ANNUAL REPORT

2018-19

INDIAN INSTITUTE OF TECHNOLOGY MANDI

Kamand– 175075, Himachal Pradesh, India

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VISION

To be a leader in science and technology education, knowledge creation and innovation, in an India marching towards a just, inclusive and sustainable society.

MISSION

- To create knowledge through team effort and individually for the benefit of society.
- To impart education to produce professionals capable of leading efforts towards innovative products and processes for the development of the Himalayan region in particular and our country and humanity in general.
- To inculcate a spirit of entrepreneurship and to impart the ability to devise globally recognized solutions for the problems of society and industry, particularly in the fragile eco-system of the Himalayas.
- To train teachers capable of inspiring the next generation of engineers, scientists and researchers.
- To work intensely with industry in pursuit of the above goals of education and research, leading to the development of cutting edge and commercially-viable technologies.
- To operate in an ambience marked by overriding respect for ability and merit.

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From the Director's Desk

Starting literally from a green field in 2009-10, in the past 10 years we have come a long way towards our long-term goal of being the best in the world in some respect. Our 10th year saw rapid expansion of IIT Mandi with many buildings being completed in the South and North Campus. The Construction Materials Lab and the Environmental Engineering Lab represent a major step forward in Civil engineering teaching and research.

In 2018-19, we started 3 new M.Tech/M.A. programmes: M.Tech. in Structural Engineering and in VLSI and notably, the first degree programme in HSS, the MA (Development Studies), was started with 12 students. The year 2018 saw an increase of 280 students to reach a total of 1281. Our faculty and research scholars won several awards including membership of the Indian National Young Academy of Sciences, DBT Innovative Young Biotechnologist Award, and several best paper awards in international conferences. Also, IIT Mandi was the leader in 2018 with 19% females in 1st B.Tech.

Since 2011, IIT Mandi has forged a strong partnership with the TU9 in Gemany. This involved significant mobility of faculty and students and joint research. Consequently, in 2018-19, IIT Mandi gained significant national recognition by being nominated as the nodal institution for Germany in the nationwide SPARC programme of MHRD. There was a significant increase in outreach activities benefiting the people of Himachal. This includes about 6 applied R&D projects sponsored by the HP Government and IIT Mandi.

In October 2018, IIT Mandi scored an impressive hat-trick in our new 750-seat Auditorium. From October 21st to 23rd, we hosted the 3rd Himachal Science Congress in cooperation with HIMCOSTE. This event saw the Auditorium packed to capacity for the inauguration, with 380 participants. On 29th October, our 6th Convocation was held in the Auditorium, indoors for the first time. The graduands were inspired by the speeches of Prof. Ashok Jhunjhunwala, Chief Guest, and Mr. Sonam Wangchuk who was awarded Eminent Himalayan Technologist 2018 by IIT Mandi. The 3rd event in the Auditorium was the International Workshop on 2D-3D Nano-Bio Materials & Devices on 31st October to 2nd November. Inaugurated by Mr. R. Subramanyam, Secretary, MHRD, this event featured over a dozen eminent speakers from US, Singapore, Taiwan and Germany, plus over 100 participants from India.

In December 2018, our contingent won 5 medals in athletics in the Inter-IIT Sports Meet in IIT-Guwahati. It is noteworthy that 3 of these were won by two PG women.

In 2018-19, our Green Committee led the 1st B.Tech. students in planting 700 trees in the North Campus. Both campuses saw 13,000 new shrubs planted. An almost complete ban on the use of disposable cups and plates in the canteens and offices was implemented.

The faculty, students and staff of IIT Mandi worked hard during 2018-19 on the challenge of making IIT Mandi a preferred destination for high-quality learning, research and innovation. Their new initiatives during the year will surely bear rich fruits during the years to come.

Prof. Timothy A. Gonsalves
Director

1. Academic Structure

Academic activities including Teaching, Learning and Research are carried out in three orthogonal but complementary structures. These are Academic Schools, Student Degree Programmes and Research Groups. Each of these is designed to serve a distinct purpose. The three interact in flexible ways to best achieve the academic goals of the Institute. The structure encourages inter-disciplinary learning and research that evolves in step with the march of technological innovation.

1.1 Schools

Faculty members belong to broadly and loosely defined Academic Schools. Each School provides a home base for faculty whose interests share some fundamental academic principles. Some faculty members also have joint appointments in other Schools. By broadly grouping faculty members into Schools, IIT Mandi has avoided traditional departments and divisions within the Institute. This has been done with a view to actively foster an interdisciplinary culture and collaborative research and projects across disciplines within the Institute.

Currently, the Schools in the Institute are:

School of Computing and Electrical Engineering (SCEE)
Faculty members in the broad areas of Computer Science, Computer Engineering, Electrical Engineering including Electronics and Semiconductors, Signal Processing, Automation and Control and Electrical Energy Systems are part of this School.

School of Engineering (SE)
Faculty members from other areas of Engineering including Mechanical Engineering and Civil Engineering, Material Science are part of this School.

School of Basic Sciences (SBS)
Faculty members from all areas of basic sciences, including Physics, Mathematics, Chemistry and Biology are part of this School.

School of Humanities and Social Sciences (SHSS)
Faculty members from English, German studies, Economics, Sociology, Psychology, Management, History and other areas of Humanities and Social Sciences are part of this School.

1.2 Degree Programmes

1. Bachelor of Technology (B.Tech) in the following engineering disciplines
   a) Civil Engineering (CE)
   b) Computer Science & Engineering (CSE)
   c) Electrical Engineering (EE) and
   d) Mechanical Engineering (ME)
2. M.S. (by Research) in the following engineering disciplines
   a) Computer Science and Engineering
   b) Mechanical Engineering
   c) Electrical Engineering
3. Ph.D. in Engineering, Basic Sciences and Humanities & Social Sciences
4. M.Sc. in Chemistry
5. M.Sc. in Applied Mathematics
6. M.Sc. in Physics
7. M.Tech in Mechanical Engineering with Specialization in Energy Systems
8. M.Tech in Energy Engineering with Specialization in Materials
9. M.Tech. in Structural Engineering
10. M.Tech in in VLSI
11. M.Tech. in Power Electronics and Drives
12. M.Tech. in Communications and Signal Processing
13. M.Tech in Biotechnology
14. I-Ph.D. (Physics)
15. Master of Arts in Development Studies

1.3 Students Statistics by Batch, Gender and Category

	2011-12		2012-13		2013-14		2014-15		2015-16		2016-17		2017-18		2018-19	
By Gender	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	2	0	4	1	8	4	24	10	161	33	205	35	265	81	367	106

	B.Tech					M.Sc.(Chemistry/Maths/Physics)					M.Tech				
Year	Gen	OBC	SC	ST	Total	Gen	OBC	SC	ST	Total	Gen	OBC	SC	ST	Total
2011	--	--	1	--	1	--	--	--	--	--	--	--	--	--	--
2012	--	1	--	--	1	--	--	--	--	--	--	--	--	--	--
2013	--	--	1	--	1	--	--	--	--	--	--	--	--	--	--
2014	2	--	--	--	2	--	--	--	--	--	--	--	--	--	--
2015	63	36	22	10	131	--	--	--	--	--	--	--	--	1	1
2016	73	40	23	11	147	--	--	--	--	--	1	1	--	--	2
2017	73	39	23	11	146	29	14	11	1	55	41	15	6	0	62
2018	94	53	29	15	191	36	27	13	3	79	68	24	7	2	101
GRAND TOTAL					620					134					166

	M.S.					Ph.D.					I-Ph.D.				
Year	Gen	OBC	SC	ST	Total	Gen	OBC	SC	ST	Total	Gen	OBC	SC	ST	Total
2011	--	--	--	--	--	--	--	1	--	1	--	--	--	--	--
2012	--	--	--	--	--	3	1	--	--	4	--	--	--	--	--
2013	--	--	--	--	--	8	1	--	--	9	--	--	--	--	--
2014	--	--	--	--	--	22	5	1	--	28	--	--	--	--	--
2015	3	--	--	--	3	38	10	2	--	50	5	1	--	--	6
2016	7	2	--	--	9	54	14	8	--	76	4	--	--	--	4
2017	8	3	1	0	12	44	11	4	--	59	4	2	--	--	6
2018	20	2	0	0	22	52	5	4	--	61	--	--	--	--	--
GRAND TOTAL					46					288					16

	M.A.					Part-Time/ERP (M.S./Ph.D.)				
Year	Gen	OBC	SC	ST	Total	Gen	OBC	SC	ST	Total
2013	--	--	--	--	--	2	--	--	--	2
2014	--	--	--	--	--	3	1	--	--	4
2015	--	--	--	--	--	3	--	--	--	3
2016	--	--	--	--	--	1	1	--	--	2
2017	--	--	--	--	--	3	2	1	--	6
2018	8	2	2	0	12	6	1	--	--	7
GRAND TOTAL					12	GRAND TOTAL				24

2. Project Oriented B.Tech. Curriculum

Historically, the IITs had a B.Tech. curriculum that was aimed at training experts in each specific branch for a career in research or engineering in the branch. The curriculum had a large and strong core covering all sub-areas of the branch in depth. There was also a substantial component in basic sciences and engineering fundamentals. The courses were carefully sequenced with the assumption that all students would take them in lock-step. With changes in society and the nature of technology, IIT Mandi has taken a fresh look at the B.Tech. curriculum. As an Indian Institute of Technology, it is our duty to train leaders for the growth of India with a strong technology focus. The necessary and desirable characteristics of our B.Tech. graduates are:

- Self-motivated with a passion to do something useful.
- The ability to learn quickly and devise innovative solutions.
- The ability to work hard, in a focused and disciplined manner.
- A solid foundation in basic principles and substantial practical hands-on experience.
- Sufficient specific knowledge to be immediately productive.
- The ability to communicate effectively and work with others.
- With these characteristics, our graduates can be expected to make their mark, enhance IIT's reputation and recompense the nation for its investment in their education.

The foundations of all B.Techs. are: Facility in design and innovation; strong understanding of common scientific and engineering principles and methods; and breadth of knowledge outside science and engineering i.e. in the humanities, social sciences and management.

Next is the core of knowledge in the student's chosen branch. This is kept to the bare minimum, with principles and techniques being learnt in theory courses, in labs or in practicums. Finally, we have a large number of specialist baskets. Many of these are interdisciplinary. In each basket, the horizontal line divides the basic from the advanced courses. The boundaries in the curriculum diagram have deliberately been drawn in a vague and overlapping manner. This is to emphasize the flexibility and the inherently inter-disciplinary nature of tomorrow's B.Tech. graduate.

2.1 Design Practicum 2019

IIT Mandi running unique flagship U. G. course named as “Design Practicum (DP)”. In this course, second year level B.Tech students learn product design and development skills. This course is designed to connect the technological knowledge with social issues in day to day life, like pollution (air, water & noise), sanitation, claimant change, public security & safety, health, agriculture etc. In this regard, interdisciplinary teams of five to six students, randomly selected from different branches, propose product ideas and then build working prototypes. There are a total of 25 teams (150 students) participating in DP. The expected learning outcomes of this program are the ability to

work in interdisciplinary teams, coordination, delegation, leadership, technical learning, planning and integrity, learning by mistakes and team work. Many of these innovative low cost product ideas are derived from the needs of the society.The products successfully built and demonstrated in the previous years include a wall climbing robot, fire-fighting robot, gesture-controlled 3-D hologram, automated ration vending machine etc. Such products have huge potential to be used in public safety, security and defence for saving the valuable human life.

Some Pictures of Open House Design Practicum – 2019

Figure: (a) ***Railway track crack*** *detection bot (b) automatic colour, size and quality sorting of apples machine named* ***Apple sorting Machine*** *and (c)* ***E-Toilet:*** *Disinfection of toilet seat using ultra violet radiations targeted for public toilets in India (mainly for women).*

Around 200 local school children (10th to 12th standard) and teachers witness the DP Open house 2019, IIT Mandi outreach program to inspire, motivate young minds and witnessed the good quality expertize of IIT Mandi students. Their scientific, technological approach will overcome the social problems with innovative solutions.

2.2 Interactive Socio-Technical Practicum (ISTP)

IIT Mandi has a unique course curriculum wherein an interdisciplinary academic culture is encouraged and the curriculum is substantially oriented towards design and innovation. One of the courses under the design and innovation stream is the Interactive Socio-Technical Practicum (ISTP), which is offered to 3rd year B.Tech. students. Every year, a team of students from the Worcester Polytechnic Institute (WPI), USA, visits the IIT Mandi campus for two months to work on joint projects with social relevance. Student teams engage in extensive field-work before assessing a specific real-world problem from all dimensions and proposing technological solutions for the same.

In 2019 there were 13 ISTP projects involving 54 IIT Mandi students, 25 WPI students, 2 WPI faculty mentors, 17 IIT Mandi faculty mentors, and 2 NGO partners. A panel of judges awarded the first prize to the project titled 'Assessing the 'Smart Village Potential' of Villages in Mandi District'. The second prize was awarded to the project titled 'An Overview of the Needs and Requirements of Persons with Disabilities in Kamand Valley'. The popular choice award, based on audience members' votes, was awarded to the project on 'Evaluating Waste Management Practices of IIT Mandi campus'.

Detailed information about the modalities of the course and all project reports are available here: http://www.iitmandi.ac.in/ISTP/

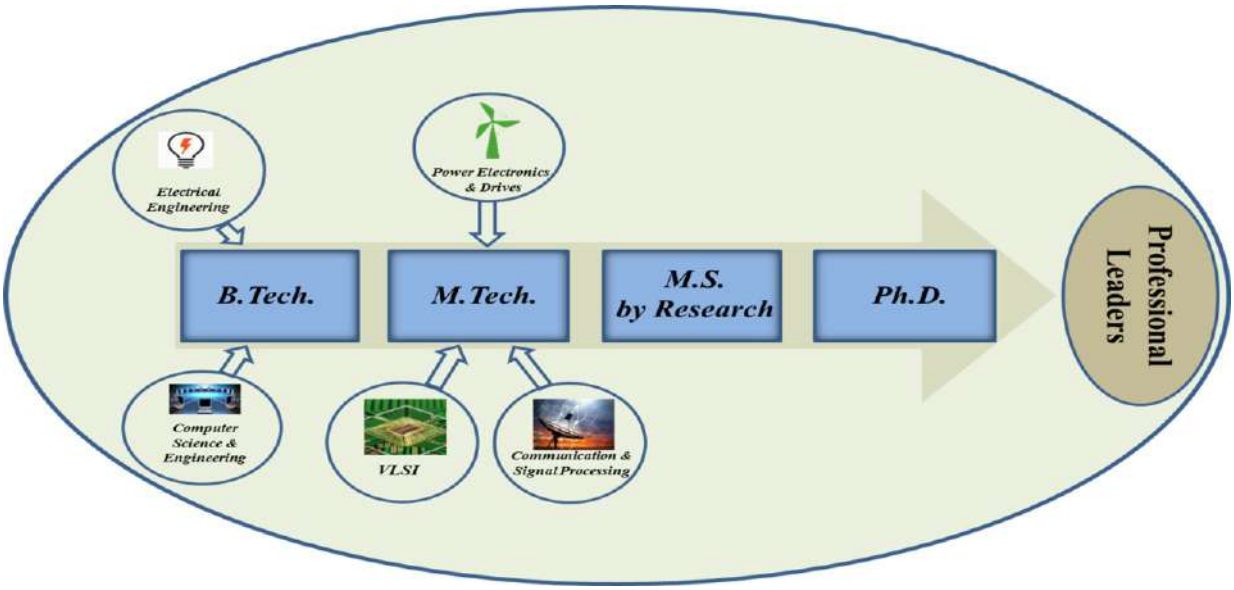
3. Academic Schools

3.1 School of Computing and Electrical Engineering (SCEE)

The School of Computing and Electrical Engineering (SCEE) of IIT Mandi aims to maintain excellence in teaching and research in technologies related to Computing, Communication, Electronics and Electrical Engineering.

The School of Computing and Electrical Engineering has 33 Faculty members, 5 Staff Members, 69 Ph. D Students, 22 Masters students and 385 B.Tech Students. It has five broad areas namely Power Electronics & Drives, Controls & Sensors, VLSI, Signal Processing and Communications, Computer Science & Engineering.

The School offered two UG degrees namely B.Tech. in Computer Science & Engineering and Electrical Engineering. The School has three M.Tech. program namely in Power Electronics and Drives, Signal Processing & Communications, and VLSI in addition to regular Ph.D and MS by Research programs.



Degree programs offered by SCEE, IIT Mandi

Various programs in SCEE with their intake capacity and start of year

Program	Year of start	Intake Capacity
B. Tech. (Compute r Science & Engineering)	2009	58
B. Tech. (Electrical Engineering)	2009	55
M. Tech. (VLSI)	2016	30
M.Tech. (Communication & Signal Processing)	2017	30
M. Tech. (Power Electronics & Drives)	2017	30
M.S. by Research	2010	As per the requirements
Ph.D.	2010	

The area of research covers a broad spectrum of theoretical and application-based topics such as: smart grid, renewable energy, materials for efficient semiconductor devices, next generation communication and efficient human-computer interaction etc.

At the undergraduate level, we emphasize the hands-on learning approach by providing students with a firm foundation of both the theory and practice of Computer Science and Electrical Engineering. We also have joint faculty positions with the School of Basic Sciences and School of Humanities to expose students to the social, ethical, and liberal education to make significant contributions to the society.

At the post-graduate level our faculty provide a deeper mastery of the basics and opportunities for research and professional development for students in the field of Computer Science and Electrical Engineering.

Our faculty members are engaged in both practical and theoretical research, often in partnership with government agencies, private industry and non-governmental organizations. National and international collaborations are one of the prime focus of the faculty. This aims towards advancement of knowledge within our disciplines and also to contribute to society.

School received Rs. 3,08,56,344/- worth of External Funding in the year 2018-19. There were around 70 Journal Papers, 91 Peer Reviewed Conference Papers, 11 book/book chapters and 4 patents filed from the School in the year 2018-19

For more information
Website: http://iitmandi.ac.in/Schools/SCEE/index.php

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Research Projects

Externally Sponsored Research Projects

S. No.	Project Title	Sponsoring Agency	Investigator	Amount Sanctioned (In Rs.)	Duration of Project
1	Development of low cost accelerated water purification systems with added mineralisation for himalayan region Date of Sanction: 01.04.2018 Date of Completion: 27.09.2021	NMHS	Dr. Jaspreet Kaur Randhawa (PI) Dr. Bharat Singh Rajpurohit, Dr. Samar Agnihotri (Co-PI's)	40,66,000	3 Years
2	High Energy and power density hybrid density hybrid supercapacitors for Grid scale energy storage Date of Sanction: 01.05.2018 Date of Completion: 30.04.2020	SERB	Dr. Rudra Kumar (PI) Dr. Satinder Kumar Sharma (Mentor)	19,20,000	2 Years
3	Deployment of sensors for landslide monitoring and early warning Date of Sanction: 15.06.2018 Date of Completion: 14.06.2019	Deputy Commissioner Mandi (H.P.)	Dr. Varun Dutt (PI) Dr. Venkata Uday Kala (Co-PI)	2,99,750	1 Year
4	Design and implementation of a cyber-physical system for high through put phenotyping & real time management of crops in the himalayan region Date of Sanction: 01.04.2018 Date of Completion: 31.03.2023	DBT	Dr. Srikant Srinivasan	32,50,000	5 Years
5	Design and fabrication of an interface ASIC for a vibratory gyroscope sensor application Date of Sanction: 22.11.2018 Date of Completion: 21.11.2020	ISRO	Dr. Satinder Kumar Sharma (PI)	45,76,000	2 Years
6	Water and energy efficient reliable irrigation system (watEr-ERIS): Solar energy and cloud-based decision support systems for automated irrigation system Date of Sanction: 15.01.2019 Date of Completion: 14.01.2022	SERB (IMPRINT-2)	Dr. Kasiviswanathan KS (PI) Dr. Subhamoy Sen, Dr. Tummuru Narsa Reddy (Co-PI's)	74,54,071	3 Years
7	Point of care monitoring of neuro-vascular interaction (Especially inverse neurovascular coupling) during spreading depolarization's in brain trauma using simultaneous recording of EEG & NIRS Date of Sanction: 14.09.2018 Date of Completion: 13.09.2019	DST	Dr. Shubhajit Roy Chowdhury (PI) Dr. Dheeraj Khurana (Co-PI) PGI Chandigarh	24,68,732	1 Year

8	Development and deployment of low-cost lanslide monitoring & waring system in District - Sirmour (H.P.) Date of Sanction: 17.01.2019 Date of Completion: 16.01.2020	DC office Sirmour(H.P.)	Dr. Varun Dutt (PI) Dr. K.V. Uday (Co-PI)	4,01,500	1 Year
9	Development of high accuracy of high machine learning diagnostics for pest and disease management for agricultural crops Date of Sanction: 25.03.2019 Date of Completion: 24.09.2022	Arnetta Technologies Pvt. Ltd	Dr. Srikant Srinivasan (PI), Dr. Anil Kumar Sao (Co-PI), Dr. Dileep A.D (Co-PI)	3,00,000	6 Months
10	POWER: Platform for open WLAN experimentation and research Date of Sanction: 28.03.2019 Date of Completion: 27.03.22	SERB (IMPRINT-2)	Dr. Samar Agnihotri (PI) from IIT Mandi and Dr. Mukulika Maity from IIIT Delhi, Dr. Venkatesh Ramaiyan from IIT Chennai, Prof. Joy Kuri from IISc Bangalore as (Co-PI's)	92,35,600	3 Years

Seed Grant Projects

S. No.	Projects Title	File No.	Investigator	Amount Sanctioned (In Rs.)	Duration of Project
1	ASIC implementation of hardware-efficient & low-power spectrum sensor based on cyclosationary feature detection for congnitive radio mobile-broadband system Date of Sanction: 12.04.2018 Date of Completion: 11.04.2021	IITM/SG/RSh/64	Dr. Rahul Shrestha	10,00,000	3 years

Sponsored Consultancy Research Projects

S.No.	Proposal Title	Faculty name	Agreement signed with	Amount Sanctioned (In Rs.)	Duration of Project
1	Turbo encoder/decoder IP core for OFDM transceiver Signing Date: 21.12.2018 Completion Date: 20.04.2019	Dr. Rahul Shrestha	Mr. Vijay Ananth K. Data Patterns (India) Pvt. Ltd., Chennai	9,51,080	4 Months

Dr. Shubhajit Roy Chaudhury
Product: Non invasive glucometer in the process of technology transfer.

Dr. Arti Kashyap
Eco- friendly Utilization of hazardous Pine Needles for social benefits through making briquettes:

Description: Pine needles cause a major threat to the environment, biodiversity and local economy in the entire Himalayan region due to their non-bio-degradability and highly-inflammable nature. In this project, utilization of pine needles by the pellatization/ briquetting in conjunction with various biomasses is the central focus for social benefit.

UHL has already been successful in preparing the briquettes as well as pellets of dry pine needle and its various forms by mixing other constituents. The center has its own set up in IIT Mandi campus. The briquetting unit set up in our campus has the capacity of 150kg/hour with a connected load of 12 HP. The cost of the unit is around six lacks.

We had proposed our technology to HP forest department and now forest department is providing 50% subsidy to the local entrepreneur for setting up briquettes unit.

Dr. Gopi Shrikanth Reddy

Design of Dual band microwave absorber with incident angle independence of more than 45°.

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2. P. Kumar, S. Thakor, "Performance of OFDM-FSO link with Analog Network Coding," in Photonic Network Communications, Journal Photonic Network Communications, vol. 35, no. 2, pp. 210-224, 2018.
3. Rahul Shrestha and Abhijit Sahoo, “High-Speed and Hardware-Efficient Successive Cancellation Polar-Decoder,” IEEE Transactions on Circuits and Systems II: Express Briefs, Early Access (D.O.I:10.1109/TCSII.2018.2877140), October-2018.
4. Mahesh S. Murty and Rahul Shrestha, “Reconfigurable & Memory-Efficient Cyclostationary Spectrum Sensor for Cognitive-Radio Wireless Networks,” IEEE Transactions on Circuits and

Systems II:Express Briefs, Volume: 65, Issue: 8, pp. 1039-1043, August-2018.

5. Mahesh S. Murty and Rahul Shrestha, "Hardware Implementation and VLSI Design of Spectrum Sensor for Next-Generation LTE-A Cognitive-Radio Wireless-Network," IET Circuits, Devices and Systems, Volume: 12, Issue: 5, pp. 542-550, August-2018.
6. Kumar, M., & Dutt, V. (2019). Alleviating misconceptions about Earth's climate: evidence of behavioral learning in stock-and-flow simulations. System Dynamics Review.
7. Sangar, S., Dutt, V., & Thakur, R. (2019). Comparative Assessment of Economic Burden of Disease in Relation to Out of Pocket Expenditure. Frontiers in public health, 7.
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Patents

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40. A. Thakur, Pulkit Sharma, Vinayak Abrol, Padmanabhan Rajan. ``Compressed convex spectral embedding for bird species classification", Proc. ICASSP 2018 pdf
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53. All-Conv Net for Bird Activity Detection-Significance of Learned Pooling: Arjun Pankajakshan, Anshul Thakur, Daksh Thapar, Padmanabhan Rajan and Aditya Nigam, in INTERSPEECH-2018.
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87. Shikha Gupta, K. De, A. D. Dileep and T. Veena, "Emotion Recognition from Varying Length Patterns of Speech using CNN-based Segment-Level Pyramid Match Kernel based SVMs", National Conference on Communications (NCC 2019), Indian Institute of Sciences, Bangalore, India , February 2019.
88. V. Spoorthy, Veena Thenkanidiyoor, A. D. Dileep, "SVM Based Language Diarization for Code-Switched Bilingual Indian Speech Using Bottleneck Features", The 6th Intl. Workshop on Spoken Language Technologies for Under-Resourced Languages, Gurugram, India, 132-136, September 2018.
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90. S. Kumar, N. Muthiyan, Shaifu Gupta, A. D. Dileep and A. Nigam, "Association Learning based Hybrid Model for Cloud Workload Prediction," 2018 International Joint Conference on Neural Networks (IJCNN), Rio de Janeiro, pp. 1-8, June 2018.
91. K. Sharma, Shikha Gupta, A.D Dileep, R. Rameshan, "Scene Image Classification using Reduced Virtual Feature Representation in Sparse Framework", ICASSP 2018 Calgary, Alberta, Canada, June 2018.

Outreach/Continuing Education Activities Organized: (Workshops/ Conferences etc.)

1. Expert sessions delivered: "Introduction to Hadoop ecosystem and MapReduce programming model for Data Processing" and "Introduction to Apache Spark for stream / batch processing with case study / demo" as part of DST Sponsored Training Programme on “Big Data Management & Comprehensive Analysis” under the Scheme “NATIONAL PROGRAMME FOR TRAINING OF SCIENTISTS & TECHNOLOGISTS WORKING IN GOVERNMENT SECTOR” at C-DAC Mohali on Feb 14, 2019.
7. Venue: Government Engineering College Jhalawar, Rajasthan Date: 17-21 Dec, 2018.
8. Organizing Committee members of Interspeech 2018 Program Interspeech 2018, Hyderabad, 2-6 September 2018 Responsibility: Registration and Finance.
9. Invited Speaker Topic: AI and Machine learning in Agriculture Venue: Central Potato Research Institute, Shimla Date: 26 July 2018.

2. Innovation Hackathon organized during the period April 07-15, 2018.
3. Xilinx workshop on FPGA based system synthesis during October 13-15, 2018.
4. NMHS workshop on Water Filtration Techniques Based on Solar Energy from 11th to 13th February 2019.
5. Workshop Speaker Topic: Machine learning and deep learning, Venue: International Conference on Computational Intelligence in Data Science, SSN College of Engineering, Chennai Date: 21 Feb 2019.
6. Faculty Development Program (FDP) Resource Persons FDP on Machine Learning
10. Organizer and Workshop Speaker Workshop: International Workshop on Applied Deep Learning, SCEE, IIT Mandi Date: 16-20 July 2018.
11. Invited Speaker Venue: National Conference on Emerging Trends in Science and Engineering (NCETSE 2018), Shri Madhwa Vadiraja Institute of Technology & Management, Bantakal, Udupi, Karnataka Date: 28 April 2018.
12. Faculty Development Program (FDP) Speaker Program: FDP on Machine Learning and Applications Venue: ABV – Indian Institute of Information Technology and Management Gwalior Date: 29 March 2018.

13. Himachal Pradesh Science Congress Panelist on "Rural Upliftment through science and technology interventions" and conducted workshop on Precision Agriculture at IIT Mandi.

14. Organized the AI in Agriculture session at the Pan-IIT conclave held on January 2019 in IIT Delhi.

Winter School on Cognitive Modelling from 4th February to 10th February

The event was attended by national and international researchers and professionals who trained students and professors on the best practices in the area of cognitive modelling. Cognitive Models are essentially theories of how people think and make decisions, implemented through computer simulations. Integrating Artificial Intelligence (AI) and Machine Learning, cognitive modeling studies human cognition by creating models of behavior in both basic and applied domains. Cognitive models can aid researchers to understand how people make decisions in novel situations such as driving a car or trading in a stock market. These decisions are often based on prior experiences and emotions. Cognitive models can also be used to explain how people make errors while performing in a number of decision tasks. Some of these tasks may involve allocation of resources, control of quantities to goals, negotiations among several individuals, and making choices in real-world situations involving risk. "The AI and Cognitive Modeling fields will see rapid growth in a world where computing technology is growing exponentially due to Moore's Law," said Timothy A. Gonsalves, director, IIT Mandi. Low-cost landslide monitoring technology and the Farmer Zone project are among two of several examples of how IIT Mandi is leading AI initiatives for the benefit of the Himachal Pradesh and India. The Cognitive Modelling Winter School at IIT Mandi is based on pedagogic models established in the US (Carnegie Mellon University's yearly ACT-R Summer School) and the Netherlands (University of Groningen's yearly Cognitive Modelling Spring School). Seventy-five applicants have been shortlisted for this year's Winter School at IIT Mandi.

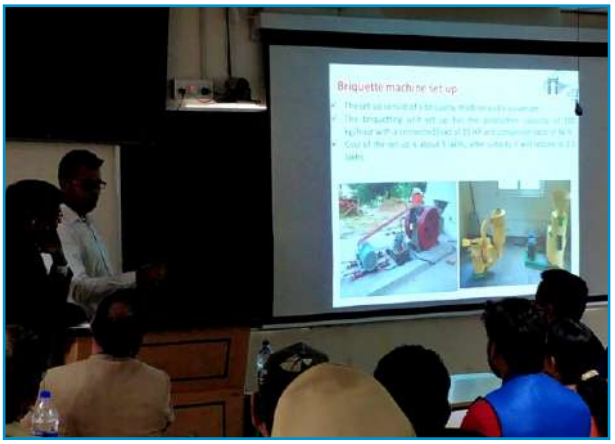
- A two day workshop on Deep Learning, at Amrita Viswavidyapeetham, Kollam, Kerala, January 2019. A talk on Deep Learning, at School of Engineering, Cochin University of Science and Technology, January 2019 A talk on bioacoustics, IISER Mohali, November 2018.
- A talk on bioacoustics, IISER Tirupati, March 2019 A talk on dictionary learning, Naval Physical and Oceanographic Lab, DRDO, Kochi, August 2018.
- Program co-chair for Medimage 2018 workshop, held in conjunction with ICVGIP 2018.
- Invited speaker at workshop for machine learning for medical image analysis (WMLMIA) at IIT Kharagpur.
- Invited speaker at workshop on deep learning for signal processing at Amrita Vishwa Vidyapeetham.
- Invited speaker at workshop on New Trends in Signal Proc., at SCET, Surat, Gujarat.
- Conducted a 5 day International Workshop on Applied Deep Learning at IIT Mandi from 16 to 20 July 2018.
- Conducted a 5 day Workshop on Deep Learning at Aligarh Muslim University from 30th Jan to 3rd Feb 2019.

Training Workshop on the Use of Briquette Machine for DPN Briquetting

One-day training workshop was organized for entrepreneurs on 26th December 2018 in the topic “the use of briquette machine for dry pine needle briquetting”. A total of 35 entrepreneurs from different parts of Himachal Pradesh participated in the workshop. The main goal of the training workshop was to motivate entrepreneurs to set up pine needle based industry. We explained the procedure involves and technicality in dry pine needle briquetting and briquette machine. We also organized a hands-on training session for participants in the briquette machine setup.

Workshop on "Eco friendly utilization of Dry Pine Needles for social benefits:

We organized a workshop recently at IIT Mandi along with forest department officials to work together on the issue. The main aim was to aware people about the use of dry pine needles and encouraged them to set up pine needle based industry. We told them that by setting up this industry they will earn handsome income and additionally contribute to saving our forest from fire.



Vigyan Jyoti Workshop 9 To 23rd Sept, 2018 (A DST initiative for young girls)

15 Days workshop on Vigyan Jyoti has been successfully completed at IIT Mandi. The purpose of this workshop was to motivate 30 young girls of Govt. schools of Himachal Pradesh to join the field of Science and Technology.

- Program Chair, International Conference on Differential Equations and Control Problems: Modeling, Analysis and Computations (ICDECP19), IIT Mandi.
- EEE PES-IAS and PELS-IES conducted an "FEM Electromagnetics Training Workshop" on 27th December.

  A hands-on training was given to the students willing to work in the area of 'Electrical Machine Design and Analysis'. There were many systems in PC laboratory in which the software has been installed and the students worked individually or in a group accordingly.

  IEEE Session Name: Ansys Electromagnetics Training Workshop
  Date: 27th December 2018
  Venue: PC laboratory (A-5 building)
  Time: 2:00 PM to 5:00 PM

- An illuminating talk was given by Prof. M. Balakrishnan, Department of Computer Science and Engineering, IIT Delhi on Monday, November 05, 2018 at 1730 hrs in room no. A1-NKN.

  Title of the talk: ASSISTECH: Assistive Technology Solutions for Mobility & Education of Visually Impaired

Expert Talks by Prof. K Gopakumar, IISc, Banglore held on 3rd Nov'18 at EED, DTU under the aegis of IEEE PELS-IES and PES-IAS Delhi Chapters, NVVN ,etc.

Title: High resolution multilevel voltage space vector structure generation for variable speed drives and grid-tied applications

- An IEEE PES-IAS Tutorial jointly organized with PELS-IES by as per the following schedule:

  Title: Manufacturing, Nanotechnology, Recent Development in Materials for Sustainability, Machine Learning to Deep Learning, High Tech Agriculture for Indian Farms, Electric Vehicle, Characterisation and Modelling of Solar Photovoltaic Panels.

  Speakers:

  - Dr.Satvasheel Powar, IIT Mandi
  - Dr. Sunny Zafar, IIT Mandi
  - Dr.Sumit Sinha Ray, IIT Mandi
  - Dr. Ajay Soni , IIT Mandi
  - Dr. Satinder Kumar Sharma, IIT Mandi .
  - Dr. Pradeep Kumar, IIT Mandi
  - Dr. Prem Felix Siril, IIT Mandi
  - Dr. Rahul Vaish, IIT Mandi
  - Dr. Atul Dhar, IIT Mandi
  - Prof. Ujjwal Maulik, Jadavpur University.
  - Dr. Aditya Nigam, IIT Mandi.
  - Dr. Shyam Kumar Masakapalli, IIT Mandi.
  - Dr. Srikant Srinivasan, IIT Mandi
  - Dr. Rajan Kapur, Dr. Aditi Halder, IIT Mandi
  - Dr. Narsa Reddy,IIT Mandi
  - Dr. Shyamasree Dasgupta, IIT Mandi
  - Ms. Pallavi Bharadwaj, Research Scholar, IISc Bangalore
- Er. Sabyasachi Roy who has a long experience of working with Electrical Power Industry offered a series of lectures as below:

  Medium and large Synchronous generators for Turbo and hydro power plants for Industries and Mini hydel power projects.

- One day IEEE workshop on Finite Element Modeling Applications to Engineering Problems using ANSYS software at IIT Mandi campus on 23rd August, 2018.
- Er. Sabyasachi Roy who has a long experience of working with Electrical Power Industry will be offered a lecture on Large MV and HV Synchronous and Induction Motors for River lift irrigation systems and River linked irrigation schemes – Mega projects in India (22nd Aug, 2018).

- Er. Sabyasachi Roy who has a long experience of working with Electrical Power Industry offered a lecture on Science–Technology–Application – Industry Interface. Learning and progressive role for would be Engineers (21/08/2018).
- Er. Sabyasachi Roy who has a long experience of working with Electrical Power Industry offered a lecture on Large MV and HV Induction Motors for Thermal Power Plant application with emphasis on present day super critical ultra mega power plants – 660/800/1000 MW. (20th Aug, 2018).
- **Title of Talk:** Smart Distribution Grid – Towards Efficient Electricity Management
  Speaker: Dr. Naran Pindoriya, Associate Professor, IIT Gandhinagar.
  Date/Time: June 7th, 2018 at 12:15 PM
  Venue: SC-NKN, IIT Mandi

Talks outline:

Access to affordable, reliable and low-carbon electricity plays a critical role for sustainable economies and social development. The transition to a decarbonized economy involves (1) optimal utilization of distributed renewable energy resources (2) developing smart grid technologies and (3) promoting energy efficiency in electricity value chain. This talk would cover the discussion on enabling technologies for smart grid – advanced sensing/measurement, integrated communications, advanced components/subsystems and improved interface/decision support. Some research scope in the smart grid domain would also be highlighted.

Brief Profile:

Dr. Naran M. Pindoriya is an Associate Professor in Electrical Engineering at Indian Institute of Technology Gandhinagar, India. Before he joined IIT Gandhinagar, he was a research fellow in the Department of Electrical and Computer Engineering at the National University of Singapore, Singapore in 2010. He received Ph.D. in Electrical

Engineering from Indian Institute of Technology Kanpur, India in 2009. His research interests include active distribution grid, microgrid, load forecasting, and demand side energy management. He has developed the Power Systems and Smart Grid (PS & SG) research laboratory at IIT Gandhinagar. The PS&SG research group has published the research findings in scholarly research journals and peer-reviewed conferences.

Conference/Workshops/Other Institute/Industry Visited (India or Abroad) or Invited Lectures Delivered

1. Dr. Varun Dutt presented his work on cybersecurity: Influence of patching vulnerabilities on the decision making of hackers and analysts at International Conference on Cyber Situational Awareness, Data Analytics and Assessment (Cyber SA 2018), At Glasgow UK.
2. Dr. Varun Dutt's team presented his work on Landslide monitoring system in a workshop conducted by district authority ant Keylong district of Lahaul Spiti on August 11th, 2018.
3. Dr. Varun Dutt's team presented a lecture on landslide monitoring and warning system, in International workshop on “Extreme Severe Storms and Disaster Mitigation Strategy” 24-26 December, 2018 at Central University, Rajasthan.
4. Dr. Varun Dutt's team presented a lecture on their startup iIoTs in product development and people leadership workshop, by IIT Mandi Catalyst at Leh dated on 15-17 November, 2018.

Eminent Guest/Scholars/Students/Interns Hosted: (With details of activities/talks etc.)

1. Hosted Prof. Kanchi Gopinath from IISc Bangalore on Sept 27-28, 2018 at IIT Mandi
2. Sept 27: Talk 1: "Managing Systems Memory" targetted towards 3rd year B.Tech. Computer Science Students doing CDP (Introduction to Communicating Distributed Processes) course and Research Scholars working in the area of Operating Systems, Big Data computing.
3. Talk 2: "Adhaar Privacy Models" open research talk Sept 28: Meeting with NMSWorks-project under UAY scheme at Director's Conference Room.
4. Prof. Meenakshi Balakrishnan, from IIT Delhi was hosted on November 05, 2018. He delivered a talk on Smart assistive technologies for the blind people.

5. Prof. Hiranmay Saha from IIEST Shibpur was hosted on August 17-18, 2018. He delivered a talk on Innovation on Power Generation using Solar and Bio-waste. Both the talks were supported by IEEE PES.
6. Hosted Prof Ajish Abraham, All India Institute for Speech and Hearing, Mysore, January 2019 (photo attached).

7. Dr. Ashutosh Gupta (IIT Bombay) Instructor of CS591_7: SAT and SMT solvers (even semester, AY 2018/2019, 1 credit).
8. Ms. Kavita Singh Kale and Santosh Kale Instructors of HS592: Multi Media Film Making (odd semester AY 2018/2019, 1 credit).
9. Prof. Paritosh Pandya (TIFR) Instructor of EE591_1: Verification in VLSI Design (even semester, AY 2017/2018, 1 credit).
10. Prof. Saurabh Lodha, IIT Bombay Title of talk: Electronic and optoelectronic devices using 2D van der Waals materials, 25th May, 2018.
    Dr. Marieke van Vugt (University of Groningen) (Guest Speaker)
    Dr. Terrance C. Stewart (University of Waterloo) (Guest Speaker)

Professional Achievements, Honors and Awards/ Membership of Professional Societies

Dr. Shubhajit Roy Chowdhury

- Outstanding Reviewer Award by the Journal of Neuroscience Methods (Elsevier) in 2018.

Dr. Gopi Shrikanth Reddy

- URSI- APRASC International Union of Radio Science “Young Scientist Award - 2019”.

Dr. Hitesh Shrimali

- Fellowship Chair: IEEE VDAT conference 2019.
- Organising committee member: IEEE EDAPS conference 2018.
- Young Faculty Research Fellowship, Meity, GoI.

Dr. Anil Sao

Young Faculty Research Fellowship, Meity, GoI.

Dr. Varun Dutt

- Member of Editorial Board of Management and Business Review (MBR) journal.
- Special topics editor on "Applications of Cognitive Approaches to Cyber Security" in Frontiers in Cognitive Science journal.
- Lead Author for Chapter 2 on "Integrated Risk and Uncertainty Assessment of Climate Change Response Policies" in Intergovernmental Panel on Climate Change (IPCC)'s 5th Assessment Report (AR5): http://mitigation2014.org/contributor/chapter-2.
- Knowledge Editor, English Financial Daily, Financial Chronicle: http://www.mydigitalfc.com
- Associate Editor, Frontiers in Cognitive Science journal, http://loop.frontiersin.org/people/48650/overview
- Review Editor, Frontiers in Neuroscience journal, http://loop.frontiersin.org/people/48650/overview

Dr. Tushar Jain

Tushar Jain has been elevated to the grade of IEEE Senior Member, 2018.

Dr. Siddhartha Sarma

- Awarded fellowship under Indo-Japanese Establishment of Young Researcher Fellowship Programmer 2018-2019. I visited University of Electro-Communications, Chofu, Tokyo, Japan. Funding agencies: INSA (India) and JSPS (Japan).

Dr. Bharat Singh Rajpurohit

- IEEE Industry Application Society (IAS) Outstanding Chapter Chair Award 2018.
- Chairperson, PES-IAS Society, IEEE Delhi Section, 2018.

New Initiatives / New Research Facilities Created / Equipment Installed / Laboratory Established

Dr. Shubhajit Roy Chowdhury

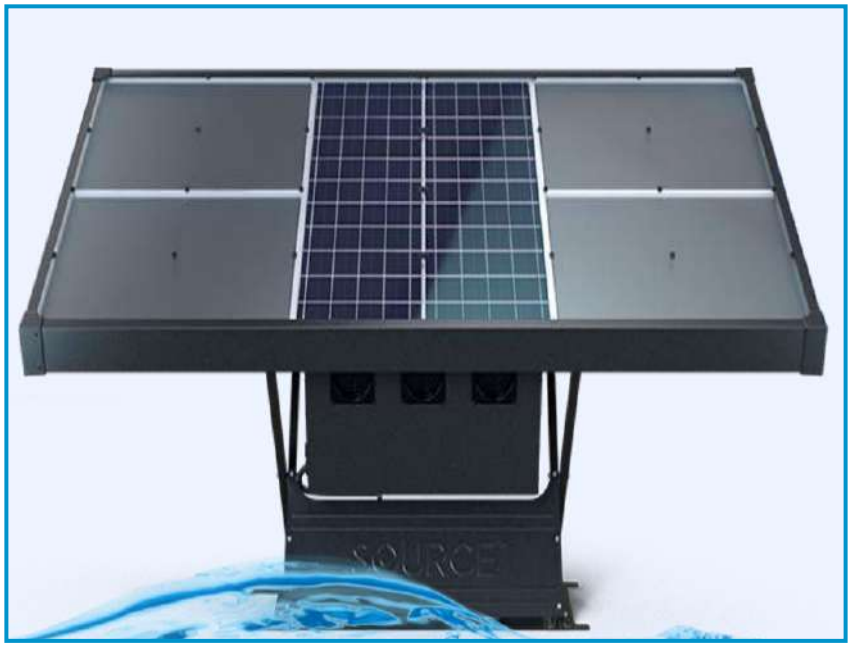
- Developed Embedded Systems Laboratory equipped with ARM Cortex boards, Xilinx Ultrazync ZCU 102 boards. Currently the testing and measuring equipments of the lab is under process.
- Installed electrometer in Biomedical Systems Lab capable of measuring current in nanoamperes.

Dr. Gopi Shrikanth Reddy

- Initiated creation of VLSI- testing facility which will cater testing facility of RF and VLSI circuits, active and passive devices.
- Current Equipment's in testing lab: P Network analyser, test antennas, Variac, DSO.

Dr. Bharat Singh Rajpurohit

- Hydropanel.



Dr. Ankush Bag

- Growth setup for ultra-wide Bandgap Semiconductors has been developed.

Dr. Varun Dutt

- Installed a 3D printer in lab.
- Installed a portable engraving machine in lab.

Dr. Tushar Jain

- As a new initiative in control systems lab, we have introduced rigorous Arduino-based control experiments which are more inclined towards imparting an in-depth working knowledge of controlled physical systems and helps in bridging the well-known gap between control theory and its practical implementation. The lab is designed in such a way that the students get complete hands-on practical knowledge of control systems which will prepare them for their MTP projects.
- Installation of TDCS (Transcranial Direct Current Stimulation) system at Biomedical Systems Laboratory, MANAS Group, IIT Mandi for performing experiments related to brain research.

Student Activities/Achievements

1. The former Ph.D student, Dr. Pravindra Kumar, has joined Thapar Institute of Engineering and Technology as an Assistant Professor in July 2018.
2. The former Ph.D student, Dr. Sanjay Rathee got Post Doctoral Fellow position at Oxford University, London in April 2018.
3. Mr. Gaurav Sharma and Ms. Yashika Arora received IBRO Fellowship from International Brain Research Organization for attending IBRO APRC School in the year 2019.
4. Best Poster Award, IEEE ICEE 2018, IISc Bangalore, (Mr. Manoj Yadav).

5. Ms. Vibha Gupta: Best paper award at workshop on Computer Vision for Microscopy Imaging (CVMI 2018) held with CVPR 2018.
6. Ms. Vibha Gupta received MSR travel grant to travel to MICCAI 2018.
7. Ms. Yashika Arora received the SERB Overseas Visiting Doctoral Fellowship (OVDF) in the year 2019.
8. Ms. Yashika Arora :"GSM based SMS alert system: Light, Fire, Gas and Intruder Detector" got 1st position in Innovation Hackathon 2018 held during April 7 to April 15, 2018 organized by Design & Innovation Centre, Indian Institute of Technology Mandi.
9. Ms. Palvi Aggarwal, got her Ph.D. and joined postdoctoral at Carnegie Mellon University, USA.
10. Ms. Neha Sharma got her Ph.D. and joined as an assistant professor in IIIT Una, Himachal Pradesh.
11. Mr. Shivendra Sangar submitted his synopsis and currently working as assistant professor for department of education in Mandi district.
12. Mona, Vyoma and Avinash attended the EECI (European Embedded Control Institute)- IGSC (International Graduate School on Control) Module-08 on "Nonlinear Model Predictive Control" held at IIT Madras in March, 2018. Each of them also received the financial support from EECI to attend the lectures held in the module.
13. Mona received student support from IEEE Control System Society (IEEE-CSS) to present his paper in 2nd IEEE Conference on Control Technology and Applications, August 21-24, Copenhagen, Denmark, 2018.
14. Mona received student support from IEEE Control Systems Society (IEEE-CSS) through organizers of the Indian Control Conference (ICC) 2019, to attend the conference hosted at IIT Delhi.
15. Vyoma Singh did internship from Robert Bosch, Bangalore on topic "Parameter estimation of Mean Value Spark Ignition Engine" from 5th November, 2018 to 11th January, 2019.
16. Avinash received student support from IEEE Control Systems Society (IEEE-CSS) through organizers of the Indian Control Conference (ICC) 2019, to present his papers in the conference at IIT Delhi in January, 2019.
17. Vyoma, Bindu and Avinash attended the EECI (European Embedded Control Institute)- IGSC (International Graduate School on Control) Module-02 on "Practical Adaptive Control" held at IIT Madras in January, 2019. Each of them also received the financial support from EECI to attend the lectures held in the module.
18. Mona has presented his research paper in IFAC SafeProcess Symposium in Warsaw, Poland 2018 with the help of the financial support received from Deity.
19. Bindu has presented her papers in ICARCV 2018 in Singapore with the help of the financial support from the School.

Students Attended: Continuing Education Activities / Conference Attended

1. Four days CBME MedTech Workshop (March 2019) at Indian Institute of Technology, Ropar, Punjab.

2. 1st Biomedical Instruments and Devices Hub Workshop on Strategy and Solutions for Better Health Care (February, 13 2019) at Postgraduate Institute of Medical Education & Research, Chandigarh.
3. Three days Workshop on Brain Connectivity Analysis and Conference on Brain Computer Interfaces (December 2018) at Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, Kerala.

4. Three days International Workshop on Nano/Micro 2D-3D Fabrication, Manufacturing of Electronic- Biomedical Devices & Applications (November 2018) at Indian Institute of Technology, Mandi.
5. Research Evaluation Workshop of Visvesvaraya Ph.D Scheme for Electronics & IT/ITES (September, 2018) at Malaviya National Institute of Technology, Jaipur.
6. Field visit to ±800kVHVDC Converter Station, Kurukshetra, Haryana during 24-26 April, 2018.

Outreach Activity: Laboratory Visits of School/Diploma/ITI Students

"We need diversity of thoughts in the world to face new challenges." "Together we can do great things". With this spirit in mind SCEE and IEEE PES-IAS Society organize a lab visit of the post graduate students (Master of Arts, Economics specialization) of Vallabh Government College, Mandi and several schools at IIT Mandi campus.

Students has visited IIT Mandi Campus at Kamand. Firstly the volunteers of this event had organized an interaction session for these college students and further directed them into respective labs. Interaction session included some interesting topics on introduction of IEEE, PES Society, IAS Society, IIT Mandi and other studies related discussions which were diversified. Volunteers also briefed students about the procedures and preparation for admission to technical institutions at India. A brief discussion on the Masters plan in IIT Mandi was also discussed as it was relevant to these Master in Economics students since they can apply for the Ph.D Research Program after their post graduate degree in the School of Humanities and Social Sciences at IIT Mandi.

The students showed keen interest in knowing the procedure and criteria for getting into IIT and the zeal and enthusiasm within them have further made the event more successful. Volunteers took students to different labs like; Advanced Material Research Center (AMRC) Mechanical Workshop, Electrical lab, Electronics lab and Language lab which was of their interest in area of Economics and Language. In Language lab an activity was been organized and the students were given the task to perform. Not only the students but the staff who accompanied them took active part in various activities and found relevant to their course and area. Some experiments were performed in Electrical and Mechanical labs which were explained in details to the students. An introduction and training to IT/ multimedia and these labs were given by the volunteers to the students.

Students came to know about the research work going on at IIT Mandi and also came to know about the working of different instruments in the laboratory. Students were very enthusiastic to know more and more about different technical activities undertaken at IIT Mandi while showing more interest in the Language lab.

1. **Publications:** There has been a celebration of the IEEE PES Day which was organized by the IEEE IAS SB Chapter and supported by IEEE PES-IAS Chapter of Delhi Section. This event was covered in the ***PES Newsletter (eNewsUpdate)***. The same has been attached below:

eNewsUpdate

IEEE

India-IIT Mandi

On the occasion of IEEE PES Day, IEEE Student Branch Chapter of IIT Mandi in collaboration with IEEE PES-IAS Joint Chapter of Delhi Section, initiated the conduction of several activities starting from 20th April 2018. One such activity was "*IEEE Awareness Talk*" which was delivered by Adil Usman, *IEEE PES YP Representative, India* supported by Dr. Bharat Singh Rajpurohit, *IEEE PES-IAS Chapter Chair, Delhi Section.*

The talk covered various topics, such as benefits of IEEE, introduction to some PES activities, significance of PES Day and some other relevant topics. The talk was followed by the concluding speech of Prof. Ravindra Arora, *Life Member, IEEE* who was the Chief Guest of the function. He is an author of an IEEE Press book titled: "High Voltage and Electrical Insulation Engineering".

Students and Faculty Staff attending the talk

Cake Cutting to observe the IEEE PES Day

The talk was followed by some activities which were lead by IEEE Executive Committee Members of IIT Mandi. Many students and faculty members attended the talk. The existing IEEE members were given *complimentary* IEEE PES and IEEE IAS Memberships. There was also the induction of newly joined members of IEEE.

Adil Usman
IEEE PES YP Representative, India

Team member installing system on a landslide

Team getting award for disaster risk reduction by SDMA.

3.2 School of Engineering (SE)

School of Engineering is committed to serve society through innovation and excellence in engineering education and research focused on development of sustainable technologies. Our mission includes translation of research into the public benefit, integration of research with engineering education; diversify external research projects towards engineering solutions via cross-disciplinary research approach etc.

School is committed for high standard of engineering education through outstanding teaching, innovative curricula, and excellent research environment. School offers a number of common courses for B.Tech like Design practicum, Reverse engineering, Graphics for design, Materials science, Product realization technology, Mechanics of rigid bodies, Continuum mechanics and Engineering thermodynamics along with the core courses of Mechanical and Civil stream.

Presently, School of Engineering has 37 faculty members including 4 Associate Professors, 26 Assistant Professor, 1 Visiting Professor, 1 Emeritus Professor, 2 Distinguished Visiting Professor, 1 Adjunct Professor and 2 mentor professor. There are currently 87 Ph.D, 32 M.S., 130 M.Tech and 223 B.Tech students in the school.

The main areas of research are broadly classified as Materials and Design, Manufacturing, Thermo-fluids Engineering, Energy and sustainable Himalayan infrastructure. In Materials and Design area, the focus is towards the development of materials for sensor, actuator & energy harvesting and energy storage applications and analysis of smart structures and systems. In thermo-fluids engineering, faculty members are investigating Radiative heat transfer, Nano-scale heat transfer and Flow analysis & Heat transfer analysis of IC engines. Additionally, molten metal's/alloys are also being explored in the school.

Energy efficient systems cover climate change studies, applications of phase change materials towards energy efficient buildings and the use of non-conventional energy sources at IIT Mandi to enhance energy efficiency. Sustainable Himalayan infrastructure encompasses the areas of slope stability, geo hazard zonation, waste management and performance based design.To this end a good number of sponsored research projects have been granted by agencies such as SERB, DRDO, ISRO, NRDMS, MoES, DLR (German Aerospace Centre), BHEL etc. The school has several well equipped UG labs (Design lab, Thermo-fluid lab, Mechanical workshop, Surveying lab, Geotechnical lab and Environmental science & technology lab. PG (Energy Engineering lab) and several research lab IC Engine lab, Smart Materials lab, Construction Material lab, Acoustic Vibration lab, Nano material lab etc.

Faculty

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Research Projects

Externally Sponsored Research Projects

S. No.	Project Title	Sponsoring Agency	Investigator(s)	Amount Sanctioned (in Rs.)	Duration of Project
1.	Investigation of phase change nanocomposites for high strain rate resistant armour application	DRDO	Dr. Viswanath Balakrishnan (PI) Dr. Mohammad Talha (Co-PI)	26,86,400	3 Years
2.	Scalable manufacturing of asymmetric micro supercapacitor for next generation energy storage devices	DST-MES	Dr. Viswanath Balakrishnan (PI) Dr. Satvasheel Powar (Co-PI)	68,60,600	3 Years
3.	Study of solute transport parameters through porous medium	MoES	Dr. Deepak Swami (PI) Dr. Dericks P Shukla (Co-PI)	44,59,325	3 Years
4.	Suitability of higher modeling approach for reactive solute transport through hetrogeneous porous medium: experimental and numerical study	SERB	Dr. Deepak Swami (PI)	42,74,600	3 Years
5.	Spatial distribution of uranium and associated water quality parameters in Mandi, Kullu and Hamirpur	DAE-BRNS	Dr. Dericks P Shukla (PI) Dr. Aditi Halder (Co-PI)	27,51,800	2 Years
6.	Snow mapping & it's parameter estimation from geospatial (AVIRIS-NG) and field data	SAC-ISRO	Dr. Dericks P Shukla (PI)	28,00,000	2 Years
7.	Development and deployment of low-cost lanslide monitoring & waring system in District - Sirmour (H.P.)	DC office Sirmour (H.P.)	Dr. Varun Dutt (PI) Dr. K.V. Uday (Co-PI)	4,01,500	1 year

8.	Improving Bio-engineering strategies to achieve soil stability	SERB	Dr. Kala Venkata Uday (PI) Dr. Shyam Kumar Masakapalli (Co-PI)	51,33,040	3 years
9.	Modelling of hydraulic diffusivity and its application in the FE simulation of moisture transport in concrete for assessing corrosion risk	SERB	Dr. Kaustav Sarkar	45,89,260	3 years
10.	Development of carbon fibre reinforced polymer composites through microwave curing	AR&DB, DRDO,	Dr. Sunny Zafar (PI) and Dr. Himanshu Pathak (Co-PI)	15,25,800	2 years
11.	Design and development of lightweight body armour	TBRL, DRDO	Dr. Himanshu Pathak (PI) and Dr. Sunny Zafar (Co-PI)	35,20,000	3 years
12.	Design analysis of adhesivelybonded composite patch repair of cracked aluminum aircraft panels	ARDB (DRDO), Government of India	Dr. Himanshu Pathak	18,12,000	3 years
13.	Development of low cost accelerated water purification systems with added mineralisation for himalayan region	NMHS	Dr. Jaspreet Kaur Randhawa (PI) Dr. Bharat Singh Rajpurohit, Dr. Samar Agnihotri (Co-PI's)	40,66,000	3 Years
14.	Spatial distribution of uranium andassociated water quality parameters in groundwater, surface water and drinking water in four districts (Una, Bilaspur, Solan & Sirmour) the state of Himachal Pradesh	DAE-BRNS	Dr. Subrata Ghosh (PI) Dr. Jaspreet Kaur Randhawa (Co-PI)	29,24,300	2 Years
15.	Low cost ferroelectric material based technology to combat microbial resistance and prevention	DBT-BIRAC	Dr. Rahul Vaish	36,45,000	1 year 6 month
16.	Investigation of Photocatalytic Activity in Ferroelectric Ceramics & their Composites	INSA	Dr. Rahul Vaish	15,00,000	3 year 10 months
17.	Photocatalytic Transparent Glass Nano/micro crystal composites for wasre water trearment	DST-SERB	Dr. Rahul Vaish	28,05,200	3 years

18.	FIST Engineering and Technology level- FIST project	DST	Dr. Rajeev Kumar (PI) Dr. Himanshu Pathak (Co-PI)	2,09,50,000	5 Years
19.	Non- linear active shape and vibration control of functionally graded structure using functionally graded piezoelectric material	DRDO	Dr. Rajeev Kumar (PI) Dr. Mohammad Talha (Co-PI)	18,03,000	3 Years
20.	Spatial distribution of uranium and associated water quality parameters in Shimla and Kinnaur	DAE-BRNS	Dr. Venkata Krishnan (PI) Dr. Rik Rani Koner (Co-PI)	29,24,300	2 Years
21.	DST-ECR- Vibration based health monitoring of tensegrity structures incorporating the effects of ambient temperature.	DST-ECR	Dr. Subhamoy Sen	33,71,390	3 Years
22.	ARDB- Development of damage detection technique for composite laminated structures under varying temperature	ARDB, DRDO	Dr. Subhamoy Sen	23,39,000	2 Years
23.	Efficient Removal of Most Penetrating Particles (diameter~ 300 nm) from Air/Water Using Supersonically Blown Ultrafine PVDF Nanofibers,IITM/SERB/SSR/215	DST-SERB	Dr. Sumit Sinha Ray	48,63,000	3 years
24.	Treatment of acid mine drainage for heavy metal removal, IITM/MoM/SSR/221	Ministry of Metals	Dr. Sumit Sinha Ray (PI) Prof. Ajit Annachatare (Co-PI)	19,84,000	1 year
25.	Imperfection Sensitivity Analysis of Functionally Graded Structures Featuring Parameter Uncertainties.	AR&DB, DRDO,	Dr. Mohammad Talha (PI)	10,14,000	2 Years
26.	Nonlinear thermo-electro-elasticity analysis of geometrically imperfect functionally graded curved panels with material uncertainties,	SERB-DST, Govt. of India	Dr. Mohammad Talha (PI)	14,85,000	3 years
27.	Determination of Mechanical and Biological Properties of Osteoporotic Bone for Indian Patients.	IIT Mandi / IIT Ropar / PGI Chandigarh	Dr. Mohammad Talha (Co- PI), Dr. Rajesh Ghosh (PI)	8,00,000	2 years

Seed Grant Projects

S. No.	Project Title	Investigator(s)	Amount Sanctioned (in Rs.)	Duration of Project
1.	Robust health monitoring of steel bridges under varying environmental and traffic conditions: an application to Victoria bridge	Dr. Subhamoy Sen	8,60,000	3 Years
2.	Modelling of the micro-mechanisms involved in the overall failure of a quasi-brittle material	Dr. Rajneesh Sharma	5,00,000	3 Years
3.	Establishing the change in shear strength of soil due to plant roots: An experimental study	Dr. Kala Venkata Uday	6,50,000	3 Years
4.	Towards zero waste campus: Sustainable solid waste and wastewater management	Dr. Satvasheel Powar (PI) Dr. Atul Dhar & Dr. Pradeep kumar (Co-PIs)	25,00,000	3 Years
5.	Development and Implementation of extended finite element (XFEM) model for ductile crack growth in structural engineering applications	Dr. Himanshu Pathak	5,12,000	3 Years
6.	Experimental Investigation of solute transport in porous media	Dr. Deepak swami	9,00,000	3 Years
7.	Development Characterisation and Mathematical modelling of microwave cured porous composites for biomedical applications	Dr. Sunny Zafar(PI) Dr. Mohammad Talha (Co-PI)	14,50,000	3 Years
8.	Material to control strategies for hybrid energy storage system AC-DC microgrid perspective	Dr. Narsa Reddy Tummuru (PI) Dr. Rik Rani Koner (Co-PI)	15,50,000	3 Years
9.	Determination of fracture properties of bone for diabetic and non-diabetic patients: experimental and numerical investigation	Dr. Rajesh Ghosh (PI) Dr. Arpan Gupta (Co-PI)	12,00,000	3 Years
10.	Heavy metal pick-up from water using nano fiber	Dr. Sumit Sinha Ray(PI)	10,00,000	3 Years

Progress of the Research Projects

PI-Dr. Sunny Zafar

- **Development of nanostructured wear resistant microwave clads to minimize slurry erosion in hydro turbines**
  - Nanostructured clads fabricated.
  - Erosion testing of clads in progress.
  - Correlation between microstructure and erosion performance is under progress.

Development of carbon fibre reinforced polymer composites through microwave curing

- Project is sanctioned, funds are yet to be received.

Design and development of lightweight body armor

- The project is under review.

Development, characterizations and mathematical modelling of microwave cured porous composites for biomedical applications

- Porous composites developed.
- Characterization of porous composites in progress.
- Mathematical modelling in progress.

PI-Dr. Himanshu Pathak

Project Title: Fracture Analysis of Functionally Graded Materials (FGMs) by coupled FE-Meshfree Method

To ensure a proper and accident-free operation of FGM components/structures, fracture mechanics based analysis needs to be performed. Therefore, the accurate crack growth modelling in 3-D FGM domain under thermo-mechanical mixed mode loading condition is most essential from the safe design point of view. The thermo-mechanical loadings of FGM structure need additional attention. For this type of work, the coupled FE-EFG method has a natural advantage of solving such problems. Therefore, in the present work, coupled FE-EFG has been used to study and analyze the FGM structure. The objective of the proposed work is to develop coupled meshfree-finite element method (FE-EFG) code for FGMs structural member under thermo-mechanical loading. This includes the evaluation of SIF and J -integral for commonly used FGM components such as thermal barrier coating used in aerospace structure/nuclear reactors. Developed codes can be also used for accurate analysis of corrosive resistance coating applied in marine structure.

The effect of cyclic thermal and mechanical fatigue loads were studied on crack interactions, crack growth contours and remaining fatigue lives in functionally graded materials. The effect of material gradient (due to FGM nature) on the fracture toughness, crack growth and fatigue life cycle were predicted by the proposed simulation approach. A generalized MATLAB code has been developed based on coupled EF-XEFG approach to solve 3-D stable crack growth in bi-material and FGM domain.

PI-Dr. Sumit Sinha Ray

Project Title : Efficient removal of most penetrating particles (dia 350 nm) from air/water using supersonically blown ultrafine PVDF nanofibers

Here in this work a new kind of ultrafiltration membrane will be developed which will be value added and relatively inexpensive in terms of manufacturing yet will be effective in entrapment of 300 500 nm particles, both air and water borne. In the present work, supersonic solution blowing, a novel method of technical textile fabrication will be introduced to produce ultrafine PVDF nanofibers for filtration application and this method. will be introduced to India for the first time. The objectives of the work are following-

- To develop supersonic solution blowing to produce 20 50 nm nanofibers from PVDF in mass scale and on demand.
- Development of efficient filter membrane with ultrafine nanofibers as surface filters for both air and water and thereby rendering the commercially available moderate efficient filters more capable towards capturing 300-500 nm air and water borne nanoparticles, which also mimic the standard water borne viruses like Reoviridae family or Caliciviridae family.

Project Title : Treatment of acid mine drainage for heavy metal removal

This project aims at the treatment of acid mine drainage using PRB and membrane separation technique. The major objectives of this project are-

- To evaluate several inorganic and organic media for their ability to remove heavy metals from AMD through physico-chemical processes such as adsorption, precipitation etc., consequently, to investigate the performance of PRB employing effective inorganic and organic media for removal of heavy metal from AMD (PART A).
- To develop biopolymer filter membrane via Solution Blowing technique to adsorb heavy metals like Cu, Fe, Zn, Mn, Ni, Pb, As etc. (PART B).
- And Finally, to incorporate membrane filtration scheme with AMD effluent treatment, where the PIs envisage to fabricate a final prototype for AMD treatment. (PART C).

Project Title : Heavy metal pick-up from water using nano fiber

This project aims at development of filter media using from polymer nanofiber containing bio adsorbents, mostly agro wastes or modified bio wastes, for removal of heavy toxic metal from water sources. The primary deliverables of this work are

- Develop robust methodology to create high value filter medium using agro wastes or modified bio wastes with diameter ~ 0.1 1 m en masse using solution blowing and electrospinning technique. Solution blowing technique will be explored in India for the first time.
- Optimize the filters for efficient removal of heavy metals from water.
- Filtration capability of 10 lit/day of heavy metal laden water at lab scale.

PI-Dr. Rajesh Ghosh

Project Title :Design and Failure Analysis of Cemented Acetabular component

We have identified that un-uniform cement mantle thickness have influence on bone remodeling around the acetabular component and stress generated in the cement mantle thickness.

PI-Dr. Viswanath Balakrishnan

Scalable manufacturing of asymmetric micro supercapacitor for next generation energy storage devices

Our work on supercapacitor resulted in impressive achievements and received good attention in the research community. We are planning to make flexible supercapacitor for wearable electronics applications. Similarly we have made good progress in the CVD growth of 2D materials for optoelectronics applications. Our present efforts are towards making 2D heterostructures based devices for electronics and sensor applications. These aspects are directly related to our ongoing DST-MES project.

Investigation of phase change nanocomposites for high strain rate resistant armour application

We are also actively working on mechanical behavior of composites for developing high strength materials for defense applications (DRDO project).

PI- Dr. P. Anil Kishan

Project Title: Numerical Simulations of Local Heating

Design and Simulation Model:

The experimental setup used for the local heating system (dome over bed), without PCM, is shown in figure 1.

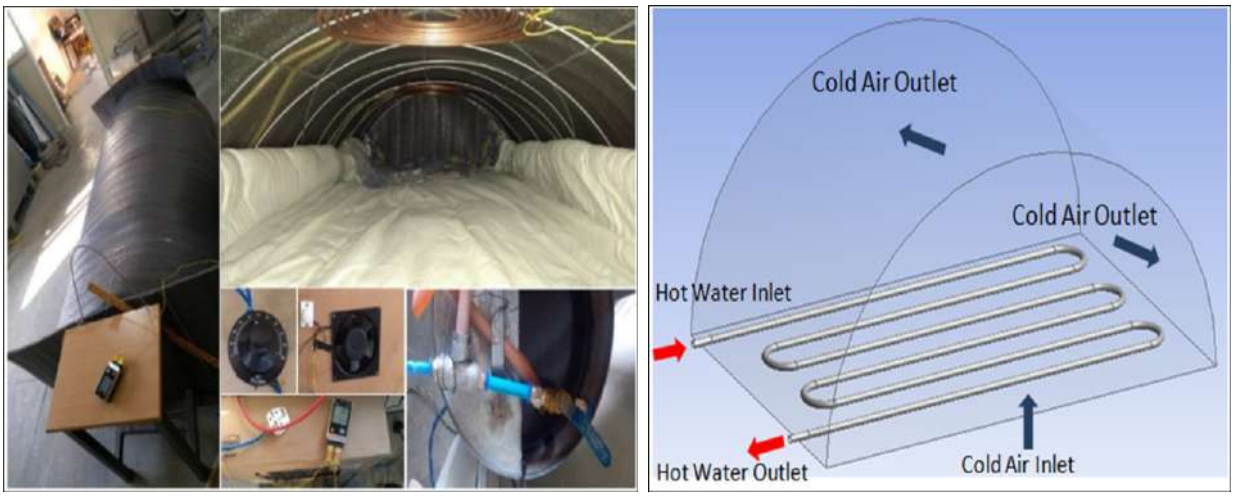


Figure 1: Local heating experimental setup and simulation model (Dome over bed)

The dimensions and boundary conditions used for simulations are given in table 1 and 2 respectively.

Table 1: Geometry specifications

Parameter	Dimensions (all in cm)
Length of bed	60.9 cm (1/3rd of original length)
Width of bed	92 cm
Dia./ Height of dome	46 cm
Dia. of the coil	1.27 cm
Surface area of dome	8798 Sq. cm
Surface area ofcoil	2231 Sq. cm

Table 1: Initial Boundary Conditions

Description	Boundary Condition	Input Conditions	
		Thermal	Flow
Hot Water Inlet	Mass flow rate	338K	0.5 kg/s
Hot Water Outlet	Pressure Outlet	-	Atm.
Cold Air Inlet	Mass flow rate	283K	0.01 kg/s
Cold Air Outlet	Pressure Outlet	-	Atm.
Walls	wall	Adiabatic	-

Validation:

The experimental results were used for validation. Four thermocouples were installed in the experimental setup as shown locations in figure 2. The temperature data were compared at same points and results were found in good agreement with very less error. Figure 2 shows the validation bar graph in the same points.

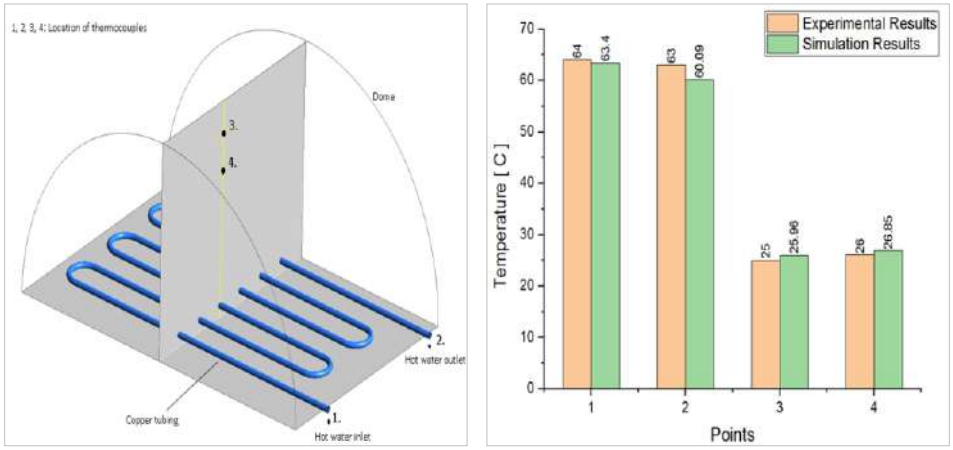
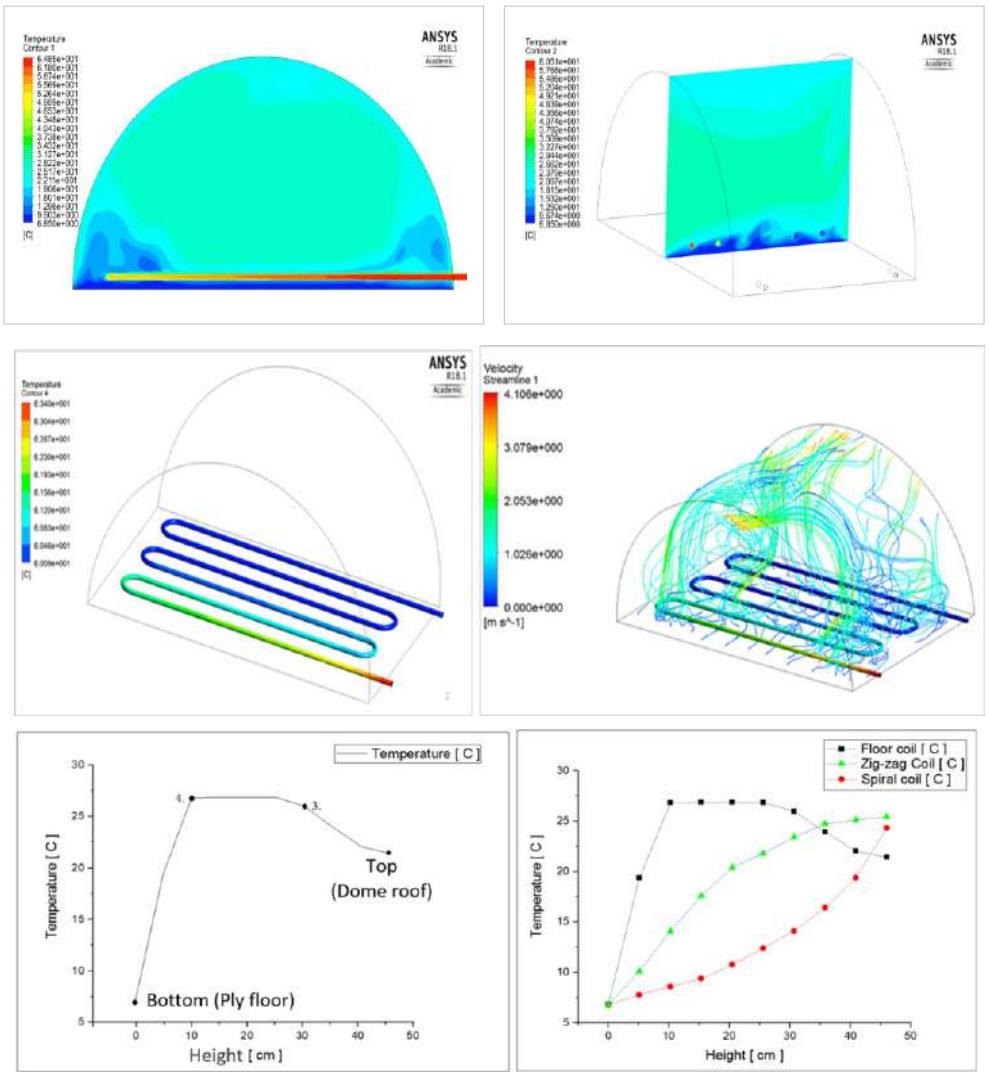
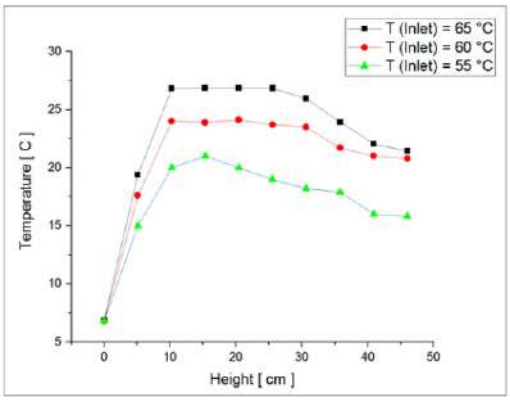
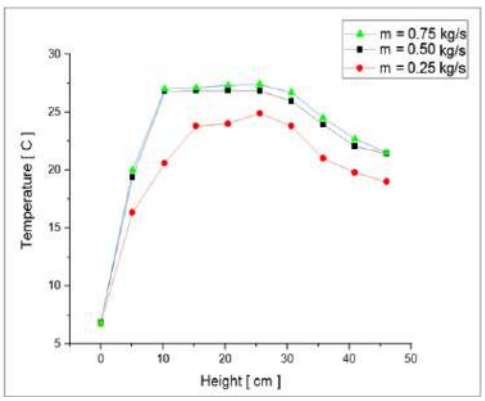
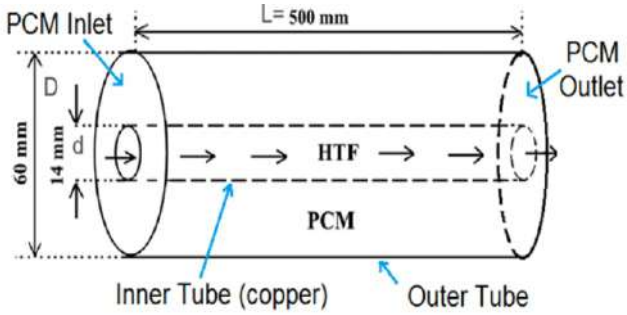


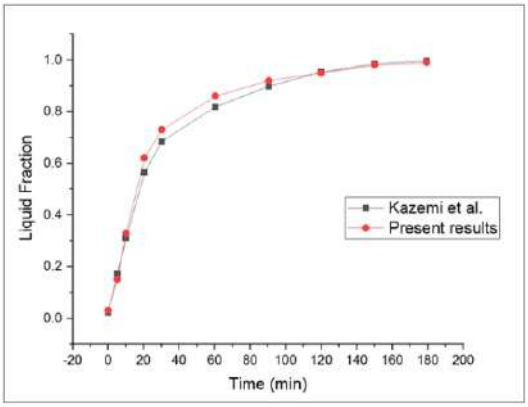
Fig. 2: Location points of thermocouples in setup with bar graph in the same data points

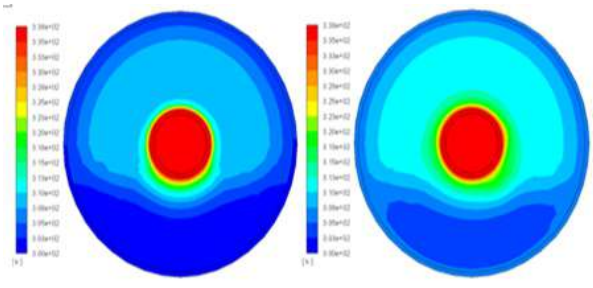


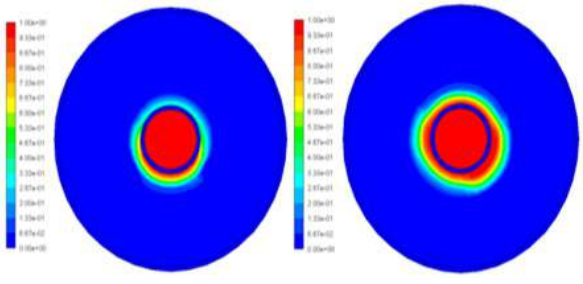

T (Inlet) = 65 °C
T (Inlet) = 60 °C
T (Inlet) = 55 °C
Temperature [C]
Height [cm]

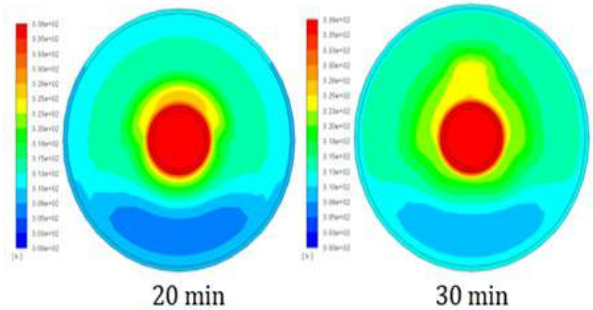

m = 0.75 kg/s
m = 0.50 kg/s
m = 0.25 kg/s
Temperature [C]
Height [cm]

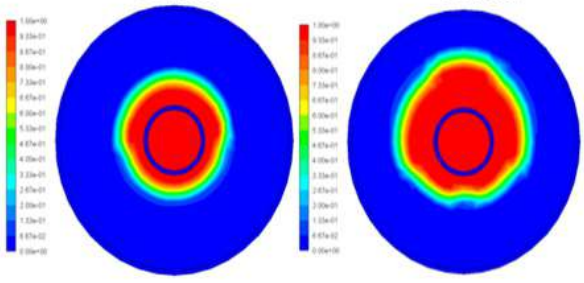

PCM Inlet
L= 500 mm
PCM
Outlet
D
d
60 mm
14 mm
HTF
PCM
Inner Tube (copper)
Outer Tube


Liquid Fraction
Kazemi et al.
Present results
Time (min)


05 min
10 min


05 min
10 min


20 min
30 min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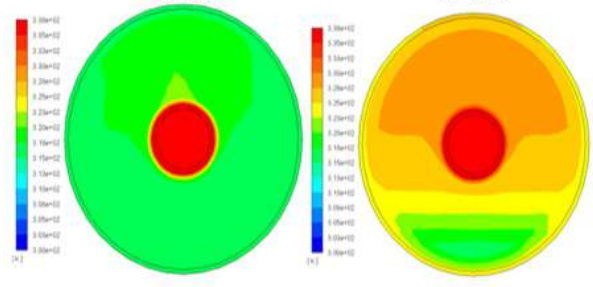
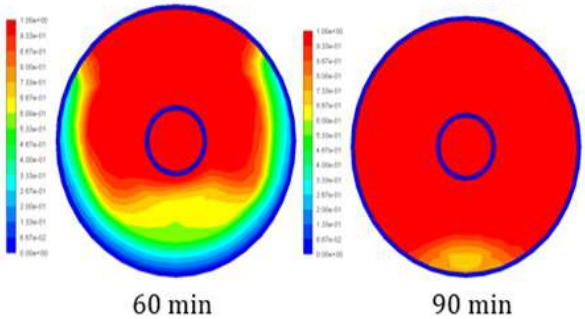
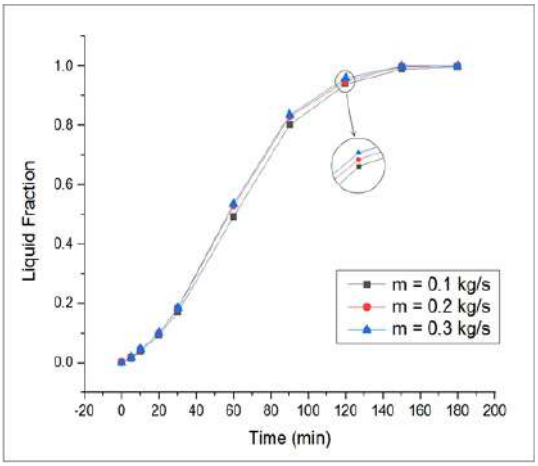
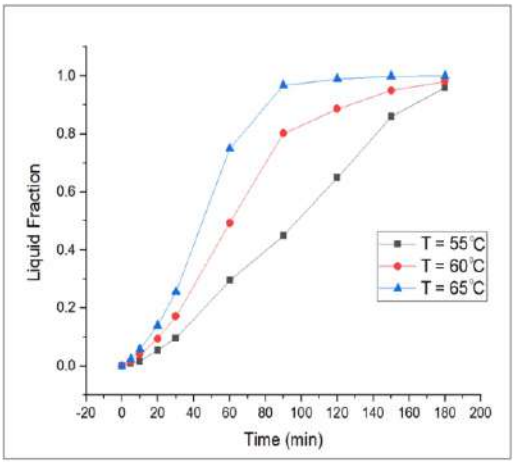
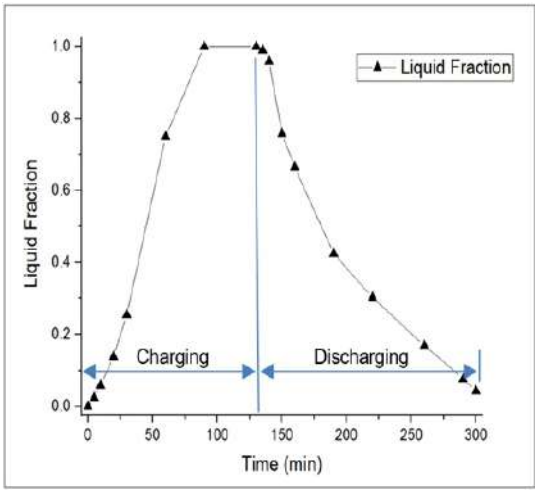
30 min

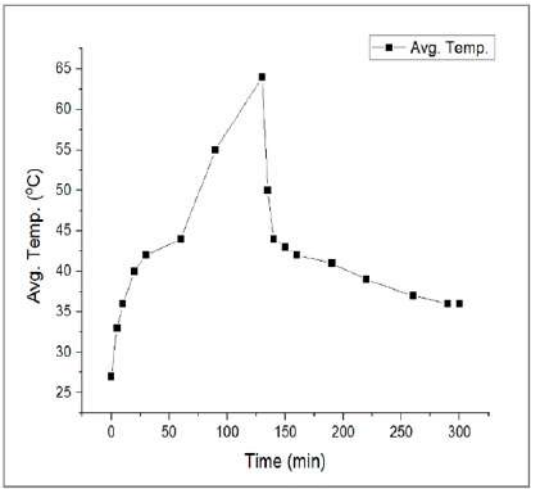

60 min
90min


60 min
90 min









Patents

1. A patent filed at India Patent Office entitled “Sonic Crystal for Noise Reduction in Hard Disk or High Performance Computing Cluster” - Patent Application Number: 201811024261 A, by Dr. Arpan Gupta & Ms. Preeti Gulia in 2018.
2. A patent filed at India Patent Office entitled “System and Method for Providing Cooking Heat from Electrical cum Solar Unit” - Patent Application Number: 201821032649 by Dr. Satvasheel Powar, Dr. Atul Dhar & Mishra A in 2018.
3. A patent filed at India Patent Office entitled “Solar cum Electric Dryer for Providing Drying Heat” - Patent Application Number: 201821038197 by Dr. Satvasheel Powar, Dr. Atul Dhar & Prashant Saini in 2018.
4. A patent filed at India Patent Office entitled, “System and Method for Providing Cooking Heat from an Efficient Cooking Stove” - Patent Application Number: 201811043993 by Dr. Atul Dhar, Dr. Satvasheel Powar & Ankur Koundal in 2018.
5. A patent filed at India Patent Office entitled, “Acoustic Levitation of Large Spherical Objects at Low Frequency” - Patent Application Number: 201811047150 by Dr. Arpan Gupta & Mr. Saurabh Yadav in 2018.

Short Term Course/Workshop organized during 1-4-2018 to 31-3-2019

1. A short term course on “Finite Element Method for Engineers and Researchers (FEMER- 2018)” was successfully organized by School of Engineering, IIT Mandi during 18th to 22nd June 2018 at Kamand Campus. This course was partially funded by the IIT Mandi.(Coordinator/ Co-Coordinators: Dr. Rajeev Kumar, Dr. Himanshu Pathak, Dr. Vishal Singh Chauhan).

2. Organized a 5-day workshop on “Recent Development in Earthquake Resistant Design” during July 02 – 07, 2018 for practicing engineers, faculties, research scholars and students. H.P. Public Works Department had nominated 10 of their senior engineers for this workshop, and 3 engineers from H.P. State Electricity Board also participated that workshop. The engineers were trained for the use of recently revised earthquake resistant design code of India and made familiar with latest technological developments. (Coordinators - Dr. Sandip Kumar Saha and Dr. Maheshreddy Gade).

Group photograph of the participants and organizers at IIT Mandi, Kamand Campus (FEMER-2018)

Group photograph with the participants "Recent Developments in Earthquake Resistant Design-2018"

3. Organized 5-day capacity building workshop on Landslide Mitigation and DPR preparation by NDMA, New Delhi at IIT Mandi from 27-31 Aug., 2018.(Coordinator: Dr. K.V. Uday).

4. Organized 3-day capacity building workshop on Landslide Mitigation and DPR preparation by SDMA - HP, Shimla at IIT Mandi from 9-11 Oct., 2018.(Coordinator: Dr. K.V. Uday).

5. Organized a “Training of Trainers Programme on Earthquake Risk Mitigation: Strengthening of Techno Legal Regime to Ensure Structural Safety’’ for Structural Engineer of H.P. at IIT Mandi, in Association with H.P. Institute of Public Administration (HIPA) and Himachal Pradesh State Disaster Management Authority (HPSDMA), during January 21 – 23 January,2019. More than 30 practicing structural engineers from various government department and privet organization of H.P. were attended. (Coordinators - Dr. Sandip Kumar Saha and Dr. Maheshreddy Gade).

6. A 3-days workshop on “Water Filtration Techniques Based on Solar Energy” was successfully organized by IIT Mandi during 11th to 13th February, 2019 at Kamand Campus.This particular aims to progress into the high-level, strategic issues relating to the water purification, investigation of practical strategies, and integration of renewable energy practitioner, project developers, and industries. (Coordinator/Co-Coordinator: Dr. Bharat S. Rajpurohit & Dr. Jaspreet Kaur Randhawa).

NMHS workshop on Water Filtration Techniques Based on Solar Energy –Feb.2019

7. A GIAN sponsored short term course on “Adaptronics” was organized by School of Engineering at IIT Mandi, Kamand during February 4-9, 2019. The course comprised of 12 lectures, 6 practical followed by an exam. Prof. Dr. Ing. Michael Sinapius, Institute of Adaptronics and Functions Integration, Technical University of Braunschweig, Germany delivered the lectures and supervised practical sessions. Dr. (Ing.) Nasser Al Natsheh, Lecturer, Institute of Adaptronics and Functions Integration, Technical University of Braunschweig organized Lab. sessions.(Coordinator: Dr. Vishal Singh Chauhan).
8. Organized a three day AICTE sponsored Faculty Developed Programme on “Universal Human Values for Student Induction’’ during January 18 - 22, 2019. More than 30 teachers from various professional colleages of HP, H.P. were attended. (Coordinators - Dr. Atul Dhar, Dr. Sudhir Pandey and Dr. P Pathak).
9. Dr. Atul Dhar, Conducted a 8 day faculty development programme for professional college teachers of Bikaner Technical University (BTU Ajmer) on “Human Values and Professional Ethics” at BTU Ajmer, Rajasthan in the capacity of Resource person Sponsored by TEQUIP-III during 5th to 12th January, 2019 at Bikaner Technical University, Bikaner, Rajasthan.

Talks in the Conference/Workshop/Visits

1. Dr. Atul Dhar, Delivered talks on Acted as resources person in “three day AICTE sponsored Faculty Developed Programme on “Universal Human Values for Student Induction’’ during January 18 - 22, 2019.
2. Dr. Atul Dhar, Delivered talks on “Solar Water Evaporator for Waste Water Treatment", in a workshop on "Water Filtration Techniques Based on Solar Energy", February 11-13, 2019 at IIT Mandi.
3. Dr. Kaustav Sarkar,Delivered talks on "Approximate Analysis of Multistorey frames subjected to lateral loads" in the 5-day workshop on Recent Developments in Earthquake Resistant Design, organized by the School of Engineering at IIT Mandi during 2-6 July, 2018.
4. Dr. Kaustav Sarkar, Delivered talks on "Non-linear Finite Element Analysis" in the Short Term Course on Finite Element Method for Engineers and Researchers, organized by the School of Engineering at IIT Mandi during 18-22 June, 2018.
5. Dr. K.V. Uday attended the 8th International Congress on Environmental Geotechnics, 28 October- 01 November, 2018 at Hangzhou, China.
6. Margi Gajjar, Himanshu Pathak, Sachin Kumar; A comparative study of linear elastic and elasto plastic fracture modeling by XFEM, Proceedings of the 9th International Conference of Materials Processing and Characterization, ICMPC-2019, GRIET Hyderabad, India, March 2019.
7. Dr. Himanshu Pathak, delivered talk on “A comparative study of linear elastic and elasto plastic fracture modeling by XFEM” in 9th International Conference of Materials Processing and Characterization, ICMPC-2019, GRIET Hyderabad, India, March 2019.
8. Dr. Himanshu Pathak, delivered talk on “Extended Finite Element Method for Fracture Mechanics Problems” and “Fracture and Fatigue Analysis of Functionally Graded Materials” in expert lecture series on computational techniques at Birla Institute of Technology (BIT) Patna, Patna, Bihar, India, June 2019.

9. Dr. Rik Rani Koner,Attended an international conference on Energy storage at IIT Roorkee on December 2018 as an invited speaker.
10. Dr. Rajesh Ghosh,presented a talk based on biomechanical research activities at IIT Mandi on UK-India Interdisciplinary Workshop on “Advanced Biomaterials and Biosensors (ABB-2018)” at IIT Ropar.
11. Dr. Mousumi Mukherjee, delivered talk on Instabilities and Rate-dependency in Mechanical Behavior of Sand: Symposium of the International Association for Computer Methods and Advances in Geomechanics (IACMAG) during March 5-7, 2019 at IIT Gandhinagar, India.
12. Dr. Mousumi Mukherjee, delivered talk on Introduction to Material Modelling and Elasticity: IACMAG pre-symposium workshop on "Behaviour of Civil Engineering Materials", organised by IIT Gandhinagar on March 4, 2019.
13. Dr. Mousumi Mukherjee, delivered talk in conference onImportance of Constitutive Model in assessing 3-D Bearing Capacity of Square Footing on Clayey Soil using Finite Element Analysis, Proceedings of the 11th Structural Engineering Convention (SEC2018), December 19-21, 2018, Jadavpur University, Kolkata, India.
14. Dr. Mohd. Talha, Keynote Speakerin The 3rd Asian Joint Symposium on Aerospace Engineering 2018 (AJSAE 2018) held in Gyeong-Ju, Korea during October 31 November 3, 2018, hosted by The Society for Aerospace System Engineering (SASE), South Korea.
15. Dr. Mohd. Talha, Invited Talk,delivered in the Department of Aerospace Engineering at Pusan National University, Busan, South Korea, on October 30, 2018.
16. Dr. Mohd. Talha, Invited Talk,delivered in the Department of Mechanical Engineering, Moradabad Institute of Technology, Moradabad, India, and August 16,2018.
17. Sumit Sinha-Ray, Alexander Yarin, Ultrafine Polymer Nanofiber Nanotexture to Improve Nucleation Pool Boiling, International Conference on Recent Advances in Fluid and Thermal Sciences 2018, BITS-Pilani, Dubai, Dec 5-7 2018.
18. Dr. Sunny Zafar, Delivered talks on “Microwave cladding and joining processes” in the one week national level program on “Advances in Manufacturing” at NITTTR Chandigarh, during 14-15 January 2019 .
19. Dr. Sunny Zafar, Delivered talks on “Carrier Opportunities in Mechanical Engineering” at BBSBEC, Fatehgarh Sahib, Punjab, on 27th November, 2018 .
20. Dr. Sunny Zafar, Delivered talks on “Additive Manufacturing for Porous Bio-composites” in the Pre-conference workshop HIMCOSTE at IIT Mandi, on 21st October 2018 .
21. Dr. Sunny Zafar, Delivered talks on “Additive Manufacturing” in the Short Term Course on Computer Aided Manufacturing at NITTTR Chandigarh, on 18th July,2018
22. Renu Tewari, Manoj Kumar Singh and Sunny Zafar*, Application of laser energy for hole drilling in microwave fabricated kenaf/ polypropylene composites, Proceedings of the International Conference on Innovative Applied Energy (IAPE 2019), University of Oxford, Oxford, United Kingdom, March 2019.
23. Y. Aggarwal, Dr. Sandip Kumar Saha, attended an “A Seismic Vulnerability Analysis of Indian Building Stocks - An Abridge Review”, 11th Structural Engineering Convention, Kolkata, India, December 19 - 21, 2018.

24. Dr. Sandip Kumar Saha, Acted as resources person for “Training of Trainers Programme on ‘Strengthening of Techno Legal Regime to Ensure Structural Safety’ for Structural Engineer of H.P.”, organized by disaster management centre, H.P. Institute of Public Administration (HIPA), in Association with Himachal Pradesh State Disaster Management Authority (HPSDMA).

25. Dr. Viswanath Balakrishnan, attended the Invited tutorial talk, International Conference on Emerging Electronics, Bangalore, and Dec, 2018.

Achievements/Awards

1. Dr. Atul Dhar,Conducteda 8 day Faculty development programme (FDP) for professional college teachers of Bikaner Technical University (BTU Ajmer) on “Human Values and Professional Ethics” at BTU Ajmer, Rajasthan in the capacity of Resource person Sponsored by TEQUIP-III during 5th to 12th January, 2019 at Bikaner Technical University, Bikaner, Rajasthan.
2. Dr. Kaustav Sarkar,received Foundation Day Award (2019)” for excellent contributions in construction related activities and in the establishment of laboratory infrastructure at IIT Mandi.
3. Dr. Sandip Saha,Received “Teaching Honor Roll” award by Indian Institute of Technology Mandi (IIT Mandi) - 2018.
4. Dr. Mousumi Mukherjee,Selected as the member of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) TC-105 Committee on "Geo-Mechanics from Micro to Macro" for the period 2018 – 2021.
5. Dr. K.V. Uday, Initiated a startup “iIoTs: Intelligent Internet of Things” as a part of Catalyst-IIT Mandi from year 2017 along with Dr Varun Dutt.
6. Dr. K.V. Uday, Constituted as member Corresponding Member of the International Technical Committee TC-208 on "Slope Stability in Engineering Practice" of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) for the term 2018-2021.
7. Dr. K.V. Uday, Under the aegis of DC office Mandi, 10 systems developed on our patented technology of “Landslide monitoring and Early Warning System” have been installed on various locations along NH 21, NH 154 in Mandi District.
8. Dr. K.V. Uday, Awarded 3rd position on work towards state disaster resilience in State Award during SAMARTH-2018 on 24th Oct., 2018.
9. Mr. Piyush Awasthi received best poster presentation award in "International conference on Electron Microscope & Allied Analytical Techniques 2019 (EMAAT)" organized by Electron Microscopy Society of India (EMSI) held at Shimla, Himachal Pradesh in June 2019. He is doing Ph.D under the Guidance of Dr. Viswanath Balakrishnan.

10. Mr. Aayush Trivedi, M. Tech. Student (Energy Materials) selected for DAAD fellowship for a period of 7 months from 1st Sept 2018 to 31st March 2019. He has worked with Prof. Wolfgang Seemann, KIT Germany. He has done his research work under the mentorship of Dr. Mohd. Talha.
11. Mr. Mohammad Amir, Ph.D Student received the Best Paper award in the 3rd Asian Joint Symposium on Aerospace Engineering 2018 (AJSAE 2018) held in Gyeong-Ju, Korea during October 31 - November 3, 2018. He is doing Ph.D under the Guidance of Dr.Mohd. Talha.
12. Mr. Pradeep Kumar and Mr. Wasim Salih, B.Tech. Mechanical Engineering students received the Best Paper award in the 1st National Conference on Advances in Mechanical Engineering-2019 held in National Institute of Technology Delhi on March 16, 2019. They are doing research work under the mentorship of Dr. Mohd. Talha.

A Few Major Instruments Installed in Labs

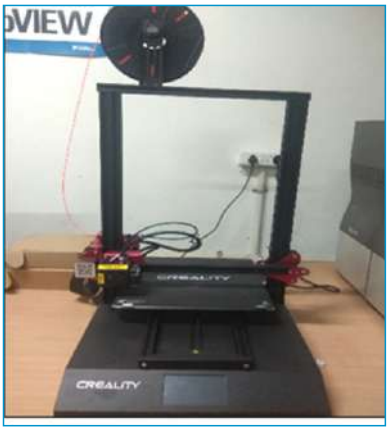


Figure 1 : 3D Printer

Figure 02: Shore D hardness Tester

Figure 03: Friction Stir Welding

Figure 04 : Spectrophotometer

Figure 05 : Izod/Charpycomputerised impact tester for polymer composites

Figure 06 : Pin on Disc Wear

Figure 07:
Strain Measurement Module

Figure 08 :
Bitumen Mixture

Figure 09 :
100 N Capacity UTM (Tinius Olsen).

Figure 10 :
BOD Incubator

Figure 11 :
Polymer Hot Press

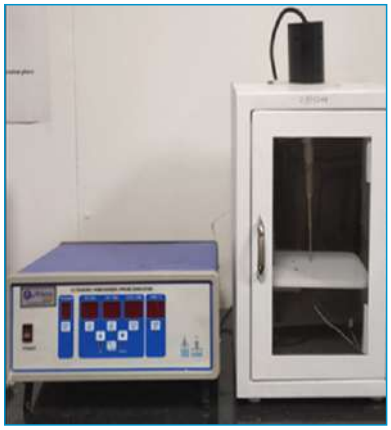


Figure 12 :
Probe Sonicator

Figure 13 :
Static & Dynamic Balancing

Figure 14 :
Optical Microscope

Figure 15 :
Muffle Furnace

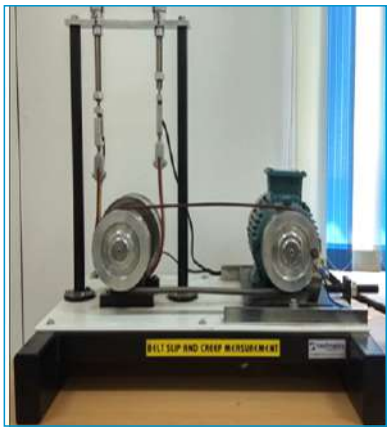


Figure 16 :
Belt Slip N Creep

Figure 17 :
Syring Pipe

Figure 18 :
Carbonation Chamber

Figure 19 :
Ductility Machine

Figure 20 :
Permeability Apparatus

Figure 21 :
Contact Angle

Figure 22 :
Fume Hood

Figure 23 :
Hot Air Oven

Figure 24 :
Le Chatelierwater Bath

Figure 25 : Extruder Machine

Book Chapters

1. Book Chapter: A Mishra, S Powar, A Dhar. Solar Thermal Powered Bakery Oven, Advances in Solar Energy Research, 577-592, Springer Singapore.
2. P Sharma, A Dhar. Particulate Emissions from Hydrogen Diesel Fuelled CI Engines, Engine Exhaust Particulates, 199-211, Springer Singapore.
3. A Singh, A Kaundal, RK Jha, S Powar, A Dhar. Solar Assisted Gasification, Advances in Solar Energy Research, 551-575, Springer Singapore.
4. AK Agarwal, A Dhar, N Sharma, PC Shukla. Introduction to Engine Exhaust Particulates, Engine Exhaust Particulates, 3-6, Springer Singapore.

Books Edited

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3.3 School of Basic Sciences (SBS)

The School of Basic Sciences at IIT Mandi is a cluster of various disciplines of science such as Mathematics, Physics, Chemistry and Life Sciences and related domains. The core of the school consists of 37 faculties having expertise in contemporary fields of research. The school start edits Ph. D. program in 2010 and presently 140 research students have enrolled to pursue research in various disciplines. The school aims to create an ambience for the smooth pursuit of scholarly activities in research and education to make an international impact. The school of Basic Sciences has started M.Sc. program in Chemistry with specialization in various areas such as Organic Chemistry, Inorganic Chemistry, and Physical Chemistry & Nano sciences from Year 2014. The School of Basic Sciences has also started Integrated-Ph.D. Physics in year 2015, M.Sc. Mathematics and M.Tech. Biotechnology program in Year 2016 and M. Sc. Physics in 2017.The school is also staring three new B.Tech. programs jointly with other schools. The faculty members of the school are closely working with the engineering colleagues on different research projects.

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Research projects

External Sponsored Research Project

S. No.	Project Title	Sponsoring Agency	Investigator (s)	Amount Sanctioned (In Rs.)	Duration of Project
1	Engineering Chemical Structure to Improve Device Efficiency: Novel Organic Polymers/Macromolecules & their Nanocomposites for Photovoltaic Application	SERB	PI: Dr. Suman Kalyan Pal Co-PIs: Dr. Subrata Ghosh Dr. C.K. Nandi Dr. Suresh Chand (NPL) Dr. Rajiv Kr. Singh (NPL)	43,64,000	3 Years
2	Effect of dimensionality on the lectronic structure of some novel transition metal oxides	UGC-DAE	Dr. Bindu Radhamany	2,29,800	4 Years
3	Development of High Temperature Thermoelectric Transport Measurements System to Study Chalcogenide Based Thermoelectric Nano-Composites	BRNS	Dr. Ajay Soni	25,00,000	3 Years
4	Layered Chalcogenide Nanocomposites for Thermoelectric Applications	SERB	Dr. Ajay Soni	26,00,000	3 Years
5	Immuno-modulating effect of Taenia solium cyst antigens on immune reactive cells and their role in pathogenesis	DBT	Dr. Amit Prasad	32,50,000	5 Years
6	Setting up centre for innovative technologies for Himalayan Region under CSTRI Scheme	DST	Dr. Arti Kashyap	31,40,000	3 Years
7	Bioinspired Advanced Materials for Enhanced Solar Energy Conversion in Organic Photovoltaics	DST-SERB	Dr. Venkata Krishnan	20,87,000	3 Years
8	Physics of Electromagnos Dynamics Probed by Raman Scattering	DST-INSPIRE	Dr. Pradeep Kumar	35,00,000	5 Years
9	Identification of the Hedgehog pathway modulators in non-small cell lung cancer stem cells	DST-INSPIRE	Dr. Neha Garg	35,00,000	5 Years
10	Generating Renewable Energy Sources Using Anthropogenic CO2 for Sustainable Future	DST-SERB	Dr. Aditi Halder	30,40,000	3 Years
11	Development of Indigenous DUV photoresistsfor 180 nm process technology at Semi-conductor Lab (SCL) Mandi: Make in India	ISRO	Dr. Subrata Ghosh	81,00,000	4 Years
12	Stimuli Responsive Smart Nanocarriers for Theranostics Application	SERB	Dr. Amit Jaiswal	22,56,000	3 Years

13	Intrinsically Disordered Proteins: Folding and Binding Mechanisms of Transactivation Domain of Adenoviral Oncoprotein E1A with its partner TAZ2	SERB	Dr. Rajanish Giri	27,36,000	3 Years
14	Novel Non Chemically Amplified Molecular Photoresists for Nanoelectronics at the 20nm Node or Beyond	DST-GITA	Dr. Subrata Ghosh	29,29,500	3 Years
15	The role of hyperinsulinemia in the pathogenesis of insulin resistance and diabetes	SERB	Dr. Prosenjit Mondal	44,41,352	3 years
16	Development of indigenous chemical mechanical polishing slurries for microelectronics application at semiconductor laboratory (SCL)	SCL Mohali	PI: Dr. Aditi Halder Co-PI: Dr. Venkata Krishnan, Dr. Rik Rani Koner	69,60,000	3 years
17	Engineering novel plasmonic nanocapsules for cancer therapy and diagnostics	DBT	Dr. Amit Jaiswal	19,31,000	3 years
18	Ramanujan Fellowship	SERB	Dr. Neha Garg	89,00,000	5 years
19	Eco friendly utilization of hazardous dry pine needles for social benefit	DST	Dr. Arti Kashyap	19,13,000	2 years
20	Development of Indigenous photoresists technology for semiconductor industries: impact on Indian economy, skilled manpower development and employment possibility	MHRD	Dr. Subrata Ghosh (PI) Dr. Satinder K. Sharma (Co-PI), Dr. Pradeep C. Parameswaran (Co-PI)"	2,39,00,000	3 years
21	Integrating Genome scale metabolic analysis of model plant pathogen Ralstonia solanacearum with RNAseq and fluomics	DBT	Dr. Shyam Masakapalli (IIT Mandi), Dr. Siddhartha Satapathy (Tezpur University); Co-PI's Dr. Tulika Srivastava (IIT Mandi), Dr. Suvendra Ray (Tezpur University)	57,40,000	3 years
22	Mathematical Modelling of the Epidemiology of Multi-Drug Resistant Tuberculosis (MDR-TB)	SERB	Dr. Sarita Azad	18,25,725	3 years
23	Low cost Bioinspired Point-of-Care devices for early detection of diseases using Saliva as diagnostic fluid in rural Himachal areas	HP State council for Science, Technology & Environment (SCSTE)	Dr. Venkata Krishnan (PI), Dr. Neha Sood (Co-PI)	6,60,000	2 years
24	Deciphering the molecular mechanisms governing the direct Aβ aggregation inhibition with the serum protein- Transferrin: Implication for Alzheimer's disease	DBT	Dr. Rajanish Giri (PI, IIT Mandi) Dr. Tamir Tripathi (Co - PI, North Eastern Hill University, Shillong)	70,33,000	3 years

25	A microfluidic based point of care testing device for measuring urine albumin using a novel organic dye	MHRD-IMPRINT	Dr. Shubhajit Roy Chowdhury(PI), Dr. Subrata Ghosh (Co-PI) Dr. Prosenjit Mondal (Co-PI)	73,20,000	3 years
26	Investigation of physical properties of multiferroic compounds belonging to double perovskites family	CSIR	Dr. Kaustav Mukherjee	10,00,000	3 years
27	Study of Nernst effect in the superconductors and semi-metallic compounds	SERB	Dr. C.S Yadav	14,18,271	3 years
28	Study of magnetic and magnetocaloric properties of mixed metal oxides and rare-earth intermetallics	SERB	Dr. Kaustav Mukherjee	30,58,110	3 years
29	Engineering the electronic structure of possible oxide topological insulators	SERB	Dr. Bindu Radhamany	29,51,960	3 years
30	Nanoplasmonic SERS substrate design for trace analysis and detection	DAE-BRNS	Dr. Amit Jaiswal	24,99,400	3 years
31	Effect of correlation, relativistic interaction and confinement on the photoionization dynamics of atomic systems	SERB	Dr. Hari Verma	18,83,750	3 years
32	Understanding intrinsically disordered proteins: Transactivation domains of cMyb and p53 from single molecule to ensemble and disease perspectives	DBT	Dr. Rajanish Giri (PI), Dr. Chayan K. Nandi (Co-PI)	70,29,200	3 years
33	Exploring the tunability of magnetic structure in multiferroic compounds YBa1-xSrxCuFeo5 (0≤ x≤ 0.6 and LnBaCuFeO5 (Ln = D, Ho, Yb) by employing temprature dependent neutron diffraction	UGC-DAE	Dr. C. S. Yadav (PI), Dr. Kaustav Mukherjee (Co-PI)	45,000	1 year
34	Role of human cathelicidine in gastric carcinogenesis	DBT	Dr. Shweta Tripathi	88,00,000	5 years
35	Immunotyping of Taenia solium functional secretome and their proteomic identification	SERB	Dr. Amit Prasad	53,85,397	3 years
36	Systems analysis of photoautotrophic metabolic phenotypes of plants in response to stress	SERB	Dr. Shyam Kumar Masakapalli	50,92,560	3 years
37	BioPEC: Cellulosic waste to high value products by integrating microbial bioprocessing and pyrolysis techniques	DBT-BMBF	Dr. Shyam Kumar Masakapalli (PI) Dr. Neil Mackinnon (PI) Dr. Swati Sharma (Germany)	45,46,000	2 years

38	Development of a hand held molecular point-of care test device for infectious diseases	DBT-IC	Dr. Rajanish Giri, Prof. Daman Saluja (University of Delhi), Prof. James Mahony (Canada)	98,25,000	2 years
39	A comparative study on microscopic structure and dynamics near glass transition in linear polymer melt at low & high densities	SERB	Dr. Prasanth P Jose	20,23,780	3 years
40	Sustainable waste water treatment through bio-photoelectro catalysis and bio production	MHRD-IMPRINT	Dr. Atul Dhar (PI), Dr. Rahul Vaish, Dr. Shyam Kumar Masakapalli, Dr. Aditi Halder, Dr. Tulika P Srivastava, Dr. Rik Rani Koner (Co PI's)	3,84,34,000	3 years
41	Novel NIR-1 and NIR-2 dyes and their functionalised nanoparticles for non-invasive imaging, tracking and target delivery of theranostic in progressive liver disease prognosis and therapy	DBT	Dr. Prosenjit Mondal (PI), Dr. Subrata Ghosh (Co-PI)	60,25,600	3 years
42	Site specific forecasting based on sensor data using machine learning time series prediction modeling	DRDO	Dr. Manoj Thakur	26,06,400	2 years
43	Folding mechanism of trans activation domain of E2APBX1, an intrinsically disordered protein involved in leukemia induction	DST	Dr. Rajanish Giri (PI) Dr. Irina M Kuznetsova (Tikhoretsky St.-Petersburg Russia)	23,39,200	2 years
44	Magnetic properties and structure transformations in binary Fe- Pb and ternary Fe-Pd-M (M- Ni, Ga)	DST	Dr. Arti Kashyap (PI) Dr. Aleksandr Popov, M.N. Miheev Institute of Mental Physics, Russian Academy of Sciences, Yekaterinburg, Russia	19,86,400	2 years
45	Development and dissemination of Agri- based technologies being optimized at IIT Mandi from lab to farmer's field of mid-Himalayan region	DST (WOS-B)	Dr. Reshma Sao (PI), Dr. Shyam Kumar Masakapalli (Mentor)	26,80,000	3 years
46	Photo- catalytic treatment of wastewater for the removal of Azo dyes: using rGO- TiO2 based cost effective composite technology	Himachal Pradesh State council for Science, Technology & Environment (SCSTE)	Dr. Satinder Kumar Sharma (PI), Dr. Venkata Krishnan (Co-PI)	5,88,000	2 years
47	Spatial distribution of uranium and associated water quality parameters in groundwater, surface water and drinking water in four districts (Una, Bilaspur, Solan & Sirmour) the state of Himachal Pradesh	DAE-BRNS	Dr. Subrata Ghosh (PI) Dr. Jaspreet Kaur Randhawa (Co-PI)	29,24,300	2 years

48	Spatial distribution of uranium and associated water quality parameters in Shimla and Kinnaur	DAE-BRNS	Dr. Venkata Krishnan (PI) Dr. Rik Rani Koner (Co-PI)	29,24,300	2 years
49	Spatial distribution of uranium and associated water quality parameters in Mandi, Kullu and Hamirpur	DAE-BRNS	Dr. Dericks P Shukla (PI) Dr. Aditi Halder (Co-PI)	27,51,800	2 years
50	Development of pristine graphene as a catalyst support	SERB	Dr. Prem Felix Siril (PI) Dr. Subrata Ghosh (Co-PI)	29,54,600	3 years
51	Vigyan Jyoti- A new initiative of DST for women	DST	Dr. Arti Kashyap (PI) Co-PI's: Dr. Bindu Radhamany, Dr. Amit Prasad, Dr. Aditya Nigam	16,57,900	1 year
52	Development of two types of POST ETCH RESIDUE STRIPPERS suitable for cleaning and removal of residues after plasma etching & photo resist ashing of metal & dielectric layers	SCL Mohali	Dr. Subrata Ghosh	39,00,000	2 years
53	Translational research on cell-free DNA (cf-DNA) sensing pathways for early diagnosis and development of biomarker for sepsis	SERB	Dr. Avinash Singh (PI) Dr. Amit Prasad (Mentor)	19,20,000	2 years
54	Papping cellular metabolism of agricultural and industrial relevant Xanthomonas spp	SERB	Dr. Tanmoy Samanta (PI) Dr. Shyam Kumar Masakapalli (Mentor)	19,20,000	2 years
55	Development of an efficient numerical method for solving stochastic partial differential equation and its application to turbulent flow analysis	SERB	Dr. Rajendra Kumar Ray	20,09,918	3 years
56	Organic-Inorganic hybrids for Photochromic photocatalytic and antioxidant applications	SERB	Dr. Pradeep C Parameswaran	39,44,600	3 years
57	Study of standard noncommuting and commuting dilations of commuting tuples	DST-INSPIRE	Dr. Kalpesh Jayantilal Haria	35,00,000	5 years
58	Curve crossing problems: Semi-analytical method for arbitrary coupling	CSIR	Dr. Aniruddha Chakraborty	2,49,833	3 years
59	Study of vector- borne diseases under the influence of environmental pollution	SERB	Dr. Nitu Kumari	22,28,160	3 years
60	Role of micro RNAs controlled by cmyc and Bmi1 in human glioma stem cells	SERB	Dr. Neha Garg	47,57,058	3 years
61	Uplifting hilly livelihood through the eco-friendly utilization of lantana weed	DST	Dr. Arti Kashyap	25,19,642	3 years
62	FIST for improvement of S & T infrastructure- FIST project	DST	Dr. Aditi Halder	1,12,00,000	5 years

63	Understanding the role of miRNAs and pattern recognition receptors mediated modulation of innate immune cells in neurocysticercosis	DBT	Dr. Amit Prasad	53,31,550	3 years
64	Development of decision support systems integrating parallel adaptive heruristic algorithms of large- scale multi- objective optimization problems for socio- economic and environmental planning	DST	Dr. Manoj Thakur (IIT Mandi) Dr. Andranik S Akopov (Russia)	26,20,400	2 years
65	Exciton manipulation in layered dichalcogenides-group II-VI semiconductor nanostructured materials	SERB	Dr. Dushyant Kushavah (PI) Dr. Suman Kalyan Pal (Mentor)	19,20,000	2 years
66	Implications of disordered regions in Zika virus capsid folding and functions	DBT-IYBA	Dr. Rajanish Giri	57,08,800	3 years
67	Study the dynamical evolution of spin and valley related many particle electronic states in two dimensional transition metal dichalcogenides using ultrafast time- resolved spectroscopy	SERB	Dr. Suman Kalyan Pal	35,00,716	3 years
68	Large unit cell materials with intrinsically low thermal conductivity for thermoelectric application	SERB	Dr. Ajay Soni	47,12,400	3 years
69	The role of ectopic liver derived systemic factors in regulating betacell function	DBT-IYBA	Dr. Prosenjit Mondal (PI)DBT	50,63,000	3 years

Seed Grant Projects

S. No.	Proposal Title	Investigator (s)	Amount Sanctioned (In Rs.)	Duration of Project
1	Controllability of Some Differential Equations	Dr. Muslim Malik	4,64,000	3 years
2	Targeted delivery of therapeutics to pancreatic beta cells by nanocarriers to augment glucose-dependent insulin secretion	Dr. Prosenjit Mondal, Dr. Amit Jaiswal	20,00,000	3 years
3	Inhabition of the Alzheimer's Aβ-Peptide Fibrillization by derived disordered peptides of Transthyretin: Molecular Mechanism by Atomic Force Microscopy	Dr. Rajanish Giri	7,00,000	3 Years
4	System Biology of selected Proteobacteria with idustrial, environmental and agricultural significance	PI- Dr. Shyam Kumar Masakapalli, Co PI- Dr. Tulika P Srivastava	18,00,000	3 Years

Women Centre In-House Project

S. No.	Investigator (s)	Title
1	Dr. Tulika P. Srivastava	EWOK - Enabling Women Of Kamand

Progress of Projects

Stimuli Responsive Smart Nanocarriers for Theranostic Applications(IITM/SERB/AJ/99)

PI: Amit Jaiswal
Funding Agency: SERB
Amount Sanctioned: Rs. 22,56,000/-
Amount Spent: Rs. 16,69,170/-
Status: Completed (27 Nov 2015 to 26 Nov 2018)

Herein, we demonstrated and evaluated for the first time the potential of poly(allylamine hydrochloride)-functionalized reduced graphene oxide (RGO)-based nanocomposite (RGO-PAH) nanocomposite as an efficient in vitro chemo photothermal agent for treating cancer. Graphene oxide nanosheets synthesized by Improved Hummer's method were simultaneously reduced and functionalized using a cationic, biocompatible polymer poly (allylamine hydrochloride) to form RGO-PAH nanocomposites. Use of PAH in place of PEI as a much safer functionalizing and reducing alternative resulted in improving the overall biocompatibility of the nanocomposites. The in vitro biocompatibility profile of RGO-PAH was found to be much superior than many of the reported GO and RGO-based nanocomposites functionalized with PEI. RGO-PAH nanocomposites exhibited excellent colloidal stability and NIR responsive photothermal transducing behavior. Presence of a net positive charge on the surface of RGO-PAH resulted in rapid internalization of the drug-loaded nanocomposites by MCF-7 cells within 30 min as compared with free drug of equivalent concentration. In addition, the RGO-PAH nanocomposites also exhibited better and faster cellular uptake at a much lower concentration in comparison with PEI-functionalized RGO-based nanocomposites reported in literature. The nanocomposites demonstrated highly efficient synergistic chemo-photothermal killing of breast cancer cells at a concentration as low as 5 μg/ml, which was again found to be much superior than other reported RGO-based nanocomposites like nrGO-PEG/PEI/DOX and PEG-BPEI-rGO/DOX in terms of therapeutic potential. Flow cytometry analysis, confocal microscopy and SEM studies revealed the potential of drug-loaded RGO-PAH nanocomposites in inducing apoptosis in MCF-7 breast cancer cells by increasing the intracellular ROS levels that ultimately led to oxidative DNA damage and alterations in cellular morphology. To further explore the gene delivery ability of the synthesized nanocomposites, a modified derivative of PAH was synthesized and used for developing RGO-mPAH with a higher positive charge as compared to RGO-PAH. For achieving targeted delivery of therapeutic cargo (nucleic acids) to breast cancer cells, the RGO-mPAH nanocomposites were functionalized with folic acid (FA), whose receptor is known to be widely overexpressed in breast cancer cells. Gel retardation assay clearly showed the DNA binding ability of all the

synthesized nanocomposites and validated their potential for further exploration as non-viral gene delivery vectors. RGO-mPAH & RGO-mPAH-FA showed complete binding with pDNA at a w/w ratio of 4:1 (NP:pDNA). Whereas, RGO_PAH showed complete binding at 6:1 ratio indicating the modification of PAH led to increase in the binding capability with pDNA.

Engineering Novel Plasmonic Nanocapsules for Cancer Therapy and Diagnostics (IITM/DBT/AJ/111)
PI: Amit Jaiswal
Funding Agency: DBT
Amount Sanctioned: Rs. 19,31,000/-
Amount Spent: Rs. 17,38,207/-
Status: Completed (23 June 2016 to 28 Sep 2018)

Herein, we have successfully demonstrated a facile approach for the synthesis of Au nanocapsules with a solid pentatwined Au bead as core and thin porous rod-shaped Au shell having LSPR peak both in NIR I and NIR II region and demonstrated its potential as a novel cancer theranostic agent. The unique properties of these plasmonic structure such as porous nature, intrinsic EM hotspots and broad absorption in the NIR region were utilized in designing a stimulus responsive nanotheranostic system capable of SERS based bioimaging along-with chemo-photothermal therapy. The porous nature and the presence of intrinsic EM hotspots in these structures allowed us to load a Raman reporter or a drug into them thereby making them function as SERS probes for bioimaging on one hand and as a drug delivery vehicle on the other hand.

A theranostic system comprising of highly porous gold nanorattles (AuNRTs) impregnated inside cationic chitosan nanocarriers have been developed. The AuNRT structure served as a (i) stimulus (NIR) responsive drug delivery vehicle, (ii) SERS bioimaging probe and (iii) NIR responsive photothermal transducer. To achieve a control and systematic release of drug from the nanocomposites, a phase changing material (PCM) having a melting temperature of ~39ºC was loaded along with a chemotherapeutic drug doxorubicin inside the pores of the AuNRTs. The synthesized CS-AuNRT nanocarrier showed high biocompatibility, excellent drug loading capacity and NIR responsive controlled drug release ability, enhanced SERS activity and excellent photothermal transduction. The nanocarriers were successfully used for in vitro SERS bioimaging guided synergistic chemo-photothermal treatment of breast cancer cells.

Nanoplasmonic SERS Substrate Design for Trace Analysis and Detection (DAE-BRNS-YSRA)
(IITM/DAE-BRNS/AJ/150)
PI: Amit Jaiswal
Funding Agency: DAE-BRNS
Amount Sanctioned: Rs. 24,99,400/-
Amount Received: Rs. 16,07,000/- (until 2nd yr)
Amount Spent: ~Rs. 16,00,000/-
Status: Ongoing (01 April 2017 to 31 Mar 2020)

Real time, point of sampling analysis detection and identification of trace materials (hazardous or benign) is of utmost importance amongst diverse fields viz. Department of Defense, homeland security, medical, environmental, industrial and forensic analysis. Herein, various anisotropic Au nanostructures are prepared which showed superior SERS sensing ability in detecting molecules of interest (2-NT as a model analyte) with distinguishable Raman band with a detection limit of 1 fM (S/N ratio > 4). We have fabricated a paper based SERS substrate using the prepared nanocapsules. The analytical enhancement factor of the fabricated SERS substrate was calculated to be 4.08 × 1013.The hot spots generated due to plasmonic coupling will allow sensitive detection of trace analyte molecule using SERS technique. The ease of fabrication of the SERS substrate and the ability of synthesizing nanostructures using a simple chemistry lab, and the availability of portable handheld Raman spectrometer will enable rapid point of sampling analysis of trace materials in the field of forensics, food safety, defense, standoff detection and environmental protection. In addition, this would help reduce the cost and time delays associated with a central lab model common to regulatory and accreditation agencies, as well as open new avenues for analysis of labile samples that would decompose or otherwise change between the point of sampling and the laboratory in which they are analyzed.

Effect of dimensionality on the lectronic structure of some novel transition metal oxides
(IITM/UGC-DAE/BR/83)
PI: Bindu Radhamany
Funding: UGC-DAE
Total Funding: Rs.2,29,800 per year
Duration: 4 years
Status: Ongoing

Resonant photoemission measurements on bulk $La_{0.2}Sr_{0.8}MnO_3$: We have performed temperature dependent resonant photoemission measurements on $La_{0.2}Sr_{0.8}MnO_3$ across Mn 3p-3d optical absorption threshold at AIPES beamline, Indus-1, RRCAT. The incident energy was varied from 40eV to 64eV and the valence band spectra were recorded at room temperature and 150K. The analysis of constant initial state spectra at RT and 150K obtained by fitting the valence band spectra indicate the temperature dependent spectral weight transfer observed in the valence band region is due to the reduction in the Mn-O hybridization. We have also carried out density of states calculations using density functional theory within local spin density approximation with onsite coulomb interaction U. We found that, for an onsite coulomb interaction energy value of 4eV, the experimental valence band spectra matches with the calculated total density of states. The results have been communicated.

Phase separation effects in GdCu, an electronic structure and crystal structure studies: GdCu is a rare earth intermetallic compound which shows a first order martensitic transition from cubic to orthorhombic phase and exhibits phase co-existence in a wide temperature range. The polycrystalline samples of GdCu were prepared using arc melting method at **UGC-DAE CSR Indore.** X-ray diffraction measurements were done by cooling the sample to different low temperatures and heating back to room temperature. Photo emission measurements were performed by

using Al-K alpha x-ray, He I and He II radiations. Temperature dependent Gd 4f core level shows changes in the asymmetry. An asymmetric spectral weight transfer is observed with temperature across the Fermi level in He I spectra. We have also carried out density of states calculations to understand the electronic structure of this compound. The analysis of the results is in progress.

Preparation and characterization of Sr_2IrO_4 : We have prepared the strontium iridium oxide (Sr_2IrO_4) using solid state reaction method. The x-ray diffraction measurements have revealed that the compound is formed in single phase. We have also performed temperature dependent susceptibility measurements to confirm the ferromagnetic transition in the compound. Preparation of electron doped samples of Sr_2IrO_4 by creating oxygen deficiency is in progress. Further experiments are planned for the core level and valence band photo emission measurements.

Engineering the electronic structure of possible oxide topological insulators (IITM/SERB/BR/149)
PI: Bindu Radhamany
Funded by: SERB
Total Funding: Rs. 29,51,960/-
Duration: 3 years
Status: Ongoing

Structure and properties of $BaBiO_3$ and $BaBi_{1-x}Y_xO_3$: We have investigated the crystal structure and the electronic structure of $BaBiO_{3-\delta}$ and $BaY_xBi_{1-x}O_{3-\delta}$ (x=0.1) using the powder x-ray diffraction (XRD) and x-ray photoemission techniques. The XRD studies performed at room temperature reveal that the prepared samples are in single phase and that $BaY_{0.1}Bi_{0.9}O_{3-\delta}$ has lower symmetry than the parent compound. The temperature dependent XRD data shows that $BaBiO_{3-\delta}$ undergoes structural transition from I2/m to P2/n phases at 140 K which is as reported in literature [1]. Resistivity data collected for the two samples show that the resistivity increases when $BaBiO_{3-\delta}$ is doped with Yttrium. The valence band spectrum obtained from XPS, shows an increase in the band gap of $BaY_{0.1}Bi_{0.9}O_{3-\delta}$ when compared with $BaBiO_{3-\delta}$, which corroborates the resistivity results. The core levels collected indicate a shift in the peaks in $BaY_{0.1}Bi_{0.9}O_{3-\delta}$ towards lower binding energy. Interestingly, the valence band studies reveal weak structures in $BaBiO_{3-\delta}$ in the energy range of 0.5 eV to 2 eV. These oscillations are suppressed on Y-doping, which indicate that these oscillations are related to Bi ions. We intend to study this phenomenon further in order to perceive its origin.

Dr. Kaustav Mukherjee, Investigation of physical properties of rare earth and transition metal based oxides and intermetallics showing significant magnetocaloric effect: The compounds with perovskite structure are reported to exhibit various functional properties like colossal magnetoresistance, giant magnetocaloric effect, high temperature superconductivity, multiferrocity etc. Further, these compounds provide a playground to study the underlying physics behind these observed mechanisms. Recent investigations on mixed transition metal oxides reveal that these compounds are interesting as the presence of two transition metals within the perovskite structure can be useful to enhance the magnetic properties and at the

same time tune or induce functional properties as compared to their parent compound. Combining 3*d*-3*d*, 3*d*-4*d* and 3*d*-5*d* transition metal within the perovskite structure can be an effective approach of enhancing the above-mentioned properties. Investigation of glassy magnetic phase observed in magnetic materials is attracting immense attention in this area of research. The prerequisite for the observation of cooperative glassy state is the presence of crystallographic disorder and/or a geometrically frustrated lattice which generally frustrates the magnetic moment of a magnetic system. However, recent investigations reveal observation of glassy magnetic phase also in crystallographically well-ordered, geometrically non-frustrated and stoichiometric compounds. Hence, studies are carried out on mixed transition metal oxides $YFe_{0.5}Cr0.5O_3$, $DyFe_{0.5}Cr_{0.5}O_3$ (and its derivatives) and binary intermetallics R_5Pd_2 (R = Er, Tb, Dy). The former compound is investigated to study the exchange bias and magnetocaloric effect exhibited by the compound. A detailed investigation of magnetic and magnetocaloric properties of partially rare-earth substituted (both magnetic and non-magnetic) mixed metal oxide, $Dy_{0.8}R_{0.2}Fe_{0.5}Cr_{0.5}O_3$ (R = Dy, Er and La) is carried out to understand the nature of magnetic transition and magnetic correlations in the series. To investigate the evolution of magnetic, magnetocaloric and multiferroic properties and to establish the role of rare-earth on magnetoelectric coupling, studies are carried out on the series $Dy_{1-x}R_xFe_{0.5}Cr_{0.5}O_3$ (x = 0.6 and; R = Er and Gd). Further, in order to explore the effect of hole doping on the dielectric or/and ferroelectric as well as on magnetic and magnetoelectric coupling properties of $DyFe_{0.5}Cr_{0.5}O_3$, investigation are carried out on $Dy_{0.6}Ca_{0.4}Fe_{0.5}Cr_{0.5}O_3$. Additionally, investigations are carried out on binary intermetallics R_5Pd_2, as these compounds have complex magnetic state along with good magnetocaloric properties. Moreover these compounds are structurally ordered and do not show geometrical frustration. Hence studies are carried out on Er_5Pd_2, Tb_5Pd_2 and Dy_5Pd_2 to thoroughly investigate the presence of different glassy magnetic phase and nature of transition in these compounds. In order to study the evolution of magnetocaloric parameters with partial replacement of 4*d* transition metal with 3*d* transition metal, investigation of magnetic and magnetocaloric properties is carried out on Dy_5PdNi.

Dr. Kaustav Mukherjee, Non-Fermi liquid behavior in the Ce based intermetallic system: In the area of research on 4*f*-electron based compounds a challenge which remains elusive is to understand the non-Fermi liquid (NFL) behavior, which violates the applicability of Fermi-liquid (FL) theory. The NFL behavior arises due to singular interaction mediated by soft collective modes and physical properties of such systems cannot be understood in term of the weak interactions among the electrons. Such behavior is characterized by the unusual temperature dependences of heat capacity, resistivity etc. These anomalous variations of the physical properties have attracted attention among physicists working in the area of strongly correlated electron systems. The current theories which explain the NFL behaviour are the following: two-channel Kondo model, models which explains NFL behavior close to the quantum critical point, and disordered Kondo model. In this context, polycrystalline CeGe, which is a 4*f*-electron based intermetallic compound, is investigated by the magnetization, heat capacity and electrical transport measurements. The results indicate towards the development of a new order parameter driven by multipolar moments in this compound, which is also studied by the Landau free energy theory. The magnetic field dependent (upto 14 Tesla) study reveals the absence of signatures of FL or NFL behavior in CeGe.

Further, investigation on this compound revealed that La-substitution at Ce-site results in the observation of NFL behavior in $Ce_{0.24}La_{0.76}Ge$. This behavior arises due to the presence of sufficient disorder. Under the influence of magnetic field, a crossover from the NFL to a short-ranged ordered magnetic state is observed near 2 Tesla in $Ce_{0.24}La_{0.76}Ge$. Magnetoresistance scaling indicates that behavior of the disorder driven NFL state is described by the dynamical mean field theory of the spin glass quantum critical point. In addition, magnetization measurements are carried out by means of DC and AC susceptibility on high quality polycrystalline magnetic semimetal CeAlGe. The results shows the presence of spin-lattice relaxation phenomena due to the spin-orbit coupling, emerging possibly from the presence of magnetic Weyl state, as predicted theoretically.

Dr. Kaustav Mukherjee, Study of the evolution of the magnetic phases arising out of Mn-substitution at Fe-site in a Heusler alloy Fe_2CrAl: Investigation is carried out on a series of Heusler alloys $Fe_{2-x}Mn_xCrAl$ (x = 0, 0.25, 0.5, 0.75 and 1). Structural analysis suggests that with increasing Mn concentration, the $L2_1$ structure of Fe_2CrAl is destabilized due to an increase of anti-site disorder between Fe and Al. From DC magnetization and AC susceptibility studies, it is observed that Fe_2CrAl undergoes a paramagnetic (PM) to ferromagnetic (FM) phase transition approximately at 202 K (*T*c). Additionally, through magnetic memory effect, heat capacity, time dependent magnetization, and DC field dependent AC susceptibility studies it is observed that as the temperature is decreased Fe2CrAl exhibits cluster glass-like transition approximately at 3.9 K(T_{f3}). With increase in Mn content, the *T*c is suppressed to 120, 48 and 27 K for $Fe_{1.75}Mn_{0.25}CrAl$, $Fe_{1.5}Mn_{0.5}CrAl$ and $Fe_{1.25}Mn_{0.75}CrAl$ respectively. However, it is observed that $Fe_{1.75}Mn_{0.25}CrAl$ and $Fe_{1.5}Mn_{0.5}CrAl$ exhibits double glass-like transition near T_{f2} ~22 Kand T_{f3} ~ 4.2 K and T_{f2}~ 30.4 K and T_{f3} ~ 9.5 K respectively. Interestingly for $Fe_{1.25}Mn_{0.75}CrAl$, a single cluster glass-like transition is noted at T_{f3}~11.5 K below *T*c. For FeMnCrAl, no long ranged magnetic ordering is observed and this alloy undergoes cluster glass-like transitions at ~ 22 K (T_{f1}), 16.6 K (T_{f2}) and 11 K (T_{f3}). At high temperatures, a detailed analysis of temperature response of inverse DC susceptibility reveals the presence of Griffiths phase around 364 K in Fe_2CrAl. This phase is suppressed to ~ 300, 206, 180, and 214 K for $Fe_{1.75}Mn_{0.25}CrAl$, $Fe_{1.5}Mn_{0.5}CrAl$, $Fe_{1.25}Mn_{0.75}CrAl$ and FeMnCrAl respectively. In the present case, drastic decrease in *T*c has been attributed to development of antiferromagnetic (AFM) coupling between Fe and Mn. Also, observation of more than one CG state has been attributed to increment in magnetic anisotropy in the system. It weakens the coupling between infinite clusters and dissociates them into small clusters. These clusters freeze at different temperature depending upon their anisotropic fields. In this series of alloys, we have found that bigger and less anisotropic clusters freezes near T_{f1} and T_{f2} whereas smaller and highly anisotropic near T_{f3}. Investigation of the high temperature regime suggest the presence of Griffiths phase in this series of alloys.

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National Conferences Attended and Papers Presented

1. Dr. Chayan K Nandi, “Rectifying the Misleading Artifacts in Carbogenic Nanodots”, 12-15th February 2019, MRSI AGM annual meeting, IISC Bengaluru.
2. Dr. Chayan K Nandi, “Fluorescent Nanodots as an Excellent Marker for the Correlative Super-Resolution Microscopy”, Spectroscopy and Dynamics of Molecules and Clusters, 21-24th February 2019, Koti Resort, Shimla.
3. Dr. Chayan K Nandi, “Paving the Path to the Future of Carbogenic Nanodots” National conference on Recent Trends in Chemical and Environmental Sciences, 7-8th Feb 2019, Punjabi University, Patiala, India.
4. Dr. Chayan K Nandi, “Carbon Dots or Organic Nanocrystals?”, 18th April 2018, INST Mohali.
5. Dr. Chayan K Nandi, “Correlative Super Resolution Microscopy: A New Direction in Nanoimaging”, 12-17th Sept 2018, National workshop on Fluorescence and Raman Spectroscopy, JNU Delhi.
6. Dr. Pradeep Kumar,Annual Meeting on Physics of Strongly Correlated Electron Systems (PSCES-2019) on Anisotropic electron-phonon coupling in MoS2, held at IIT Delhi, 6-8 March 2019.
7. Dr. Rajendra Kumar Ray, Shear flow past an array of three square cylinders in side-by-side arrangement: A structural bifurcation analysis, In: International Conference on Applied and Computational Mathematics (ICACM-2018), November 23-25, 2018, IIT Kharagpur, India.
8. Dr. Rajendra Kumar Ray, Shear flow past an array of three square cylinders in side-by-side arrangement: A structural bifurcation analysis, In: International Conference on Mathematical Modeling and Computations (ICMMC-2018), December 1 – 3, 2018, South Asian University, New Delhi, India.
9. Dr. Rajendra Kumar Ray, Structural Bifurcation Analysis Of Unsteady Flow Separation From Shear Flow Past Circular Cylinder At Low Reynolds Number, In: International Conference On Complex Fluids And Soft Matter (COMPFLU-2018), December 06-09, 2018, IIT Roorkee, India.
10. Dr. Hari Varma, Photoionisation studies of potassium using multi-configuration methods.13th Asian International Seminar on Atomic and Molecular Physics,Tata Institute of Fundamental Research & IIT Mumbai, Mumbai, Dec.3-8, 2018.
11. Dr. Hari Varma, Effects of exchange-correlation functionals on the ground state of Nax(x = 8,20 and 40) clusters. 13th Asian International Seminar on Atomic and Molecular Physics, Tata Institute of Fundamental Research & IIT Mumbai, Mumbai, Dec.3-8, 2018.
12. Dr. Hari Varma, WES time delay across autoionization resonances in krypton. 13th Asian International Seminar on Atomic and Molecular Physics, Tata Institute of Fundamental Research & IIT Mumbai, Mumbai, Dec.3-8, 2018.
13. Dr. Bindu Radhamany, Investigation of Mn 3*d* character in $La_{0.2}Sr_{0.8}MnO_3$, Indus synchrotron User’s meeting’19 (ISUM) at UGC-DAE, CSR Indore - National conference on electronic structure-2018 (special invitee).

14. Dr. Amit Jaiswal, Plasmonic Nanostructures and 2-D Material based nanocomposites for applications in Biology, Catalysis and Sensing, Invited Talk, ACES-2019, National Conference on Advances in Chemical Engineering and Science, March 07-08, 2019 at IISER Bhopal.
15. Dr. Amit Jaiswal, Stimuli Responsive Nanomaterials for Drug Delivery and Photothermal Therapy, Oral Presentation, 6th world congress on Nanomedical Sciences-ISNSCON-2018", "Chemistry-Biology Interface 2019" and "Conference on "Science and Technology for the Future of Mankind" from 7th to 10th January, 2019 at Vigyan Bhawan, New Delhi.
16. Dr. Amit Jaiswal, Advanced nanomaterials for Biomedical Applications, Selected Talk, UK-INDIA Interdisciplinary Workshop on Advanced Biomaterials and Biosensors, (ABB-2018) Cardiff University (UK) / IIT Ropar (India) Workshop, 13-15 November 2018.
17. Dr. Amit Jaiswal, Gold Nanorattles: An Emerging Nanoplatform for Sensing and Theranostic Applications, Invited Talk, NANOBIOTECK 2018, 24th - 27th October, 2018 at All India Institute of Medical Sciences (AIIMS), New Delhi. NANOBIOTECK-2018 is jointly hosted by All India Institute of Medical Sciences, New Delhi and Indian Institute of Technology, New Delhi in partner with Department of Biotechnology, Government of India.
18. Dr. Amit Jaiswal, Plasmonic Nanorattles: Engineering its Structure for Applications in Catalysis, Sensing and Theranostics, Invited Talk, BioMET 2018, International Conference on Bio-Materials, Bio-Engineering and Bio-Theranostics 24th - 28th July 2018 Organized by Centre for Biomaterials, Cellular and Molecular Theranostics (CBCMT), VIT, Vellore, India In Association with Society for Biomaterials and Artificial Organs, India (SBAOI) Society for Tissue Engineering and Regenerative Medicine, India (STERMI).
19. Dr. Ajay Soni, Optimization of Charge Carriers and Thermoelectric Performance of Intrinsically p-Type Bi_2Te_3 by Germanium Doping, Niraj Kumar Singh, Juhi Pandey, Somnath Acharya and Ajay Soni, PSCES, IIT Mandi, 2018.
20. Dr. Ajay Soni, High Thermoelectric Power Factor in p-Type Cu_8GeSe_6, Somnath Acharya and Ajay Soni, poster presentation in DAE Solid State Physics Symposium at Hisar, India in December, 18-22, 2018.
21. Dr. Ajay Soni, Copper-Induced Majority Charge Carrier Reversal in Bismuth-Telluride Based Nanothermoelectrics, Niraj Kumar Singh, G. Ramanath and Ajay Soni, poster presented at in DAE Solid State Physics Symposium at Hisar, India in December, 18-22, 2018.
22. Dr. Ajay Soni, Manipulating Charge Transport in Copper Incorporated Bismuth Telluride Nanoplatelets, Niraj Kumar Singh, G. Ramanath and Ajay Soni, poster presented at PSCES, IIT Delhi, 2019.
23. Dr. Ajay Soni, Understanding of Multiexciton and Excitonic Excited States in Monolayer MoS_2, Juhi Pandey and Ajay Soni, oral presentation in Material Research Society of India, MRSI 2019, at IISc Bangalore in March 2019.
24. Dr. Ajay Soni, Probing Multiexciton and Excitonic Excited States in Monolayer MoS_2 Using Photoluminescence Spectroscopy, Juhi Pandey and Ajay Soni, poster presentation in International conference on Functional Materials, ICFNM 2019, at IIT BHU in March 2019.

25. Dr. Ajay Soni, Alternate Floating Gate layers for High-Density Non-Volatile Flash Memory Applications with Large Memory Window and Robust Retention Characteristics, Mahesh Soni, Ajay Soni and Satinder Kumar Sharma, poster presentation in Nano/Micro 2D-3D Fabrication, Manufacturing of Electronic–Biomedical Devices & Applications (IWNEBD), Mandi, 2018.
26. Dr. C. S. Yadav,Effect of synthesis temperature on the electrical and thermal transport properties of $ZrTe_3$. Annual Meeting on Physics of Strongly Correlated Electron Systems at IIT Delhi, India (March 6 – 8, 2019).
27. Dr. C. S. Yadav, Magnetic Studies of Pyrochlore Antiferromagnet $La_2Zr_2O_7$. Annual Meeting on Physics of Strongly Correlated Electron Systems at IIT Delhi, India (March 6 – 8, 2019).
28. Dr. C. S. Yadav, Crystal Structure and Magnetism of Layered Perovskites Compound $EuBaCuFeO_5$. *AIP Conf. Proc.* 1942, 130004, (2018).
29. Dr. C. S. Yadav, Thermal Conductivity of Multiferroic Material $YBa_{1-x}Sr_xCuFeO_5$ (x= 0, 0.25, 0.5). *AIP Conf. Proc.* 2005, 050001(2018).
30. Dr. C. S. Yadav, Electronic transport and Magnetic properties of Fe intercalated Bi_2Se_3 compound: $Fe_{0.10}Bi_2Se_3$. Physics of strongly correlated electron systems (PSCES),2-4 April 2018, IIT Mandi, Mandi.
31. Dr. C. S. Yadav, Structural, dielectric and magnetic studies of Mn doped Y-type barium hexaferrite ($Ba_2Mg_2Fe_{12}O_{22}$. *AIP Conf. Proc.*, 1942, 1300037 (2018).
32. Dr. C. S. Yadav, Unusual Quantum oscillations in preferred oriented polycrystalline $ZrTe_5$. Annual Meeting on Physics of Strongly Correlated Electron Systems at IIT Mandi, India (April 2 – 4, 2018).
33. Dr. C. S. Yadav,Electronic transport and Magnetic properties of Fe intercalated Bi_2Se_3 compound: $Fe_{0.10}Bi_2Se_3$. International Conference on Magnetism and Magnetic Materials at NISER Bhubneshwer (9-13th November 2018).
34. Dr. C. S. Yadav, Low temperature Properties of Sr Doped Layered Perovskite Compound. International Conference on Magnetism and Magnetic Materials at NISER Bhubneshwer (9-13th November 2018).
35. Dr. C. S. Yadav, Structural and Magnetic Properties of Multiferroic Compound BiMn2O5. International Conference on Magnetism and Magnetic Materials at NISER Bhubneshwer (9-13th November 2018).
36. Poonam Jyoti, Manushree, Srivastava TP, Ray SK, Sathapathy SS, Masakapalli SK metabolic systems biology of Ralstonia solanacearum genome to phenome. Poster presented in Molecular Intricacies of plant associated microorganisms, MIPAM-2019, NIPGR Delhi, Feb 1st to 3rd, 2019.
37. Poonam Jyoti, Srivastava TP, Ray SK, Sathapathy SS, Masakapalli SK.System Biology of Ralstonia solanacearum-decoding its PHB biosynthetic ability. Poster presented in 2nd Annual meeting of Biological Engineering Society and Conference, IIT Bombay, Oct 26th - 27th , 2018 [Best Poster award].
38. Maneesh Lingwan, KVK Linga Rao, Masakapalli SK. Comprehensive metabolome analysis of essential oils and associated phytochemical pathways using GC-MS. "Biological Engineering Society Conference (BESCON) 2018", 26-27th October 2018 at IIT Bombay.

39. Dr. Kaustav Mukherjee, tuning of f-d hybridization of CeGe compound by La-substitution. First Indian Materials Conclave, Feb. 2019, IISc, Bangalore, India.
40. Dr. Kaustav Mukherjee, Coexistence of Ferromagnetic and Glassy Magnetic states in the Heusler Compound Fe1.75Mn0.25CrAl. DAE Solid State Physics Symposium: Dec 2018, Hissar, Haryana, India.
41. Dr. Kaustav Mukherjee, H/T scaling in heat capacity and magnetization in Ce0.6Y0.4NiGe2 compound. National Conference on Quantum Condensed Matter: July 2018, IISER Mohali, India.
42. Dr. Kaustav Mukherjee, Multiferroic Properties of Layered Perovskite Sr doped YBaCuFeO5 Compound. National Conference on Quantum Condensed Matter: July 2018, IISER Mohali, India.

International Conferences Attended and Papers Presented

1. Dr. Pradeep Kumar, Orbiton-Phonon coupling in Ir5+(5d4) double perovskite Ba_2YIrO_6. 26th ICORS held at ICC Jeju (South Korea), 26-31 Aug. 2018.
2. Dr. Kalpesh Haria, Attended the International Congress of Mathematicians-2018, at Rio de Janeiro, Brazil, 01-09, August, 2018.
3. Dr. Rajendra Kumar Ray, The control of vortex shedding behind square cylinder for shear flows at *Re = 100*, In: 7th Annual International Conference "CMCGS-2018", 9-10 April 2018, Singapore.
4. Dr. Hari Varma, Photoionization dynamics of Ar and K+ trapped inside fullerenes and Time delay in photoionization from confined atoms: A contrastingstudy of hard Vs smooth jellium model potential. 49th Annual Meeting of the Division of Atomic, Molecular andOptical Physics (DAMOP 2018) of the American Physical Society, FortLauderdale, Florida, USA, May 28 – June 1, 2018.
5. Dr. Ajay Soni, Enhanced Thermoelectric Performance of Bulk Metal Chalcogenide Materials, Somnath Acharya and Ajay Soni, poster presentation in Conference on Modern Concepts and New Materials for Thermoelectricity (ICTP) at Trieste, Italy from March 11-15, 2019.
6. Dr. Ajay Soni, Thermoelectric Properties of Mn and Yb Doped Self Compensated SnTe, Somnath Acharya and Ajay Soni, Oral presentation in 12th International Conference on Ceramic Materials and Components for Energy and Environmental Applications (CMCEE 2018) at Singapore from July 22-27, 2018.
7. Dr. Ajay Soni, Effect of Charge Carrier Optimization on Thermoelectric Properties of Mn and Yb Doped SnTe, Somnath Acharya, Juhi Pandey and Ajay Soni, poster presentation in 37th Annual International and 16th European Conference on thermoelectrics (ICT-2018) at CAEN (Normandy), France from July 1-5, 2018.

8. Dr. Ajay Soni, Thermoelectric Performance of by Acceptor Type Germanium Doping, Niraj Kumar Singh, Juhi Pandey, Somnath Acharya and Ajay Soni, poster presented at International Conference on Thermoelectrics (ICT-2018), at Caen, France, from July 1-5, 2018.
9. Dr. C. S. Yadav,Quantum oscillations in $ZrTe_5$. 43rd Condensed Matter and Materials Meeting 2019 at Wagga Wagga, NSW, Australia (February 5-8, 2019) (Contributed talk).
10. Dr. C. S. Yadav, Multiferroic Properties of Layered Perovskite Sr Doped $YBaCuFeO_5$ Compound. Gordon Research Conference at Lewiston, ME, USA (Oct-2018).
11. Prosenjit Mondal, International Congress of Diabetes and Metabolism by Korean Diabetes Association 11-13 October, 2018 Seoul, Korea, Title of oral presentation: "Calcium channel blockers to ameliorate obesity-associated glucose intolerance and fatty liver pathologies"
12. Prosenjit Mondal, Keystone Symposia Conference subject Drivers of Type 2 Diabetes: From Genes to Environment October 7 - October 11, 2018 Seoul, Poster Title: Heavy metal exposure perturbs glucose homeostasis and promotes Non-Alcoholic Fatty Liver Diseases through hepatic calcium channel blocker.
13. Prosenjit Mondal, 7th International conference on Molecular Signaling, 2019. Oral presentation title: Zinc oxide nanoparticles attenuate hepatic steatosis development in high-fat-diet fed mice through activated AMPK signalling axis Pune during 23rd to 25th January 2019.
14. Semwal T, Masakapalli SK, Kala VU (2018) Root Morphology and Mechanical Characteristics of Himalayan (Indian) Native Plant Species. The International Congress on Environmental Geotechnics, 385-392.
15. Surender Lal, Sonu Chillar, K. Mukherjee, S.D. Kaushik, and C. S. Yadav, Commensurate to incommensurate antiferromagnetic ordering in $YBa_{1-x}Sr_xCuFeO_5$ (x = 0, 0.5): Low temperature neutron diffraction study. International Conference on Hyperfine Interactions and their Applications (HYPERFINE 2019): Feb 2019, Goa, India.
16. Mohit K. Sharma and K. Mukherjee, Field induced nature and nonlinear DC susceptibility studies of Ni substituted Dy_5Pd_2 cluster glass system. International Conference on magnetic materials and applications (ICMAGMA-2018), Dec. 2018, NISER, Bhubaneswar, India.
17. Kavita Yadav and K. Mukherjee, Magnetic properties of Mo doped intermetallic compound Fe2CrAl. International Conference on magnetic materials and applications (ICMAGMA-2018), Dec. 2018, NISER, Bhubaneswar, India.
18. Surrender Lal, K. Mukherjee and C. S. Yadav, Low temperature properties of Sr substituted layered perovskite materials. International Conference on magnetic materials and applications (ICMAGMA-2018), Dec. 2018, NISER, Bhubaneswar, India.
19. Sonu Chhillar, K. Mukherjee and C. S. Yadav, Structural and Magnetic Properties of Multiferroic Compound BiMn2O5. International Conference on magnetic materials and applications (ICMAGMA-2018), Dec. 2018, NISER, Bhubaneswar, India.

20. Mohit K. Sharma and K. Mukherjee, Field induced Magnetic Transition and Evidence of large magnetocaloric effect in Er_5Pd_2 intermetallic compound. International conference on caloric cooling: Sept. 2018, Darmstadt, Germany.
21. Surrender Lal, K. Mukherjee and C. S. Yadav, Multiferroic properties of layered perovskite Sr doped $YBaCuFeO_5$ compound. Multiferroic and Magnetoelectric Materials Gordon Research Conference: August 2018, Lewiston, ME, USA.
22. Karan Singh and K. Mukherjee, Onset of magnetic vortex state in CeGe compound: A dc and ac susceptibility, resistivity and heat capacity study. International Conference on Magnetism: July 2018, San Francisco, USA.
23. Karan Singh and K. Mukherjee, Magnetic excitation, partial gap opening and chemical pressure effect in $CeNiGe_2$. Intermag: April 2018, Singapore.

Workshop/ Conference Organized

1. Dr. Rajendra Kumar Ray, Instructional School for Teachers on "Field and Algebraic Number Theory", 4 -16 June, 2018, IIT Mandi.
2. Dr. Rajendra Kumar Ray, Faculty Development Program (FDP) On High Performance Computing (HPC), 26-30 November, 2018, IIT Mandi.
3. Dr. Pradeep Kumar, Organised a symposium cum annual meeting with ~ 120 participants on Physics of Strongly Correlated Electron Systems (PSCES-2018) at IIT Mandi, along with Dr. Shekhar and Dr. Kaustuv. 02.-04 April 2018.
4. Dr. Muslim Malik, Coordinator of the 3 days Indian academy lectures workshop on Essence of Partial Differential Equations during April 2-4, 2018. Member of the organizing committee of Mini MTTS during 8-13 October, 2018.
5. Dr. Arti Kashyap,Vigyan Jyoti Workshop 9 To 23rd Sept 2018 (A DST initiative for young girls): 15 Days workshop on Vigyan Jyoti has been successfully completed at IIT Mandi. The purpose of this workshop was to motivate 30 young girls of Govt schools of Himachal Pradesh to join the field of Science and Technology.
6. Dr. Arti Kadshyap, "Training Workshop on The Use of Briquette Machine For DPN Briquetting-The one-day training workshop was organized for entrepreneurs on 26 December 2018 in the topic "the use of briquette machine for dry pine needle briquetting". A total of 35 entrepreneurs from different parts of Himachal Pradesh participated in the workshop. The main goal of the training workshop was to motivate entrepreneurs to set up pine needle based industry. We explained the procedure involves and technicality in dry pine needle briquetting and briquette machine. We also organized a hands-on training session for participants in the briquette machine setup".
7. Dr. Arti Kashyap, "Workshop on Eco-friendly utilization of Dry Pine Needles for social benefits: We organized a workshop recently at IIT Mandi along with forest department officials to work together on the issue. The main aim was to aware people about the use of dry pine needles and encouraged them to set up pine needle based industry.We told them that by setting up this industry they will earn handsome income and additionally contribute to saving our forest from fire".

8. Dr. Syed Abbas, Organized "Mini-MTTS 2018", Mathematical workshop to the college students, 3-8 Dec 2018, IIT Mandi.
9. Dr. C. S. Yadav, Annual meeting on physics of strongly correlated electron systems April 02-04, 2018.
10. Dr. Shyam Kumar Masakapalli,2 days Farmer Zone 2018 workshop (May 2018) co-organised along with Farmerzone team at IIT Mandi – Participants were Principal Scientific Advisor, Govt of India; DBT India; CPRI Shimla and Meerut, NIAB UK; IORA Ecological solutions, Delhi; Vertiver, Delhi; Lahoul Potato Growers Association, Manali; Sanga Farms, Jalandhar; TCS; Microsoft Research, India and GODAN.

Professional Achievements, Honours and Awards

1. Dr. Chayan K. Nandi, CRSI bronze medal 2018-2019: The medal is given for the significant contribution in research in Chemistry. It is given by the "chemical research society of India (CRSI)". The medal will be given at IIT Kanpur on 19-21st July 2019.
2. Dr. Amit Jaiswal, "Received The Young Scientist MAHE Award" by the Society for Biomaterials and Artificial organs (India) during the XXVIII National conference of SBAOI and the International conference on Bio Materials, Bio Engineering and Bio Theranostics during July 24-28, 2018.
3. Dr. Rajanish Giri,Innovative Young Biotechnologist Award (IYBA 2018).
4. Dr. Rajendra Kumar Ray, Best Paper award: 7th Annual International Conference "CMCGS-2018", 9-10 April 2018, Singapore.
5. Dr. Ajay Soni, Bhaskara Advanced Solar Energy (BASE) Research Fellowship 2018 by Indo-US Science and Technology Forum and Department of Science and Technology India.
6. Dr. Qaiser Jahan, Awarded WISTEMM Indo-US, IUSSTF fellowship for three months to visit University of Oregon, Eugene, USA.
7. Dr. Syed Abbas, Indian National Young Academy of Science (INYAS), 2019.

Patents

1. Dr. Arti Kashyap, "Biomass Compact Briquette Fuel and its Preparation" 201811000279 (patent filed).

2. Prosenjit Mondal, "A Non-peptidic Glucagon-Like Peptide-1 Receptor Agonists for Anti-obesity and Anti-diabetes Therapeutics" 201811045023.

Membership of Professional Societies

1. Dr. Rajendra Kumar Ray, Member, Society for Industrial and Applied Mathematics (SIAM), 2011-Present.
2. Dr. Rajendra Kumar Ray, Life member, Calcutta Mathematical Society, 2017-Present.
3. Dr. Rajendra Kumar Ray, Life member, Indian Mathematical Society, 2017-Present.
4. Dr. Ajay Soni, Life membership of Society for Interdisciplinary Research in Materials and Biology.
5. Dr. C. S. Yadav, Neutron Scattering Society of India.
6. Dr. Shyam Kumar Masakapalli, Member of American Society of Microbiology (ASM).
7. Dr. Shyam Kumar Masakapalli, Founding member of Biological Engineering Society, India.

Visit to Academic Institutes and Lectures Delivered

1. Dr. Rajendra Kumar Ray,Two lectures on "Numerical Methods For PDE" in One–Week Faculty Development (FDP) Program On "Teaching Sciences and Mathematics", 21–25 January 2019, SMVD University, Katra, J&K.
2. Dr. Pradeep C. Parameswaran, Invited lecture titled 'Hybrid Polyoxometalates as Photochromic Materials, Photoresists and Self-Separating Catalysts' during the International Conference on Structural and Inorganic Chemistry (ICSIC) – II held at IISER Pune on 18-19th March 2019.
3. Dr. Pradeep C. Parameswaran, Invited lecture titled 'Hybrid Polyoxometalates as Photochromic Materials, Photoresists and Self-Separating Catalysts' during the 2nd International Conference on Chemistry, Industry and Environment held at Aligarh Muslim University on 18-19th February, 2019.
4. Dr. Pradeep Kumar,Delivered a talk 'Quantum Mechanics and Nanoscience' in 3rd Himachal Pradesh Science Congress held at IIT Mandi - 2018. 22-23 Oct. 2018.
5. Dr. Pradeep Kumar, Science outreach activity at a school in Mysore organised by Indian Academy of Sciences - 2018. Delivered a lecture 'Sir C V Raman and his legacy'28 June 2018.
6. Dr. Pradeep Kumar,Delivered a popular talk "Light + Light = No Light " on National Science Day-2019, organised by SCRI, IIT Mandi.28 Feb. 2019.
7. Dr. Pradeep Kumar,Delivered an invited talk in 2nd Annual Meeting on Physics of Strongly Correlated Electron Systems (PSCES-2019) held at IIT Delhi. 6-8 Mar. 2019.
8. Dr. Kalpesh Haria,Delivered lectures for School Children/Teachers on Srinivasa Ramanujan: A Mathematical Genius (On the occasion of the National Mathematics Day 2018) in Zonal level Exhibition cum Project Competition of INSPIRE AWARD MANAK at IIT Mandi, 21-23 December, 2018.
9. Dr. Venkata Krishnan, Delivered an invited talk at Jaypee University of Information Technology, Solan, Himachal Pradesh, India on Mar. 16, 2019.

10. Dr. Venkata Krishnan, Delivered an invited talk at Department of Chemistry, National Institute of Technology Trichy, Tamil Nadu, India on Feb. 07, 2019.
11. Dr. Venkata Krishnan, Participated and delivered an invited talk at the India-UK Second International Conference on Advanced Nanomaterials for Energy, Environment and Health Care Applications (ANEH-2019) held at Bishop Heber College, Trichirappali, Tamil Nadu, India from Feb. 04 to 06, 2019.
12. Dr. Venkata Krishnan, Participated and delivered an invited talk at the International Conference on Energy and Environmental Challenges (CE2C-2019) held at National Institute of Technology Nagpur, Maharashtra, India from Jan. 18 to 19, 2018.
13. Dr. Venkata Krishnan, Participated and delivered an invited talk at the National Conference on Advanced Materials for Energy and Environmental Applications (AMEEA-2018) held at National Institute of Technology Rourkela, Odisha, India from Dec. 12 to 14, 2018.
14. Dr. Venkata Krishnan, Participated and delivered an invited talk at the First XPS Workshop: Fundamentals and Applications of Surface Analysis at Goa, India from Nov. 27 to 28, 2018.
15. Dr. Venkata Krishnan, Delivered an invited talk at Department of Applied Sciences, PSG College of Technology, Coimbatore, India on Sep. 03, 2018.
16. Dr. Venkata Krishnan, Participated and delivered an invited talk at the Joint India-UK International Conference on Advanced Nanomaterials for Energy, Environment and Healthcare Applications (ANEH-2018) held at K.S.R. College, Tiruchengode, India from Aug. 31 to Sep. 01, 2018.
17. Dr. Venkata Krishnan, Participated and delivered an invited talk at the One-day Workshop on Water Technology held at Punjab Engineering College, Chandigarh, India from Aug. 11, 2018.
18. Dr. Venkata Krishnan, Delivered an invited talk at Department of Chemistry, IIT Ropar, Ropar on Jul. 25, 2018.
19. Dr. Venkata Krishnan, Participated and delivered an invited talk at the International Conference on Nanomaterials (ICN-2018): Synthesis, Characterization and Applications held at Mahatma Gandhi University, Kottayam, India from May 11 to 13, 2018.
20. Dr. Venkata Krishnan, Participated and delivered an invited talk at the International Symposium on Functional Materials (ISFM-2018): Energy and Biomedical Applications held at Chandigarh, India from Apr. 13 to 15, 2018.
21. Dr. Venkata Krishnan, Delivered an invited talk at Department of Chemistry, Anna University, Chennai, India on Apr. 06, 2018.
22. Dr. Muslim Malik, Visited department of Mathematics IISER Kolkata during 23rd January 2019 to 31st January 2019 for the collaborative research work.
23. Dr. Chayan K. Nandi,Invited speaker-Lecture delivered, International conference “Materials Research Society of India (MRSI AGM Feb 2019)”, 12-16th February 2019 Bengaluru.
24. Dr. Chayn K. Nandi, Invited speaker-Lecture delivered, International conference “SDMC meeting”, 21-24th February 2019 Shimla India.
25. Dr. Chayan K. Nandi, Invited speaker-Lecture delivered, National conference, 7-8th February 2019, Pujnabi University 2019.

26. Dr. Chayan K. Nandi,Invited speaker, Lecture delivered, International conference “FCS meeting”, 12-17th November 2018, JNU November 2018.
27. Dr. Syed Abbas,Invited talk on “dynamic equations on time scale” in SAU Delhi 2019. 21-23 January 2019.
28. Dr. Syed Abbas, Invited speaker in VI Rajasthan Science Congress, 13-15 Oct. 2018, CURAJ, India.
29. Dr. Syed Abbas,Invited talk in Indian Mathematical Society Conference, SMVDU Katra, Jammu, 27-30 Nov-2018.
30. Dr. Syed Abbas,Invited talk in ICMMAAC’18 International Conference on Mathematical Modelling, Applied Analysis and Computation, JECRC Univ. Jaipur, 6-8 July 2018.
31. Dr. Syed Abbas,Invited talks on "Neural networks and almost periodic solutions" in STCCTMA, NIT Kurushetra, 18-19 Jan. 2018.
32. Dr. Syed Abbas,Given Lectures in Vigyan Jyoti Training at IIT Mandi, Sept 10-12, 2018.
33. Dr. Rajanish Giri, Invited talk in the " Antimicrobial Resistance, Novel Drug Discovery and Development: Challenges and Opportunities" from 17 - 19 Mar 2019 at IIT Delhi, Sonipat Campus, Haryana, India. (This was a unique opportunity as it was an international conference where Nobel Laureate, Prof. Ada Yonath spoken about the structure of Ribosome. I also got the opportunity as a speaker.).
34. Dr. Rajanish Giri, Invited talk in the " Recent Advancements in Biochemical Engineering and Biotechnology" (RABEB-2019) at IIT (BHU) Varanasi during March 15-16, 2019.
35. Dr. Rajanish Giri, Invited talk in the " 11th National Symposium cum Workshop on "Recent Trends in Structural Bioinformatics and Computer Aided Drug Design"[SBCADD'2019], Algappa University, Karaikudi, Tamilnadu, 12th –15th February, 2019.
36. Dr. Suman Kalyan Pal, “Two-dimensional transition metal chalcogenides for future optoelectronic applications” in 7th National Conference on ‘Nanoscience and Instrumentation Technology’ (NCNIT-2019) during March 09-10, 2019.
37. Dr. Ajay Soni, Invited talk in International Conference on Functional Nanomaterials (ICFNM-2019), held at Indian Institute of Technology, Banaras Hindu University, Varanasi during Feb. 22-15, 2019. Dr. Soni also chaired a session in the conference.
38. Dr. Ajay Soni, invited talk in The 30th Annual General Meeting of MRSI and the First Indian Materials Conclave held at the Indian Institute of Science, Bangalore, India during Feb 12-15, 2019. Also co-organizer/chair of Thermoelectric Symposium in the same meeting.
39. Dr. Ajay Soni, Nanoscale Two Dimensional Layered Materials for Optoelectronics and Flexible Electronics Applications, Ajay Soni, Invited talk in 3rd International Conference on Soft Materials, Organized by MNIT Jaipur, INDIA, December 09-14, 2018.
40. Dr. Ajay Soni, Understanding Transport Properties of Bulk Chalcogenides, Ajay Soni, Invited talk in Two day Symposium on Thermoelectric Materials, Devices and Systems, Organized by Nanotech Research Innovation & Incubation Centre and PSG Institute of Technology, Coimbatore December 10-11, 2018.

41. Dr. Ajay Soni, Thermoelectric Performance through Band Modification and Phonon Engineering in Doped SnTe Somnath Acharya, Juhi Pandey and Ajay Soni, Invited talk in India-UK workshop on Thermoelectric Materials for Waste-Heat Harvesting, Organized by The Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR, India) and the University of Reading (UK), 2018.
42. Dr. C. S. Yadav, Unusual quantum oscillations and topological surface states in ZrTe5. Annual meeting on Physics of Strongly Correlated Electron Systems held at IIT Delhi from March 6-8, 2019.
43. Dr. C. S. Yadav, Quantum Oscillations and zero cusp paramagnetic susceptibility in $ZrTe_5$. National Conference: Advanced Materials for Energy and Environmental applications (AMEEA-2018) on Nov 2018 at NIT Rourkela, India.
44. Dr. C. S. Yadav, Is $YBaCuFeO_5$ a type II multiferroics? National Conference on Quantum Condensed Matter on July 2018 at IISER Mohali India.
45. Dr. Qaiser Jahan, Delivered a seminar on "Wavelets on Compact Abelian Group" at University of Oregon on February 5, 2019.
46. Dr. Qaiser Jahan, Visited "California Institute of Technology" during January 07-17, 2019.
47. Prosenjit Mondal, Invited talk at CSIR-Indian Institute of Chemical Biology on 20th Deecember, 2018 Title of the talk " Calcium channel blockers to ameliorate obesity-associated glucose intolerance and fatty liver pathologies ".
48. Prosenjit Mondal, "Trends in Modern Biology: Techniques and Applications" on 23rd and 24th of March, 2019 in the Department of Zoology, Visva-Bharati, Santiniketan. Invited lecture "Calcium channel blockers to ameliorate obesity-associated glucose intolerance and fatty liver pathologies".
49. Dr. Shyam Kumar Masakapalli, Defining cellular metabolic phenotypes using 13C tracers, NMR and GC-MS, Presented at Institute of Microstructure, Karlsruhe Institute of Technology, Germany, 2nd Aug 2018.
50. Dr. Shyam Kumar Masakapalli,13C fluxomics – challenges and opportunities to define cellular metabolic phenotypes. Presented at BESCON-2018, IIT Bombay, 27th Oct 2018.
51. Dr. Shyam Kumar Masakapalli, Introducing 13C Fluxomics and Smart Agriculture in Indian Context. Presented at NCBS, Bangalore, 20th Nov 2018.
52. Dr. Shyam Kumar Masakapalli, Comprehensive Phytochemical analysis from Himalayan flora with their potential applications at The Himalaya Drug Company, Bangalore, 19th Nov 2018.
53. Dr. Shyam Kumar Masakapalli, Introducing Metabolomics, Fluxomics and Smart Agriculture in Indian context. Presented at IISER Bhopal, 27th Dec 2018.
54. Dr. Shyam Kumar Masakapalli,High Tech Agriculture for Indian farms - How can we contribute? Presented at Rayagada College, Odisha, 16th Jan 2019.
55. Dr. Shyam Kumar Masakapalli,13C fluxomics towards mapping the Plant-microbial metabolic cross talk. Presented at Molecular Intricacies of plant associated microorganisms, MIPAM-2019, NIPGR, New Delhi, Feb 1st to 3rd, 2019.

56. Dr. Shyam Kumar Masakapalli, Metabolic Systems Biology approaches for optimal bioprocessing of cellulosic waste to valuables. Presented at BioSD, IICT Hyderabad, 24th Nov 2018.
57. Dr. Shyam Kumar Masakapalli, Defining cellular metabolic phenotypes using 13C tracers, NMR and GC-MS, Presented at Institute of Microstructure, Karlsruhe Institute of Technology, Germany, 2nd Aug 2018.
58. Dr. Shyam Kumar Masakapalli, Introducing 13C Fluxomics and Smart Agriculture in Indian Context. Presented at NCBS, Bangalore, 20th Nov 2018.
59. Dr. Shyam Kumar Masakapalli, Introducing Metabolomics, Fluxomics and Smart Agriculture in Indian context. Presented at IISER Bhopal, 27th Dec 2018.
60. Dr. Shyam Kumar Masakapalli,High Tech Agriculture for Indian farms - How can we contribute? Presented at Rayagada College, Odisha, 16th Jan 2019.

Outreach Activities

1. Dr. Pradeep C. Parameswaran, Nominated by the Chair, BoG of IIT Jammu as a member of the Senate, IIT Jammu for the academic sessions 2018-19 and 2019-20.
2. Dr. Pradeep Kumar, Co-coordinator - Science and Technology Education Programme (STEP) - an annual outreach activity of IIT Mandi.
3. Dr. Bindu Radhamany,One of member of the organising committee of Vigyan Jyoti workshop.
4. Dr. Syed Abbas,Interacted with School Students “Government Middle School Sumnani Dhar” on dated 27.03.2019.
5. Dr. Suman Kalyan Pal, “Organizing Zonal level Exhibition cum Project Competition of INSPIRE Awardee”, 21-23 December 2018.
6. Dr. Suman Kalyan Pal, Visit Jawahar Navodaya Vidyalaya, Pandoh, District Mandi for INSPIRE project evaluation.
7. Dr. Ajay Soni, Co-Chaired theme symposia on thermoelectric materials in First MRS Conclave meeting during Feb 2019 at IISc Bangalore.
8. Dr. Anirudha Chakraborthy,The Amazing World of Quantum Mechanics.Delivered talk at the STEP program for High School Students, (June 11-24, 2018), Indian Institute of Technology Mandi, Kamand, Himachal Pradesh, India.
9. C.S.Yadav and A. Taraphder conducted one day outreach activity on May 12, 2018 for the school and college students on the occasion of 125th birth anniversary of eminent physicist Satyendra Nath Bose. Activity was aimed to motivate the young students of the Mandi district in Himachal Pradesh.
10. Dr. Shyam Kumar Masakapalli,Activities conducted in IIT Mandi-Industry-EWOK-Farmer Network.

11. Dr. Shyam Kumar Masakapalli,Supported startups in Agriculture (Thapasu foods – IIT Mandi Catalyst startup).
12. Dr. Shyam Kumar Masakapalli,Hosted Himalayan Drug Company- Bangalore for exploratory visit towards empowering local farmers via EWOK network.
13. Dr. Shyam Kumar Masakapalli,Trained women from EWOK – Tea Packaging.
14. Dr. Shyam Kumar Masakapalli,Organised Botanical Garden tours of several local (about 7) schools, Girls students of VigyanJyoti conference held at IIT Mandi, MIT Boot camp students.
15. Dr. Shyam Kumar Masakapalli,Plantation Drives - 5WIP and NSS.
16. Dr. Shyam Kumar Masakapalli,Handson workshop for Northeast STEP students – Botanical Garden visit and DNA from plants.
17. Dr. Shyam Kumar Masakapalli, Co-chaired a session in Him Science congress at IIT Mandi Oct 2018.

Annual meeting on physics of strongly correlated electron systems, 2018-Dr. C.S. Yadav

2 days Farmer Zone 2018 workshop at IIT Mandi-Dr. Shyam Kumar Masakapalli

3.4 School of Humanities And Social Sciences (SHSS)

Over the course of the academic year 2018-2019, the School of Humanities and Social Sciences flourished and grew both in research output, projects garnered and in terms of curricular offerings. Faculty from the School garnered considerable funding from outside agencies in sponsored projects that promise to have far-reaching potential to respond to national needs. The School hosted a Need Assessment Workshop for Himachal Pradesh, Uttarakhand and Jammu and Kashmir on "Capacity Building for Climate Change Vulnerability Assessment in the Himalayan States in India" in collaboration with IIT Guwahati and IISc Bangalore. In addition, faculty demonstrated their international standing by publishing books, book chapters and journal articles in the top academic outlets of reputed presses (including Cambridge University Press, Duke University Press, Sage, Elsevier, Taylor & Francis etc.). The School scaled new heights by beginning its first M.A. Programme in Development Studies in August 2018 with the first batch of twelve eager students. Over their first year this pioneer batch engaged in interdisciplinary coursework in a unique curriculum that is rigorous and problem-oriented. The first batch also got their first taste of ground level reality of development issues through a mandatory Institute-supported field work which took them to rural areas of Tamil Nadu, Maharashtra, Bihar and Haryana. The School also graduated its first Ph.D. student in Convocation 2018 in the field of English Literature. In the upcoming year, the School looks forward to hosting its first national conference at IIT Mandi: the17th Annual Conference of the Indian Association for Social Sciences and Health. As the School of Humanities and Social Sciences forges ahead creating its unique identity within the broader vision of the Institute, the year 2018-19 stands out as a singular year of new ventures and accomplishments.

Faculty

Dr. Rajeshwari Dutt
Chairperson
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Prof. Pramod Talgeri
Visiting Professor
Specialisation: Philosophy of Hegel and Critique of Modernity and Contemporary Western Philosophy, Modern German Literature, Comparative Literature
Ph.D from University of Munich, Germany
Home Town: Pune
Email: pramod

Dr. Ramna Thakur
Assistant Professor
Specialization: Development Economics
Ph.D from HPU Shimla
Home Town: Mandi
Phone: 01905-267044
Email: ramna

Dr. Shyamasree Dasgupta
Assistant Professor
Specialization: Energy and Environmental Economics, Economics of Climate Change, Applied Econometrics
Ph.D from Jadavpur University
Home Town: Kolkata, West Bengal
Phone: 01905-267122
Email: shyamasree

Dr. Varun Dutt
Assistant Professor (Joint Appointment)
Specialization: Judgment and Decision Making, Environmental DecisionMaking, Artificial Intelligence, Human-Computer Interaction
Ph.D. From Carnegie Mellon University (USA)
Home Town: Lucknow, Uttar Pradesh
Phone: 01905-267041
Email: varun

Dr. Manu V. Devadevan
Assistant Professor
Specialization: Literary Practices in South Asia, Political and Economic Processes in Premodern South Asia & South Asian Epigraphy
Ph.D from: Mangalore University, Mangalagangothri, Mangalore.
Phone: 01905-267147
Email: manu

Dr. Puran Singh
Assistant Professor
Specialization: Corporate Finance, Microfinance
Ph.D from Punjab University
Home Town: Mandi, Himachal Pradesh
Phone: 01905 267148
Email: puran

Dr. Suman
Assistant Professor
Specialization: Colonialism, Post colonialism, Imperialism and Romance Literature
Ph.D from IIT Delhi.
Home Town: Faridabad
Phone: 01905-267140
Email: suman.sigroha

Dr. Surya PrakashUpadhyay
Assistant Professor
Specialization: Sociology of Religion, Urban Sociology, Post-Reform India
Ph.D from Indian Institute of Technology Bombay
Home Town: Lucknow, Uttar Pradesh
Phone: 01905-267136
Email: surya

Dr. Gokul Somasekhran
Teaching Fellow
Specialization: German Literature
Pursuing Ph.D from Free University Berlin
Home Town: Thrissur, Kerala
Phone: 01905-267144
Email: gokul

Research Projects

Externally Sponsored Research Projects

S. No.	Project Title	Sponsoring Agency	Investigator (s)	Amount Sanctioned (In Rs.)	Duration of Project
1	Democratization of Indian Christianity: Dalit Christian liberation movement in contemporary India	ICSSR	Dr. Ashok Kumar Mocherla	60,00,00	1 year 6 Months
2	MHRD- Unnat Bharat Abhiyan scheme	MHRD	Dr. Satvasheel Powar (PI) Dr. Suryaprakash Upadhyay, Dr. Dericks P Shukla, Dr. Atul Dhar (Co-PI's)	3,50,000	1 year
3	Smart Agriculture: Farmer Zone	DBT	Dr. Srikant Srinivasan (PI), Dr. Shyamasree Dasgupta (one of the Co-PI's) from IIT Mandi	7,16,00,000	3 years
4	Evaluation of business correspondent model of banking: A case study in Himachal Pradesh	ICSSR	Dr. Puran Singh (PI) Dr. Shyamasree Dasgupta (Co-PI)	2,50,000	1 year
5	Capacity Building on Climate Change Vulnerability Assessment in States of Indian Himalayan Region	Swiss Development Corporation (SDC)	Dr. Shyamasree Dasgupta	18,84,562	1 year 4 Months
6	Socio-economic profile of tribes of Himachl Pradesh	Tribal Development Department, Himachal Pradesh	Dr. Ramna Thakur (PI) Dr. Rajeshwari Dutt (Co-PI)	5,00,000	1 year 6 Months
7	Deployment of sensors for landslide monitoring and early warning	Deputy Commissioner office Mandi (H.P.)	Dr. Varun Dutt (PI) Dr. K.V. Uday (Co-PI)	2,99,750	1 year
8	Development and Deployment of low- cost landslide monitoring and warning system in district Sirmaur (H.P.)	Deputy Commissioner office Sirmaur, HP	Dr.Varun Dutt & Dr. KV Uday	4,01,500	1 year
9	Primogeniture in the Cold Desert of Indian Himalayan Region: A Fading Reality	Ministry of Culture, Government of India	Dr. Ramna Thakur (PI)	5,00,000	1 year
10	Time and Motion Study of MGNREGA in Himachal Pradesh	Department of Rural Development, H.P. Govt.	Dr. Ramna Thakur (PI) Dr. Rajeshwari Dutt (Co-PI)	19,98,000	1 year 5 Months

11	Development and Evaluation of Landslide Risk Communication Solutions in Mandi Distt. of H.P.	Himachal Pradesh State council for Science, Technology & Environment (SCSTE)	Dr. Varun Dutt	5,12,600	2 years
12	Development of Human-Performance Modeling Framework via Physiological and Signal Processing Tools for Visual Cognitive Enhancement in IVD,VR and AR Paradigms	DRDO	Dr. Varun Dutt	22,62,850	3 years

Seed Grant Projects

S. No.	Proposal Title	Investigator (s)	Amount Sanctioned (In Rs.)	Duration of Project
1	The Kangra Earthquake (1905): A Social and Political History	Dr. Devika Sethi	5,00,000	3 years
2	Financial Inclusion and Financial Deepening Through Branchless Banking in Himachal Pradesh	Dr. Puran Singh (PI)	5,00,000	2 years
3	Comprehensive Valuation of Forest Ecosystem Services and Understanding the Method of Value Formation: A case Study in Himachal Pradesh	Dr. Shyamasree Dasgupta	5,00,000	3 years
4	Institutions of Technology and Language Instruction	Dr. Aruna Bommareddi	5,00,000	3 years
5	Disaster at Mass Gatherings: A study of Pilgrims Shared Identities and Responses to Catastrohic Flooding	Dr. Shail Shankar	4,20,000	3 years
6	Mayans in 19th Century Mexico &Belize	Dr. Rajeshwari Dutt	6,20,000	3 years
7	Transitioning to E-autos in Hill States: A Case Study in Mandi Town	Dr. Shyamasree Dasgupta, Dr. Narsa Reddy and Dr. Rajan Kapur	23,80,000 (5,00,000 for Shyamasree)	2 years

Book Reviews

1. Devadevan, M.V. (2019). Review of Whitney Cox, Politics, Kingship, and Poetry in Medieval South India: Moonset on Sunrise Mountain, Indian Economic and Social History Review, Vol. 56, No. 2,Sage.

Book Chapters Published

1. Roy, J., Dasgupta, S., et al. (2018). Governing National Actions for Global Climate Stabilization in Barua, A., Narain, V., Vij, S. (Eds.) Climate Governance in South Asia. Taylor and Francis.
2. Mali, N., Chaturvedi, P., Dutt, V., & Kala, V. U. (2019). Training of Sensors for Early Warning System of Rainfall Induced Land slides. In Recent Advances in Geo- Environmental Engineering, Geo-mechanics and Geo-technics, and Geo-hazards (pp. 449-452). Springer, Cham.
3. Chaturvedi, P., &Dutt, V. (2018, December). Interactive Landslide Simulator: Role of Contextual Feedback in Learning against Landslide Risks. In International Conference on Intelligent Human Computer Interaction (pp. 170179). Springer, Cham.
4. Kaushik, S., Choudhury, A., Dasgupta, N., Natarajan, S., Pickett, L. A., & Dutt, V. (2018, July). Evaluating Frequent-Set Mining Approaches in Machine-Learning Problems with Several Attributes: A Case Study in Healthcare. In International Conference on Machine Learning and Data Mining in Pattern Recognition (pp. 244- 258). Springer, Cham. Aggarwal, P., Gonzalez, C., & Dutt, V. (2018, September). Hack It: A Real-Time Simulation Tool for Studying Real World Cyber-Attacks in the Laboratory. In Handbook of Computer Networks and Cybersecurity: Principles and paradigms. Springer, Cham.
5. Chaturvedi, P., Thakur, K. K., Mali, N., Kala, V. U., Kumar, S., Yadav, S., & Dutt,V.(2018). A Low-Cost IoT Framework for Landslide Prediction and Risk Communication. In book: Internet of Things A to Z: Technologies and Applications, Edition: First, Chapter: Chapter 21, Publisher: Wiley-IEEE Press, Editors: Qusay F. Hassan, pp.593-610.
6. Devadevan, M.V. (2019). 'Temple and Territory in the Puri Jagannatha Imaginaire,' in Shonaleeka Kaul (ed), Eloquent Spaces: Meaning and Community in Early Indian Architecture, Routledge, New Delhi, pp. 105-128.

Conference Proceedings

1. Pathania, A., Kumar, P., Kesri, J., Agarwal, S., Sihag, P., Mali, N., Singh, R., Chaturvedi, P., Uday, K.V., & Dutt, V., (2019). Reducing Power Consumption of Weather Stations for Landslide Monitoring. International Conference Information & Technology in Geo engineering, 062, v1.
2. Kumar, P., Shroti, S., Chaturvedi, P., Sihag, P., Agarwal, S., Pathania, A., Mali, N., Singh, R., Uday, K.V., & Dutt, V., (2019). Daily-Scale Predictions of Debris Movement in Chamoli Uttarakhand Area using Conventional and Deep Machine-Learning Methods. International Conference Information & Technology in Geo engineering, 062, v1.
3. Mohan, G., Galhotra, M., Rao, A. K., Pathania, A., Agarwal, S., Chaturvedi, P., Ghosh, C., Uday, K. V., & Dutt, V., (2019). Learning from Feedback: Evaluating the Effectiveness of Computer Games for Landslide Education. ARICPEST at Kings College London, UK.

Paper Published in International Journals

1. Li, Y, Su, B, Dasgupta, S. (2018). Structural Path Analysis of India's Carbon Emissions. Energy Economics. 76 (2018), pp:457-469.
2. Roy, J, Dasgupta, S., et al. (2018). Where is the hope? Blending modern urban lifestyle with cultural practices in India. Current Opinion in Environmental Sustainability. 31 (2018), pp:96-103.
3. Dutt, R. (2019). Loyal Subjects at Empire's Edge: Hispanics in the Vision of a Belizean Colonial Nation. Hispanic American Historical Review. Duke University Press. 99 (1), p. 31-59. https://doi.org/10.1215/00182168-7287962.
4. Kumar, M., & Dutt, V. (2019). Alleviating misconceptions about Earth's climate: evidence of behavioral learning in stock-and-flow simulations. System Dynamics Review.
5. Sangar, S., Dutt, V., and Thakur, R. (2019). Distress Financing of Out-of-pocket Health Expenditure in India. Review of Development Economics, 23(1), 314-330 Wiley.
6. Sangar, S., Dutt, V., and Thakur, R. (2019). Analysis of the impoverishment Impact of Ailments in India. Frontiers in Public Health, 7,9.
7. Sangar, S., Dutt, V.,and Thakur, R. (2019). Burden of Out-of-pocket Health Expenditure and Its Impoverishment Impact in India: Evidence from National Sample Survey. Journal of Asian Public Policy, Taylor & Francis.
8. Aggarwal, P., Moisan, F., Gonzalez, C., & Dutt, V. (2018). Understanding Cyber Situational Awareness in a Cyber Security Game Involving Recommendations. International Journal of Cyber Situational Awareness. 3(1),1-29.
9. Choudhury, A., Kaushik, S., & Dutt, V. (2018). Social-network analysis in healthcare: analyzing the effect of weighted influence in physician networks. Network Modeling Analysis in Health Informatics and Bioinformatics, 7(1),17.
10. Chaturvedi, P., Arora, A., & Dutt, V. (2018). Learning in an interactive simulation tool against landslide risks: the role of strength and availability of experiential feedback. Natural Hazards and Earth System Sciences, 18(6),1599-1616.
11. Sharma, N., Debnath, S., & Dutt, V. (2018). Influence of an intermediate optionon the descriptionexperience gap and information search. Frontiers in Psychology, 9, 364.
12. Kumar, M., & Dutt, V. (2018). Experience in a Climate Microworld: Influence of Surface and Structure Learning, Problem Difficulty, and Decision Aids in Reducing Stock-Flow Misconceptions. Frontiers in Psychology, 9,299.
13. Rao, A., Pramod, B.,S., Chandra, S., & Dutt,V.(2018). Influence of Indirect-Vision and Virtual Reality training under varying manned / unmanned interfaces in a complex search-and-shoot simulation. In proceedings of the 9th International Conference on Applied Human Factors and Ergonomics, Orlando, Florida, USA.
14. Sharma, N., Debnath, S. & Dutt, V. (2018). Influence of an Intermediate Option on the Description-Experience Gap and Information Search. Frontiers in Cognitive Science, 9:364. doi:10.3389/fpsyg.2018.00364.
15. Sigroha S. Gendered Migrations and Literary Narratives: Writing Communities in South Asian Diaspora. Millennial Asia, SAGE, 9:1, 93 - 108, (2018).

16. Bala, S. and Sigroha, S. Familiar Yet Exotic: Anita Nair's Mistress. Muse India, 78 (2018).
17. Kaushik, M. and Sigroha, S. Facticity and Fictionality: Mahesh Dattani's Where Did I Leave My Purdah? MEJO, The MELOW Journal of World Literature, Facts, Distortions and Erasures: Literature As History; History in Literature, 3:1, 99 – 109, (2018).
18. Bala, S. and Sigroha, S. Voices from the Margins: Her-Story in Arundhati Roy's The God of Small Things. MEJO, The MELOW Journal of World Literature, Facts, Distortions and Erasures: Literature As History; History in Literature, 3:1, 131 – 141, (2018).
19. Keane, M. P and Thakur, R. (2018). Health Care Spending and Hidden Poverty in India, Research in Economics, 72 (4), 435-451, 2018,Elsevier.
20. Thakur, R., Sangar, S., and Ram, B. (2019). Household Strategies to Cope with the Economic Cost of Illness in Low and Middle Income Countries: A Review Study. Available at SSRN: http://dx.doi.org/10.2139/ssrn.3328174.
21. Sangar, S., Dutt, V., & Thakur, R. (2018). Economic burden, impoverishment, and coping mechanisms associated with out-of-pocket health expenditure in India: A disaggregated analysis at the state level. The International journal of health planning and management. Wiley.
22. Thakur, R., Sangar, S., Ram, B., & Faizan, M. (2018). Quantifying the burden of out-of-pocket health expenditure in India. Public health,159, 4-7. Elsevier.
23. Sangar, S., Dutt, V. & Thakur, R.(2018). Rural–urban differentials in out-of-pocket health expenditure and resultant impoverishment in India: evidence from NSSO 71st Round. R. Asia-Pacific Journal ofReginal Sciences. Springer.
24. Thakur, Ramna,Sangar, Shivendra and Ram, Bhed(2018), Incidence and Intensity of the Burden in Paying for Health Care in India: A Rural-Urban Analysis. Available at SSRN: https://ssrn.com/abstract=3218829.
25. Sangar, S., Dutt, V., & Thakur, R. (2018). Economic burden, impoverishment and coping mechanisms associated with out-of-pocket health expenditure: analysis of rural-urban differentials in India. Journal of Public Health, 1-10. Springer.

International Conferences

1. Devika Sethi. Monument to Transition: A Colonial and Post-Colonial History of India Gate,at the Historical Monuments and Modern Society Conference, Shanghai University, China, December, 2018.
2. Devika Sethi. Fact of Fiction: Biographies of Prophet Muhammad in Colonial India, at the Ways of Knowing Conference, Harvard Divinity School, Harvard University, Cambridge, USA, October,2018.
3. Devika Sethi. Hate Speech or Free Speech? The Public Sphere and Muslim Identities in Britain and India in the 1920 -1940s, at the Words that Kill Conference, George and Irina Schaeffer Center for the Study of Genocide, Human Rights and Conflict Prevention, American University of Paris, France, May 2018.

4. Devika Sethi. The 'Floodgates of Mass Agitation': A History of the 'Living Biographies' Controversy (1956)' at the CEIAS (Centre d'Études de l'Inde et de l'Asie du Sud/ Center for South Asian Studies), Paris, France, May 2018.
5. Rajeshwari Dutt. Cost of Protection: Securing Belizean Bordersduring Maximilian's Empire in Mexico. The British Scholar Society's Britain and the World Conference, University of Exeter, UK, June 2018.
6. Rajeshwari Dutt."Loyal Subjects at Empire's Edge: Hispanics and Maya in the Belizean Vision of a Colonial Nation at the End of the Caste War, 1880-1898." American Historical Association Conference, Chicago, January 2019.
7. Shyamasree Dasgupta. Climate Econometrics in European Geosciences Union General Assembly, Vienna, Austria, April,2018.
8. Shyamasree Dasgupta. Understanding Energy Use and Climate Change Mitigation Response at Sectoral Level Based on Detailed Econometric Models. European Geophysical Union General Assembly 2018, in Session CL5.14-Climate Econometrics. 9-14 April, 2018. Vienna, Austria,2018.
9. Varun Dutt. International Conference on Cyber Situational Awareness, Data Analytics and Assessment (Cyber SA 2018), At Glasgow UK,2018.

Professional Achievements, Honors and Awards

1. Puran Singh, Appointed 'Research Fellow' with Digital Identity Research Initiative, Indian School of Business, Hyderabad.
2. Shivam Mishra, Awarded a fellowship for the research stay at the Bergische University Wuppertal (Germany) for two months (Jan to Feb) 2018.
3. Varun Dutt, Appointed to the Board of Governors of RxDataScience, USA in January, 2018.

Membership of Professional Societies

1. Rajeshwari Dutt, Member: American Historical Association; Latin American Studies Association; Britain and the World.
2. Ramna Thakur, Member: International Health Economic Association.
3. Shyamasree Dasgupta, Member: International Association for Energy Economics; The International Society for Ecological Economics; Life Member: Indian Econometric Society; Bengal Economic Association; Indian Society for Ecological Economics; SYLFF Fellow, Jadavpur University.
4. Varun Dutt, Member: Society of Judgement and Decision Making; National Academy of Psychology (NAOP), India. Senior member: IEEE.

Workshops

Workshop / Talk Organized. - Need Assessment Workshop for Himachal Pradesh, Uttarakhand and Jammu and Kashmir on "Capacity Building for Climate Change Vulnerability Assessment in the Himalayan States in India" in collaboration with IIT Guwahati and IISc Bangalore. 20-21 April 2018 [Photo attached] (Dr. Shyamasree).

Talk Organized

Speaker	Affiliation	Title ofthe Talk	Date
Prof. Padmini Swaminathan	Council for Social Development, Hyderabad	Gendering Public Policy	8th March, 2018 (on the occasion of International Women's Day
Dr. Kaveri Haritas	O.P. Jindal Global University Sonepat, Haryana	Gender, protest and struggles for rehabilitation housing in Bangalore	16th March, 2018
Ambassador P.S.Raghavan (Ministry of External Affairs Talk)	National Security Advisory Board, Govt. of India	The Making of India's Foreign Policy	18th April, 2018
Prof. Amit Bhaduri (As Institute Colloquium)	Professor Emeritus, Jawaharlal Nehru University, New Delhi	Nationalism, Development and Inequality in India	24th April, 2018
Dr. John Mathew	IISER Pune	The Translocate as a Mediator of Zoological Natural History and its implications for 19th and early 20th Century India	8th October, 2018

Dr. Rohini Chaturvedi	World Resources Institute	Landscape Restoration	11th October, 2018
Dr. Debjani Haldar	Fellow, IIAS Shimla	Nita's womanhood in Ritwik Ghatak's Meghe Dhaka Tara	15th October, 2018
Prof. Sujata Patel (Distinguished Talk)	IIAS Shimla	India's Urbanism and Urbanisation	12th November, 2018
Prof. Ravi Rajan	University of California Santa Cruz	Sustenance, Security and Suffrage: A Theory of Environmental Human Rights	15th November, 2018
Prof. V. Ranganathan	Retd. RBI Chair Professor, IIM Bangalore	Energy Infrastructure in India: Issues and Challenges	26th February, 2019

MA in Development Studies with Field Study as a component

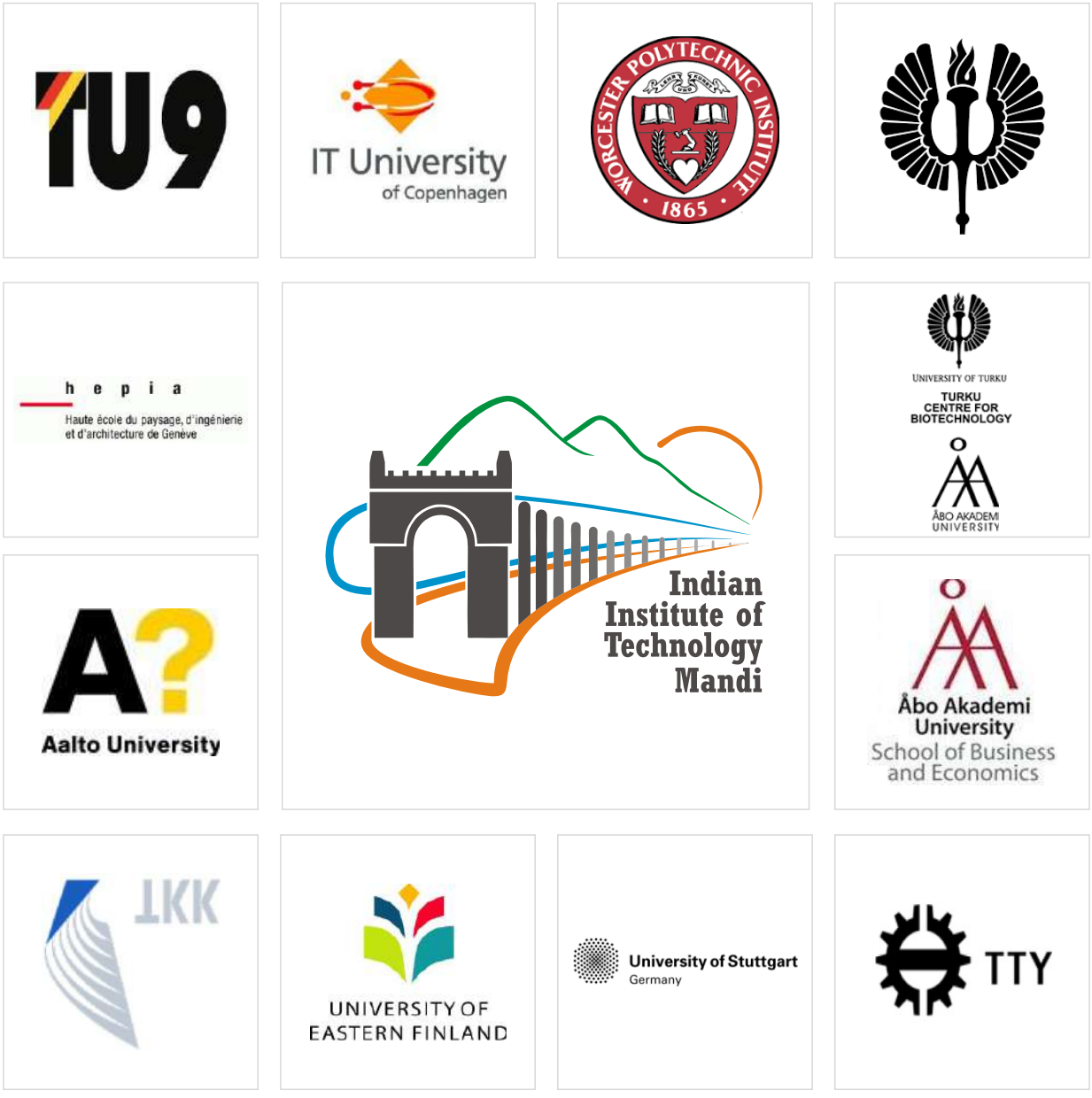
First Batch of MA students

The first Masters Programme by SHSS was launched in 2018 in the form of MA in Development Studies. The intake of the first batch was 12 and they came from all over the country and had varied disciplinary backgrounds. The programme aims to create a pool of development practitioners and/or academics, who will be well equipped to participate in the process of such informed decision making. The location of the Institute will also provide the programme with a unique opportunity to deal with development

challenges in the Himalayan region, which has both local, regional and global relevance.

To suit the aim of the programme, students, other than taking up core and discipline related courses, also had to take up 2 group projects, named “Development Studies Practicum” and a mandatory “Field Study” during the summer term. The first task of a development practitioner is to 'diagnose' the problem on the ground, to understand the 'socio-economic nuances' of the problem and to have a thorough understanding of the 'agencies' who are already working on the ground. For this 4-credit course “Field Study”, this year the students stayed in remote rural local areas, with the community in many cases. This course is expected to help students to learn how to diagnose the development challenges and get the praxis right.

4. A BRIEF REPORT ON COLLABORATION (MoU) BETWEEN INDIAN INSTITUTION OF TECHNOLOGY MANDI AND INSTITUTIONS OVERSEAS



International Activities of IIT Mandi with Institutions Located Overseas

International Bachelor's, Master's and Ph.D. students can spend up to a year at IIT Mandi under student exchange. Also, international students can pursue graduate degree programs at the Institute. Students coming for student exchange or degree programs can get credit for courses they take at IIT Mandi. International students can work with the Institute's faculty on collaborative research topics involving institutional, regional, and national interests. IIT Mandi also provides possibilities for faculty members at international universities/Institutes to spend time for the purposes of teaching and research. The fields in which IIT Mandi is currently involved at the Bachelor's, Master's, and Ph.D. levels include: Computer Engineering, Electrical Engineering, Civil Engineering, Mechanical Engineering, Basic Sciences, and Humanities and Social Sciences. For those international universities with which IIT Mandi has an existing Memorandum of Understanding (MoU)/agreement, the terms and conditions for the exchange of students and faculty is determined by the underlying MoU/agreement. For students and faculty of international universities with which IIT Mandi does not have an existing MoU/agreement, the terms and conditions on exchange, IPR, and funding pattern will need to be workedout.

Under an existing MoU with Worcester Polytechnic Institute (WPI), USA, IIT Mandi invited a team of 22 undergraduate students and two faculty mentors from WPI to visit the Institute for two-months between mid-March, 2018 and early-May, 2018. These students worked with similar number of IIT Mandi undergraduate students in solving a number of socio-economic issues concerning the local communities in Mandi and Kamand. Furthermore, a number of international students visited IIT Mandi between 1st April, 2018, and 31st March, 2019. These included 2 students from Germany, 1 student from UK and 1 student from Ethiopia. Four students joined in August 2018 and four students joined in February 2019 from Nepal and Bangladesh for Masters and Ph. D program. Five students are from Nepal and three students are from Bangladesh.

There were a number of workshops conducted at IIT Mandi involving visitors from universities abroad between April, 2018 and March, 2019. The details of these workshops is given below.

Annual meeting on Physics of Strongly Correlated Electron Systems (PSCES)
School of Basic Sciences IIT Mandi organized the first of 'Annual meeting on Physics of Strongly Correlated Electron Systems (PSCES)' during 02 - 04 April, 2018. Prof. Herbert Pfnur (Leibniz Universität Hannover, Germany) was the one of speaker in this meeting.

ISTP Open House
The Interactive Socio-Technical Practicum (ISTP) course of IIT Mandi culminated in an Open House on 27 April 2018 with a display of posters, prototypes and models. 38 IIT Mandi students and 22 students from WPI (Worcester Polytechnic Institute, Massachusetts, USA) participated under the mentorship of 16 IIT Mandi faculty mentors, and 2 WPI faculty mentors.

Tutorial on Emerging Science and Technology on 21st October 2018
IIT Mandi has conducted an One day tutorial programme on Emerging Science and Technology on 21st October, 2018. The tutorial was open for Faculty/students of

engineering/science colleges,practicing engineers from utility, industry and other organizations. Speakers include Prof. Rajan Kapoor, President Larankelo Ventures LLC, Boulder, Colorado.

IIT Mandi hosted first-of-its-kind 'Winter School on Cognitive Modeling 2019' in India

Indian Institute of Technology Mandi became the first Institute in India to host a 'Winter School on Cognitive Modeling,' invitingnational and international researchers and professionals to train students on the best practices in the area of cognitive modelling.The Winter School was hosted by IIT Mandi from 4th to 10th February 2019.

The Winter School featured a number of national and international speakers. Speakers included Dr. Cleotilde Gonzalez from Carnegie Mellon University, USA, Dr. Marieke Van Vugt from University of Groningen, the Netherlands, Dr. Terrence C. Stewart from University of Waterloo, Canada.

IIT Mandi organised AstraX'19, from 30th - 31st March 2019

The Space Technology and Astronomy Cell of IIT Mandi organised a two day, inter - college Astro-meet event, AstraX'19, which featured a panel of national and international speakers, on 30th and 31st March 2019.

Dr. Redouane Boumghar, Data Scientist, European Space Agency and AI and Robotics Mentor, NASA Frontier Development laboratory, delivered a lecture on 'How machine learning on spacecraft operations supports the acquisition of good scientific data'.

Mr. Juan Luis Cano Rodriguez, Astrospace Engineer, Satellogic and Python Professor, Instituto Empresa and Barcelona Technology School, delivered a lecture on 'Open source in the space industry, open source communities, the importance on open science.

International Workshop on Climate Change and Extreme Events in the Himalayan Region at IIT Mandi from 18th to 20th April 2019

Indian Institute of Technology Mandi is hosted an International Workshop on Climate Change and Extreme Events (C2E2) in the Indian Himalayan region from 18th to 20th April 2019, providing a platform to Indian and international scientists to discuss climate change and extreme events.

Noted US geophysicist Prof Roger Bilham, University of Colorado Boulder, U.S., delivered a video lecture on 'Future great earthquakes in the Himalaya.' Prof Roger Bilham is a wellknown U.S. geophysicist and his years of research forms the basis for the current knowledge about earthquakes in the Himalayan region

IIT Mandi organised an International Conference on Differential Equations and Control Problems: Modeling, Analysis and Computations (ICDECP19) during 17-19 June, 2019

Conference was attended by total 240 participants. 16 keynotes lectures were delivered by eminent mathematicians from IITs, TIFR, universities and abroad. More than 60 invited lectures were given and about 130 contributed papers have been presented by the young faculties and research scholars in the conference.

IIT Mandi students visiting Institutions Abroad

A number of IIT Mandi graduate and undergraduate students visited several EU

institutions under academic exchange in the last 1-year. The undergraduate visits included: 4-students to TU Munich and 1- student to RWTH Aachen, Germany.

IIT Mandi Faculty visiting Institutions Abroad

Several IIT Mandi faculty members visited institutions in Singapur, Sweden, France, Germany, UK, Poland, China, Italy, Japan, Taiwan, Nepal, USA, Russia, Spain, Ireland, Australia, Austria, Bhutan, Canada, Switzarland, Korea, Poland, Brazil, Greece, UAE, Maldieves and Bangkok in 2018-19 for attending conferences and furthering industry and academic collaborations.

The visits included four faculty members from the School of Humanities and Social Sciences; twenty faculty members from the School of Computing and Electrical Engineering; eighteen faculty members from the School of Basic Sciences; and, twelve faculty members from the School of Engineering.

MoU

Indian Institute of Technology Mandi has signed its Memorandum of Understanding with EdCIL (India) Limited in May 2018 and renewed again in January 2019 for one year.

MoUs Renewed

Indian Institute of Technology Mandi has renewed its Memorandum of Understanding with TU9, Germany in August 2018 and renewed Memorandum of Understanding with Worecester Politechnic Institute, USA (WPI) in May 2018.

Selected Photographs

International Workshop on Climate Change and Extreme Events in the Himalayan Region atIIT Mandi

ISTP PROJECT 2019

International Conference on Differential Equations and Control Problems: Modeling, Analysis and Computations (ICDECP19)

IT Mandi conducts NMHS workshop on Water Filtration Techniques Based on Solar Energy

5. Thrust Area Research Centres

5.1 AMRC

Vision

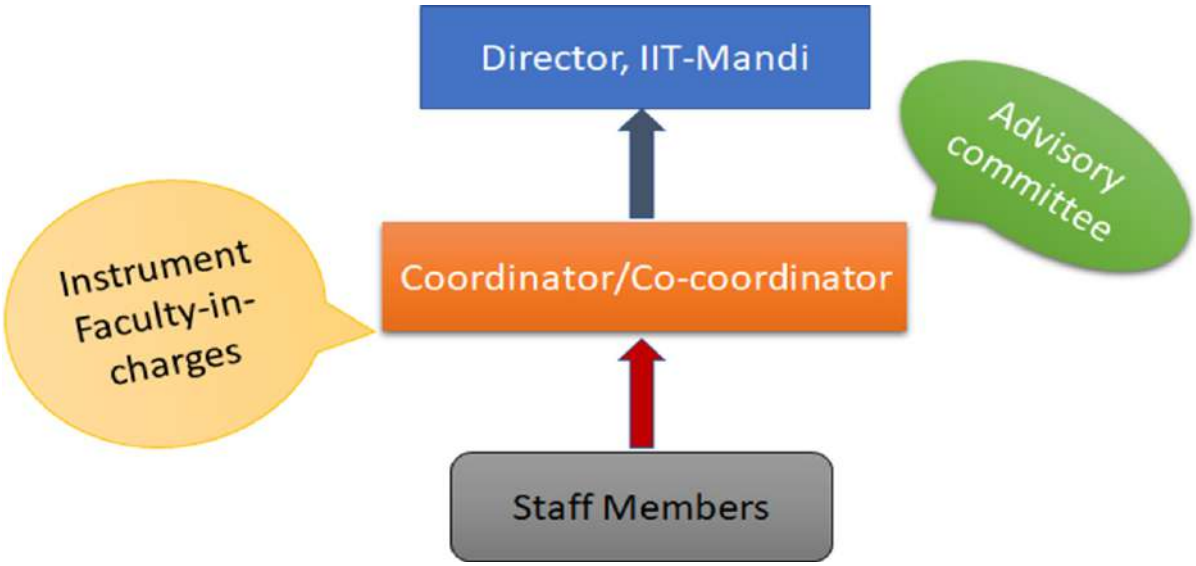
To promote excellence in advanced materials science and technology via cross disciplinary collaboration with internal and external users of the center.

Mission

Advanced Materials Research Centre (AMRC) is a multi-disciplinary hub for research facilities at IIT Mandi with a mission to foster basic and applied research in the area of advanced materials dealing with synthesis of new materials, processing, structural, microstructural, thermal, optical and electrical characterizations at various length scales. AMRC represents materials focused research in the areas of energy, environment, electronics, magnetism, organic displays, solar cells, drug delivery, nanotechnology etc with participation of faculty members from physics, chemistry, biology and engineering disciplines. Our main objective is to support and nurture research enterprise by providing access to state-of-art facilities and expertise towards knowledge creation and cutting edge research in the area of materials.

Structure of AMRC

AMRC is overseen by AMRC coordinator and co-coordinator, AMRC advisory committee consisting of 9 faculty members from different disciplines, instrument faculty-in-charges and and 7 efficient staff members



AMRC Coordinator: Dr. Rik Rani Koner
AMRC Co Coordinator: Dr C.S.Yadav.
Advisory committee members:
Patron: Prof. Subrata Ray
Chairman: Prof. S.C. Jain
1 . The Dean Academics or Nominee
2. Dr. Rahul Vaish
3. Dr. Ajay Soni
4. Dr. Ankush Bag
5. Dr. Aditi Halder
6. Dr. Viswanath Balakrishnan
Member –Secretary: Dr. Rik Rani Koner

Staff members:
1. Ms. Isita Mahanty Nandi
2. Mr. Dushyant Kumar Gumra
3. Mr. Puneet Sood
4. Mr. Sunil Kumar Thakur
5. Mr. Arjun Barwal
6. Mr. Naveen Kumar Gumra
7. Mr. Karam Singh Thakur

Achievements using AMRC Facilities

The research results, obtained using the facilities available at AMRC, have been published in reputed international journals. AMRC has produced more than 600 research articles since its inception in 2013 and in the year 2018-19, more than 180 research articles have been published.

Students Achievements

- Harpreet Kaur: Awarded best posterin CACEE TIFR, Bombay, 2018.
- Bidisha Biswas received best poster award at National BioOrganic Chemistry Conference -2018 (NBCC-2018), 20th -24th Dec, 2018 organized by NISER Bhubneswar.
- Ms. Nisha Kumari - Received best poster award at International Symposium on Functional Materials (ISFM), Chandigarh held in Apr. 2018.

- Ms. Tripti Chhabra - Received best poster award at International Symposium on Functional Materials (ISFM), Chandigarh held in Apr. 2018.
- Manoj Kumar Yadav:Best Poster Award in International Conference in Emerging Electronics (ICEE), Indian Institute of Science, Bangalore, India, 2018.
- Kavita Yadav: Best poster award in conference- DAE SSPS 2018 held at Guru Jambheshwar University of Science and technology, Hisar, Haryana from 18-22 December 2018.
- Birender Singh: First Prize in Poster Presentation in 43rd Condensed Matter and Material Meeting Wagga Wagga, NSW Australia, 2019.
- Mr.Navneet C. Verma:MRSI AGM 2019 best poster award.
- Ms Shilja Sharma got full financial support (for travel lodging etc) from ICTP Trieste Italy to attend a conference on Modern concepts in New Materials for Thermoelectrics (March 2019).
- Mr Mandeep Kr Hooda was selected for contributory talk at the conference 'Condensed Matter and Materials Meeting 2019' held at Wagga Wagga, NSW, Australia (February 5-8, 2019).
- Kavita Yadav Best poster award: Research fair, IIT Mandi 2019.
- Aditya Yadav Best poster award: Research fair, IIT Mandi 2019.

Achievements of Faculty Members

- Dr. Chayan Kanti Nandi : Received CRSI bronze medal.
- Dr. Venkata Krishnan :ReceivedPublons Peer Review Awards 2018 – Top 1% of Reviewers in Chemistry.
- Dr. Sumit Sinha Roy: Delivered invited talk on Ultrafine Polymer Nanofiber Nanotexture to Improve Nucleation Pool Boiling, at International Conference on Recent Advances in Fluid and Thermal Sciences (iCRAFT 2018), held at BITS-Pilani, Dubai Campus, Dec 05-07, 2018.
- Dr. Aditi Halder : SPARC Grant (MHRD) : Advancing the Fundamentals of Electrocatalysis with the use of Earth Abundant Materials for future of Energy and Transportation -49.2 lakhs.

Featured Article

B Devi, M Venkateswarulu, H Singh Kushwaha, A Halder and R R Koner: *Chemistry*: A *European journal*, 2018, 24, 6586-6594.It has selected as HOT Paper. A Polycarboxyl Decorated Fe(III) Based Xerogel Derived Multifunctional Composite (Fe3O4/Fe/C) as an Efficient Electrode Material towards Oxygen Reduction Reaction and Supercapacitor Application.

Selected Publications in High Impact Journals

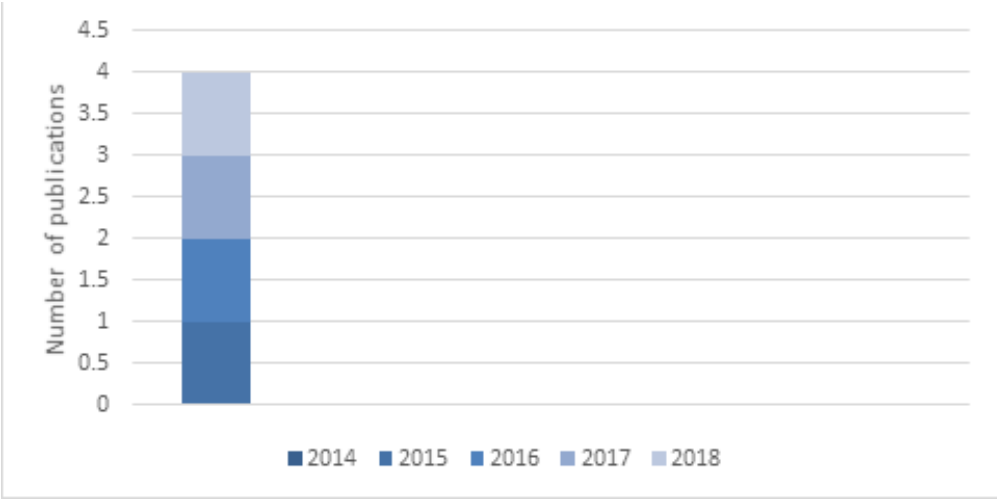
1. Mushtaq, A.; Kushavah, D; Ghosh, S.; Pal, S. K. *Appl. Phys. Lett. 2019, 114, 051902*.Nonlinear optical properties of benzylamine lead (II) bromide perovskite microdisks in femtosecond regime.
2. Ghosh, S.; Kushavah, Pal, S. K. *J. Phys. Chem. C 2018, 122, 21677–21685*Unravelling the Role of Surface Traps on Carrier Relaxation and Transfer Dynamics in Ultrasmall Semiconductor Nanocrystals.

3. Bidisha Biswas, M.Venkateshwarulu, Pankaj Gaur, Yamini Sharma, Sougata Singha,* Subrata Ghosh. * *Journal of Photochemistry and Photobiology A:Chemistry, 2019, 371, 264-270.* Triggered Emission for Rapid Detection of Hydrogen Sulphide Chaperoned byLarge Stokes Shift.
4. Bidisha Biswas, Gourab Dey, Surbhi Dogra, Antara Mukhopadhyay, Shubhajit Roy Chowdhury, Prosenjit Mondal, * Subrata Ghosh. * * *ACS Applied Bio Materials, 2019*Molecular Scale Optimum Hydrophobicity To Establish an Enhanced Probe Protein Interaction : Near Infrared Imaging of Albumin Biosynthesis Modulation.
5. M Chawla, A Kumari, PF Siril *Chemistry Select 3 (31), 9071-9083*. Exceptional Catalytic Activities and Sensing Performance of Palladium Decorated Anisotropic Gold Nanoparticles.
6. R Kumar, P Soni, PF Siril *ACS Omega 4 (3), 5424-5433* Engineering the Morphology and Particle Size of High Energetic Compounds Using Drop-by-Drop and Drop-to-Drop Solvent–Antisolvent Interaction Methods.
7. Bahuguna, A. Kumar, T. Chhabra, A. Kumar and V. Krishnan. *Condensation ACS Appl. Nano Mater. 2018, 1, 6711-6723*.Potassium-Functionalized Graphitic Carbon Nitride Supported on Reduced Graphene Oxide as a Sustainable Catalyst for Knoevenagel Condensation.
8. Kumar, K. L. Reddy, S. Kumar, A. Kumar, V. Sharma and V. Krishnan. ACS Appl. Mater. Interfaces 2018, 10, 18, 15565–15581.Rational Design and Development of Lanthanide-doped NaYF4@CdS-Au-RGO as Quaternary Plasmonic Photocatalysts for Harnessing Visible-NIR Broadband Spectrum.
9. Navneet C. Verma, Chethana Rao, Ashutosh Singh, Neha Garg and Chayan K. Nandi**Nanoscale 11, 6561-6565, 2019* Dual Responsive specifically labelled Carbogenic Fluorescent Nanodot for Super resolution and Electron Microscopy".
10. Chethana Rao, Navneet C. Verma and Chayan K. Nandi*. *J. Phys. Chem. C. 123, 2673-2677, 2019* Unveiling the Hydrogen Bonding Network of Intracellular Water by Fluorescence Lifetime Imaging Microscopy".
11. P Avasthi, V Balakrishnan, *Advanced Materials Interfaces 6 (6), 1801842 (2019)*. Tuning the Wettability of Vertically Aligned CNT–TiO2 Hybrid Electrodes for Enhanced Super capacitor Performance, Advanced Materials Interfaces 6 (6), 1801842 (2019).
12. P Kumar, D Singh, V Balakrishnan, *Applied Surface Science 480, 680-688 (2019)*Thermally driven reversible photoluminescence modulation in WS2/VO2 heterostructure.
13. Ashish Tiwari, Navneet C. Verma, Anup Singh, Chayan K. Nandi and Jaspreet K. Randhawa**Nanoscale (2018 10, 10389-10394),*–Carbon coated coreshell multifunctional fluorescent SPIONs.
14. Ashish Tiwari, Ayan Debnath, Anup Singh Rashi Mathur and Jaspreet K. Randhawa *ACS Applied Nano Materials 2019*, Multifunctional Magneto-Fluorescent Nanocarriers for Dual Mode Imaging and Targeted Drug Delivery .
15. D Gambhir, S Kumar, G Dey, V Krishnan, RR Koner* *Chem. Commun., 2018, 54, 11407-11410* Preferential intermolecular interactions lead to chiral recognition: enantioselective gel formation and collapse".
16. H Kaur, R Kumar, A Kumar, V Krishnan, RR Koner* *Dalton Trans*, 2019, 48, 915-927Trifunctional metal–organic platform for environmental remediation: structural features with peripheral hydroxyl groups facilitate adsorption, degradation and reduction processes"
17. Ankita Mathur and Aditi Halder, *Catalysis Science and Technology (2019, 9, 1245-1254)* One Step Synthesis of Bifunctional Iron doped Manganese oxide Nanorods for Rechargeable Zinc Air Battery .

18. Bandhana Devi, Rik Rani Koner, Aditi Halder, *ACS Sustainable Chem. Eng.,2019, 7 (2), pp 2187–2199*Ni(II)-Dimeric Complex-Derived Nitrogen-Doped Graphitized Carbon-Encapsulated Nickel Nanoparticles: Efficient Trifunctional Electrocatalyst for Oxygen Reduction Reaction, Oxygen Evolution Reaction, and Hydrogen Evolution Reaction,.
19. Juhi Pandey and Ajay Soni, Applied Surface Science 463, 52 (2019), Unraveling Biexciton and Excitonic Excited States from Defect Bound States in Monolayer MoS_2,
20. Somnath Acharya Juhi Pandey and Ajay Soni ACS Applied Energy Materials2(1), 654 (2019) Enhancement of Power Factor for Inherently Poor Thermal Conductor Ag_8GeSe_6 by Replacing Ge with Sn.
21. Somnath Acharya, Dibyendu Dey, Tulika Maitra, Ajay Soni and Arghya TaraPh.Der Applied Physics Letters113, 193904 (2018), arXiv:1811.04389. Rare Earth Doping and Effective Band-Convergence in SnTe for Improved Thermoelectric Performance.
22. M. K. Hooda, and C.S. Yadav. *Journal of Alloys and Compounds 785, 603 (2019).*Semiconducting nature and thermal transport studies of $ZrTe_3$.
23. M.K. Hooda, and C.S. Yadav. *Physical Review B 98, 165119 (2018)* Unusual magnetoresistance oscillations in preferentially oriented p-type polycrystalline ZrTe5.
24. Karan Singh and K. Mukherjee *Sci. Rep. 9, 5131 (2019)*:Possibility of a new order parameter driven by multipolar moment and Fermi surface evolution in CeGe.
25. Mohit K. Sharma, Kavita Yadav and K. Mukherjee.J. Phys.: *Condens. Matter 30, 215803 (2018)* Complex magnetic behavior and evidence of superspin glass state in a binary intermetallic compound Er_5Pd_2.
26. T. Pareek, S. Dwivedi, B. Singh, D. Kumar, Pradeep Kumar and S. Kumar, *Journal of Alloys and Compounds 777, 602-611, (2019).* “LiSnZr(PO4)3: NASICON-type solid electrolyte with excellent room temperature Li+ conductivity.
27. Birender Singh, Sunil Kumar and Pradeep Kumar J. Phys: *Condens. Matter 31, 395701 (2019).* “Broken translational and rotational symmetries in LiMn1.5Ni0.5O4 spinel”.
28. Sushmita Dwivedi, Nidhi Chamoli, Tanvi Pareek, Deepu Kumar, Pradeep Kumar, and Sunil Kumar *J Mater Sci: Mater Electron (2019)*. “Structural,dielectric,and piezoelectricproperties of lead free $(1-x)$ K ½ Na ½ Nb O $_{3-x}$ Ca(Zn $_{1/3}$Ta $_{2/3}$)O $_3$ perovskite solid solution.
29. S Roy, A Sarkar, A Jaiswal*, *Nanomedicine, , 2019 14 (3), 255-274*Poly (allylamine hydrochloride) functionalized reduced graphene oxide for synergistic chemo-photothermal therapy,Nanomedicine.
30. Prem Singh, Tobias AF Koenig, and Amit Jaiswal*. *ACS applied materials & interfaces, 2018*"NIR active Plasmonic Gold Nanocapsules Synthesized using Thermally Induced Seed Twinning for Surface Enhanced Raman Scattering Applications."
31. Daniel PV, Kamthan M, Gera R, Dogra S, Gautam K Ghosh D, Mondal P *FEBS Lett. 2019 Jul 15. doi: 10.1002/1873-3468.13538* *Chronic exposure to Pb2+ perturbs ChREBP transactivation and coerces Hepatic Dyslipidemia.
32. Dogra S, Kar AK, Girdhar K, Daniel PV, Chatterjee S, Choubey A, Ghosh S, Patnaik S, Ghosh D, Mondal P*(2019*) Nanomedicine: Nanotechnology, Biology and Medicine 17: 210-222* Zinc oxide nanoparticles attenuate hepatic steatosis development in high-fat-diet fed mice through activated AMPK signaling axis.
33. Kumar. Ashish, Bag.Ankush. *IEEE Photonics Technology Letters,31 (2019) 619-622*.“ High Responsivity of Quasi-2D Electrospun -Ga2O3 based Deep-UV Photodetectors.

34. Ashish Kakoria, Bandhana Devi, Abhishek Anand, Aditi Halder, Rik Rani Koner, and Sumit Sinha-Ray*. *ACS Applied Nano Materials, 2019, 2 (1), 64-74*.Gallium Oxide Nanofibers for Hydrogen Evolution and Oxygen Reduction. ACS Applied Nano Materials, 2019, 2 (1), 64-74.
35. Ashish Kakoria, and Sumit Sinha-Ray*. *Fibers 6, no. 3 (2018):*45.A Review on Biopolymer-Based Fibers via Electrospinning and Solution Blowing and Their Applications.
36. Manoj Kumar Singh and Sunny Zafar; *Journal of Thermoplastic Composite Materials,2018(accepted) DOI:10.1177/0892705718799832* Development and mechanical characterisation of microwave cured thermoplastic based natural fibre reinforced composites.
37. Gaurav Arora, Himanshu Pathak and Sunny Zafar*; Journal of Composite Materials, 019, (accepted) (IF: 1.613) DOI: 10.1177/0021998318822705* Fabrication and characterization of microwave cured high-density polyethylene/carbon nanotube and polypropylene/carbon nanotube composites.
38. Rajiv. K. Maurya, Priyamedha Sharma, Rajeev. Rawat, Ravi. S. Singh, Bindu R. *Eur. Phys. J. B 92 162 (2019)*Structural response to the magnetic pre-ordering in LiFeSi2O6.
39. Priyamedha Sharma,RJ Chaudhary, D M Phase, and R Bindu *Mater. Res. Express 6 , 086316 (2019)*Investigation of Mn 3d derived states in La0.2Sr0.8MnO3.

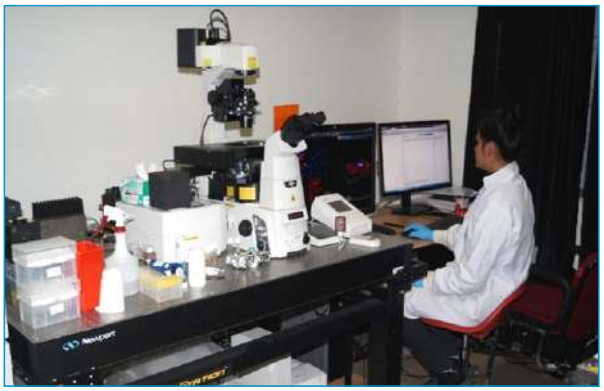
Year Wise Publication



Instrument Facility at AMRC

High Resolution Transmission Electron Microscope (TEM) – Energy Dispersive Spectroscopy (EDS)

Nuclear Magnetic Resonance Spectrometer 500 MHZ

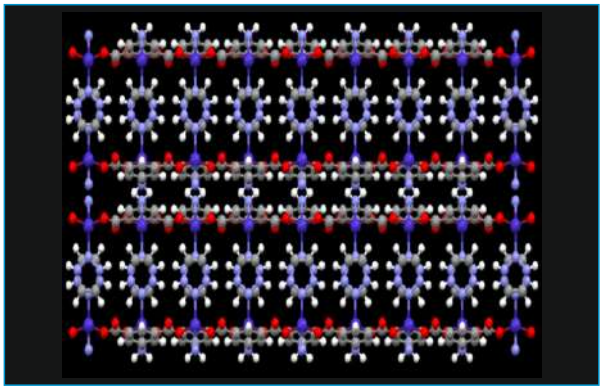


Confocal Microscopy

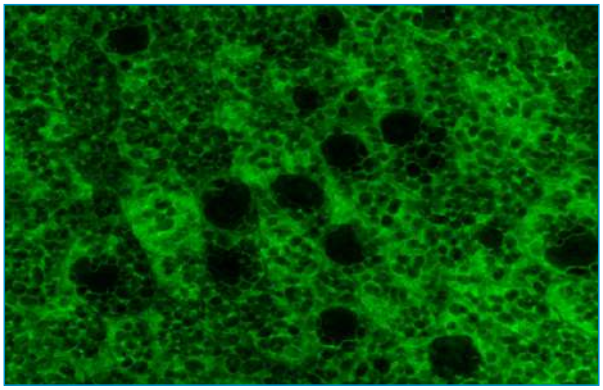
High Resolution Mass Spectrometer

X-Ray Photo emission Spectroscopy

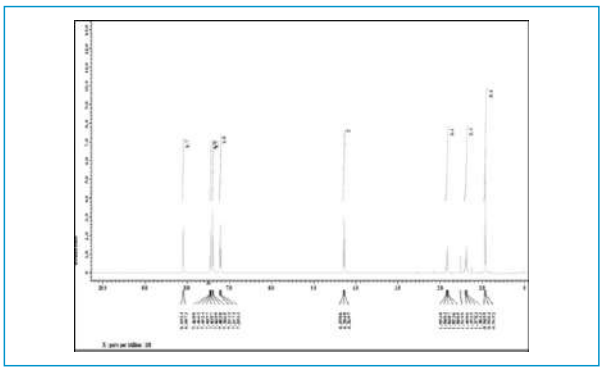
Physical Properties Measurement System



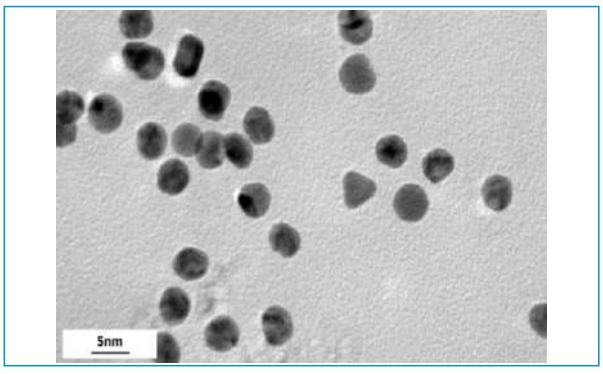
SCXRD is used for structural characterization of inorganic-Organic hybrid materials at Molecular level



Banana pitch stained with Acridine Yellow as being observed using Confocal Microscope



NMR spectrometer provides the structural Information of organic materials

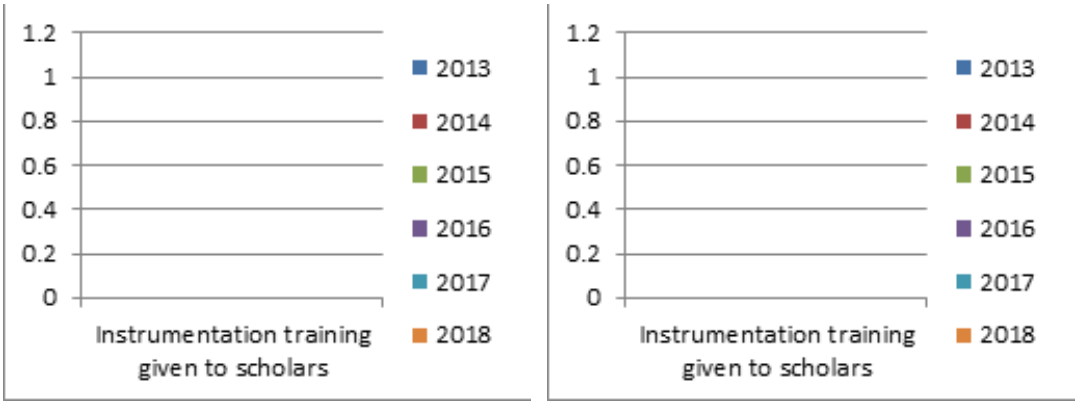


Gold nanoparticles as observed under high resolution transmission electron microscope (HR-TEM)

Activities of AMRC:

Over the years AMRC is well known for its cutting-edge research, ancillary instruments, and efficient technicians and well organized administration. We supports and foster the research enterprise, at the Indian Institute of Technology Mandi by providing facilities of analytical services to other academic Institutes in India and external commercial organizations too. We are providing our instrumental facilities to 40 Institutes in India from 15 different states. We are also organizing workshops with other companies.

- Intensive instrumental training for the research scholars are getting organized on a regular basis. Please see below year-wise statistics.



- AMRC organizes the safety training every semester.

- To grow scientific awareness and motivation towards science among the school children across the Himachal State, AMRC organizes an educational tour on regular basis.

Students attending session at characterization lab

Students attending session at synthesis lab

- **AMRC outreach for Schools and Universities**

AMRC also arranged outreach program for 791 students through-out Himachal Pradesh, Jammu & Kashmir under several program.

S.No.	Name of School/Program/Institute	Number of students	Date of visit
1	G.S.S.S. Thaltukhod	46	29/03/2019
2	GMS Sumnidhar	15	28/03/2019
3	NBA Kullu	53	25/03/2019
4	SET Model S.S.S. Banjar	34	04/02/2019
5	G.S.S.S. Gagal	118	13/02/2019
6	G.S.S.S. Dhar	37	08/01/2019
7	G.S.S.S. Shivabadar	67	30/01/2019
8	G.S.S.S. Urla	92	04/12/2018
9	G.S.S.S. Drang	45	14/12/2018
10	G.S.S.S. Batheri	38	28/09/2018
11	G.S.S.S. Mandap	48	24/08/2018
12	G.S.S.S. Kamand	23	04/07/2018
13	G.S.S.S. Katoula	17	09/07/2018
14	G.S.S.S. Nishoo	27	15/06/2018
14	G.G.S.S.S. Bhangrotu	55	23/05/2018
15	Kendriya Vidyalaya Mandi	30	27/04/2018
	Total no students visited from April 2018 -March 2019	745	

External institutions throughout India where AMRC is providing instrumental facility

List of External Institutions

Himachal Pradesh and Jammu & Kashmir Region

- NIT Hamirpur, HP
- CSIR-IHBT Palampur, HP
- HPU Shimla, HP
- Shoolini university, HP
- Sri Sai University, Palampur HP
- Jaypee University, HP
- Carrier Point University, HP
- Arni University.Kangra, HP
- Maharaja Agra Sen University, Baddi, HP
- Laureate Institute of Pharmacy, Kathog, Kangra, HP
- M Pharmacy Institute, Jwalamukhi. HP
- Indus International University, Bathu, Una, HP
- A.P.Goyal Shimla University, Shimla, HP
- Baddi University, Baddi, HP
- Eternal University, Baru Sahib, Kangra, HP
- School of Pharmacy and Emerging Science University, Baddi, HP
- Jammu University, Jammu & Kashmir
- YS Parmar University, Solan, HP
- Govt College Jammu
- NIT Jammu, Jammu & Kashmir
- NIT Srinagar, Jammu & Kashmir

Other Academic Institutes

- NIT Jalandhar, Punjab.
- NIT Manipur
- NIT Delhi, New Delhi.
- NIT Durgapur, West Bengal.
- IIT Gandhinagar
- IIT Ropar, Punjab
- IIT Guwahati, Assam
- IIT Kharagpur
- IISC Bangalore
- Doon University, UK
- Jamia Millia Islamia University, New Delhi
- Kuruhshetra University, Kurukshetra.
- Agra University, Agra.
- Punjab University, Patiala
- Shiv Nadar University, New Delhi
- HNBG University, UK
- Madhav University, Rajasthan
- IIT Patna, Bihar.
- NIT Trichy, TamilNadu.

Coordinator: Dr. Rik Rani Koner, Ph.: 01905-267220
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Website:www.iitmandi.ac.in/research/amrc/index.php

5.2 Centre For Design & Fabrication Of Electronic Devices, (C4DFED)

Co-ordinator : Dr. Satinder Kumar Sharma

Centre for Design & Fabrication of Electronic Devices (C4DFED) at IIT Mandi is a unique facility for multidisciplinary research on device design and fabrication at IIT Mandi where many state of the art facilities and utilities are housed inside class 100, class 1000 and class 10000 clean laboratories.This high endstate of the art facility was inaugurated by Shri R. Subrahmanyam, Secretary (HE), Ministry of Human Resource Development (MHRD), Government of India on 31st October,2018.

The ultimate goal of this Centre is to cater the different need of IIT Mandi research and scientific community for various ongoing projects and futuristic and also train the students to provide skilled professionals and researchers to serve India and semiconductor industries/society in the long run. The C4DFED facility at IIT Mandi is fully operational from last one and half year's and is now capable of handling research projects like Development and Application of Nanoelectronics, Development of Extreme Ultraviolet Lithography (EUL) resists materials for the next generation technology node, IC design and fabrication and Nano-Micro (NEMS & MEMS) systems and designs etc. A good number of researchers, students from the Institute and neighboring Institutes are benefited from this infrastructure available at IIT Mandi and this is also a source of revenue generation for the self-sustainability of facility. The user charges collected in two past quarter are around 4 Lakhs. Along with that, many government Institute like ISRO, DRDO, DST etc. or industrial funded projects have been successfully completed or still going on. In the present projects, center manager, two project staff and instrument operators are hired for the proper day to day operations of center facilities. Whereas, two technical staff members are taking care of the complete clean room & plant room operations, which are equipped with AHUs, MAUs, Chillers, UPS and BMS.

To make C4DFED facilities self-reliance and self-sustainable, a cumulative effort has been started. In this regard, an expert committee from different Institutes/organizations from India (IIT Mandi, IIT Delhi, IISc, IIT Ropar, ISRO, DRDO and company etc) and abroad have visited in person/skype IIT Mandi C4DFED facility, on 11th Dec 2019 and as per their suggestions center is going to organizing more training programs, workshops and conference like previous year.

Vision of C4DFED User Facility

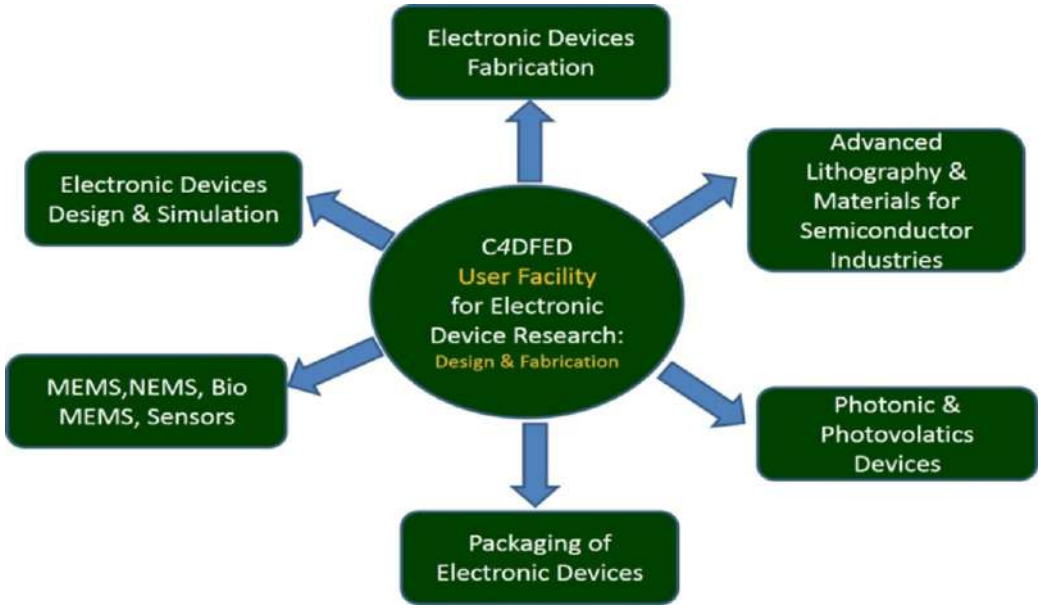
- A World-Class Dynamic Infrastructure and Toolset for Next Generation Integrated Circuits (IC's) & Electronic Device Design & Fabrication Research and also technology development focusing Semiconductor Industries.
- The School of Computing and Electrical Engineering (SCEE), School of Engineering (SE) and School of Basic Sciences (SBS) currently have established diverse expertise and research projects and various program in this area as well others related area. This centre will provide the state of art infrastructure, fulfilling the research needs for IIT Mandi research community and also build a network of faculties & researchers working in the electronic device design & fabrication field that can sustain these activities and foster growth in an advanced area with broad participation or attaining its objective.
- Industrial interactions is one of important focus.
- A Regional Center is envisaged. Education and manpower development through outreach is one of the major objectives.
- Vision of the centre is in line and synchronizes well with the vision of IIT Mandi: “To be a Leader in science and technology education, knowledge creation and innovation”
- This is within the ambit of the Make in India Advanced Manufacturing National and State policies.

Mission of C4DFED User Facility

- Creation of a centralized state of the art infrastructure facility for next generation integrated circuits (IC's)/electronic device design & fabrication and also futuristic materials research for semiconductor industries.
- Develop and sustain educational resources and a skilled workforce for semiconductor industries through the team efforts.
- Foster collaboration with industries and transfer of new technologies into products for commercial and public benefits.
- To initiate an interdisciplinary MS (by Research), M.Techand Ph. D program.
- Outreach training programme for undergraduates, post graduate and teachers & researchers of neighbouring Institutes.
- A REGIONAL FACILITY in North India / NATIONAL facility with access to universities and academic institutions as well as industry.

Thematic Area C4DFED User Facility

- The *C4DFED* user facility is focused to produce the nano/micro electronics devices for specific users areas and applications and in that process is developing the core technology as well as techniques which will make the centre knowledge and resource centre in the area of electronic device design & technology.
- While the *C4DFED* user facility is focused on immediate deliverables and developing some prototype as well as proof-of-concept devices, a part of the user facility is engage in new ideas and phenomena to form the science & engineering core of next generation nano/micro devices design & technology and thus ensure its sustainability and growth.



Summary of C4DFED

Sr. No.		
1	Objective of the Centre	To create a unique facility for multidisciplinary research on device design and fabrication at IIT Mandi
2	Users	• All IIT Mandi faculties who have similar research interest. • Masters and Ph.D students of IIT Mandi
3	Total Cost of the project	Rs.10 Crores + Rs.40 Crores Equipment
4	Electrical Power required	600 KVA
5	Class 100 area	1200 Sq Ft
6	Class 1000 area	450Sq Ft
7	Class 10000 area	350Sq Ft

	Class 100000 area	2000 Sq Ft
8	Equipment installed	He Ion Milling and Imaging system, Electron Beam Lithography with imaging system and Field emission Scanning Electron Microscope are the three major equipment already installed. Few other device characterising equipment will also be installed very soon.
9	Projects expected	Related to Development and Application of Nanoelectronics, Development of Extreme Ultraviolet Lithography (EUL) resists materials for the next generation technology node, IC design and fabrication and Nano-Micro (NEMS & MEMS) systems and designs etc

5.3 BioX

Co-ordinator : Dr. Tulika P. Srivastava
Activities in the BioX Centre

Situated in the largely agrarian, scenic and fragile Central Himalayas, IIT Mandi has a focus on agriculture and the environment. Another important focus area of research is human health. Towards this, IIT Mandi has initiated activities in the life sciences in the broad areas of immediate relevance to the Himalayan region, and to health care particularly for the rural and lower-income strata of society. There is an immediate need to extend the benefits of advanced knowledge and technology to the traditional farmers, particularly those engaged in the cultivation of fruits, vegetables, saffron and medicinal plants in this region. Also, with the advancements in technology, better health care regimes need to be evolved.

Towards these goals, IIT Mandi has taken initiatives to conduct interdisciplinary research and developments including faculties from various different disciplines of basics sciences and engineering. As a part of this initiative the BioX Centre was conceived at IIT Mandi in 2012, driven by the need for affordable health care for India, and advanced technology interventions in agriculture and for preservation of the environment in the Himalayan Region. Since then, IIT Mandi has recruited six faculties and two fellows in Life Sciences as a part of the School of Basic Sciences. These faculties and fellows along with the faculties from the other Schools, including the School of Computing and Electrical Engineering and School of Engineering, are engaged in highly interdisciplinary research in the focus areas of life sciences, biophysics, nanotechnology, bioinformatics, plant systems biology, and others.In addition, IIT Mandi also made an initial investment of Rs. 10 crores for purchasing lab equipment related to these areas. A similar amount of funding has also been received by the individual faculties and researchers working in the Centre from different funding agencies including DBT, DST, SERB, MHRD, etc. As it had reached a critical mass, the formal structure of the BioX Centre was finally approved in December 2016.

The broad vision of the BioX Centre at IIT Mandi is to perform cutting edge research in the focus areas of Systems and Synthetic Biology with applications in Health care, Agriculture, and Environment. The BioX Centre is envisioning to push the frontiers of technology development and engineering toward advancements in disease prevention and affordable health care, agricultural practices with respect to the Himalayan region, and Himalayan Biodiversity exploration for biotechnological applications by bridging the gap between life sciences, physical sciences, and engineering. Some of the important missions of the BioX Centre include:

- To tackle major health-related and agri-based challenges and perform cutting-edge research.
- To encourage multi-institutional and inter-disciplinary collaborations to attract extramural funding.
- To develop industry-academic partnerships.
- To facilitate interaction between engineers, computational scientists, and physical and life science researchers.
- To pursue excellence in research, innovation and discovery with focus on life sciences and technology development.

Currently a group of 20 faculties within IIT Mandi with different expertise whose research focus aligns with the vision of the BioX Centre form a core part of the Centre. These include faculties from the School of Basic Sciences (Biologists, Chemists, Mathematicians, Computational Biologists), School of Engineering (Mechanical Engineering), and School of Computing and Electrical Engineering (Computational Engineering and Electrical Engineering).

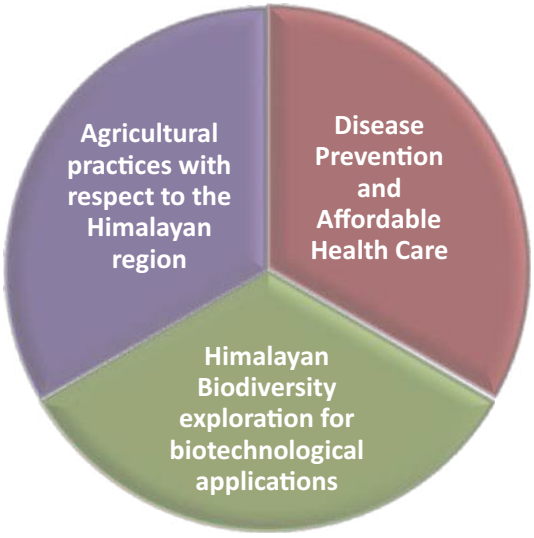


Figure: Thrust areas of research being carried out at IIT Mandi

The thrust areas of research which are being focused at the centre include:

Disease Prevention and Affordable Health Care

- Biomedical Devices & Instrumentation
- Biomechanics
- Biomedical imaging
- Nanobiotechnology
- Biomaterials
- Diagnostics and Therapy for Diseases

Himalayan Biodiversity exploration for biotechnological applications

- Natural Products Biotechnology For Health and Industry
- Exploration of Novel microbes (enzymes) in extreme environments for industrial and biotechnological applications

Agricultural practices with respect to the Himalayan region

- High-throughput phenotyping in agriculture
- Systems analysis of important crop pathogens for management

The BioX Centre has spear headed the formation of a BioX consortium with IIT Ropar and PGIMER Chandigarh joining IIT Mandi in this venture. The major theme areas which are covered under the consortium include Biomedical Devices & Instrumentation, Biomechanics, Biomedical Imaging, Diagnositics& Therapy for Diseases, Biomedical Nanotechnolgy. So far three major activities have been held under this consortium which include the first meeting of the consortium members held on 5 -6 Feb 2016 at IIT Mandi to discuss the potential ideas of collaboration among the three Institutes towards the vision of the consortium. There were close to 30 participants from IIT Mandi and IIT Ropar. This was followed by the second meeting at IIT Ropar on 12 – 13 March 2016 in which 47 participants took part from the three Institutes and several researchers

presented project proposals requesting grant of seed funding under the consortium. The third meeting was held on 12th May 2016 with participants from IIT Mandi and IIT Ropar. Towards this, a total seed funding of Rs 48 lakh has been awarded so far from IIT Mandi and IIT Ropar to the different PIs.

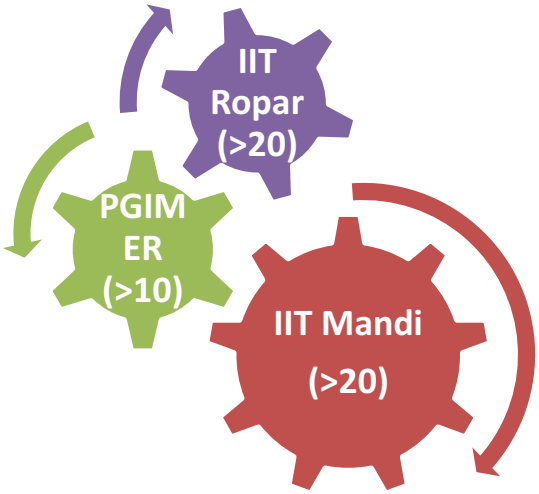


Figure: BioXConsortium members. Numbers in braces indicate the number of faculty involved from the respective Institute

The major thematic areas being pursued for research in the BioXConsrotium include:

- Biomedical devices & instrumentation
- Biomechanics
- Biomedical imaging
- Diagnositics & therapy for diseases
- Biomedical nanotechnolgy

The BioX faculty have been able to successfully attract collaborative projects of high value. There are twoIMPRINT projects worth ~Rs. 4.7 crores under the IMPRINT health and IMPRINT Energy sectors.

Sustainable waste water treatment through bio-photoelectro catalysis and biofuelproduction

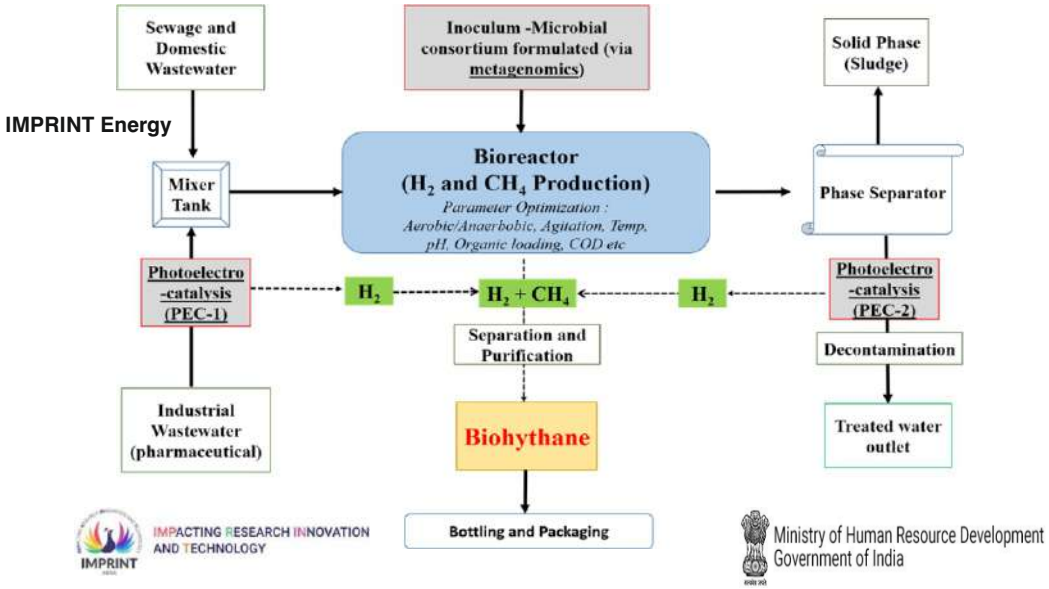


Figure: IMPRINT project overview under Energy sector.

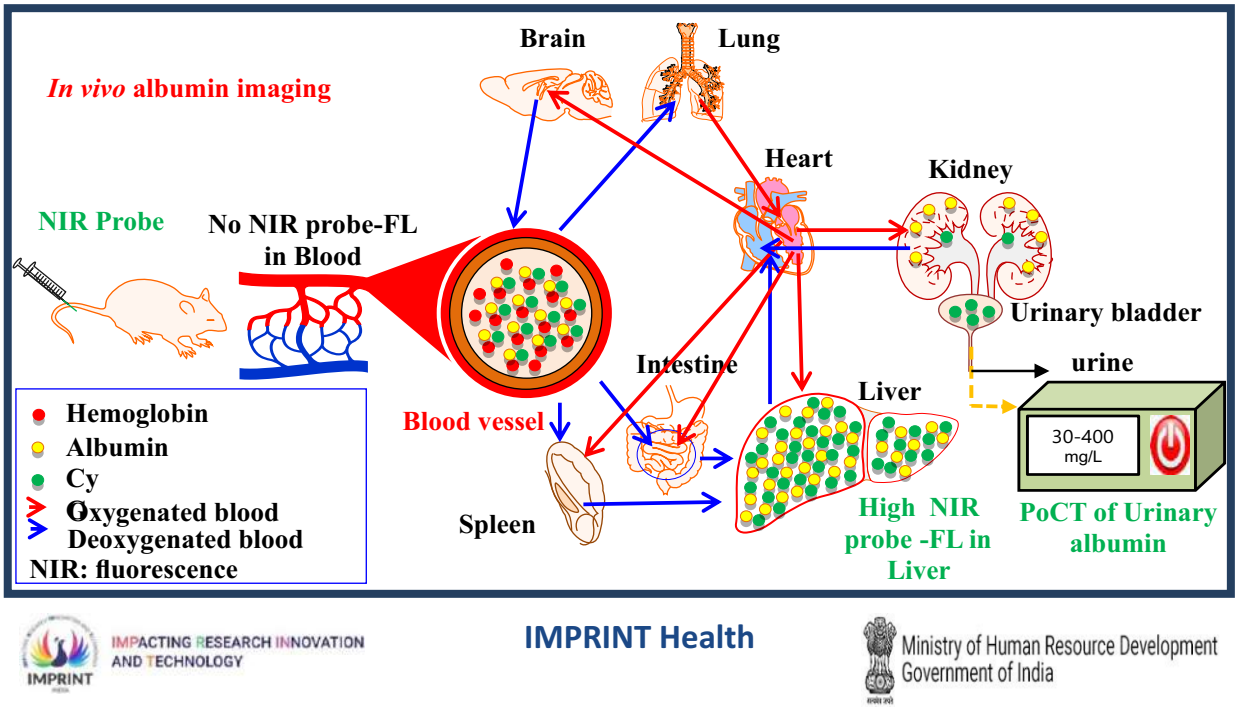


Figure: IMPRINT project overview under Health sector.

There is also one DBT FarmerZone project worth ~Rs. 10 crores.

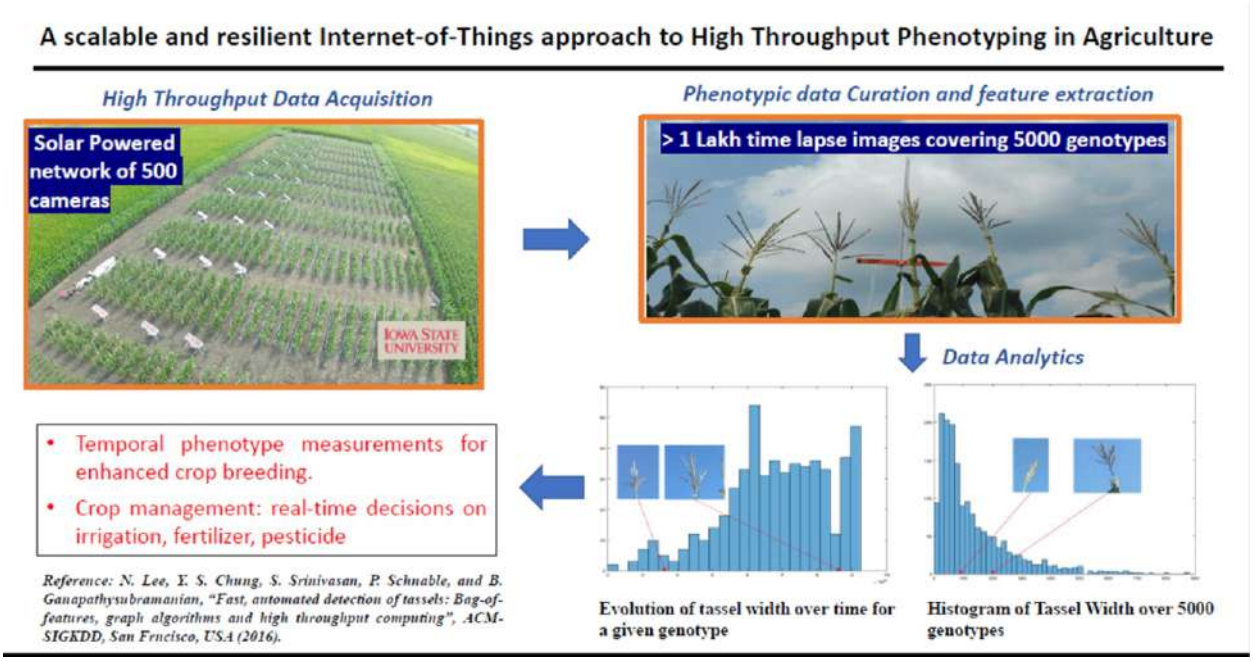


Figure: DBT funded FarmerZone project overview.

In addition several other independent projects have been received by the BioX Centre faculty from various funding agencies.

The laboratories and technology platforms that currently exist at the BioX Centre of IIT Mandi include:

- Advanced Materials Research Center (AMRC) (equipped with high end facilities like NMR, Mass-Spec, Single crystal XRD, Confocal Microscope, Spectrophotometers, etc).

- High Performance Computing facility.
- Molecular and Systems biology.
- Nanotechnology.
- Next Generation Sequencing facility.
- Animal House facility.
- Cell and Tissue culture facilities.
- Expanding in other Omics.


Cell and Tissue Culture facilities

Fungal Culture Facilities


Next Generation Sequencing Facility

Gas Chromatography (Mass Spec)

Bioreactor

Fow Cytometer

UV-VIS NIR

Fluorescence Microscope

Stop Flow

Basic Molecular Biology Lab

Systems Biology Lab

Plant Growth Lab

Medicinal Plant Garden

Botanical Garden

Herbarium

Upcoming

Animal House Facility

Figure: Existing research facilities at the BioX Centre.

Figure: Other research facilities of the Institute being used by the researcher of the BioX Centre.

Microsoft Research India, Penn State Univ, CPRI Shimla, National Institute of Agricultural Botany (NIAB) - UK The Centre facilities are also an integral part of the ongoing M.Tech in Biotechnology program of the School of Basic Scneices at IIT Mandi. The M.Tech in Biotechnology programme was started in August 2016 with the goal to train the next generation of students with cutting edge knowledge and skills suitable towards biotechnological research and bio-pharma based industry. M.Tech in Biotechnology programme at IIT Mandi is intended to nurture and train the students with strong interest in research and Bio-industry to meet the existing challenges of the biomedical research/industry. The curriculum is directed towards fundamental and practical understanding of the core biotechnology areas along with specialized fields in the form of specialization programs in “Systems Biology” and “Medical and Nano-biotechnology”. In addition, elective courses from other disciplines provide interdisciplinary exposure to the students. The core-subjects, specialized theme areas of BioX, electives from other schools, hands on laboratory training along with the Thesis project component to be undertaken in-house/ other R&D Institutes/ industries enrich students with right skills required in the current Job market both in academia and industries, on completion of the program. The first batch of MTech students (8 nos) have already completed their degrees.

The BioX Centre serves as a platform to foster R&D and teaching in several areas of biotechnology, including systems biology, bioinformatics, biophysics of misfolding diseases, Intrinsically Disordered Proteins (IDPs), metabolic engineering, nanobiotechnology, translational medicine, synthetic biology, etc. exploiting their strong synergy with different areas of technology. Currently, more than fifty research scholars pursuing their Ph.D degree in the related areas, are using the facilities developed at the BioX Centre. The BioX Center faculty have been able to publish their research work in the peer reviewed international journals of high impact. The growth in the number of research articles published by the faculty in the Life Sciences area is given below:

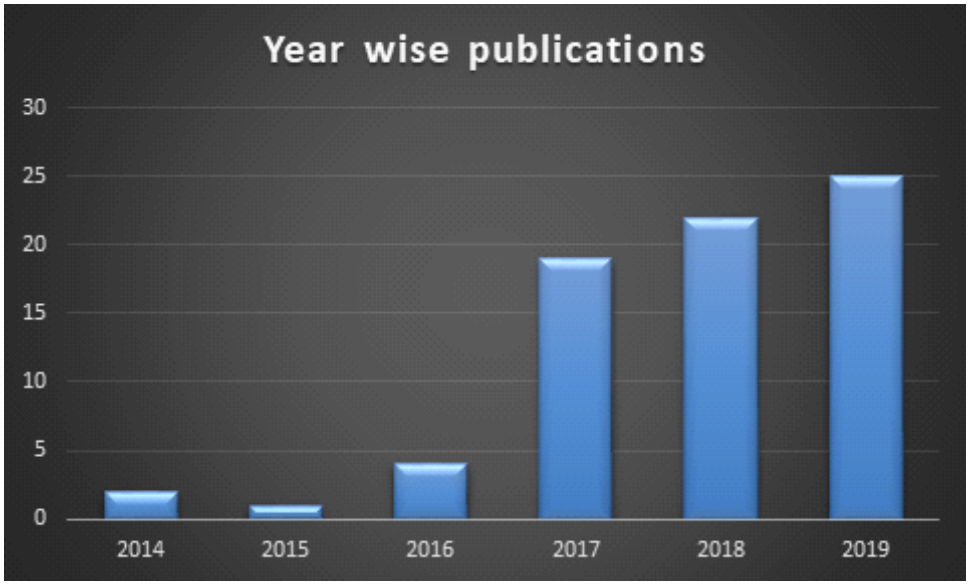


Figure: The growth in the number of publications of the faculty of the BioX Centre in the area of Life Sciences (upto Dec 2019).

Dr. Rajanish Giri was awarded the IYBA, DBT award (sanction date: 31st January 2019).

Dr. Amit Jaiswal was awarded the Young scientist award by the Society for Biomaterials and Artificial organs (India), 2018. He was also honored with the Teaching Honour Roll Award by Indian Institute of Technology Mandi for excellence in teaching during the academic year 2017-18. In addition, he got the ACS Pittcon Travel Award 2018.

Dr. Tulika Srivastava has been appointed as a Visiting Scientist at the Laboratory for Microbiome Sciences, RIKEN Center for Integrative Medical Sciences,Yokohama, Kanagawa, JAPAN.

The funding from extramural sources were sanctioned to the BioX faculty as per the following details:

Name of the project	Status/ Duration	Spons. Agency	Amount sanctioned (in Rs.)	PI	Co-PI's
Mapping cellular metabolism of agricultural and industrial relevant Xanthomonasspp	Awarded 2 years (2018-2020)	SERB-NPDF	~50 lakhs	Dr. Tanmoy	Mentor: Dr Shyam K Masakapalli
Smart Agriculture: Farmer Zone	Awarded 3 years (2018-2021)	DBT	~947 lakhs	Dr. Srikant Srinivasan	Dr. Shyam K Masakapalli, Dr. Renu M.R, Dr. Siddhartha Sarma, Dr. A.D. Dileep, Dr. Shyamasree Dasgupta (Co-PI's)
Developing novel strategies to capture Phytopathogen-Agricultural host metabolic crosstalk by cell type specific 13C metabolic phenotyping	Awarded 2 years (2019-2021)	MHRD-SPARC	46.81 lakhs	Dr. Shyam K Masakapalli & Prof George Ratcliffe (Univ. of Oxford)	Prof Nick Kruger (Univ. of Oxford), Prof Suvendra Ray and Dr Siddhartha sathapathy (TezpurUniverity)

Principal Investigator: Dr. Prosenjit Mondal

DBT- BT/PR27786/MED/30/1980/2017 March, 2019 - March,2022

Title: The Role of Ectopic Liver Derived Systemic Factors in Regulating Beta-cell Function

Budget: Rs. 50,61,000/-

The faculty at the BioX Centre gave the following talks at the international/national meetings/conferences:

Invited Talks Delivered by Dr. Shyam K. Masakapalli in the year 2019

1. "Integrating genomics with 13C tracers for efficient mapping of microbial metabolic systems", BESCON 2019, IIT Madras https://web.iitm.ac.in/bescon2019/speakers .html.
2. High Tech Agriculture for Indian farms - How can we contribute? Presented at Rayagada College, Odisha, 16th Jan 2019.
3. 13C fluxomics towards mapping the Plant-microbial metabolic cross talk. Presented at Molecular Intricacies of plant associated microorganisms, MIPAM-2019, NIPGR, New Delhi, Feb 1st to 3rd, 2019.

Invited Talks Delivered by Dr. Shyam K. Masakapalli in the year 2018

1. Defining cellular metabolic phenotypes using 13C tracers, NMR and GC-MS, Presented at Institute of Microstructure, Karlsruhe Institute of Technology, Germany, 2nd Aug 2018.
2. 13C fluxomics – challenges and opportunities to define cellular metabolic phenotypes. Presented at BESCON-2018, IIT Bombay, 27th Oct 2018.
3. Introducing 13C Fluxomics and Smart Agriculture in Indian Context. Presented at NCBS, Bangalore, 20th Nov 2018.
4. Comprehensive Phytochemical analysis from Himalayan flora with their potential applications at The Himalaya Drug Company, Bangalore, 19th Nov 2018.
5. Metabolic Systems Biology approaches for optimal bioprocessing of cellulosic waste to valuables.Presented at BioSD, IICT Hyderabad, 24th Nov 2018.
6. Introducing Metabolomics, Fluxomics and Smart Agriculture in Indian context. Presented at IISER Bhopal, 27th Dec 2018.

Conference Proceedings/Invited Talk (2018-2019)				
Talk title	**Conference Details**	**Organizer/Venue**	**Year**	**Author**
(Invited Speaker) Metal and semiconductor based nanocomposites for Theranostics	National Conference on Nanomaterials in Biology (NCNB 2019)	NIT Jaipur & University of Rajasthan	2019	Amit Jaiswal
(Invited Speaker) Plasmonic Nanostructures and 2 -D Material based nanocomposites for applications in Biology, Catalysis and Sensing	Advances in Chemical Engineering and Science (ACES - 2019)	IISER Bhopal	2019	Amit Jaiswal
(Invited Speaker) Stimuli Responsive Nanomaterials for Drug Delivery and Photothermal Therapy	6th world congress on Nanomedical Sciences-ISNSCON-2018,	Vigyan Bhawan New Delhi	2019	Amit Jaiswal
(Oral Talk) Gold Nanorattles: an emerging nanoplatform for sensing and theranosticapplications	NanoBioteck 2018, 3rd Annual Conference of Indian Society of Nanomedicine	AIIMS, New Delhi.	2018	Amit Jaiswal
(Selected Talk) Advanced nanomaterials for Biomedical Applications	UK-INDIA Interdisciplinary Workshop on Advanced Biomaterials and Biosensors (2018)	IIT Ropar.	2018	Amit Jaiswal
(Invited Speaker) PlasmonicNanorattles: Engineering its Structure for Applications in Catalysis, Sensing and Theranostics	International conference on Biomaterials, Bioengineering and Biotheranostics (BioMET 2018)	VIT Vellore	2018	Amit Jaiswal

The following events were organized by the BioX Centre for the dissemination of Science and Technology knowledge:

1. 2 days Farmer Zone 2018 workshop (May 2018) co-organised along with FarmerZone team at IIT Mandi – Participants were Principal Scientific Advisor, Govt of India; DBT India; CPRI Shimla and Meerut, NIAB UK; IORA Ecological solutions, Delhi; Vertiver, Delhi; Lahoul Potato Growers Association, Manali; Sanga Farms, Jalandhar; TCS; Microsoft Research, India and GODAN

2. An annual research fair of the BioX Center was celebrated on 20th May 2018 wherein the updates of the research highlights were presented in the form of oral presentation and poster presentations by the research scholars of the Centre.

Highlights of our Students Achievements

1) Ankur Kumar, Ph.D student, Awarded with Fulbright Fellowship.
2) Bhuvneshwari Gehi: Awarded with Khorana Fellowship funded by IUSSTF.
3) Best oral presentation awarded to Ms Manu Shree for her work on Defining the central metabolism of Geobacillusthermoglucosidasius using 13C tracers at BESCON 2018, IIT Bombay, Bombay, India, Nov, 12-15.
4) Ms. Naina Arora got global travel award to attend key stone symposia on Helminths held at Capetown, SA.
5) Ms Naina Arora got best poster award at national Parasitology Congress 2019 held at JNU, New Delhi.
6) Ms Farhan got best poster award at the annual conference of TBRS society held at Lucknow.
7) Manu Shree, Masakapalli SK., 13C based tracer analysis of BXO43 central metabolism. Poster presented at ASM microbe -2018, June, 07-11, Atlanta, USA.
8) MTech Student Ms. Priya Singh received the IASc-INSA-NASI Summer Research Fellowship 2018.
9) Several Ph.D students visited abroad to present their work, including Ms Naina Arora (Lindau meeting), MsManushree (ASM microbiology, Atlanta, USA), Fauzul Mobeen (IHMC 2018, Killarney, Ireland), Ms Aditi Jangid (IHMC 2018, Killarney, Ireland).

Outreach Activities of the BioX Centre

1. Activities conducted in IIT Mandi-Industry-EWOK-Farmer Network.
2. Supported/mentored startups in Agriculture (Thapasu foods, Mushroom tablet, Chlorohemp, Azeedo – IIT Mandi Catalyst startups).
3. Hosted Himalayan Drug Company- Bangalore for exploratory visit towards empowering local farmers via EWOK network.

4. Trained women from EWOK – Herbal tea packaging.
5. Organised Botanical Garden tours of several local (about 12) schools, Girls students of VigyanJyoti conference held at IIT Mandi, MIT Boot camp students.
6. Plantation Drives - 5WIP and NSS.
7. Handson workshop for Northeast STEP students – Botanical Garden visit and DNA from plants.

Publications

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2. The mechanism of phosphatidylcholine- induced interference of PAP (248-286) aggregation. Kumar V, Gour S, Verma N, Kumar S, Gadhave K, Mishra PM, Goyal P, Pandey J, Giri R, Yadav JK. J Pept Sci. 2019 Feb19. e3152.
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Book Chapter (2018-2019)				
Peroxidase Like Activity of Metal Nanoparticles for Biomedical Applications	**Book Title** Nanobiomaterial Engineering - Concepts and Their Applications in Biomedicine and Diagnostics	Springer	(**2019**) ISBN: 978-981-329-839-2	S. Ghosh and A. Jaiswal*
Gold Nanostructures for Photothermal Therapy	**Book Title** Nanotechnology in Modern Animal Biotechnology	Springer	(**2019**) ISBN: 978-981-13-6003-9	P. Singh, S. Roy, P. Sanpui, A. Banerjee*, A Jaiswal*
Bio-inspired Polydopamine and Composites for Biomedical Applications	**Book Title** Electrically Conducting Polymer and Polymer composites: From Synthesis to Biomedical Applications	Wiley-VCH Verlag GmbH & Co. Germany.	(**2018**) ISBN: 978-3-527-34289-1	Z. Khan, R. Shanker, D. Um, A Jaiswal, H. Ko

6. Research Groups

6.1 UHL: The Centre for Uplifting Himalayan Livelihood (UHL)

A brief report on Lantana and DPN(Dry Pine Needles)

The Center for Uplifting Himalayan Livelihood (UHL) is a DST funded center at IIT Mandi, in Himachal Pradesh working on socio-technical issues of the Himalayan region in general and H.P. state in particular. The center is currently working on a two DST funded projects entitled "Uplifting hilly livelihood through the eco-friendly utilization of Lantana weed" and "Eco- friendly Utilization of hazardous Pine Needles for social benefits".

A. Bio-fuel of menace weed Lantana

Status of Lantana in Himachal Pradesh

Lantana is spreading very fast in Himachal Pradesh. According to the survey done by the forest department in 2015, the total area covered by Lantana in Himachal is more than 2, 30,000 hectare. A survey was also carried out during 2011-12 and 2015-16 to know the extent and level of invasion. The seven territorial circles namely Dharmashala, Nahan, Hamirpur, Chamba, Bilaspur Mandi and Shimla have a significant infestation of Lantana.The intensity wise forest area infected with Lantana in the state is given in table 1 (according to the study of 2015), and the availability of lantana in Himachal Pradesh is also given in table 2.

Table1: Intensity of Lantana in H.P.

Intensity	Area(ha)	%
<25%	53203.82	22.59
25%-50%	68244.03	28.98
50%-75%	73778.35	31.32
>75%	40285.75	17.11
Total	235491.75	100

Table 2: Lantana availability circle wise (based on January-March 2011)

Circle	Forest Area under the Invasion of Lantana (In hectare)
Nahan	21,456.99
Bilaspur	55,941.55
Mandi	7,900.00
Hamirpur	12,680.00
Dharamshala	47,403.00
Shimla	4,060.89
Rampur	0.00
Chamba	4,631.77
Kullu	575.70

Unfortunately, there is no good viable solution for eco-friendly lantana management. Now, HP Forest Department is collaborating with IIT Mandi to find some solution. Following steps need to be achieved in a sustainable manner for the use of Lantana biomass:

a. Comparative study on the use of lantana in various ways
b. Designing a low-cost tool for the collection and chopping of lantana
c. Briquetting/ pelletization of lantana potential available in Himachal Pradesh
d. Laboratory analysis of biomass briquettes/ pellets and trial studies on the usage of briquette /pellets

Based on our collaborative effort and understanding so far, after exploring all possible usages of lantana like furniture, oil extraction etc, it seems that making bio-fuel in the form of briquettes/pellets of lantana can be a better and viable solution. Recently, IIT Mandi has been successful in making the bio-fuel out of lantana bio mass. The initial studies indicate that it can be a good substitute to be used in any industry which requires the burning of coal/wood. Its use as domestic fuel is yet to be evaluated.

Interestingly, all previous efforts in eradication of lantana have been either hand pulling, slashing/chopping of the stems, control burning and manual grubbing with substantial removal of the root system etc to remove lantana. These methods had no or little effect in controlling the spread of lantana infestation, due to their inherent limitations and absence of an integrated control strategy. Making bio-fuel seems to be a possible and viable way as a sustainable solution. The figure below shows the chopping tool we found highly suitable and the bio-fuel samples IIT Mandi has made.

Pruner

Uprooter

Lantana Briquettes

Lantana + Pine needle briquettes

The table below shows the calorific value of briquettes that is the heat liberated when the solid fuel undergoes complete combustion in oxygen.

Table3: Calorific value of Lantana briquettes (sample: lantana +pine needle)

Lantana %	Calorific value (Kcal/kg)	Moisture%
100	5761.69	8
50	5120.27	7

A. Eco-friendly utilization of dry pine needle for uplifting rural livelihood

Pine needles cause a major threat to the environment, biodiversity and local economy in the entire Himalayan region due to their non-bio-degradability and highly-inflammable nature. In past few decades, the forest departments of hilly states such as Himachal Pradesh and Uttrakhand have tried various ways for collection and disposal of dry pine needles (DPN) in order to avoid the forest fires caused by them. After studying various possible ways, we realized that "Pelletization and briquetting" of pine needle biomass is the most eco-friendly and economically viable solution. Center successfully prepared the briquettes and pellets by the different combination of biomasses mixing with DPN. Due to high calorific value and economic viability, the product is ideal for use. Center also filed a patent on DPN briquetting entitled "BIOMASS COMPACT BRIQUETTE FUEL

AND ITS PREPARATION METHOD" Patent no. 201811000279, dated 03/01/2018. The brief introduction of the invention is given below:

1. Briquetting of pine needle

Briquetting is a process where the raw material is compressed under high pressure to form a round or square briquette, such briquettes of biomasses can be used as fuel. During the compression of the material, temperatures rise sufficiently to make the raw material liberate various adhesive that will assist in keeping the particles together in the compressed shape.

1.1. Briquettes and pellets produced at the center

Interestingly, all previous efforts in this direction either applied controlled burning and then compression or mixing of materials like cow dung/soil etc to make fuel. The product made with these techniques is neither of acceptable quality nor easy to make. Based on our observations and understanding we decided to chop and compress the needles at high pressure. After many trials, we could finalize what kind of set up will work the way we wanted it to work. We succeeded in making very clean, dense and easily manageable briquettes and pellets with pure pine needles and with the mixing of pine needles with many other biomasses. The figure below shows the samples we have made at the center.

Fig-1: [DPN briquette]

Fig-2 : [DPN pellets]

1.2. Briquette and pellet Machine set up in Center

Center has its own set up in IIT Mandi campus. The briquetting unit set up in our campus has the **capacity of 150kg/hour** with a connected load of **12 HP.** The cost of the unit is around **six** lacks. Center also have pellet machine and pulverizer with a capacity of 50kg/hour and connected load 5 HP. The figure below shows the briquette machine and pellet machine.

Fig-3: Briquetting machine

Fig-4: Palletization Machine

1.3. Chemical analysis of briquettes

Biomass briquettes have higher the value of calorific value as compare to wood. Further, we conducted a variety of fundamental ash analysis tests including elemental ash tests, ash fusion tests and coal ash analysis. Following tables lists the calorific value along with moisture and ash content of the various samples made up of pine needles mixed with wood chips.

Table 4: Calorific value of DPN briquettes (sample: pine +wood chips)

Pine %	Calorific value (Kcal/kg)	Moisture%	Ash%
60	6442.58	6.03	2.77
40	6186.60	6.98	3.18
20	5368.2	7.40	3.09

2. Benefits of product

2.1. Economic Viability

Based on our cost-benefit analysis studies, it seems economically viable product. The following computation gives the approximate cost of the product.

Machine cost = Rs. 6 lakhs (It includes briquette machine and pulveriser cost)

Plant Operating cost = (Power consumption + Labor charges) = Rs. 940 / ton

Material cost = (Collection cost + Transportation cost + Labor charges) = Rs. 3350/ ton

Manufacturing overhead = Rs. 200 / ton (approx)

Total production cost= Rs. 4500 / ton

The production cost of briquette is Rs. 4500/ton or Rs. 4.5/kg.

- From the calculation, the production cost of briquette would be Rs 4.5/kg while wood also costs around Rs 4.5/kg.
- Cost of the machine (6 lakhs) can be recovered in two to three seasons.

2.2. Techno-commercial feasibility of the product

In the Himalayan region, more than 70% people depend on wood as fuel for their cooking requirements. Pellets and briquettes have useful heat content. The cost of briquettes comes out to be Rs 4.5/kg while wood costs around the same. Owing to the high calorific value, consumption of briquettes will be quite less than wood. A household will require only 3kg of briquettes/pellets per day as compared to 10 kg of wood. From the data reported by the Himachal government, the total households which depend on using wood for cooking are approx 8 lakhs, which is the half of the total population.

2.3. Employment generation

It is estimated that the fall of the pine needles is about 1.2 ton per hectare per season. A healthy person can easily collect around 100-150 KG of pine needles in a day, thereby earning around Rs 200-250 on a daily basis depending on the market price of pine needles. The unit is also helping with employment. At least 4 People will work in a single unit. People who have own vehicles will have a chance to earn more by transporting the needles.

2.4. Community involvement

The UHL Center organized awareness programs in nearby Gram-Panchayats for Gram Pradhans. The response and acceptance of the product are very good.

Through this project, the centre unarguably intends to create livelihood opportunities among local communities by conducting relevant workshops so that the upcoming generation can take up the newly created entrepreneurial possibilities to not only meet their livelihood requirements but also contribute in solving the age-old forest fire problem of the Himalayas mainly happening due to pine needles. In addition, as this project shall facilitate local youth to become entrepreneurs, it shall also encourage local or state governments and non-government organizations to consider possibilities of exploring and expanding on this field, eventually making it a movement across the Himalayas.

6.2 Design and Innovation Centre; Patents, Design and Innovation Culture

The Design Innovation Centre at IIT Mandi provides necessary ecosystem for graduates and research scholar to develop much needed skills that are required to design and develop products and technologies. Since India is moving towards “Make in India” policy and IIT Mandi's mission and vision are coherent with the country vision, our Institute attempt to produce graduates and research scholars with skills that would enable them to think independently in terms of creativity and innovation. With the conviction that technological innovation constitutes an essential element for achieving progressive development and permanent improvement in any activity, state-of-the-art design centreis being set-up in the campus funded by MHRD. Since the next wave of economic growth globally will be led by innovation and entrepreneurship, this would be the key economic driver for India in the coming years.

The Design and Innovation Centre is a Rs. 1.6 crore project funded by the Ministry of Human Resource Development, Govt. of India. The centre is equipped enough to support the prototype and product development endeavors of the students and faculty members of IIT Mandi. Facilities like 3D printer, PCB fabrication unit, magnetic stirrers, Elvis System Development board and other development and test facilities are available at the centre. The Institute is all set to provide easy access of the centre to its students round the clock.

The centre is coordinated by Dr. Shubhajit Roy Chowdhury (School of Computing and Electrical Engineering) along with Dr. Md. Talha, Dr. AtulDhar, Dr. Kaustav Sarkar (School of Engineering) and Dr. Shyam Kumar Masakapalli (School of Basic Sciences).

The centre organized an open house on May 22, 2019 to exhibit the students' projects. The following projects were demonstrated during the open house among others:

1. **Trajectory tracking of a redundant rotor tail sitter UAV**

   Team Member: Preethi Kannapan

   Advisors: Dr. Tushar Jain and Dr. Gaurav Bhutani

   Abstract: UAV is an acronym used for Unmanned Aerial Vehicle, which is an aircraft with no pilot on board. The proposed UAV is a remotely operated tail sitter UAV. Tail sitter UAVs can take-off and land vertically while cruising horizontally without the need for relative tilting of rotors or wings with respect to the body. The novel aspect of this project is the redundancy in the number of rotors along with trajectory

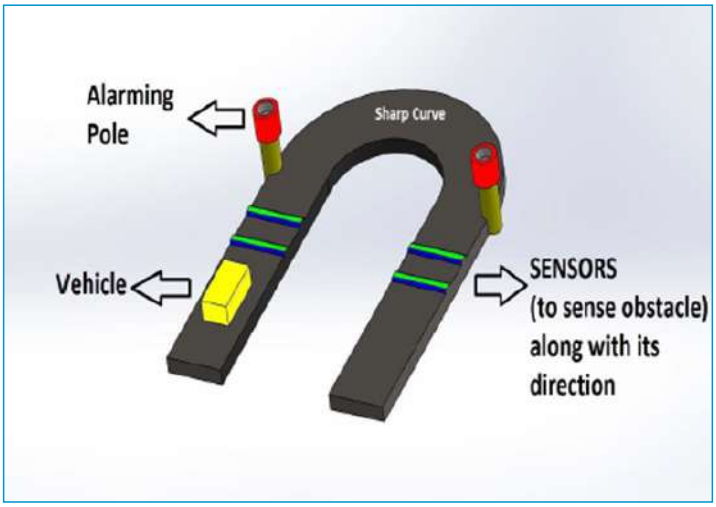
tracking capabilities which allows for fault tolerance with respect to rotor failure, flexible battery power management and safe landing in the case of low battery. This project aims at modeling and simulation of the dynamics of the UAV prototype, implementation of control algorithms for take-off, cruising, landing, trajectory tracking, and redundant rotor control.

2. Smart Accident Free Roads

Team Members: Amudhan M, Naman Chaudhary, Shishir Asthana

Advisors: Dr. Kala Venkata Uday

Abstract: Road accidents are a major concern to the entire world as they result in loss of property and hundreds of lives each year. The main reason is lack of awareness required while driving, especially on sharp curves where you are blind of what is on the other side. There have been serious and fatal accidents reported in such blind curves and majorly in hilly terrains. Keeping this in view, the project aims to alert/inform the driver approaching such curves about the hindrance, in any, approaching at the blind curves adding possible safety to the drive. The project aims alerting every individual on the turns (either walking or driving). As Himachal Pradesh is one of the hilly states with many such turns and curves, the market for such product is immense, to the best of our knowledge. Also adding to the fact that the state has limited rail and air connectivity, majority of the transportation is by roads with number of blind curves.

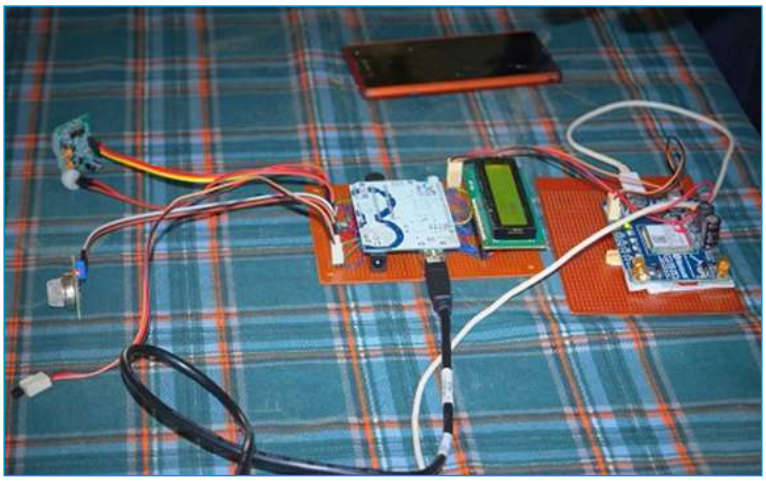


3. GSM Based Security Alert System

Team Members: Bodhayan Nandi, Prateek Kumar Sonker, Yamini Sharma, Yashika Arora

Advisor: Dr.Shubhajit Roy Chowdhury

Abstract: The project aims at building a GSM based home security system for alerting the user with SMS message in case of security breaches. It aims at real time monitoring of common household hazards and unauthorized intrusion. The system sends SMS alert to owner of the house at anytime from anywhere in case of a problem. The system is battery powered, hence no dependence on power failure issues.

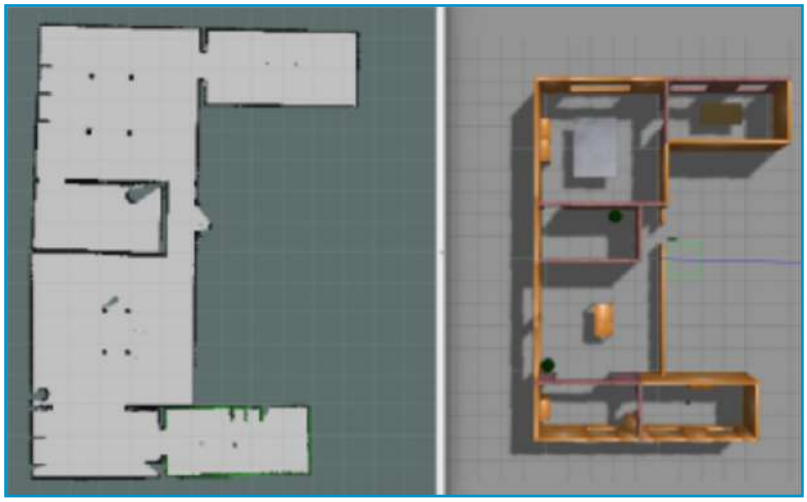


4. Coordinated Multi-robot exploration and mapping

Team Members: Aditi Mann, V. Sai Subba Rao

Advisors: Dr. Arpan Gupta and Dr. Tushar Jain

Abstract: Through this project we seek to take the first steps in exploring the usability of multiple UAVs in the fields of Search & Rescue and construction. To begin with we seek to model the dynamics of the group behavior of swarm robots and analyze them. Subsequent to the development of dynamic model, coordination control and synchronization problem would be addressed and implemented on a swarm of quadcopters, of size of about four. During this process we shall explore various control paradigms - time optimal, fuel optimal, graph based approaches, etc for addressing the agents synchronization problem.



Among the projects, the project on Smart Roads went a step ahead and led to the opening of a start-up named Smart Roads.

The infrastructure was also upgraded to include a 3D scanner. Currently the process is on to procure a Virtual Reality tool.

6.3 Multimedia, Analytics, Networks and Systems (MANAS)

The multimedia, analytic, networks, and systems (MANAS) group consist of more then 8 faculty, who compliment each other on expertise, at IIT Mandi broadly focuses data acquisition and on extracting useful information from various types of data including images, audio and video streams, human computer interaction, social networks, documented records etc.

Recent Activities in the MANAS Group Includes

- Project is sanctioned for Classification of Sonar Signals using Deep Convolutional Neural Networks by DRDO (Rs 16 lakhs, Padmanabhan Rajan: PI, AD Dileep: Co-PI).
- Project for Multimodal Bird Analytics, Sanctioned by National Mission on Himalayan Studies (Rs 32 lakhs, Padmanabhan Rajan: PI, Arnav Bhavsar, AD Dileep: Co-PIs).
- Project for low-cost MEMS-based and Video-based Monitoring and Early Warning System for Rainfall Induced Landslides (Rs 40 lakhs, Arnav Bhavsar: Co-PI).
- NM-ICPS TIH Grant (7.25 cr initial grant, MANAS Co-PIs: Arnav Bhavsar, AD Dileep, Srikant Srinavasan, Aditya Nigam, Anil Sao).
- 15th Winter School on Speech and Audio Processing WiSSAP) was hosted during Jan 8-10, 2020. This workshop is one of prestigious event in the field of speech signal processing in India.
- Workshop on Applied Deep Learning, was organized during July 1-5, 2019. This workshop has participant from academia and industries.

6.4 Condensed Matter Physics

Condensed Matter Physics is one of the highly active fields of research at IIT Mandi, consisting of nineyoung and dynamic faculty members studying the physics of contemporary topics of interest. The group is well supported by the experimental and computational facility and has been quite productive in terms of the publications and has generated funding from external agencies. The faculty members in the group are well known among their peers across the country and have form healthy collaborations across the country as well as abroad. The research activities in condensed matter physics are lead by the faculty members Dr. Ajay Soni, Dr. Bindu Radhamany, Dr. C. S. Yadav, Dr. Kaustav Mukherjee, Dr. Pradeep Kumar, and Dr. Suman K Pal (all experimentalist) and Dr. Arti Kashyap, Dr. Sudhir K. Pandey (both computational). Recent addition of theoretical condensed matter physicist Dr. Girish Sharma, has further enriched the group. At present there are approximately 50 researchers (including faculty members, Ph.D students and Project associates) who are actively studying the different aspects of condensed matter systems. Overall activity in the field can be divided in following subgroups:

(a) Superconductivity, Topological states of matter, Metal-Insulator transition

Faculty members: Dr. C.S. Yadav, Dr. Pradeep Kumar, Dr. K. Mukherjee, Dr. Girish Sharma

(b) Quantum Magnetism, Multiferroics, Magnetocalorics, Heusler Alloys,

Faculty Members: Dr. Kaustav Mukherjee, Dr. C.S.Yadav

(c) Electron-Electron Correlation, Spin Phonon Coupling

Faculty members: Dr. Bindu Radhamany, Dr. K. Mukherjee

(d) Nano-Science, Optoelectronics, Functional Devices

Faculty Member: Dr. Ajay Soni, Dr. P. Kumar, Dr. Suman K. Pal

(e) Thermoelectrics, Energy Materials

Faculty members: Dr. Ajay Soni, Dr. C. S.Yadav, Dr. Sudhir K. Pandey

(g) Electronic Band Structural Calculation (DFT):

Faculty members: Dr. Arti Kashyap, Dr. Sudhir K.Pandey

(h) Theoretical Condensed Matter Physics

Faculty members: Dr. Girish Sharma

CMP group is equipped with state of art experimental facilities, like Photoemission Spectrometer, SQUID Magnetometer, Physical Properties Measurement System, Raman Spectrometer, Femtosecond Laser, and x-ray Diffractometer with the accessibility of measurements down to low temperature. The other facilities extensively used by the CMP faculty members are Field emission Scanning Electron Microscope (FE-SEM), High Resolution Transmission electron Microscope (TEM),Confocal Microscope, Single Crystal X-Ray Diffractometer, Pulse Laser Deposition system,Atomic Force Microscope etc. These experimental facilities are funded by Institute and oare pen to all the internal and external users.In addition to the commercial procured sophisticated equipment, CMP members have designed and fabricated experimental set ups for the measurement ofelectrical resistivity (T =300-600 K), thermoelectric power (T = 77-600 K), thermal conductivity (T = 300-600K), and dielectric properties (T = 10 -300 K).These set ups are well calibrated and in extensively used for the research work.

In the past years, the CMP members have published close to research articles in the reputed research journals of the field. The major research journals are Nature 2D Materials, Physical Review B (Rapid), Physical Review B, J. Phys: Cond. Matter, Scientific Report,JACS, EPL, Appl. Phys. Lett.,Physics Letters, J. Magn.& Mag. Mater., J. Alloy and Comp., Solid State Comm., Physica B, J. Appl. Phys., J. Phys. D: Appl. Phys., Applied Surface Science, AIP Advances, RSC Advances, Carbon, Materials Express, Materials Letter, Computation Material Science, IEEE Transactions of Magnetics etc.

There are approximately 20 ongoing research projects of total worth approx. 3 Crore from various external-funding agencies like DST-SERB, CSIR, BRNS, UGC-DAE CSR, and DST-INSPIRE.

There have been adequate representations of CMP members in various reputed national and International conferences, where the faculty and research scholars have presented their work in the form of invited/contributory talks, and poster etc. Condensed matter faculties (Dr. K. Mukherjee, Dr. C. S. Yadav, and Dr. Pradeep Kumar) organized a 'Discussion Meeting on Recent Advances in Magnetism (DMRAM)' from May 14- 16, 2019 at IIT Mandi. This meeting was aimed for the intense discussion in the field with more than 35 researchers from institution like TIFR Mumbai, IITs, IISERs, NISERs, and NITs

The faculty members have developed good collaborations within the Institute and outside the Institutes. At present CMP members are having collaborative research work with faculty members from different schools in the Institute such as School of Engineering and School of Computing and Electrical Engineering. Besides this, faculty members are collaborating with other Indian institutions such as TIFR Mumbai, UGC-DAE CSR Indore, IIT Kharagpur, IIT (BHU), NIT Rourkela, IISER Mohali, JNCASR, Bangalore, IIT Roorkee, UGC-DAE CSR Mumbai and IIT Bhubaneswar, IIT Tirupati etc.Faculty members are also having strong collaboration with the researchers at international institutions like University of Nebraska, Lincoln, USA, Linkoping University, Linkoping, Sweden, RPI, USA, Hiroshima University, Japan, IFW Dresden, GermanyAalto University, Aalto, Finland, Pierre and Marie Curie University Paris France, IMPMC France.

7. Summer Internship Programme

IIT Mandi organized "SUMMER INTERNSHIP" 2018, this year. This Internship spanned from 11th June – 3rd August, 2018. In this year, thirty-five interns were invited for summer internship, based on recommendations from selected advisors. The students from 22 Institutes/Universities covering all parts of India have completed their Summer Internship in different areas.

School wise summer internship details:

S.No.	Name of School/Department/Section	No. of interns
1	School of Basic Sciences (SBS)	8
2	School of Computing and Electrical Engineering (SCEE)	7
3	School of Humanities and Social Sciences (SHSS)	1
4	School of Engineering (SE)	5
5	Library	1

The summer Internship program was held during 11th June, 2018 to 3rd August, 2018 (8 weeks). The internship includes a stipend and housing assistance as well.

8. Central Library

Central Library plays a vital role in furthering the academic and research mission of IIT Mandi and facilitates creation and dissemination of knowledge. Library provides essential support by offering current library services which are integrated with teaching, learning and research activities. The Library facilitates excellence in teaching, creates an appropriate learning and research environment, anticipates and responds to student learning and research needs, and provides the information infrastructure essential in today's changed environment.

Central library at IIT Mandi is rapidly developing its collection of books, reference books, reports, periodicals, and electronic resources. The Text Book Collection in the Library provides vital supports for on-going undergraduate teaching programs. The books are on various disciplines ranging from Computer Science Engineering, Mechanical Engineering, Electrical Engineering, Mathematics, Physics, Chemistry, Economics, Philosophy, Psychology & English literature. The collection for Post Graduate programs is also being developed simultaneously.

Central Library provides access to the various e-journals databases. This includes access to hundreds of journal titles on subjects such as Mathematics, Chemistry, Physics, Computer Science, Electrical Engineering, Mechanical and Astronomy. Central Library is completely automated by using open source library management software **KOHA**. All documents are bar-coded and by retro conversion all collections acquired prior to automation are also included in the Central Library books database. Transaction of books is also automated. Library has introduced various innovative services including CAS/SDI, On-line status of ILL, On-line reservation of books etc. By using Web OPAC, users can check their borrowing details online. Two workstations have been set up for users to access library holdings.

Software Used in Library:

(i) **KOHA:** For automation purpose.

(ii) **DSpace:** For digitization purpose.

(iii) **Greenstone:** For digitization purpose.

(iv) **Linux:** For operating system.

1. Collection Development and Management

Collection building is one of the important functions of the library that supports academic and research work of the students, faculty, staff, and other users. Library collection comprises of books, journals, reports, pamphlets and other reading material in science, engineering, technology, humanities and social sciences.

1.1 Print Documents added during the year 2018-19

During the period of 2018-19, Central Library acquired 645 books. It also added few periodicals/magazines, besides reprints, technical reports and annual reports of other universities/institutions.

A list of new additions of books is issued every month and can be accessed on the library

home page. This list also circulated by Email. An Email alert is also sent to the requesting faculty members(s) about the arrival of publications requested by them.

1.2 Electronic resources subscribed during the year 2018-19

Central Library provides web-based access to the following e-resources.

1.2.1 Full-text e-journals: Access to 10000+ full-text journals from the following databases:

AIP,ACM Digital Library, ACS, APS, ASME, Cell Press, IOP, Elsevier's ScienceDirect, IEEE Electronic Library, JSTOR, SIAM, Springer Link, Taylor & Francis (S&T complete Collection), Nature, Annual Reviews etc.

1.2.2 Bibliographic e-databases: SciFinder, MathSciNet, SCOPUS & Web of Science.

1.2.3 Video Resources: Jove – Biology, Chemistry and Engineering collection.

1.2.4 E-Books: Central Library provides access to a collection of more than 19622 e-Books in various disciplines. The e-book collection contains the titles which are a rigorous recommendation by the subject experts of the Institute and cater to the needs of the users. The publishers of e-books collection include Science-Direct (Elsevier), McGraw Hill, Pearson, T&F, IEEE,IEEE-MIT press, IEEE-Wiley, Morgan Claypool, CUP, ASME, World Scientific and John Wiley. The e-books collection also includes the Lecture Notes Series on Mathematics (LNM), Physics (LNP) & Computer Science (LNCS) of Springer publisher.

The process of e-book collection development for this year has already been started. The efforts are being made to include the book collection of other renowned publishing houses.

2. Circulation

Circulation activities are now automated. Library users can check their borrowing details by using WebOPAC. We serve the users consisting of the faculty, research scholars, students and staff. Circulation desk is kept open for 66 hours a week. On an average, the monthly circulation transactions are about 1800.

3. Digital Library

Central Library has its own homepage (http://library.iitmandi.ac.in/), which provides web-based access to its resources, procures over 19,000 electronic journals, electronic books and databases.

4. OPAC (On-line Public Access Catalogue)

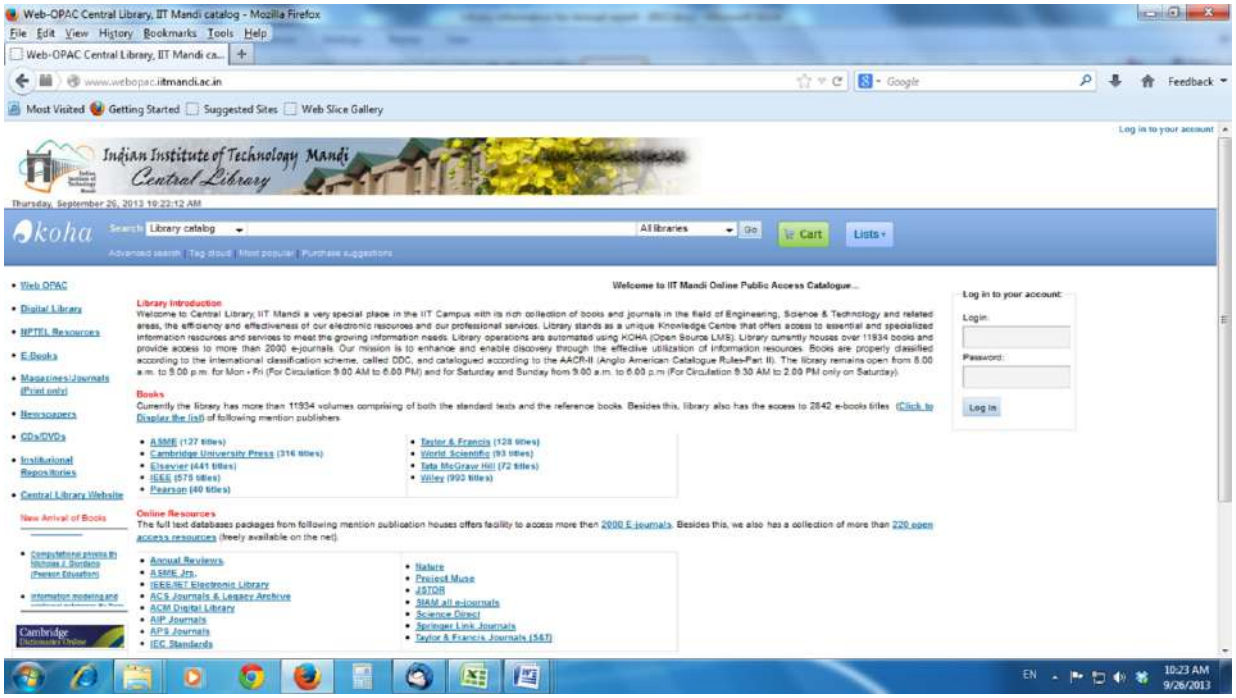
The OPAC is one of the most heavily used databases of the library and is accessible 24*7 via library web page (http//www.webopac.iitmandi.ac.in/). Besides listing all the documents available in the library, it allows on-line renewal and reservation, circulation and tells the current status of each & every book. OPAC is searchable by author, title, accession number, subject and several other fields.

5. Services Offered

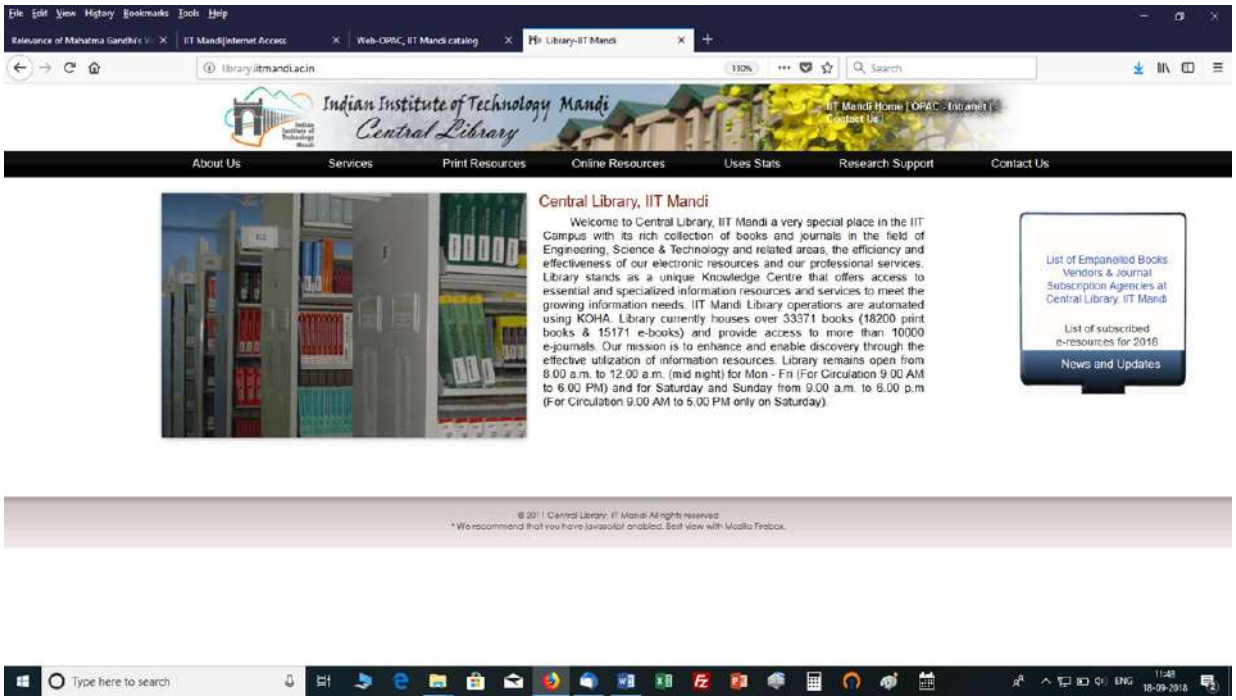
- Fully automated Circulation
- Online book reservation, Information search, Patron's library book loan status check
- WebOPAC (Web based Online Public Access catalogue)
- Reserve collection development for student's in-house reading
- New Arrival Book Section
- Reference Service
- Inter-Library Loan
- Document Delivery Service
- Information Alert Services
- E-Journals/Databases
- Digital library services
- User education program
- Mobile App services

6. Future Plans:

- Database of different softwares available with CDs/DVDs available in the Library.
- Single Search solution.
- Online recommendation platform for different library resources.



WEB OPAC



Library Web Page

9. Sixth Convocation

Sixth Convocation of the Institute was held on 29th October, 2018. Prof. Ashok Jhunjhunwala, Padma Shri, Institute Chair Professor, Indian Institute of Technology Madras was the Chief Guest of the function. Er. Sonam Wangchuk, Ladakhi Engineer, Innovator, Education Reformist and Founding Director of the Students' Educational and Cultural Movement of Ladakh (SECMOL) was the Guest of Honour of the function.

As part of this Convocation, 112 B.Tech. students,20 M.Tech., 28 M.Sc. (Chemistry), 11 M.S. (by Research) students, 11 M.Sc. (Applied Mathematics) and 29 Ph. D. Scholars graduated from the Institute.

Ms. Muthiyan Neha (B14113) and Mr. Siddharth Kumar (B14133) was awarded the President of India Gold Medal (Joint), Mr. Patel Shravan Rajnarayan (B14225), (Computer Science and Engineering), Mr. Pulkit Rajgadiya (B14226), (Electrical Engineering), and Mr. Aakashdeep (B14301), (Mechanical Engineering) were awarded the Institute Silver Medals.

Furthermore, Ms. Muthiyan Neha (B14113) was awarded with Rani Gonsalves Memorial Medal. Mr. Nishant Dhiman, (V16012), M.Sc. Chemistry and Mr. Bhishamdev Verma, (V16045), M.Sc. Applied Mathematics was awarded Outstanding Academic Achievement Award.

10. Students Amenitites and Activities

10.1 Physical Edcation and Sports

Physical Education and Sports Section in playing an important role to promote healthy culture among Students, Faculty and their family through active participation in sports & games throughout the year.

The year 2018-19 is proved a mile stone in the history of IIT Mandi. Last year the new Sports complex A6 is added to sports facilities in north Campus. It had played important role in promoting Physical activity in north campus.

The students of IIT Mandi had also rose to the occasion and brought several laurels by winning medals in important sports competitions.

The group was again headed by Mr. Nitish Kumar, he won the Asian Para Badminton championship. Which was held at Jakarta Mr. Tanmay our B.Tech student also won the Gold medal in Mandi District Open Tournament and Himachal Pradesh State Table Tennis tournament and He was selected for H.P. State youth T.T. team and also participated in National Table Tennis Championship held at Chandigarh.

Our students had full fill the demand of winning medal in Inter IIT Sports meet. Our three Athletic Ms Yati, Ms. Amrutha and Mr. Pawan had won 5 Medals during Inter IIT Sports Meet held at IIT Guwahati 2018.

The Annual Sports Festival Rann-Neeti 2018 was organized with lot of pomp and show, for the first time. The Team Rann-Neeti 2018 headed by sports secretary Mr. Ram Lakhan had made it self-reliant and also became cash surplus for the first time. The icingon the cake was IIT Mandi Sports contingent for the first time won General Championship trophy.

1. Summer Sports Camp 2018

The Preparation for promoting Sports in our Campus started with Summer Sports Camp. Last year the camp was held from18 to 31st July It was proved to be the land mark event because students were pushed their limit of Physical fitness and Boys group ran a cross country far 10 KMS and Girls group ran 5 KMS. This event had set self confidence among the participants. Surly this experience will go long way to improve Physical fitness level of our Institute students.

2. Five week Induction: for 1st year B.Tech student

Last year we had made an elaborate preparation to give a disciplined and enjoyable experience of sporting activities to our 1st year students during 5 WIP.

The students were divided into eight groups and each group had imparted instruction for Physical fitness. Yoga Pranayam and ineight major Sports. Although rain had interrupted few days but over all students had lot of benefits which reflected in their response.

3. Fresher's Meet 2018

The 1st year B.Tech students had and fulfilling day to experience the fun and excitement of Sports competition during fresher sports meet. This event was organized to initiate students to promote competitiveness among first year students and it also helps to spot the player with efficiency to induct in Institute Sports team which participate in tournaments like Inter IIT Sport meet.

4. Inter Hostel Sports Championship 2018

This is a complex events because here we have different hostel buildings are clubbed together to from a single identity Names like Parashar, Nako, Chandertal etc. Therefore events are organized in several days. The mass participation in sports competition is one of the main objectives of this event; large number of students took part in these events for first time.

Beas Kund Hostel was the winner and Prasher Hostel was the Runner op. They were awarded the trophy and individual medals certificate to winner and Runner of each Sports event players. Approximately 600 students took part in inter hostel sports championship 2018.

5. Aagaz 2018

Students every year awaits for this events because it provide them opportunity to establish their supremacy of their batch in sports arena. Last year it was organized on an elaborate scale. The competitions were keenly fought and the general championship trophy was won by Third year and PG finished runner up.

6. International Yoga Day Celebration

The Institute had celebrated International Yoga day on 21st June 2019. This an event where whole Institute participate, (students, staff, faculty and their family). The guest students present in the Institute during this time also joined to learn the Yoga and its importance with Yoga Guru. This time we had invited MSSulakshna from Mandi. She is a Qualified Yoga teacher. She had administered the oath of Physical fitness to all the participant and also taught the Yogaasana. Yogic Kriya and technique of pranayama to participant, all had a nice experience during summer morning.

7. Rann Neeti 2018

The Inter College sports festival 2K18 was an event. Which achieved several land mark. For the first time IIT Mandi lifted the overall general Championship trophy. For the first time this event became financially self-sufficient. General secretary Mr. Ram Lakhanand his team had raised sufficient amount to meet all thefinancial expenditure of the meet and save surplus money which can be used as seed money to make this event better next year.

For the first time organizing team had presented a blue print of activities they will do to make the event better. Before the semester ended in the month of June 2018 Several administrative suggestions put forward by Dr. Rajendra Ray and Sports advisor Dr. Deepak Swamy and Dr. Shyamasree Dasgupta was in corporate to make the working of Runn-Neeti 2018 organizing committee more effective and efficient it brought a positive result at the end.

The Physical Education and Sports Section had involved in outreach activities to promote healthy Physical activities through organising various Sports event throughout the year. Last year, following event were organised:

1. Himachal Pradesh Gramin Bank sports meet. The several Gramin bank employees had great time while interacting with their follow employees during various competitions, they had organised during a day. Prize distribution was organised the end the event. The contribution was highly appreciated by participants
2. T-20 Cricket league
   Selected team of Mandi and our own team firsttime participated in IIT Mandi T-20 league tournament. Our team had won the Runner up trophy.
3. Several village youth who reside in and round our Kamand Campus and using our facilities to prepare for Physical efficiency test which are required for their job recruitment test for Army, Police, Forest department etc.
4. We are organising since few year children activities to promote.
   Cricket and Football.
   As the children are growing up our programmes are becoming effective, local village children are also tasking benefits of this programme.
5. Last year Dean Students, Dr. Summan Kalyan Pal had taken keen interest and started Sunday evening football play. This is growing as healthy Campus activities where faculty, staff and PG students are regularly participating.

Sports Infrastructure

Last year we have seen a big Jump in sports infrastructure.

1. The Quality of existing playing ground have improved both north as well as in south campus due to heavy growth of surface grass.

   The massive deweeding of Jungle grass is done manually but it greater effort this year.
2. The inclusion of A6 Multi Sports Complex for Section had provided a big boost to sporting culture. Once it is fully operative we can have a good number of facilities to

involve hundreds of students regularly inside in door facilities.

3. A big proposal for future developmentof several outdoor facilities in north Campus were approved and work started in north campus which will be ready by year 2020. This will make the sports infrastructure sufficient for current strength of campus residents' students, faculty, staff and their family.
4. The weight lifting facilities are created last year on a small scale. Surly in future it will grow to a great strength due to personal interest taken by our sports advisor Dr. Deepak Swami.
5. The surface of weight training hall in south campus which was long due to be improved, now having rubber tiled surface which is attracting large number of students to this activities.

Achievements

This was a year of achievement of our students who had brought several levels to the Institute.

1. 1st time Physical Education and Sports Section had fulfil the Institute Goal of winning there medals in Inter IIT Sports meet held at IIT Guwahati, our athletes Ms. Yati (two Silver medals) Mr. Pawan (two Silver medals) and Ms. Amrutha (One Bronze medal) made it possible.
   They were awarded the the Institute blazer for their achievement.
2. Mr. Tanmay Rastogi our B.Tech Student had won state ranking Table Tennis Championship and received honour of Participation National Table Tennis Championship at Chandigarh as a member of Himachal Pradesh Table Tennis team.
3. First time our Students women cricket team participated in Mandi open tournament and won the Ranner up trophy.
4. The students cricket team won the Runner up trophy in the first Cricket T-20 series league tournament organised by IIT Mandi.
5. The students of our Institute displayed their best performance by winning over all general championship trophy for RannNeeti 2K18.

The Physical Education and Sports Section would not have achieved so much without the supports of our Dean Students Dr. Summan Kalyan Pal, Sports advisor Dr. Deepak Swami, Sports Co advisor Dr. Shyamasree Dasgupta, Gymkhana Chairman Dr. Rajendra Kr. Ray, Jr. Superintendent Mr. Pavin Samuel (Dean Student office) and his entire staff.

We also like to record our gratitude to all those who made our Physical Education and Sports Section functional throughout the year 2018-19

10.2 National Service Scheme (NSS)

National Service Scheme (NSS)-IIT Mandi is a voluntary group of students working for the betterment of the community around them and currently (FY 2018-2019) 152 volunteers are working for the betterment of society and have organized 40 events over the year. They are the social workers of the institute striving for an improved society around them. The motto of NSS is "NOT ME BUT YOU". This reflects the essence of democratic living and upholds the need for selfless service. The overall objective of this scheme is Education and service to the community by the community.

NSS-IIT Mandi has taken up three areas of societal needs where volunteers render their service:-Literacy Section, Awareness Section & Health Section.

PRAYAS TEACHING PROGRAMME FOR GOVERNMENT SCHOOL STUDENTS

PRAYAS Program aims to enhance the quality of education provided to the local Himachal youth of the nearby government schools. In this program, the volunteers of NSS-IIT Mandi seek to identify opportunities through which they can play a supportive role to the school teachers and administration, and help to motivate the local young boys and girls to aim for excellence. The PRAYAS program was initiated in November 2013 with 30 girl students of Government Girls Senior Secondary School Mandi. Given that the program is in the 6th year of its operation, it suggests that volunteers are devoted to cater the needs of local students who require guidance and support.

MIGRANT WORKER'S CHILDREN BRIDGE SCHOOL PROGRAMME

As our campus is new and under construction phase, a significant number of migrant workers from states like U.P., W. Bengal, Jharkhand, and M.P. live here. The aim of the Bridge School program is to provide basic education to workers' children, who have become infrequent to formal education.The programme was started in 29th May, 2015 and continued its 4th year since then. During fiscal 2018-19, a total of 5 children from the South Campus and 22 children from North Campus of IIT Mandi were admitted to the nearby Government Primary School in Kamand. Till date more than 70 migrant worker's children have been admitted in nearby government schools.

BLOOD DONATION CAMP

Blood donation is one of the most significant contributions that a person can make towards the society. Around 150 units of blood were collected in FY 2018-2019 over 2 blood donation camps.

PLANTATION CAMP

National Service Scheme unit IIT Mandi organized Tree Plantation Camps over the year and planted close to 700 saplings at various locations, like-IIT Mandi north campus, Shikari devi and Suhada, Prashar.

CLEANLINESS DRIVE

'Swachh Bharat Abhiyan' (Clean Indian Mission) is a national level campaign by the Government of India. NSS-IIT Mandi organized cleanliness drive under 5 Week Induction Programme with newly joined 200 B. Tech. students at Mandi town. Further cleanliness drives continued to Shikari devi, Prashar andnear Panchwaktar Temple, Mandi etc. Different competitions were organized in different government schools on the occasion of Swachtta Pakhwada.

150th BIRTH ANNIVERSARY OF MAHATMA GANDHI JI

IIT Mandi celebrated 150th Birth Anniversary of Mahatma Gandhi ji at IIT Mandi and organized several activities throughout week. The activities organized during birth anniversary are: intra-school competition based on debate, writing and recitation, celebration of Gandhi Jayanti cultural function, talk on drug abuse, movie screening on “Gandhi”, painting competition and quiz competition etc.

DIGITAL SELECTION OF YOUTH PARLIAMENT (HP) AND ORGANIZATION OF DISTRICT YOUTH PARLIAMENT

160 participants of 6 districts of Himachal Pradesh were participated in Digital Selection of Youth Parliament (HP) on 21st January, 2019.Also IIT Mandi hosted the district level youth parliament and around 150 participants with 50 volunteers, staff, faculty members and eminent leaders participated during the event dated on 28th January, 2018.

DONATIONS

Divya Manav Jyoti Anathalaya- donated Stationary of Rs.5000.00.

Old Age Home Sundernaggar, August-2018- donated Fruits of Rs.2000.00.

National Blind Association Kullu, August-2018- donated Cash of Rs.3100.00.

Leprosy Patients Mandi, November-2018- donated Grocery items of Rs.8200.00.

10.3 Guidance And Counseling Service (GCS)

Activities by the Guidance and Counseling Service during the year 2017-18 are broadly categorized in to sections below.

1. Five Week Induction Program (5WIP)

A five week induction program was conducted for the incoming batch of B.Tech students from 1st of August to 2nd of September 2017. More than 70 faculty members were involved in the 5WIP. Responsibilities of GCS include, pre arrival counseling and admission guidance on arrival, organization of the orientation program, over all coordination of activities, preparation of timetable, carrying out informal activities and distinguished lectures.

2.Orientation Programs

a. **PG/Ph.D students:** Orientation program was organized for the incoming PG and Ph.D students to introduce them to the academics, research and student life at IIT Mandi. Two such programs were organized in year 2017-18. On 8th August 2017 and on 13th February 2018 for students taking admission in odd and even semester.

b. **'WPI students:** In March 2018 organized an orientation program for the visiting WPI students. The program included a introductory session with talks, and walk around the campus.

10.4 Career and Placement Cell

Career and Placement Cell organized the following career sessions.

1. Interaction with Alumni on 8th August 2018: During this interaction the alumnus shared their experience and the job opportunities available at Practo and Coal India.

Speakers: Devang Bacharwa (B.Tech CSE, 2012-16 batch) Currently, working at Practo. Divakar Maurya (B.Tech EE, working at Coal India, 2012-16 batch).

2. Technical talk cum interactive session on 19th August 2018: The technical talk is about the ADA, LCA Tejas (New indigenous aircraft of Indian air force), future projects of the ADA, the squadrons present with Indian air force etc. The interactive session regarding various career opportunities available in ADA.

Speaker: Mohit Kumar Malhotra (B.Tech EE, IIT Mandi) Currently, working as a Scientist, National Control Law (CLAW) Team, Aeronautical Development Agency (ADA).

3. Seminar by Manya The Princeton review on 23rd September, 2018: The Princeton Review conducted a seminar on overseas Education. They talked about the challenges and requirements to apply abroad for further studies in which they covered details about various entrance exams (GRE, IELTS, TOEFL, etc) and procedures associated with each.

Speakers: Officials from Manya, The Princeton Review

4. Communication and writing skill classes started from 10th September to end of October 2018.

Speaker: Aruna Bommareddi, Assistant Professor School of Humanities and Social Studies, IIT Mandi.

5. A talk on Research and Career Alternatives in Environmental Sector on 4th October 2018: This talk covered various environmental problems faced by the world (such as climate change, ozone layer depletion, spread to toxic chemicals, water pollution, and eutrophication, acid rain, loss of biodiversity etc.) and possible technological solutions to address these problems. Current and future research directions and possible career opportunities also discussed.

Speaker: Prof.Ajit P. Annachhatre, Visiting Professor, School of Engineering, IIT Mandi and The School of Environment, Resources and Development, Asian Institute of Technology, Thailand.

6. Talk on Entrepreneurship as a career after degree on 6th October 2018: Talk and discussion about startups, funding, problems and solutions etc.

Speaker: Mr. Saurabh Mittal is the Senior Advisor of IIT Mandi Catalyst. He is the head of leadership development and coaching at Fractal Analytics. He has extensive global experience over two decades of working with senior executives in defining strategy, providing thought leadership, creating new business solutions and leading large multicultural, cross-functional teams to implement improved business processes in global businesses.

7. CoCubes test series for Pre- final and final year students 15th October 2018 on wards: Conducted 7 diagnostics assessment and pre-assess test for final year students and 6 diagnostics assessment and one pre-assess for final year students.

10.5 Gymkhana Activities

Rann-Neeti-2018

"It was the time when heat was amplified, we battled not for victory but for glory all at stake was respect."

The valley of Kamand witnessed the biggest sports fest of The Himalayas when RANN-NEETI IIT MANDI unleashed itself in its 5th incarnation. Enthralling and lightning it was such that the sun never set, every nook and corner of the campus was filled with colours of enthusiasm. This edition of the fest was bigger than expected, larger than ever it was a complete package.

The mega event lasted for three days, with its inauguration on 30th September, the enthusiasm was sky high and teams were equally deserving and confident about their win. The heat was on and the competition was tough. There were total of 30 colleges with around 1000 students from various colleges witnessing the mega event. The battle was tough so was the quest to break your limits.

DAY1 witnessed intensive battle among teams to qualify for next round. DAY2 was an amplified version of the same but the tiresome day was followed by much awaited pronite of the fest that featured The Passive Aggressive Haryanvi comedian Vijay Yadav and amazingly talented band from Retro Delhi T I T L I featuring Ria and Kyra as lead singers.

Day 3 was the most heated up day following the finals and alas champions in all fields claimed their victory. The closing ceremony witnessed Sushma Verma, Indian Wicket Keeper Batswomen as chief guest and Prof. Timothy A Gonsalves, Director IIT Mandi as guest of honour. The heat was to settle at that very event but still joy was in air participants seemed to enjoy each and every bit of the cultural program that was following. General Championship Award was deservingly bagged by IIT MANDI for their incredible campaign throughout.

#TurnUpTheHeat became a cliché and is thought to continue for a much longer time. The heat was turned up and now all eyes wait for next year when we witness yet another mega edition of the event in making.

AstraX, the first Astromeet

STAC hosted an inter-college astro-meet from 29th to 31st March called AstraX '19. Featuring a fascinating panel of keynotes, exciting competitions, and a workshop on satellite communication, the meet was a huge success. The meet witnessed active participation of 60 students (excluding IIT Mandi) from IIT Roorkee, IISER Mohali, PEC Chandigarh, NIT Hamirpur and various other colleges.

TRAILS – 2019

The club successfully organized a two day racing event on 30th and 31st March 2019 in and around South Campus.

A total of 43 people including the Director, students, staff, family members, and Mandi residents took part in the event with different strengths in different races.

10 bikes(cycles) were hired from Trek India Outdoors, Manali. Including the club bike and Director's bike, with a total count of 12 bikes, those who did not have their personal bikes could rent them during the race.

It was an individual time trial, where in each participant was judged according to their personal time to complete the route. They were flagged off at regular intervals, and their start and end time were noted.

ROUTES

DAY 1 (30/03/19)

- Peepal Point Race

Route: Fish Pond -> Peepal Point -> Fish Pond
Total distance: ~5 Km.
Number of Participants: 31
Results : 1st Position : Yogesh Pant
2nd Position : Sachit Yadav
3rd Position : Harsh Arora

- Riyagadi Race

Route: Fish Pond -> Riyagadi -> Fish Pond
Total distance: ~20 Km.
Number of Participants: 17
Results : 1st Position : Yogesh Pant
2nd Position : Keshav Thakur
3rd Position : Harsh Arora

DAY 2 (31/03/19)

- Diana Park Race

Route: Fish Pond -> Katindi -> Diana Park -> Katindi
Total distance: ~47 Km.
Number of Participants: 17
Outside Participation: 4
Results : 1st Position : Keshav Thakur
2nd Position : Uday Shankar(Outside Participation)
3rd Position : Pradeep Kapoor(Outside Participation)

11. Media Coverage

Statistics on Coverage (April 2018 - March 2019)

Total number of coverage : 1,077.
National print coverage : 102.
Total number of press releases issued: 56.
Total number of faculty featured: 49.
The total number of research covered: 11.
Total number of authored article placement: 3.

Important Highlights

IIT Mandi and HIMCOSTE co-hosted 3rd Himachal Pradesh Science Congress

Indian Institute of Technology Mandi and Himachal Pradesh Council for Science, Technology and Environment (HIMCOSTE) co-hosted the 3rd Himachal Pradesh Science Congress on 22nd and 23rd October 2018 at IIT Mandi's Kamand campus to provide a major boost to rural innovation. Several Universities, research organizations, Scientists and students of Engineering colleges and Universities from Himachal Pradesh participated in the Science Congress to make it a grand success. Held at IIT Mandi campus on 22nd and 23rd October 2018, the theme of the 3rd Himachal Pradesh Science Congress focused on 'Rural Upliftment Through Science and Technology Interventions.'

IIT Mandi unveiled state-of-the-art class 100 clean laboratory for device fabrication

Indian Institute of Technology Mandi hosted the International Workshop on Nano/Micro 2D & 3D fabrication and manufacturing of Electronic & Biomedical Devices and Applications (IWNEBD-2018) at the institute campus between October 31st and November 2nd, 2018. The international workshop was conceived by Prof. Timothy A. Gonsalves, Director of IIT Mandi, and presided by Mr. Subrhamanyam, Secretary – Higher Education, Ministry of Human Resource Development (MHRD), Govt. of India and featured talks by some of the pioneers in the field of advanced lithography, electronics and 2D-3D manufacturing from academia and industry.

IIT Mandi witnesses a successful 2018 with achievements in Academics, R&D and Innovation

Indian Institute of Technology Mandi witnessed the year 2018 filled with achievements in diverse sectors ranging from R&D, academics and sports to innovations and startups. 2018 saw a significant increase in the number of sponsored research projects and funding for IIT Mandi. The total number of projects sanctioned was nearly 200 with the sanctioned amount of over Rs. 80 crores. In a message shared to the Institute, the Honorable Prime Minister Shri Narendra Modi congratulated the graduating students and noted that despite being one of the youngest IITs in the country, IIT Mandi has emerged as a premier centre for engineering education and research, fulfilling the aspirations of the region.

Deputy Commissioner of Mandi kicked off 'Startup Exploration Program 2019' of IIT Mandi Catalyst

IIT Mandi Catalyst, the first technology business incubator of Himachal Pradesh, at Indian Institute of Technology Mandi, inaugurated the 'Startup Exploration Program 2019' on 11th February 2019. Mr. Rugved Thakur, Deputy Commissioner of Mandi, inaugurated the program. The inaugural session began with an address by Prof. Timothy A. Gonsalves, Director, IIT Mandi, who welcomed 10 startup teams and encouraged them to make the best use of the research labs and faculty expertise available in the Institute. The inaugural session was followed up by a 'Startups Showcase', during which the dignitaries visited the presentation booths of the startup teams and engaged in detailed discussion on their ideas and prototypes. IIT Mandi Catalyst provided training, mentoring and financial support to these startup teams for a period of next three months during which the teams converted their ideas into prototypes/products.

IIT Mandi Collaborates on Research with leading International Universities under MHRD Initiative

As many as seven research proposals from the Indian Institute of Technology Manid have been accepted by the Union Ministry of Human Resource Development (MHRD), Government of India, under 'Scheme for Promotion of Academic and Research Collaboration' (SPARC). These seven faculty-led, research projects are in areas such as 'Energy and Water Sustainability', 'Advanced Sensors, Electronics and Communication', 'Infectious Diseases and Clinical Research', 'Humanities and Social Sciences', 'Nano, Biotechnology and Applications', 'Advanced Functional and Meta Materials' and 'Basic Sciences'.

The SPARC grants will help IIT Mandi to collaborate with international universities located in U.S., France, Germany, UK and Taiwan (Republic of China), world-class faculties and researchers from across the globe to undertake joint research work and to offer short term courses to the students.

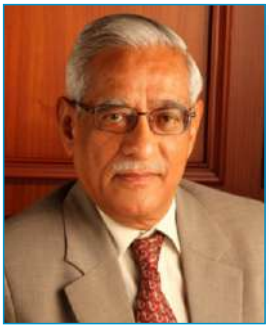
With a Decade of Excellence behind it, IIT Mandi is becoming a Leader in Science, Research, Academics and Innovation.

Indian Institute of Technology Mandi celebrated its 10th Foundation Day on 24th February 2019. Since its inception, the Institute has been making rapid strides in Science, Technology, Innovation, Academics, Entrepreneurship, Research and Development. IIT Mandi celebrated the occasion with an event on campus in which the Chief Guests were Mr. Raj Kamal Singh, Mr. Gaurav Yadav, Mr. Saurabh Jain, Mr. Ishansh Singh, Mr. Mohit Kumar Malhotra, alumni of the first B. Tech batch (2009 - 2013) of IIT Mandi.

Addressing the Institute during this grand occasion, Prof. Timothy A. Gonsalves who has been Director of IIT Mandi since its Day One till now and has been a major force behind its rapid development, said, “IIT Mandi is a flourishing member of the IIT system. Our faculty, students and alumni have carried the name of IIT Mandi throughout India and to distant corners of the world through their remarkable achievements. IIT Mandi is rapidly becoming a jewel in the Himalayan crown of India.”

The vision of the Institute is to be a leader in science and technology education, knowledge creation and innovation, in an India marching towards a just, inclusive and sustainable society.

12. Board of Governors



Chairperson
Shri Subodh Bhargava
Former Chairman, TATA Communications Limited
Villa 69, the Palm Springs
Golf Course Road, Sector – 54
Gurgaon – 122002, Haryana

Members

Prof. Timothy A Gonsalves
Director, IIT Mandi(Ex-officio)
Indian Institute of Technology Mandi
Mandi – 175001 (H.P.)

The Chief Secretary/ Secretary (HE)
(Ex-Officio)
Government of Jammu & Kashmir
Srinagar – 190 001

Prof. (Mrs.) Basabi Bhaumik
Dept. of Electrical Engineering
Indian Institute of Technology Delhi
Hauz Khas,New Delhi-110 016

Prof. Subrata Ray
Distinguished Visiting Professor
School of Engineering
Indian Institute of Technology Mandi
Mandi – 175005(H.P.)

Dr. Pradeep C. Parameswaran
Associate Professor
School of Basic Sciences
Indian Institute of Technology Mandi
Mandi – 175005(H.P.)

The Chief Secretary/ Secretary (TE)
(Ex-Officio)
Government of Himachal Pradesh
Shimla – 171 002

Prof. S.C. Sahasrabudhe
Former Director
Dhirubhai Ambani Institute of
Information and Communication
Technology (DAIICT)
Gandinagar – 382 007

Mr. Satish K. Kaura
CMD, Samtel Group
6th Floor, 7 TDI Centre
District Centre, Jasola
New Delhi – 110 025

Shri Raj P. Khilnani
Former DG, Anti-Corruption Bureau
1001, Cello Nyati Wind Chimes
Underi, Pune – 411 060

Secretary
Dr. Vishal Singh Chauhan
Registrar/Registrar I/c (Ex-officio)
Indian Institute of Technology Mandi
Mandi – 175005(H.P.)

During this year meetings of the Board of Governor were held on 11.05.2018, 07.09.2018 and 29.10.2018.

13. Finance Committee

Chairperson (Ex-officio)
Shri Subodh Bhargava
Former Chairman, TATA
Communications Limited
Villa 69, the Palm Springs
Golf Course Road, Sector – 54
Gurgaon – 122002, Haryana

Members

Prof. Timothy A Gonsalves
Director, IIT Mandi (Ex-officio)
Indian Institute of Technology Mandi
Mandi – 175001, (H.P.)

JS & FA (Ex-officio)
MHRD
Shastri Bhawan
New Delhi – 110001

Prof. P. Sriram
Registrar I/c, Dean (Admin)& Head
Dept. of Aerospace Engineering
Indian Institute of Technology Madras
Chennai - 600 036

Secretary

Dr. Vishal Singh Chauhan
Registrar I/c (Ex-officio)
Indian Institute of Technology Mandi
Kamand – 175 005, (H.P.)

Addl. Secretary (Ex-officio)
MHRD
Shastri Bhawan
New Delhi – 110001

Prof. S. C. Sahasrabudhe
Former Director
Dhirubhai Ambani Institute of
Information and Communication
Technology (DAIICT)
6B, Anjaneya, Orchard Avenue
Near Hiranandani School
Powai, Mumbai – 400 076

Dr. Vishal Singh Chauhan
In-charge Dean (F&A) (during
01.04.2018 to 28.06.2018)

Dr. Subrata Ghosh
In-charge Dean (F&A) (during
29.06.2018 to till further orders)

Dean (F & A) (Ex-officio)
Indian Institute of Technology Mandi
Kamand – 175005,(H.P.)

**During this year meetings of the Finance Committee were held on 11.05.2018 and 07.09.2018.*

14. Building & Works Committee

Chairman (Ex-officio)
Prof. Timothy A. Gonsalves
Director
Indian Institute of Technology Mandi
Kamand – 175005, (H.P.)

Dean (I&S) (Ex-officio)
Indian Institute of Technology Mandi
Kamand – 175005, Himachal Pradesh

Member

Prof. B. Bhattacharjee
Professor
Department of Civil Engineering
IIT Delhi

Er. A.K. Jain
Senior Consultant, IIT Mandi &
Special DG, CPWD (retired)
Mandi - 175005, Himachal Pradesh

Er. Niranjan Singh
Chief Engineer (Civil), CPWD (retired)
A-3/202, Nirmal Chhaya Towers
V.I.P Road, Zirakpur
Distt. SAS Nagar, Mohali (PB)- 140 603

Member Secretary (from 12-02-2018)
Er. Sunil Kapoor
Superintending Engineer (Ex-officio)
Indian Institute of Technology Mandi
Kamand Campus, VPO Kamand
Distt. Mandi – 175 005, (H. P)

**During this year meetings of the B & W Committee were held on 30.04.2018, 05.09.2018 and 10.01.2019.*

15. Senate

Chairman

Prof. T. A. Gonsalves, Director, IIT Mandi (Ex- officio)

Institute Members

Prof. B.D. Chaudhary, Emeritus Professor & Dean (Faculty), IIT Mandi

Prof. Ramesh Oruganti, Emeritus Professor, SCEE, IIT Mandi

Prof. Kenneth E. Gonsalves, Distinguished Visiting Professor, SBS, IIT Mandi

Prof. Deepak Khemani, Prof.(on Deputation), SCEE, IIT Mandi

Dr. Suman Kalyan Pal, Associate Professor & Dean (Students), SBS, IIT Mandi

Dr. Subrata Ghosh, Associate Professor & Dean (I&S), SBS, IIT Mandi

Dr. Prem Felix Siril, Associate Professor & Dean (SRIC), SBS, IIT Mandi

Dr. Pradeep Parameswaran, Dean (Academics) & Associate Dean (Course), IIT Mandi

Dr. Vishal Singh Chauhan, Assistant Professor & Dean (F&A) I/c & Asso. Dean(F & A), SE, IIT Mandi

Prof. B. Subramanian, Visiting Faculty, SHSS IIT Mandi

Prof. Subrata Ray, Distinguished Visiting Professor, SE IIT Mandi

Prof. Bhavender Paul Sharma, Adjunct Professor, SHSS IIT Mandi

Dr. Bharat S. Rajpurohit, Chair, SCEE, IIT Mandi

Dr. Rajeev Kumar, Associate Professor & Chairperson, SE, IIT Mandi

Dr. Rajeshwari Dutt, Assistant Professor & Chairperson, SHSS, IIT Mandi

Dr. Syed Abbas, Associate Professor & Chair - SBS, IIT Mandi

Dr. Venkata Krishnan, Associate Dean (Research), IIT Mandi

Dr. Samar Agnihotri, Associate Dean (SRIC), IIT Mandi

Dr. Varun Dutt, Associate Dean (International Relations), IIT Mandi

Dr. Tulika P. Srivastava, Associate Dean (Recruitment) & Coordinator - BioX, IIT Mandi

Dr. Satinder K. Sharma, Co-ordinator, C4DFED, IIT Mandi

Mr. Naresh Singh Bhandari, Deputy Librarian, IIT Mandi

Dr. Astrid Kiehn, Chair Library Advisory Committee (LAC), IIT Mandi

Dr. C.S.Yadav, Chief Warden, IIT Mandi

Dr. Rajendra Kumar Ray (SAP Chair) IIT Mandi

Dr. Chayan K. Nandi, Chair CPC, IIT Mandi

Dr. Anil K. Sao, Associate Professor & Coordinator – CIG M.Tech. Comm & Signal Processing, IIT Mandi

Dr. Hari Varma, Coordinator CIG-I.Ph.D (Physics), IIT Mandi

Dr. Anirudha Chakraborty, Coordinator CIG MSc. (Chemistry), IIT Mandi

Dr. Jaspreet Kaur Randhawa, Coordinator CIG M.Tech. (Energy Materials), IIT Mandi

Dr. Dileep A. D. (CIG- CSE), IIT Mandi

Dr. Arpan Gupta (CIG- ME), IIT Mandi

Dr. Deepak Swami (CIG- CE), IIT Mandi

Dr. Rahul Vaish, Associate Professor,SE, IIT Mandi
Dr. Viswanath Balakrishnan, Assistant Professor, SE, IIT Mandi
Dr. Kaustav Sarkar, Assistant Professor, SE, IIT Mandi
Dr. Manoj Thakur, Assistant Professor, SBS, IIT Mandi
Dr. Shyam Kumar Masakapalli, Assistant Professor, SBS, IIT Mandi
Dr. Devika Sethi, Assistant Professor, SHSS, IIT Mandi
Dr. Suman Sigroha, Assistant Professor, SHSS, IIT Mandi
Dr. Vishal Singh Chauhan, Registrar I/C & Secretary (Ex-officio), IIT Mandi
Sh. Suresh Kumar Rohilla, In-Charge Assistant Registrar (Academics), IIT Mandi
Mr. Manushree, Student Research Affairs Secretary, IIT Mandi
Mr. Rakhde Anurag Keshav, Student General Secretary, IIT Mandi
Mr. Abhishek, Student Academic Affairs Secretary, IIT Mandi

Outside Members

Prof. Sunil R. Kale
Professor
Deptt. of Mechanical Engg., IIT Delhi

Prof. Rowena Robinson
Professor, SHSS, IIT Bombay

Prof. N. Sathyamurthy
Former Director, IISER, Mohali &
Honorary Professor
Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru

**During this year meetings of the Senate were held on 26.04.2018, 31.08.2018, 25.10.2018 and 13.02.2019.*

16. Academic Officials as on 31.03.2019

DIRECTOR

Prof. Timothy A. Gonsalves
Director

DEANS

Prof. Deepak Khemani (from 27.03.2017 to 22.04.2018)
Dean (Faculty)

Prof. B. D. Chaudhary (from 23.04.2018 till date)
Dean (Faculty)

Dr. Suman Kalyan Pal
Dean (Students)

Prof. B.D Chaudhury (from 26.08.2015 to 19.04.2018)
Dean (Academics)

Dr.Pradeep C. Parameswaran (from 20.04.2018 till date)
Dean (Academics)

Dr. Subrata Ghosh (from 20.06.2016 to 03.05.2018)
Dean (Infrastructure and Services)

Prof. S.C. Jain (from 04.05.2018 till date)
Dean (Infrastructure and Services)

Dr. Subrata Ghosh
Dean (Finance & Accounts)I/c

Dr.Prem Felix Siril
Dean (SRIC)

ASSOCIATE DEANS

Dr. Pradeep Parameswaran (from 28.05.2013 to 21.05.2018)
Associate Dean (Courses)

Dr. Anil K. Sao (from 22.05.2018 till date)
Associate Dean (Courses)

Dr. Vishal Singh Chauhan (from 28.05.2013 to 21.05.2018)
Associate Dean (Finance & Accounts)

Dr. Samar Agnihotri
Associate Dean (SRIC)

Dr. Varun Dutt
Associate Dean (International Relations)

Dr. Rahul Vaish (from 07.09.2018 till date)
Associate Dean (Research)

Dr. Venkata Krishnan (from 27.06.2016 to 06.09.2018)
Associate Dean (Research)

Dr. Tulika P. Srivastava (from 27.06.2016 to 06.09.2018)
Associate Dean (Faculty)

CHAIRPERSONS

Dr. Bharat Singh Rajpurohit
School of Computing and Electrical Engineering

Dr. Syed Abbas
School of Basic Sciences

Dr. Rajeshwari Dutt
School of Humanities and Social Sciences

Dr. Rajeev Kumar (from 27.08.2015 to 13.02.2019)
School of Engineering

Dr. Viswanath Balakrishnan (from 14.02.2019 till date)
School of Engineering

17. Administrative Officials as on 31.03.2019

Dr. Vishal Singh Chauhan
Registrar I/C

Mr. Naresh Singh Bhandari
Deputy Librarian

Mr. C.L. Sharma
Assistant Registrar (Audit & Accounts)

Mr. Parminder Jit Singh
Assistant Registrar (S&P)

Dr. Chander Singh
Medical Officer

Dr. Neha Sharma
Medical Officer

Mr. Hardeep Singh
Security Officer

Er. Sunil Kapoor
Superintending Engineer (from 10.04.2019 to till date)

Mr. J.R. Sharma
Finance & Accounts Officer

Mr. Vivek Tiwari
Assistant Registrar (Admin)

Mr. Suresh Kumar Rohilla
Assistant Registrar (Academics)

Dr. Shib Nath Jha
Principal Sports Officer

Dr. Mridu Thakur
Medical Officer

Mr. Amar Singh
Officer on Special Duty

18. List Of Regular Employees as on 31/03/2019

S. No.	Name	Designation
	Group 'A'	
1	Mr. Naresh Singh Bhandari	Deputy Librarian
2	Mr. Suresh Kumar Rohilla	Assistant Registrar (Academics)
3	Mr. Vivek Tiwari	Assistant Registrar (Administration)
4	Mr. Parminder Jit Singh	Assistant Registrar (S&P)
5	Ms. Shelika	Assistant Registrar (Recruit & Guest House)
6	Dr. Chander Singh	Medical Officer

Group 'B'		
7	Ms. Monika Kashyap	Superintendent
8	Ms. Chandan Sharma	Superintendent
9	Mr. Anuj Kumar Dubey	Superintendent
10	Mr. Puneet Kumar	AE(Civil)
11	Mr. Siddharth Jamwal	AE(Civil)
12	Mr. Vinod Kumar	Sr. Library Information Assistant
13	Mr. Abhijeet Tiwari	Sr. Library Information Assistant
14	Ms. Sonali Malhotra	Sr. Library Information Assistant
15	Mr. Jitendra Yadav	Sr. Library Information Assistant
16	Er. Neeraj Chauhan	Jr. Engineer (Electrical)
17	Mr. Hardeep Singh	Security Officer
18	Mr. Ramesh Kumar	Jr. Superintendent (A/c)
19	Mr. Hardeep Kumar Singh	Jr. Technical Superintendent
20	Mr. Lalit Thakur	Jr. Technical Superintendent
21	Mr. Rakesh Kumar	Jr. Technical Superintendent
22	Ms. Lishma Anand	Jr. Superintendent
23	Sh. Pavin S. Samuel	Jr. Superintendent
24	Mr. Pawan Kumar	Jr. Superintendent
25	Mr. Kaul Singh	Physical Training Instrucor
Group 'C'		
26	Ms. Suchetna Shachi	Sr. Assistant
27	Ms. Sushma Kumari	Sr. Assistant
28	Mr. Sunil	Sr. Assistant
29	Mr. Sushil kumar Pal	Sr. Assistant
30	Mr. Amit Sharma	Sr. Lab Assistant
31	Mr. Ankush Kapil	Sr. Lab Assistant
32	Mr. Aditya	Jr. Assistant
33	Mr. Prakash Singh Negi	Jr. Assistant
34	Mr. Desh Raj	Jr. Lab Assistant
35	Mr. Dinesh Thakur	Jr. Lab Assistant
36	Mr. Tarun Verma	Jr. Lab Assistant
37	Mr. Gopal	Jr. Lab Assistant (Tech.)
38	Mr. Sanjay Kumar	Jr.Assistant
39	Mr. Girish Pal	Jr.Assistant
40	Mr. Vikram Jeet	Jr.Assistant
41	Mr. Manoj Kumar	Junior Attendant
42	Mr. Leela Dhar	Junior Attendant
43	Mr. Shyam Singh	Driver

19. List Of Contrat Employees (On Consolidated Emoluments) as on 31/03/2019

S. No.	Name	Designation
1	Mr. J.R. Sharma	Finance & Accounts Officer
2	Mr. C.L. Sharma	Asstt. Registrar (Audit & Accounts)
3	Mr. R.S.Raghav	Technical Superintendent
4	Er. Anil Kumar Jain	Sr. Consultant (Part time)
5	Mr. Daulat Ram	Field Supervisor
6	Dr. Shib Nath Jha	Principal Sports Officer
7	Mr. Om Shankar Dwivedi	Deputy Manager (Office Automation)
8	Mr. Mandheer Bali	JE (Civil)
9	Mr. Vikas Kumar Chaudhary	AE (Civil)
10	Ms. Debashrita Roy Chowdhury	Web- Content Developer
11	Ms. Nimisha N. B.	Carrer & Placement Executive
12	Mr. Deen Dyal	JE (Civil)
13	Dr. Mridu Thakur	Medical Officer
14	Dr. Neha Sharma	Medical Officer
15	Ms. Ishita Mahanti Nandi	Project Scienctist
16	Sh. Amar Singh	Officer on Special duty

20. List of deputation/foreign service employees as on 31/03/2019

S. No.	Name	Designation
1	Er. Sunil Kapoor	Superintending Engineer (upto 09.04.2019)

21. Student Leadership 2018-19

Mr. Param Prabhakar Kashyap	General Secretary
Mr. Abhijeet Rajput	Cultural Secretary
Mr. Ram Lakhan	Sports Secretary
Mr. Ayush Meghwani	Technical Secretary
Ms. Mamta Raju Bhagia	Literary Secretary
Mr. Shubham Kumar	Hostel Affairs Secretary
Mr. Abhishek	Academic Secretary
Mr. Ashish Tiwari	Research Secretary

22. Ph.D. Scholars – 2018 Batch

SR. NO.	ROLL NO.	NAME	SCHOOL
1	D18001	CHETNA MADAN	SBS
2	D18002	SUMANTA CHOWDHURY	SBS
3	D18003	SWARUP CHATTERJEE	SBS
4	D18004	MANOJ KUMAR	SBS
5	D18005	SALMAN ASHRAF	SBS
6	D18006	SUBHASH CHANDRA	SBS
7	D18007	PRIYANKA	SCEE
8	D18008	JYOTIBHUSAN PADHI	SCEE
9	D18009	CHETALI YADAV	SCEE
10	D18010	ARNAB MONDAL	SCEE
11	D18011	JYOTI	SCEE
12	D18012	SURYANI SINHA RAY	SHSS
13	D18013	SUJATA	SHSS
14	D18014	JITENDRA ADHIKARI	SE
15	D18015	MOOL CHAND SHARMA	SE
16	D18016	SAHIL VERMA	SE
17	D18017	NITIKA ARYA	SE
18	D18019	SIDDHARTH PATHAK	SE
19	D18020	ANMOL JALALI	SE
20	D18021	AMAN CHANDEL	SE
21	D18022	SAPTARSHI KARMAKAR	SE
22	D18023	ANKIT KUMAR GOYAL	SE
23	D18024	SHIVANI TYAGI	SE
24	D18025	SHIVA PRASAD SHIVRAM SHASTRI	SE
25	D18028	SENGAR KETAN KUMAR	SE
26	D18029	SHWETA SINGH	SE
27	D18030	ARZENA KHATUN	SBS
28	D18031	MILON KUNDAR	SBS
29	D18032	SABIN KAFLEY	SCEE
30	D18033	DAKSH THAPAR	SCEE
31	D18034	SURAJ SINGH RAWAT	SBS
32	D18035	HUSHAN CHAND	SBS
33	D18036	VISHAL SHARMA	SBS
34	D18037	KOUSIK ROUTH	SBS
35	D18038	MANISHA SHARMA	SBS
36	D18039	BHISHAM DEV VERMA	SBS
37	D18040	SONIKA	SBS
38	D18041	KEWAL SINGH RANA	SBS
39	D18042	SWATI PATHAK	SBS
40	D18043	NISHITA MANOHAR HOSEA	SBS
41	D18044	PRATEEK KUMAR	SBS
42	D18045	VARSHA DWIVEDI	SBS
43	D18046	PRAVEEN KUMAR	SBS
44	D18047	TANIYA BHADWAJ	SBS
45	D18048	KAPUGANTI SHIVANI KRISHNA	SBS

46	D18049	PROMA MONDAL	SBS
47	D18050	MOHAMMED SHAKIR	SE
48	D18051	NISHANT VERMA	SE
49	D18052	AJIT KUMAR	SE
50	D18054	YETURI PRAMOD KUMAR REDDY	SE
51	D18055	MISBAH BASHIR	SE
52	D18056	MANISH KUMAR	SE
53	D18057	DEEPA THAKUR	SE
54	D18058	NIRAJ K.C.	SE
55	D18059	SONALAL PRASAD CHAURASIYA	SE
56	D18061	ANKUSH THAKUR	SCEE
57	D18062	SIBA RAM BARAL	SCEE
58	D18063	SHIVANGI SHRINGI	SCEE
59	D18064	MD NAJRUL ISLAM	SCEE
60	D18065	KRITISHNU SANYAL	SHSS
61	D18066	ARYA PRIYADARSHINI	SHSS
62	D18067	AMAN MISHRA	SHSS

23. M.S. Scholars - 2018 Batch

SR. NO.	ROLL NO.	NAME	SCHOOL
1	S18001	PREETHI SRINIVASAN	SCEE
2	S18002	MOHANA SINGH	SCEE
3	S18005	GANESAN P	SCEE
4	S18006	MOHIT	SE
5	S18007	KAMAL SADHURAM KHEMANI	SE
6	S18008	MUNDUPALAM NIKHIL MATHEW	SE
7	S18009	NEHA ASWAL	SE
8	S18010	ANURAG	SE
9	S18011	MARGI ATULBHAI GAJJAR	SE
10	S18012	MANISH CHANDRA BISHT	SE
11	S18013	NEERAJ KUMAR SINGH	SE
12	S18017	SHREESH S PARVATIKAR	SE
13	S18018	RAHUL SHARMA	SCEE
14	S18019	ANKUSH	SCEE
15	S18020	DEBASHIS SAHOO	SCEE
16	S18021	PRIYADARSHAN S	SCEE
17	S18022	RUSHIRAJ SUNIL JAWALE	SCEE
18	S18023	DHANUNJAYA VARMA	SCEE
19	S18024	SIDDHANTH KUMAR	SCEE
20	S18025	ARPIT DWIVEDI	SE
21	S18026	KAMALPREET SINGH	SE
22	S18027	PRAKASH POUDEL	SE

24. B.Tech. Students – 2018 Batch

CIVIL ENGINEERING

SR.NO.	ROLL NO.	STUDENT NAME
1	B18001	ABHISHEK GAUTAM
2	B18002	AMAN KUMAR
3	B18003	AMAN MAHESHWARI
4	B18004	AMAN SINGH
5	B18005	AMIT KUMAR JATAV
6	B18006	ANIMESH CHOUDHARY
7	B18007	ANKIT BALUNI
8	B18008	ANKIT GUPTA
9	B18009	ASHISH SAGAR
10	B18010	ASHUTOSH SHARMA
11	B18012	BHUMANYU GOYAL
12	B18014	GOURAV GOEL
13	B18015	JAY PRAKASH
14	B18016	KENA PATEL
15	B18017	KUNAL SENGAR
16	B18018	MISHA NIMISH SAGAR
17	B18019	MUSKAN GUPTA
18	B18020	NISHA
19	B18021	RACHIT KATEWA
20	B18022	RADHA
21	B18023	SAGAR TOMAR
22	B18024	SHAH SAUD ALI
23	B18025	SHIKHAR KUSHWAH
24	B18026	SUNIL KUMAR SINGH
25	B18027	SURAJ
26	B18028	SWPNIL ENGLA
27	B18029	TORAL GOGIYA
28	B18030	TUSHAR GOYAL
29	B18031	UJJWAL SONI
30	B18032	URVASHEE MEENA
31	B18033	VIKASH KUMAR MEENA
32	B18035	VIKRAM SINGH MEENA
33	B18036	VISHAL KUMAR
34	B18037	VIVEK MOAR
35	B18038	YASH VARSHNEY
36	B18039	YATIN KUMAWAT
37	B18040	ZAIDAN MOHAMMAD BHAT
38	B18189	RAKESH MEENA

COMPUTER SCIENCE & ENGINEERING

SR.NO.	ROLL NO.	STUDENT NAME
1	B18041	A.DILSHAAD
2	B18042	AAKASH MAURYA
3	B18043	ABHIJEET MANHAS
4	B18044	ADITYA BRAJESH PANDEY
5	B18045	AKSHIT KUMAR
6	B18046	ANAM SIDDIQUI
7	B18048	ASHWIN GINORIA
8	B18049	BOKKA KANAKA KEERTHI
9	B18050	CHANDAN PRAKASH
10	B18051	CHIRUMARRI VENKATA SIVA NAGA MEDHA
11	B18052	DEBAJYOTI NATH
12	B18053	DINESH BHAGAT
13	B18054	DIPANSHU VERMA
14	B18055	HARJOT SINGH
15	B18056	HARSHIT KUMAR MITTAL
16	B18057	HRIDAYESH AKHAND
17	B18058	INDERJEET
18	B18059	ISHAN DAHIYA
19	B18060	JAHNVI
20	B18061	JAI LUTHRA
21	B18062	KAIRAV BANSAL
22	B18063	KALYANI KUMARI
23	B18064	KHYATI AGARWAL
24	B18065	KSHITIZ JAIN
25	B18066	KUMAR HARSH
26	B18067	MALVI ADITYA PARITOSH
27	B18068	MEHAK JAIN
28	B18069	MILIND TOPNO
29	B18070	MOHIB QURESHI
30	B18071	MOHIT
31	B18072	MOHIT KUMAR
32	B18073	MOOD VIKRAM
33	B18074	MRINAL TYAGI
34	B18075	MUDIT GOSWAMI
35	B18076	MUKUL DHIMAN
36	B18077	PIYUSH GOYAL
37	B18078	RAHUL ANAND
38	B18079	RAHUL KUMAR
39	B18080	RAHUL SAINI
40	B18081	RASHIKA RATHI
41	B18082	RITIKA SAGAR

42	B18083	S.KALYAN RAM
43	B18084	SAATVIK CHUGH
44	B18085	SHIKHA SUMAN
45	B18086	SIDDHARTH MITTAL
46	B18088	SUBHASH SUMAN
47	B18089	UMESH
48	B18090	VINAYAK SHIVAM GUPTA
49	B18091	VISHAL SIWACH
50	B18092	VIVEK KUMAR
51	B18093	VYOM GOEL
52	B18094	YASH CHAUDHARY
53	B18095	YASH SANJAY BANSOD
54	B18096	YASHIKA BAAN
55	B18097	YASHWINDER KUMAR
56	B18098	YOGESH DEVERTH

ELECTRICAL ENGINEERING

SR.NO.	ROLL NO.	STUDENT NAME
1	B18099	ABHINAV KUMAR
2	B18100	ADARSH RAJ
3	B18102	ADITYA MISHRA
4	B18103	AKSHAY KUMAR
5	B18104	AMIN UL HISAAM
6	B18105	ARSHITA KALRA
7	B18106	ASHISH ANAND
8	B18107	ASHOK KUMAR
9	B18108	B SAI SHIVANI
10	B18109	DEEKSHA SINGH
11	B18110	DEEPTI SINGH
12	B18111	DHANANJAY VERMA
13	B18112	EKANSH SHARMA
14	B18113	FINAVIA YASH
15	B18114	GARIMA CHAHAR
16	B18115	HARISH JAGLAN
17	B18116	HEMRAJ RAJNIKANT PARMAR
18	B18117	KARAN DOSHI
19	B18118	KARTIK KATHURIA
20	B18119	KESHAV GARG
21	B18120	KUSHAGRA SAHNI
22	B18121	MANVENDRA RATHORE
23	B18122	MD TARIQUE ASAD RIZWEE
24	B18123	NAMAN TAYAL
25	B18124	NIDHI JAIN
26	B18125	NISHANT VEDWAL
27	B18126	NITESH
28	B18127	PAMULA SHASHIDHAR

29	B18128	PRAKHAR UNIYAL
30	B18129	PRATIK GODBOLE
31	B18130	RAHUL KUMAR MEENA
32	B18131	RAHUL KUMAR MEENA
33	B18132	RAJAN GARHWAL
34	B18133	RAJEEV RAJ
35	B18134	RAMAN SONI
36	B18135	RUCHIKA SHARAN
37	B18136	RUPANSHI
38	B18137	SACHIT BATRA
39	B18138	SAHIL GARG
40	B18139	SAKET LALLA
41	B18140	SANSKAR GUPTA
42	B18141	SARTHAK JAIN
43	B18142	SHRAWAN KUMAR
44	B18143	SHRIKHA MAHANTY
45	B18144	SHRINIVAS KHATAVKAR
46	B18145	SHUBHAM KUMAR
47	B18146	SOURAV KUMAR MEENA
48	B18147	SUDHANSHU RADHEYSHYAM CHAUHAN
49	B18148	VARSHA MEENA
50	B18149	VASU GUPTA
51	B18150	VISHAL KUMAR SINGH
52	B18151	VISHAL RAJ
53	B18152	VISHAL VERMA
54	B18153	VIVEK MITTAL

MECHANICAL ENGINEERING

SR.NO.	ROLL NO.	STUDENT NAME
1	B18154	ABHAY SINGH RATHORE
2	B18155	ABHISHEK SEHARA
3	B18156	ABHISHEK SINGH
4	B18158	ANJALI DEEP
5	B18159	ANKIT KARAN
6	B18160	ANKUSH MAHER
7	B18161	ANUJ GOEL
8	B18162	AVULA SHANDILYA
9	B18163	AWANTIKA SINGH
10	B18164	AYUSHMAN DIXIT
11	B18165	BALKAR SINGH
12	B18166	BEGARI VARAPRASAD
13	B18167	CHINMAY GANESH PATIL
14	B18168	DESAI VIDHI NIKUNJBHAI
15	B18169	E.PRANATHI
16	B18170	GANDI GAHAN
17	B18172	KARAN SINGH
18	B18173	LOKESH BHAGWAT
19	B18174	MANAS PATEL

20	B18175	MANAV MEHTA
21	B18176	MAYANK SINGH
22	B18177	MOHD ASIM ANSARI
23	B18179	NEHA
24	B18180	NIKHIL KATNOUR
25	B18181	NISHITA
26	B18182	OM PANDEY
27	B18183	PARTH AGGARWAL
28	B18184	PRADYUMNA PRATAP SINGH
29	B18185	PRAGYANSHU CHAUDHARY
30	B18186	PRANJAL SONI
31	B18187	PRATIK KUMAR
32	B18188	RAJPAL MAHICH
33	B18190	SAKSHAM BARARA
34	B18191	SARANSH JAIN
35	B18192	SHASHANK SHEKHAR DWIVEDI
36	B18193	SHIKHA CHAUDHARY
37	B18194	SHUBHAMKUMAR KAMAKHYANARAYAN PANDEY
38	B18195	SHUBRAH GUPTA
39	B18196	SURINDERPAL SINGH
40	B18197	UDIT SINGH CHAUHAN
41	B18198	VAIBHAV
42	B18199	VANGARA KARTHIK KUMAR
43	B18200	VISHESH

25. M.Sc. (chemistry)

SR.NO.	ROLL NO.	STUDENT NAME
1	V18031	AKHIL BHARDWAJ
2	V18032	CHANJOT KAUR
3	V18033	ABHISHEK JAIN
4	V18034	KRITI KOCHAR
5	V18035	RITU
6	V18036	PAVITRA SRIVASTAVA
7	V18037	ANJALI NEGI
8	V18038	AASTHA JAIN
9	V18039	POOJA SHARMA
10	V18040	DEEKSHA SHARMA
11	V18041	SRISHTI GUPTA
12	V18042	ADITYA PRASUN
13	V18043	PARUL SHARMA
14	V18044	GULNAAZ
15	V18045	RAJDIP SONI
16	V18046	RAJAT SAINI
17	V18047	SHRIYA RAWAL
18	V18048	KRITI SHAKYA
19	V18049	MOHAMMAD ZEESHAM ALAM

20	V18050	ANKIT PATEL
21	V18051	HIMANSHU SAINI
22	V18052	SUNIDHI
23	V18053	NISHCHAL CHAUHAN
24	V18054	SANIYA
25	V18055	VIJAY
26	V18056	NEHA
27	V18057	BHOLA NATH GUPTA

26. M.Sc. (Applied Mathematics)

SR.NO.	ROLL NO.	STUDENT NAME
1	V18001	SANTOSH
2	V18002	ARISHI ORRA
3	V18003	NISHA
4	V18004	MONIKA NANDAL
5	V18005	DIVYA AGRAWAL
6	V18006	ANURAG TIWARI
7	V18008	ALKA SINGH CHAUHAN
8	V18009	NAMRATA MANI TRIPATHI
9	V18010	SONU
10	V18011	HIMANSHU CHOUDHARY
11	V18012	POONAM
12	V18013	VIKASH KUMAR POONIYA
13	V18014	RISHABH SAINI
14	V18015	AMIT KUMAR YADAV
15	V18016	SANJAY
16	V18017	ASHISH NANDKISHOR AWANDKAR
17	V18018	MAHESH KUMAR OLA
18	V18019	PAYAL
19	V18020	KM YATNESH
20	V18021	KAUSHAL PINKY
21	V18022	NAWANG THAKUR
22	V18023	MOHIT KAPOOR
23	V18024	MANTU PRASAD GUPTA
24	V18025	SIDHARTHA SANKAR PRADHAN
25	V18026	RAHUL
26	V18027	VISHNU SHARMA
27	V18028	YASH KUMAR
28	V18029	ANJU BAWRA
29	V18030	VIMAL KUMAR

27. M.Sc. (Physics)

SR.NO.	ROLL NO.	STUDENT NAME
1	V18061	AKASH
2	V18062	PANKAJ KUMAR
3	V18063	SAGAR REWADIA
4	V18064	SUBHASISH MANDAL
5	V18065	JAGRITI AHUJA
6	V18066	SHUMILE AHMED SIDDIQUI
7	V18067	POOJA MANRAL
8	V18068	SARDAR DILBAG SINGH KHALSA
9	V18069	MONU MEHTA
10	V18070	YOGESH YADAV
11	V18071	ARSHAD
12	V18072	NIKESH KUMAR
13	V18073	ANURAG KUMAR
14	V18074	EKTA KUMARI KUMARI
15	V18076	RAHUL DHANKHAR
16	V18077	SANTOSH KUMAR SAHU
17	V18078	DEENBANDHU SHARMA
18	V18079	BHISMA NARAYAN MAHANTY
19	V18080	SONU KUMAR KULDEEP
20	V18081	RAHUL SHARMA
21	V18082	GOURAV

28. M.Tech. (Structural Engineering)

SR.NO.	ROLL NO.	STUDENT NAME
1	T18101	VARUN SHARMA
2	T18102	AJENDRA SINGH
3	T18103	HIMANSHU SINGH GANGWAR
4	T18105	MD MASIBUL
5	T18106	ANAND SHAW
6	T18107	GANESH JAISWAL
7	T18108	SAURABH KUMAR
8	T18109	MAHIPAL KULARIYA
9	T18110	SUMIT KUMAR
10	T18111	GEETHESH NAIYYALGA
11	T18112	NAVEEN BHARTI
12	T18113	SHAILENDRA KUMAR SINGH
13	T18114	GURPREET SINGH
14	T18115	ATHARV ANANT SAURKAR
15	T18116	KSHITIJ TANDON
16	T18117	MOHAMMAD TALAHA SIDDIQUI
17	T18118	BHAG CHAND MEENA

29. M.Tech.

(Mechanical Engineering With Specialization In Energy Systems)

SR.NO.	ROLL NO.	STUDENT NAME
1	T18121	SUBHAV CHAUHAN
2	T18122	RENU TEWARI
3	T18123	PAWAN SINGH BISHT
4	T18125	AMIT KUMAR CHOUDHARY
5	T18126	CHANDER MOHAN
6	T18127	VAGISH KUMAR
7	T18128	JAIPRAKASH ANAND
8	T18129	SANDEEP YADAV
9	T18130	AMAN KUMAR SONI
10	T18131	KARAN DHUPER
11	T18132	SONU KUMAR
12	T18133	DIVANSHU GUPTA
13	T18134	VIJAY TIWARI
14	T18135	SATYAM SINGH THAKUR
15	T18136	TARUN PRATAP SINGH
16	T18137	MAN MOHAN SINGH PATEL
17	T18138	KUNWAR PRATAP SINGH YADAV
18	T18140	DEEPAK GANGADHAR GAIKWAD
19	T18141	ANSHUL MEHROTRA
20	T18142	VARUN KUMAR
21	T18143	RAMEEZ RAJA KHAN
22	T18144	SAMANVAY ANAND
23	T18145	PRAKASH GIRI

30. M.Tech.

(Energy Engineering With Specialization In Materials)

SR.NO.	ROLL NO.	STUDENT NAME
1	T18151	MOHIT BARTHWAL
2	T18152	ANKIT JOSHI
3	T18153	ABHISHEK GOEL
4	T18154	DHARMENDER KUMAR
5	T18163	HARSH ARORA
6	T18168	GAURAV KUMAR
7	T18169	SAYALI MARUTI KAWADE
8	T18174	ARUNABHA DAS
9	T18175	CHHAIL BIHARI SONI
10	T18176	MARUTI NANDAN TRIPATHI
11	T18177	SHOBHIT NIGAM
12	T18178	RAHUL SINGH
13	T18179	MOHD UZAIR KHALIDI
14	T18180	VAIBHAV KUMAR MITTAL
15	T18181	VIKRAM BISHT

31. M.Tech. in VLSI

SR.NO.	ROLL NO.	STUDENT NAME
1	T18001	SANDEEP PAREEK
2	T18002	MONU
3	T18004	SASWATH T
4	T18005	SHAKTI SINGH
5	T18006	NISHANT SINGH
6	T18007	SAURABH DHIMAN
7	T18008	ADRASH
8	T18009	PRASHANT SHARMA
9	T18010	ASHISH TIWARI
10	T18011	KANCHAN SINGH RANA
11	T18013	SHUBHAM MISHRA

32. M.Tech. (Power Electronics and Drives)

SR.NO.	ROLL NO.	STUDENT NAME
1	T18061	SWARNIM SHARMA
2	T18062	RAJIV
3	T18064	VISHNU PRASAD J
4	T18065	JAIDEEP SINGH KANDARI
5	T18067	ABHINAV SINGH KASHYAP
6	T18068	DEEPAL GUPTA
7	T18069	PATEL PARTH HASMUKHBHAI
8	T18071	KARTIK SHARMA
9	T18072	VIVEK KUMAR SHARMA
10	T18073	ROHAN RAJKUMAR LALWANI
11	T18074	CHANDAN BHARTI
12	T18077	MAYANK GUPTA
13	T18078	MD IRSHAD ANSARI
14	T18079	ABHISHEK KUMAR
15	T18080	AJEET KUMAR YADAV
16	T18081	POGULAGUNTLA RAVI TEJA

33. M.Tech. (Communication And Signal Processing)

SR.NO.	ROLL NO.	STUDENT NAME
1	T18031	SUPRIYO BANERJEE
2	T18032	PUSHAP DEEP SINGH
3	T18033	ANKIT CHAKRABORTY
4	T18034	NILESH KUMAR SHUKLA
5	T18035	MAHESH KUMAR GUPTA
6	T18036	HIMANSHI THAKKAR
7	T18037	RISHABH RANJAN
8	T18038	SOUVIK MIRA
9	T18039	SOMPAL SINGH
10	T18040	SUBHANSHU SAHU

34. M.Tech. (Biotechnology)

SR.NO.	ROLL NO.	STUDENT NAME
1	T18201	ANIRBAN BANDYOPADHYAY
2	T18202	VIKAS KUMAR SINHA
3	T18203	DEEPANSHU VERMA
4	T18204	ANKUR KUMAR
5	T18205	JAYANTHLAL GUDIVADA
6	T18206	ASHUTOSH KUMAR SINGH
7	T18207	PREM CHAND
8	T18208	NIKITA DESHWAL
9	T18209	MEENAKSHI APPASAHEB SHEGANE
10	T18210	BHUVANESHWARI RAJENDRAKUMAR GEHI

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