient heritage digital reconstruction lead by Shiva Ji (Assistant Professor) along with Manasi and Vinay. It frames a novel approach in Indian heritage reconstruction in digital space by reconstructing the lost structures of historical significance.

Design for Sustainability lead by Shiva Ji (Assistant Professor) with team Learning Network on Sustainability (LeNS) for New theoretical considerations of and contributions to the role of design and other disciplines in the transition towards the Sustainability for all society. Particularly handling areas of Design for Sustainable Materials and Energy, Product Design for Sustainability, Product-Service System Design for Sustainability and Design for Sustainable Distributed Economies, etc.

ELECTRICAL ENGINEERING

Since its inception in 2008, EE department @ IITH has progressed rapidly into a full fledged, multi-faceted department having the largest number of faculty and students in IITH. EE department has 28 full-time faculty and 4 visiting faculty and it caters to close to 500 students. The thrust of the department is invention and innovation. Research grants to the tune of 80 crores is a testament for the drive/capabilities of our Faculty. Spanning across four major domains, viz., Communication and Signal Processing, Micro/Nanoelectronics & VLSI, Power Systems and Power Electronics and Control Systems, EE runs four M.Tech programs on its own and also offers one more M.Tech program in conjunction with Computer Science department. With multiple offers in hand, our B.Tech students are well placed across different top notch MNCs. Moreover, offers for higher studies in Ivy league universities has become common place for our undergraduate toppers. Placements for Masters and Ph.D programs have been lucrative thus far. Couple of our research scholars have become faculty in IITs and NITs. Last but not the least, the emphasis on practical work and state-of-the-art research work has led to incubation of four startups. Two of these start ups have revenue in-flow and will pretty soon be getting series-A funding. We at EE aim to be pioneers rather than peers.

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(in peer reviewed conferences)

F.R. Mohammad and Z.A.K. Mohammed, On non-Randomized Hard Decision Fusion Under Neyman-Pearson Criterion Using LRT, *IEEE 88th Vehicular Technology Conference (VTC-Fall), Chicago, IL, USA, 2018, 1-5.*

S. Shafivulla, A. Patel and M.Z.A. Khan, Low Complexity Signal Detection in MIMO Systems, *IEEE 88th Vehicular Technology Conference (VTC-Fall), Chicago, IL, USA, 2018, 1-5.*

N.R. Banavathu and M.Z.A. Khan, Joint Optimization of both m and K for the m-out-of-K Rule for Cooperative Spectrum Sensing, European Wireless 2018, *24th European Wireless Conference, Catania, Italy, 2018, 1-6.*

F.R. Mohammed, D. Nikhil, and Z.A.K. Mohammed, Reduced complexity optimal hard decision fusion under Neyman-Pearson criterion, *26th Signal Processing and Communications Applications Conference (SIU), Izmir, 2018, 1-4.*

Kiran K. Vupparaboina, Roopak R. Tamboli, Shanmukh Manne, Peter A. Kara, Maria G. Martini, Attila Barsi, Ashutosh Richhariya, and Soumya Jana, Towards True-To-Scale 3D Reconstruction of the Human Face Using Structured Light Projection and Off-The-Shelf Cameras, *International Conference on 3D Immersion (IC3D), 2018, 1-7.*

Roopak R. Tamboli, Peter A. Kara, Nikita Bisht, Attila Barsi, Maria G. Martini, and Soumya Jana, Objective Quality Assessment of 2D Synthesized Views for Light-Field Visualization, *International Conference on 3D Immersion (IC3D), 2018, 1-7.*

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B. Prathap Reddy, K. Siva Kumar, Torque Ripple Minimization of PPMIM Drives with Phase-Shifted Carrier PWM, *IECON 2018 - 44th Annual Conference of the IEEE Industrial Electronics Society, Washington, DC, USA, 2018, 725-730.*

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D. Anil Kumar and Mohammed Zafar Ali Khan, A Millimetre Wave Embroidary Beam Forming Antenna Array for UWB Applications, *Progress in Electromagnetics Research Symposium (PIERS-Toyama), Toyama, Japan, 1-4 August 2018, 751-755.*

D. Santhosh Reddy, Ramkrishna Bharath, and P. Rajalakshmi, A Novel Computer-Aided Diagnosis Framework Using Deep Learning for Classification of Fatty Liver Disease in Ultrasound Imaging, *20th International Conference on E-health Networking, Application & Services (Healthcomm'18), Ostrava, Czech Republic, September 2018.*

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P. Kancharla, S.S. Channappayya, Improving the Visual Quality of Generative Adversarial Network (GAN)-generated Images Using the Multi-scale Structural Similarity Index, *ICIP 2018, Athens, Greece, October 2018.*

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C.P. Konkimalla, M.S. Yellapragada, T. Gayam, S. Mandal, and S.S. Channappayya, Optical Character Recognition (OCR) for Telugu: Database, Algorithm and Application, *ICIP 2018, Athens, Greece, October 2018.*

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M. Taparia, A. Kumar, P. Rajalakshmi, B. Marathi, and U.B Desai, A Threshold Based Segmentation Method For Estimating Canopy Coverage of Crop, *AFITA/WCCA, Bombay, India, 24-26 October 2018.*

A. Kumar, R. Bharath, M. Taparia, P. Rajalakshmi, B. Marathi, and U.B. Desai, Automated Counting of Filled and Unfilled Spikelets of Aerobic Rice Using Blue Channel

Discrimination, *AFITA/WCCA, Bombay, India, 24-26 October 2018*.

G.V.N. Yatendra Babu and Vaskar Sarkar, A Minimalistic Approach for Wide-Area Out-of-Step Identification, *Nat. Power Syst. Conf., NIT Trichy, India, 14-16 December 2018*.

Shri Ram Vaishya and Vaskar Sarkar, A Combined Energy and Transmission Pricing Scheme under ACOPF Framework, *Nat. Power Syst. Conf., NIT Trichy, India, 14-16 December 2018*.

R. Verma and V. Sarkar, Power flow analysis of unbalanced distribution network with integration of various characteristics DGR, India, *Int. Conf. Power Electron., Jaipur-India, 13-15 December 2018*.

Sai Vikas Desai, Ajay Kumar, Mahesh Taparia, P. Rajalakshmi, Vineeth N. Balasubramanian, U.B. Desai, and Wei Guo, AI Based High Throughput Crop Phenotyping using Drone and Static Images, Workshop on AI and Its Impact on Society in Developing Nations, *AAAI Chapter India, Hyderabad, India, 21 December 2018*.

S. Qadeer, Mohammed Zafar Ali Khan, and M. Yousuf Khan, Computation of Discrete Fourier Transform (FFT): A Review Article. *In Lecture Notes in Electrical Engineering, Springer, Singapore, 476, 2019, 381-390*.

R. Yoghitha, A. Kumar, and M. Donelli, Resource allocation for Dual Connectivity with millimeter wave based fronthaul in Cloud RAN, COMSNETS 2019.

Funded Research Projects 2018-19

K. Sri Rama Murty, *Development of Speech Interface to Command Control System*, DRDL, Hyderabad, 2018, Rs. 23.4 Lakhs.

Kiran Kumar Kuchi, *Indigenous 5G Testbed*, Department of Telecommunications, 2018, Rs. 64.44 Lakhs.

Ashudeb Dutta, *Design and Development of Dual Frequency Phased Locked Loop (PLL) for IRNSS Receiver*, SAMEER Kolkata, 2018, Rs. 9.99 Lakhs.

Ashudeb Dutta, *Design and Development of Space Grade X-band Integrated 15W Gallium Nitride (GaN) Power Amplifier*, DSST, Research Centre Imarat (RCI), DRDO, 2018, Rs. 172.00 Lakhs.

G.V.V. Sharma, *Development of a Transciever System with Variable Rates and Blocklengths for Digital Video Broadcast (DVB-S2)*, CRL, Bharat Electronics Limited, 2018, Rs. 10.62 Lakhs.

Rajalakshmi (Co-Investigator), *5G Testbed*, DoT, 2018, Rs. 660.00 Lakhs

Shishir Kumar, *Graphene nanopores for selective molecular filtering*, DST Nanomission, 2018, Rs. 25.41 Lakhs.

Gajendranath Chowdary, *Solar and Vibration based Hybrid Energy Scavenging System for Self-Sustainable Defense Applications in 180 nm CMOS*, CARS, ANURAG DRDO, August 2018, Rs. 45.3 Lakhs.

Rajalakshmi, *AI based High Throughput Phenotyping to Accelerate Crop Improvement through Crop images Captured from Unmanned Aerial Vehicle (UAV) with On-Vehicle Sensors*, Meity, November 2018, Rs. 100.00 Lakhs.

Rajalakshmi (Co-Project Investigator), *IoT-based 3D printed time lapse smart microscope for embryo monitoring in IVF clinics*, SERB, DST, IMPRINT, 24 December 2018, Rs. 71.89 Lakhs.

Amit Acharyya, *IoT based deMonstrator design using proposed methOdology with CNN and BSS for RehabIlitated ParaLYZEd Patients* (i-MOBILYZE, Xilinx, February 2019, Rs. 68.00 Lakhs.

Amit Acharyya, *Intelligent IoT enabled Autonomous Structural Health Monitoring System for Ships, Aeroplanes, Trains and Automobiles*, IMPRINT-II.B, Govt. of India, March 2019, Rs. 34.00 Lakhs.

Amit Acharyya, *IoT Based Holistic Prevention and Prediction of CVD (i-PREACT)*, Department of Science and Technology, March 2019, Rs. 215.00 Lakhs.

Gajendranath Chowdary, *Ultra-low power circuits for autonomous sensor nodes in IoT networks*, SERB ECR Scheme, March 2019, Rs. 45.14 Lakhs.

Seshadri Sravan Kumar V, *Development of Coordination and Control Schemes for Grid Connected Variable Speed Wind Generators under Unbalanced and Low Voltage*

Conditions, SERB ECR Scheme, March 2019, Rs. 37.13 Lakhs.

Emani Naresh Kumar, *Investigation of the carrier surface recombination in III-V semiconductors for on-chip nanophotonic applications*, SERB ECR Scheme, March 2019, Rs. 45.26 Lakhs.

Rajalakshmi (Co-Project Investigator), *Design and Fabrication of Passenger Drone*, Meity, 15 March 2019, Rs. 854.00 Lakhs.

Aditya Sripuram, *Signal processing perspectives on unsupervised graph learning*, Rs. 21.59 Lakhs.

Abhinav Kumar, *Privacy preserving framework for location based services, Collaboration Kick-Starter Program (CKP)*, JICA, Rs. 34.00 Lakhs.

Talks Given in National / International Conferences

Dr. Aditya Sripuram, *LP relaxations and Fuglede's conjecture*, IEEE International Symposium on Information Theory (ISIT), Vail, CO, USA, 2018.

S. Chatterjee and G. Chowdary, *A 200-pA Under-Voltage Lockout Circuit for Ultra-Low Power Applications*, IEEE International Symposium on Circuits and Systems (ISCAS), Sapporo, Japan, 2019.

M.K. Rajendran, P.V.A. Abhilash, G. Chowdary and A. Dutta, *An Event Triggered-FOCV MPP Technique with Irradiance Change Detection Block for Next Generation EH-Converters*, IEEE International Symposium on Circuits and Systems (ISCAS), Sapporo, Japan, 2019.

Awards / Recognitions

Dr. Kiran Kumar Kuchi, *Vasvik Industrial Research Award* in Electrical and Electronic Sciences category for 2018.

D. Santhosh Reddy, R. Bharath, and P. Rajalakshmi, *Outstanding paper award* in IEEE Healthcom 2018 .

P. K. Mishra, B. Jagadish, M.P.R.S. Kiran, and P. Rajalakshmi, *Outstanding paper award* in IEEE Healthcom 2019.

Ajay Kumar, Mahersh Taparia, won *Best oral presentation* at ICRISAT CORTEVA Plant Science Symposium 2018 at ICRISAT, Patancheru, Hyderabad India.

Dr. Amit Acharyya, Visiting Research Fellow in the University of Southampton, UK from 2018-2019.

Dr. Amit Acharyya, *Young Investigator's Award* for Basic Science in the Heart Rhythm Congress, UK 2018 – Mr. Naresh V and Dr. Acharyya's collaborative work with the Southampton General Hospital, UK won the prestigious Young Investigators Competition, at Heart Rhythm Congress 2018, Birmingham, UK organized jointly by the Arrhythmia Alliance and the British Heart Rhythm Society. (The future of S-ICD sensing: 'IMPROVE' significantly increases R:T ratio and generates universal device eligibility without impairing VF detection; Reference: EP Europace, Volume 20, Issue suppl_4, 1 October 2018, Pages iv1).

Dr. Amit Acharyya, B. Tech project titled Modified Huffman based compression methodology for Deep Neural Network Implementation on Resource Constrained Mobile Platforms done by Mr. Sunil Pankaj and Mr. Wasim Akram is selected for *AMD Best BTech Project Award*.

Number of patents filed: 6, successfully completed introduction of a new waveform in Rel-15 and Rel-16 of 5G New Radio global standard. Development of end-to-end 5G testbed is on track. Development of NB-IoT SoC initiated

Primary focus research areas can be broadly classified into the following areas: 1) Agricultural sector: where we developed IoT based ground and aerial networks for monitoring important soil and crop parameters. In conjunction with AI, using this data, we developed intelligent algorithms for significantly improving the speed of crop phenotyping; 2) Intelligent and autonomous transportation: We developed a LiDAR testbed at WiNet Lab, IITH for utilizing the point cloud data for accurate real-time obstacle detection which can be used in autonomous ground and aerial vehicles; 3) Healthcare: We are putting continuous efforts in developing computer aided diagnosis frameworks using both ultrasound and EEG, along with state of the art AI algorithms for autonomous diagnosis which are more reliable, especially in developing countries; 4) Theoretical aspects of IoT: We work in theoretical modeling of efficient data aggregation methods, channel access mechanisms and security for large scale and dense traffic IoT networks

Implementing an indigenous Phased Locked Loop (PLL) in Complementary metal oxide semiconductor (CMOS) for dual frequency IRNSS SPS receiver (for L5 and S bands) with brief system specification: L5 band: 1176.45 MHz (24 MHz) and S-band: 2492.028 MHz (16.5 MHz), Receiver Sensitivities: -136 dBm for L5-band and -139 dBm for S-band

Implementing an indigenous power amplifier suitable to work under X-band space grade applications with higher output power and efficiency in GaN process

Implementing the entire physical layer in the DVB-S2 standard: modulation techniques like APSK, frame, phase, frequency and time synchronization, coding techniques like BCH and LDPC.

LIBERAL ARTS

The Department of Liberal Arts comprising of 16 faculty members offers courses in various disciplines including Anthropology, Cultural Studies, Development Studies, Economics, English, Linguistics, Psychology, and Sociology. Liberal Arts faculty have published book chapters, and several journal papers in the year 2018-2019. Additionally, faculty in the area of anthropology and sociology have published two books. Also, faculty have been invited for talks at various conferences and seminars, both national and international; and have received research grants in the area of economics and psychology in 2018-19. Several faculty and students have received awards and recognitions by various international bodies. The department organized seminars in the disciplines of medical humanities and psychology in February 2019. Furthermore, the department has launched a masters program in Development Studies that will commence from the next academic semester.

FACULTY

Haripriya Narasimhan
Ph.D – Syracuse University - NY, USA
Associate Professor
Research Areas: Media, Gender, Health, India

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

K.P. Prabheesh
Ph.D – IIT Madras
Associate Professor
Research Areas: Macroeconomics, International Finance and Applied Econometrics

Amrita Deb
Ph.D – BHU, Varanasi
Associate Professor
Research Areas: Positive Psychology, Clinical Psychology and Personality Psychology

M.P. Ganesh
Ph.D – IIT Bombay
Associate Professor
Research Areas: Cross-Cultural Virtual Teams, Workplace Bullying, Cross-Cultural Collaborations

Srirupa Chatterjee
Ph.D – IIT Kanpur
Assistant Professor
Research Areas: American Literature, Body Studies, Gender Studies, Literary Theory

Mahati Chittem
Ph.D – University of Sheffield, UK
Assistant Professor
Research Areas: Chronic Disease Management, Health Behaviours

Shubha Ranganathan
Ph.D – IIT Bombay
Assistant Professor
Research Areas: Culture and Mental Health, Qualitative Research Methods, Gender, Critical Psychology, Chronicity and Care-Giving

Nandini Ramesh Sankar
Ph.D – Cornell University, USA
Assistant Professor
Research Areas: 20th Century and Contemporary Poetry, Visual Arts, Theories of the Gift, Literature and Philosophy

Prakash Mondal
Ph.D – IIT Delhi
Assistant Professor
Research Areas: Theoretical Linguistics, Language and Computation, Language and Biology, Philosophy of Language and Mind

Anindita Majumdar
Ph.D – IIT Delhi
Assistant Professor
Research Areas: Medical Anthropology, Kinship, Reproduction, Infertility

Aalok Khandekar
Ph.D – Rensselaer Polytechnic Institute
Assistant Professor
Research Areas: Science, Technology, and Society Studies (STS), Environmental Sustainability, Urban Studies, Cultural Anthropology

Chandan Bose
Ph.D – University of Canterbury, New Zealand
Assistant Professor
Research Areas: Ethnography, Historiography, Visual Anthropology, Artisanal Communities and Production, Critical Heritage Studies, Memory, Futures

Shuhita Bhattacharjee
Ph.D – University of Lowa
Assistant Professor
Research Areas: Nineteenth-Century Literature and Culture, Religion and the Post-Secular, Gender and Sexuality Studies, Postcolonial Studies, Graphic Novels, Literature and Culture of The Diapora

Amrita Datta
Ph.D – International Institute of Social Studies, Erasmus University Rotterdam
Assistant Professor
Research Areas: Development Studies, Migration and Development, Gender and Development, Village and Longitudinal Studies

Book Published

Anindita Majumdar, Surrogacy: Oxford India Short Introductions. New Delhi: Oxford University Press, 2019.

Chandan Bose, Perspectives on work, home and identity from artisans in Telangana: Conversations around Craft, Palgrave Macmillan, New York, 2019.

Book Chapters

A. Deb, Understanding resilience in a multicultural society: The Indian perspective. In Jourdan-Ionescu, C., Ionescu, S., Kimessoukié-Omolomo, É., & Julien-Gauthier, F. (Eds.), Resilience et culture, culture de la resilience (pp. 27-35). Québec, Canada: Livres en ligne du CRIRES, 2018.

A. Deb, Psychology of resilience. In G. Misra (Ed.). Psychosocial interventions for health and well-being (pp. 43-57). New Delhi: Springer, 2018.

S. Ranganathan, Indigenous healing practices in India: Shamanism, spirit possession, and healing shrines. In G. Misra (Ed.). Psychosocial interventions for health and wellbeing. New Delhi: Springer, 2018.

Publications
(in peer reviewed journals)

Vaseem Akram and Badri Narayan Rath, Exchange rate misalignment and total factor productivity growth in case of emerging market economies, International Economics and Economic Policy, 15, 2018, 547-564.

K. Seenaiah and Badri Narayan Rath, Does innovation matter for total factor productivity growth in India? Evidence from ARDL bound testing approach, *International Journal of Emerging Markets*, 13, 2018, 1311-1329.

Vaseem Akram, Bhushan Praveen Jangam, and Badri Narayan Rath, Does human capital matter for reduction in energy consumption in India? *International Journal of Energy Sector Management*, 2018, 10.1108/IJESM-07-2018-0009.

K. Seenaiah and Badri Narayan Rath, Does innovation enhance productivity in case of selected Indian manufacturing firms? Singapore Economic Review, 2018, 10.1142/S0217590818500340

Bhavesh Garg and K.P. Prabheesh, External Shocks, consumption-smoothing and capital mobility in India: evidence from an intertemporal optimization approach, Applied Economics, 50, 2018, 4814-4829.

M. Chittem, S. Chawak, S.G. Sridharan, and R. Sahay, The relationship between diabetes-related emotional distress and illness perceptions among Indian patients with Type II diabetes, Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 13(2), 2018, 965-967.

M. Chittem, P. Norman, and P. Harris, Primary family caregivers' reasons for disclosing versus not disclosing a cancer diagnosis in India, Cancer Nursing, 2018, 10.1097/NCC.0000000000000669.

A. Broom, K. Kenny, E. Kirby, N. George, and M. Chittem, Improvisation, therapeutic brokerage and antibiotic (mis)use in India: A qualitative interview study of Hyderabadi physicians and pharmacists, Critical Public Health, 2018, 1-12.

R.S. Ture and M.P. Ganesh, Pro-environmental behaviours at workplace: an empirical study in Indian manufacturing organizations, *Benchmarking: An International Journal*, 25(9), 2018, 3743-3766.

Anindita Majumdar, Conceptualizing Surrogacy as Work-Labour: Domestic Labour in Commercial Gestational Surrogacy in India, *Journal of South Asian Development*, 13(2), 2018, 1-18.

Anindita Majumdar, ARTs and the Problematic Conceptualisation of Declining Reproduction, *Indian Journal of Medical Ethics*, 3(2), 2018, 119-24.

Badri Narayan Rath, Vaseem Akram, Debi Prasad Bal, and Mantu Kumar Mahalik, Do fossil fuel and renewable energy consumption affect total factor productivity growth? Evidence from cross-country data with policy insight, Energy Policy, 127, 2019, 186-199.

Pradipta Kumar Sahoo, D. Tripati Rao, and Badri Narayan Rath, Does financial integration reduce output volatility? New evidence from cross-country data, Economic papers: A Journal of Applied Economics and Policy, 38, 2019, 41-55.

Badri Narayan Rath, Does total factor productivity converge among ASEAN countries? Bulletin of Monetary Economics and Banking, 21, 2019, 477-494.

Debi Prasad Bal and Badri Narayan Rath, Nonlinear causality between crude oil price and exchange rate: A comparative analysis of China and India – A reassessment, Economics Bulletin, 39, 2019, 592-604.

Vaseem Akram and Badri Narayan Rath, Is there any evidence tax-and-spend, spend-and-tax or fiscal synchronization from panel of Indian state? Applied Economics Letters, 2019, 10.1018/13504851.2019.1584363.

C.T. Vidya and K.P. Prabheesh, Intra-Industry Trade between India and Indonesia, Bulletin of Monetary Economics and Banking, 12, 2019, 511-530.

S. Chawak, M. Chittem, P. Butow, and N. Huilgol, Indian cancer patients' needs, perceptions of and expectations from their support network: A qualitative study, *Journal of Cancer Education*, 2019, 10.1007/s13187-019-1483-4.

S. Kottai and S. Ranganathan, Fractured narratives of psy disciplines and the LGBTQIA+ rights movement in India: A critical examination, *Indian Journal of Medical Ethics*, 2019, 10.20529/IJME.2019.009.

M.P. Ganesh and M. Ángeles López-Cabarcos, Paula Vázquez-Rodríguez. Are self-leaders more willing to mentor others? A study among Indian and Spanish university teachers, Cross Cultural & Strategic Management, 2019, 10.1108/CCSM-04-2017-0047.

K. Chua, S. Nair, and M.P. Ganesh, Strategies in Developing an Aviation & Aerospace Skill Ecosystem for the State of Telangana, India–Case Study of TASK-Telangana Academy for Skill and Knowledge. *International Journal of Aviation, Aeronautics, and Aerospace*, 6(1), 2019, 4.

Shuhita Bhattacharjee, Review of Imperial Women Writers in Victorian India: Representing Colonial Life, 1850–1910, by Éadoaoin Agnew, English Literature in Transition, 1880-1920, 62(3), 2019, 435-441.

Publications
(in peer reviewed conferences)

Prakash Mondal, Lexicon, Meaning Relations, and Semantic Networks, Workshop on Natural Language for Artificial Intelligence (NL4AI), 2018, 40-52.

Talks Given in National / International Conferences

M. Chittem, *Miles to go before we sleep: How public perceptions, structural barriers and illness experiences shape cancer outcomes in India, Invited paper, Asia-Pacific region*, the International Psycho-oncology Society (IPOS) conference, Hong Kong, 2018.

M. Chittem, T. Epton, and R. Tanikella, *Is it all in the label? The role of using a medical term vs euphemism on psychological outcomes and health behaviours among Indian cancer patients*, International Psycho-oncology Society (IPOS) conference, Hong Kong, 2018.

M. Chittem and C. Rowland, *Supportive care needs and their association with psychological well-being, illness beliefs and quality of life among cancer patients in India*, the Multinational Association of Supportive Care in Cancer conference, Vienna, Austria, 2018.

K.P. Prabheesh, *The effectiveness of trilemma policy mix in the presence of macroprudential policies: Evidence from emerging economies*, 8th Applied Financial Modelling Conference, Istanbul Sehir University, Istanbul, Turkey, 11-12 April 2018.

Anindita Majumdar, *Banning a select few: Conversations on reproductive justice and reproductive labour in commercial surrogacy in India, Sexual and Reproductive Rights in India: Social Movements and Legal Battles*, Centre for Law and Policy Research in association with University of Sussex and Centre on Law and Social Transformation, University of Bergen, Norway, Bangalore, 14-15 April 2018.

Aalok Khandekar, Kim Fortun, Mike Fortun, Lindsay Poirier, Alli Morgan, Brian Callahan, Brandon Costelloe-Kuehn, Alison Kenner, and Brad Fidler Hosting the platform for experimental, collaborative ethnography, Panel on Displacements of Method/The Collaborative Lab as Generative Space, Displacements, Biennial Meeting of the Society for Cultural Anthropology (in partnership with the Society for Visual Anthropology, Virtual Conference, 19-21 April 2018.

Srirupa Chatterjee, *Biblical radicalism and gender politics in Marilynne Robinson's housekeeping*, The American Literature Association (ALA) Annual Conference, San Francisco, CA, USA, 24-28 May 2018.

Aalok Khandekar, Kim Fortun, Mike Fortun, Lindsay Poirier, Alli Morgan, Brian Callahan, Brandon Costelloe-Kuehn, Alison Kenner, and Brad Fidler, Hosting the platform for experimental, collaborative ethnography, Digital Humanities Alliance of India conference. Indian Institute of Management Indore and Indian Institute of Technology Indore, 1-2 June 2018.

Anindita Majumdar, *The rogue doctor: Imagining legitimacy in assisted conception in India, Remaking reproduction: The global politics of reproductive technologies*, Reproductive Sociology Group, Department of Sociology, University of Cambridge, UK, 27-29 June 2018.

Amrita Deb, *Incorporating resilience into textbooks: Positive education practices in an institute of higher education in India*, Fourth World Congress on Resilience and Culture, University Aix-Marseille, Marseille, France, 28-30 June 2018.

Haripriya Narasimhan, *The Midwife and the Dula: Changing Professional Birthing Practices in Contemporary Indian Obstetrics and Gynaecology,* European Conference for South Asian Studies, Paris, France, July 2018.

Anindita Majumdar, *Infertility as inevitable: The nature of chronicity in assisted reproduction in India*, European Conference on South Asian Studies (ECSAS), European Association of South Asian Studies Annual Meeting, Paris, 24-27 July 2018.

Anindita Majumdar, *The quest for children: Conceptualising the post-menopausal in India, Reframing the Biological Clock: Aging and Reproduction in Contemporary Ethnographies,* Indian Institute of Technology Hyderabad in association with Wellcome UK, 17-18 August 2018.

K.P. Prabheesh, *Intra-industry trade between India and Indonesia, maintaining stability, Strengthening momentum of growth amidst high uncertainties*, Bali, Indonesia, 29-31 August 2018.

Badri Narayan Rath, *Does total factor productivity converge among ASEAN countries?* 12th BMEB International Conference, Bank of Indonesia, Bali, 30-31 August 2018.

Badri Narayan Rath and Bhushan Praveen Jangam, *Does Productivity Differential Drive the Real Exchange Rate Movements? A Re-Examination of the Balassa Samuelson Hypothesis in Selected EMEs*, 12th BMEB International Conference, Bank of Indonesia, Bali, 30-31 August 2018.

Aalok Khandekar and Kim Fortun, Presenter and Panel Chair, studying air pollution governance in 6+ cities: Theory, tactics, findings, Panel on Air Pollution Governance: Histories, Sites, Styles, TRANSnational STS, Annual Meetings of the Society for Social Studies of Science. Sydney, Australia, 29 August-1 September 2018.

Aalok Khandekar, *Lead curator, STS across borders exhibit*, Annual Meetings of the Society for Social Studies of Science. Sydney, Australia, 30-31 August 2018.

Aalok Khandekar, *Studying air pollution governance in 6+ cities: Theory, tactics, findings*. Centre for Public Awareness of Science, Australian National University, Canberra, Australia, 3 September 2018.

Aalok Khandekar, Invited Participation, The Second Technology Foresight Meeting on AI & Environment and Sustainability Lab, Tandem Research, Goa, India, 5 October 2018.

Anindita Majumdar, *Conceptualizing Declining Reproduction: Exploring Old and New Fertilities within Assisted Reproduction in India*, BRICS Dialogues on Fertility Industry: New Reproduction and (Old) Stratification, University of Cape Town, 4-5 October 2018.

Aalok Khandekar, *Studying air pollution governance in 6+ cities: Theory, tactics, findings. School of Humanities and Social Sciences*, Birla Institute of Technology and Science Pilani, Hyderabad Campus, India, 24 October 2018.

Aalok Khandekar, *Crafting knowledge, anchoring innovation in handloom weaving in India*, Conference on Rethinking Indian Industrialization of Crafts, Chirala, India, 11-18 November 2018.

Aalok Khandekar, *Developing Research infrastructure for Collaborative Hermeneutics (RICH)*, Popular Talk Series, Indian Institute of Technology Hyderabad, 14 November 2018.

Aalok Khandekar, Resource Faculty, *Short-Term Programme on Disaster Management, Human Resource Development Centre (HRDC)*, University of Hyderabad, India, 16 November 2018.

Prakash Mondal, Lexicon, *Meaning Relations, and Semantic Networks*, International Workshop on Natural Language for Artificial Intelligence (NL4AI), Trento, Italy, 22-23 November 2018.

Aalok Khandekar, STS in the New Technoscientific Consensus, International Conference on Interrogating the technoscientific consensus: Intersections, Complementarities and Disconnects between Citizen Science, STS, and Innovation Studies, Indian Institute of Technology Bombay, India, 4 December 2018.

Aalok Khandekar, *Hosting the platform for experimental, collaborative ethnography*, Hitotsubashi University, Tokyo, 18 December 2018.

Srirupa Chatterjee and Shreya Rastogi, *Beauty Politics and Aesthetic Labour in Post Millennial Indian Cinema*, International conference on Region/Nation/Trans-Nation: Literature-Cinema Interface. Department of Humanities & Social Sciences, Birla Institute of Technology & Science, Pilani, Goa, India, 31 January-2 February 2019.

Badri Narayan Rath and Vaseem Akram, *A reassessment of productivity growth convergence: Evidence from cross-country analysis*, 7th Applied Financial Modelling Conference, Deakin University, Melbourne, 7-8 February 2019.

Anindita Majumdar, *Creation Narratives: Conceptualising men's procreative experiences in transnational commercial surrogacy in India, Exploring Networks of Transnational Surrogacy*, Forum Transregionale Studien with Max Weber Stiftung, Berlin, 14-15 February 2019.

Aalok Khandekar, *Anthropology in Science and Engineering Education and Research*, Chaitanya Bharati Institute of Technology, Hyderabad, 7 March 2019.

Seminars Conducted

Jeyavelu, Professor and Dean, VIT-AP Business School delivered a talk on Liberal Education, 20 August 2018.

Devesh, Controller of Examinations, University of Hyderabad, RTI Act, 2005, 29 August 2018.

Sheela Prasad, Professor and Head of Regional Studies, University of Hyderabad, A Small Family is a Happy Family? Population Control Modernity and Women in India, 5 September 2018.

B.S. Sherin, The English and Foreign Languages University, Hyderabad, Public Universities and the Precarity of Humanities, 12 September 2018.

Rahul Menon, Assistant Professor, School of Livelihoods and Development, Tata Institute of Social Science, Hyderabad, Secular stagnation and excess savings: A Keynesian view, 19 September 2018.

Johny Stephen, Department of Natural Resources and Governance, TISS Hyderabad, Fishing for Space- Understanding conflicts over natural resources from a spatial perspective, 26 September 2018.

Varalakshmi, School of Medical Sciences, University of Hyderabad, Gender dimensions of health and social status among older adults, 3 October 2018.

Nishant Sinha, Consultant Pulmonologist, Care Hospital, Patient's expectations and health care delivery in India: Doctor's role more than a Doctor? 17 October 2018.

Vinoo Alluri Assistant Professor, Cognitive Science, IIIT Hyderabad, Decoding Brain States Using Music, 24 October 2018.

N. Rekha, Mahatma Gandhi National Council of Rural Education, Hyderabad, Factors influencing mentor's learning from mentoring relationships: Insights from a serial mediation study in Indian context, 30 October 2018.

S. Kousik, Department of Biomedical Engineering, IIT Hyderabad. Parkinson's disease – beyond the motor cliché, 14 November 2018.

Sujata Raman, Australian National University, Making Antibiotic Resistance a Matter of Environmental Justice, 9 January 2019.

Kavita Chauhan, University of Hyderabad, Communication in Art, 16 January 2019.

Mini Thomas, BITS-Pilani, Hyderabad, New Insights from a structural approach to India's Services-led Growth story, 6 February 2019

Ayla Joncheere, Ghent University, Belgium, Travelling among Kalbeliya Dancers: From staging of authenticity to intercultural dialogues in Indian dance practice, 27 February 2019.

Sunita Vatuk, Independent scholar, Kolams: Mathematical Thinking in a South Indian Art Form, 27 March 2019.

Workshops / Symposiums

Two-day seminar on The performing body: Conversations on Medical Humanities, organized by Haripriya Narasimhan and Shubha Ranganathan, Department of Liberal Arts, IIT Hyderabad, 1-2 February 2019.

One-day Resilience Seminar funded by Indian Council of Medical Research, organized by Amrita Deb, Department of Liberal Arts, IIT Hyderabad, 15 February 2019.

Awards / Recognitions

Badri Narayan Rath, *Member in Editorial Advisory Board*, Science, Society and Technology Journal, (Sage).

Badri Narayan Rath, *Member in the Scientific Committee*, 1st APAEA PhD Scholar Conference, Xi'an International Studies University, China, 18-19 June 2018.

Badri Narayan Rath, *Member in the Scientific Committee*, 7th Applied Financial Modelling Conference, Deakin University, Melbourne, 7-8 February 2019.

Utsab Ray, *Fulbright Doctoral Fellowship*, US.

Rajalekshmi K, *Charles Wallace India Trust short-term Research Fellowship*, UK.

Prakash Mondal, *Albert Nelson Marquis Lifetime Achievement award-2018*.

Aalok Khandekar, *Visiting Researcher*, Department of Anthropology, University of California Irvine, USA.

Aalok Khandekar, *Member, Rachel Carson Book Prize Committee 2020*, Society for the Social Studies of Science (4S).

Aalok Khandekar, *Member, Conference Program, Committee*, Annual Meeting of the Society for the Social Studies of Science (4S), New Orleans 2019.

Aalok Khandekar, *Lead Curator*, Innovating STS, Annual Meeting of the Society for the Social Studies of Science (4S), New Orleans 2019.

Aalok Khandekar, *Editor, infraStrucTureS*, http://stsinfrastructures.org.

Aalok Khandekar, *Member, International Advisory Committee*, Dutch Council for Scientific Research-Science for Global Development (NWO-WOTRO) Sustainable Development Goals (SDG) Research Programme, 2018-2023.

RESEARCH

HIGHLIGHT

Prakash Mondal's recent research work proposes a fresh formulation of conceptually grounded meaning relations by way of construction of certain well-defined relations over the lexicon of a natural language. These relations are constrained by the logical structures of linguistic meanings across sentence and discourse contexts. One of the biggest advantages of such meaning relations is that they are not defined over, or do not ride on, the syntactic structure of a given language. Nor do they turn on compositional relations for the computation of meaning values. This helps in the formulation of meaning relations to be defined on the symbolic elements of a lexicon on the one hand, and to be extracted from the surface structure of linguistic constructions on the other. This has consequences not merely for the nature of lexical meaning but also for the construction of a kind of (shallow) semantic networks that can be used for semantic processing in natural language understanding or machine translation systems that are driven by a kind of shallow processing of linguistic meanings. AI research on natural language will hopefully benefit from this formalism because it reduces the computational burden of relying on heavy syntactic resources of natural languages.

Aalok Khandekar launched a new digital research platform, infraStrucTureS (http://stsinfrastructures.org), for the field of Science and Technology Studies (STS) in collaboration with Society for Social Studies of Science (4S). They have hosted a digital and gallery exhibition, STS Across Borders, at the 2018 annual 4S conference in Sydney, Australia, with over 20 participating groups internationally. We continue with a new exhibit, Innovating STS, which will be hosted as part of the 2019 annual 4S conference in New Orleans.

Chandan Bose's current work is on craft practices and knowledges, learning and sharing of skill, relationship between work and identity, colonial discourse on artisanal production, construction of 'craft' and 'craftspeople' as subjectivities by the nation-state, new emerging markets and technologies in urban spaces, and global commodification of heritage.

MATERIALS SCIENCE & METALLURGICAL ENGINEERING

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

The MSME department at IITH offers unique innovative courses, which are unparalleled with courses at other IITs. Research programs are closely designed with national research laboratories and industries. Currently MSME has annual intake of 20 B.Tech. and 12 M.Tech students and has over 50 registered PhD scholars who are working in fundamentals to advance and emerging areas. The department has over INR 3 Cr of project funding and publishes a large number of articles every year in reputed international journals. The department offers a unique curriculum comprised of fractal courses which facilitates expansion of the core subject acumen as well as personal skills. The department prepares its students for professional roles to perform in industry and cutting edge R&D, as well as encourages them for the entrepreneurship.

FACULTY

Bharat B. Panigrahi
Ph.D – IIT Kharagpur
Associate Professor & HoD
Research Areas: Powder Metallurgy; Sintering; Nanocrystalline Materials; High Entropy Alloys; Max Phase and Mxene; Microstructure-Properties of Steels; Titanium Alloys; Composites, Additive Manufacturing

Pinaki Prasad Bhattacharjee
Ph.D – IIT Kanpur
Associate Professor
Research Areas: High Entropy Alloys; Thermo-Mechanical Processing; Crystallographic Texture; Mechanical Properties

Suhash Ranjan Dey
Ph.D – University Paul-Verlaine - Metz, France
Associate Professor
Research Areas: Multi-Component Alloys; Titanium Alloys; CIGS/CZTS Solar Cells; Electrodeposition; Biomaterials; Interstitial Free Steels

Ranjith Ramadurai
Ph.D – IISc Bangalore
Associate Professor
Research Areas: Multifunctional Thin Films; Piezoresponse Force Microscopy; Hybrid Piezoelectrics; Piezoelectric Sensors and Actuators

Atul Suresh Deshpande
Ph.D – Max-Planck Institute of Colloids and Interfaces - Potsdam, Germany
Assistant Professor
Research Areas: Nanomaterial Synthesis; High Entropy Oxides; Superhydrophobic Materials; Energy Storage Materials

Saswata Bhattacharya
Ph.D – IISc Bangalore
Associate Professor
Research Areas: Phase-Field Modeling of Microstructural Evolution in Alloys and Oxides; Phase Transformations; Micromechanical Modeling

Mudrika Khandelwal
Ph.D – University of Cambridge, UK
Assistant Professor
Research Areas: Cellulose Composites; Drug Delivery; In Situ Modifications; Food Packaging

Subhradeep Chatterjee
Ph.D – IISc, Bangalore
Assistant Professor
Research Areas: Phase Transformations; Electron Microscopy; Welding and Solidification Processing; Microstructural Modelling

Rajesh Korla
Ph.D – University of Cambridge, UK
Assistant Professor
Research Areas: Deformation Behavior of Materials at Room Temperature and High Temperature

Sai Rama Krishna Malladi
Ph.D – Technische Universiteit Delft, The Netherlands
Assistant Professor
Research Areas: In Situ Transmission Electron Microscopy; Phase Transformations in Materials; Electrochemsitry and Corrosion; Graphene Based Super Capacitors; Materials for Energy Applications

Shourya Dutta Gupta
Ph.D – Swiss Federal Institute of Technology Lausanne
Assistant Professor
Research Areas: Plasmonics; Nanophotonics; Biosensing; Raman Spectroscopy; Nanofabrication; Active Devices; Graphene Devices

Chandrasekhar Murapaka
Ph.D – Nanyang Technological University (NTU) Singapore
Assistant Professor
Research Areas: Nanomagnetic Materials; Spintronic Based Memory and Logic Devices

Patents Filed

Mudrika Khandelwal, Shivakalyani Adepu, Pharmaceutical Compositions And Delivery Systems For Prevention And Treatment Of Candidiasis, 17 September 2018, Provisional Application No. 201841034939.

Book Published

B.S. Murty, J.W. Yeh, S. Ranganathan, P.P. Bhattacharjee, High Entropy Alloys, 2nd edition, Elsevier, 2019.

Publications
(in peer reviewed journals)

S.R. Reddy, U. Sunkari, A. Lozinko, S. Guo, and P.P. Bhattacharjee, Development and homogeneity of microstructure and texture in a lamellar $AlCoCrFeNi_{2.1}$ eutectic high entropy alloy severely strained in the warm-deformation regime, *Journal of Materials Research*, 34, 2019, 687-699 (Invited article).

U. Sunkari, S.R. Reddy, S. Chatterjee, and P.P. Bhattacharjee, Effect of prolonged aging on phase evolution and mechanical properties of intermetallic strengthened $CoCrFeNi_2$. 1Nbx high entropy alloys, Materials Letters, 248, 2019, 119-122.

S. Narayanswamy, S.R. Reddy, R. Saha, and P.P. Bhattacharjee, Texture Homogeneity and Stability in Severely Warm-Rolled and Annealed Ultrafine Pearlite, Materials Science and Technology, 35, 2019, 437-447.

Vajinder Singh, Chandan Mondal, P.P. Bhattacharjee, and P. Ghosal, Microstructural Characterization by Automated Crystal Orientation and Phase Mapping by Precession Electron Diffraction in TEM: Application to Hot Deformation of a γ-TiAl based Alloy, Microscopy and Microanalysis, https://doi.org/10.1017/S1431927619000394.

V. Singh, C. Mandal. P.P. Bhattacharjee, and P. Ghosal, Hot Deformation of High Nb-containing γ-TiAl Alloy in the Temperature Range of 1000°-1200°C: Microstructural Attributes to Hot Workability, SN Applied Sciences, 1, 2019, 366.

S.S. Kumar, T. Raghu, and P.P. Bhattacharjee, G.A. Rao, U. Borah, Evolution of microstructure and microtexture during hot deformation in an advanced P/M nickel base superalloy, Materials Characterization, 146, 2018, 217-36.

Vajinder Singh, Chandan Mondal, Atul Kumar, P.P. Bhattacharjee, and P. Ghosal, High temperature compressive flow behavior and associated microstructural development in a β-stabilized high Nb-containing γ-TiAl based alloy, *Journal of Alloys and Compounds,* 788, 2019, 573-585.

B.R. Bodapati, P. Sudharshan Phani, P.P. Bhattacharjee, and G. Sundararajan, Uniaxial compression behaviour of porous copper: Experiments and modelling, Materials Today Communications, 16, 2018, 320-329.

B.R. Bodapati, P. Sudharshan Phani, P.P. Bhattacharjee, and G. Sundararajan, On the Constraint Factor and Tabor Coefficient Pertinent to Spherical Indentation, Transactions of the Indian Institute of Metals, 71, 2018, 2893-2901.

Sreekanth Mandati, Bulusu V. Sarada, Suhash R. Dey, and Shrikant V. Joshi, Two-dimensional CuIn1-xGaxSe2 Nano-flakes by Pulse Electrodeposition for Photovoltaic Applications, Solar Energy, 181, 2019, 396-404.

Brijesh Singh Yadav, Suhash R. Dey, and Sanjay R. Dhage, Effective ink jet printing of aqueous ink for $Cu(In,Ga)Se_2$ thin film absorber for solar cell application, Solar Energy, 179, 2019, 363-370.

Rajamallu Karre, Basanth Kumar Kodli, Archana Rajendran, Nivedhitha J., Deepak Pattanayak, Kei Ameyama, and Suhash R. Dey, Comparative study on Ti-Nb binary alloys fabricated through spark plasma sintering and conventional P/M routes for biomedical application, Materials Science and Engineering C, 94, 2019, 619-627.

P.K. Kannan, Sushmita Chaudhari and Suhash R. Dey, Impact of sulphurisation environment on formation of Cu_2ZnSnS_4 film using electron beam evaporated stacked metallic precursors, Bulletin of Materials Science, 42, 2019, 11-17.

Sreekanth Mandati, Suhash R. Dey, Shrikant V Joshi, and Bulusu V Sarada, $Cu(In,Ga)Se_2$ Films with Branched Nanorod Architectures Fabricated by Economic and Environmental-friendly Pulse-reverse Electrodeposition Route, ACS Sustainable Chemistry & Engineering, 6, 2018, 13787-13796.

Harendra Kumar, Rajamallu K, Rameez R. Tamboli, and Suhash R. Dey, Fabrication of beta $Ti_{29}Nb_{13}Ta_{4.6}Zr$ alloy through powder metallurgy route for biomedical applications, Transactions of PMAI, 44(1), 2018.

Ronit Ganguly, Hasnat Zamin, Nishant Saxena, Anbarasu Manivannan, Amit Acharyya, and Ranjith Ramadurai, Dielectric Switching Studies of poly-vinylidene fluoride thin films with dominant planar ferroelectric domain configuration for flexible electronic devices, IEEE, (TDEI), 2019.

M.M. Saj Mohan, Soumya Bandyopadhyay, Tushar Jogi, Saswata Bhattacharya, and Ranjith Ramadurai, Realization of Rhombohedral, Mixed and Tetragonal like phases of BiFeO3 and Ferroelectric Domain Engineering Using a Strain Tuning Layer on LaAlO3(001) Substrate, *J. Appl. Phys.,* 125, 2019, 12501, 10.1063/1.5054372.

K Prabahar, R Ranjith, P Saravanan, and A Srinivas, Effect of magnetic field annealing on the magnetostriction and deflection properties of $CoFe_2O_4$ thin films grown by PLD, J. Magn. Magn. Mater., 475, 2019, 276-281.

Kumaraswamy Miriyala and Ranjith Ramadurai, Microstructural Influence on Ferroelectric Domain Pattern and Piezoelectric Properties of $Na_{0.5}Bi_{0.5}TiO_3$ Thin Films, Ceram. Int., 44, 2018, 14556-14562.

Ronit Ganguly, Soumya Bandyopadhyay, Kumaraswamy Miriyala, Vijayabhaskar Gunasekaran, Saswata Bhattacharya, Amit Acharyya, and Ranjith Ramadurai, Tunable polarization components and electric field induced crystallization in polyvinyliden-efluoride: A piezo polymer, Polymer crystallization, 2(1), 2018, e10027.

N. Ramu, K. Meera, R. Ranjith, and R. Muralidharan, The role of B-site substitution on the structural and dielectric properties of samarium orthoferrite polycrystals, Materials Research Express, 6(3), 2018, 036106.

D. Singh, B. Mallesham, A. Deshinge, K. Joshi, R. Ranjith, and V. Balakrishnan, Nanomechanical behavior of Pb $(Fe_{0.5} - xScxNb_{0.5})$ O_3 multi-ferroic ceramics, Materials Research Express, 5(11), 2018, 116303.

Sahil Rohila, R. B. Mane, G. Ummethala, and B. B. Panigrahi, Nearly full-density pressureless sintering of AlCoCrFeNi-based high-entropy alloy powders, *Journal of Materials Research*, 34, 2019, 777-786.

R. B. Mane, A. Hari Babu, S. Rohila, and B. B. Panigrahi, Oxidation kinetics of Ti_3GeC_2 MAX phase, Corrosion Science, 151, 2019, 81-86.

Rahul B. Mane and B. B. Panigrahi, Sintering mechanisms of mechanically alloyed CoCrFeNi high entropy alloy powders, *Journal of Materials Research*, 33, 2018, 3321-3329.

Rahul B. Mane, Y. Rajkumar and B. B. Panigrahi, Sintering mechanism of CoCrFeMnNi high-entropy alloy powders, Powder Metallurgy, 61, 2018, 131-138.

Rahul B. Man and B. 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 B. 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, A. Hari Babu, and B. B. Panigrahi, Synthesis and sintering of Ti_3GeC_2 MAX phase powders, Ceramics International, 44, 2018, 890-893.

D. Davis, M. Srivastava, M. Malathi, B. B. Panigrahi, and S. Singh, Effect of Cr_2AlC MAX phase addition on strengthening of Ni-Mo-Al alloy coating on piston ring: Tribological and twist-fatigue life assessment, Applied Surface Science, 449, 2018, 295-303.

R. B. Mane, B. B. Panigrahi, Effect of configurational entropy on sintering behavior of high entropy alloy powders, Trans. PMAI, 44, 2018, 1-11.

D. Damodar, S.K. Kumar, S.K. Martha, and A.S. Deshpande, Nitrogen-doped graphene-like carbon nanosheets from commercial glue: morphology, phase evolution and Li-ion battery performance, Dalton Transactions. 47(35), 2018, 12218-27.

M. M. Saj Mohan, S. Bandyopadhyay, T. Jogi, Saswata Bhattacharya, and R. Ramadurai, Realization of rhombohedral, mixed, and tetragonal like phases of $BiFeO_3$ and ferroelectric domain engineering using a strain tuning layer on $LaAlO_3$ (001) substrate, *Journal of Applied Physics*, 125(1), 2019, 012501.

Sandeep Sugathan and Saswata Bhattacharya, Phase-Field Modelling of Evolution of Compact Ordered Precipitates in Ternary Alloy Systems, MRS Advances, 104, 2019, 1-7.

M.P. Illa, M. Khandelwal, and C.S. Sharma, Bacterial cellulose-derived carbon nanofibers as anode for lithium-ion batteries. Emergent Materials, 2018, 1-16.

Gaydhane, M.K., and et al., Cultured meat: state of the art and future, Biomanufacturing Reviews, 3(1), 2018, 1.

N. T. B. N. Koundinya, Nandha Kumar E, Niraj Chawake, Rajesh Korla, and Ravi Sankar Kottada, A simple and versatile machine for creep testing at low loads (6–300 N) and on miniaturized specimens: Application to a Mg-base alloy, Review of Scientific Instruments 89, 2018, 105102.

Sarode Krishna Kumar, Sourav Ghosh, Sairam K. Malladi, Jagjit Nanda, and Surendra K. Martha, Nanostructured Silicon – Carbon 3D Electrode Architectures for High-Performance Lithium-Ion Batteries, ACS Omega, 3 (8), 2018, 9598-9606.

G. Kelp, N. Arju, A. Lee, E. Esquivel, R. Delgado, Y. Yu, S. Dutta-Gupta, K. Sokolov, and G. Shvets, Application of metasurface-enhanced infra-red spectroscopy to distinguish between normal and cancerous cell types, Analyst, 144, 2019, 1115-1127.

Minwoo Jung, Shourya Dutta-Gupta, and et al., Polarimetry Using Graphene-Integrated Anisotropic Metasurfaces, ACS Photonics, 5, 2018, 4283-4288.

Publications

(in peer reviewed conferences)

Brijesh S. Yadav, Suhash R. Dey, and Sanjay R. Dhage, Role of selenization content in selenization of inkjet printed $CIGSe_2$ thin film solar cell, AIP Conference Proceedings, 2082, 2019, 050001.

Amol C. Badgujar, Brijesh S. Yadav, M. Ramakrishna, Suhash R. Dey, Rajiv O. Dusane, and Sanjay R. Dhage, Molybdenum bilayer thin film on large area by cylindrical rotating DC magnetron sputtering for CIGS solar cell application, EU PVSEC 2018, 35th European PV Solar Conference and Exhibition, Brussels, Belgium, Conference Proceedings, 2018, 866-869.

M.M. Saj Mohan and Ranjith Ramadurai, Template assisted strain tuning and phase stabilization in epitaxial $BiFeO_3$ thin films, AIP Conference Proceedings. 1942, 2018, 80040 10.1063/1.5028874.

Funded Research Projects 2018-19

Dr. Saswata Bhattacharya, *Microstructural degradation under supercritical conditions*, DST (Clean Coal Project), September 2018, Rs. 13.00 Lakhs.

Dr. Subhradeep Chatterjee, *National Centre for Clean Coal Research & Development (joint project under a consortium coordinated by IISc): WP8 Microstructure-property relationship in welds*, DST, 13 September 2018, Rs. 99.96 Lakhs.

Dr. Sai Rama Krishna Malladi, *New insights into the localised corrosion of advanced metallic alloys using electron microscopy*, DST-SERB Early Career Research Award, 15 September 2018, Rs. 52.47 Lakhs.

Dr. Pinaki Prasad Bhattacharjee, *Development of High Entropy Alloys with Outstanding Strength-Ductility for various Applications*, TATA Steel, Jamshedpur, India), November 2018, Rs. 12.84 Lakhs.

Dr. Mudrika Khandelwal, *Development of bacterial cellulose eco-friendly depth filter by in situ modifications suitable for food and beverage industry*, Eaton Pvt. Ltd, December 2018, Rs. 70.00 Lakhs.

Dr. Suhash Ranjan Dey, *Tuning the magnetic properties of nanocrystalline multi-component alloy thin film coatings through a single step electrodeposition for sensor applications (Two years with Shanghai Jiao Tong University, Chaina)*, SPARC, DST, March 2019, Rs. 50.00 Lakhs.

Dr. Mudrika Khandelwal, *Bacterial cellulose derived tunable nanostructured carbon as high performance anode for lithium ion battery*, DST-SERB, March 2019, Rs. 49.00 Lakhs.

Dr. Shourya Dutta Gupta, *Spinodal decomposition in Cu-Ag alloy thin films: A route to tunable plasmonics*, DST-SERB Early Career Research Award, 18 March 2019, Rs. 49.70 Lakhs.

Dr. Chandrasekhar Murapaka, *Spin-orbit torque induced magnetization dynamics in perpendicular magnetic anisotropy materials for non-volatile memory and logic applications*, DST-SERB Early Career Research Award, 21 March 2019, Rs. 49.96 Lakhs.

Dr. Ranjith Ramadurai, *Strain, Microstructure*

and Defect Induced Effects on Ferroic Domains of Morphotropic Phase Compositions in Lead Free Ferroelectric Thin Films, DST-SERB EMR, 31 March 2019, Rs. 58.00 Lakhs.

Talks Given in National / International Conferences

P.P. Bhattacharjee, *Thermo-mechanical processing strategies for managing strength-ductility in a nano-lamellar $AlCoCrFeNi_{2.1}$ eutectic high entropy alloy*, 2nd International Conference on High Entropy Materials (ICHEM 2018), 9-12 December 2018, Jeju, South Korea (invited lecture)t

P.P. Bhattacharjee, *Bulk Heterostructured High Entropy Alloys: Emergence of a Novel Class of Advanced Structural Materials,* 1st International Conference on Processing and Characterization of Materials, ICPCM 2018, 6-8 December 2018, NIT Rourkela, India (invited lecture).

P.P. Bhattacharjee, *High Entropy Alloys with Tailored Heterogeneities: A Novel Class of Advanced Structural Materials*, Advances in Metallurgy and Manufacturing Processes, 13-14 July 2018 Hyderabad, India (invited lecture).

Suhash Ranjan Dey, *Importance of Microstructure in Materials Science, Refresher Course on Materials Science*, Hyderabad Central University, Hyderabad, Telangana, India, 19 January 2019.

Brijesh Singh Yadav, *Suhash Ranjan Dey and Sanjay R. Dhage, Bottlenecks on the development of inkjet printed $CIGSe_2$ thin film solar cell, International conference on optoelectronics and Nano materials for advanced technology (icoNMAT-2019)*, Cochin University of Science and Technology, Cochin, Kerala, India, 5 January 2019.

Rameez Tamboli, Basudev Bhattacharya, Suhash Ranjan Dey, *Role of aluminium addition in high strength interstitial free (IFHS) steel*, National Metallurgical Day (NMD-ATM 2018), Kolkata, India, 15 November 2018.

B. B. Panigrahi, *Beyond conventional Titanium and Nickel Superalloys: Emerging High Specific Strength Materials for Aerospace Sector*, National Symposium on Advances In Aerospace Materials And Processes, 6-7 July 2018, Hyderabad (Keynote Talk).

Sahil Rohila, S. Naskar, and Bharat B. Panigrahi, *Comparative study of Mechanical Properties of AlCoCrFeNi High Entropy Alloy Produced through Pressureless Sintering and Hot-Pressing,* International Conference on Powder Metallurgy, Pune, 18-22 February 2019.(Keynote Talk).

B. B. Panigrahi, *High Entropy Alloys: Scopes in Powder Metallurgy and Additive Manufacturing*, National Conference on Processing Materials NCOPOM, 19-21 September 2018, Surathkal, India (Invited Talk)

Chandrakant, Sahil Rohila, Rahul B. Mane, and Bharat B. Panigrahi, *Studies on Electro-Spark Coating behavior using sintered filament of high entropy alloys on steel substrate*, International Conference on Powder Metallurgy, Pune, 18-22 February 2019.

Rahul B. Mane and Bharat B. Panigrahi, *Synthesis of Spherical Powders from Mechanically Alloyed High Entropy Alloy Powders for Additive Manufacturing*, International Conference on Powder Metallurgy Pune, 18-22 February 2019.

Shourya Kant, Kirtiratan Godbole, Srinath Gudur, S. Surya Kumar, and Bharat B. Panigrahi, *Effect of Heat Treatment on Properties of Additive Manufactured Steel Component*, International Conference on Powder Metallurgy, Pune, 18-22 February 2019.

Sahil Rohila, S. Naskar, Rahul B. Mane, and Bharat B. Panigrahi, *Enhancement in sintering and properties of AlCoCrFeNiSi HEA by Ni addition.* International conference on high entropy materials, Jeju, South Korea, 9-12 December 2018.

A.S. Deshpande, D. Damodar, and M. Usha Rani, *Precursor dictated morphology control of nanostructured carbons, Carbon MEMS: New Horizons*, Fourth International Carbon-MEMS Meeting, Hyderabad, December 2018

Srinivas Dudala, S. Chenna Krishna, and Rajesh Korla, *Influence of grain size and temperature on the deformation behavior of $Al_{0.2}CoCrFeNi$ High entropy alloy*, International conference on high entropy materials, Jeju Island, South Korea, 9-12 December 2018.

K. Sairam Goud and Korla Rajesh, *Texture reversibility in Mg AZ_{31} alloy by twinning under multi axial compression*, NMD-ATM, Jamshedpur, Kolkata, 11-13 November 2018.

Yasam Palguna and Rajesh Korla, *Microstructure and Mechanical Behaviour of Al(0.5,2)CoCrFeNiMo$_{0.5}$ High Entropy Alloy*, NMD-ATM, Jamshedpur, Kolkata, 11-13 November 2018.

Srinivas Dudala, S. Chenna Krishna, and Rajesh Korla, *Microstructural Evolution and Grain Growth Kinetics in Al$_{0.2}$CoCrFeNi High Entropy Alloy*, NMD-ATM, Jamshedpur, Kolkata, 11-13 November 2018.

S. Chenna Krishna, Abhay K Jha, Bhanu Pant, and Rajesh Korla, *Processing and Characterization of Cu-Cr-Nb-Zr alloy produced through Ingot Metallurgy*, Research Scholar symposium on Materials Science and Engineering-IIM, Trivandrum, 2018.

Sairam K Malladi, *Challenges with in-situ Microscopy: heating, gases and liquids*, The International Conference on Microscopy and 39th Annual Meeting of Electron Microscope Society of India (EMSI) 2018, Bhubaneshwar, India, 18-20 July 2018.

Sairam K. Malladi, *TEM as a nanoscale laboratory: in-situ TEM studies based on MEMS devices*, International Conference on Recent Trends in Materials Science and Technology (ICMST 2018), Thiruvananthapuram, India, 10-13 October, 2018.

Sairam K Malladi, *Recent trends in MEMS based in-situ TEM studies*, Invited lecture at the Japan Fine Ceramics Centre, Nagoya, Japan, 7 December 2018.

Sairam K Malladi, *TEM as a laboratory: Carrying in-situ TEM studies using MEMS based devices*, National Conference on Emerging Trends in Science, Technology & Application of Electron Microscopy (STAEM 2018), Thiruvananthapuram, India, 19-21 December 2018.

Shourya Dutta Gupta, *Plasmonic metasurfaces for cancer diagnosis and active light modulation*, MRSI Annual Meeting and 1st Indian Materials Conclave, I.I.Sc. Bangalore, 12-15 February 2019.

Shourya Dutta-Gupta, *Active modulation of light using graphene integrated plasmonic metasurfaces*, Global Nano Photonics (GNP), December 2018, T.I.F.R. Mumbai.

Shourya Dutta-Gupta, *Surface enhanced IR absorption spectroscopy for non-destructive diagnosis*, AP Science Congress 2018, Yogi Vemana University, Kadapa, 9-11 November 2018.

Chandrasekhar Murapaka, A. Litvinenko, P. Sethi, A. Jenkins, L. Vila, V. Cros, P. Bortolotti, R. Ferreira, and U. Ebels, *Phase shift keying in spin torque nano-oscillators for wireless communication applications*, International Conference on Magnetic Materials and Applications (ICMAGMA-2018), NISER Bhubaneswar, 13 December 2018.

Seminars Conducted

Dr. M.P. Gururajan, Associate Professor, IITB, Molecular dynamics (MD) simulations of interface stresses, 19 December 2018.

Dr. Okunishi Eiji, JEOL Ltd., Tokyo, Japan, The NEOARM - Latest developments in the field of Spherical Aberration Microscopes and the Role of Cold FEG, 23 January 2019.

Dr. M. Vijayalakshmi, Independent Director, BHAVINI, DAE, Kalpakkam, Tamil Nadu, India, Precession Electron Diffraction – Principles and Applications to Materials, 3 April 2019.

Dr. Partha Ghoshal, Head, Electron Microscopy Group, Defence Metallurgical Research Labs, Hyderabad, India, Advanced Characterisation of Materials using PED/ ACOM, 3 April 2019.

Awards / Recognitions

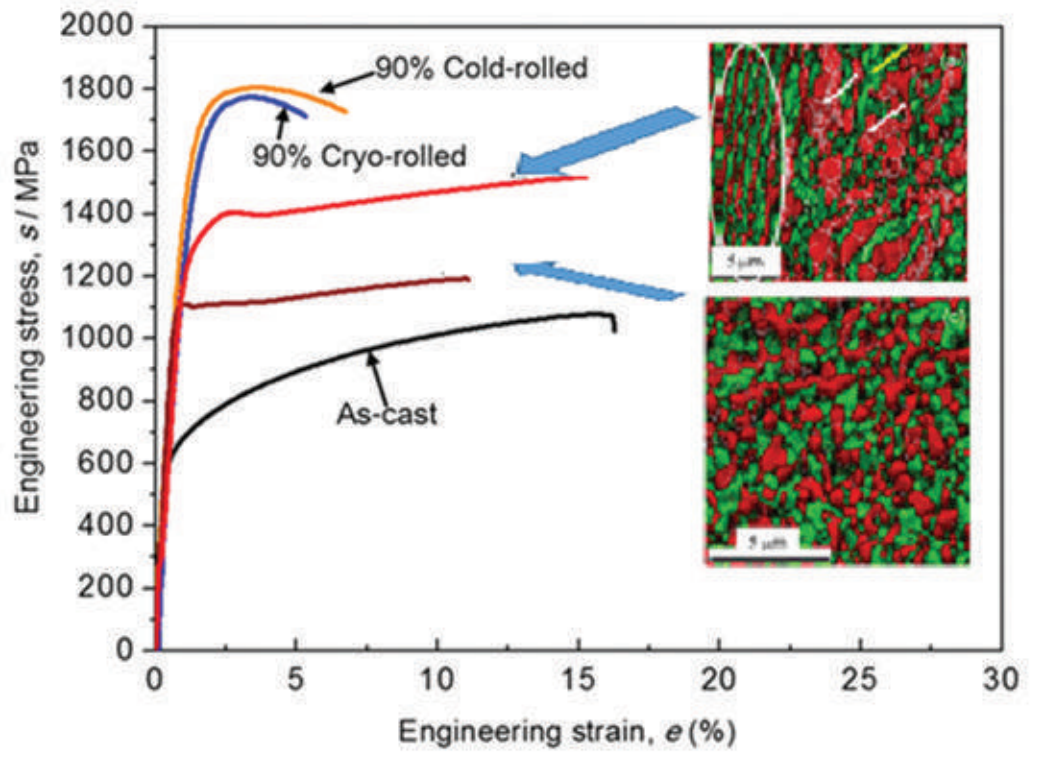
Pinaki Prasad Bhattacharjee, *Best paper award* for Microstructure and texture of severely warm-rolled nano-lamellar AlCoCrFeNi$_{2.1}$ eutectic high entropy alloy, S.R. Reddy, P.P. Bhattacharjee, NMD-ATM 2018, Kolkata, India, 14-16 November 2018,

P.K. Kannan from the research group of Dr. Suhash Ranjan Dey, has received *SERB-Purdue University Overseas Visiting Doctoral Fellowship 2018* from Department of Science and Technology (DST), India to spend one year at Professor Rakesh Agrawal's (Purdue University, USA) laboratory.

Shourya Dutta Gupta, *Visiting Assistant Professor at Applied and Engineering Physics (AEP)*, Cornell University, May-July 2018.

RESEARCH

HIGHLIGHT



भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

MATHEMATICS

FACULTY

Jayaram Balasubramaniam
Ph.D – Sri Satyasai Institute of Higher Learning
Associate Professor& HoD
Research Areas: Approximate Reasoning; Connectives in Multi-Valued Logic

C S Sastry
Ph.D – IIT Kanpur
Associate Professor
Research Areas: Wavelets; Inverse Problems and Sparse Representation Theory

Puranam Anantha Lakshmi Narayana
Ph.D – IIT Kharagpur
Associate Professor
Research Areas: Fluid Mechanics; Convection in Porous Media; Linear and Non-Linearstability Analysis

Venku Naidu Dogga
Ph.D – IIT Madras
Associate Professor
Research Areas: Harmonic Analysis; Functional Analysis

Daniel Sukumar
Ph.D – IIT Madras
Associate Professor
Research Areas: Functional Analysis; Banach Algebra

G. Ramesh
Ph.D – IIT Madras
Associate Professor
Research Areas: Functional Analysis; Operator Theory

Tanmoy Pal
Ph.D – ISI Calcutta
Assistant Professor
Research Areas: Functional Analysis

Narasimha Kumar
Ph.D – TIFR Bombay
Assistant Professor
Research Areas: Number Theory

Pradipto Banerjee
Ph.D – University of South Carolina
Assistant Professor
Research Areas: Number Theory

Bhakti Bhusan Manna
PhD – TIFR CAM
Assistant Professor
Research Areas: Partial Differential Equations

Amit Tripathi
PhD – IISc Bangalore
Assistant Professor
Research Areas: Algebraic Geometry and Commutative Algebra

Sameen Naqvi
PhD – IIT Kanpur
Assistant Professor
Research Areas: Reliability Theory; Stochastic Orders; Applied Statistics; Risk Theory

Satya Prakash Singh
PhD – IIT Bombay
Assistant Professor
Research Areas: Optimal Design Theory; Order Restricted Experiments; Cluster Randomized Trials and Crossover Designs

Neeraj Kumar
PhD – .University of Genoa, Italy
Assistant Professor
Research Areas: Commutative Algebra

Dipankar Ghosh
PhD – IIT Bombay
Assistant Professor
Research Areas: Commutative Algebra

Publications
(in peer reviewed journals)

M. Stepnicka, B. Jayaram and Yong Su, A short note on the suitability of the Bandler-Kohout subproduct as an inference mechanism, Fuzzy Sets and Systems, 338, 2018, 90-96.

Prasad Theeda, P. U. Praveen Kumar, C. S. Sastry and P. V. Jampana, Reconstruction of sparse-view tomography via preconditioned Radon sensing matrix, *Journal of Applied Mathematics and Computing*, 59, 2019, 285-303.

B. S. Chandra, C. S. Sastry, L. Anumandla and S. Jana, Dictionary-based monitoring of premature ventricular contractions: An ultra-low-cost point-of-care service, Artificial Intelligence in Medicine, 87, 2018, 91-104.

M. Amaralingam, P. K. Mishra, P. Rajyalakshmi, S. Channappayya and C. S. Sastry, Novel Light Weight Compressed Data Aggregation using sparse measurements for IoT networks, *Journal of Network and Computer Applications*, 121, 2018, 119-134.

B. S. Chandra, C. S. Sastry and S. Jana, Robust Heartbeat Detection From Multimodal Data via CNN-Based Generalizable Information Fusion, IEEE Transactions on Biomedical Engineering, 66, 2019, 710-717.

J. Ganesh, G. Ramesh, D. Sukumar, A characterization of absolutely minimum attaining operators. *J. Math. Anal. Appl.*, 468, 2018, 567-583.

Geethika Sebastian, D. Sukumar, A characterizing property of commutative Banach algebras may not be sufficient only on the invertible elements, C. R.Acad.Sci. Paris, Ser.I, 356, 2018, 594-596.

C. Sivaramakrishnan, D. Sukumar, Venku Naidu Dogga, On the images of Dunkl-Sobolev spaces under the schrodinger semigroups associated to Dunkl operators, *J. Pseudo-Differ. Oper. Appl.*, 10, 2019, 93-120.

C. Sivaramakrishnan, D. Sukumar, Venku Naidu Dogga, On the images of Dunkl-Sobolev spaces under the schrodinger semigroup, Adv. Pure Appl. Math., 10, 2019, 65-79.

S. H. Kulkarni, G. Ramesh, On the denseness of minimum attaining operators. Oper. Matrices, 12, 2018, 699-709.

J. Ganesh, G. Ramesh, D. Sukumar, A characterization of absolutely minimum attaining operators. *J. Math. Anal. Appl.*, 468, 2018, 567-583.

G. Ramesh, Absolutely norm attaining paranormal operators. *J. Math. Anal. Appl.*, 465, 2018, 547-556.

Surjeet Kaushik, Narasimha Kumar, Naomi Tanabe, Equidistribution of signs for Hilbert modular forms of half-integral weight, Research in Number Theory, 4, 2018, n 4-13.

Surjeet Kaushik, Narasimha Kumar, Simultaneous behaviour of the Fourier coefficients of two Hilbert modular cusp forms, Archiv der Mathematik, 112, 2019, 241-248.

Narasimha Kumar, A variant of multiplicity one theorems for half-integral weight modular forms, to appear in Acta Arithmetica.

Girivaru Ravindra, Amit Tripathi, Remarks on higher rank ACM bundles on hypersurfaces, Comptes Rendus Mathématique de l'Académie des Sciences, Paris Ser. I, 356, 2018, 1215-1221.

Publications

(in peer reviewed conferences)

P. Theeda, P. Sasmal, P.V. Jampana and C. S. Sastry, Incoherent Minimal ScaledFrame, 3rd IEEE-ICSIP, DOI: 10.1109/SIPROCESS.2018.8600449.

C. Sivaramakrishnan, D. Sukumar, Venku Naidu Dogga, On the images of Dunkl-Sobolev spaces under the schrodinger semigroups associated to Dunkl operators, *J. Pseudo-Differ. Oper. Appl.*, 10, 2019, 93-120.

C. Sivaramakrishnan, D. Sukumar, Venku Naidu Dogga, On the images of Dunkl-Sobolev spaces under the schrodinger semigroup, Adv. Pure Appl. Math., 10, 2019, 65-79.

On non-vanishing and sign changes of the Fourier coefficients of two Hilbert cusp forms, to appear in the Proceedings of the Ropar Conference on 'Number theory: Arithmetic, Diophantine and Transcendence'.

Funded Research Projects 2018-19

Puranam Anantha Lakshmi Narayana, *The effect of heat source on non-Newtonian fluid flow through a horizontal porous bed*, SERB-TARE, 8 February 2019, Rs. 2.50 Lakhs.

Tanmoy Pal, *Some new variants of Bishop-Phelps-Bollobas theorem for spaces X* Lip_{0}(X)*, MATRICS-SERB, June 2018, Rs. 6.00 Lakhs.

Talks Given in National / International Conferences

Tanmoy Pal, *Best approximation in normed linear spaces*, University of Memphis, USA, May 2018.

Tanmoy Pal, *Some geometric properties of relative Chebyshev centers in Banach spaces*, University of Memphis, USA, May 2018.

Narasimha Kumar, Invited speaker at Institute of Mathematical Sciences, Chennai, May 2018.

G. Ramesh, *Maps preserving AN-operators, International Workshop on Operator Theory and Applications (IWOTA)*, East China Normal University, Shanghai, China, 23-27 July 2018.

Tanmoy Pal, *Some recent developments of proximinality in Banach spaces*, Dept. Colloquium, IIT Madras, 8 November 2018.

Narasimha Kumar, Invited speaker at *Iwasawa theory and p-adic automorphic forms, Fudan University, Shanghai*, China, 10-14 December 2018.

G. Ramesh, *Maps preserving AN-operators, International Conference on Banach Algebras, Harmonic Analysis and Operator Theory*, Sardar Patel University, Gujarath, 20-22 November 2018.

Tanmoy Pal, *On strongly Hahn-Banach subspaces of Banach spaces*, OTOA 2018, ISI Bangalore, December 2018.

G. Ramesh, *On a subclass of norm attaining operators, Recent Advances in Operator Theory and Operator Algebras (OTOA 2018)* ISI Bangalore, India, 13-19 December 2018.

Narasimha Kumar, Invited speaker at *International conference on Number Theory*, IISER Thiruvananthapuram, 11-13 March 2019.

Seminars Conducted

Dr. Gugan Thoppe, Duke University, Durham, USA, Betti numbers of Gaussian excursions in the sparse regime, 19 May 2018.

Prof. Sashikumar Ganesan, Chair, CDS, IISC, Bangalore, Career as a computational scientist: opportunities and challenges, 23 January 2019.

Prof. S. Nanda, IIT Kharagpur, retired, From logic to fuzzy logic, 28 January 2019.

Dr. Shaunak Deo, TIFR, Mumbai, Effect of level raising on pseudo-deformation rings, 26 March 2019.

MECHANICAL & AEROSPACE ENGINEERING

The Department of Mechanical & Aerospace Engineering had a very productive year in terms of academics and research. The department offers postgraduate programs in three specializations: Mechanics & Design, Thermo-Fluids Engineering and Integrated Design and Manufacturing. We have embarked on a significant upgrade of research infrastructure through institute support and funding through JICA. Some of the highlights from this year are:

- Five Ph.D. students graduated from our department
- Two new faculty Dr. M. Gopinath and Dr. S Banerjee joined the department
- Dr. K. Badarinath was selected as a Suzuki Fellow and will be spending the summer of 2019 in Shizuoka University
- Anjishnu Choudhury, the Ph.D. student of Dr. Harish, has been selected for the prestigious Overseas Visiting Doctoral Fellowship awarded by SERB. He will be spending twelve months at the University of British Columbia on research collaboration
- Professor Pratap Vanka from University of Illinois Urbana-Champaign has joined our department as Adjunct Professor
- A new lab course on automation has been introduced to first-year undergraduate students
- Prof. Eswaran received the best teacher award for the 2018-19 academic year.
- Prof. N V Reddy, Dr. Mahesh M. Sucheendran and Dr. R Prasanth Kumar had filed one patent each

In numbers, department filed 3 patents, 48 peer reviewed journals and 27 conference publications and 2 book chapters.

FACULTY

R Prasanth Kumar
Ph.D – IIT Kharagpur
Professor
Research Areas: Multibody Dynamics; Robotics; Control Systems

N. Venkata Reddy
Ph.D – IIT Kanpur
Professor
Research Areas: Deformation Processes; Predictive Models for Digital Fabrication; Integrated Product and Process Design Systems; Layered Manufacturing

Vinayak Eswaran
Ph.D - State University of NY at Stony
Professor
Research Areas: Computational Fluid Dynamics (CFD) and Heat Transfer, Finite-Volume Methods for Flow and Heat Transfer in Complex Geometries, Convection Heat Transfer, Turbulence Modelling, Computation of Turbulent Combustion, Simulation of Flow and Heat Transfer in Industrial and Natural Processes, Direct Numerical Simulation of Turbulence, Higher Order Numerical Methods: Spectral Methods and Compact Schemes, Explaining the Archaic-Modern Human Transition Using a Numerical Diffusion Wave Model (Anthropology), Radiation Modelling in Flow Problems

M. Ramji
Ph.D – IIT Madras
Professor
Research Areas: Composite Structures and Repair; Fundamental Fracture Mechanics; Material Characterisation; Computational Fracture and Damage Mechanics; Experimental Mechanics

Ashok Kumar Pandey
Ph.D – IISc, Bangalore
Associate Professor
Research Areas: Linear and Nonlinear Vibration; MEMS; Vehicle Dynamics

Chandrika Prakash Vyasarayani
Ph.D – University of Waterloo, Canada
Associate Professor
Research Areas: Nonlinear Dynamics and Control

K. Venkatasubbaiah
Ph.D – IIT Kanpur
Associate Professor
Research Areas: Computational Heat Transfer and Hypersonic Flows

B. Venkatesham
Ph.D – IISc, Bangalore
Associate Professor
Research Areas: Acoustics and Vibration

Badarinath Karri
Ph.D - National University of Singapore
Assistant Professor
Research Areas: Experimental Fluid Mechanics; High-Speed Imaging; Cavitation; Bubble Dynamics

Gangadharan Raju
Ph.D - IISc, Bangalore
Assistant Professor
Research Areas: Composite Structures; Buckling and Post-Buckling Analysis; Variable Angle Tow Composite Plates; Damage Modeling in Composite Structures; Non-Destructive Evaluation; Structural Health Monitoring

Suryakumar S
Ph.D – IIT Bombay
Associate Professor
Research Areas: Metal Additive Manufacturing; 3D Printing; CAD/CAM

FACULTY

Mahesh M. Sucheendran
Ph.D – UIUC, USA
Assistant Professor
Research Areas: Vibroacoustics; Aeroelasticity; Computational Mechanics; Aerodynamics; Aeroacoustics

Pankaj Sharadchandra Kolhe
Ph.D - The University of Alabama, USA
Assistant Professor
Research Areas: IC Engines; Gas Turbine Engines; Alternative Fuels; Combustion and Spray Diagnostics; Sprays in Smart Farming

Raja Banerjee
Ph.D – University of Missouri Rolla - USA
Associate Professor & HoD
Research Areas: Computational Fluid Mechanics with Emphasis on Multiphase Flow; High Fidelity Solver Development on Accelerators Like Gpu; Experimental and Numerical Study of Interfacial Flows Like Primary Jet Breakup, Sloshing of Liquid In Partially Filled Tanks; Spray And Atomization of Liquid Fuel And Turbulent Non-Premixed Combustion; Nucleate Boiling Using Two-Phase Lattice Boltzmann Method

Syed Nizamuddin Khaderi
Ph.D - University of Groingen, Netherlands
Assistant Professor
Research Areas: Solid Mechanics; Impact Mechanics; Fluid-Structure Interaction; Lattice Materials; Metal Foams

Viswanath R Chinthapenta
Ph.D – Brown University, USA
Assistant Professor
Research Areas: Computational Solid Mechanics

Harish N. Dixit
Ph.D – Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore
Assistant Professor
Research Areas: Interfacial Flows – Moving Contact Lines; Drop; Bubbles and Thin Films; Hydrodynamic Stability Theory

Saravanan Balusamy
Ph.D - University of INSA of Rouen, France
Assistant Professor
Research Areas: Combustion; Laser Diagnostics; Fluid Mechanics; IC Engines; Gas Turbines; Alternative Fuels

Patents Filed

Manish Tripathi, Ajay Misra and Mahesh Sucheendran, Skewed grid fin for aerospace applications, 4 January 2019, Appl No.201811049281.

Prof. N.V. Reddy, IIT Hyd and TATA Steels Ltd, A System For A Sheet Metalworking And A Process Thereof, Filed On: 28 February 2019, Appl No.201941008005.

Prof. R Prasanth Kumar, A Vacuum Cleaner, 26 March, 2019, Appl No: E-2/956/2019/CHE.

Book Chapters

Manish Kumar, Abhay Sharma, Uttam Kumar Mohanty, and S. Suryakumar, 'Additive Manufacturing with Welding: Advances in Welding Technologies for Process Development', CRC Press.

SN Khaderi, JMJ den Toonder, PR Onck, Numerical simulations of fluid transport by magnetically actuated artificial cilia in Atlas of cilia bioengineering and biocomputing, River Publishers.

Kale, Rakesh, and R. Banerjee. Spray Collapse in a Multi-hole GDI Injector and Its Effect on In-Cylinder Combustion. Two-Phase Flow for Automotive and Power Generation Sectors. Springer, Singapore, 2019. 43-61.

Publications
(in peer reviewed journals)

Akarapu Ashok, P. Manoj Kumar, Sajal Sagar Singh, P. Raju, Prem Pal, and Ashok Kumar Pandey, Achieving wideband micromechanical beams array, Sensors and Actuators: A, 273, 2018, 12-18.

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Funded Research Projects 2018-19

M. Ramji, *Calibration of Constitutive Models for Aluminum Foam*, ODF Medak, 1 April 2018, Rs. 12.56 Lakhs.

B. Venkatesham, *Acoustic Characterization*

of Functionally Engineered Materials, The Boeing Company, May 2018, Rs. 20.0 Lakhs.

B. Venkatesham, *Development of Noise Measuring Facility*, National Engineering Industries Ltd, July 2018, Rs. 3.06 Lakhs.

Ashok Kumar Pandey, *Analysis of fabrication tolerances on the performance of comb drive*, RCI Hyderabad, 19 July 2018, Rs. 9.96 Lakhs.

M. Ramji, *Fatigue assessment of steel material*, Rexnord India Pvt. Ltd., 1 November 2018, Rs. 3.54 Lakhs.

Development of a Highly Scalable CPU-GPU Hybrid Architecture Based Parallel Two-Phase Unstructured CFD Solver, DST-VAJRA (VJR/2017/000203), USD 35,000, 01/09/2018

Talks Given in National / International Conferences

Aparna Gangele and Ashok Kumar Pandey, *Elastic and Vibrational Characteristics of functionally graded graphene-silicon nanocomposites reinforced with prestressed single layer graphene sheet*, 6th European Conference on Computational Mechanics (ECCM 6) and 7th European Conference on Computational Fluid Dynamics (ECFD 7), Glasgow, UK, 11-15 June 2018.

Ashok Kumar Pandey, *Introduction to MATLAB and Simulink, Computation Research Techniques using MATLAB*, NIT Warangal, India, 9-14 July 2019.

Ashok Kumar Pandey, *Overview of MEMS and Vehicle Dynamics, Advances in Mechanical Engineering*, RGMCET, Nandyal, India, 25 July 2018.

Ashok Kumar Pandey, *Overview of MEMS and Vehicle Dynamics, Advances in Mechanical Engineering*, RGMCET, Nandyal, India, 25 July 2018.

Ashok Kumar Pandey, *Introduction to Simulink and GUI, Advances in Mechanical Engineering*, RGMCET, Nandyal, India, 25 July 2018.

Ashok Kumar Pandey, *FEM Applied to Dynamic Systems, Continuing Education Program (CEP) on Missile Structural Dynamics*, DRDL, Kanchan Bagh, Hyderabad, India, 5 September 2018.

N.V. Reddy, *Double Sided Incremental Forming: Capabilities and Challenges*, Key Note, NUMISHEET 2018, Tokyo, 2 August 2018.

Ashok Kumar Pandey, *Vibration Analysis of Joints, Continuing Education Program (CEP) on Missile Structural Dynamics*, DRDL, Kanchan Bagh, Hyderabad, India, 5 September 2018.

Vivek T. Rathod, Gangadharan Raju, Lalitha Udpa, Sastish Udpa, and Yiming Deng, *Embedded thin-film based sensors based multi-mode guided wave filter*, IEEE Sensors 2019, New Delhi, India, 28-31 October 2018.

B. Karri, Y. V. P. Reddy, and K. Sahu, *Experimental study of a rising air bubble in liquid medium through confinement*, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, Georgia, 18-20 November 2018.

Praveen K. Sharma and Harish N. Dixit, *Dynamics of a bouncing drop near a solid surface*, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanda, Georgia, 18-20, November 2018.

M. Agrawal, R. K. Katiyar, K. C. Sahu, and B. Karri, *Experimental investigation of a freely falling liquid drop in air*, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, Georgia, 18-20 November 2018.

Madhu Kiran Karanam and Viswanath R. Chinthapenta, *Effect of strain hardening on void growth in single crystals*, International Workshop on Mechanics of Energy Materials (IWMEM-2018), IIT Madras, Chennai, India, 19-22 November 2018.

Aparna Gangele and Ashok Kumar Pandey, *Vibrational characteristics of carbon nanosheet composites including surface effects,* International conference on Carbon-MEMS 2018, Hyderabad, India, 5-7 December 2018.

Ashok Kumar Pandey, Linear and Nonlinear Analysis of Carbon based Nano and Microdevices, 4th IEEE International conference on Emerging Electronics, Bangalore, India, 17-19 December 2018.

S. Suryakumar, *Additive Manufacturing for Large Metallic Components, Invited Talk Indo-German Bilateral workshop on Additive Manufacturing of Metals: Current issues and way forward*, CSIR-NML, Jamshedpur, India 4-6 February 2019.

Harish N. Dixit, *Role of surface viscosity in*

rupture of thin films, Invited Talk, Department of Chemical Engineering, IIT Madras, India, 11 March 2019.

Madhu Kiran Karanam and Viswanath R. Chinthapenta, *Study on the effect of crystallographic orientations on the tensile behavior of FCC single crystal*, Accepted in 62nd Congress of The Indian Society of Theoretical and Applied Mechanics (ISTAM-2017), At University College of Engineering, Osmania University, India, December 15-18, (2017).

Seminars Conducted

Prof. Eyal Buks, Electrical Engineering, Technion Israel Institute of Technology, Optomechanical Cavities: Applications and Nonlinear Dynamics, 20 December 2018.

Dr. Dhiraj Patil, IIT Dharwad, Lattice Boltzmann Method for Fluid Flow Simulations, 2 January 2019.

Prof IftekharAKarimi, National University of Singapore, Design and Operation of LNG Regasification Terminals, 18 February 2019.

Mr. Ashish Kulkarni, Tridiagonal Solutions, Multi Phase Flows in Industrial Systems, 26 March 2019.

Workshops / Symposiums

Dr. Ashok Kumar Pandey, Two days workshop on Numerical Methods for Engineers conducted, BHEL R&D, Balanagar, 10-11 December 2018.

Awards / Recognitions

Dr. Ashok Kumar Pandey, *Best poster award* to Aparna Gangele for the paper titled Vibrational characteristics of carbon nanosheet composites including surface effects, authored by Aparna Gangele and Ashok Kumar Pandey in International conference on Carbon-MEMS 2018, Hyderabad, India, 5-7 December 2018.

Dr. Gangadharan Raju, Lala Bahadur Andaraju, Awarded 1st prize for the best paper - Damage Characterization of CFRP Composite Curved Beam (L-Bend) Specimen using AE and DIC, IGniting NDE In Technical and Engineering Institutions (IGNITE), 1st International NDE Symposium for Research Scholars and Students, IIT Madras, Chennai, India, 3-4 November 2018.

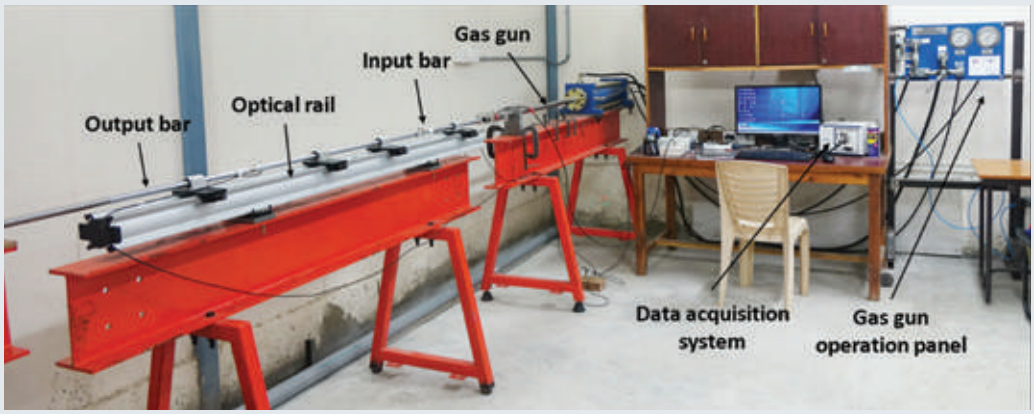
Anjishnu Choudhury under guide Dr. Harish N. Dixit, selected for *Overseas Doctoral Visiting Fellowship (OVDF), SERB* to spend 12 months at University of British Columbia, Vancouver, Canada.

Prof. M. Ramji, *Outstanding reviewer – Journal of Materials Processing Technology,* Dec 2019. Awarded this status as he is within the top 10 percentile of reviewers for the Journal.

RESEARCH

HIGHLIGHT

Materials are subjected to a variety of static and dynamic loading conditions. Examples range from the dead loads acting on a building to impact loads experienced in a typical car crash. Conventionally, the testing of materials is performed in a universal testing machine, in which the force required to slowly stretch a cylindrical sample is measured. This data tells us about the mechanical strength of the material. This information is very useful for most of the mechanical design purposes. However, when a component is subjected to an impact loading, the response may be very different. A split-Hopkinson or a Kolsky bar is a device that is used to characterize the impact response of materials. This set-up has been indigenously developed by MAE recently. The impact behavior of materials ranging from ceramics to biomaterials (such as nacre, bones, and tissues) can be easily studied now. This set-up will be modified in the future to study the ballistic performance of armor devices such as bulletproof jackets and helmets.



PHYSICS

The Department of Physics at IIT Hyderabad is a rapidly growing department, presently the department has 17 permanent faculty members, 8 technical staff, ~180 students (PhD, MSc. and B.Tech. (Engineering Physics)). The department had significant success at academic as well as research fronts during the FY 18-19. Department graduated B.Tech, M.Sc batches and few PhD students. The department has included several advanced teaching experiments in the earlier established labs. 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-the-art research laboratories from the sponsored (DST, FIST, DSIR, DAE, CSIR and so on) and institute supported projects. The department has procured several high end equipment such as BLS, LASER. MFM SQUID, XRD etc funded by JICA. The faculty of the department have published nearly 100 international journals and also delivered several talks at prestigious national / international workshops / conferences.

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Prem Pal
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Publications

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Funded Research Projects 2018-19

Anurag Tripathi, *The grant Perturbative QCD for Precision Physics* at the LHC (The Institute of Mathematical Sciences in Chennai, INDIA, and from the University of Turin, ITALY, and the University of Amsterdam, NETHERLANDS), SPARC, MHRD, March 2019, Rs. 81 Lakhs.

V. Kanchana, *Computational study of layered materials*, CSIR, June 2019, Rs. 30.67 Lakhs

J. Mohanty, *Anisotropy engineering and process optimization for the development of advanced magnetic thin materials for field sensing application*, NRB/DRDO, 20 September 2018, Rs. 33.17 Lakhs.

Priyotosh Bandyopadhyay, *CORE Research grant*, SERB, Rs. 31.44 Lakhs.

Priyotosh Bandyopadhyay, *Symposium, SERB*, Rs. 2.00 Lakhs.

Sai Santosh Kumar Raavi, *Interface-engineered and energy-efficient organic solar cells based on porphyrin small molecules (In partnership of China and Brazil)*, BRICS-STI 2017 grant, 30 March 2019, Rs. 31.8 Lakhs.

Sai Santosh Kumar Raavi, *Hot and Multi Electron Mediated Photoelectrochemical Methods of High Efficiency Water Splitting,* SPARC 2018 scheme, 15 March 2019, 53.43

Shantanu Desai, *Explorations in astrophysics data mining and machine learning*, ICPS-DST, March 2019, Rs. 45.00 Lakhs.

Vandana Sharma, *Unraveling radiation damage processes in biologically relevant mesoscopic systems*, MHRD (SPARC), 15 March 2019, Rs. 74.00 Lakhs.

Vandana Sharma, *India-UK partnership in laboratory astro-particle physics*, MHRD (SPARC), 15 March 2019, Rs. 94.8 Lakhs.

Talks Given in National / International Conferences

Priyotosh Bandyoapdhyayay, *Extended Higgs sector in supersymmetric context at the LHC*, Washington University in St. Louis, 4 May 2018.

Priyotosh Bandyoapdhyayay, *Charged Higgs bosons in supersymmetric extended Higgs sectors at the LHC,* Phenomenological symposium 2018, University of Pittsburg, 7 May 2019.

Priyotosh Bandyoapdhyayay, *Supersymmetric extended Higgs sectors in at the LHC*, University of Pittsburgh, 15 May 2018.

Shantanu Desai, *Testing modified gravity using galaxy clusters and gravitational wave observations*, Seminar at Kavli, IPMU Japan,26 June 2018.

J. Mohanty, *Exploring nanoscale magnetic material with microscopy and modeling,* EMSI 2018, Bhubaneswar, India, July 2018.

J. Suryanarayana, *Magnetotransport in molecular junctions, Characterization and modelling of magnetic materials*, BITS Hyderabad, India, 13-14 July 2018.

V. Kanchana, *Exploring Novel thermoelectric materials from first principles investigation*, CMCEE 2018, Suntc Singapore, 22-27 July 2018.

Shubho R. Roy, E. Rabinovici and S. Bolognesi, *Universal Features of the Holographic Quantum Complexity of Bulk Singularities*, Gauge Gravity duality 2018 conference, Wurzburg, Germany, 31 July 2018.

Shantanu Desai, *Shapiro delay of photons, neutrinos and gravitational waves*, Seminar at Homi Bhabha Center for Science Education', Mumbai, 7 September 2018.

Vandana Sharma, *Molecule under intence Investigation - Catching the molecule in its act*, SCOP 2018, Ahmedabad, 4-7 October 2018.

Prem Pal, *RFMEMS Components Using Silicon WET Bulk Micromachining Technology,* Two-day seminar on Compact modeling of RF MEMS/NEMS devices for next generation wireless communication technologies, Sathyabama Institute of Science and Technology, Chennai, 5-6 October 2018.

Prem Pal, *Determination of Precise*

Crystallographic Directions on Silicon Wafers, National Conference on Advancement in Materials Science and Physics (NCAMP 2018), Manipal University Jaipur, Rajasthan, India, 1-2 November 2018.

Priyotosh Bandyopadhyay, *Extended Higgs sectors at the LHC,* The 8th KIAS workshop on Particle and Cosmology 2018, KIAS, Seoul, South Korea, 30 October 2018.

J. Mohanty, *Modification of nanoscale magnetic domains in thin films and multilayers*, ICMAGMA 2018, NISER Bhubaneswar, Orissa, India, December 2018.

Sai Santosh Kumar Raavi, *Transient Optical Probes to follow the the photogenerated charges in organic photovoltaics,* 1st INYAS Frontiers of Science Brainstorming Meeting, Hyderabad, 9-11 December 2018.

A. Haldar, *Bias-field free magnonic devices, International conference on magnetic materials and applications (ICMAGMA),* NISER, Bhubaneswar, India, 9-13 December 2018.

A. Haldar, *Reconfigurable and bias-field-free magnetic waveguides for channeling spin waves*, International conference on complex and functional materials (ICCFM), S. N. Bose National Centre for Basic Sciences, Kolkata, India, 13-16 December 2018.

A. Haldar, *Reprogrammable and energy-efficient magnonic devices*, 4th IEEE-ICEE 2018 International conference on emerging electronics, IISc Bangalore, India, 16-19 December 2018.

A. Haldar, *Bias-field free magnetic waveguides for magnonic devices*, 63rd DAE Solid State Physics Symposium (SSPS), Hisar Haryana, India, 18-22 December 2018.

Vandana Sharma, *Ultrafast dynamics of Oxygen molecule,* ISAMP-TC7 2018, Tirupathi, 6-8 January 2019.

Shantanu Desai, *Indian Pulsar Timing Array Experiment* 30th meeting of IAGRG, BITS-Pilani, Hyderabad, India, 3-5 January 2019.

Tejas P. and Shantanu Desai, *Generalized Lomb-Scargle analysis of data from PTB*, Poster presented at 30th meeting of IAGRG, BITS-Pilani, Hyderabad campus 3-5 January 2019.

Priyotosh Bandyopadhyay, *Extended Higgs (charged and neutral) boson phenomenology at the LHC*, International meeting of High energy Physics 2018, Institute of Physics Bhubaneswar, India, 22 January 2019.

Priyotosh Bandyopadhyay, *Extended Higgs bosons at the LHC*, Indian Institute of Technology Kanpur, India, 31 January 2019.

Sai Santosh Kumar Raavi, *Novel strategies for enhanced photo-conversion efficiencies in emerging photovoltaics technologies*, National Conference on Physics and Chemistry of Functional Materials (PCFM 2019), GITAM University, Hyderabad, India 21-22 February 2019.

Sai Santosh Kumar Raavi, *FRET based Polymer Solar Cells*, National Photonics Symposium, Cochin University of Science and Technology, 27-28 February 2019.

Priyotosh Bandyopadhyay, *Extended Higgs bosson in supersymmetry at the LHC*, Activity week at Harish-Chandra Research Institute, 2019, Prayagraj (Allahabad), 5 March 2019.

V. Kanchana, *Thermoelectric Properties of Transition Metal Dichalcogenides*, Workshop and Symposium on Advanced Simulation Methods: DFT, MD and Beyond, Delhi, 6-10 March 2019.

Shantanu Desai, *Applications of machine learning to astrophysics*, Joint IITH-Riken workshop on machine learning and applications, IIT Hyderabad, India, 15-16 March 2019.

Suryarao Bethapudi and Shantanu Desai, *Separation of pulsar signals from noise using supervised machine learning*, Poster at joint IITH-Riken workshop on machine learning and applications, IIT Hyderabad, India, 16-18 March 2019.

Vandana Sharma, *Post ionization alignment effect in O2+*, NCAMP 2019, Kanpur, 25-28 March 2019.

Seminars Conducted

Sreeram Valluri, University of Western Ontario, Lambert W-Functions, 8 August 2018.

Dr. Christoph Sürgers, KIT, Germany, Anomalous Hall effect in noncollinear antiferromagnets, 28 September 2018.

Cosimo Bambi, Fudan University, Testing black Holes using X-ray Spectroscopy, 4 October 2018.

Dr. Christoph Sürgers, KIT, Germany, Thermoelectric effects in CMOS-compatible Mn5Ge3Cx, 5 October 2018.

Subha Majumdar, TIFR, Darkness that surrounds us, 12 November 2018.

Sarmista Banik, BITS-Hyderabad, Properties of rapidly rotating hot neutron stars with exotic matter, 10 January 2019.

Dr. Devendra K Namburi, Cambridge University, High temperature superconducting technology; current status and future potential, 24 January 2019.

Prof E V Sampath Kumaran, Distinguished Professor, TIFR, Geometrically frustrated magnetism, 29 January 2019.

Sanjay Reddy, University of Washington, Seattle 'Neutron star mergers and r-process nucleosynthesis', 7 February 2019.

Hideki Asada, Hirosaki University, Gravitational Lensing of Exotic Objects, 28 February 2019.

Bharat Ratra, Kansas State Univ, Spatial Curvature, Dark Energy Dynamics, Neither, or Both?, 11 March 2019.

Bharat Ratra, Kansas State University, The Accelerating Expanding Universe: Dark Matter, Dark Energy, AND Einstein's Cosmological Constant, 11 March 2019.

Stefan Liebler, Institute for Theoretical Physics (ITP) of KIT, Collider phenomenology of extended Higgs-boson sectors, 14 March 2019.

Prof. Hari Srikanth, Physics Department, University of South Florida, USA, Caloric Effects in Magnetic Materials, IEEE Distinguished Lecture), 25 March, 2019.

Prof. Sushil K. Misra, Physics Department, Concordia University, Canada,A review of magnetization of nanoparticles of dilute magnetic semiconductors doped by transition-metal ions and carbon based materials as studied by EPR, 28 March 2019.

Awards / Recognitions

Anjan Kumar Jena, Received *MMM student travel award*.

Anjan Kumar Jena, Selected for IEEE Magnetic Summer School at Virginia Commonwealth University in Richmond, Virginia, USA.

Anjan Kumar Jena, Received Best Poster award (Third Prize) at NCCM/BARC.

Priyotosh Bandyopadhyay, SERB CORE Research grant of INR 3144732 which includes a Postdoctoral Postion.

Mr. Saunak Dutta, Got funding of local hospitality and free tution for ICTP summer school 2019.

Chandrima Sen, Certificate of Excellence for MSc in the year 2018.

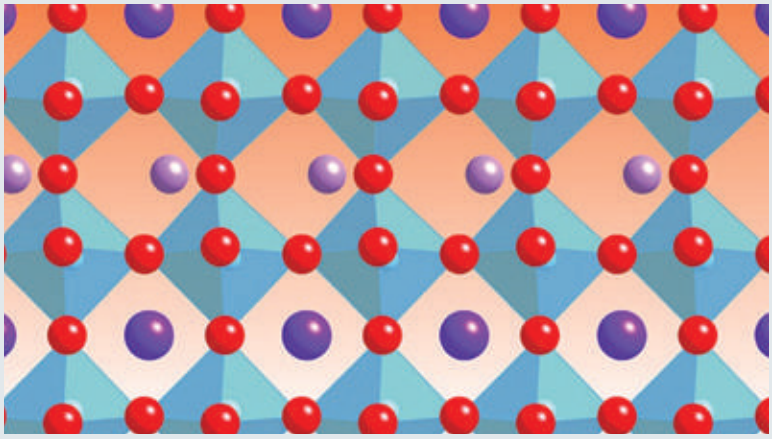
B. Ramakrishna, *Royal Society Fellowship* to visit Scotland.

J. Suryanarayana, DAAD Fellow through DAAD - IIT Faculty exchange programme (Through bi-lateral exchange of academics).

RESEARCH

HIGHLIGHT

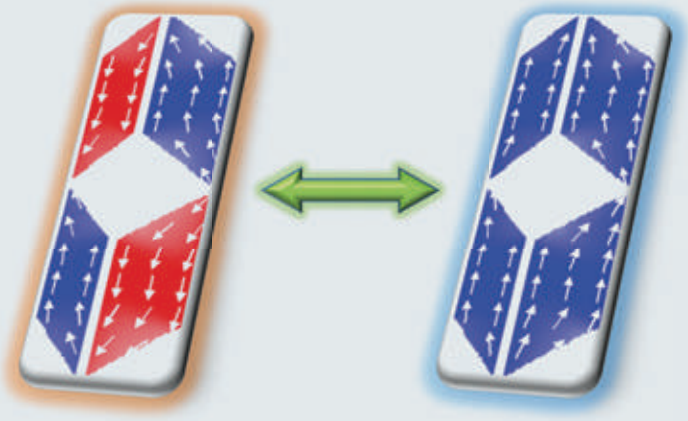
A first-principles study reveals effects of cation ordered nanoregions in a lead-free relaxor ferroelectric, $K_{1/2}Bi_{1/2}TiO_3$ (Group of Dr. Manish Niranjan and Dr. Saket Asthana)



Featured article and also covered by media in Scilight.

Lead-based oxides such as lead zirconatetitanate (PZT) feature in a wide variety of technological applications, such as high-performance sensors, actuators and transducers. Results published in the *Journal of Applied Physics* (vol 123 (2018) 244106)present a first-principles study of cation ordering and its influence on Raman intensity and infrared reflectivity spectra for one of these promising piezoceramics, $K_{1/2}Bi_{1/2}TiO_3$ (KBT)

A reconfigurable ferrimagnetic-type magnetic metamaterial (Group of Dr. Arabinda Haldar)



Featured on AIP Scilight news (https://doi.org/10.1063/1.5045477) and also featured on the cover page of Journal of Applied Physics Vol. 123 (2018)

RESEARCH

HIGHLIGHT

Magnetic metamaterials – similar to photonic metamaterials – are the key building blocks for future microwave devices that are small and reconfigurable. Research published in the *Journal of Applied Physics (Vol. 123, page 243901 (2018))* describes a new method to create a stable, reprogrammable ferrimagnetic-type magnetic state for these metamaterials. A ferrimagnet refers to uncompensated anti-parallel magnetic spin orientation within a magnetic material. Here, we have created a ferrimagnetic-type configuration in an array of dipolar coupled magnetic elements which are of rhomboid shape with two different widths alternated in the array. Tunable microwave properties are realized by switching between two different remanent magnetic states. Metamaterials like this are important for technology continuing to shrink. Typically, arrays require tuning with external magnetic fields, which hinders device integration and low-power operation. This research presents a new solution for reconfigurable magnetization on a small scale without needing external bias fields. The new material is also more reliable than previous array designs based on dipolar-coupling, which often suffer from unavoidable structural defects and require careful and complex field initialization.

Open Day 2019

NSS-IIT Hyderabad organized 'Sixth Open Day cum one-day workshop for technological awareness among rural children' on Saturday, 2 Mar 2019. Around 300 students from the government schools of nearby villages namely ZPHS-Kandi, ZPHS-Cheriyal, ZPHS-Yeddumailaram, have participated along with their faculty members.

IIT Hyderabad has initiated Open Day program to enable students of government schools to get a taste of IIT culture and enhance their understanding of technological growth and developments of 21st century. The students enjoy special live demonstrations from various engineering and science departments at IIT Hyderabad. Later the students explored classrooms, interacting with the faculty and research students, the Sci-tech clubs, visited Physics and Chemistry labs and also enjoyed a sumptuous lunch sponsored by IIT Hyderabad. The students participated with full enthusiasm till the end.

• Lightening the Inauguration Lamp • Chemistry Demo Expo (Prof. Tarun K. Panda) • Physics Labs Visit • Chemical Labs Visit • Sci-Tech Clubs Exhibition • Cultural Performance • Conclusion Ceremony are different events of the Open Day programme.

Lightening the Inauguration Lamp

Lighting a lamp before a ceremony shows everyone who is present how to rise upwards and dispel darkness. The function began with Lamp Lighting Ceremony by the Prof. Prem Pal, NSS Coordinator joined by Prof. Tarun K. Panda, and Dr. Sharadha and some school girls from different government schools.

It was followed by briefing about IITH and a warm welcome to students by Prof. Prem Pal, followed by small speech about how societal contribution by technical students matters and told them safety measures to be followed by the students while in the IITH and to guide school students around 20 NSS volunteers and 6 Guards were arranged. Students introduced themselves and told their first impression about IITH.

Chemistry Demo Expo (Prof. Tarun K. Panda)

The demonstrations were kick started by Prof. Tarun K Panda, Dept. of Chemistry along with his research students. Around 18 experiments which fascinated students and the students enjoyed special live demonstrations with full enthusiasm till the end. Students asked many doubts regarding these experiments and other Chemistry related ones. Prof. Tarun explained how interestingly Chemistry can be learnt practically and theoretically.

The afternoon session of the camp resumed after the serving of lunch to the students. Students were taken to various labs at IITH.

Physics Lab Visit

In Physics labs, students were shown basic physics experiments explaining diffraction of light, laser, Newton rings. etc. Some experiments of basic physics were performed and students were shown various instruments in the lab and their functioning was explained by the staff and research scholars. Students have got a better understanding in fundamentals of physics.


Chemistry Lab Visit

This was followed by students visit to Chemistry labs. Students were shown various lab equipments and made to understand the way in which they are used by the lab staff. Students were shown basic experiments that helped them to get a clear idea on concepts.


Conclusion Ceremony

In the end, there was a short Conclusion Ceremony which involved taking group photos, distribution of snacks, etc. They were given send off by the student volunteers of IITH and were asked to visit again next year.


Blood Donation Camp

NSS, IIT Hyderabad organized Blood Donation Camp in association with Niloufer Blood Bank on 26 January 2019 marking the 70th Republic Day of India. 90 volunteers have registered in that 74 volunteers have donated blood.






Holi Celebration

Colorful Holi was celebrated by IIT Hyderabad Students as a part of Ek Bharat Shresht Bharat, which unites the students and brings everyone to a single point on 21 March 2019. Students celebrated a dry Holi, using only eco-friendly colors and keeping in view of hot summer wastage of water was also very less. Students maintained great joy and enthusiasm with full of fun till the end by splashing colored water and spraying colored powder on each other.




The Open-Mic 2019

Cultural and Literary Council

Open mic was conducted on 19 January 2019, it was a fun filled night at IIT Hyderabad with a stage open to all the students providing an opportunity to present the best of their talents to the entire of IIT Hyderabad.

The event began at 7:45 PM and went on till 11:00 PM.

ELAN & ηvision - 2019

ELAN & ηvision, the annual techno-cultural fest of IIT Hyderabad has been conducted from 22 to 24 February, 2019. The fest is confluence of two worlds created and enjoyed by the thousands of people who step out for these three days. Whether you end up coding your mind away, dancing your heart out, grasping the audience with your captivating performances, meeting people, making friends and memories.

SPORTS
2018-19

With a strength of around 600 students, the National Sports Organization started its full-fledged schedule for the academic year 2018-19 in the month of August. The list of events goes as follows:

Friendship Race

It was conducted on 5 August 2018 as a part of freshmen interaction on eve of the International Friendship Day-2018. It had a huge participation of around 500 from students, staff and faculty with their family members. Prizes for the event were distributed on 15 August on the eve of Independence Day.

International Day of Yoga

Sports department of IIT Hyderabad has organized fourth international day of yoga fest 2018 from 16 to 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 to 20 June daily at D block terrace between 8:30 to 9:00 AM the yoga experts demonstrated deferent yoga asanas to all the participants regularly. On 21 June, fourth International Day of Yoga celebrations, started at UDDH by Prof. U B Desai, Director IITH along with Dr. Prempal, 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.

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 2018.

NSO

Our first NSO interaction with freshmen was conducted on 28 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 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 2018

Camp for Inter IIT Sports Meet 2018 started on 26 November with a total participants of 112 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 2018 was held at IIT Guwahati from 11 to 21 December 2018.

Run for Unity

It was organized on 31 Oct 2018 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 campus, GITAM University Hyderabad, WOXEN MBA College, Sangareddy District and BHEL Township teams.

Students also participated in friendly tournaments with IIIT and BITS Hyderabad etc.

Intramural Sports

Informal leagues for Basketball, Cricket, Football, Hockey, TT, Tennis and Volleyball were conducted. The 11th 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 the occasion of Gymkhana Day Celebrations.

Gymkhana Day

On 12 April 2018, prizes were distributed for winner teams of various events and rolling cup for General Championship for the 2nd year B.Tech boys and PhD girls teams which bagged highest points in inter year sports meet-2018. Mementos for emerging player of the year and for the outgoing sports secretary were also given.

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