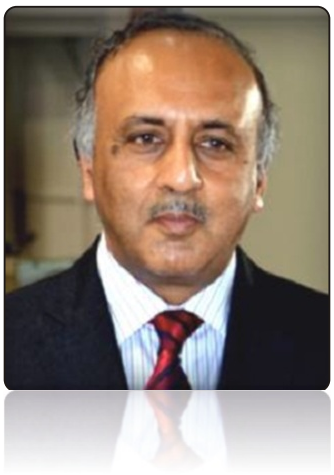
5th Convocation Report 2017

Memories of IIT Indore
4th Convocation

भारतीय प्रौद्योगिकी संस्थान इन्दौर

INDIAN INSTITUTE OF TECHNOLOGY INDORE

Board of Governors (2016-17)



Professor Pradeep Mathur
(Chairman, BoG, IIT Indore & Director, IIT Indore)

Dr. William Selvamurthy
President - Amity Science, Technology & Innovation Foundation (ASTIF), New Delhi

Mr. Sanjay Bandopadhyay
Principal Secretary,
Department of Technical Education & Skill Development, Govt of Madhya Pradesh, Bhopal

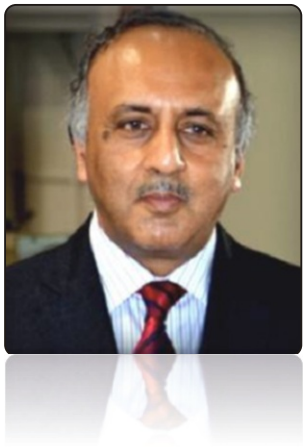
Dr. I. A. Palani
Head, Discipline of MEMS, IIT Indore

Mr. Aman Kumar Singh
Principal Secretary to Hon. Chief Minister,
Government of Chhattisgarh, Energy & Information Technology, Raipur

Dr. Somaditya Sen
Associate Professor, IIT Indore

Mr. Ram Phal Dwivedi
Registrar, IIT Indore and Secretary BoG

Institute Functionaries



Director, IIT Indore
Professor Pradeep Mathur

Dean, Academic Affairs
Prof. N. K. Jain

Dean, Research & Development
Dr. A. Kranti

Dean, Planning
Dr. Rajesh Kumar

Dean, Administration
Dr. Pritee Sharma

Dean, Student Affairs
Dr. Abhishek Srivastava

Dean, International Affairs
Dr. Kapil Ahuja

Registrar, IIT Indore
Mr. Ram Phal Dwivedi

Associate Deans

Academics: Dr. Vipul Singh
Dr. M. Santhakumar
Administration: Dr. Somnath Dey
Research and Development: Dr. Bhupesh Lad
Planning I: Dr. Shaikh M. Mobin
Planning II: Dr. Mirza S. Baig
Planning III: Dr. Sandeep Chaudhary

Heads of Schools

Basic Sciences: Dr. Swadesh Kumar Sahoo
Engineering: Dr. Shaibal Mukherjee
Humanities & Social Sciences: Dr. Sanjram Premjit Khanganba

Heads of Department

Computer Science & Engineering: Dr. Surya Prakash
Electrical Engineering: Dr. Trapti Jain
Mechanical Engineering: Dr. Devendra L. Desmukh
Civil Engineering: Dr. Sandeep Chaudhary
Chemistry: Dr. Satya S. Bulusu
Mathematics: Dr. Sk. Safique Ahmad
Physics: Dr. Manavendra Mahato
Astronomy: Dr. Abhirup Datta
Biosciences and Biomedical Engineering: Dr. Suman Mukhopadhyay
Metallurgy Engineering and Material Science: Dr. I. A. Palani

Senate Members

Professor Pradeep Mathur
Chairman, Senate & Director IIT Indore

Prof. R. Narsimhan
Professor, Department of Mechanical Engineering, Indian Institute of Science, Bangalore

Prof. M.K. Surappa
Professor, Department of Materials Engineering, Indian Institute of Science, Bangalore

Prof. R. Balasubramanian
Department of Mathematics, Institute of Mathematical Sciences, Chennai

Prof. Sudhir Chella Rajan
Development Studies, Department of HSS, Indian Institute of Technology, Madras

Prof., Neelesh Kumar Jain
Dean-Academic Affairs, Professor Mechanical Enginnering, IIT Indore

Dr. Abhinav Kranti
Dean-Research and Development, Associate Professor, Electrical Engineering, IIT Indore

Dr. Rajesh Kumar
Dean-Planning, Associate Professor, Physics, IIT Indore

Dr. Abhishek Srivastava
Dean-Student Affairs, Associate Professor, Computer Science, IIT Indore

Dr. Pritee Sharma
Dean-Administration. Associate Professor, Economics, IIT Indore

Dr. Kapil Ahuja
Dean-International Affairs, Associate Professor, Computer Science, IIT Indore

Dr. Shaibal Mukherjee
Head, School of Engineering, Associate Professor, Electrical Engineering, IIT Indore

Dr. Sk. Safique Ahmad
Head of Discipline, Mathematics, Associate Professor, Mathematics, IIT Indore

Dr. Swadesh Kumar Sahoo
Head, School of Basic Sciences, Associate Professor, Mathematics, IIT Indore

Dr. Sanjram Premjit Khanganba
Head, School of Humanities and Social Sciences, Assistant Professor, Philosophy,
IIT Indore

Dr. Trapti Jain
Head of Discipline, Electrical Engineering, Associate Professor, Electrical Engineering, IIT Indore

Dr. Devendra L. Deshmukh
Head of Discipline, Mechanical Engineering, Assistant Professor, Mechanical Engineering, IIT Indore

Dr. Surya Prakash
Head of Discipline, Computer Science and Engineering, Assistant Professor, Computer Science and Engineering, IIT Indore

Dr. Bulusu Satya Silendra
Head, Discipline of Chemistry, Assistant Professor, Chemistry, IIT Indore

Dr. Manavendra Mahato
Head, Discipline of Physics, Associate Professor, Physics, IIT Indore

Dr. Abhirup Datta
Head, Centre of Astronomy, Associate Professor, Astronomy, IIT Indore

Dr. I.A. Palani
Head, Discipline of Metallurgy Engineering and Material Science, Associate Professor, Mechanical Engineering, IIT Indore

Dr. Suman Mukhopadhyay
Head, Centre of Biosciences and Biomedical Engineering, Associate Professor, Chemistry, IIT Indore

Ms. Anjali Bandiwadekar
Deputy Librarian, IIT Indore

Dr. Amit Kumar
Chief Warden, Associate Professor, Biosciences and Biomedical Engineering, IIT Indore

Dr. Prabhat Kumar Upadhyay
Faculty In-charge, Training & Placement, Assistant Professor, Electrical Engineering, IIT Indore

Dr. Sandeep Chaudhary
Head of Discipline, Civil Engineering, Associate Professor, Civil Engineering, IIT Indore

Mr. Ram Phal Dwivedi
Registar & Secretary to Senate, IIT Indore

Contents

Director's Message

In the eight years since IIT Indore began its academic programme, the institute has matured in its academic and research endeavours. The National Institutional Ranking Framework 2017 places IIT Indore as the top ranked new IIT and an impressive 24th ranked amongst all institutions and universities. Amongst the engineering institutions, the institute is ranked 15th and under the teaching, learning resources classification, IIT Indore is ranked an impressive 5th amongst all engineering institutions. Our upward trajectory is the result of impressive contribution by our faculty and staff members, and the students. The institute is marked by many as the chosen favourite to begin the teaching and research careers or their student lives. We continue to have an outstanding student placement record and the high international standard of our PhD programme is a major factor propelling us upwards in various rankings. With hands on training, experimentation and research on state of the art facilities available to undergraduate and postgraduate researchers, the institute imbibes excitement amongst all for innovation and invention. International collaboration linkages form a major component for the institute's engagement to pursue cutting edge research. It has hosted a number of international conferences and meetings and has led the IITI – TU9 linkage initiative, a partnership which has already led to significant results as seen by a number of outstanding joint publications. Three dozen patents have been filed and numerous institute – industry joint projects have been initiated.

This year the institute witnesses 118 B. Tech., 25 M. Tech., 22 M.Sc., and 38 Ph.D. degrees being awarded.

On behalf of the Institute, I wish our graduates all success, each one of whom has made the institute proud.

Professor Pradeep Mathur

IIT Indore

Awards and Recognition

Indian Institute of Technology Indore
5th Convocation 2017: Recipients of Medals and Awards

PRESIDENT OF INDIA GOLD MEDAL

Mr. Chaware Ketan Uday
B Tech (CSE)
Roll No. 130001009

INSTITUTE SILVER MEDAL FOR UNDERGRADUATE PROGRAMS

Mr. Aishwary Gagrani
B Tech (CSE)
Roll No. 130001004

Mr. Ritesh Modi
B Tech (EE)
Roll No. 130002032

Mr. Vivek Khokhar
B Tech (ME)
Roll No. 130003039

INSTITUTE SILVER MEDAL FOR POSTGRADUATE PROGRAMMES

Mr. Vijay Choyal
MTech (Production and Industrial Engineering)
Roll No. 1502103009

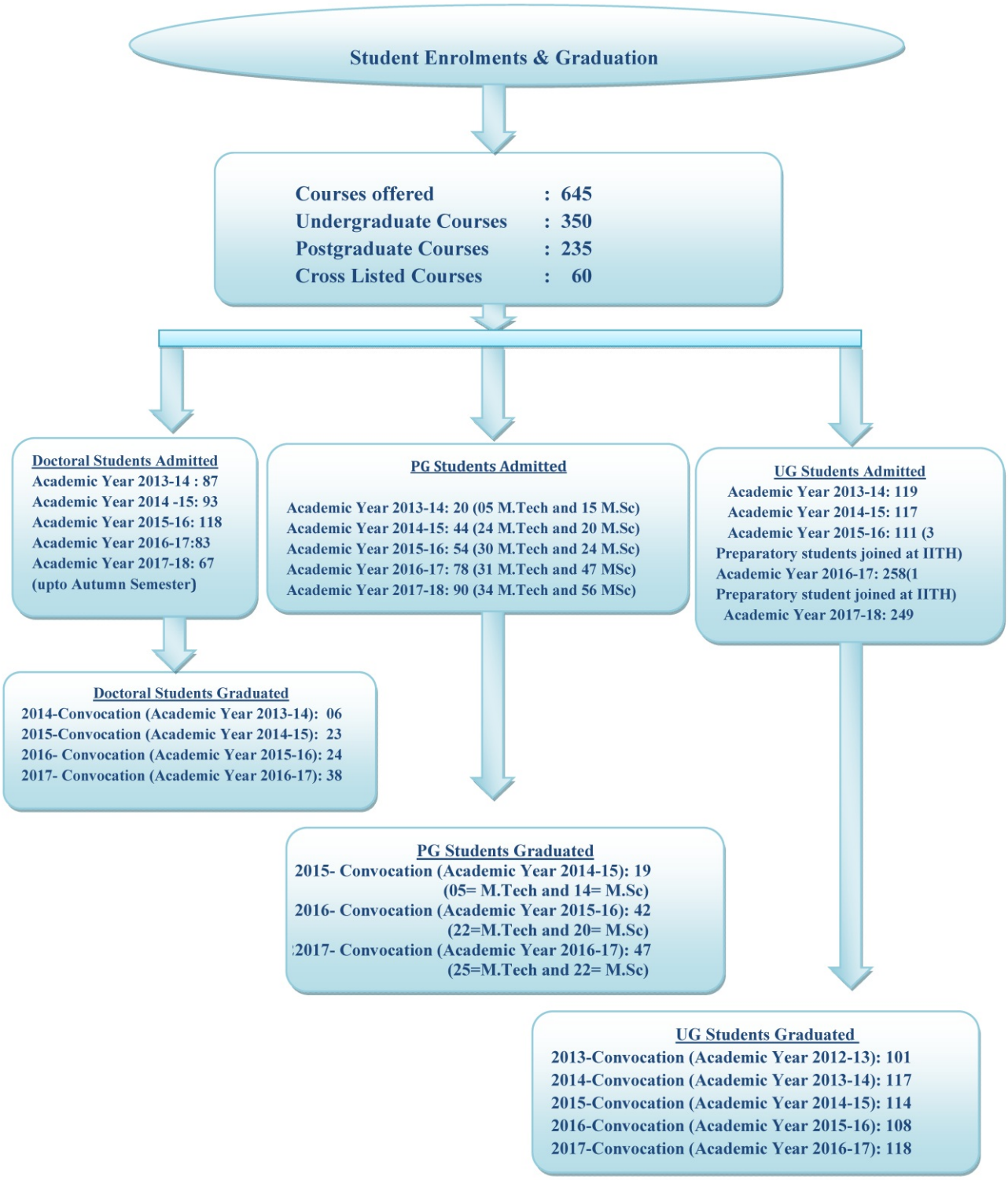
BEST B.TECH. PROJECT AWARD CERTIFICATE

Mr. Akash Kumar Jain
B Tech (ME)
Roll No. 130003005

Mr. Karmarkar Gaurav Abhay
B Tech (ME)
Roll No. 130003019

Mr. Jadhav Aniket Sandip
B Tech (ME)
Roll No. 130003018

Project title: "Shape memory alloy actuated micro-flapper for micro aerial robot"


Student Enrolments & Graduation
Courses offered : 645
Undergraduate Courses : 350
Postgraduate Courses : 235
Cross Listed Courses : 60
Doctoral Students Admitted
Academic Year 2013-14 : 87
Academic Year 2014 -15: 93
Academic Year 2015-16: 118
Academic Year 2016-17:83
Academic Year 2017-18: 67
(upto Autumn Semester)
PG Students Admitted
Academic Year 2013-14: 20 (05 M.Tech and 15 M.Sc)
Academic Year 2014-15: 44 (24 M.Tech and 20 M.Sc)
Academic Year 2015-16: 54 (30 M.Tech and 24 M.Sc)
Academic Year 2016-17: 78 (31 M.Tech and 47 MSc)
Academic Year 2017-18: 90 (34 M.Tech and 56 MSc)
UG Students Admitted
Academic Year 2013-14: 119
Academic Year 2014-15: 117
Academic Year 2015-16: 111 (3 Preparatory students joined at IITH)
Academic Year 2016-17: 258(1 Preparatory student joined at IITH)
Academic Year 2017-18: 249
Doctoral Students Graduated
2014-Convocation (Academic Year 2013-14): 06
2015-Convocation (Academic Year 2014-15): 23
2016- Convocation (Academic Year 2015-16): 24
2017- Convocation (Academic Year 2016-17): 38
PG Students Graduated
2015- Convocation (Academic Year 2014-15): 19
(05= M.Tech and 14= M.Sc)
2016- Convocation (Academic Year 2015-16): 42
(22=M.Tech and 20= M.Sc)
2017- Convocation (Academic Year 2016-17): 47
(25=M.Tech and 22= M.Sc)
UG Students Graduated
2013-Convocation (Academic Year 2012-13): 101
2014-Convocation (Academic Year 2013-14): 117
2015-Convocation (Academic Year 2014-15): 114
2016-Convocation (Academic Year 2015-16): 108
2017-Convocation (Academic Year 2016-17): 118

Indian Institute of Technology Indore
Graduating B.Tech. Students in AY 2016-17

Computer Science and Engineering Student's Name

Abhay Chandra

Aishwary Gagrani

Ajay Kumar Saini

Apurv Goel

Bhagwate Avnish Sudharam

Bittu Kumar

Chaware Ketan Uday

Dhruva Kumar Ahuja

Digvijay Singh

Dudhagundi Parinita

Gajam Niharika

Harish Patidar

Himanshu Dogra

Hursh Tiwari

Husain Haidery

Jaspreet Singh Saluja

Kamble Aditya Nagnath

Kondubhatla Sai Swetha

Manish Singh Saini

Mudit Maheshwari

Mukul Anand Sharma

Parul Gupta

Piyush Verma

Prateek Gupta

Rathlavath Santosh

Sanchita Arora

Sarthak Goyal

Sharang Dev Kalsi

Shashank Gupta

Simmi Malhan

Sudhakar Verma

Teekaram Meena

Tilak Lodha

Utkarsh Saxena

Vishwajeet Singh Thakur

Anant Lal

Shah Aditya Deepakbhai

Shah Harshil Ketankumar

Ambade Amey Sanjay

Electrical Engineering Student's Name

Ameya Pradeep Bharati

Shubham Khandelwal

Abhinav Tripathi

Ambar Shukla

Apoorva Kushwaha

Arpit Nama

Ashish Amitabh Bharatwal

Ashish Kumar Nath

Ashutosh Kumar Das

Bapat Akshay Sudhir

Bhandari Kanchan Prakash

Chaparala Hari Kishore

Deepesh Gothwal

Dharmendra Kumar

Gunjan Patil

Guntupalli Veerendra

Hemant Kumar

Jayesh Bairagi

Jonaq Niveer Sarma

Joshi Dhaivat Janmejay

Ketan Kumar

Madan Singh Bhati

Manyala Anirudh

Mergu Surya Teja

Pardeep Kumar

Pothedar Sandeep Achary

Praphull Kumar Ranjan

Pravin Kumar

Premkumar Reddy Angapuram

Ramlakhan Meena

Ravi Bujethiya

Ravi Meena

Rishabh Garg

Ritesh Modi

Saurabh Agrawal

Shraddha Mehra

Surbhi goyal

Tanvi Priya

Vikash Kumar

Yash Jangrey

Abhishek Kumar Yadav

Kartika Meena

Piyush Dugar

Mechanical Engineering Student's Name

Shubham Gondey

Abhishek Singh Yadav

Aditya Govil

Akarsh Jain

Akash Kumar Jain

Alok Kumar

Anshul Bhardwaj

Ashok Kumar

Ashutosh Kr Yadav

Ayush Pandey

Chandan Kumar

Ezaj Ahmed

Gumalapuram Manideep

Gurrala Chaitanya Kumar

Harsh Sharma

Jadhav Aniket Sandip

Karmarkar Gaurav Abhay

Lenka Ashutosh Keshab

Manish Suresh Raut

Navneet Singh

Nidish Ramakrishnan

Parantak Sharma

Parikshit Gaur

Patil Abhijeet Janrao

Patil Pratik Hanmantrao

Prajapati Ronak Kanubhai

Ramavath Indeevar

Ramesh Kumar Nagar

Samyak Jain

Sanghavi Yashkumar Ramanraj

Snigdh Mohan Singh

Uma Bharti Meena

Vinod Kumar Bairwa

Vipin Kumar

Vivek Khokhar

Yerra Sri Yeshwanth

Graduating M.Tech. Students in AY 2016-17

M.Tech. with specialization in **Production and Industrial Engineering Student's Name**

Rajat Kasliwal

Gaurav Kumar

Narayane Dhiraj Chindhuji

Rahul Kashyap

Ram Poojan Yadav

Vijay Choyal

Akash Laharia

Sanet Kumar Meena

M.Tech. with specialization in **Communication and Signal Processing Student's Name**

Anuj Pratap Singh

Ashish Kumar

Anish Kumar Singh

Neetu Para

Parual Datta

Saurabh Soni

Sushree Sangeeta Behera

Yagnik Khushbu Nalinkant

M.Tech. with specialization in **Materials Science and Engineering Student's Name**

Ashima Singh

Punkit Sood

Rahul Raj Khare

Rahul Singh Mourya

Rituraj Verma

Sandeep Jain

Sarthak Acharya

Sumit Kumar Barange

Inderpal Singh Pasrija

Graduating M.Sc. Students in AY 2016-17

Student's Name

Chemistry

Aditya Kumar Bharti

Amit Lochab

Antara Reja

Charu Popli

Jyoti Kumari

Manjeet

Vaishali Chhabra

Mathematics

Manami Bera

Pooja Lekhi

Rajkamal Nailwal

Ranjeet Verma

Satyam Azad

Usha

Physics

Akshay Kumar Verma

Anil Kumar

Anjali Chaudhary

Ankit Mishra

Deepika Poonia

Jithin T S

Mrityunjay Kumar

Rahul Kumar Singh

Rajib Kumar Basumatary

Graduating PhD Students in AY 2016-17

Student's Name

Arpita Tawani
BSBE
Structural and Molecular Insights of Naturally Available Small Molecule Modulators for their Anti-Cancer Activity via Targeting G-Quadruplex DNA (Dr. Amit Kumar)

Veenu Mishra
Chemistry
Investigation of Structurally Diversified Homo and Heterometallic Complexes
(Dr. Shaikh M. Mobin and Prof. Pradeep Mathur)

Anvita Srivasrava
Chemistry
Development of Novel Methodolgy for the Synthesis of An Important Class of Functionalized Indoles and Related Heterocyclic Scaffolds (Dr. Sampak Samanta)

Thaksen Vasant Jadhav
Chemistry
Tetraphenylethylene Luminogens: Design, Synthesis and Applications (Dr. Rajneesh Misra)

Rohit Kumar Rai
Chemistry
Development of Nanoparticle Based Heterogeneous Catalysts for Important Organic Reactions
(Dr. Sanjay Kumar Singh)

Anupam Das
Chemistry
Liposome-DNA/Protein Interactions: Impacts on Anticancer Drug Molecules (Dr. Anjan Chakraborty)

Deepika
Chemistry
Design, Synthesis and Characterization of Arene-Ru(II) Complexes Based on Nitrogen Donor Ligands:
Catalytic Reactions and Mechanistic Investigations (Dr. Sanjay Kumar Singh)

Shivendra Singh
Chemistry
Development of Metal-Free Based One-Pot Synthetic Protocol for the Facile Constructions of Indole and Coumarin Based Fused Heterocyceles (Dr. Sampak Samanta)

Konda Maruthi

Chemistry

Synthesis and Self-assembly Study of Hybrid Peptide Foldamers for the Development of Functional Supramolecular Architectures (Dr. Apurba K. Das)

Manoj Kumar Manna

Chemistry

Supramolecular Construction of Optoelectronic p-Conjugated Peptide and

Peptide-Inorganic Hybrid Materials (Dr. Apurba K. Das)

Chandan Adhikari

Chemistry

Stimuli Responsive Drug Delivery Systems Composed of Biocompatible Materials for the Controlled Delivery of Chemotherapeutic Drugs (Dr. Anjan Chakraborthy)

Sonam Mandani

Chemistry

Fluorescent Carbon dots and their Composites for Multifunctional Applications

(Dr. Tridib Kumar Sarma)

Arup Mahata

Chemistry

Atomic Scale Designing of Materials for Low-Temperature Fuel Cells

(Dr. Biswarup Pathak)

Pankaj Kumar Sharma

EE

Performance Analysis of Cooperative Cognitive Spectrum Sharing Systems over Fading Channels (Dr. P.K. Upadhyay)

Rajeev Sharma

EE

Automated Identification Systems Using Advanced Signal Processing Techniques Applied on EEG Signals (Dr. Ram Bilas Pachori)

Anubha Bilgaiyan

EE

Investigations on the influence of ZnO nanostructures on ZnO/P3HT based Hybrid Photodetectors (Dr. Vipul Singh)

Ashish Kumar

EE

Optimization of Hydrothermally Grown ZnO Nanorods Network towards UV Sensitive FET Applications (Dr. Vipul Singh)

Vishnu Awasthi

EE

Investigation of Heterojunction Interface of CIGSe/doped ZnO for Solar Cell Applications (Dr. Shaibal Mukherjee)

Bhupendra Reniwal

EE

Process/Variability Aware Design of SRAM in Conventional & Non-Conventional MOS Technologies: A Sense Amplifier Perspective (Dr. S.K. Vishvakarma)

Rangeet Mitra

EE

Nonlinear Signal Processing for Visible Light Communication (Dr. Vimal Bhatia)

Manish Mandloi

EE

Detection Algorithms for Multiple-Input Multiple-Output Wireless Communication Systems (Dr. Vimal Bhatia)

Tejendra Dixit

EE

Investigations on the Effect of Surface Plasmon Resonance Towards Performance Improvement of Hydrothermally Grown ZnO/ZnCr2O4 Nanostructures Based Optoelectronic Devices (Dr. Vipul Singh and Dr. I.A. Palani)

Devendra Singh Gurjer

EE

Performance Analysis of Two-Way Relaying with MIMO and D2D Communications (Dr. P.K. Upadhyay)

Karthik Thirumala

EE

Power Quality Monitoring in Emerging Power Systems Using Adaptive and Intelligent Techniques (Dr. Amod C. Umarikar and Dr. Trapti Jain)

Deblina Biswas

EE

Development of Photoacoustic Spectral Response Technique for Biomedical Applications (Dr. S. Vasudevan)

Deepika Gupta

EE

Analysis of Charge Trap NAND Flash Memory for Improved Reliability (Dr. S.K. Vishvakarma)

Nagendra Kumar

EE

Performance Analysis of Cooperative Relay Network for QAM Signals under Various Fading Channels (Dr. Vimal Bhatia)

Jaya Shrivastava

HSS (English)

Perspective Development in the Novels of Colson Whitehead: A Cognitive Narratological Approach (Dr. Amarjeet Nayak & Dr. Joe Verghese)

Bijaya Kumar Sethi

HSS (English)

Caste, Gender and the Aesthetics of Experience in Dalit Autobiographical Narratives: A Dalit Literary Perspective (Dr. Amarjeet Nayak)

Sanjay Kumar Lenka

HSS (Economics)

Financial Development, Financial Inclusion and Economic Growth: Empirical Evidence from India (Dr. Ruchi Sharma)

Manas Ranjan Mohapatra

Maths

Geometric Properties of the Cassinian Metric (Dr. Swadesh Kumar Sahoo)

Yogesh Singh

ME

Performance Investigations on Mechanical Design and Motion Control of Planar Parallelb Manipulators (Dr. M. Santhakumar)

Manish Rawat

ME

Investigation of joint decision making in fleet system reliability design and maintenance planning (Dr. Bhupesh Kumar Lad)

Shiva S

ME

Laser Additive Manufacturing of Bulk Shape Memory Alloy Structures: Numerical Modeling and Experimental Investigation (Dr. I.A. Palani and Dr. C.P. Paul)

Kadam Sambhaji Tanaji

ME

Studies on Heat Transfer in Microchannel (Dr. Ritunesh Kumar)

Vinod Kumar Singh

ME

Measurement of CO2 Adsorption Isotherms and Kinetics of Activated Carbons Suitable for the Development of CO2 based Adsorption Cooling Systems (Dr. E. Anil Kumar)

Hari Mohan Rai

Physics

Observation, Evidence and Origin of Room Temperature Magnetodielectric Effect in Mn/Fe Doped LaGaO3

(Dr. P.R. Sagdeo & Dr. Rajesh Kumar)

Najimuddin Khan

Physics

Exploring Extensions of the Scalar Sector of the Standard Model

(Dr. Subhendu Rakshit)

Discipline of Computer Science & Engineering

The Discipline of Computer Science and Engineering (CSE) was set up in July 2009. It is one of the disciplines under the School of Engineering and offers Bachelor of Technology (B.Tech.) and Doctor of Philosophy (PhD) programs. The discipline adopts a modern approach to teaching wherein students are rendered in adequate academic freedom to innovate and learn in the process. State of the art facilities including the latest software and advanced hardware are available in various laboratories for the use in both teaching and research. This facilitates adequate implementation of major B.Tech. projects and for verification and validation of research results.

The faculty members of the discipline are from diverse streams and specializations. Being a part of an emerging and relatively new institute, together with extremely competent research faculty, the Computer Science and Engineering faculty of IIT Indore offer a unique interactive platform for the students to explore the arena of fundamental and applied research.

Faculty Members

Dr. Kapil Ahuja
Associate Professor

Dr. Gourinath Banda
Associate Professor

Dr. Narendra S. Chaudhari
Professor

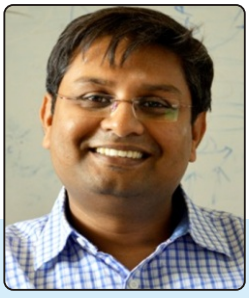
Dr. Somnath Dey
Assistant Professor

Dr. Neminath Hubballi
Assistant Professor

Dr. Bodhisatwa Mazumdar
Assistant Professor

Dr. Surya Prakash
Assistant Professor

Dr. Anirban Sengupta
Assistant Professor



Dr. Abhishek Srivastava
Associate Professor

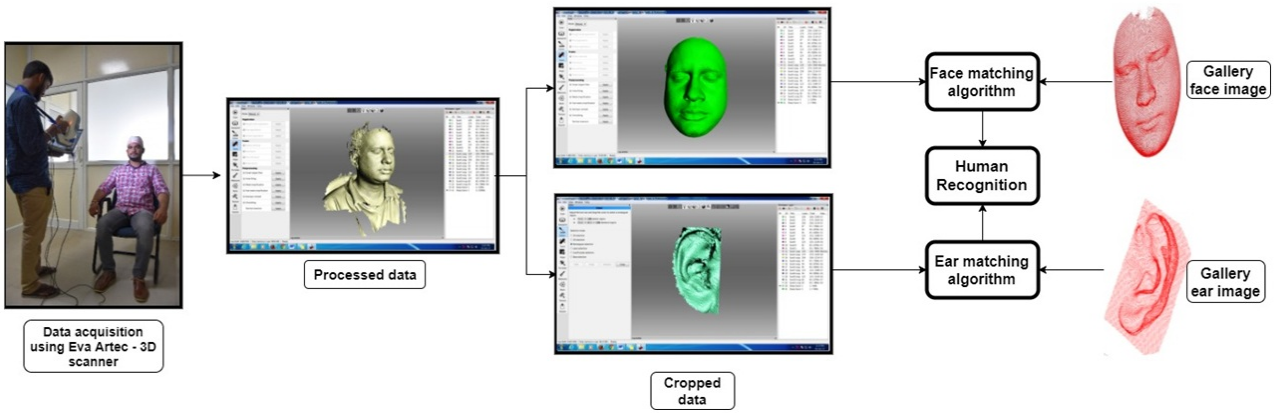
Dr. Aruna Tiwari
Associate Professor

Research Areas

Discipline of Computer Science and Engineering is actively contributing in several important and cutting edge research areas listed below.

1. Numerical Analysis, Numerical Linear Algebra, Computational Science and Engineering, Information Retrieval.
2. Formal Analysis of Reactive Systems: Model Checking, Abstract Interpretation, Static Analysis, Real Time Systems: Kernels, Software Engineering, RTOS,etc.,Cyber-physical Systems, Embedded Systems, Mechatronic Systems.
3. Algorithms and Complexity, Theoretical Computer Science, Combinatorics: Design Theory.
4. Pattern Recognition, Biometrics, Computer Vision, Image Processing, Human Computer Interaction, Computer Graphics, Big Data.
5. Machine Learning for big data handling, Soft computing, Neural Network Learning Algorithms, Data Mining.
6. Network Security, System Security, Cloud Security.
7. Side-channel attacks, Fault analysis attacks, Fault sensitivity analysis of cryptographic implementations, Hardware security (Logic locking, IC camouflaging, IP security), Logic synthesis and cryptographic implementations with improved resilience against side-channel attacks.
8. High Level Synthesis, Fault Secured High Level Synthesis, Trojan Security Aware HLS, Hardware Trust in High Level Synthesis, IP core Protection during HLS, Evolutionary Computing during HLS, Physical Design using CAD.
9. Software Engineering, Dynamic Systems, Model-Based Software Testing, Software Quality Assurance, Web Services.

Research Highlights of CSE



Human recognition in 3D using fusion of ear and face data for high security applications
(Project Investigator: Dr. Surya Prakash)

Notable Achievements of 2016-2017 (till Septemper 2017)

1. JEE (Advanced) rank of the current CSE undergraduate students consistently starts below 1000, which is one of the best among new IITs.
2. Around half of the CSE faculty members have received external funding for executing research projects.
3. CSE faculty members have active collaboration with many centrally funded institutes in India such as Indian Institute of Management Indore and Indian Institute of Soybean Research.
4. CSE faculty members have active collaboration with established institutes across the globe (France, Germany, Singapore, Canada, USA etc.).
5. Dr. Kapil Ahuja is appointed as Dean of International Affairs at IIT Indore, August 2017.
6. Dr. Kapil Ahuja funded and invited for research talk and collaboration at Lawrence Berkeley National Laboratory, Berkeley, USA, July 2017.
7. Dr. Kapil Ahuja funded and invited for research talk and collaboration at Sandia National Laboratory, Albuquerque, USA, June 2017.
8. Dr. Kapil Ahuja awarded Council of Scientific & Industrial Research (CSIR) Foreign Travel Grant to present at Householder Symposium XX, USA, June 2017.
9. Dr. Kapil Ahuja funded and invited for research talk and collaboration at TU Dresden, Germany, May-June 2017.
10. Undergraduate student of Dr. Kapil Ahuja, Mr. Ruchir Garg, awarded Promotion of Research/Innovation for Undergraduate Students (PRIUS) grant at IIT Indore to visit Max Planck Institute in Magdeburg (Germany) for research collaboration, May-July 2017.
11. Dr. Kapil Ahuja successfully hosted the French Admissions Tour (organized by French Embassy) at IIT Indore, March 2017.
12. Dr. Kapil Ahuja is a distinguished invitee at ACM-Microsoft-Infosys Academic Research Summit, IISc, Bangalore, India (Jan 2017).
13. Dr. Kapil Ahuja awarded Best Teacher for the year 2016 by IIT Indore, January 2017. This is the 3rd time Dr. Ahuja has received the best teacher award at IIT Indore.
14. Dr. Kapil Ahuja successfully organized the first IIT Indore - TU9 research workshop at TU Berlin, Germany, November 2016.
15. Dr. Kapil Ahuja enabled signing of MoU between IIT Indore and the following German institutes: TU Berlin, TU Dresden, LU Hannover, and Max Planck Institute in Magdeburg, November 2016.
16. Dr. Kapil Ahuja successfully secured German Academic Exchange Service (DAAD) funding for a month long stay of PhD student (Mr. Navneet Pratap Singh) in TU Braunschweig, Germany, September – October 2016.
17. Dr. Kapil Ahuja successfully secured Max Planck Society (MPG) funding for a month long stay of PhD student (Mr. Rajendra Choudhary) in Max Planck Institute in Magdeburg, Germany, September – October 2016.
18. Dr. Kapil Ahuja successfully ran the GIAN (Global Initiative of Academic Networks) course "Linear and Nonlinear Systems, and Opt. with Appl. in Medical Imaging, Optimal Design, and Graphics" at IIT Indore, June-July 2016. Prof. Eric de Sturler from Virginia Tech was the course instructor.
19. Dr. Kapil Ahuja invited for talk at Institute of Computational Mathematics, TU Braunschweig, Germany, June 2016.
20. Dr. Gourinath Banda organized a GIAN course on "Basic Concepts and Issues in Big Data

Management". The course was offered by Prof. Spyratos Nicholas of University of Paris-South, France.

21. Rajat Saxena, a CSE PhD scholar working with Dr. Somnath Dey, received Best Paper Award for his paper "Cloud Audit: A Data Integrity Verification Approach for Cloud Computing" in 12th International Conference on Communication Networks (ICCN 2016) held at Bangalore, India.
22. Dr. Neminath Hubballi Organized a GIAN course on Optimization techniques. The course was offered by Prof. Chandrashekar Putcha of California State University, Fullerton, CA, USA.
23. Mayank Swarnkar, a CSE PhD scholar working with Dr. Neminath Hubbali, received the best poster award in Industry Academia Conclave held in September 2017 held at IIT Indore.
24. Nikhil Tripathi, CSE Ph.D. scholar working with Dr. Neminath Hubballi participated in Sixth IDRBT Doctoral Colloquium held at IDRBT Campus Hyderabad, India.
25. Dr. Neminath Hubballi received a project under DST-UKIERI: UK-India Education and Research Initiative.
26. Dr. Neminath Hubballi delivered an Invited Talk in "International Symposium on Green Technologies for Sustainable Development" held at Bagalkot, Karnataka
27. Anuja Tayal, a Ph.D. Scholar of Dr. Neminath Hubballi has been offered internship at TRDDC Pune.
28. Dr. Surya Prakash organized a GIAN course on "Probabilistic Models and Belief Propagation". The course was offered by Prof. Gaurav Sharma of University of Rochester, USA.
29. Dr. Anirban Sengupta has been awarded "Outstanding Associate Editor" Award from IEEE TCVLSI Letter Editorial Board, IEEE Computer Society in 2017
30. Dr. Anirban Sengupta has been awarded IEEE Distinguished Lecturer by IEEE Consumer Electronics Society, 2017
31. Dr. Anirban Sengupta Awarded prestigious national award 'Sir Visvesvaraya' Faculty Research Fellow (Awarded by Ministry of Electronics & IT)
32. Dr. Anirban Sengupta has been awarded 'Best Research Paper Award 2017' by Indian Institute of Technology Indore.
33. Dr. Anirban Sengupta has been awarded 'Excellent' ratings by expert committee of Department of Science & Technology (DST) based on the performance (output) in externally funded project in 2017.
34. Dr. Anirban Sengupta has been invited to join Editorial Board as Associate Editor of the prestigious IEEE Transactions on Aerospace &Electronics Systems.
35. Dr. Anirban Sengupta has been appointed Guest Editor in prestigious IEEE Transactions on VLSI Systems from Sep 2016
36. Dr. Anirban Sengupta has been promoted to Executive Editor of prestigious IEEE Consumer Electronics Magazine from Aug 2016.
37. Dr. Anirban Sengupta has been appointed Associate Editor of IEEE Access Journal from 2016
38. Dr. Anirban Sengupta has been awarded by prestigious 'IEEE Access Journal ' on July 2016 for research contributions in advancing engineering profession.
39. Dr. Anirban Sengupta has been selected as Technical Program Chair of 36th IEEE International Conference on Consumer Electronics 2018, Las Vegas
40. Dr. Anirban Sengupta has been elevated to Steering Committee of IEEE International Symposium on Nanoelectronic and Information Systems (iNIS)
41. Dr. Anirban Sengupta selected as Technical Program Chair of 3rd IEEE International Symposium on Nanoelectronic and Information Systems (iNIS)

42. Dr. Anirban Sengupta has been selected as Technical Program Chair of 16th IEEE International Symposium on VLSI (ISVLSI), Florida
43. Dr. Anirban Sengupta has been selected as Technical Program Chair, 15th IEEE International Conference on Information Technology (ICIT).
44. Dr. Anirban Sengupta delivered a talk on "Hardware Security of CE Devices: Threat Models and Defense against IP Trojans and IP Piracy", IEEE CE Society Distinguished Lecture/Keynote, IEEE professionals of Sydney, Tokyo audience, Sep 9, 2017
45. Dr. Anirban Sengupta delivered a talk on Embedded Watermarking of IP core" in NTU Singapore on June 2016.
46. Dr. Anirban Sengupta's paper entitled "TL-HLS: Methodology for Low Cost Hardware Trojan Security Aware Scheduling with Optimal Loop Unrolling Factor during High Level Synthesis" has been listed in Top 50 popular list in IEEE Transactions on CAD of Integrated Circuit & Systems from Aug 2016 – Present
47. Dr. Anirban Sengupta's paper entitled "Hardware Security of CE Devices: Threat Models and Defence against IP Trojans and IP Piracy" has been listed in Top 50 popular list in IEEE Consumer Electronics from Dec 2016 - May 2017
48. Dr. Anirban Sengupta's paper entitled "Hardware Vulnerabilities and Their Effects on CE Devices: Design for Security Against Trojans" has been listed in Top 50 popular list in IEEE Consumer Electronics from June 2017 – Present
49. Dr. Anirban Sengupta's paper entitled "Design Flow of a Digital IC: The role of digital IC/SOC design in CE products" has been listed in Top 50 popular list in IEEE Consumer Electronics from June 2016 - Nov 2016).
50. Dr. Anirban Sengupta's paper entitled "Intellectual Property Cores: Protection of IP-Core Designs for CE Products" has been listed in Top 50 popular list in IEEE Consumer Electronics from April 2016 - July 2016.
51. Dr. Anirban Sengupta's paper entitled "Everything You Want to Know About Watermarking: From Paper Marks to Hardware Protection: From paper marks to hardware protection" has been listed in Top 50 popular list in IEEE Consumer Electronics from June 2017 – Present.
52. Dr. Anirban Sengupta's paper entitled "Anti-Piracy aware IP Chipset Design for CE Devices: Robust Watermarking Approach" has been listed in Top 50 popular list in IEEE Consumer Electronics in April 2017.
53. Dr. Aruna Tiwari organized a GIAN course on "Neural Network Learning Theory-Advanced Topics". The course was offered by Prof. Suresh Sundaram of Nanyang Technological University, Singapore.
54. Dr. Aruna Tiwari organized International symposium on Computational Mathematics, Optimization, and Computational Intelligence during 17th to 19th July 2017 which is first event of India under NTU-India Connect program of Nanyang Technological University Singapore. The event received funding from various government agencies: DST-SERB, CSIR, INSA & NBHM)
55. Dr. Aruna Tiwari organized one Day Research Workshop and enabled signing of MOU with CSIR-Central Electronics Engineering Research Institute (CSIR-CEERI), Pilani September 2016.
56. Dr. Aruna Tiwari organized a workshop on Nature Inspired Optimization Techniques & their Applications jointly organized with Soft Computing Research Society (SCRS), India in June 2016.

Sponsored Projects

1. **Project Name:** Management of Internationalization
   Funding Agency: DAAD-DIES, Germany
   Amount: 10 Lakhs INR; 13800 Euros
   Duration: 2017-2018
   Project PI: Dr. Kapil Ahuja

2. **Project Name:** Recycling Krylov Subspaces for Parametric Model Order Reduction and Uncertainty Quantification
   Funding Agency: Council of Scientific and Industrial Research (CSIR), India
   Amount: 10 Lakhs INR; 15000 USD
   Duration: 2013-2016
   Project PI: Dr. Kapil Ahuja

3. **Project Name:** Linear and Nonlinear Systems, and Opt. with Appl. in Medical Imaging, Optimal Design, and Graphics.
   Funding Agency: GIAN Scheme of Ministry of Human Resources & Develop. (MHRD), India.
   Amount: 8 Lakhs INR; 12000 USD
   Duration: 2016
   Project PI: Dr. Kapil Ahuja

4. **Project Name:** Design and Development of Efficient Cancelable Template Generation Methods for Fingerprint and Iris Biometrics
   Funding Agency: Science & Engineering Research Board (SERB), Department of Science and Technology
   Duration: 2017-2020
   Project PI: Dr. Somnath Dey

5. **Project:** Design and Development of a Trusted and Accountable Cloud Computing Platform
   Funding Agency: Science & Engineering Research Board, Government of India
   Duration: 2015 - 2018
   Project PI: Dr. Neminath Hubballi

6. **Project:** Big Data Aware High Capacity Wireless Network Architecture Using Caching and Machine Learning
   Funding Agency: DST and UKIERI
   Project Co-PI: Dr. Neminath Hubballi

7. **Project:** Development of an Efficient Ear Biometric System and Investigation of Age Invariant Nature of Human Ear
   Funding Agency: Department of Science & Technology (DST), Government of India
   Duration: 2015 - 2018
   Funding Amount: Rs. 31.53 lakhs
   Project PI: Dr. Surya Prakash

9. **Project:** Development of Novel Methodologies for Trusted and Secured IP chip design for Consumer Electronics.
   Funding Agency: Council of Industrial & Scientific Research, Extra Mural Research Division (CSIR-EMR)
   Duration: 2017 – 2020
   Funding Amount: INR 26, 00, 000
   Project No.: 22 (0730) /17/ EMR-II
   Project PI: Dr. Anirban Sengupta

10. **Project:** Development of Multi-Objective Design Space Exploration Methodologies in Architectural Synthesis of Data Intensive Applications for Application Specific Processor Design.
    Funding Agency: SERB, Young Scientist Scheme, Department of Science and Technology (DST)
    Duration: 2014 – 2017
    Funding Amount: INR 13, 88, 428
    Project No.: SB/FTP/ETA-0474/2012
    Project PI: Dr. Anirban Sengupta

11. **Project:** Sir Visvesvaraya Faculty Research Fellow
    Funding Agency: Department of Electronics and Information Technology (DEITY), Ministry of Electronics & IT (MEitY)
    Funding Amount: INR 36, 00, 000
    Duration: 2017 – 2022
    Project PI: Dr. Anirban Sengupta

12. **Project:** Development of an Efficient Scalable Clustering Algorithm for Big data and Investigation of Integrated System for Protein sequence classification.
    Duration: Three years
    Funding Agency: Council of Science and Industrial Research (CSIR), Delhi.
    Project PI: Dr. Aruna Tiwari

13. **Project:** Design of a Quantum inspired Fuzzy based Neural Network and its hardware realization for signature verification.
    Project PI: Dr. Aruna Tiwari (with CSIR-CEERI)

14. **Project:** Hardware Realization of Extreme Learning Machine based Fast Data Descriptor with Gaussian Kernel for Anomaly/Novelty Detection.
    Project PI: Dr. Aruna Tiwari (with CSIR-CEE)

Discipline of Electrical Engineering

The discipline of Electrical Engineering (EE) at IIT Indore has been a major centre for both academic and research programs in various branches of electrical engineering that includes micro/nanoelectronics, communication & bio-medical signal processing, power electronics and power systems. The discipline currently has 13 faculty members with expertise in diverse fields. The academic programs offered by the discipline include B.Tech, M.Tech and Ph.D. The M.Tech programs are currently being offered in two streams: Communication and Signal Processing, VLSI Design and Nanoelectronics. The discipline also hosts many Post-Doctoral candidates with institute/external supports from time to time. The vision of the discipline is to impart quality education and promote inter-disciplinary, industry-oriented advanced scientific research to address the challenges towards future technologies and societal requirements.

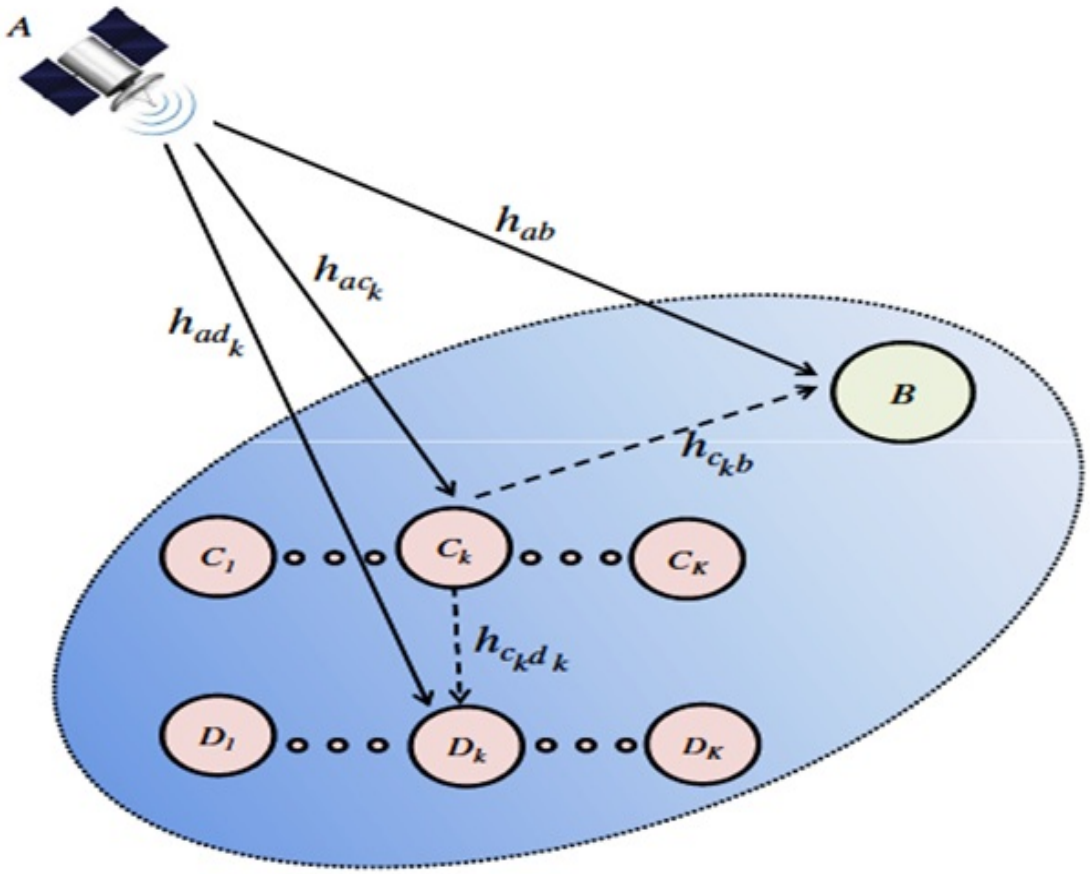


Figure 1: Hybrid Satellite-Terrestrial Spectrum Sharing System

Faculty Members

Dr. A. C. Umarikar
Associate Professor

Dr. R.B. Pachori
Associate Professor

Dr. S. K.Vishvakarma
Associate Professor

Dr. Shaibal Mukherjee
Associate Professor

Dr. Vipul Singh
Associate Professor

Dr. Abhinav Kranti
Associate Professor

Dr. S. Vasudevan
Assistant Professor

Dr. M. Anbarasu
Associate Professor

Dr. P.K. Upadhyay
Assistant Professor

Dr. Vimal Bhatia
Associate Professor

Dr. Mukesh Kumar
Assistant Professor

Dr. Trapti Jain
Associate Professor

Dr. Vivek Kanhangad
Associate Professor

Research Areas

- Renewable energy systems
- Power quality analysis and monitoring
- Biomedical imaging and speech signal processing
- Design and fabrication of SRAM memory and nanoscale phase change memory devices
- Internet of Things (IoT) enabled system design
- Opto-electronics, organic electronics, nano-scale sensors
- Wireless and Mobile Communications
- Power System Security Analysis
- Integration of Electric Vehicles into grid
- Pattern recognition with focus on biometrics and biomedical applications.

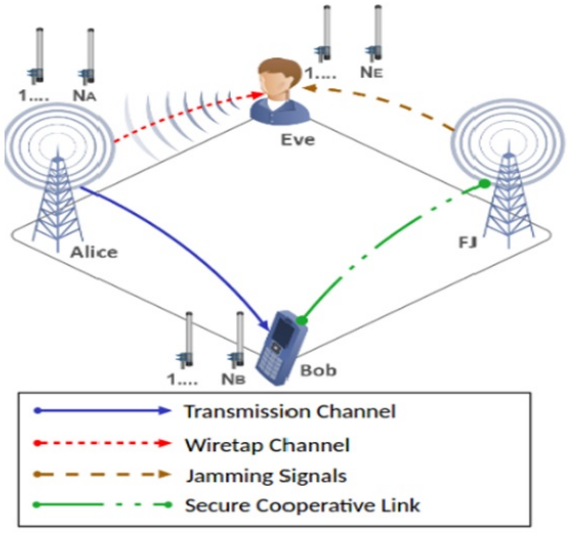


Figure 2: MIMO wiretap channel, composed by a Tx (called Alice), a legitimate Rx (named Bob), and one malicious node or eavesdropper (called Eve).

Notable Achievements of 2016-2017 (Till Septemper 2017)

Faculty

- Dr. Ram Bilas Pachori has been recognized as Fellow of IETE.
- Dr. Shaibal Mukherjee received Bhaskara Advanced Solar Energy (BASE) Fellowship under the program supported by Department of Science and Technology, Govt. of India, and the Indo-U.S. Science and Technology Forum (IUSSTF).
- Dr. Abhinav Kranti received the German Academic Exchange Service (DAAD) Bilateral Exchange of Academics Fellowship to visit RWTH Aachen, Germany, in June 2017
- Dr. Prabhat K. Upadhyay has been selected for Sir Visvesvaraya Young Faculty Research Fellowship of Ministry of Electronics and Information Technology (MeitY), Government of India, 2017

Students

- Mr. Abhijit Bhattacharyya has been selected for Raman-Charpak Fellowship for the year 2017.
- Mr. Pankaj Sharma has been given Young Researcher Award for Outstanding Work presented in 3rd international Conference on Smart Materials and Structures, Orlando, Florida, USA, 2017.
- Mr. Vivek Garg has been recognized for Outstanding Work from The International Precious Metals Institute (IPMI), Inc., USA, 2017.
- Mr. Tadi Ravi Teja Reddy has been selected for the award of the 2017 Charpak Research Internship scholarship by French Government.

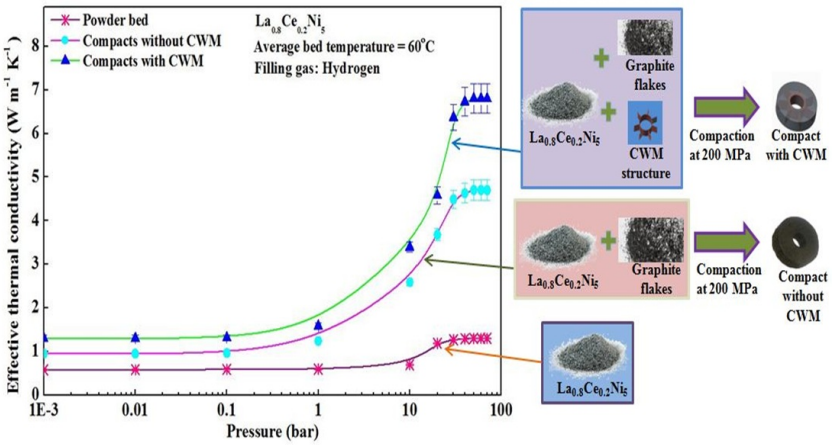
Sponsored Projects

- "Design and Fabrication of Prestrained Post Buckled Shape Memory
- Alloy Composites to Develop Adaptive Flapper", DRDO, Total cost: INR 22,62,000/- Duration: two years (2016-2018), PI: Dr. Amod C Umarikar
- "Analysis of coronary artery disease by signal processing through MATLAB, Professional Group of Conferences (PGC), Visakhapatnam, India, Rs. 7,40,600, Duration: 20 months (Started from July 2017). (Consultancy Project) (Consultant) Dr. Ram Bilas Pachori
- "Development of a portable acoustic sensor based canine pregnancy detection system and biomarker-based canine pregnancy test kit", DBT, Total cost: INR 99,90,000/- Duration: four years (2017-2021), Co-PI: Dr. Ram Bilas Pachori
- "Detection of human brain disorders using novel machine learning approaches", CSIR, Total cost: INR 31,26,240/-, Duration: three years (2017-2020), Co-PI: Dr. Ram Bilas Pachori
- "Aalto- IIT-I cooperation for the skill developments of IoT-based implementation", Center for International Mobility (CIMO), Helsinki, Finland, Total cost: Euro 50,000/-, Duration: two years (2016-2018), Co-PI: Dr. Santosh Kumar Vishvakarma
- "Teaching Learning Centre (TLC)", Department of Higher Education, MHRD, Total cost: INR 75,400,000/-, Duration: three years (2016-2019), Co-PI: Dr. Santosh Kumar Vishvakarma
- "Internet of Things (IoT) Enabled Portable Water Quality Monitoring System", IIT Indore and CEERI Pilani, Total cost: INR 6,00,000/-, Duration: one year (2017-2018), PI: Dr. Santosh Kumar Vishvakarma
- "Development and study of the effect of valence plasmonic features and band alignment on the performance of cadmium-free and cost-effective chalcopyrite and kesterite heterojunctions for photovalraic applications", SERB-DST, Total cost: INR 37,62,000/-, Duration: three years (2016-2019), PI: Dr. Shaibal Mukherjee
- "Microstructural and electronic parameters of hetrojunction solar cells on the base of Cu2ZnSn(S, Se)4 and Cu2(Sn, Ge) S3 materials grown by dual ion beam sputtering", SERB-DST, Total cost: INR 20,89,600/-, Duration: two years (2017-2019), PI: Dr. Shaibal Mukherjee, Co-PIs: Dr. Abhinav Kranti, Dr. Mukesh Kumar
- "Synergistic Effect of Self-assembling Organic Inorganic Hybrid Materials for the applications in nanosciences", DST Nanomission, Total cost: INR 52,90,000/-, Duration: three years (2016-2019), PI: Dr. Shaibal Mukherjee

- "Development of Low Voltage High Sensitivity Organic Photosensitive Transistor for Near Infrared Light Sensors": DST, Total cost: INR 49,09,520/- Duration: three years (2017-2020), PI: Dr. Vipul Singh
- "Germanium junctionless transistors for low power logic technology applications", CSIR, Total cost: INR 7,40,000/-, Duration: three years (2016-2019), PI: Dr. Abhinav Kranti, Co-PI: Dr. Shaibal Mukherjee
- "Innovative low power transistor architectures for capacitorless DRAM", Global Innovation and Technology Alliance, Total cost: INR 24,09,000/-, Duration: three years (2016-2019), PIs: Dr. Abhinav Kranti, Prof. Jyi-Tsong Lin, Dr. Shaibal Mukherjee
- "Reducing computational complexity using FPGA to study structure and dynamic properties of nanoparticles", DST, Total cost: INR 21,90,000/-, Duration: two years (2017-2019), Co-PI: Dr. Srivathsan Vasudevan
- "Emerging Techniques for Wireless Communication Systems", Ceará Council of Scientific and Technological Development (FUNCAP), Total cost: INR 266,73,016/-, Duration: two years (2017-2019), PI: Dr. Prabhat K. Upadhyay and Dr. Daniel Benevides da Costa
- "Development of Counter Measures for presentation attacks on Biometric Systems with Focus on hand Geometry and Palmprint Based Systems", CSIR, Total cost: INR 15,46,000/-, Duration: three years (2016-2019), PI: Dr. Vivek Kanhangad
- "Design of efficient strategies for phase estimation in optical metrology using advance signal processing techniques", SERB-DST, Total cost: INR 29,93,350/-, Duration: three years (2017-2020), PI: Dr. Vimal Bhatia
- "Nano Optoelectronic Sensing Platform based on Slot-waveguide for Fast and Efficient Lab-on-chip Applications", DBT, Total cost: INR 26,24,600/-, Duration: three years (2016-2019), PI: Dr. Mukesh Kumar
- "Quasi -2D Silicon Photonic Crystal Based Hollow Waveguide for Optical Communications & Sensing", DRDO, Total cost: INR 51,32,560/-, Duration: three years (2016-2019), PI: Dr. Mukesh Kumar
- "Reliability Modeling of FinFET and its Application in Circuit Design: A Device Circuit Co-Design", SERB-DST, Total cost: INR 19,20,000/-, Duration: two years (2016-2018), PI: Dr. Nandkishor Yadav

Discipline of Mechanical Engineering

Here at the Mechanical Engineering department, we are committed to provide quality education by carrying out robust research programs and working closely with industry. One of our major objectives is to provide quality engineering education with basic and specialized engineering training required for the present and emerging requirements of society. The discipline also has equal responsibility to contribute to the advancements of knowledge by conducting relevant social research with cutting edge technology. With a responsibility to provide continuing education to practicing industrial engineers and to develop industry / academia collaborations, the Discipline is also organizing continuing educational programs. The discipline composes of 15 regular faculties.



Variation of effective thermal conductivity with hydrogen gas pressure

Faculty Members

Dr. Anand Parey
Associate Professor

Dr. Neelesh K. Jain
Professor

Dr. Anil K. Emadabathuni
Associate Professor

Dr. Bhupesh K. Lad
Associate Professor

Dr. Devendra Deshmukh
Assistant Professor

Dr. I. A. Palani
Associate Professor

Dr. Kazi Sabiruddin
Associate Professor

Dr. M. Santhakumar
Associate Professor

Dr. Ritunesh Kumar
Associate Professor

Dr. Santosh K. Sahu
Associate Professor

Dr. Satyajit Chatterjee
Assistant Professor

Shanmugam Dhinakaran
AssociateProfessor

Dr. Shailesh I. Kundalwal
Assistant Professor

Dr. Indrasen Singh
Assistant Professor

Dr. Subbareddy Daggumati
Assistant Professor

Research Areas

- Noise and Vibration ,Gear fault diagnosis, Signal Processing.
- Advanced Machining Processes, Hybrid Machining Processes, Micro-machining and Nano-finishing Processes
- Hydrogen storage, Renewable energy, Sorption refrigeration and air-conditioning systems
- Reliability Engineering, Assessment Management, Prognostics
- Internal combustion engines, Biofuels, Spray and combustion diagnostics
- Mechatronics, system design Smart materials and Structures, Laser based micro-Manufacturing and surface processing
- Thermal spray coatings
- Desiccant Cooling Systems, Heat Transfer
- Thermal-hydraulics of nuclear reactors, Nanofluids, Impinging jets, Heat exchanging equipments, Pool boiling heat transfer, Gas flow through micro channels, Phase change materials
- Surface Technology, Bluff body flows, Heat transfer in porous medi
- Robotics, Nonlinear Control, Mobile Robots and Assistive Robots
- Computational solid mechanics, Metallic glass, Nanoglass, Fracture mechanics, Mechanical behaviour of materials, Finite element methods
- Computational Nanomechanics of Solids, Finite Element Analysis of Composites, Nanomechanics & Micromechanics of Composites, Nanotechnology in Engineering, Smart Materials and Structures
- Mechanics of Fiber Reinforced Composites, Design of Composite Structures, Experimental Characterization of Composite Materials

Major Achievements / Awards / Milestones

Dr. Devendra Deshmukh

- Received project under special call on "Combustion" by SERB. Titled "Investigation of Biodiesel Spray in an Optical Diesel Engine"

Dr. Santosh K. Sahu

- Research article entitled "Experimental study on heat transfer characteristics of circular jet impingement boiling on the variety of structured copper surfaces in stagnation zone" by MayankModak, Vishal Nirgude, Avadhesh K. Sharma, S K Sahu, has been selected as qualified student award winner of the student paper competition in the 24th International Conference on Nuclear Engineering (ICONE24), USA, 2016.

- Research article entitled"Experimental Study On Structured Surfaces For Nucleate Pool Boiling Enhancement by Vishal Nirgude, Avadhesh K. Sharma, Mayank Modak, Santosh K. Sahu, is selected as qualified student award winner of the student paper competition in the 25th International Conference on Nuclear Engineering (ICONE25), Shanghai, China, 2017.

Dr. Shanmugam Dhinakaran

- Received funding of 24000USD from MHRD to conduct 3 GIAN Courses in the year 2016

Dr. Bhupesh Kumar Lad

- Received Hamied-Cambridge Visiting Lecture fellowship, University of Cambridge, International Strategy Office, Cambridge, UK, 2016
- Received Best Technology Development Award, National Technical Institutes Competition 2016, Aditya Birla Group and ITP publishing
- Appointed as Associate Editor for International Journal of Performability Engineering (IJPE), Totem Publisher, Inc, USA

Dr. I.A. Palani

- Appointed as Editorial board Member for International journal of intelligent machines and robotics
- Appointed as President SPIE student chapter for the year 2017-2018 by SPIE Head office, USA
- Project guided by Dr.I.A.Palani was awarded Best B.Tech project for the year 2015-2106
- Project guided by Dr.I.A.Palani is awarded Best B.Tech project for the year 2016-2017
- M.Tech project guided by Dr.I.A.Palani has received Best poster award in the international conference on emerging trends in Materials and manufacturing Engineering

Dr. E. Anil Kumar

- Dr. Anil Kumar is serving as expert panel member for DST- CERI (Materials for Energy Storage, 2017)

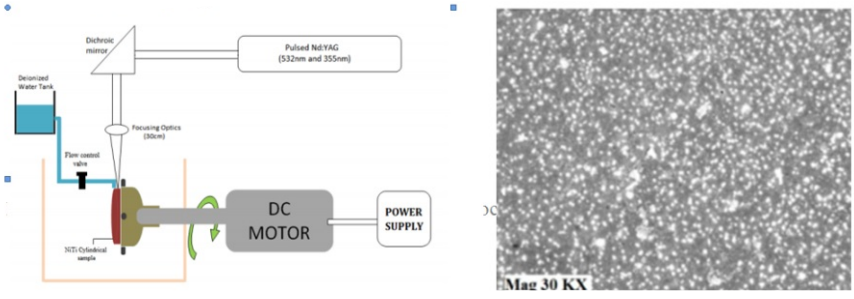
- Received the SERB international travel grant for attending OCEANS 2016 at Shangahi.
- Received the Alexandar von Humboldt fellowship for 12 months.

Dr. Mohan Santhakumar

- Received the SERB international travel grant for attending OCEANS 2016 at Shangahi.
- Received the Alexandar von Humboldt fellowship for 12 months.

Sponsored Projects

- INSPIRE FELLOWSHIP: Integration of biodiesel production with wastewater treatment using cyanobacterial species.
- Development of High Performance Falling Film Tower for Liquid Desiccant Systems.
- High Deposition Rate Additive Manufacturing of Complex Metal Parts (HiDepAM).
- Investigation and modelling of the relationships among cutting tool wear, product quality and operating conditions based on online condition monitoring
- Design and development of an economical light weight and multi-purpose four degrees of freedom hybrid robotic motion platform
- FIST PROGRAM OF DST- MECHANICAL DEPARTMENT
- Building capacity in collaborative research for advanced manufacturing
- Investigation on calibration of smart metal based micro stages using swept source interferometry.
- Teaching Learning Centre for Internet of Things.
- Design and Development of Shape Memory Alloy belt for Exhaust heat recovery from an automotive engine.
- Investigation of Biodiesel Spray in an Optical Diesel Engine.
- Design, development and demonstration of indigenous hydrogen storage and fuel cell system for mobile and stationary applications of 5kW capacity.
- Design and development of a new innovative parallel micro channel heat sink with mitigated flow maldistribution
- Reversible Alkali Metal Based Hydrides for High Temperature Thermal Energy Storage.
- Investigations on Structural and thermos-mechanical behaviour of the Cu- based shape memory alloy bi-morphs prepared by laser assisted manufacturing.
- Numerical investigation of Flow and heat transfer characteristics of three dimensional impinging jet/jets on an isothermal hot surface



NITI Nano Particle Generation

Discipline of Civil Engineering

The Civil Engineering Discipline was established in the year 2016. First batch of undergraduate students joined the Discipline in July, 2016. Currently, the Discipline has 40 B. Tech. first year students and 38 B. Tech. second year students. There are three faculty members in the Discipline with broad specialization in Water Resource Engineering and Structural Engineering. Ph. D programme has been started in year 2017.

Faculty Members

Dr. Umesh C. Chaube
Professor & Coordinator

Dr. Sandeep Chaudhary
Associate Professor

Dr. Munir A. Nayak
Assistant Professor

Research Areas

Water Systems Engineering, Hydrology, Hydroclimatology

Steel Concrete Composite Construction, Concrete Technology

Notable Achievements of 2016-2017 (Till Septemper 2017)

1. Prof U.C. Chaube appointed as Member of Senate of IIT Indore and Coordinator of Civil Engineering Discipline
2. Dr. Sandeep Chaudhary appointed chair of Technical Committee 1 of Asian Concrete Federation.
3. Dr. Munir Ahmad Nayak appointed as an Executive editor of Journal of Environmental Pollution and Climate Change.

Sponsored Projects

1. "Sustainable and economical functionally graded rubberized concrete pavements" funded by DST, Govt of India (PI: Dr. Sandeep Chaudhary)
2. "Waste utilisation in concrete as aggregate: Asian perspective" funded by Asian Concrete Federation (PI:Dr. Sandeep Chaudhary)
3. Consultancy Projects of INR 11,00,000 carried out by Dr. Sandeep Chaudahry
4. Contribution to Industry-Academia interaction as External investigator in several industry projects of IIT Roorkee(Prof. U.C.Chaube)

Discipline of Chemistry

Department of Chemistry at Indian Institute of Technology Indore was started in 2009 with a vision of establishing a centre of excellence and a state of the art facility in chemical sciences research, education and scientific leadership in technology transfer to industry. Today, the department is home to 14 faculty members who are eminent in probing fundamental, molecular level of chemical reactions, structures and properties of matter.

The department has 79 PhD students, 25 postdoctoral/project staff who work in various frontier areas of nanotechnology, organic light harvesting materials, organometallic pharmaceuticals and catalysts, asymmetric synthesis, biosensor metal clusters, molecular fluorescence spectroscopy, computational aspects of materials/alloys and molecular inhibitors for disease targets. Research in these areas is acknowledged by the scientific world in the form of international research publications and in several lectures in national and international conferences. Our research is supported by generous funding from private and public agencies, especially DST and CSIR to an amount equal to ~585 lakhs that shows a model of self-sustaining system. This year department have seen 11 students successfully defending their PhD thesis during 2016-2017.

The chemistry department at IIT Indore will be one among other new IIT's in India to open the avenue for full-fledged two year master's program in chemistry discipline with a current strength of 24 students per academic year. Highlight of our M.Sc program is one full year research project rather than a traditional two year theoretical programme with meagre space for research exercise.

The department of chemistry also offers interdisciplinary collaboration with institutes of national (Banaras Hindu University, RRCAT, IACS, IIT Kharagpur, SNU) and international (Uppsala University, Kalshrue Institute of Technology, University of Mainz, National Institute of Advanced Industrial Science and Technology, Osaka University, Virginia University,IST,Nanyang Technological University) repute to expedite scientific discoveries in various disciplines of research ranging from sciences to engineering

Faculty Members

Dr. Pradeep Mathur
Professor

Dr. Chelvam Venkatesh
Assistant Professor

Dr. Anjan Chakraborty
Asociate Professor

Dr. Apurba K. Das
Asociate Professor

Dr. Suman Mukhopadhyay
Associate Professor

Dr. Tridib Sarma
Assistant Professor

Dr. Tushar Kanti Mukherjee
Associate Professor

Dr. Biswarup Pathak
Associate Professor

Dr. Sampak Samanta
Associate Professor

Dr. Shaikh M. Mobin
Associate Professor

Dr. Sanjay Kumar Singh
Associate Professor

Dr. Satya S. Bulusu
Assistant Professor

Dr. Amendra K. Singh
Assistant Professor

Dr. Rajneesh Misra
Associate Professor

Research Areas

- Metal mediated transformations of acetylenes, Metal-acetylide and metal-oxo chemistry
- Alkynyl Fischer carbene complexes in metal cluster chemistry, Synthesis of mixed-metal clusters, Ferrocenyl-incorporated metal carbonyl complexes
- Total synthesis of anticancer natural products by solid state phase synthesis, Synthesis of small molecule inhibitors and ligands for drug targets, Design, synthesis and diagnostic applications of new targeting ligands for cancers and inflammatory diseases
- Drug delivery systems, near-infra red fluorescence, nuclear imaging and bioconjugate chemistry, Novel materials for biofuel conversion, trace metal and hormone detection etc.
- Spectroscopy, supramolecular electronics, cell culture and organocatalysis applications
- Chiral metal organic frameworks
- Activation of small molecules and metal mediated organic synthesis.
- Inorganic and organometallic pharmaceuticals
- Nanoparticles mediated catalysis
- Inorganic nanoparticle enzyme composites
- Coordination polymers and hydrogels
- Functionalized materials based on carbon structures
- Nanoparticles as in-vitro and in-vivo contrast agents, Single Particle Fluorescence Microscopy, Semiconductor & Metal Nan particles. Protein Nano-particle Interactions
- Fluorescence Spectroscopy.
- Theoretical Chemistry
- Asymmetric synthesis, Heterocycles, Metal mediated synthetic transformation, Green chemistry, Total synthesis of biologically active compounds Medicinal Chemistry
- Inorganic and Material Chemistry
- C-C coupling reactions, C-N coupling reactions, Hydration, oxidation and hydrogenation reactions, C-H activation reactions, Catalysts for Biomass transformation
- Materials for H2 generation and H2/CO2 storage
- Model Potentials for metal clusters and nanoalloys, Model Potentials for small organic molecules, Devolopment of novel computational techniques to study nanoalloy clusters
- Synthetic inorganic and organometallic chemistry, spectroscopic characterization, single crystal X-ray diffraction and computational methods.
- Organic photonics and electronics, Organometallic Chemistry

Notable Achievements of 2016-2017 (Till Septemper 2017)

Dr. Chelvam Venkatesh :

1. Invited Professors from Purdue University, USA, Prof. Kavita Shah, Illinois Wesleyan University, USA, Prof. Ram Mohan and University of Hamburg, Germany, Prof. Malte Brasholz under GIAN (Global Initiatives of Academic Networks) program to IIT Indore for lectures and probable joint research collaboration during 2016-17.
2. Two Ph.D students working in my research group, Ms. Mena Asha Krishnan and Mr. Premansh Dudhe were awarded Newton-Bhabha Research grant fellowships for performing part of their Ph.D thesis at Keele University, United Kingdom with Prof. Paul Roach for a period of 6-months in 2016-17.
3. Board of Radiation and Isotope Technology, BARC has signed MoU with IIT Indore for joint Ph.D admission, research collaboration and training programs in March 2017.
4. Dr. Fabian Frengle, Max-Planck-Institute of Colloids and Interfaces, Germany is visiting IIT Indore under GIAN program to teach course entitled "Chemistry and Biology of Carbohydrates" in Nov. 2017.

Dr. Biswarup Pathak:

Visiting Faculty Fellow, Australian National University, DST, June 2017-March 2018

Sponsored Projects

Dr. Sanjay Kumar Singh

1. New Catalytic Systems based on Arene-Ruthenium Complexes for Direct CN bond formation;

   Duration: 2014-2017.

   Funding agency: DST

   Total amount: Rs. 21,20,000/-

2. Development of new catalytic systems for efficient transformation of biomass/biomass derivatives to biofuel components

   Duration: 2017-2020

   Funding agency: DST-SERB

   Total amount: Rs. 62, 00,000/-

3. Development of active molecular catalysts based on transition metal complexes for efficient C-H bond activation and functionalization

   Duration: 2017-2020

   Funding agency: CSIR ,

   Total amount: Rs. 12, 00,000/-

4. Reversible Alkali Metal Based Hydrides for High Temperature Thermal Energy Storage, Materials for Energy Storage (MES)

   Duration: 2016-2019

   Funding agency: DST

   Total amount: Rs. 1, 50,00,000/-

Dr. Sampak Samanta

1. Development of Organocatalytic Mediated Asymmetric Synthesis of Highly Functionalized Tetrahydrocarbazole Derivative as a Privileged Structure;

   Duration: 2014-2017.

   Funding agency: DST

   Total amount: Rs. 32,00,000/-

2. Metal Free Based Domino Technique for the access to functionalized puridins related to heterocycles & their application in drug-discovery.

   Duration: 2017-2020.

   Funding agency: CSIR

   Total amount: Rs. 9,00,000/-

Dr. Apurba K. Das:

Project Title: Synergistic Effect of Self-assembling Organic Inorganic Hybrid Materials for the Applications in Nanosciences

Principal Investigator: Dr. Apurba K. Das

Amount: 52.9 lakhs, Funding Agency: DST, New Delhi, India.

Dr. Suman Mukhopadhyay:

Project: Exploring tetrazole based transition metal complexes in the field of catalysis, luminescent materials and bioactivity (October 2015 - September 2017)

Funding agency: CSIR

Total amount: Rs. 9, 00,000/-

Dr. Biswarup Pathak:

Designing of Mn-Based Electrocatalysts for CO2 vs. Proton Reduction

Duration: 2016-2019.

Funding agency: DST-SERB

Total amount: 44,00,000/-

Dr. Shaikh M. Mobin

Development of Intracellular Fluorescent Metal Ion Sensors and Subcellular Targeting

Duration: 2017-2020

Funding agency: DST, SERB

Total amount: Rs. 20,16,960/-

Dr. Satya Bulusu

Reducing computational complexity using FPGA to study structure and dynamical properties of nanoparticles

Duration: 2017-2020.

Funding agency: DST

Total amount: Rs. 30,18,606/-

Dr. Amrendra Kumar Singh

Designing Bimetallic Complexes with Cooperative Metal-Metal Interactions for the Multi-electron Reduction of Small Molecules

Duration: 2017-2020

Funding agency: DST

Total amount: Rs. 61,10,720/

Dr. Rajneesh Misra

Donor-Acceptor Pyrazaboles for Photonic Applications

Duration 2015-2018

Funding Agency:CSIR

Total amount: Rs. 6,00,000/-

Reversible Mechanochromism and Aggregation induced emission in tetraphenylethylene derivatives

Duration 2015-2018

Funding Agency: DST

Total amount: Rs 46,00,000/-

Discipline of Mathematics

The Discipline of Mathematics of IIT Indore was started in 2009. The discipline provides an outstanding research environment complemented by excellent teaching for students to flourish in different area of research, academics and industry. The current faculty members of the discipline are well equipped to conduct research programme in various areas of pure and applied mathematics, computation and simulations. The discipline offers Ph. D and M. Sc. programs in Mathematics. The discipline also plans to start a B. Tech. programme in "Mathematics and Computing". Provision can also be made for B. Tech. students to earn minor in Mathematics who have strong interest in Mathematics that goes beyond their required B. Tech. courses in Mathematics. This will also be reflected in their degree certificate. The discipline also encourages bachelor and master students in Science and Engineering for their summer internships and Ph. D programs in Mathematics. Discipline conducted two major "GIAN courses" on "Julia" and "Big Data" in 2016 and three international symposia in 2013, 2015 & 2017. Discipline also continuously conducting some nationalized courses like "Madhava Mathematics", GIAN, "MTTS", CEP, etc.

Faculty Members

Dr. Sk. Safique Ahmad
Associate Professor

Dr. Swadesh K. Sahoo
Associate Professor

Dr. Antony Vijesh
Associate Professor

Dr. Anand Parkash
Assistant Professor

Dr. Niraj Shukla
Assistant Professor

Dr. Md. Aquil Khan
Associate Professor

Dr. Ashisha Kumar
Assistant Professor

Dr. M. Ashok Kumar
Assistant Professor

Dr. Vijay Sohani
Assistant Professor

Dr. M. Tanveer
Assistant Professor

Dr. Sanjeev Singh
Assistant Professor

Dr. Santanu Manna
Visiting Assistant Professor

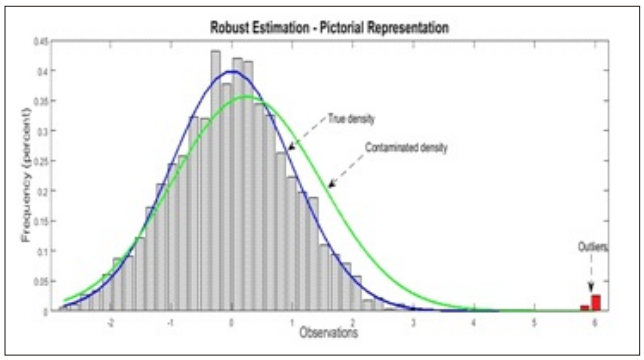
Dr. C. Cherugondi
Visiting Assistant Professor

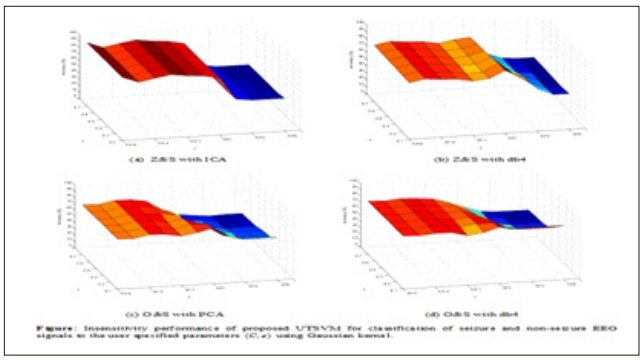
Research Areas

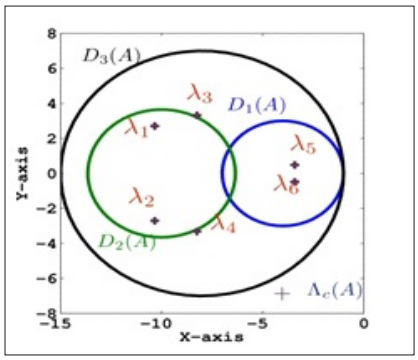
Algebra
Analysis
Differential Equations
Rough Set Theory
Modal Logics
Co-algebra
Numerical Linear Algebra

Quaternion Linear Algebra
Information Theory
Minimum distance based Inference methods Information geometry Robust estimation
Wavelet Analysis

Machine Learning
Biomedical Signal Processing
Applications to Alzheimer's disease
Optimization
Seismology
Earthquake Statistics







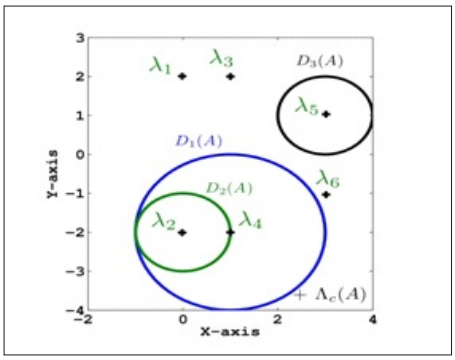


Image by Dr. Sk. Safique Ahmad

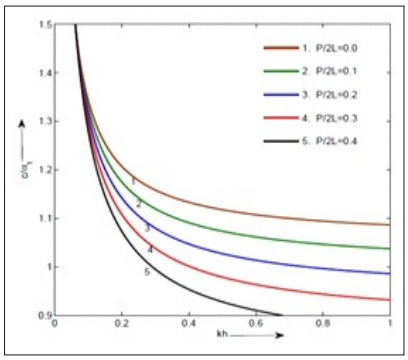


Image by Dr. Santanu Manna

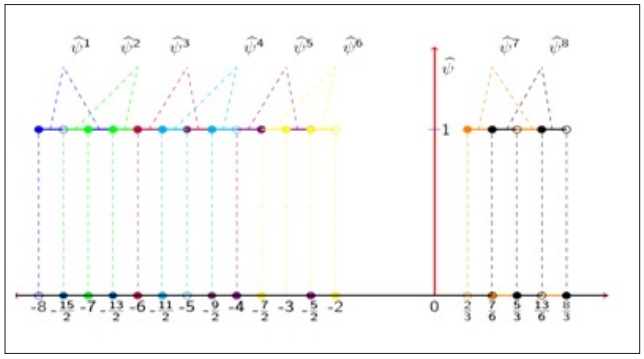


Image by Dr. Niraj Kumar Shukla

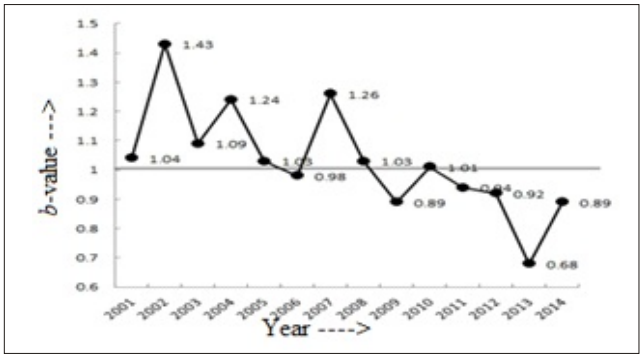


Image by Dr. Santanu Manna

Notable Achievements of 2016-2017 (Till Septemper 2017)

1. Dr. Sk Safique Ahmad organized a GIAN course on "Modern applications on Numerical linear algebra methods" held during June 27 - July 05, 2016.

   This GIAN course conducted at IIT Indore got highlighted in Quartz India news.

   https://qz.com/963225/julia-an-indian-computer-scientist-built-a-new-programming-language-from-bengaluru/

2. Dr. M. Ashok Kumar & Dr. Sk Safique Ahmad organized a GIAN course on “Big Data Stream Analytics” held during 26 October 2016 and 01 November 2016 sponsored by MHRD.
3. Dr. Anand Parkash & Dr. Ashisha Kumar, conducted MTTS (O level) at IIT Indore.
4. Dr. S.K. Sahoo, Dr. M. Tanveer & Dr. Aruna Tiwari - Organized the joint event - NTU-India Connect Program: International Symposium on Computational Mathematics, Optimization, and Computational Intelligence (CMOCI 2017) held on July 17-19, 2017 at IIT Indore.
5. Dr. M. Ashok Kumar, attended the 2016 IEEE International Symposium on Information Theory (ISIT 2016) , held at Barcelona, Spain during 10-15 July, 2016 and presented the paper “On Projections of the Renyi Divergence on Generalized Convex Set” co-authored with Igal Sason.
6. Dr. Santanu Manna, Invited Speaker: Wavelet Transform and its application in signal Processing, at IPS Academy, Indore, 4-5 November, 2016.
7. Dr. Santanu Manna, Invited Speaker: The Indian Mathematics Consortium in co-operation with American Mathematical Society (AMS), at BHU Varanasi, 14-17 December, 2016.
8. Dr. Santanu Manna, Invited Speaker: National Conference on Emerging Trends in Applied Sciences (NCETAS 2017), at Galgotias University, 17-18 August, 2017.
9. Dr. Niraj Kumar Shukla, received travel support from DST-SERB, New Delhi to attended an international conference entitled ATFA17: Aspects of Time Frequency Analysis, held at Politecnico di Torino, ITALY during June 05-07, 2017.
10. Dr. Niraj Kumar Shukla, delivered a talk entitled “Finite Fourier Transform and Wavelets”, at Department of Applied Mathematics & Computational Science, SGSIT, Indore in the workshop “Recent Advances in Mathematics and its Applications” during Jan 20-21, 2017.
11. Dr. Niraj Kumar Shukla, delivered a talk entitled “Generalized Nonuniform Multi resolution Analyses”, in the conference “International conference, Interdisciplinary Mathematics, Statistics & Computational Techniques” organized by FIM at Department of Mathematics, Manipal University, Jaipur during Dec 22-24, 2016.

12. Dr. Sk Safique Ahmad, Keynote speaker: Faculty Development Program on Recent Trend of Research in Mathematics in Shree Vaishanv Vidyapeeth Viswavidyalaya on May 27, 2017.
13. Dr. Sk Safique Ahmad, Invited Speaker: Faculty Development programe on Statistical and R software during 27th Feb-1st march 2017 at College of Engineering, Cherthala.
14. Dr. Sk Safique Ahmad, Invited Speaker: Perturbation on Nonlinear eigenvalue problems, IIT Indore-TU9 Research held at Berlin, Nov 02-03, 2016.
15. Dr. Sk Safique Ahmad, Contributed talk: AMS conference during Sept. 16-17, 2017 in University of Buffalo, USA.
16. Dr. Sk Safique Ahmad, Contributed talk: AMS conference during Sept. 23-24, 2017 in University Central Florida, USA.

Sponsored Projects

1. Dr. S.K. Sahoo, Geometry of hyperbolic type metrics and their applications in analytic function theory (funded by National Board for Higher Mathematics DAE; Duration: 2016 - 2019).
2. Dr. M. Tanveer, Classification and prediction of Alzheimer disease using multimodal imaging data

   Sponsoring Agency: Science and Engineering Research Board (SERB), New Delhi, INDIA under Ramanujan Scheme

   Designation: Principal Investigator

   Period: 2016-2021

   Sanctioned Amount: INR 89 Lakhs
3. Dr. M. Tanveer, Optimization models and algorithms for non-parallel support vector machines

   Sponsoring Agency: Science and Engineering Research Board (SERB), New Delhi, INDIA under Early Career Research Award (ECRA) Scheme

   Designation: Principal Investigator

   Period: 2017-2020

   Sanctioned Amount: INR 26 Lakhs
4. Dr. M. Tanveer, Detection of human brain disorders using novel machine learning approaches

   Sponsoring Agency: Council of Scientific & Industrial Research (CSIR), New Delhi, INDIA under Extra Mural Research (EMR) Scheme

   Designation: Principal Investigator

   Period: 2017-2020

   Approved Amount: INR 31 Lakhs

Discipline of Physics

The discipline of physics, incepted in 2009, aims to educate the students by giving them a blend of knowledge of fundamental and applied physics, as well as our faculty aspire to develop advanced research areas in central India.

The faculty members are from diverse streams and specializations such as Experimental Condensed Matter Physics, Complex Systems and Non-linear Dynamics, Theoretical and Experimental High Energy Physics. Being part of an institute of national importance, the Physics faculty of IIT Indore offer a unique interactive platform for the students to explore the arena of fundamental and applied research. Physics discipline at IIT Indore started M.Sc. Physics from July, 2013 onwards to serve the higher education besides promoting current research. Holding many experimental facilities, good mix theoretical and experimental research, significant number of research scholars, national and international collaborations, physics discipline is now a vibrant platform for both higher education and research.

Faculty Members

Dr. Manavendra Mahato
Associate Professor

Dr. Krushna Mavani
Associate Professor

Dr. Subhendu Rakshit
Associate Professor

Dr. Sarika Jalan
Associate Professor

Dr. Ankhi Roy
Associate Professor

Dr. Raghunath Sahoo
Associate Professor

Dr. Rajesh Kumar
Associate Professor

Dr. Pankaj Sagdeo
Associate Professor

Dr. Somaditya Sen
Associate Professor

Dr. Sudeshna Chattopadhyay
Associate Professor

Dr. Preeti Bhobe
Associate Professor

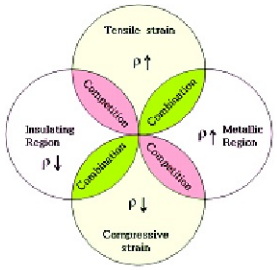
Dr. Parasharam Shirage
Ramanujan Fellow

Research Areas

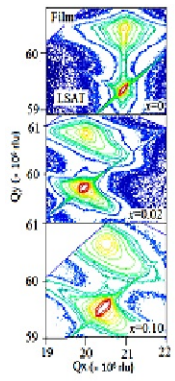
String Theory, Particle physics phenomenology, Quark Gluon Plasma, Heavy Ion Collisions, Hadron physics, light mesons, Multiferroics, thin films and THz spectroscopy ,semiconductors, dilute magnetism, nano materials, single crystals, Organic and inorganic semiconductors, nanoclusters and nanostructures, nanowires, Crystallography and structure property correlation, highly correlated electron systems, Shape memory alloys, Magnetic Semiconductors, XAFS, PES and Thermoelectric power, Surfaces and interfaces, building better batteries, thermoelectric materials, Complex Systems , Statistical physics and Non-linear Dynamics

Notable Achievements of 2016-2017 (Till Septemper 2017)

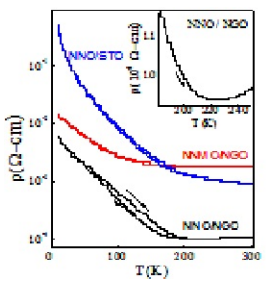
Controlling the electronic state by strain and Mn-doping in epitaxial thin films of NdNiO3



Venn diagram showing competing and combining effect of strain and Mn-doping in NdNiO3 thin films



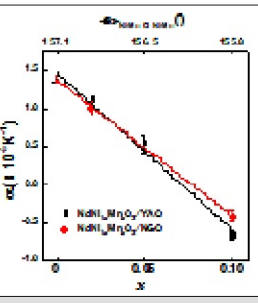
Reciprocal space mapping of thin films deposited on LSAT.



Temperature dependent resistivity showing competing and combining effects of tensile strain and Mn-doping

RNiO3 (R= Rear earth ion) compounds compounds have applications in switches, sensors, photovoltaics and multiferroic devices.

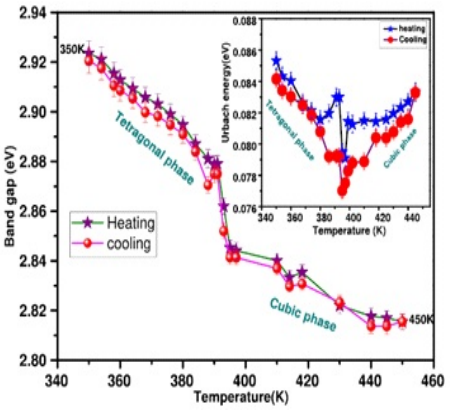
This system shows a temperature driven first order metal to insulator transition, which is very sensitive to the external perturbations. We have studied a combined effect of Mn-doping and epitaxial strain on the metallic as well as insulating state of NdNiO3 thin films. The Reciprocal space mapsshow that undoped thin film is epitaxial and the epitaxy is maintained till higer Mn-doping. Our study reveals that a slight increase in the tensile strain via lattice mismatch can result in an order of magnitude difference in the resistivity for pure NdNiO3 thin films1,2. Moreover, the temperature dependent resistivity curves of pure NdNiO3 films demonstrate that the tensile strain increases the resistivity in a similar way for all temperatures. However, a crossover of resistivity curves is observed due to competing effects of doping and strain. The Venn diagram3 depict that depending upon the temperature region, the effect of tensile and compressive strain on metallic and insulating states, either compete (dark pink region) or combine (dark green region) with those of Mn-doping.



Linear change in temperature coefficient of resistivity and corresponding change of bond angle due to Mn-doping.

Relaxation in Pure BaTiO3

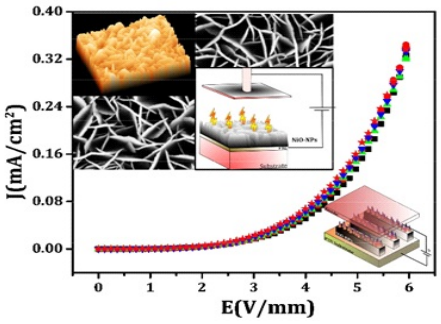
Group Leaders: Dr. P.R. Sagdeo and Dr. Rajesh Kumar
Research Scholars: Vikash Mishra et. al.



The search for the new material(s) for various electronic applications have dominated the research worldwide particularly after the development of silicon based tiny integrated circuits and BaTiO3 based tiny capacitors. During last five decades the nature of electronic devices has witnessed huge changes. Very small as well as energy efficient electronic devices are replacing the conventional electronic circuit elements. While using a material for a specific purpose it is important to know the exact values of Band Gap and corresponding disorder present in the sample. Possibly for the first time using simple temperature and time dependent optical spectroscopy our group has shown that pure BaTiO3 shows relaxation of electronic disorder of the order of 0.08eV. This is one of the very crucial information as pure BaTiO3 is considered to be non relaxor material and know to show relaxation only at THz range.

NiO Excellent Electron Emittor

Group Leaders: Dr. Rajesh Kumar and Dr. P.R. Sagdeo
Research Scholars: Suryakant Mishra et. al.



Schematic illustration of parallel plate field emission measurement set-up. Field emission (J-E plot) obtained from NiO-NPs@FTO at various cycles. Insets show J-E curves. http://dx.doi.org/10.1039/ C7TC01949A

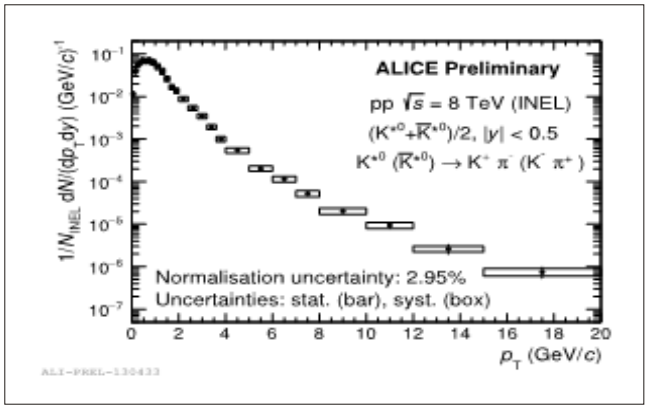
The enhance electron emission is the need for bright electron source in new generation of scanning and tunneling electron microscopy. Recently our group has shown that NiO nano flakes are potential candidates as a bright electron emitter. A power efficient and stable field emission from ultrathin nanothorn covered nickel oxide (NiO) nanopetals (NPs) fabricated using a simple technique. Which is very extensively applicable in field emission (FE) based display device.

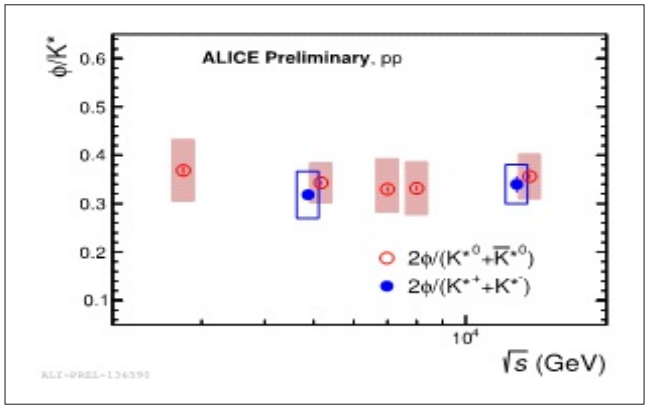
Variation in band gap during heating and cooling cycles which confirms reversibility in the band gap values of BaTiO3, however, Eu shows hysteresis as shown in the inset. The vertical lines are error bars in the measurements, which show that the errors are very small when compared to the variation in the Eu values near the transition temperature (see the inset). Journal of Applied Physics 122, 065105 (2017); doi: 10.1063/1.4997939

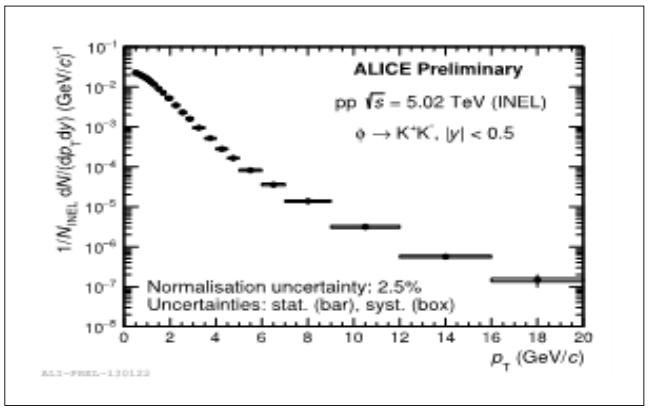
Resonance production in proton+proton collisions with ALICE at the Large Hadron Collider

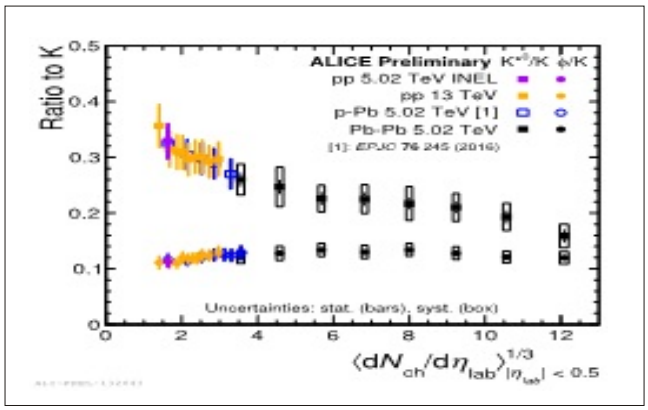
Group Leader: Dr. Raghunath Sahoo,
PhD/Postdoc Students: Arvind Khuntia, Sushanta Tripathy, Pragati Sahoo, Sudipan De

Resonances are important tools to probe the hadronic phase formed in heavy-ion collisions. Due to their short lifetimes of 10-23 sec, they enable us to study the mechanisms, such as regeneration and re scattering, which alter the shape of transverse momentum (pT) spectra and can affect the measurable yields. Measurements in pp collisions constitute a baseline for heavy-ion measurements and provide a reference for the estimate of the nuclear modification factors and information for tuning event generators inspired by perturbative-Quantum Chromodynamics (pQCD).









Charged and neutral K* (892) and φ(1020) are reconstructed through invariant mass analysis with their hadronic decay channels. The signals of K* (892) and f (1020) in different pT intervals are obtained by subtracting the combinatorial background from the unlike-sign charged particle invariant mass distribution. The combinatorial background is estimated using an event mixing technique. The extracted K*(892) signal is fitted with a Breit-Wigner function and the f (1020) signal is fitted with a Voigtian function, which is a convolution ofBreit-Wigner and Gaussian function. Fig. a and b show the yield of K*(892)0 and f (1020) in different pT intervals.Fig. c shows new measurements of f /K* as a function of center of mass energy ($\sqrt{}$ s) The new results from pp collisionsat $\sqrt{}$ s = 5.02, 8and 13 TeV are compared with other energies. No significant energy dependence of the particle ratios in minimum bias pp collisions

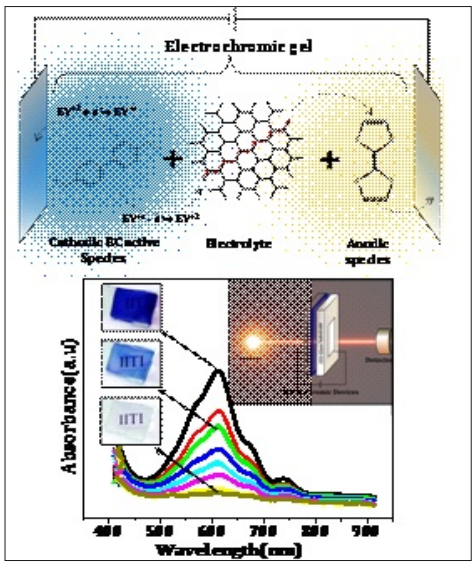
is observed at LHC energies. Fig. d shows new measurements of K*0/K and ϕ/K as a function of charged particle multiplicity, which acts as a proxy for system size. Here, the K*0/K decreases with system size for heavy-ion collisions and also a similar trend is observed for pp collisions as a function of charged particle multiplicity. In contrast, the ϕ meson lives 10 times longer than the K*0 (~4.6 fm/c), decays predominantly after the end of the hadronic phase and it is not affected by the re-scattering and regeneration, which can be inferred from flat behavior (within systematic uncertainties) of ϕ/K as a function of charged particle multiplicity.

References:

1. https://aliceinfo.cern.ch/Notes/node/628, ID Number: ANA-3946, Pragati Sahoo and Raghunath Sahoo
2. https://aliceinfo.cern.ch/Notes/node/629, ID Number: ANA-3949, Pragati Sahoo, Sudipan De, Raghunath Sahoo
3. https://aliceinfo.cern.ch/Notes/node/545, ID Number: ANA-3445, Sushanta Tripathy, Arvind Khuntia, Raghunath Sahoo and Anders G. Knospe
4. https://aliceinfo.cern.ch/Notes/node/563, ID Number: ANA-3446, Arvind Khuntia, Aditya Nath Mishra, Sushanta Tripathy, Raghunath Sahoo and Anders G. Knospe,

Improved Electrochromic Display

Suryakant Mishra, Rajesh Kumar



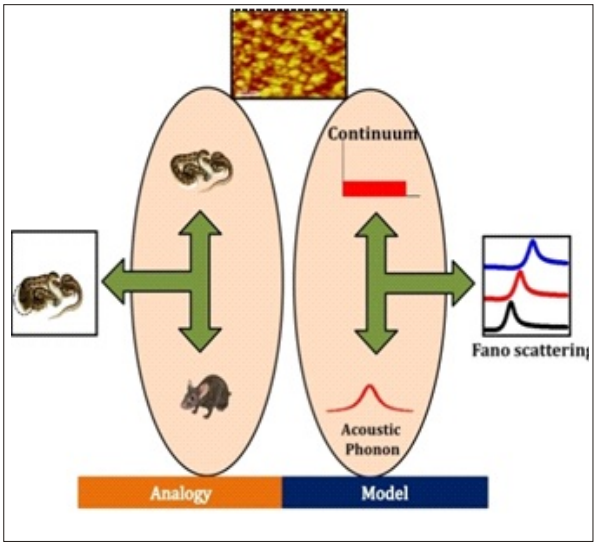
We have fabricated an electrochromic display based on EC-Gel has been prepared by using ethyl viologen (EV)–graphene nanoflakes (GNFs)–tetrathiafulvalene (TTF) for a faster and more efficient electrochromism. A prototype flexible electrochromic device has been fabricated by using the above-mentioned EC-Gel as an active layer which shows overall improved coloring efficiency. At the same time, the abovementioned electrochromism shows color switching at very low potential with fast coloration/ bleaching time, which is better in comparison to that of other traditional EC-Gel or non EC-Gel-based electrochromic devices. Besides acting as an electrolyte, GNFs also facilitate achieving a faster bleaching time by allowing reversing the redox process quickly.

Discovery of 'Fano Scattering'

Priyanka Yogi, Rajesh Kumar

We have discovered a new phenomena, named as 'Fano Scattering', which is possible in nanomaterial in low frequency silicon nanostructures (Si NSs) were used as the physical system -

to harvest low frequency acoustic phonons which can interact with an intraband quasi-continuum to give rise to Fano-interaction as observed through Raman spectroscopy. A size- dependent asymmetry in Raman line shape at lower frequency for SI NSs has been observed. The experimental asymmetry of Raman line shape has been explained by a theoretical model that incorporate the quantum-confined phonons as well as the contribution of intraband quasi-continuum.



http://pubs.acs.org/doi/10.1021/acs.jpclett.6b02090

http://pubs.rsc.org/en/content/articlelanding/2017/tc/c7tc02913f#!divAbstract

Sponsored Projects

1) FIST Programme of DST Physics Discipline
2) Analysis of complex Systems and emerging behaviour under the combined framework of network theory and random matrix theory
3) In-Situ Spectroscopic characterization of electrochromic materials for devices applications
4) Generalized method of fabrication of tunable self-assembly to design nano-scale arrays and patterns- engineering of the electromagnetic field in the nano- scales, an important goal of photonics
5) Analysis of Interplay of Multiplexing and Optimization in Complex Networks.
6) Leptons from heavy flavour hadron decays in proton-proton collisions at the LHC
7) Quantitative Substrate-Strain Induced Effect on Optical, Electrical and Magnetic Properties of Manganites
8) A large ion collider experiment (ALICE) upgrade, operation & utilization
9) Ramanujan Fellowship: High Pressure Synthesis of Novel Superconductors, Single Crystal Growth and Physical Prosperities Measurements to Determine the Guiding Principle for Enhancement of Tc"
10) First principle studies and synthesis, characterization, physical properties of multiferroics Rfeo3 (R=Bi, Ga, La, Nd) nanoparticles
11) Challenges in particles physics after Higgs Discovery

School of Humanities and Social Sciences

The School of Humanities and Social Sciences is a multidisciplinary establishment of IIT Indore. We emphasize on providing students the much-needed experiences that enable them to face the opportunities and challenges of today's changing world. In this effort, we endeavour to provide excellence in teaching and research.

We have created a learner-centric, research-intensive, multidisciplinary academic ecosystem. Our doctoral program integrates social understanding and technological advantage while responding to the needs of global society. This provides them a platform to develop expertise and appreciate diversity while gaining deeper insights into their areas of interest.

Social challenges that we face as a global society today are complex, but our understanding of its intricacies has grown and continues to grow. Our school focuses on the interaction among social sciences, management, engineering, and science & technology that comprise the solution- driven approach in addressing real-world problems. Since its inception, the School of Humanities and Social Sciences has carved a niche for itself as a multi- dimensional establishment. With modern state-of- art facilities, the school's academic program offerings are both broad and in-depth, covering social-centric issues to technically oriented fields to the creative specialties (thus aiming at incorporating anthropology, history, political science, human services, human sciences, arts, media, music studies, design, and allied fields). The school is proud of its environment that fosters fellowship, intellectual understanding and problem solving.

Faculty Members

Dr. Ruchi Sharma
Associate Professor

Dr. Pritee Sharma
Associate Professor

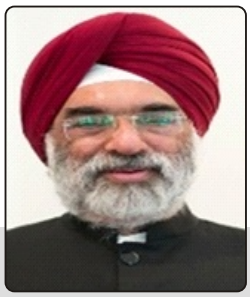
Dr. Nirmala Menon
Associate Professor

Dr. Bharath Kumar
Associate Professor

Dr. Sanjram PK
Assistant Professor

Dr. Niraj Mishra
Assistant Professor

Dr. Amarjeet Nayak
Assistant Professor



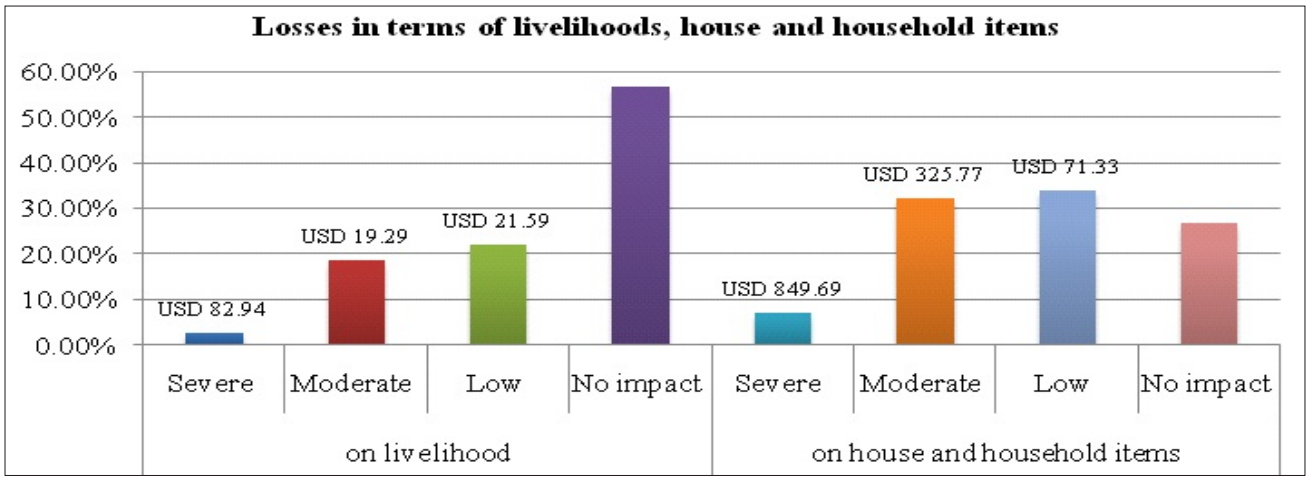
Ambassador Gurjit Singh
Honorary Professor

Research Areas

- Economics of Innovation with specific focus on R&D; Patenting; Patent Policy; Technology Transfer; Foreign Direct Investment; Licensing.
- Agricultural and Resource Economics. (i) Agricultural Productivity, and resource use efficiency in land and water in climate change scenario (ii) rural poverty and (iii) trade concerns of developing countries.
- Postcolonial Studies, Digital Humanities and Publishing and Translation Studies.
- Contemporary Indian Philosophy, Moral Philosophy, Social and Political Philosophy.
- Ethno-hydrography of Indian River Systems: Study of River Chambal and its tributaries in Ganga Basin; Environment, Politics, and Religion in the Management of Indian Rivers; Local Initiative for total Sanitation: Case Study of "Simrol Model" Toilet Project in Madhya Pradesh; "Understanding River Basin Governance in India: Case study of Kshipra River basin in Indore and Ujjain districts of Madhya Pradesh", Water Governance networks in the slums of Indian Cities, CAQDA Lab for Training and Research using Qualitative Methods.
- Human Factors.

Notable Achievements of 2016-2017 (Till Septemper 2017)

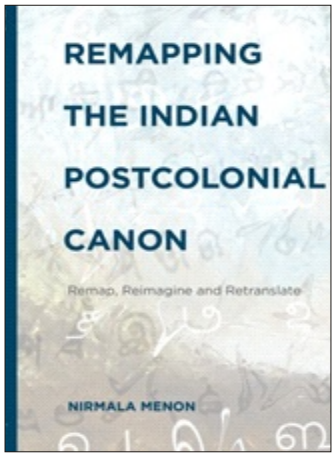
1. Dr. Ruchi Sharma organized GIAN course on Intellectual Property Rights and International Economic Development with Prof. Walter G. Park, American University, Washington D.C. from December 12-16, 2016.
2. Dr. Ruchi Sharma received Best Paper Award for article co-authored with Aakririt Jain and P. Vigneswara Ilavarasan as second author, during the conference on Management of Intellectual Property Rights and Strategy 2016, held at IIT Bombay from July 15-16 2016.
3. Dr. Ruchi Sharma gave distinguished lecture on "Make in India, Make for India and Innovate in India," during Make in India Conference at Career College Bhopal on 17 February 2017. She also gave an invited talk on "Software Patenting in India," during Workshop on IPRs, at IPS academy, Indore on April 8, 2016.
4. Dr. Pritee Sharma was invited as Renewable Energy Technology Transfer (Macro) expert by the Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland at the Energy Workshop held during July 5-7, 2017. She presented the work undertaken by her and Ms. Surabhi Joshi on "Solar Energy Deployment Process in India". Dr. Pritee Sharma will also present her work undertaken with Taru Leading Edge a Non Government Organization and the International Institue of Environment and Development (IIED) London at the 2017 Earth System Governance Conference to be held at Lund, Sweden, during October 08-11, 2017.

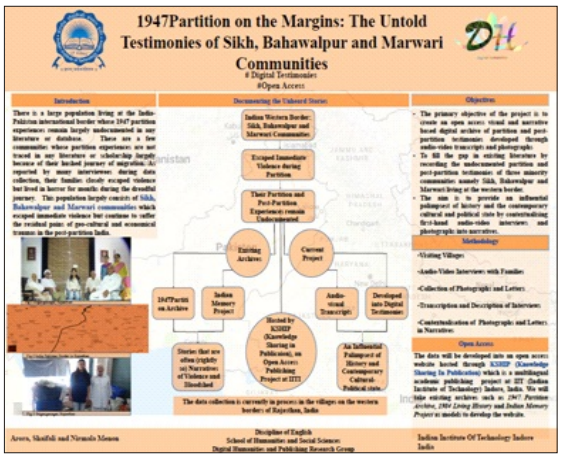


Source: Sharma, Karanth, Burvey and Dubey (2016) Available at http://pubs.iied.org/10789IIED/

5. Dr Nirmala Menon was invited to present the IIT Indore scholarly publishing project KSHIP (Knowledge Sharing in Publishing) at the Digital Humanities Conference, DH2017 Montreal, Canada.
6. Dr Nirmala Menon was invited to give a public lecture on Digital Humanites in India at Saint Anselm College, New Hampshire, US in April 2017.
7. Books: Nirmala Menon Remapping the Indian Postcolonial Canon: Remap Reimagine and Retranslate Palgrave Macmillan, Springer Nature Dec 2016

   http://www.springer.com/in/book/9781137537973#otherversion=9781137537980
8. Shaifali Arora and Nirmala Menon: Poster Presentation at Digital Humanities 2017 Conference, Montreal, Canada





Sponsored Projects

1. Dr. Ruchi Sharma received grant of 30 lakhs as Project Director of the project titled Knowledge Spillovers of Foreign Patenting on Indian Firms: Econometric Analysis Using Patent Citation Data funded by Indian Council for Social Science Research, New Delhi.
2. Dr. Ruchi Sharma received grant of 5.4 lakhs to conduct GIAN course on Economics of Science, Technology and Innovation: Empirical Approaches and Randomized Control Trials (RCTs) with Dr. Ina Ganguli of University of Massachusetts Amherst as lead instructor.

Fellowships:

Ms. Reema Chowdhary: Fellow British Council Charles Wallace India Trust Research Grant, 2017

Ms. Melissa De Lury: Fullbright Fellow from Trinity College, Ireland and CUNY New York is a fellow with the Digital Humanities Lab from September 2017-August 2018, First Fulbright fellow to IIT Indore

Ms. Shanu Shukla: Fullbright-Nehru fellowship grant at University of Michigan, Annn Arbor, USA from September 2017-August 2018.

Biosciences and Biomedical Engineering

Biosciences and Biomedical Engineering (BSBE) is a unique interdisciplinary center which has been established in 2012 with a vision to encourage human resource development and research in the area of bioscience, bioengineering and biomedical engineering.

The BSBE group aims to be internationally recognized in bio-related research and to produce the leaders of tomorrow, with the integrated use of training, and career development efforts to improve individual, group and organizational effectiveness in these areas. The vibrant group of faculty members, staffs, research and masters students of the BSBE group aspires to create an ambience for the smooth pursuit of scholarly activities in research and training, leading to novel innovations, in addition to carrying out fundamental studies in life sciences.

The BSBE group seeks to pursue research and development activities resulting in new discoveries in imaging techniques, diagnostics kits, and novel therapies. Additionally, the BSBE group intends to carry out patient-based research in collaboration with physicians at renowned hospitals in India and abroad. Our aim is not only to perform the fundamental biology research and novel technological innovations, but also to take these discoveries to the clinical applications, in true sense "bedside to bench and back".

We seek to create a unique institutional environment to conduct a truly multidisciplinary research that translates scientific and technological advancements into innovations that will not only improves public health, but also immensely contributes in the areas such as agriculture, energy and environment. Indian Institute of Technology Indore is recognized for its science and technology advancement and offers many opportunities for interdisciplinary collaborations with various departments and research centers including the disciplines of Computer Science and Engineering, Electrical Engineering, Mechanical Engineering, Physics, Chemistry, Mathematics, Humanities and Social Sciences.

Faculty Members

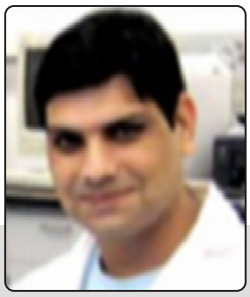
Dr. Suman Mukhopadhyay
Associate Professor

Dr. Prashant Kodgire
Associate Professor

Dr. Amit Kumar
Associate Professor

Dr. Debasis Nayak
Assistant Professor

Dr. Sharad Gupta
Assistant Professor



Dr. Mirza S. Baig
Assistant Professor

Dr. Abhijeet Joshi
INSPIRE Faculty

Dr. Kiran Bala
Assistant Professor

Dr. Hem Chandra Jha
Assistant Professor

Dr. Parimal Kar
Ramalingaswami Fellow

Dr. Sushabhan Sadhukhan
Assistant Professor

Dr. Mobin Shaikh
Associate Professor

Dr. Chelvam Venkatesh
Assistant Professor

Dr. Sarika Jalan
Associate Professor

Dr. Sudeshna Chattopadhyay
Associate Professor

Dr. Rajesh Kumar
Associate Professor

Dr. Sanjram Premjit K.
Assistant Professor

Dr. Shanmugam Dhinakaran
Associate Professor

Dr. Ram Bilas Pachori
Associate Professor

Dr. Srivatsan Vasudevan
Assistant Professor

Research Areas

- Bioinorganic Chemistry, Inorganic Pharmaceuticals
- Molecular Biology, Molecular Immunology
- Molecular Structural Biology, NMR Spectroscopy ,Target Identification and Drug discovery for different diseases
- Non-Invasive Characterization and Disease Diagnosis
- Drug delivery systems, NIR imaging & Bio-conjugate technology, Immunotherapy and targeting ligands for cancer and inflammation
- Human Factors
- Bio-Sensors and Bio-Electronics
- Biological Network
- Biofluid Mechanics, Blood flow in arteries, Non-Newtonian fluid Mechanics
- Bio-Medical Signal Processing
- Biophotonics, Photothermal response & imaging

- Raman imaging and Spectroscopy
- Biodiesel Production, Carbon Sequestration, Bioremediation
- Innate immunity & Inflammation Transcriptional Regulation, Macrophage Biology, Transcriptional Regulation, Signal Transduction
- Viral Nanotechnology: Vesicular stomatitis virus glycoprotein based virus-like particles (VLPs) platform for targeted drug delivery
- Viral vector vaccines: Recombinant VSV (rVSV) based multi-valent vaccine development
- Emerging viral infection of the CNS: Immunopathogenesis of encephalitis and meningitis caused by emerging neuroviruses (CHIKV, DENV)
- Biosensors, Biomaterials, Drug Delivery, Diagnostics, Theranostics
- Structure and dynamics of proteins and nucleic acids via multiscale coarse-grained/all-atom simulations

- Molecular dynamics simulations of glycans and protein-glycan complexes
- Multiscale modeling of biomolecular recognitions
- Protein-membrane interactions via Molecular Dynamics simulations
- Host-pathogen interaction- Epstein-Barr virus and Helicobacter pylori associated co-infection in cancer progression.
- Epigenetic regulation- Pathogens derived pathogenesis in cancer.
- Pathogens burden during viral infection of Gastric Cancer, Head and Neck Cancer and Multiple Sclerosis.
- Drug discovery in cancer and infectious agents derived diseases.
- Genetic Engineering
- Bio-nanomaterials, Biomineralization, Surfaces and Interfaces
- Chemical Biology, Cancer Cell Metabolism
- Metabolomics, Proteomics, Bio-orthogonal Probe Development

Notable Achievements of 2016-2017 (Till Septemper 2017)

- Dr. Abhijeet Joshi received Early Career Award from SERB
- Dr. Parimal Kar received Early Career Research Award" from SERB.
- Dr. Debasis Nayak has been awarded GIAN-2016 Course on the title “Human infectious disease and animal models”
- Dr. Debasis Nayak has been awarded GIAN-2017 Course on the tittle “Vaccines for Human And Animal Viral Pathogens”
- Dr.Hem Chandra Jha has been awarded GIAN-2017 Course on the title “How Next Generation Sequencing (NGS) Untying the Knots in Viral Pathogenesis”
- Dr. Prashant Kodgire won Excellence in Teaching Award of IIT Indore in 2016.
- Dr. Amit Kumar and his group won the best research paper award from IIT Indore in 2016.
- Dr. Amit Kumar has been invited to join as Associate Editor, Scientific Reports- Nature Publishing Group
- Mr. Vinay Sharma has been awarded ESONN (European School on Nanosciences and Nanotechnologies) Fellowship, Grenoble France August -Sept 2016.
- Ms. Jaya Singhal, has won the first position in both poster and oral presentations in International Conference on NanoBio Interface 2016 hosted in JNU, New Delhi
- Dr.Mirza S.Baig has been awarded Travel Grant from Indian Council of Medical Research (ICMR), New Delhi, India for 19th International conference on inflammation (ICI 2017), Amsterdam, The Netherland in 2017
- Dr.Mirza S.Baig received Early Career Research Award from Department of Science and Technology,Government of India, New Delhi, India in 2016
- Dr.Mirza S.Baig received Outstanding Scientist Award for the contribution in the field of Immunology from the Centre for Advanced Research and Design-CARD of Venus International Foundation, Chennai, India in 2016
- Dr.Debasis Nayak received Early Career Research Award from Department of Science and Technology,Government of India, New Delhi, India in 2016
- Dr.Debasis Nayak has got approval for Extramural Award on Development of a portable acoustic sensor based canine pregnancy detection system and biomarker-based canine pregnancy test kit from Department of Biotechnology, Government of India, New Delhi, India in 2017
- Dr. Sharad Gupta appointed as a Guest Editor of Journal of Nanotechnology
- Dr. Sudeshna Chattopadhyay, appointed as a Guest Associate Editor of Materials Today: Proceedings (Elsevier)
- Dr. Sudeshna Chattopadhyay, Invited as a Speaker in International Conference on Functional Nanomaterials (IC-FNM 2016)
- Invited Prof. Kavita Shah, from Purdue University, USA under GIAN (Global Initiatives of Academic Networks) program to IIT Indore to teach the course entitled " Chemical Biology: The Integration of Chemistry, Biology, and Medicine" and probable joint research collaboration during 2016-17.
- Ms. Mena Asha Krishnan first BSBE Ph.D student to be awarded with Newton-Bhabha Ph.D Research Grant fellowship for carrying out part of her Ph.D thesis work at Keele University, United Kingdom with Prof. Paul Roach for a period of 6-months in 2016-17.
- Board of Radiation and Isotope Technology, BARC has signed MoU with IIT Indore in March 2017 for joint Ph.D admission, research collaboration, training programs and also to translate molecules for human clinical trials from IIT Indore.
- Ms.Aparna received the full travel grant from DST to attend NetSci X held in South Korea, May 30 - June 03, 2016.
- Dr.Kiran Bala awarded with International Travel Support by DST, Delhi to attend 11 the International Phycological Congress, held at Szczecin, Poland from 13 th – 19 th August, 2017.

Sponsored Projects

1 Non canonical role of macrophage matrix metalloproteinase (MMP) in alcoholic liver disease (ALD)
2 Role of Nuclear Receptor coactivator PGC1β in diabetes mediated endothelial cell dysfunction and angiogenesis
3 Multiscale Simulations of Protein-Glycan Complexs: Toward Understanding the Molecular Basis of Host-Pathogen Interactions and Immune Response
4 Seroepidemiology, molecular characterization and development of diagnostic tools for bovine ephemeral fever virus (BEFV) isolates prevalent in India
5 To identify essential kinases and their signaling in Epstein-Barr virus-mediated tumorigenesis.
6 Role of Nuclear nitric oxide synthase (NOS1) in the TLR4-triggered inflammatory response via the SOCS1-p38-AP1 signaling axis
7 Demonstration of sustainable algal biomass production in outdoor environment for cost effective biofuel production
8 Multi-analyte nano-engineered Quantum dot based flourescent biosensors for clinical quantification of biomarkers in diabetes related kidney diseases
9 Recognition of Human G-quadruplex structure by natural product Piperine and its derivative for mechanistic insight of its anti cancer activity
10 Exploration of cis elements in attracting AID to proto-oncogenes BCL6 and MYC leading to B-lymphoma
11 Pathogenesis of Epstein-Barr Virus and Chlamdia Pneumonia in Multiple Sclerosis
12 Flourimetric biosensor for detection and quantification of insecticides and pesticides using recombinant organo-phosphorus hydrolase expressed in E. Coli

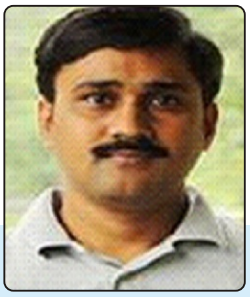
Discipline of Metallurgy Engineering and Materials Science

Discipline of Metallurgy Engineering and Materials Science started in the year 2013 (as Centre for Material Science and Engg.) Metallurgy Engineering and Materials Science is an interdisciplinary field. We explore the scientific fundamentals of materials, their design and their processing for real world applications. Discipline has 12 core faculty members and 18 associated faculty members from other discipline.

Faculty Members

Dr. I.A. Palani
Associate Professor

Dr. Parasharam M. Shirage
Associate Professor



Dr. Rupesh Devan
Assistant Professor

Dr. Mrigendra Dubey
Assistant Professor

Dr. Santosh Hosmani
Assistant Professor

Dr. Vinod Kumar
Assistant Professor

Dr. Jayaprash Murugesan
Assistant Professor

Dr. Sumanta Samal
Assistant Professor

Dr. Eswara P. Korimilli
Assistant Professor

Dr. Ajay Kushwaha
Assistant Professor

Dr. Satya S. Bulusu
Assistant Professor

Dr. Rajesh Kumar
Associate Professor

Dr. Dhirendra K. Rai
Assistant Professor

Dr. Kazi Sabiruddin
Associate Professor

Dr. M. Anbarasu
Associate Professor

Dr. Preeti Bhobe
Associate Professor

Dr. Satyajit Chatterjee
Assistant Professor

Dr. Sudeshna Chattopadhyay
Associate Professor

Dr. Sharad Gupta
Assistant Professor

Dr. Abhinav Kranti
Associate Professor

Dr. Krushna Mavani
Associate Professor

Dr. Rajneesh Misra
Associate Professor

Dr. Shaibal Mukherjee
Associate Professor

Dr. Biswarup Pathak
Associate Professor

Dr. Pankaj R. Sagdeo
Associate Professor

Dr. Somaditya Sen
Associate Professor

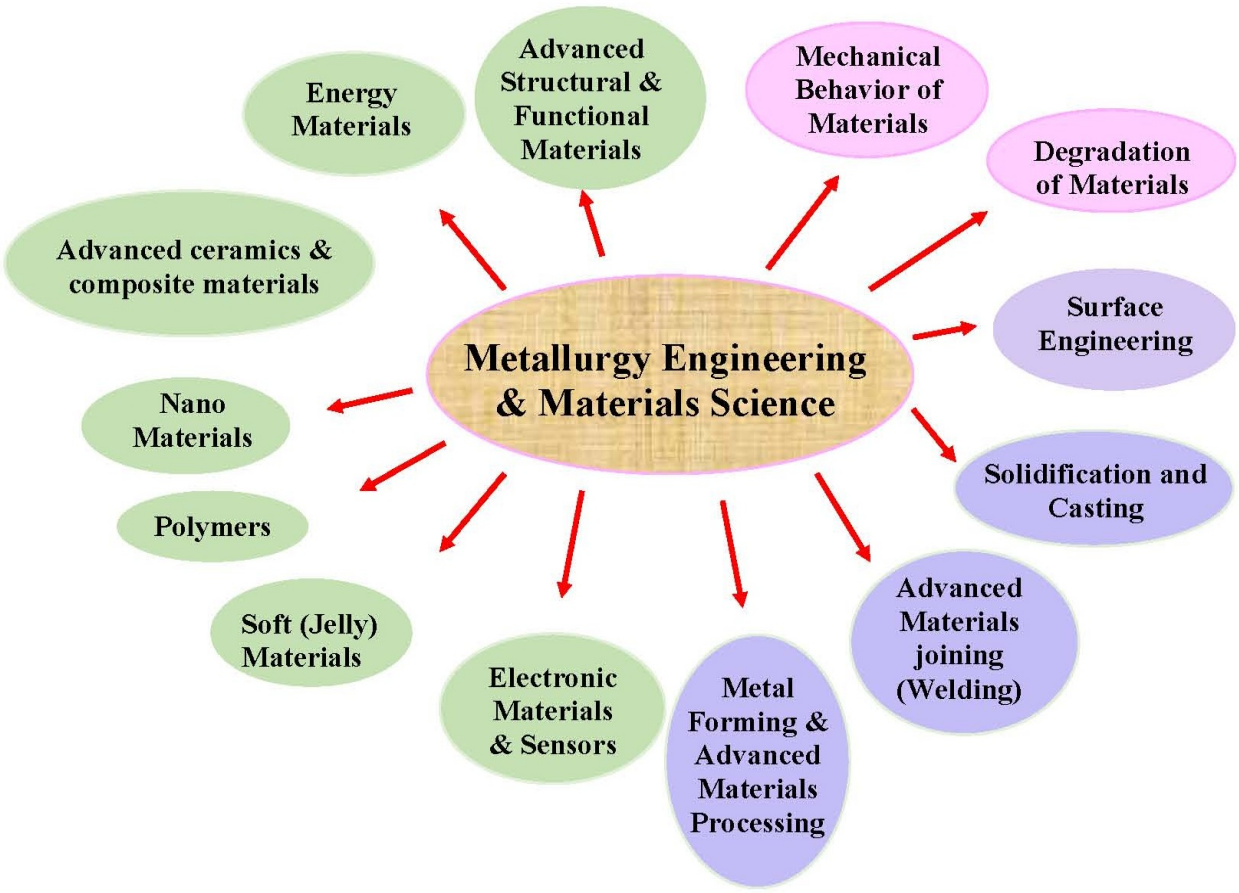
Dr. M. Mobin Shaikh
Associate Professor

Dr. Sanjay K. Singh
Associate Professor

Dr. Vipul Singh
Associate Professor

Dr. Sunil Kumar
INSPIRE Faculty

Research Areas



Materials testing laboratory –
for materials property evaluation

Atomic layer deposition unit –
for thin films

Notable Achievements of 2016-2017 (Till Septemper 2017)

Dr. Mrigendra Dubey received Young scientist award for the year 2017 from International academy of Physical sciences.

Sponsored Projects

SN.	Title , PI	Sponsoring Agency	Period	Amount
1	Wet chemical approach to fabricate visible-near infrared light harvesting photo electrodes PI: Dr Ajay K Kushwaha	DST	5 years (2016-2021)	85 Lakhs (Rs)
2	Internet of Things (IOT) enables portable water quality monitoring system PI: Dr Ajay K Kushwaha	IITI-CEERI PiIlani	1 year (2017-2018)	6 Lakhs (Rs)
3	Lead free inorganic halide perovskite nano structures for Solution-Processable photovoltaic cell PI: Dr Ajay K Kushwaha	SERB	3 years (2017-2020)	36 Lakhs (Rs)
4	Development of Solid Electrolyte for All-Solid-State Rechargeable Lithium Batteries PI: Dr Sunil Kumar	DST	5 years (2015-2020)	89 Lakhs (Rs)
5	Compositionally and Microstructurally Engineered Lead¬-Free Ceramics for Piezoelectric Applications PI: Dr Sunil Kumar	SERB	3 years (2017-2020)	48.3 Lakhs (Rs)

Centre of Astronomy

Centre of Astronomy, IIT Indore was founded in 2015 as an interdisciplinary centre, in order to promote and promulgate research in Astronomy and Space Sciences. Work being done at the Centre of Astronomy ranges from Space weather / Ionospheric studies, to Novel Materials for Space applications, and from Navigation Systems to the study of high-energy jets from galaxies and stellar-sized objects, and radio astronomical observations. With this wide range of inter-linked and related interests, Astronomy at IIT Indore has grown from a Special Interest Group to a full Centre, with rapidly expanding interdisciplinary research interests, and is now contributing significantly to two consortia / collaborations – the Square Kilometre Array-India Consortium (SKAIC), and Indian Regional Navigation Satellite System (IRNSS), or the NAVIC (NAVigation with Indian Constellation).

The Centre now has a regular Ionosphere/Space Weather monitoring facility, high performance computing facilities and radio astronomy instrumentation laboratory. We have started a minor program in Astronomy and from July 2018 we are going to offer an M.Sc in Astronomy.

- Dr. Abhirup Datta, HoD (Astronomy)

Faculty Members

Dr. Abhirup Datta
Associate Professor

Dr. Siddharth Malu
Associate Professor

Dr. Bhargav Vaidya
Assistant Professor

Dr. Manoneeta Chakraborty
DST-INSPIRE Faculty Fellow

Prof. Hari B. Hablani
Visiting Professor

Research Areas

Observational Cosmology

Dr. Datta works in the area of observational cosmology. His current research includes observations a low radio frequency with uGMRT, VLA, ATCA and in future SKA. He is a science team board member for Epoch of Reionziation key science project in International SKA collaboration from India. His current interest in this field is in foreground characterization and removal from reionization data from radio interferometers using machine learning techniques like neural networks. This group is also working on using the state-of-the-art radio imaging/calibration algorithms to achieve high dynamic range imaging with low frequency radio data-sets.

Dr. Datta is also collaborator in the international DARE (Dark Ages Radio Explorer) experiment which is currently a concept mission being proposed to NASA for flight. This involves probing cosmic reionization using the global 21cm signal. Currently, three PhD students are working in this area.

Ionosphere Research and IRNSS

Dr. Datta's group is also involved in studying effect of ionosphere in low frequency radio astronomy. The group has recently acquired a GNSS receiver to study the ionosphere above Indore. The group is in talks to acquire IRNSS receiver from ISRO-SAC. The group is working on studying and characterizing the ionosphere. There is already a dense grid of GNSS receivers in Northern India. Our proposal will complement that in Central and Western India. This will allow us to predict the ionospheric conditions and model them with better precision. In turn, this will help in satellite and aerospace communication as well as making it possible to observe at low radio frequencies. This study will help us to establish leadership in ionospheric research mainly in context of astronomical observations. India's role in SKA (Square Kilometer Array) can be used to share this information with the upcoming state-of-the-art largest radio telescope in the world. Currently, 3 PhD students are working in this area.

Galaxy clusters and cluster mergers - X-ray studies, diffuse radio emission and SZ effect

The group led by Dr. Datta and Dr. Malu studies mergers or collisions between clusters of galaxies, which leads to copious amounts of radio emission, with a characteristic power law spectrum. Cluster-wide radio emission, which is found in central regions of the cluster, is known as a radio halo, and when found in peripheral regions of clusters/mergers, is known as a radio relic. There are several models that may explain the spectrum of this diffuse radio emission; however, the physical mechanisms that accelerate particles in these cluster mergers, and cause enhancements of the magnetic fields in the clusters, are not entirely understood. The group studies this diffuse radio emission at frequencies ranging from a few hundred MHz to ~ 20 GHz, to characterize its spectrum across a wide a range of frequencies, in order to gain insight into particle acceleration.

We also study inverse Compton scattering of cosmic microwave background photons from galax cluster electrons – known as the Sunyaev-Zeldovich Effect (SZ effect), as a way to characterize pressure structures. With X-ray observations of thermal plasma, and radio observations of non-thermal plasma in clusters, it is possible to characterize the energy distribution of the galaxy cluster plasma. This is the aim of SZ effect observations at cm-wavelengths – these are the lowest frequencies at which SZ effect can be measured. Currently, 2 PhD students are working in this area.

Compact object physics

Dr. Chakraborty's research in this area encompasses a variety of high energy astrophysics topics with particular emphasis on compact object physics. Neutron stars and black holes exhibit the most extreme physical conditions in the universe. They offer the ideal laboratories to probe strong gravity, the properties of supranuclear matter and the most intense magnetic field conditions. The group is actively involved in the timing and spectroscopic studies of stellar and super-massive black holes, neutron star, pulsars and magnetars. The work focuses deeply on the study of accretion in X-ray binary systems and its radiative properties and variabilities. The spectral evolution of such compact objects in both isolated and binary systems is studied to understand the behavior of the accretion disk and the corona during the outburst state of the X-ray binary. A multi-wavelength monitoring of these objects can reveal intricacies of the disk-jet connection and the hard X-ray component. Thermonuclear bursts and burst oscillations are used to probe the surface properties of neutron star and thus are the most promising candidates to constrain the equation of state of ultra-degenerate supra-nuclear neutron star matter. Research is also carried out on pulsars - rotation powered, accretion powered and magnetically powered - and how blurring of classes among the different categories of pulsars can lead to understanding about the evolution and lifecycle of pulsars. The timing and spectral variabilities are also studied across different scales - from stellar mass black holes in X-ray binaries to supermassive black holes in active galactic nuclei. The group is also interested in investigating the connection of more recently discovered class of objects like Ultra-luminous X-ray sources (ULXs) and fast radio bursts (FRBs) with current understanding of the compact objects. For pursuing the above science problems, data from multiple instruments across multiple wavelengths are analyzed. The research involves extensive analysis of data from missions like RXTE, Chandra, Swift, XMM-Newton, NuStar, Astrosat, GMRT, VLA, SALT and many others. Apart from the electromagnetic window the group is also interested in the observation of these objects in the gravitational wave window as these compact objects are the primary origins of gravitational waves either through mergers or through steady spin-down decay of pulsars.

Computational astrophysics opens new windows that combines modern computational methods and algorithms to simulate and analyse data so as to discover new phenomena, and to make predictions in astronomy, cosmology and planetary sciences. Research in area of Computational Astrophysics is led by Dr. Bhargav Vaidya whose interests cover a wide range of topics closely associated with Computational and theoretical aspects of Astrophysics. In particular, the main aim of his research is to develop synthetic observatory for multiple astrophysical sources to bridge results from state-of-the-art simulations with observations and develop templates that can predict and or verify various features observed using existing and up-coming observatories like GMRT, ALMA, LOFAR, SKA, TMT and CTA.

At present, the focus is on astrophysical jets that are an ubiquitous phenomenon seen in wide variety of astrophysical sources like young stellar objects, Active galactic nuclei, Pulsar wind nebulae etc. The current goal is to study the interplay of different processes that are responsible to accelerate particles to very high energies in these jets. Additionally, the goal is to combine these acceleration mechanisms with various processes that contribute to radiative losses via synchrotron and Inverse Compton to produce non-thermal emission commonly observed in jets. The condition for stability and the physics of magnetic energy dissipation in large scale collimated jets are also some of the major research interests. The synthetic observatory that will primarily be developed for Astrophysical jets will pave a new and versatile pathway to expand research capabilities in the area of space weather modelling, simulating radio haloes, supernova feedback and triggered star formation, accretion disk physics and microscopic behaviour of astrophysical plasma. Dr. Vaidya is one of the integral developer of a widely popular astrophysical code called PLUTO (http://plutocode.ph.unito.it) and has a strong collaborations with the developers in University of Torino, Italy.

Radio Astronomy instrumentation

Having set up a Radio Frequency (RF) laboratory, the Centre has received funds from DST-SERB to make a 4-element radio interferometer at 1.4 and 5 GHz. Other than constructing this pathfinder, the RF lab also helps characterize RF properties of novel materials (made by one of the Associate members, Dr. Somaditya Sen). Currently, 1 PhD student and 1 JRF are working in this area.

Spacecraft & Satellite Navigation

Prof. Hablani leads this group developing algorithms to use satellite navigation signals for precise navigation of land vehicles, airplanes, satellites, launch vehicles, and missiles; Control of Satellites and Payloads and Minimization of Mutual Interference; Agile Maneuvers of Reconnaissance and Surveillance Spacecraft with Control Moment Gyros; Navigation of Precision Munition with Infrared and Millimeter-Wave Radar Sensors Homing in on Moving Ground Targets; Dynamics and Guidance of Reentry Spacecraft; Entry and Descent Navigation of Lunar Lander of Team Indu. Currently, 1 PhD student is working in this area.

Notable Achievements of 2016-2017 (Till Septemper 2017)

The Minor Program in Astronomy was approved in 2016, and the first course in the program started in July 2017.

The M.Sc program in Astronomy is now offered from July 2018. In take is through JAM Physics exam.

Sponsored Projects

1. DST-INSPIRE Faculty fellowship research grant

Title: Probing the extreme physics around compact objects in binary and isolated systems through investigations of their burst and outburst behaviour

Sponsoring agency: DST (Department of Science and Technology)

PI: Dr. Manoneeta Chakraborty

Amount: Rs. 35 lakhs

2. Early Career Research Grant

Title: "Unveiling Mergers Of Galaxy Clusters With Radio Halos/Relics: Using High Fidelity Radio and X-ray Observations"

Sponsoring Agency: DST (Department of Science and Technology)

PI: Dr. Abhirup Datta

Amount: Rs. 50 lakhs

3. ISRO Research Grant

Title: "Differential NavIC & GAGAN aided Inertial Navigation with Applications to Land, Air and Space Vehicles"

Sponsoring Agency: ISRO (Indian Space Research Orgaization)

PI: Dr. Abhirup Datta

Amount: Rs. 37 lakhs

4. DST-SERB Research Grant

Title: C and L-Band Interferometer as Galaxy Cluster Observatory Pathfinder

Sponsoring Agency: DST (Department of Science and Technology)

PI: Dr. Siddharth Malu Co-PIs: Dr. Abhirup Datta, Dr. Somaditya Sen

Amount: Rs. 83 lakhs

Research and Development

IIT Indore envisages the process of convergence of disciplines as the key to accomplish ground breaking research objectives. With this vision, the institute has done very well all areas of Science, Engineering and Humanities and Social Sciences. The institute has the highest h-index among all new IITs. Last year, IIT Indore has secured 40 externally funded research projects from various funding agencies. The institute has also filed 15 patent applications with another 15 under various stages of process.

Research at IIT Indore has been recognized at International level with active participation through joint collaborations with research organizations/ institutes/universities in Japan, South Korea, Russian Federation, Portugal, France, Germany, USA, Taiwan, UK, Canada, South Africa and many other countries. The research funding from these projects is nearly Rs. 21.28 Crore. International projects with several countries namely Brazil, Russia, UK, Tunisia, Germany and Poland have been approved under various collaboration schemes in the last year. Besides this, faculty members have been successful in securing several international fellowships/awards for joint research work.

The institute has conducted 22 courses under Global Initiative of Academic Networks (GIAN) scheme of Ministry of Human Resource Development. These courses are aimed at sharing knowledge and expertise of distinguished visitors and further strengthening of the existing linkages. In a major initiative to engage with industry on cutting-edge research, the institute has been successful in running a number of sponsored and consultancy projects. These projects aimed at jointly develop technologies for the challenges being faced by participating industrial partners.

IIT Indore has consciously promulgated the idea of involving undergraduate students in forefront research projects through a research scheme, Promotion of Research and Innovation for Undergraduate Students (PRIUS). This scheme along with a dedicated 7th semester for undergraduate research project has been instrumental in the involvement of students in the forefront of state-of-the-art research in various laboratories.

The Sophisticated Instrumentation Centre (SIC) at IIT Indore, unique facility of state-of-the-art equipment's under one roof, continues to provide growth and characterization facilities to users from all over the country and, also from abroad. Facilities include Single Crystal X-ray Diffraction, Nuclear Magnetic Resonance, Mass Spectrometry, Atomic Force Microscopy, Field Emission Scanning Electron Microscopy, Elemental Analysis, Single Molecule Imaging, Dual Ion Beam Sputtering Deposition System and other characterization facilities.

The institute has inaugurated the Start-up Centre on August 15, 2017 which is a part of Centre for Innovation and Entrepreneurship (CIE). Other constituents of CIE are Industry Relation Cell, Innovation and Entrepreneurship Development Centre (IEDC) (supported by DST), Student Entrepreneurship Support Cell (SESC) and ENACTUS. Since inception IEDC has supported 15 student projects and several patent applications have been filed out of these projects. In addition, two start-up companies have been incubated at the start-up Centre at IIT Indore.

Publications

Journals

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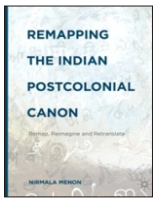

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Dr. Ravinder
Instrument: Confocal Microscope

Sophisticated instrumentation centre (SIC) was established in September 2011 with institute funding to expedite the research program at IIT Indore. The SIC mission is to support and foster the research enterprise in the School of Basic Science, at the Indian Institute of Technology (IIT) Indore, as opportunities exist, by providing state-of-the-art instrumentation and ancillary equipment, and expertise in its use and application. The SIC in the School of Basic Science at IIT Indore is equipped with Single Crystal X-ray Diffraction, Nuclear Magnetic Resonance, Mass Spectrometry, Elemental Analysis, Single Molecule Imaging and Spectroscopy and other Spectroscopic facilities all together under one roof to provide the very highest quality of data analysis to academics and students in both research and teaching. With our excellent facilities and high level of expertise, we can offer our analytical services to other schools within the Institute sector and external commercial organizations.

SIC has now emerged as one of the first such centers in the country providing extensive support to the users across the country. It has become a self sustained centre by generating funds from service provided to external users from academia and industry.

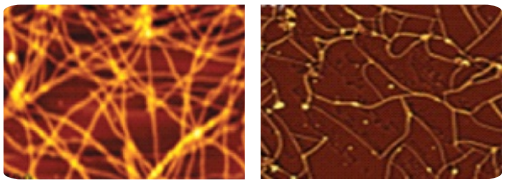
A major advantage of SIC is its accessibility to the students within the institute, a very healthy ratio of students to the time availability on instruments.

The SIC instruments strengthens the following research areas: Fundamental Research in Inorganic Chemistry, Organic Chemistry, Organometallic Chemistry, Various aspects of Material Science, Bio Science and Engineering, including work on biosensors, Materials Science and Engineering, and Condensed Matter Physics

Our mission is to support and foster the research enterprise in the School of Basic Science at IIT Indore, as opportunities exist, by providing state-of-the-art instrumentation and ancillary equipment, and expertise in its use and application. The SIC in the School of Basic Science at IIT Indore is equipped with Single Crystal X-ray Diffraction, Nuclear Magnetic Resonance, Mass Spectrometry, Elemental Analysis and Single Molecule Imaging and Spectroscopy all together under one section to provide the very highest quality of data analysis to academics and students in both research and teaching. With our excellent facilities and high level of expertise, we can offer our analytical services to other Schools within the Institute sector and external commercial organisations.

Some Major Facilities

Atomic Force Microscopy (AFM)

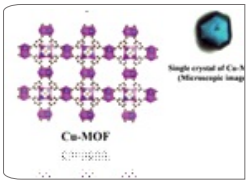


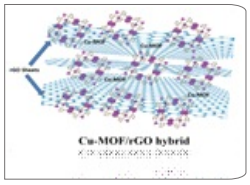
Atomic Force Microscopy (AFM) or Scanning Probe Microscopy (SPM) AIST-NT Smart SPM 1000, is one of the first 100% automated systems that offers its cutting-edge technology of ultra-fast, metrological and high resolution measurements for the most advanced materials research at the nano scale in all AFM and STM modes. Various Measuring modes, Contact AFM in air/liquid; Semi-contact AFM in air/liquid; Non-contact AFM; Phase Imaging; Magnetic Force Microscopy (MFM); Kelvin Probe (Surface Potential Microscopy); Electric Force Microscopy (EFM); Piezo Response Force Microscopy; Force curve measurements; Nanolithography; Conductive AFM; Scanning Tunneling Microscopy STM (optional); Photocurrent Mapping; Volt-ampere characteristic measurements.

Single Crystal X-ray Diffraction

Single Crystal X-ray Diffraction Facility at SIC is equipped with state- of –the- art dual core Agilent Technologies (Oxford Diffraction) Super Nova CCD System. It gives access to micro-focus Cu and Mo sources which allows even small size crystals data collection and fairly good structure solutions. It is also equipped with Oxford cryo systems which enable temperature range from 90 to 400 K. There are also high definition microscopes for separations and mounting of crystals.

Services provided include:





Crystal screening and mounting, including air-sensitive samples.

Diffraction data collection under various conditions, including temperatures as low as 90 K .

Structure solution, refinement, and interpretation upto publication level.

Cambridge Structure Database searching.

Single Crystal X-ray Diffraction Facility is an independent National Facility. Currently, it is offering service to School of Basic Science within the Institute, other academic institutes and Industries throughout India for X-ray Crystallographic studies.

Dual Ion Beam Sputtering Deposition (DIBSD)

The goal is to encourage and foster the research initiative in the School of Engineering, at Indian Institute of Technology Indore, by providing state-of-the-art research facility, and expertise in its use and application. The diverse novel researches performed by this unique facility will be a platform to attract top-seeded researchers and experimentalists in key semiconductor opto-electronic and nanotechnology industries, research laboratories, and academic institutions across the entire globe to establish a strong collaborative research programme with IIT Indore. Research activities, boosted by the DIBSD facility, are mainly focused on growth of novel nanostructures and high-quality thin films having enormous applications in semiconductor opto-electronics, sensors, solar photovoltaics, detectors, biotechnology, microelectro-mechanical systems (MEMS), nanoelectromechanical systems (NEMS) etc.

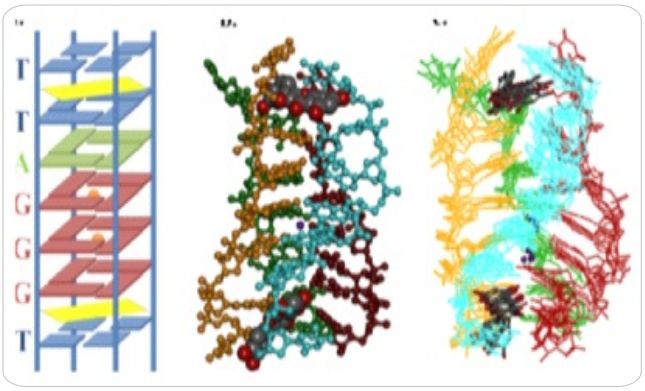
Diverse novel research activities would have major impact on following industries:

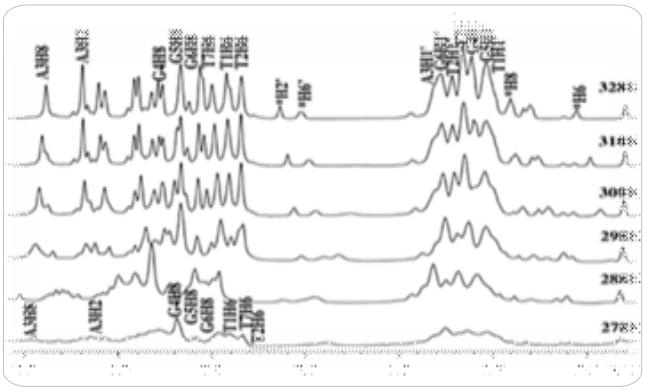
- Automobile
- Pharmaceutical (Nano-Bioelectronics)
- Chemical
- Nanotechnology
- Electronics
- Renewable Energy

In a broad sense, the research work accomplished by this facility would be extremely beneficial to showcase our expertise in the emerging areas of current research and development.

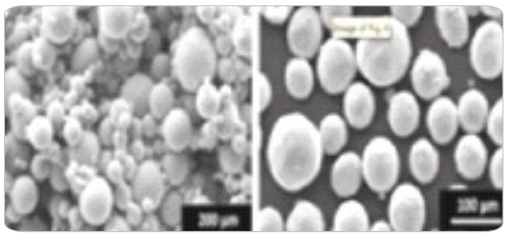
Nuclear Magnetic Resonance 400 MHz (NMR)

NMR spectrometer: Fourier transform Nuclear Magnetic Resonance spectrometer, Model AVANCE III 400 Ascend Bruker BioSpin International AG, Switzerland. Magnet: 8.96 Tesla (Superconducting), 50 mm bore Probes Available: For Solution State NMR 5 mm Broad Band Fluorine Observe Probe with gradient along Z-axis and Automated Tuning & Matching (ATM) accessory. 5 mm Broad Band Inverse Probe with gradient along Z-axis and Automated Tuning & Matching (ATM) accessory. Console: The state of the art Avance III 400 NMR console with digital lock and 2 independent RF channels providing 60 W 1H/19F transmitter and 150 W transmitters and broad band Preamplifier. In addition 5 W 2H transmitter for deuterium observe and decoupling.



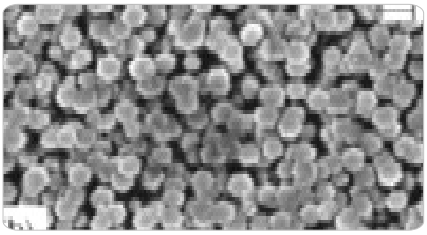


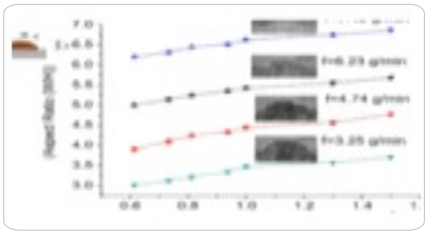
Field-Emission Scanning Electron Microscope (FE-SEM)

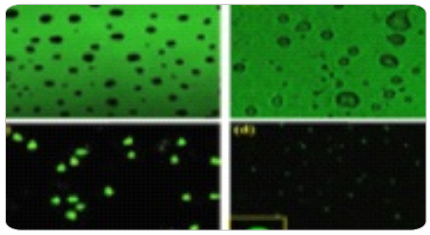


Supra55 Zeiss, provides excellent imaging properties combined with analytical capabilities makes this high end FE-SEM suitable for a wide range of applications in materials science, life science and semiconductor technology. The large specimen chamber for the integration of optional detectors and accessories enables the user to configure the SUPRA for specific applications without sacrificing productivity or efficiency.

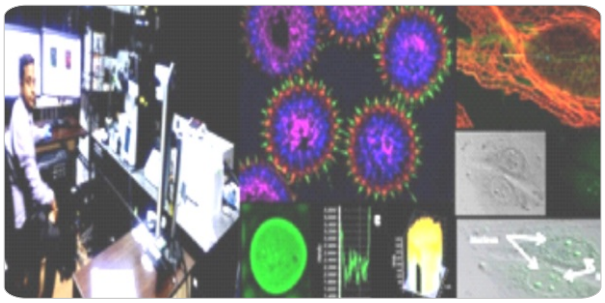
- GEMINI Technology with high efficiency in-lens detector and no magnetic field at specimen level
- Superb resolution and image quality at high and low operating voltages
- Extremely wide operating voltage range from 0.02-30kV
- Designed-in ease of use with minimal adjustments required when changing operating conditions
- Short analytical working distance of 8.5 mm for simultaneous high resolution imaging and X-ray analysis
- High probe current (up to 100 nA) with high stability (better than 0.2%/h) for precise analytical results
- Multi-User friendly with Windows® based SmartSEM control software







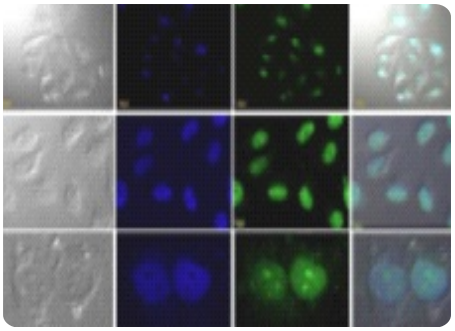
Confocal Laser Scanning Microscope (CLSM)



IIT Indore confocal microscopy facility is located at sophisticated instrument center (SIC) building, Simrol campus, IIT Indore. The facility has a state of the art imaging system with a fully motorized inverted microscope based multiphoton system capable of confocal imaging, fluorescence lifetime imaging microscopy (FLIM), fluorescence correlation spectroscopy (FCS), IR imaging, live cell imaging. The microscope is also fitted with Mai Tai DeepSee femtosecond tunable laser.

- Confocal laser scanning microscopy
- Two-photon laser scanning microscopy
- Fluorescence lifetime imaging microscopy
- Fluorescence correlation spectroscopy
- Live cell imaging

BET Surface Area Analyzer



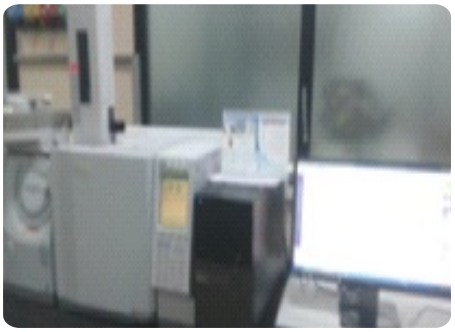
Surface Area Analyzer quantachrome, Autosorb iQ2, BET Surface Area & Pore Volume Analyzer is an instrument to determine the specific surface area of powders, solids and granules. Analyses: Single- and Multipoint BET (Brunauer, Emmett, and Teller) surface area, thickness, pore area distributions (BJH method), pore volume, and pore surface area Langmuir surface area, Temkin and Freundlich isotherm analyses.

Unique Features:

Physisorption: The shape of the typical isotherm provides various useful information on the large uptake of nitrogen at low P/Po indicating filling of the micropores. The linear portion of the curve represents multilayer adsorption of nitrogen on the surface, and the concave upward portion of the curve represents filling of meso-and macropores. An entire isotherm is needed for one to calculate the pore size distribution of the material

Chemisorption: Some surfaces, especially catalysts, are sufficiently reactive to form chemical bonds with certain gases. In contrast to physisorption, chemical adsorption (chemisorption) involves the formation of strong bonds between adsorbate molecules and specific surface locations known as active sites. Chemisorption is thus used primarily to evaluate quantitatively the number of surface active sites which are likely to promote (catalyze) chemical reactions. Both static adsorption isotherms and dynamic pulse titrations yield monolayer uptake, metal area, nanocluster (crystallite) size and active metal area of heterogeneous catalysts. Isothermal results can be used to map surface energetic heterogeneity via heat of adsorption calculation

Gas Chromatography – Mass Spectrometry (GC-MS)



Gas Chromatography–Mass Spectrometry (GC-MS), is a versatile analytical tool for separation and identification of non-polar / mid polar compounds in the reaction mixture. Presently SIC is equipped with GC-MS QP 2010 Ultra mass spectrometer from Shimadzu Analytical India Pvt. Ltd. The machine can be configured into 3 types of configurations viz. GC-MS, GC-TCD, GC-FID. GC-MS uses Electron Ionization (EI), Chemical Ionization (CI) since it has the capability to perform positive and negative ionization for molecular weight information of more complex samples. GC-MS uses helium as inert carrier gas. It is very sensitive instrument, and can detect upto PPM level masses. The mass range is 10-1000 Da, which allows analysis over a wide range of low and high molecular weight compounds. NIST Mass spectra library is available for separation/ identification of organic compounds and molecules. GC-TCD can be used for Gases samples analysis such as Hydrogen, Nitrogen, Carbon Monoxide, Carbon Dioxide, and Methane effectively. The GC-FID is well suited for analysis of hydrocarbons such as methane, ethane, acetylene etc., but also for organic substances containing hydrocarbons and for volatile organic compounds.

Apart from these the SIC has several other instruments enlisted at http://www.iiti.ac.in/sic/index.php

Collaborators - The Institutes and Industries for which service is being provided are:

Academic Institutions:

BARC, Mumbai
Banaras Hindu University
Delhi University
Guru Nanak Dev University, Punjab
IIT Bombay, IIT Madras, IIT Mandi
IIT Patna, IIT Gandhinagar
GITAM University, Visakhapatnam
Jammu University
MS University Baroda
NIPER Mohali
NIT Rourkela and others
Institute of Himalayan Bio-resource Technology (IHBT)
Pune University
Pinnacle Biomedical Research Institute (PBRI), Bhopal
Devi Ahilya Vishwavidyalaya, Indore
Shri Govindram Seksaria Institute of Technology and Science
NMU Jalgaon
RD University Jabalpur
Central University Sagar
Guru Ghasidas Vishwavidyalaya Central University, Bilaspur
SRM University
University College Trivandrum
Tumkur University, Karnataka
Thapar University, Patiala
Punjab University
TIFR Hyderabad
Awadhesh Pratap Singh University, Rewa
University of Hyderabad, Telangana
Pondicherry University, Puducherry
Vikram University, Ujjain
Mewar University, Rajasthan

Industries:

Gharda Chemicals
Glenmark Pharmaceuticals
Piramal Healthcare Mumbai
Jubilant Biosys Ltd.
Lupin Pharmaceutical Pvt. Ltd.
Mimani Wires Pvt. Ltd.
Choksi Labs Ltd.
UV Resins Pvt. Ltd.
Impress Chemicals Pvt. Ltd.
Syntochem Pvt. Ltd.
Symbiotec Pharma Lab, Indore
Medilux Pharma, Indore
Emcure. Pune
Reliance Industries Ltd.
Navin Fluorine International Ltd., Dewas
SRF Ltd., Indore
M.P. Dye Chem., Indore
Rupak Enterprises, Indore
Sprint Testing Solutions, Mumbai

International Academic Institutes:

Universität Stuttgart, Germany
Jehangirnagar University, Bangladesh
Dhaka University, Bangladesh

Scientific Publications: +350 articles

IITI CENTRAL WORKSHOP

Introduction

The Central Workshop is equipped with modern state-of-the-art instruments. Currently, the workshop is having seven sections, Glassblowing, Machining, Welding, Forming, Foundry, Injection Molding, Fitting, and Carpentry; each section is manned by a team of skilled operators. Each member of the workshop operators have successfully proved themselves in various projects related to research and development. The Central Workshop was established to provide hands-on-experience to students in science and engineering and to facilitate research ideas by modifying simple mechanical components. Effective and successful working models using both machine tools and computers at the workbench has helped students brainstorm their innovations. Students are exposed to different methods of manufacturing, materials and components, as well as procedures and software programs currently used in commercial manufacturing and assembly processes. Here in the workshop we transform students to engineers and engineers to future scientist to facilitate research scholars to perform novel and cutting edge research using the state-of-the-art facilities available under the roof of Central Workshop.

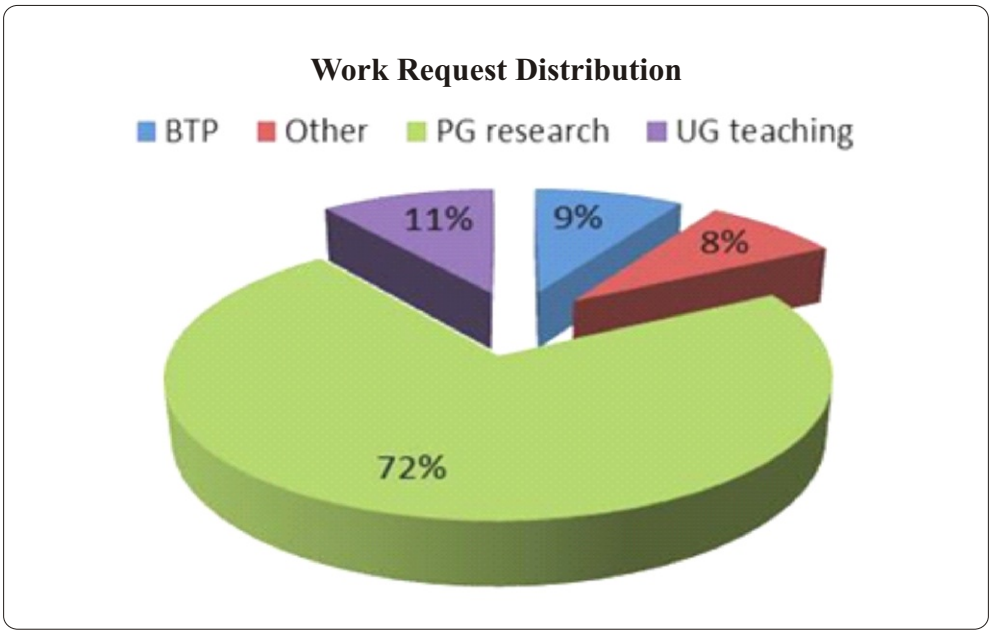
Basic Manufacturing Technique Lab (ME 156), Manufacturing Processes Lab (ME 258) and Machining Science Lab (ME 355) are held in the Central Workshop. Central Workshop provides infrastructure and services to faculty members and research scholars to fabricate their experimental setup for research and consultancy purposes and helping the UG/PG students in fabricating their B.Tech/ M.Tech/Ph.D projects.

In December 2, 2015 a new chapter opened in history of Central Workshop when it shifted to permanent campus. The entire workshop was relocated to Simrol Campus in just few days by dedicative efforts of machine operators, staff under the guidance of Dr. Somaditya Sen, HoD (Workshop). A strong team effort supported by the motivation of the HoD, Workshop, made it fully functional on December 10, 2015 without affecting any lab and research activity. The complete setup of Central Workshop was rearranged with proper machining space, underground power supply system, and natural light following complete safety norms. In fact the Central Workshop building was actually the first building completed in the permanent Simrol Campus.

Work Request Completed

For the period Apr-15 to Mar-16 total 133 work requests has been received for various purposes which include PG Research, UG Teaching, BTP, other work.

Purpose	Distribution
BTP	12
PG Research	96
UG Teaching	14
Other	11
Total	**133 Nos.**



Students during first lab classes at Central Workshop, Simrol Campus

BAJA-SAE-2016 Vehicle Project

Students During Fabrication of BAJA SAE-2016 Vehicle

BAJA SAE-2016 AT Vehicle

Astronomy Antenna Project (Continue Since –July-2013)

(a) Reassembled 4.5 meter Radio Telescope dish at Simrol Campus.

(b) A movable rotary base for small antenna detection fabricated under guidance of Dr. Somaditya Sen and Dr. Siddharth Malu.

(c) 2.5 meter dish fabricated with base, gear boxes with azimuth and elevation motion system.

- 4.5 mtr Radio Telescope Dish disassembled from PACL and Reassembled at Simrol Campus in Feb - 2016 under guidance of Dr. Somaditya Sen and Dr. Siddharth Malu.
- Fabricated of base and motion system along with gear box for 2.5 mtr Radio Telescope dish at Simrol Campus IIT Indore under guidance of Dr. Somaditya Sen and Dr. Siddharth Malu.
- Fabricated of base for 2.5 mtr Radio Telescope dishes at Simrol Campus IIT Indore.

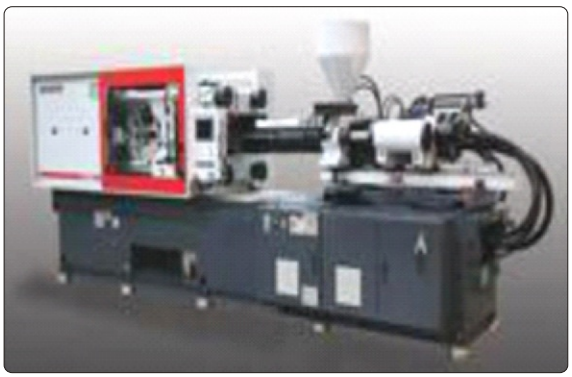
Facilities Available

The following facilities available in Central Workshop-

- Precision Turning, Facing ,Drilling, Boring, Tapping.
- Surface Grinding .
- Milling & Slotting.
- Injection Moulding.
- Sheet Shearing, Bending, Punching, Wire drawing.
- Arc, MIG/MAG/Co2 ,Gas Welding & Brazing.
- Induction Heating & Metal Casting

List of Equipments

Arc Welding Equipment



Injection Moulding Machine

Spot Welding Machine

Wire Drawing Machine

Deep Drawing Machine

Sheet Bending Machine

Pedestal Grinder

Lathe Machine

Milling Machine

Gear Hobbing Machine

Surface Grinder

Tool and Cutter Grinder

Sheet shearing Machine

Advanced Scientific Glass blowing Section

Glass blowing shop started functioning in May 2013 and offers support to research and academic laboratory works of Science and Engineering departments by repair of glass wares and quartz fabrication of specialized glassware as required by faculty members, master science students, research scholar of the institute. Necessary tools and equipment for carrying out the glassware works are available and is augmented from time to time.

Glass Blowing Section work request details 2015-2016

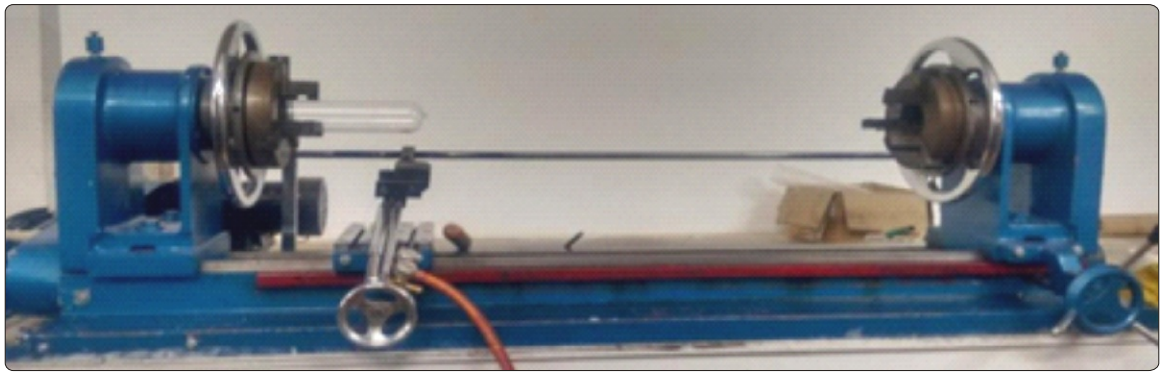
During April, 2015 to March, 2016, 105 work requests have been received from all departments.

Laboratory Glassware prepared in the facility

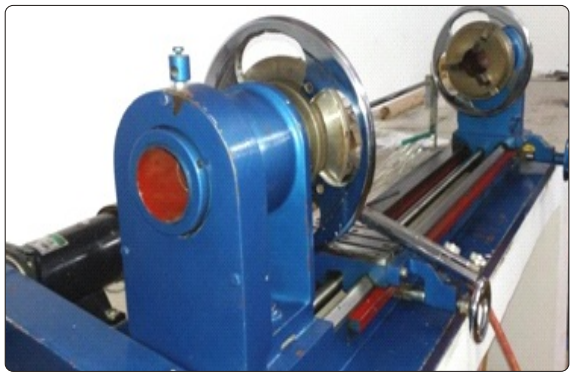
Condensers

Machinery Available

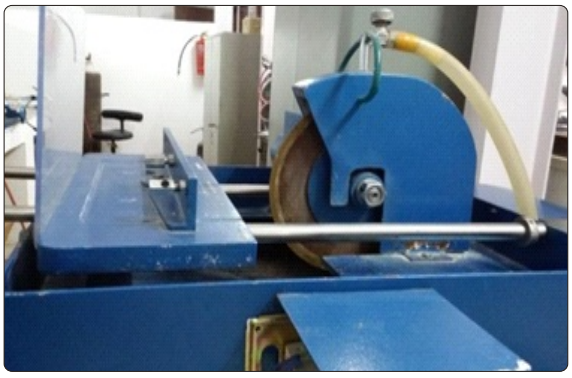
Table blowing, double chuck Lathe, Glass cutting machine, Grinding machine, Annealing Furnace, Surface Grinding, Pumping system and Accessories for thermal evaporation, Tools and Accessories.



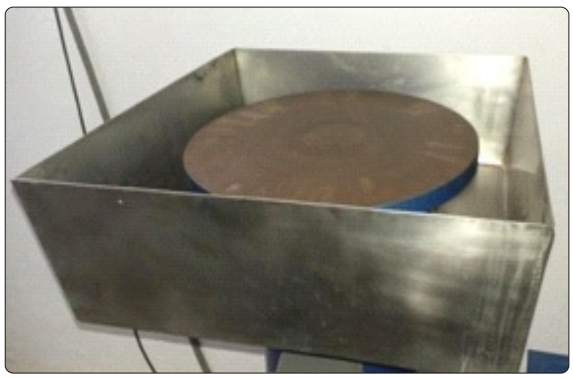
Double Chuck Lathe - Bore 70mm



Glassblowing Lathe



Glass Cutting Machine



Surface Grinding Machine

Pumping system for vacuum seal attached with Thermal Evaporation for metallic thin film

Counselling Cell

Counselling cell at IIT Indore is an integral part of IIT Indore since its inception in December,2011. Presently cell consists of a full time trained counselor Ms. Monika Gupta (M.Phil, Clinical Psychology, NIMHANS, Bangalore and a visiting consultant psychiatrist Dr. Ashutosh Singh (MBBS, DNB Psychiatry).

With a vision to enhance positive well being and facilitate overall development of IIT Indore student's community counselling cell closely works with office of Dean of student affairs, and office of Dean of academic affairs and student gymkhana. Cell's services are equally accessible to all the students (B.Tech, M.Tech/ M.Sc, Ph.D and any other course) of IIT Indore. Having the focus on prevention of mental health issues- prevention of suicide and chronic mental health problems, counselling cell works for early identification and early intervention for various mental health issues in students.

Counselor with Team of Student Mentors

Counseling cell undertakes various activities-

- Individual counselling sessions- supportive counselling, cognitive behaviour therapy with eclectic approach.
- Small group interaction with students having common concerns
- Creating a good liaison with various departments and services at the institute to facilitate the implementation of the intervention plan.
- Working towards creating a strong referral system as a basis for enhancing mental health services, where students are being referred by academic office, medical unit, faculty advisors, sports and security officers, wardens and hostel office, parents and friends, apart from walk in students who approach the counselor on their own.
- Facilitation of a meeting during orientation program involving fresher students and their parents, faculty advisors, student mentors.
- Peer tutoring and peer mentoring program.
- Greater support for students coming from underprivileged background- PwD
- Facilitation of various policies for students having academic concerns.
- Organises expert talk and activities to create awareness for mental health issues and enhancing positive well being.

Industry-Academia Conclave

The 5th annual Industry Academic Conclave (IAC) was held on 6th September 2017 at IIT Indore.

Since its inception in 2012, Industry-Academia Conclave has evolved into a forum where experts from both Industry and Academia discuss and address important concerns, and galvanize their efforts towards forging successful partnerships that would prove mutually beneficial. IAC 2017, as an endeavor, focuses on exploring research avenues between academic institutions and corporate organizations. The theme of this year's conclave is: 'Possibilities for Tomorrow'. IAC 2017 also presents an 'Innovation Pavilion' where innovators from all over India are given a chance to exhibit their products on one of the most prestigious platforms for Industry-Academia interaction. IAC 2017, for the first time, presents an 'Incubation Centre & Centre for Excellence' where younger ideas are invited and a base is set for the technology of future.

This year's IAC witnessed 6 new startups, more than 60 research facilities and posters, 13 prototypes, 18 technical talks, a panel discussion, and a reinvented incubator and over a dozen sponsorships. It beckoned a footfall of over 400 people. IAC 2017 also garnered support of 11 external sponsors for the event.

This edition of the IAC saw an influx of powerful speakers, which talked about how governmental educational institutes and the Industry can interact so that the Industry and Academia can evolve together. The Chief Guest, Mr Gurjit Singh, the former Indian Ambassador to Germany, talked about his prior experiences dealing with the overlap of Industry and Academia in Ethopia and Japan.

Dr Vimal Bhatia, Convener of the Industry Relations Team, initiated the session by talking about the importance of IAC and how it has grown over the years.

Professor Pradeep Mathur, Director of IIT Indore, emphasized the role of IIT Indore as a catalyst in this simultaneous growth of industry and academia, especially long term growth and inviting application for setting up center of excellence at IIT Indore.

Dr Debojit Chakraborty, Global Category Head of Technology and Applications at Keva Fragrance Innovation, spoke about the interest of private organizations in academic research.

Dr Kumar B Salui from ANSYS, India talked about implications of modern research in the field of computer aided simulations, and its usage in autonomous vehicles and efficient industrial production.

Mr Sandeep Saxena from TCS, Mumbai predicted the exponential growth of digital data in the near future and its management and utility. He briefly touched on the urgent need to create a more efficient workspace for employees and researchers.

IAC plays a vital role as a forum for such Industry-Academia interaction, and also provides an opportunity for the Industry to present areas where they would seek research assistance from the Academia. The industry could also benefit from the knowledge of the on-going R&D projects, and could then actively participate in those that might interest them. The exchange of perspectives between the industry personnel and the academia can provide an impetus for various research and development opportunities; it

Central Library

The Central Library started with a small number of books in 2009. The Collection Development activity gathered momentum in the year 2010. At present, the Library has a collection of 32095 books and new books are being added to the collection continuously. These include books on all relevant subjects for teaching and for reference. The Library also boasts of a select collection of fiction, literature, and general interest books such as sports, films, etc. to take care of the leisure and recreation reading needs of the users. The Library has also developed a special Collection of books on Gandhian Studies.

At present, the Library is functioning from two locations: Room No. 201 & 202, School Building; and Academic POD CSE 02. Users can avail of all services of the Library at both locations.

Library at a Glance:

Collection:

Books	E Journals	E Books	Print Journals	Magazines	Newspapers
32095	3320+	7600 approx.	04	25	10

Library Usage: (April 2016 to September 2017)

Books Issued	Reading Room Usage per month (Average)
33967	4000 users p.m. approx

Periodicals and Newspapers (Print Format): At present, the Library subscribes to 04 Print Journals, 25 Magazines and 10 newspapers.

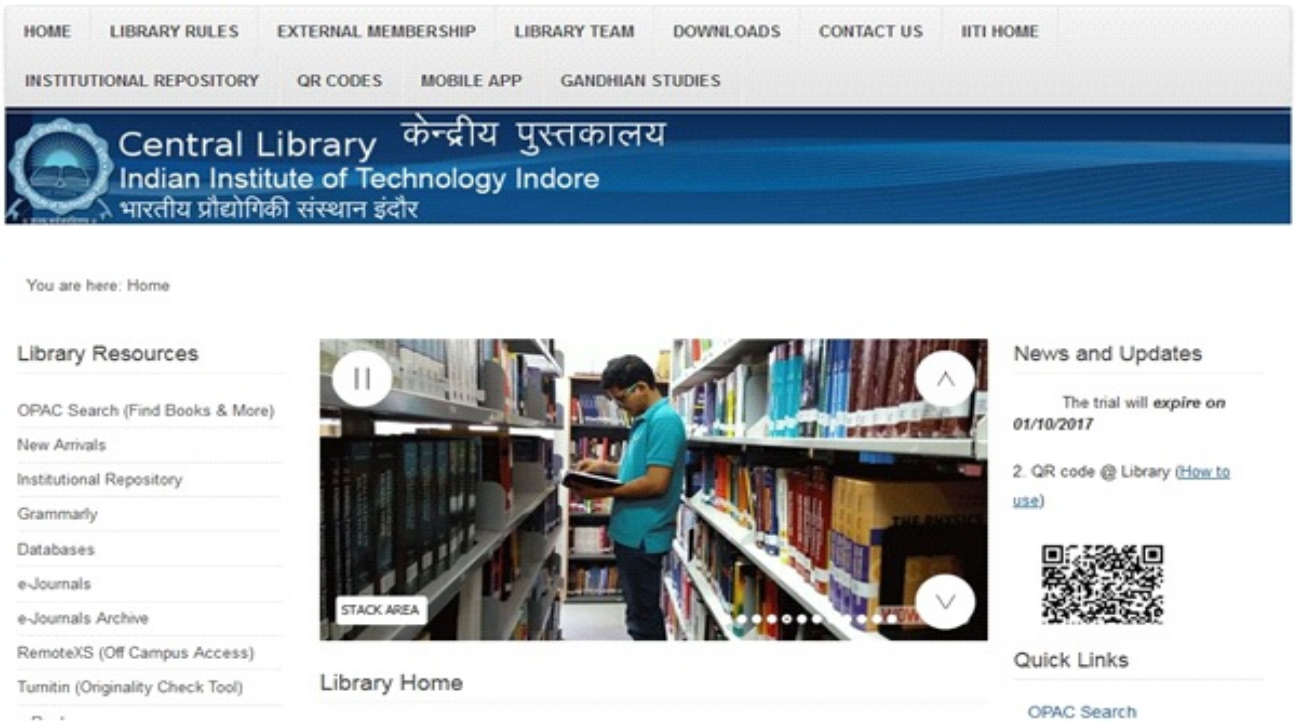
Electronic Resources: In today's world of Information explosion, access to electronic information resources is essential, particularly in an academic environment. The library has developed a collection of Electronic Resources which includes thousands of journal articles, research papers, books, and other resources. The E Resource collection of the library includes electronic journals in various disciplines. The collection also includes 7600 E-Books from various publishers. The complete list of e-resources with hyperlinks is available on the Library web page at the Institute website for users' convenience, so that users can access the resources from the library webpage itself.

Library Services:

At present, the Library offers services as described below:

- **Lending facility:** Undergraduate students can borrow 08 books for the period of 15 days, whereas Ph.D. students can borrow up to 08 books for the period of 1 month. Faculty members can borrow up to 40 books for a semester.
- **Overnight Lending:** Overnight lending facility is provided to students who wish to borrow a book from the reserved section, or have crossed their entitlement limit. Books on overnight issue have to be returned by 9.30 a.m. the next day.
- **Claims/ Reservations:** Users can claim/ reserve books which are issued out. Claimed/ reserved books are kept in the Library for the user for 2 days from the date of return by the previous borrower, before they can be issued to the next claimant.
- **Renewals:** Books can be renewed only if there are no claims.

- **Reading Room:** The Library provides air conditioned and wi-fi enabled Reading Room with a seating capacity of 50 students in both locations. In addition to this, PCs are kept in the reading room for the use of research scholars and faculty members for the purpose of accessing e-resources, checking Web OPAC, etc.
- **Inter Library Loan & Document Delivery Services:** The Library has informal Inter Library Loan arrangements and Document Delivery Services with institutes such as IIMIndore, RRCAT Indore, IIT Bombay, GSITS Indore, etc. Under this facility, access is provided to books or electronic materials which may be needed by users but is not available in our library.
- **Book Bank:** Under the Book Bank scheme, text books are provided to SC/ST students for the period of a semester.
- **Library Portal:** Detailed information about the Library can be accessed through the Library portal. It can be accessed at : http://library.iiti.ac.in/



- **Reprography Services:** Users are provided Photocopies or Printouts of library resources subject to the provisions of the Copyright Act.
- **Orientation Program:** Library conducts orientation programs for new students to make them aware of the library facilities and services and to help them utilize the library resources optimally.
- **Originality Check:** The library provides originality reports to students on their assignments and papers, using Turnitin software.
- Remote access to library resources: The Library provides 24x7 access to its resources for the users of the library, using RemoteXs.
- **Institutional Repository:** The Library has created the Institutional Digital Repository (IDR) to preserve and showcase the scholarly output of the institute such as research papers and Theses and Dissertations.
- **Other Activities:** The Library organizes various Training Programs/ Informative Sessions for E Resources and also for Print Resources. The Library also organizes Book Exhibitions under the name "IITI Booksville" every year.

Library Automation:

- **ILMS:** The Library uses KOHA, an open source library management system. Users can check the Library collection by using the Web OPAC (Online Public Access Catalog).
- **CCTV Surveillance:** The Library has installed high tech cameras to ensure the safety and security of its users and collections.
- **Bar Coding:** Bar Code Technology is being used for issue/ return of books at the Circulation Counter.
- **RFID implementation:** RFID implementation is under consideration in the library.

- **QR Codes:** The Library is using QR codes to provide quick access to users to the library website, library OPAC, and recommendation forms for books and journals.

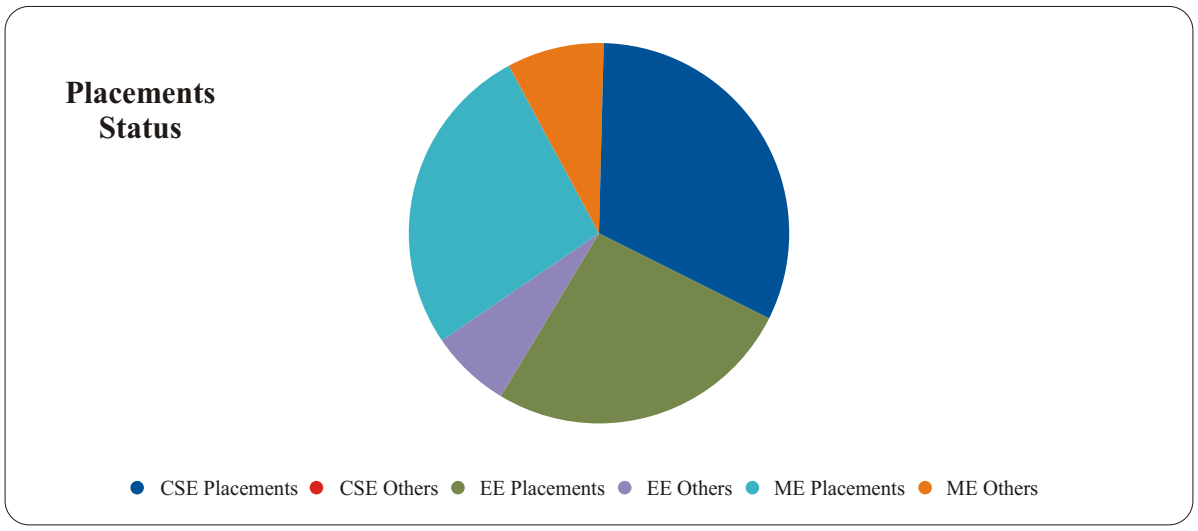
- **Mobile App:** A mobile app has been developed by the library to provide its users quick access to library resources and services.

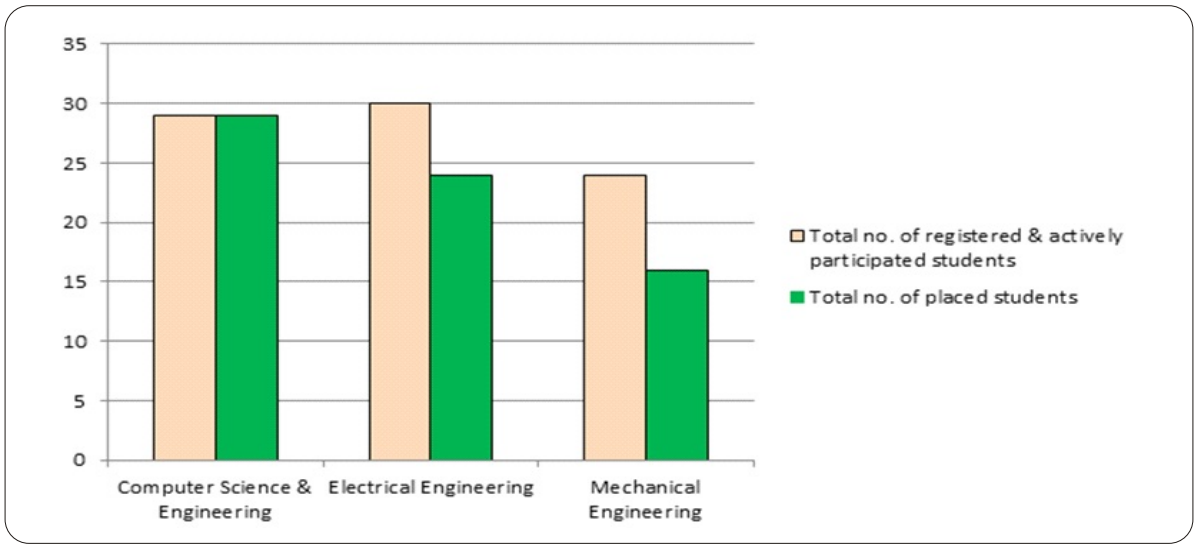
Placement Statistics 2016-2017

IIT Indore has received a warm response regarding placements for Undergraduate, Post Graduate and Doctoral programs. We have achieved more than 80% placements in 2016-17 session. In this placement session, we were approached by a number of well-known and reputed companies from various sectors. These companies include Amazon, Microsoft, DE-Shaw, Arcesium, Works Applications Tokyo, Directi, Book My Show, Hyundai Motor, Go-Jek, Strand Life Sciences, Codenation, Capgemini, Samsung R&D India, TCS, Infosys, Mahindra & Mahindra, L&T, ISRO, BPCL, TATA Motors, Bharat Forge, Tata Trusts, Ujaas Energy, Wipro, Reliance Jio, Evalueserve, United Health Group Ltd., MAQ Software, Future First, Quantile Analytics etc.

The average salary package received is 13.65 LPA, INR (an increase of 24% over previous year), the median is 10 LPA, INR and highest package received is 40 LPA, INR. As our infographics shows, we have achieved 100% placements in Computer Science for the fourth time in a row. In addition to above, the number of Internship offers has increased in this placement session and among these Microsoft, Amazon, Wipro, Code Nation, Mentor Graphics, Works Applications, TCS, DE-Shaw, Arcesium offered attractive internships along with full time placements. The highest internship stipend received is 1 lakh per month.

On the other hand, almost 10-15% students opted for higher studies at IIMs, IITs, and top-rated foreign institutions while many others have shown their interest to prepare for competitive exams. A few also showed interest to start their own venture.





Student Achievements

IIT Indore has been at the forefront in terms of providing the best to its student population. We are proud to now house our entire undergraduate strength within the premises of our Simrol Campus. Some of the best facilities have been provided to our students in terms of their residence, sports facilities, and there is ample opportunity provided for them to pursue extra-curricular interests.

Our students in turn have not let us down and have earned accolades across domains. A few notable achievements are included below.

ACM - International Collegiate Programming Contest (ICPC)

Often dubbed as the 'Olympics of Programming', the ACM-ICPC is the most prominent programming contest in the world and has participation every major university. IIT Indore known for its programming culture has been a regular participant in the contest and this year too figured amongst the top teams. Our team comprising: Utkarsh Saxena, Aditya Shah, and Hardik Shah was placed second in India and 56th in the world.

RoboCon 2017

RoboCon is another annual event that finds participation at IIT Indore on a regular basis. This is a contest where students have to develop a working prototype of a robot from scratch and is one of the most popular contests in the country. The team from IIT Indore slogged it out at the contest at was able to secure the third position. The great thing about these contests is that it finds participation amongst students of our institute across disciplines. Here's a picture of the proud team with their prototype.

IIT vs IIM

Indore is unique in the fact that it is the only city in the country that has both an IIT and an IIM. There are quite a few collaborative endeavours that take advantage of this fact and their is also some very healthy competition. An annual affair now is the 'IIT vs IIM' cultural meet which we have now got into a habit of winning. This was the second year in a row that IIT Indore comfortable outclassed the management institute and took home the spoils.

Student Entrepreneurship Support Cell (SESC)

The Student Entrepreneurship Support Cell, SESC was formed in August, 2013 and since then has been striving to bring in more people who will be creators rather than producers and people who will challenge the usual, and conquer the so called impossible. Since inception in 2013, the Student Entrepreneurship Support Cell at IIT Indore has been involved in numerous activities and workshops to promote entrepreneurial spirit amongst students and faculty members alike.

In 2014, following our submission of proposal complete with innovation and entrepreneurship activities done by the team, and successful defence of the proposal, Department of Science and Technology granted IIT Indore to setup an Innovation and Entrepreneurship Development Centre by funding of over Rs. 45 Lakhs. The DST-IEDC at IIT Indore creates an ecosystem for Innovation and Entrepreneurship at IIT Indore. It promotes and encourages Start-up and Incubation support in the institute for prototype/ product development. This was in fact the 1st externally funded centre at IIT Indore. The DST IEDC Centre's advisory board include representatives from DST, MSME, SIDBI, SBI, RRCAT, IIM Indore, NEN, IIT Indore and entrepreneurs. Since inception, there has been two successful board meetings with support for 10-projects and further 5-being considered for support for the next financial year. In addition, since inception, of Department of Science and Technology's Innovation and Entrepreneurship Development Centre at IIT Indore, the Centre have already resulted in filing 6-IPRs, and further 2-IPR are under process.

SESC has been able to reach new heights with setting up of Centre for Innovation and Entrepreneurship. The Centre now hosts SESC, Enactus, DST supported IEDC, MHRD-DST supported Startup Centre, and Industry Relations. This year also saw setting up of IIT Indore's incubation facility with two of IIT Indore's alumni startups as first hosts.

This year also saw launch of TEDx IIT Indore chapter by organizing first event on March 26th of 2017 with a theme called "Impact". It was the most inspiring and thriving event for SESC. It saw huge participation from across the city as it was the first city wide TEDx event. We were happy to see youth participating in this kind of event. The theme "Impact" highlighted the influence of life changing critical moments in an individual's lifespan. It also extends to the effect of our work on other's lives. Circumstances in the life of a person define who he/she would grow up to be. Everyone has an impact on other's life in some way or the other. It depends on the attitude, motivation and ambition of the person which decide whether it would turn out to be a boon or bane to the society. Pushing the boundaries of innovation, creativity, art, music and innumerable other fields, "Impact" encourages everyone to have a positive effect on today's society. There have been many people who have sacrificed their lives for the welfare of the society. "Impact" is a tribute to all those benevolent souls which have made our planet a better place to live.

Global Initiative of Acadmic Networks (GIAN) Courses in 2016-17

- **Course Name** : Modern Power Distribution Systems
  Course Area : Electronics, Electrical, Information & Communication Technology
  Foreign Faculty : Anil Pahwa, , United States of America
  Host Faculty : Trapti Jain, Electrical Engineering
- **Course Name** : COMPLEXITY AND DYNAMICS IN NEUROSCIENCE
  Course Area : Mathematical & Computer Sciences
  Foreign Faculty : Mikhail Ivanchenko, Russia
  Host Faculty : Sarika Jalan, Physics Department, Complex Systems Lab
- **Course Name** : Grid Integration of PV Solar and Wind Power Systems
  Course Area : Electronics, Electrical, Information & Communication Technology
  Foreign Faculty : Rajiv K. Varma, , Canada
  Host Faculty : Trapti Jain, Electrical Engineering
- **Course Name** : Introduction to Thermal Systems Design
  Course Area : Mechanical Sciences & Infrastructure
  Foreign Faculty : Srinivas Garimella, , United States of America
  Host Faculty : Dr. E. Anil Kumar, Mechanical
- **Course Name** : Theory and Application of Wavelets and Framelets
  Course Area : Mathematical & Computer Sciences
  Foreign Faculty : Bin Han, , Canada
  Host Faculty : Niraj Kumar Shukla, Mathematics
- **Course Name** : Quasiconformal Mappings and their Applications
  Course Area : Mathematical & Computer Sciences
  Foreign Faculty : Pekka Koskela, , Finland
  Host Faculty : Swadesh Kumar Sahoo, Mathematics
- **Course Name** : Porous and Granular Materials: Applications in Modern Science and Technology
  Course Area : Mechanical Sciences & Infrastructure
  Foreign Faculty : Arzhang Khalili, Max Planck Institute for Marine Microbiology Bremen, , Germany
  Host Faculty : Dr. Shanmugam Dhinakaran, The Centre for Fluid Dynamics, Department of Mechanical Engineering, IIT Indore
- **Course Name** : Adsorption Science and Technology for Cooling and Desalination Applications
  Course Area : Mechanical Sciences & Infrastructure
  Foreign Faculty : Bidyut Baran Saha, , Japan
  Host Faculty : Anil Kumar Emadabathuni, Mechanical
- **Course Name** : Data Protection – from Principles to Practice
  Course Area : Mathematical & Computer Sciences
  Foreign Faculty : Anwitaman Datta, , Singapore
  Host Faculty : Dr. Somnath Dey, Discipline of Computer Science and Engineering
- **Course Name** : Second Law Analysis of Thermal Energy Storage Systems
  Course Area : Mechanical Sciences & Infrastructure
  Foreign Faculty : Bale V. Reddy, , Canada
  Host Faculty : Anil Kumar Emadabathuni, Mechanical Engineering

- **Course Name** : Advanced Radar System Design and Signal Processing
  Course Area : Electronics, Electrical, Information & Communication Technology
  Foreign Faculty : Amit Kumar Mishra, University of Cape Town, , South Africa
  Host Faculty : Vimal Bhatia, ELECTRICAL ENGINEERING
- **Course Name** : Small Scale Combined Heat and Power Generation Units: Modelling of Thermal-Hydraulic Issues, System Design and Operation
  Course Area : Mechanical Sciences & Infrastructure
  Foreign Faculty : Dariusz Mikielewicz, , Poland
  Host Faculty : Ritunesh Kumar, Mechanical
- **Course Name** : Generalized Iterative Methods for Non-linear Differential Equations
  Course Area : Mathematical & Computer Sciences
  Foreign Faculty : Aghalaya S Vatsala, , United States of America
  Host Faculty : Antony Vijesh, Discipline of Mathematics
- **Course Name** : Fundamentals and Applications of Absorption Heat Pumps and Refrigeration Systems
  Course Area : Mechanical Sciences & Infrastructure
  Foreign Faculty : Alberto Coronas, , Spain
  Host Faculty : Anil Kumar Emadabathuni, Mechanical
- **Course Name** : Next Generation Solar Cells in the Realm of Future Energy Challenges: From Materials Design to Device Architectures
  Course Area : Chemical, Bio-Chemical & Material Sciences
  Foreign Faculty : Shyam Sudhir Pandey, , Japan
  Host Faculty : Vipul Singh, Electrical Engineering, Indian Institute of Technology Indore
- **Course Name** : Economics of Science, Technology and Innovation: Empirical Approaches and Randomized Control Trials (RCTs)
  Course Area : Social Sciences
  Foreign Faculty : Ina Ganguli, , United States of America
  Host Faculty : Ruchi Sharma, Economics, School of Humanities and Social Sciences
- **Course Name** : How Next Generation Sequencing (NGS) Untying the Knots in Viral Pathogenesis
  Course Area : Life Sciences & Healthcare
  Foreign Faculty : Subhash C Verma, , United States of America
  Host Faculty : Dr. Hem Chandra Jha, Centre for Biosciences and Biomedical Engineering
- **Course Name** : Media Security and Forensics
  Course Area : Mathematical & Computer Sciences
  Foreign Faculty : Gaurav Sharma, , United States of America
  Host Faculty : Dr. Surya Prakash, Computer Science and Engineering
- **Course Name** : Ubiquitous Computing
  Course Area : Electronics, Electrical, Information & Communication Technology
  Foreign Faculty : Hee Yong Youn, , Korea South
  Host Faculty : Abhishek Srivastava, Computer Science and Engineering
- **Course Name** : New Developments in Global Political Theory: Comparative, Decolonial and Indian Political Theory
  Course Area : Humanities & Liberal Arts
  Foreign Faculty : Aakash Singh Rathore, , Italy
  Host Faculty : Dr. Bharath Kumar, Humanities and Social Sciences
- **Course Name** : Vaccines for Human and Animal Viral Pathogens

Course Area : Life Sciences & Healthcare
Foreign Faculty : Asit K Pattnaik, , United States of America
Host Faculty : Debasis Nayak, Centre for Biosciences and Biomedical Engineering

- **Course Name** : Humanoid Robotics: Modelling and Control
  Course Area : Mechanical Sciences & Infrastructure
  Foreign Faculty : Christine Chevallereau, , France
  Host Faculty : Santhakumar Mohan, Mechanical Engineering
- **Course Name** : Advanced Pattern Recognition Techniques for Biometrics
  Course Area : Mathematical & Computer Sciences
  Foreign Faculty : Massimo Tistarelli, , Italy
  Host Faculty : Dr. Surya Prakash, Computer Science and Engineering
  Duration : 04-12-2017 to 08-12-2017
- **Course Name** : Multibody Dynamics
  Course Area : Mechanical Sciences & Infrastructure
  Foreign Faculty : Burkhard Corves, , Germany
  Host Faculty : Santhakumar Mohan, Mechanical Engineering
- **Course Name** : Explosive transitions in complex networks: new opportunities, new dangers
  Course Area : Physical Sciences
  Foreign Faculty : Inmaculada Leyva, , Spain
  Host Faculty : Sarika Jalan, Physics
- **Course Name** : Intellectual Property Rights (IPR) and International Economic Development
  Course Area : Humanities & Liberal Arts
  Foreign Faculty : Walter G. Park, American University , , United States of America
  Host Faculty : Dr. Ruchi Sharma, School of Humanities and Social Sciences
- **Course Name** : Chemistry and Biology of Carbohydrates
  Course Area : Chemical, Bio-Chemical & Material Sciences
  Foreign Faculty : Fabian Pfrengle, , Germany
  Host Faculty : Chelvam Venkatesh, Discipline of Chemistry and Centre for Biosciences and Biomedical Engineering
- **Course Name** : Inorganic chemistry of imaging: Magnetic resonance and optical imaging with coordination complexes
  Course Area : Chemical, Bio-Chemical & Material Sciences
  Foreign Faculty : Janet R. Morrow, University at Buffalo, State University of New York, , United States of America
  Host Faculty : Mobin Shaikh, Discipline of Chemistry

IIT Indore – TU9 Collaboration

In the Joint Statement of the 3rd India Germany Inter Governmental Consultations (IGC) held at New Delhi in October 2015, both the leaders had proposed to explore the possibilities of collaboration between the newly established IIT Indore and TU9 institutions.

A follow up meeting between teams from IIT Indore and TU9 took place on 4th April 2016 at the Embassy of India, Berlin. The objective of the meeting was to discuss research programs at different TU9 universities and IIT Indore, and to identify areas for future joint cooperative programs.

Director of IIT Indore participated in the India-Germany JWG meeting in Bonn/ Aachen on 21st and 22nd June 2016. A part of the MHRD delegation and members of the BMBF staff met senior professors and other senior staff of RWTH Aachen. This has resulted in a very productive collaboration between IIT Indore and RWTH as evidenced by several joint publications as well as student and faculty exchanges.

Continuing efforts in this initiative, a "Research Workshop" was organized by IIT Indore – TU9 at Technische Universität Berlin (TU Berlin) on 2nd and 3rd November 2016. This was the second such meeting in 2016 showing the eagerness between the teams to formulate a long-term collaborative program. The Honorable Minister, Mr. Prakash Javadekar, addressed this meeting through a video clip.

Most sessions were focused on technical talks that highlighted research already done and planned future work. At the concluding session it was agreed by all to organize the next workshop at IIT Indore on 5th and 6th October 2017.

The first outcome of this workshop was preparation of a proposal to setup an Indo-German center titled “Innovative Approaches to Novel Material, Engine and Chip Design in Theory and Experiment” at IIT Indore and TU Berlin. This proposal was submitted to MHRD and BMBF in April of 2017. The second outcome of this workshop was substantial increment in joint proposals (half a dozen), joint papers (more than a dozen), and exchanges (half a dozen).

As an outcome of the above initiatives, presently, IIT Indore is formally collaborating with seven of the nine TU9s in multiple areas, and has signed individual Memoranda of Understanding with five of the nine TU9s.

First IIT Indore – TU9 Research Workshop was held on November 2-3, 2016 in Berlin. This is the second event that has been organized for increasing collaboration between IIT Indore and TU9 universities (first was a preliminary workshop held in Berlin in April 2016).

This workshop has helped IIT Indore – TU9 collaboration progress in a direction as visualized by the Indian Prime Minister, Mr. Narendra Modi, and the German Chancellor, Dr. Angela Merkel, during the third Indo-German Intergovernmental Consultations (IGC) held in New Delhi in fall of 2015. Thirteen eminent German professors participated in this workshop. The five TU9s that were represented by them include Karlsruher Institut für Technologie, Leibniz Universität Hannover, RWTH Aachen, TU Berlin, and TU Braunschweig. Faculty members from two other TU9s, TU Dresden and Universität Stuttgart, could not participate in the current workshop in-person because of prior commitments, but were involved in discussions related to it. A twelve member IIT Indore delegation (led by Director, seven faculty members, and four research students) participated in this workshop.

The two-day workshop consisted of seven sessions. Opening session included talks by Mr. Prakash Javadekar (MHRD Minister; recorded speech), Prof. Pradeep Mathur (Director, IIT Indore), Mr. Gurjit Singh (Ambassador of India, Berlin), and Dr. Martin Goller (DLR - Project Management Agency/Head of Unit South Asia, Southeast Asia).Most sessions were focused on technical talks that highlighted research already done (in the form of about a dozen published papers and submitted proposals), and planned future work.Four themes emerged out of the workshop for enhancing collaboration between IIT Indore and TU9 universities, which include, Development and Study of Novel Materials, Mathematical Science Research, Theoretical Studies, and Robotics.

The concluding session involved two main discussions. One was finalization of the date and venue of the second workshop. It was agreed by all to organize the second workshop at IIT Indore on 5th and 6th October 2017. The second discussion involved setting of a fund so that groups could collaborate more easily. Since research output has already been shown, this will help take the joint research to a higher level. It was agreed that a joint proposal (for setting up of a fund) would be submitted to both MHRD and BMBF in December 2016.

Signing of MoU

IIT Indore signed Memoranda of Understanding with few TU9 universities and top research institutes in Germany during the recently concluded first IIT Indore – TU9 research workshop in Berlin (November 2-3, 2016). These Memoranda of Understanding, among other things, would enable increased exchange of faculty and students as well joint organization of research programs and conferences.

Earlier to this, IIT Indore already had Memoranda of Understanding with two of the nine TUs (RWTH Aachen and TU Braunschweig). During this visit, on November 2nd, a Memorandum of Understanding was first signed with TU Berlin. The President of TU Berlin (Prof. Dr. Christian Thomsen) and Director IIT Indore (Prof. Dr. Pradeep Mathur) were signatory to this. Next, a Memorandum of Understanding was signed with LU Hannover.

The President of LU Hannover (Prof. Dr. Volker Epping) signed the MoU offline, and during the workshop Prof. Dr. Holger Butenschön represented the President. Here again, from IIT Indore, Prof. Dr. Pradeep Mathur was the signatory to the MoU. Mr. Gurjit Singh, H. E. The Ambassador of India to Germany was witness to the two ceremonies.

On November 3rd, a Memorandum of Understanding was signed with the Max Planck Institute in Magdeburg. The Director of the Max Planck Institute (Prof. Dr. Peter Benner) and Director IIT Indore (Prof. Dr. Pradeep Mathur) were signatory to this.

A proposal for setting up of Indo-German center at IIT Indore and TU Berlin was submitted to BMBF and MHRD (Apr 2017).

Second IIT Indore – TU9 Research Workshop (October 5-6, 2017)

To keep-up with the aggressive pace of this collaborative research, the second IIT Indore – TU9 research workshop was organized at IIT Indore on 5th and 6th October 2017.

This workshop highlighted IIT Indore's past year's collaborative output with seven of the nine TU9s, reinforced the idea behind signing Memoranda of Understanding with five of nine TU9s, and helped establish new linkages not just between IIT Indore and TU9 institutions but other IITs as well.

Introduction

The workshop had forty participants out of which about half were external participants. Besides the eight TU9 participants, there was representation from the German Embassy in New Delhi, DAAD Delhi, IIT Mandi, and IIT Ropar. The workshop consisted of four different tracks as follows: introductory session, session on scholarships and posters, technical sessions, and sessions on reaching other young IITs/ future of this collaboration.

The introductory session first involved welcome address by IIT Indore authorities (Dr. Kapil Ahuja and Prof. Neelesh Kumar Jain), where current status of IIT Indore – TU9 collaboration as well as unique aspects of IIT Indore's academic curriculum were emphasized.

Next, head of cultural and educational department at German Embassy in New Delhi (Mr. Graf von der Schulenburg) enlightened the audience about the recent increment in Indo-German collaboration.

Finally, the TU9 coordinator from IIT Mandi (Dr. Prem Felix Siril) highlighted their collaborative research with a few TU9 institutions

Scholarships and Posters

Ms. Shikha Sinha from DAAD Delhi apprised the audience about multiple funding opportunities for IIT Indore faculty members as well as students in separate sessions. Both these sessions were very well received with attendance crossing more than a hundred participants.

The poster session was useful too, where seeds for new collaborative exchanges between IIT Indore and TU9 institutions were sown.

Technical Sessions

The heart of the workshop was highlighting the research output from the existing collaborations between IIT Indore and TU9 institutions. In this respect, the sessions were conducted under three streams: application, experimental and theoretical.

Under the application stream, cutting-edge research done in materials for universal memory, smart hybrid materials, engine design for alternative fuels, and routing algorithms for next generation chips were highlighted.

Under the experimental stream, the focus was on ligands, catalysis and three-dimensional Benzene. Under the theoretical stream, focus was mostly on networks and model order reduction.

Other IITs & Future Directions

Two sessions were devoted towards expanding the IIT Indore - TU9 collaboration to the young IITs - TU9 collaboration as the future direction. One was the Skype call on Oct 5th between IIT Indore, Universität Stuttgart and IIT Mandi. IIT Ropar was a special invitee for this. The other session on Oct 6th was a group discussion between all the participants of the workshop.

Since IIT Mandi has been collaborating with TU9 institutions for more than half-a-decade, it was proposed that IIT Indore and IIT Mandi together could lead this initiative from India. BMBF has already identified Universität Stuttgart as the coordinating TU9.

It was also decided to hold the next meeting at Universität Stuttgart during the first two weeks of October 2018. To appeal to a wider audience, it was recommended to have representations from other five young IITs and have parallel tracks on application, experimental and theory. It was also decided to have the next workshop span three days with a technical excursion planned for the middle day.

Health Care and Medical Facilities

Health Centre provides dedicated health services to institute community. The medical team comprises of medical officers, specialist consultants and patient friendly paramedical and supporting staff.

Facilities

The health centre provides O.P.D., day care and in-patient facility for minor ailments.

Itprovides essential investigation facility. This includes -

a) ECG Facility

b) Rapid Spot blood investigation

For further evaluation, sample collection facility is available at both units.

A well equipped Physiotherapy facility has been started since December 2016.

Technical up-gradation

a) Advanced life support ambulance- A state-of-art facility for continuous emergency medical care while transferring critically ill patient to higher medical centre

b) Cardiac monitor

c) Emergency medical care set up

d) In-patient facility for minor ailments

Other activities-Basic life support training was organized for students and employees including drivers and security guards in January 2017.

A workshop on 'Women's Health and Wellness was organized in May 2016.

Blood Donation Camp- Health centre with Avana group organized blood donation camp in November 2016.

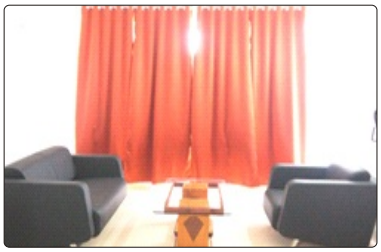
Annual Census of Health Centre FY 2016-2017						
S.No.	**O.P.D.**	**In Patient and Day Care Cases**	**Emergency Cases**	**Trauma/Minor Surgical Cases**	**ECG**	**Laboratory Tests**
1	11399	346	850	1155	278	756

Hostel Facility

The Hall of Residence

Hall of Residence for students at IIT Indore is located in the permanent campus of the institute at Simrol. The hall was inaugurated on **29th November 2016 by Professor Pradeep Mathur, Director IIT Indore**. The newly constructed building of the hall has latest amenities. Each unit has phone, sofa set, fridge and discussion table for the comfortable stay of the residents. Presently, more than 900 students are residing in the hall. Staying here will be a wonderful and memorable experience for students.

IIT Indore provides 5 BHK unit to accommodate 5 students with one student per bedroom with following facilities:



- Large spacious rooms with Cot, Almirah, Study Table, Chair
- Refrigerator
- Telephone
- RO drinking Water
- Hot Water
- Sofa Set
- Discussion Table
- Wi-Fi Connection & LAN port
- Individual Attached Bathroom

Hall also have following common facilities for all the residing students:

- Dining Hall
- Gymnasium
- Sports (Table Tennis, Football, Volleyball, Football, Badminton, etc.)
- Medical
- Transport
- Bank & ATM
- Printing Facility

For more information, visit us at : http://iiti.ac.in/Hall%20of%20residence/index.php

Contact Us

Emergency Contact

Hall-Security : +91(0)9522289512

Ambulance : +91(0)9977128407

Medical : +91(0)731-2438987

Secretary : +91(0)9826361419

Mess-Secretary : +91(0)7470849010

Hall Office

Hall Office (Room No. 114, Ground Floor),
Indian Institute of Technology Indore,
Khandwa Road, Simrol, Indore 453552, Madhya Pradesh INDIA
Phone : +91-7324-306583
Email: hostel [at] iiti.ac.in

General Administration

Registrar – Mr. Ram Phal Dwivedi

Officer on Special Duty – Mr. Subrata Sarkar

Deputy Librarian – Ms. Anjali Bandiwadekar

Superintending Engineer – Mr. P. V. Narayana Rao

Deputy Registrar – Mr. T. Satyanarayana

Deputy Registrar – Mr. Pradeep Agarwal

Deputy Registrar – Mr. S. P. Hota

Deputy Registrar – Mr. Sunil Kumar

Executive Engineer – Mr. Saroj Kumar Mallick

Project Engineer & Estate Officer – Mr. Atul Kumar Pandey

Senior Medical Officer – Dr. Shilpa Raut

Administrative Officer – Mr. Suresh Chandra Thakur

Administrative Officer – Mr. Kumar Gaurav

Chief Security Officer – Mr. Ramakant Kaushik

Officer on Special Duty – Mr. Pargat Singh

Deputy General Manager Workshop – Mr. Anand Petare

Sports Officer –Mr. Ritesh Guchhait

Library Information Officer – Mr. Rajesh Kumar

Counsellor – Ms. Monika Gupta

1. Academic Section:

1.1 During the academic session 2017-18 (as on September 30, 2017), the following was the programme-wise admissions:

S. No.	Programme	No. of Students 2017-18	No. of Students 2016-17
1	UG – B.Tech	249	**258** (1 Preparatory student joined at IITH)
2	PG – M.Sc.	56	47
3	PG – M.Tech.	34	31
4	Ph.D / Research Prog	67 (upto 2017-Autumn Semester)	83

1.2 The total strength of the students in the Campus as on September 30, 2017 were as under:

A.Y.	B. Tech	M. Tech	M.Sc.	M.Tech.+ Ph.D.	M.Sc + Ph.D	Ph. D	Total
2009-10	-	-	-	-	-	-	-
2010-11	01	-	-	-	-	02	03
2011-12	01	-	-	-	-	06	07
2012-13	03	-	-	-	-	22	25
2013-14	04	-	-	-	-	48	52
2014-15	117	-	-	-	-	84	201
2015-16	108	-	02	02	04	106	222
2016-17	257	26	44	-	-	74	401
2017-18	247	34	54	-	-	67	402
TOTAL	738	60	100	02	04	409	1313

Total student strength as on September 30, 2017 was 1313.

1.3 Programmes offered during the year are:

B. Tech:-

(i) Computer Science and Engineering

(ii) Electrical Engineering

(iii) Mechanical Engineering

(iv) Civil Engineering (from July 2016)

(v) Metallurgy Engineering and Material Science (from July 2016)

Ph. D:-

(i) Basic Science: (Chemistry, Mathematics, Physics)

(ii) Engineering: (Computer Science and Engineering, Electrical Engineering, Mechanical Engineering, Civil Engineering (from July 2017), Metallurgy Engineering and Material Science)

(iii) HSS (Economics, English, Philosophy, Psychology, Sociology),

(iv) Inter Disciplinary Research Group (Biosciences & Biomedical Engineering, Astronomy)

M.Sc., M.Sc.+Ph. D. dual degree:-

(i) Chemistry

(ii) Physics

(iii) Mathematics

(iv) Biotechnology (from July 2017)

M.Tech., M.Tech.+Ph. D. dual degree:-

(i) Communication and Signal Processing

(ii) Production and Industrial Engineering

(iii) Material Science and Engineering (from July 2015)

(iv) VLSI Design and Nanoelectronics (from July 2017)

1.4. Summary of the activities of the Academic section during the year 2015-16 were broadly comprising of the following :

1	Courses offered	Courses offered : 645 Undergraduate Courses : 350 Postgraduate Courses : 235 Cross Listed Courses : 60
2	Doctoral Students Admitted in AY 2017-18	67 (upto 2017-Autumn Sem.)
3	Doctoral Students Graduated	33 students have successfully defended their thesis and passed out (from last Convocation to September 30, 2017). However total 38 students will receive the degree in 5th Convocation.

4	Under Graduate Students Graduated	118 BTech students are graduated this year and will confer the degree in 5th Convocation.
5	Post Graduate Students Graduated	25 M.Tech and 22 MSc students are graduated this year and will confer the degree in 5th Convocation.

1.5 Summary of admitted Students in different academic year in IIT Indore :

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
UG (B.Tech.)									
CSE	35	43	38	38	40	39	39	61	57
EE	38	42	39	39	40	38	37	59	59
ME	34	37	40	39	39	40	35	60	58
CE	-	-	-	-	-	-	-	40	38
MEMS	-	-	-	-	-	-	-	38	37
Total A	**107**	**122**	**117**	**116**	**119**	**117**	**111**	**258**	**249**
UG (Preparatory)Total B	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**
PG (M.Tech.)									
PIE	0	0	0	0	3	12	11	11	8
CSP	0	0	0	0	2	12	9	11	7
MSE	0	0	0	0	0	0	10	9	10
VDN	-	-	-	-	-	-	-	-	9
Total C	**0**	**0**	**0**	**0**	**5**	**24**	**30**	**31**	**34**
PG (MSc)									
Chemistry	0	0	0	0	8	10	7	19	19
Physics	0	0	0	0	7	10	9	18	20
Mathematics	0	0	0	0	0	0	8	10	11
Biotechnology	-	-	-	-	-	-	-	-	6
Total D	**0**	**0**	**0**	**0**	**15**	**20**	**24**	**47**	**56**
PhD									
CSE	0	3	6	7	11	2	11	2	4
EE	0	6	11	14	19	22	27	19	7
ME	0	6	5	11	21	14	7	9	6
CE	-	-	-	-	-	-	-	-	1
Chemistry	0	8	9	15	13	13	25	11	8
Physics	0	4	5	10	4	20	8	3	8
Mathematics	0	3	3	2	3	1	2	6	1
Economics	0	2	2	2	0	1	5	4	3
English	0	0	2	1	3	1	2	-	0
Philosophy	0	1	0	2	1	0	1	1	0
Psychology	0	0	0	1	1	1	1	-	0
Sociology	0	0	0	0	1	0	2	1	0
BSBE	0	0	0	2	9	6	17	15	15
MEMS	0	0	0	0	1	12	10	6	11
Astronomy	-	-	-	-	-	-	-	6	3
Total E	**0**	**33**	**43**	**67**	**87**	**93**	**118**	**83**	**67**
Grand Total (A+B+C+D+E)	**107**	**155**	**160**	**184**	**226**	**254**	**283**	**419**	**406**

1.6 Summary of Students graduated from IIT Indore :

	2013-Convocation	2014-Convocation	2015-Convocation	2016-Convocation	2017-Convocation
UG (Btech)					
CSE	35	41	39	45	39
EE	35	42	39	33	43
ME	31	34	36	30	36
Total A	**101**	**117**	**114**	**108**	**118**
PG (Mtech)					
PIE	-	-	3	12	8
CSP	-	-	2	10	8
MSE	-	-	-	-	9
Total B	**-**	**-**	**5**	**22**	**25**
PG (MSc)					
Chemistry	-	-	8	10	7
Physics	-	-	6	10	9
Mathematics	-	-	-	-	6
	-	**-**	**14**	**20**	**22**
Total C					
PhD					
CSE	-	-	3	2	-
EE	-	2	8	5	14
ME	-	4	3	3	4
Chemistry	-	-	5	5	12
Physics	-	-	2	5	2
Mathematics	-	-	-	2	1
Economics	-	-	2	1	1
Philosophy	-	-	-	1	-
English	-	-	-	-	2
BSBE	-	-	-	-	1
Total D	**-**	**6**	**23**	**24**	**37**
Grand Total (A+B+C+D)	**101**	**123**	**151**	**174**	**202**

2. Administration

2.1 The Administration Department is responsible for generation administration and human resources management in the Institute. The overall aim of the department is to make administration more responsive and work in tandem with the institute's vision and mission. The department also acts as a link between an institute's various departments and ensures smooth flow of information from one section to other. Some of the specific duties of the department are as follows:-

- Implementation of rules, regulations & policies of Institute.
- Record keeping of data pertaining to employees. Addressing service and personal matters of the employees including ex-employees.
- Conduct of service matters such as appointments, promotions, retirement, disciplinary action, leave record, creation of posts pertaining to both teaching and non-teaching employees of the institute.
- Financial up-gradation/ Assessment and Pay fixation related activities including MACP (i.e. Modified Assured Career Progression) scheme of non-teaching and teaching staff.
- Coordinate between departments and operating units in resolving day-to-day administrative and operational problems.
- Issuance of Office Orders & Memorandums.
- Coordinate and conduct of disciplinary and legal matters.

2.2 Staff position:

As on 30th September, 2017, **104 no** of faculty and **93 no** of non-teaching staff were in position as per the details given in the table below;

Faculty members - 104

Visiting Faculty - 03

Group A Officers - 18

Technical staff - 35

Other Administrative Staff - 40

Number of faculty / staff members appointed during the year 2016-17 is as under: Professors - Nil, Associate Prof – **02**, Assistant Prof - **23**, Visiting Faculty – **03**, Non-teaching staff - **23**.

No of faculty were relieved due to resignation or other reasons of separation **02**.

No of staff were relieved due to resignation / other reasons were **09**.

2.3 The list of faculty / staff appointed between April 1, 2016 and Sptember 30, 2017 are as under:

S.No.	Name	Designation	Department	Qualification	D.O.J.
1	Dr. Bhargav Pradeep Vaidya	Assistant Professor	Astronomy	Ph.D	15-May-17
2	Dr. Kiran Bala	Assistant Professor	BSBE	Ph.D	21-Feb-17
3	Dr. Hem Chandra Jha	Assistant Professor	BSBE	Ph.D	21-Feb-17
4	Dr. Mirza Saqib Baig	Assistant Professor	BSBE	Ph.D	21-Feb-17
5	Dr. Sushabhan Sadhukhan	Assistant Professor	BSBE	Ph.D	19-May-17
6	Dr. Amrendra Kumar Singh	Assistant Professor	Chemistry	Ph.D	3-Jun-16
7	Dr. Munir Ahmad Nayak	Assistant Professor	Civil Engineering	Ph.D	16-May-17
8	Dr. Sandeep Chaudhary	Associate Professor	Civil Engineering	Ph.D	17-May-17
9	Dr. Bodhisatwa Mazumdar	Assistant Professor	CSE	Ph.D	1-Mar-17
10	Dr. Vijay Kumar Sohani	Assistant Professor	Mathematics	Ph.D	22-Feb-17
11	Dr. M. Tanveer	Assistant Professor	Mathematics	Ph.D	29-Sep-17
12	Dr. Sanjeev Singh	Assistant Professor (Contractual)	Mathematics	Ph.D	29-Sep-17
13	Dr. Shailesh Kundalwal	Assistant Professor	ME	Ph.D	21-Feb-17
14	Dr. Indrasen Singh	Assistant Professor	ME	Ph.D	12-Apr-17
15	Dr. Subbareddy Daggumati	Assistant Professor	ME	Ph.D	15-May-17
16	Dr. Parasharam M. Shirage	Associate Professor	MEMS	Ph.D	21-Feb-17
17	Dr. Rupesh Shivaji Devan	Assistant Professor	MEMS	Ph.D	28-Mar-17
18	Dr. Vinod Kumar	Assistant Professor	MEMS	Ph.D	30-Apr-17
19	Dr. Sumanta Samal	Assistant Professor	MEMS	Ph.D	10-Apr-17
20	Dr. Santosh Sattappa Hosmani	Assistant Professor	MEMS	Ph.D	17-Apr-17
21	Dr. Mrigendra Dubey	Assistant Professor	MEMS	Ph.D	15-May-17
22	Dr. Jayaprakash Murugesan	Assistant Professor	MEMS	Ph.D	12-Jun-17
23	Dr. Eswara Prasad Korimilli	Assistant Professor	MEMS	Ph.D	27-Jun-17
24	Dr. Dhirendra Kumar Rai	Assistant Professor	MEMS	Ph.D	29-Sep-17
25	Dr. Ajay Kumar Kushwaha	Assistant Professor	MEMS	Ph.D	29-Sep-17
26	Mr. Swapnil Dasharath Sankhe	Deputy Manager (Accounts)	Library	B.Com, CA Inter (Pass)	25-Apr-16
27	Mr. Amit Kumar Mishra	Deputy Manager (Lab)	BSBE	B.Sc(BioTech), M.Sc(BioTech)	20-May-16
28	Mr. P.K.Parthiban	Manager (Technical) Glassblower	Chemistry	SSC,B.COM,Certification of Training Course in Glass Blowing	1-Jun-16
29	Mr. Rameshwar Dohare	Lab Incharge / Office Incharge	Chemistry	SSC,HSC	24-Jun-16

30	Mr.	Nitin Upadhyay	Deputy Manager (Lab)	Physics	B.Sc, M.Sc, M.Tech	28-Jun-16
31	Ms.	Vinita Kothari	Deputy Manager (Lab) (On Contract- On Scale)	Chemistry	B.Sc,MBA	29-Jun-16
32	Mr.	Jitendra Verma	Lab Incharge / Office Incharge	Mathematics	BA	19-Jul-16
33	Mr.	Sachin Laxman Bhirodkar	Deputy Manager (Lab)	ME	B.E (Mech), M.Tech	19-Sep-16
34	Ms.	Kriti Jain	Manager (Library)	Library	B.Com, B.Lib.Isc, M.Lib.Isc,DCA, PGDCA	14-Oct-16
35	Mr.	Kapil Kumar Gupta	Manager (Library)	Library	BCA,BLiSC,M LiSC	7-Nov-16
36	Mr.	Murali B	Deputy Manager (Lab)	EE	B.Tech (EE),M.Tech	28-Nov-16
37	Mr.	Digant Karve	Deputy Manager	Hostel Office	B.Sc	22-Dec-16
38	Ms.	Nisha Birla	Deputy Manager	R & D	BE(CS)	26-Dec-16
39	Mr.	Nitin Parashar	Deputy Manager	Academics	B.Sc,MBA	30-Dec-16
40	Mr.	Piduru Venkata Narayana Rao	Superintending Engineer (On Contract-On Scale)	Estate	AMIE,M Tech,MBA	30-Dec-16
41	Mr.	Jagat Singh	Deputy Manager (Lab)	CSE	B.Sc,MCA	30-Dec-16
42	Ms.	Pooja Dutta	Manager	MMS	B.Sc,MA, PGDMM	13-Feb-17
43	Mr.	Tapesh Parihar	Manager	Academics	B.Com, MBA	13-Feb-17
44	Mr.	Vijayendra Shastri	Manager	Finance & Accounts	B.Com, CA Inter (Pass) M.Com	13-Feb-17
45	Mr.	Kumar Gaurav	Administrative Officer	Audit + R & D + Hospitality	B.Com,MBA	1-Mar-17
46	Mr.	Suresh Chandra Thakur	Administrative Officer	MMS + Estate + Housekeeping	BA(Honours), MA,PGDBM	3-Apr-17
47	Mr.	Ram Phal Dwivedi	Registrar	Registrar Office	BA,Master in Personnel Mgt,LLB,MCA	8-May-17
48	Mr.	Raju Singha	Lab Incharge	ME	Diploma in M.E.	11-May-17
49	Mr.	Mahesh Jhade	Lab Incharge	ME	Diploma in M.E.,BE (ME)	18-May-17
50	Mr.	Sunil Kumar	Deputy Registrar	Administration + Alumni Affairs + International Affairs	B.E.(Mech), M.Sc.	8-Jun-17
51	Mr.	Pooran Mittal	IT Officer	Computer Centre	B.Sc, AMIE(I),M.E.	28-Jul-17

3. Finance and Accounts

3.1 The year 2016 – 17 is characterized with the following Income and Expenditure:

(₹ in crores)

S. No.	Particulars	2016-2017 Current Year
1.	**INCOME**	
1.1.	**Grants** Total Grant received : 200.00 **Less** –Allocated for creation of Capital assets : 113.50 **For Recurring Purpose :** **86.50**	86.50
1.2.	Academic Receipts	07.75
1.3.	Interest Earned	05.87
1.4.	Other Income	00.77
1.5.	**Total of 1**	**100.89**
2.	**EXPENDITURE**	
2.1.	Staff Payments & Benefits	25.67
2.2.	Academic Expenses	18.80
2.3.	Administrative & General Expenses	12.94
2.4.	Transportation Expenses	01.40
2.5.	Repairs and Maintenance	01.03
2.6.	Depreciation	13.47
2.7.	Other Expenses	00.97
2.8.	**Total of 2**	**74.28**
3.	**Balance being excess of Income over Expenditure**	**26.61**

3.2 The position relating to creation of capital assets is as under:

(₹ in crores)

S. No.	Particulars	2016-2017
2.1	Opening Balance of Grant-in-Aid Plan	-46.61
2.2	Grant received during the year - For Creation of Capital Assets 112.50 - For Revenue Expenditure 86.50 **200.00**	200.00
2.3	Internal Revenue Generation	14.37
2.4	**Total funds available at the disposal of the Institute**	**167.76**
2.5	Revenue Expenditure excluding Depreciation (74.28-13.47)	60.81
2.6	Plan Grant after adjusting utilization for Income & Expenditure (200.00-46.61-60.81)	92.58
2.7	Utilized for developing infrastructure - Buildings & Works 107.77	120.31
	Utilized for Equipment's and other Assets 12.54	
2.8	Unspent balance as on 31.03.2017	-27.73

3.3 Funds availability and status of utilization thereof:

During financial year 2016-17, against sanction of Revised Detailed Project Report (DPR) of ₹ 1,902 crores, a sum of ₹ 200.00 crores were released by Ministry of Human Resource Development. The Internal income of the Institute reckoned during the year was ₹ 14.37 crores and after considering the unspent balance as on 01.04.16 of ₹ -46.61 crores, the total funds available at the disposal of the Institute was of the order of ₹ 167.76 crores.

A sum of ₹ 120.31 crores has been utilized for the creation of Capital assets and a sum of ₹ 60.81 cores (which excludes Depreciation of ₹ 13.47 crores) was incurred on recurring expenditure out of the grant at the disposal with the Institute. Further Internal Revenue Generation for the year amounting to ₹ 14.37 crores transferred to Corpus Fund.

3.4 Reforms, measures and initiatives undertaken during the year include:

During the year under review the following reforms, measures Initiatives were initiated from Finance & Accounts:

3.4.1 Tuition fees for the undergraduate students joining from Academic Year 2016-17 is revised and subsequently MHRD has introduced Vidyalaxmi scheme vide MHRD letter No. 24-2/2016 TS 1 dated July 14, 2016 for provision of interest free loans to students for first five years to be paid by IIT. 27 students applied for Education loan under Vidyalaxmi scheme through State Bank of India, Nodal Bank for the scheme. Interest implication for Financial Year 2016-17 is ₹ 2,38,174/-.

3.4.2 Public Finance Management System (PFMS) is a platform for all DBT payments.

3.4.3 Institute has developed payment gateway on IIT Indore website with State Bank of India as channel partner bank for the facility.

3.5. Education assistance for children:

During the financial year 2016-2017, the Institute reimbursed a sum of ₹ 15,39,977/- to 60 faculty and staff members against for education assistance according to Government of India norms.

3.6. Transport facilities for staff members:

Transport facilities have been provided for the benefit of movement of staff from one campus to another campus at subsidized rates as the IITI Campus is located in 4 different places.

3.7. Advances:

During the reporting year, a total sum of ₹ 9.72 lakhs was sanctioned as personal advances for the following.

Sl. No.	Nature of Advance	No. of Beneficiaries	Amount Sanctioned	Amount outstanding as on 31.03.2017
			(in ₹)	(in ₹)
1	House Building Advance	2	4,75,400	14,81,040
2	Car Advance	-	-	1,38,000
3	Two-wheeler advance	7	3,48,000	3,56,212
4	Personal computer advance	-	-	-
5	Festival advance	33	1,48,500	88,200
		Total	**9,71,900**	**20,63,452**

3.8 Insurance:

Group Medical Insurance cover of ₹ 1.50 lakhs is provided to all students of the Institute for In-Patient treatment. Expenses towards insurance is ₹ 11,54,252/- during financial year 2016-17. Care of Out-patient treatment is taken care mainly by the Health Centre internally.

3.9 Financial Assistance to Research Scholars/Students for Presentation of Papers Abroad/India:

This Institute encourages research scholars to present papers at international conferences and give them financial assistance towards this endeavour. The assistance (adhoc amount, including registration fees) provided to Ph.D scholars is ₹ 80,000/-. Assistance is given to other PG students also as per need basis.

3.10 Fellowships/scholarships:

3.10.1. To Research Students:

During financial year 2016-17, Institute has disbursed Fellowships for following category of Students:

S. No.	Category of Students	No. of Student	Fellowship (per month)
01.	Institute Funded through MHRD grant-PHD	249	JRF- ₹ 25,000/- + HRA @ 20% SRF- ₹ 28,000/- + HRA @ 20%
02.	DST Funded (PHD)	20	
03.	CSIR Funded (PHD)	17	
04.	UGC Funded (PHD)	17	
05.	Institute Funded through MHRD grant-M. Tech.	50	₹ 12,400/- + HRA @ 20%

3.10.2. Merit cum Means Scholarship:

Institute has disbursed ₹ 99,19,539/- as Merit cum Means Scholarships to B. Tech & MSc. Students who are meeting the eligibility criteria set by Institute under various categories:

S. No.	Category	Course	No. of Students	Amount of Scholarship (in ₹)
01.	General	B.Tech.	78	59,81,185
		MSc.	9	1,35,601
02.	General (PD)	B.Tech.	1	8,415
		MSc.	-	-
03.	OBC	B.Tech.	41	26,78,853
		MSc.	4	64,687
04.	SC	B.Tech.	13	5,20,301
		MSc.	3	1,46,334
05.	ST	B.Tech.	8	3,16,747
		MSc.	2	67,416
	Total		**159**	**99,19,539**

3.10.3. Remission of Tuition Fees to Depraved Class of Students:

Institute has Remitted/disbursed ₹ 1,43,33,370/- as Remission of Tuition fees of Under Graduate Students of Depraved Class admitted in Academic Session 2016-17 as per Ministry of HRD letter F. No. 24-2/2016 TS 1 dated April 04, 2016. Students how are meeting the eligibility criteria under various categories are as under:

S. No.	Category	No. of Students	Amount of Fees Remission (in ₹)
01.	General	39	56,66,686
02.	OBC	52	86,66,684
03.	SC	-	-
04.	ST	-	-
Total Rs. ⟶		**91**	**1,43,33,370**

Summary of the Balance Sheet and Income & Expenditure is as under:

A. BALANCE SHEET AS AT 31.03.2017

(Amount in ₹)

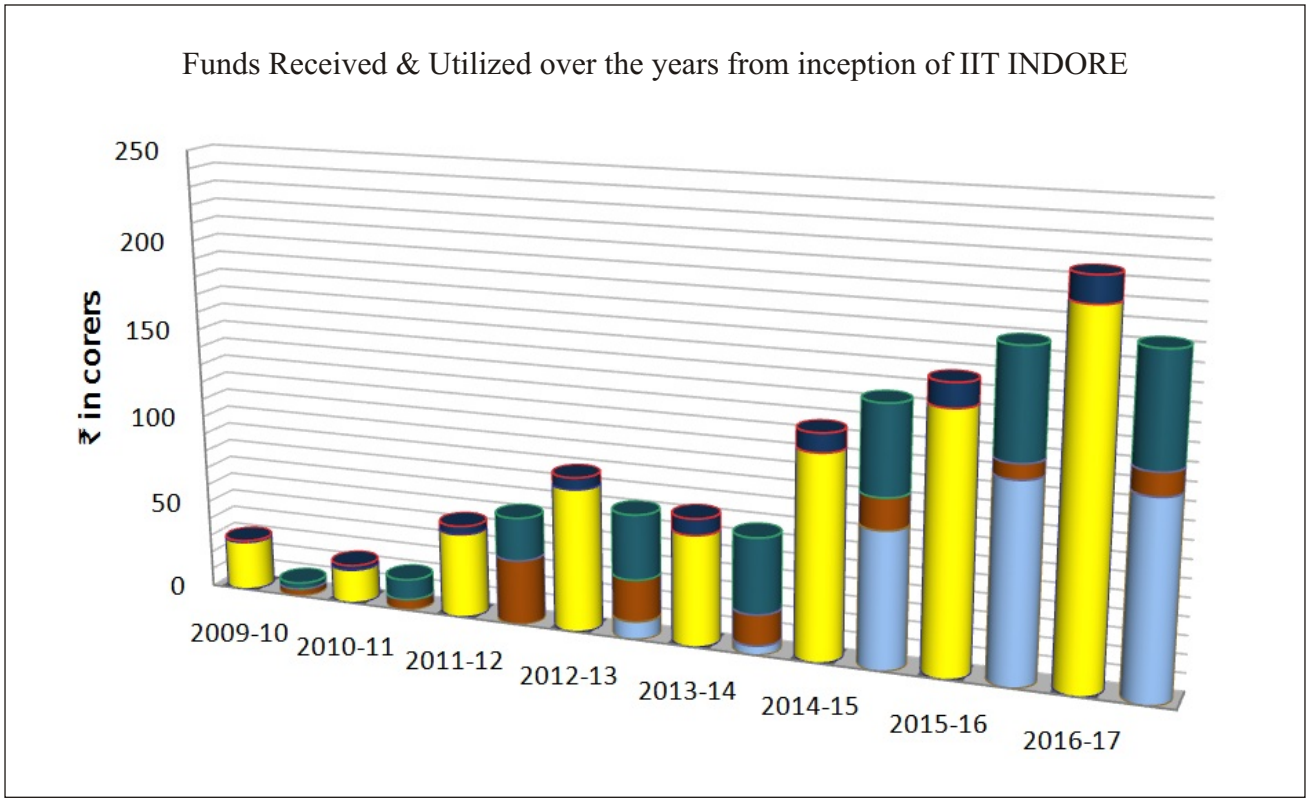
SOURCES OF FUNDS	SCHEDULE	AS AT 31-03-2017	AS AT 31-03-2016
Corpus/Capital Fund	1	4,31,10,83,703	3,08,82,65,489
Designated/Earmarked Funds	2	4,87,01,472	3,21,24,346
Current Liabilities & Provisions	3	47,40,15,389	41,80,85,762
TOTAL		**4,83,38,00,564**	**3,53,84,75,597**
APPLICATION OF FUNDS			
FIXED ASSETS	4		
A. Tangible Assets		79,24,25,016	69,98,34,883
B. Intangible Assets		36,78,959	14,88,558
C. Capital Work-In-Progress		2,89,40,68,390	1,89,74,40,939
CURRENT ASSETS	5	40,19,88,331	35,36,84,403
LOANS, ADVANCES & DEPOSITS	6	74,16,39,868	58,60,26,814
TOTAL		**4,83,38,00,564**	**3,53,84,75,597**

B. INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH'2017

(Amount in ₹)

PARTICULARS		SCHEDULE	2016-2017	2015-2016
(A) INCOME				
Academic Receipts		7	7,74,60,242	6,22,01,939
Grants & Subsidies	2,00,00,00,000	8		
Less: Capital Grants for Fixed Assets	1,13,50,00,000		86,50,00,000	43,30,00,000
Interest Earned		9	5,87,31,049	6,32,34,253
Other Income		10	68,67,242	42,94,295
Prior Period Income		11	9,10,013	4,48,433
TOTAL (A)			**1,00,89,68,546**	**56,31,78,920**
(B) EXPENDITURE				
Staff Payments & Benefits		12	25,67,21,357	21,50,47,397
Academic Expenses		13	18,79,98,498	20,52,15,624
Administrative and General Expenses		14	12,93,65,637	15,03,09,588
Transportation Expenses		15	1,39,74,812	1,00,87,528
Repairs and Maintenance		16	1,03,18,184	71,73,542
Finance Costs		17	3,109	2,781
Depreciation		4	13,46,79,687	12,21,84,139
Other Expenses		18	60,19,564	34,68,961
Prior Period Expenses		19	37,19,495	15,00,783
TOTAL (B)			**74,28,00,343**	**71,49,90,343**

Balance being excess of Income over Expenditure (A-B)		**26,61,68,203**	(15,18,11,423)
Less: (i) Transfer to Corpus fund towards Internal Revenue Generation of 2016-2017 (2015-16) (See Notes to Account - no.6)		14,37,30,372	13,24,45,286
(ii) Transfer to Corpus fund towards Internal Revenue Generation during 2009-2010 to 2014-15 (See Notes to Accounts - no.6)		-	34,49,50,825
Add: Amount transfer to Capital Fund (Depreciation)		13,46,79,687	12,21,84,139
Balance being Surplus (Deficit) Carried to Schedule 3C Unutilized Grant from Govt. of India		25,71,17,518	(50,70,23,395)



Sr. No.	Particulars		2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
1	RECEIPT	GRANT	₹ 27.78	₹ 19.15	₹ 47.47	₹ 80.00	₹ 62.00	₹ 113.45	₹ 142.80	₹ 200.00
		IRG	₹ 0.97	₹ 2.65	₹ 4.68	₹ 6.58	₹ 9.10	₹ 10.51	₹ 13.24	₹ 14.37
2	EXPENDITURE	BUILDING	₹ 0.00	₹ 0.00	₹ 0.00	₹ 9.89	₹ 4.98	₹ 75.82	₹ 109.41	₹ 107.77
		EQUIPMENT	₹ 3.99	₹ 5.98	₹ 36.36	₹ 23.54	₹ 17.29	₹ 17.39	₹ 8.46	₹ 12.54
		RECURRING	₹ 3.50	₹ 11.47	₹ 24.06	₹ 36.14	₹ 42.15	₹ 49.32	₹ 59.51	₹ 60.79

4. Material Management Section (MMS)

Material Management Section (MMS) is part of the administrative structure of the institute which is entrusted with the responsibility of procuring goods and services for all user departments to pursue academic, research and institutional activities. MMS at IIT Indore is also shouldering the task of creating and facilitating campus facilities of the institute through various contracts.

The institute policy of "buying the best" by following the Principles of Transparency, Accountability, Fair Competition and financial propriety is well documented in the "Manual and Procedure for Purchase of Goods and Services 2014" which broadly confirms the General Financial Rules (GFR) and other norms of public procurement.

During the F.Y. 2016-17 the following initiatives have been taken up to streamline the procedure and standardize practice besides adding value to the institute.

1. **Renewal of DSIR Certificate:** DSIR Renewal has been done for next five years i.e. 21/08/2021 to avail the concessional custom and excise duty. The DSIR certificate revised with the permanent address of the institute and PIN Code.
2. **E-publishing of Tenders/NITs on CPPP and E-tendering:** Completed registration has been done with CPPP for e-publish/e-tendering with publication of 73 no. of tenders for FY 16-17. All tenders/NITs/RFPs/RFQs above ` 2 Lakh on CPPP & Institute Website as per Govt. notification no. 10/3/2012 dated 09/01/2014 are being uploaded regularly.
3. **Cashless Transactions at MMS:** The MMS team took initiative to collect the EMD/Bid Security online to promote Cashless transactions. The separate link has been created at MMS webpage for online submission of EMD http://deposit.iiti.ac.in/mms/ . All the payments are released to the suppliers vis NEFT, RTGS, Wire Transfer and Letter of Credit.
4. **Tender space at website:** To enable the transparency in the procurement process separate tender page has been created with details of floated tender and MMS contact details on IITI webpage i.e. http://www.iiti.ac.in/tender_mms.php
5. **Migration of data:** Since inception, the stock ledger has been maintained manually in registers such as PIR, DIR, Non-Consumable/Asset register and Consumable. Now to simplify the data and for faster retrieval, entire data maintained/entered in various stock ledgers/registers are to be migrated into electronic mode.
6. **Software:** MMS took initiative to develop a software for streamlining the MMS activities, few of them are listed below:
   a) Issuance of Indent number for tracking of files/requisitions.
   b) Drafting of sanction proposal and draft purchase order for placement of order.
   c) Issuance of purchase order number via software to avoid any duplication, mismatch etc.
   d) Recording of stocks in software for swift retrieval of data for no-dues, departmental record, personal inventory, item wise stock etc.
   e) Generation of various documents for clearance/movement of items such as Custom Duty Exemption Certificate (CDEC), Excise Duty Exemption Certificate (EDEC), Road Permit etc.
   f) MIS reports etc.
7. **Barcoding of Assets:** Barcoding of assets has been initiated and the same is in progress along with the physical verification of assets. Meanwhile, the barcoding of chairs procured for convocation/events has been done.

8. **Manual and Procedure for Store Management:** After accessing the need of stores at Institute, development of storage center was proposed and accordingly, a detailed manual and procedure for management of Store was put up and approved in the 21st BOG Meeting held on 11/03/2017.
9. **Development of Storage Centre:** As the institute is far off the city and to cater the daily requirement of IITI Community development of a storage center was proposed by MMS. Detailed proposal with requirement of location, area, space and layout for development of storage center has been finalized and approved by the 31st BWC meeting at Point No. 31.6 the final proposal is with Estate section for further processing.
10. **Streamlining of Project Indents:** Separate series for indents and purchase order under projects has been streamlined.

Value Added Services:

1. **Furnishing of Guest House:** MMS was assigned a specific task of furnishing of 25 rooms at Studio Apartment within a time frame and the task was accomplished well within a time frame. Few of the activities pertaining to the furnishing are mentioned below:
   a) Planning of guest house inventory matching with VIP Suits of recognized hotels of Indore.
   b) Market survey and price rationalization of items
   c) Sourcing of items from Rate Contract, Local Market confirming approved samples
   d) Execution, arrangement of materials as per layout at shortest available time (48 hrs.)
   e) Mobilization of institute resources for arrival, stay and academic events.

2. **Green Campus Initiative:** MMS team took initiative and interacted and conducted prebid meeting for accessing the suppliers for green vehicle across India. The order was placed for a fleet of Green vehicles after rounds of meetings and discussions at reasonable price. The special arrangements of logistics of Green Vehicles in absence of any unloading facility such as
   a) Ramp
   b) Material handling tools etc.

   The vehicles are being used widely for intra campus movement.
3. **Demonstration of Advance Life Support Ambulance:** The procurement of Advance Life Support Ambulance was finalized after the arrangement of demonstration of features and functionality of ambulance etc. MMS team was rigorously involved in finalization of design of body graphics; follow up of delivery, inspection of ambulance, assistance in pre-dispatch and post-dispatch inspection etc. This world-class facility is unique in the Institute.

4. **Standardizing furniture:** Standardizing furniture for labs, office space, hostels etc. B scrutinizing and by facilitating the institute Furniture Committee.

5. **Other major activities:**
   i. Shifting of hostel from Silver Spring to Simrol Campus- monitoring repair, upkeep and return to owners of 41 houses.
   ii. Furnishing of Hostel Building- as preparedness to accommodate new batch of students.

iii. Disposal of 02 Buses- task completed through open tender

iv. Disposal of scrap at PACL - task completed through open tender to salvage the scrap value and optimize space.

v. Disposal of scrap at Silver Spring has been completed.

vi. Facilitated the procurement of Tractor, Tanker, Trolley and E-cart on fast track for horticulture and landscaping

vii. Furnishing of health Centre at Hostel Building Simrol- physiotherapy unit for students

viii. Furnishing of Classrooms at Academic Pod with furniture & fixtures

ix. Event Management:

a. Convocation 2016

b. Fluxus- Students venture

c. Industry Academia Conclave

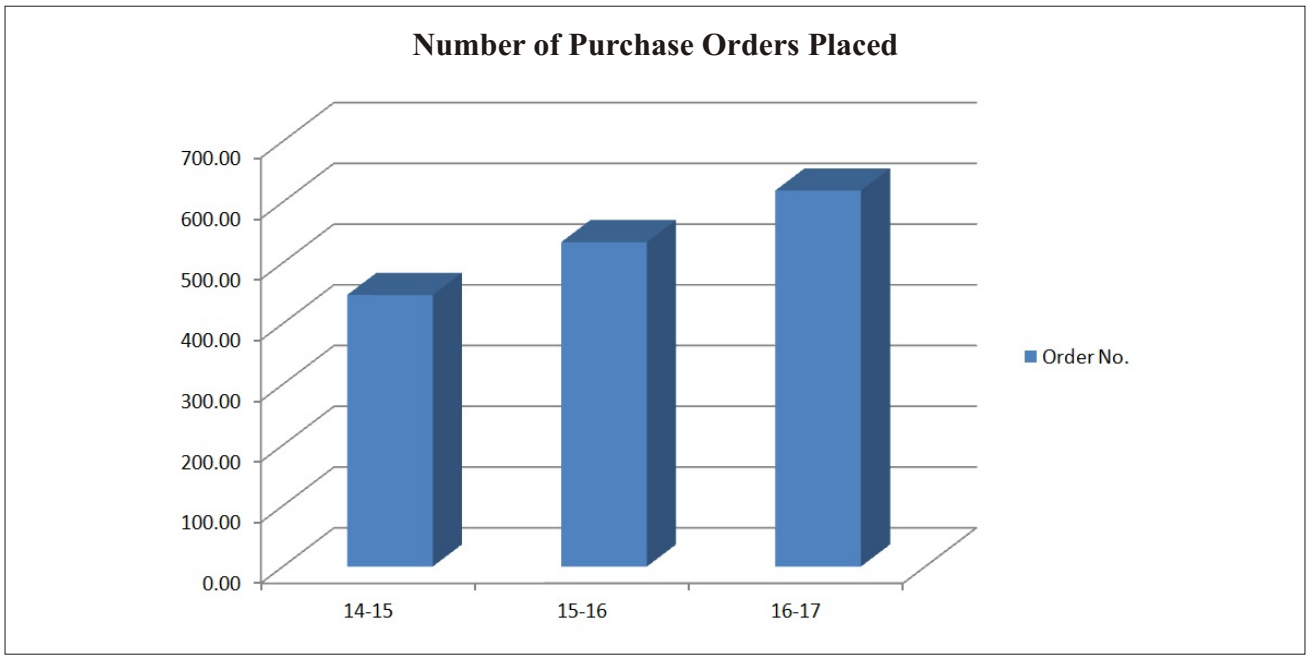
d. TU9 Submit- Printing, designed and customized items and coordinated delivery in desired location abroad

15. Activities of MMS during 2016-17 at a glance:

Sl.No.	Details	Remarks	Value in `
1	**Total Purchase Order Issued**	**619**	19,32,04,477.00
2	**Total Import Order issued**	**45**	3,80,57,542.00
3	**Total Indigenous Order**	**574**	15,51,46,935.00
4	**Total Order Under LPC**	**510**	**6,76,00,963.00**
5	**Total Order Under Limited tender**	**51**	**4,63,04,245.00**
6	**Total Order Under Open Tender**	**15**	**3,61,04,441.00**
7	**Total Order Under Rate Contract**	**28**	**2,50,20,199.00**
8	**Total Order Under PAC**	**11**	**1,66,04,142.00**
9	**Total Order Under Repeat Order**	**02**	**15,70,487.00**
10	**Total CDEC**	**180**	**Total 180 Custom duty exemption certificates were issued in FY 16-17**
11	**Total EDEC**	**78**	**Total 78 excise duty exemption certificates were issued in FY 16-17**
12	**Total Road Permit**	**334**	**Total 334 road permits were issued in FY 16-17**
13	**Stock Entries completed for inventory**	9184	**Direct Purchase- 5825** **Purchase Order- 1073** **Advance Settlement- 1456** **CPDA- 334** **General Reimbursement- 396** **Imprest- 77** **Other 23**

14	Service Order Issued	1. Rate Contract for Advertisement 2. Rate Contract for Stationery & Office Consumables 3. Rate Contract for Hiring of Vehicle 4. Rate Contract for Courier Services 5. Rate Contract for C&F 6. Rate Contract for Medicine 7. Rate Contract for Furniture 8. Rate Contract for Travel Desk Facility 9. Insurance of Fixed Asset 10. RC Hotel Accommodation & Food Services 11. Rate Contract for Computer & Accessories 12. Set up of Food Joints 13. Security & Surveillance Services 14. Manpower Services
15	Total Prebid Presentation & Demonstration conducted for procurement of Various items/services:	1. Networking Device 2. Hostel Furniture- Cot, Almirah & Table 3. Ambulance ACLS 4. Chemistry Lab Set up 5. Equipment for Civil Engineering Lab 6. Equipment for MEMS Lab 7. Patrolling Vehicle 8. Green Vehicle 9. Classroom Desk & Infrastructure 10. Mini Refrigerator to hostel 11. Bed, Table, Chest Drawer, Almirah & Dressing Table for Set Up of Guest House 12. Hostel Furniture- Cot, Almirah & Table 13. Real Time Digital Power System Simulator 14. Catering Services 15. Security & Surveillance Services 16. Housekeeping Services-Cleaning Capability & Skill in Mechanized wash 17. Portable FFT Data 18. Replacement of Office Car 19. I P Telephony

16. Graphical representation of Data:



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