



DIRECTOR'S REPORT



PROF. AJIT KUMAR CHATURVEDI

Director, Indian Institute of Technology Mandi

Prof Anil Kakodkar, the Chief Guest, Professor Prem Vrat, Chairperson of the Board of Governors; Members of the Board of Governors, Members of the Senate, Faculty and Staff Members of the Institute, graduating students and their family members, distinguished guests: I welcome you all on the occasion of the 9th Convocation of the Indian Institute of Technology Mandi.

Today, we are delighted to have with us Padma Vibhushan Prof Anil Kakodkar as the Chief Guest of the 9th Convocation of IIT Mandi. On behalf of IIT Mandi and my personal behalf, I thank him for accepting our invitation. It is a privilege to be in his company and hear him. I am sure his convocation address will not only inspire the graduating students but all of us as well.

I'm delighted to announce that on the occasion of 9th Convocation, 146 B.Tech. 137 M.Tech. 99 M.Sc., 11 M.A, 14 M.S. (by Research) and 45 Doctor of Philosophy (PhD) scholars including an Integrated-PhD (I-PhD) candidate are being conferred graduating degrees.

Thankyou, JAIHIND

Prof. Ajit Chaturvedi



1. GRADUATING STUDENTS

146 B.Tech (60 in Computer Science and Engineering, 44 in Electrical Engineering, 24 in Mechanical Engineering and 18 in Civil Engineering), including several scholars with Honours/Minor in Management/Intelligent systems and/or Applied physics, 137 M.Tech. (19 in Mechanical Engineering with specialization in Energy Systems; 17 in Energy Engineering with specialization in Materials; 25 in Structural Engineering; 29 in VLSI; 15 in Power Electronics and Drives and 16 in Communications and Signal Processing; 16 in Biotechnology), 99 M.Sc. (35 in Chemistry, 36 in Applied Mathematics and 28 Physics), 11 M.A. (Development Studies), 14 M.S. (by Research) and 45 Doctor of Philosophy (PhD) scholars including an Integrated-PhD (I-PhD) will be graduating today. The details of the graduating scholars as well as the summary of the research being recognized today for the award of the degrees is presented in this Brochure

2. ACADEMIC ACTIVITIES

Current Academic Programs, Students and faculty

Currently, at IIT Mandi, 4-year B.Tech. programs are offered in six branches, viz., Civil Engineering (CE), Computer Science and Engineering (CSE), Electrical Engineering (EE), Mechanical Engineering (ME), Data Science and Engineering (DSE), and Engineering Physics (EP) along with B. Tech.–M.Tech. integrated dual degree in Bioengineering (5–year program). There are three M.Sc. programs in Physics, Chemistry, and Mathematics; Nine M.Tech. programmes - in Mechanical Engineering with Specialization in Energy Systems, Materials and Energy Engineering, Structural Engineering, Fluid and Thermal Engineering, Power Electronics and Drives, Communications and Signal Processing, VLSI, Computer Science and Engineering and Biotechnology. There is one MA program in Development Studies. Programs leading to MS (by Research), Ph.D. and Integrated-PhD (I-PhD) are also offered. In the coming academic year, we are starting MTech in Electric transportation

Four schools are hosting the academic programs: Schools of Basis Sciences (SBS), School of Computing and Electrical Engineering (SCEE), School of Engineering (SE), and School of Humanities and Social Sciences (SHSS). In 2021, BTech admissions are ongoing and yet to be finalized. A total of 150 M. Tech. students, 131 M.Sc. students, and 19 M.A. students secured admission at IIT Mandi. We now have a total of 1,769 students including 367 Ph.D., 73 M.S., and 22 I-Ph.D. research scholars along with faculty strength of 136 including Assistant Professors, Associate Professors, Professors, Visiting, Adjunct and Emeritus Professors.

The institute encourages multi- and inter-disciplinary research for the balanced growth of its students and scholars. Hence, the labs and other resources of the schools are mixed and shared. Subject specialist faculties are proactively dedicated to improving the schools continuously. IIT Mandi has national and international linkages and practices collaborations with leading and developing institutes and industries.



Life after IIT

Despite several disruptions created by the pandemic, the Career and Placement Cell (CnPC) at IIT Mandi worked actively throughout the year and hosted 101 companies for the placement and 47 companies for the internship. During the 2020-21 placement season, 81% of the registered undergraduate students received job offers from reputed companies. Branch-wise placement percentage for B.Tech students was 98% in CS, 61% in ME, 84% in EE, and 33% in Civil. Among the registered postgraduate students, 35% of M.Tech, 54% MSc. 82% MS received job offers from good companies, including core companies. The major companies and organizations that visited the campus for placement and internship includes Microsoft, Amazon, Codenation, DEShaw, Adobe, Salesforce, Irage, Yodlee, Ceremorphic, Qualcomm, Intel, CDAC, Jaguar Land Rover India, L&T, ACME, Marvell, Indeed, TCS, Samsung, Pentair, Meesho, IOLCP, Publicis Sapient etc.

Some of the students decided to go for higher education in institutes like IIT Madras, IIT Bombay, IIT Roorkee, IIT Kanpur, and other sister IITs, National Brain Research Centre, IISER Pune, JKU University Austria, Max Planck Institute for Dynamics of Complex Technical Systems Germany, Dublin City University, University of Missouri etc.

Besides placement, the Career and Placement Cell took significant initiatives to conduct several career sessions throughout the year to make students aware of various options open to them. These included, sessions by inspiring academicians, motivation towards startups by successful entrepreneurs, information about various competitive exams by coaching institutes, webinars on UPSC exam preparation, interactive sessions with Alumni, and corporate pre-placement talks.

Major institute-level achievements during the past year

- Owing to the thriving academic environment of the Institute along with the presence of an effective business incubation, i.e., IIT Mandi Catalyst, IIT Mandi has made a debut in the Atal Ranking of Institutions on Innovation Achievements, Ministry of Education, Government of India. The rankings were announced on 18 th August 2020, by the Hon'ble Vice President Shri. M. Venkaiah Naidu. The Institute has been ranked #7 in the centrally funded institutions category in India of ARIIA 2020. IIT Mandi is the only institute from the second generation of IITs to be featured in ARIIA 2020.
- IIT Mandi as per NIRF 2021 ranking is among the Top 50 in the Engineering category and overall is among the Top 100 Indian institutes.
- A Technology Innovation Hub in human-computer interaction (IIT Mandi iHub) has been successfully setup at the Indian Institute of Technology (IIT) Mandi under India's National Mission on Interdisciplinary Cyber-Physical Systems. The iHub is planned to make India a leader in human-computer interaction (HCI) research in the world. The iHub is a section-8 company that has been created with a funding of INR 110 crores supported by DST, Govt. of India. The iHub in its entirety is dedicated to contribute in the domains of environment, healthcare, Information technology, and defense & security.
- IIT Mandi successfully collaborated with Enabling Women of Kamand (EWOK) Society and NABARD on setting up Farmer producer organisations in the Mandi district of Himachal Pradesh.



Selected achievements by faculty and students

Faculty:

In the last 1 year, despite COVID challenges our faculty and students achieved success in academics, research and service. Few selected mentions are

- Researchers from IIT Mandi (Dr Varun Dutt and Dr K.V. Uday) and Mandi district administration received the 2020 Gold Skoch Award in the “Safety and Security” category for the landslide monitoring and warning system implemented in Mandi district.
- Dr Sandip Kumar Saha listed as 2020 Outstanding Reviewers" for the "Practice Periodical on Structural Design and Construction" published by ASCE He has been appointed as Associate Editor for the "Practice Periodical on Structural Design and Construction" published by ASCE
- Dr Varun Dutt and team’s work on “Risk perception, fear, social distancing, mask, and treatment preference regarding COVID-19 in India and the United States of America,” got accepted for a presentation at the Colloquium proposed by the French Presidency of the UNESCO Intergovernmental Committee Bureau - Management of Social Transformations (MOST)
- The cultural wing of the Mexican Embassy in the U.S. at Washington D.C. interviewed Dr. Rajeshwari Dutt about a historical moment (the Caste War of Yucatan) in Mexican history. This interview was a part of the commemorations for the bicentennial of Mexican independence.
- Dr Kala Venkata Uday, along with his team of B.Tech. students successfully developed a smart road monitoring system to prevent accidents, enhance traffic management by employing the Micro-Electro-Mechanical Systems (MEMS) and Internet of Things (IoT) technologies.
- Dr Baskar Bakthavachalu received SERB-STAR Award in this year. Also, he received India Alliance DBT Wellcome Intermediate Fellowship for 2020-25 along with research funding support of ~INR 3.6 crores
- Dr. Amit Jaiswal got selected as an Associate at The Indian Academy of Sciences, Bangalore, 2020
- Dr Amit Jaiswal also received highly prestigious INSA Young Scientist Award 2021 for excellence in Research
- Dr Ajay Soni joined editorial team of Energy and Environment Journal in young leaders committee.
- A team of IIT Mandi Wikipedians put Himachal on Wikipedia map. More than 200 images used in 220 articles in Wikipedias in 21 languages: Tamil, Punjabi, Hindi, Bengali, Swahili, Hebrew, French, German, Indonesian etc.

Students

- Ms. Arya Priyadarshni, Ph.D. Scholar in SHSS received Newton Bhabha - PhD Placement - 2020-2021 under the ICSSR (India)-British Council (UK) Newton-Bhabha Programme.
- Mr. Jaideep Gaikwad and Ms. Akanksha Singh, current MA students received SBI Youth Fellowship Programme for India enabling them to work on rural development projects
- Mr. Sahil Gaikwad, MA student of the graduating Batch (2019-21), has been selected for the prestigious Mahatma Gandhi National Fellowship program administered by the IIMs. This 2-year fellowship program has been designed at the initiative of the Ministry of Skill Development and Entrepreneurship (MSDE), Government of India (GoI), and implemented in collaboration with State Skill Development Missions (SSDMs).
- Mr Rishi Kant Thakur, student under the guidance of Dr Rajeev Kumar and Prof, S C Jain, won second place and a 400 USD prize from the sponsored agency “IEEE Industry Application Society USA” for project titled “Auto tuned Ventilator A contactless treatment machine especially for COVID 19 patients”
- Kumar Udit Saumya, PhD Scholar, SBS received Overseas Doctoral Fellowship Program(OVDF), 2021.
- Ms.Purba Mukherjee, MTech Biotechnology scholar received Khorana fellowship 2021.
- Ankur Kumar, PhD Scholar, working with Dr. Rajnish Giri, received Fulbright Nehru PhD Fellowship.
- Shaunak Roy, PhD Scholar, working with Dr. Amit Jaiswal, received Fulbright Nehru PhD Fellowship.
- Vipin Kumar, PhD Scholar, working with Dr. Muslim Malik, received Indo-French Raman-Charpak Fellowship.
- Giredhar Muthiah, M. Tech. Biotechnology student received DAAD fellowship.

Notable Alumni achievements

- Dr. Palvi Aggarwal, a 2018 Ph.D. graduate, guided by Dr. Varun Dutt, Associate Professor, has received an offer to a fulltime tenure track Assistant Professor position in the Department of Computer Science at the University of Texas at El Paso, USA. Dr. Aggarwal is planning to join the faculty position at the University of Texas in September 2021.
- Dr. Hari Vansh Rai Mittal, a 2016 Ph.D. graduate, guided by Dr. Rajendra K. Ray, Associate Professor, has received an offer to a regular Assistant Professor (Gr.-I) position in the Department of Mathematics at the Indian Institute of Technology (IIT) Palakkad. Dr. Mittal is planning to join the faculty position at the Indian Institute of Technology (IIT) Palakkad in January 2022.
- Mr Shashank Shekhar and Mr Piyush Kumar, Alumnus of MA in Development Studies ranked #162 and #400 respectively, in the GATE 2021 in Humanities and Social Science discipline, conducted for first time in India.
- Ms. Neha Grewal secured 2nd Rank in the prestigious Combined Defense Services Examination (CDSE) declared this year. Ms. Grewal, completed her B.Tech in Electrical Engineering from IIT Mandi in the year 2018.

- Mr. Mohit Rawat and Mr. Lalitesh K. Meena, have secured 462nd Rank and 655th Rank respectively in the final results of the prestigious Civil Services Examination (CSE) declared this year. Mr. Mohit Rawat, completed his B.Tech in Computer Science and Engineering from IIT Mandi in 2015. Mr. Lalitesh K. Meena, a resident of Rajasthan, completed his B.Tech in Electrical Engineering from IIT Mandi in 2015

Significant research and technology development:

- Dr. Ajay Soni and Niraj Singh with their collaborators have studied the benchmark research on Cd doped AgSbTe₂ and achieved a highest thermoelectric figure of merit $ZT \sim 2.4$. *Science*, 371, 722-727(2021)
- Dr. Girish Sharma and Azaz Ahmed investigated magnetotransport in Weyl fermions and identified a new and independent source that drives the system to switch the sign of magnetoconductance. *PRB* 103, 115146 (2021)
- Dr. Abbas and his group has studies the existence of a unique pseudo compact almost automorphic solution that is exponentially attractive is shown for a generalized differential equation with feedback and time-varying delays. A new criteria for the existence and convergence dynamics of pseudo compact almost automorphic solutions for some models that involves sum of nonlinear terms that satisfy a general condition has been obtained. *J. of Mathematical Analysis and Applications*, 495 (1) 124722 (2021).
- Dr. Sarita and her group has observed and projected changes in extreme drought and food-prone regions over India under CMIP5 RCP8.5 using a new vulnerability index, *Climate Dynamics* (2021).
- Prof. Chayan Nandi and team have recently uncovered a new avenue on the fundamental aspects of the photoluminescence mechanism in red emissive carbon nanodots (CNDs). Their work has solved the long-standing mystery of the origin of photoluminescence in red emissive CNDs. *Chem. Sci.*, 2021, 12, 3615
- Dr. Amit B. Pawar and team have recently reported an efficient synthesis of indoloindolones via [4+1] C–H amination/annulation cascade of sulfoxonium ylides with anthranils using inexpensive and air stable [Cp*Co(CO)I₂] catalyst. *Chem. Comm.*, 2021 doi.org/10.1039/D1CC02817K
- Dr. Amit Jaiswal and his team of researchers have developed a virus-filtering, self-cleaning and antibacterial material that can be used to make face masks and other PPE equipment. This path breaking development comes at a time in which it has become imperative to develop techniques to stop the second wave of the COVID-19 pandemic in the country. *ACS Appl. Mater. Interfaces*, 13 (11), 12912 (2021)
- Dr. Rajanish Giri and his team elucidated the part of structure of a key protein (NSP1) in the COVID-19 virus, which helps in understanding its mode of action, its role in the spread and severity of the disease and development of antiviral therapeutics.

- Dr Prosenjit Mondal and his team has uncovered a previously unknown mechanism in regulating the biological response to high-carb diet which is useful in developing treatments for non-alcoholic fatty liver disease. *J Biol Chem* 2021, 296, 100714
- Dr Deepak Swami and his team developed new software for precisely predicting the movement of contaminants through complex soil structures. Researchers at the Indian Institutes of Technology (IITs) and the University of California collaborated on this work.
- Dr Subhajit Roy Chowdhury and his team invented a new technique to detect abnormal brain characteristics associated with ischemic stroke. IIT team collaborated with researchers from Institute of Neurosciences, Kolkata, and Department of Biomedical Engineering, University at Buffalo, USA.
- Dr. Sumit Sinha Ray and his team developed facemask membrane containing nanofiber membrane which are efficient in capturing PM_{0.1-2} with efficacy at 94-99% at a pressure drop much lower than the prescribed one for N95. These membranes are derived from waste plastic bottle as raw material and using electrospinning technique the raw material, while dissolved in specific solvents, is extruded in the scale of 400-1500 nm.
- Dr. Rajeev Kumar and his team developed the concept of low-cost mechanical ventilator and research efforts are ongoing with collaborators from Vardhman Mahavir Medical College (VMMC) & Safdarjung Hospital (SJH) New Delhi.
- Dr. Arpan Gupta and his team developed a prototype for mechanical ventilator in association with medical doctors from Mandi. The developed ventilator is low cost, can be directly operated with an AC supply or from batteries.
- Dr. Himanshu Pathak, Dr. Sunny Zafar, Dr. Hitesh Shrimali, Dr. Prosenjit Mondal and Dr. Amit Prasad have developed the Disinfection Tunnel for Courier Packages Against SARS-CoV-2 (COVID-19) virus.
- Dr. Hitesh Shrimali and Dr. Prateek Saxena have developed the Model and Design of Oxygen Generator (Concentrator).
- Dr. Atul Dhar, Dr. Parmod Kumar & Dr. Hitesh Shrimali have developed the ICU Ventilator
- Dr. Tushar Jain and his team at IIT Mandi along with Robert Bosch Engineering and Business Solutions Private Limited, Bangalore, have developed algorithms to predict the functioning of vehicular Internal Combustion (IC) engines
- Dr Sumit Sinha Ray and his team has developed a fibrous membrane filter using a biopolymer-based material to remove heavy metals from water
- Dr Srikant Srinivasan, Dr Shyam K Masakapalli and their FarmerZone team including Central Potato Research Institute, Shimla have developed a computational model based on Artificial Intelligence (AI) for automated disease detection in potato crops using photographs of its leaves.





3. INTERNATIONAL LINKAGES

IIT Mandi has remained an attractive destination for international students and faculty and fostered its linkages with the wider academic world through student and faculty mobility, as well as joint research projects and MoUs. Presently IIT Mandi has 10 active MoUs with international partners. IIT Mandi has been made the national coordinating Institution for Germany under the Scheme for Promotion of Academic and Research Collaboration (SPARC) of the Government of India. Additionally, it has also assumed leadership among the eight-second generation IITs for attracting students from SAARC nations.

Since 2013, over 57 of our students have had the chance to go for semester exchange to RWTH Aachen University, Technical University of Munich, Blekinge Institute of Technology, Hepia, Switzerland, IT University of Copenhagen and University of Stuttgart. Over 120 international students have experienced the project-based learning and other academic offerings of IIT Mandi since 2015, the majority from Worcester Polytechnic Institute (WPI), USA.

International Students at IIT Mandi

At present there are 14 International students are enrolled for Masters and Ph.D programmes at IIT Mandi. Of these, 5 students are from Bangladesh and 7 students are from Nepal. Two students joined IIT Mandi in person from Ethiopia in April 2021 for the Ph. D program.

IIT Mandi Students Visiting Institutions Abroad

Several IIT Mandi students visited several EU institutions under academic exchange in 2020. The undergraduate visits included 3 students to RWTH Aachen (Germany). 4 students of IIT Mandi's M.Tech. Program visited Germany under DAAD (KOSPIE) program. In October 2021, despite the pandemic situation, 13 IIT Mandi students (11 B.Tech. and 2 M.Tech.) will be visiting Germany at our partner institutions on semester exchange programs.

International Visitors at IIT Mandi

Dr. Erwin Fuhrer from Germany joined IIT Mandi as Visiting Assistant Professor for one year.

MoUs

IIT Mandi signed an MoU with Technical University Dresden in August 2020 and with Kyushu University in Japan in December 2020.

Events with International Participation

There were a number of workshops/Talks conducted online at IIT Mandi involving visitors from universities abroad including:

- Indian Institute of Technology Mandi virtually hosted the 2nd Winter School on Cognitive Modeling (WSCM) from 15th to 17th December 2020. This initiative was hosted by IIT Mandi in collaboration with Himachal Pradesh Technical University (HPTU), University of Groningen, University of Waterloo, and Indian Institute of Technology Roorkee. The event included key sessions from various national and international researchers and professionals to train students on the best practices in the area of cognitive modelling.
- SCRI (Society for Collaborative Research and Innovation) IIT Mandi organized a virtual talk on “Using Maths to Clean up our Ocean” by Dr. Tom Crawford on 15th January 2021. Tom is an Early Career Teaching and Outreach Fellow in Mathematics at St Edmund Hall and is also responsible for the teaching of Visiting Students. Tom specializes in Applied Mathematics and completed his PhD in Fluid Dynamics at the University of Cambridge under the supervision of Prof. Paul Linden. His award-winning website tomrocksmaths.com hosts videos, podcasts, puzzles and articles that aim to make mathematics entertaining and understandable to all. Tom works with several partners including the BBC and the Numberphile YouTube channel – the largest mathematics education channel on the platform with over 3.5-million subscribers.
- An International workshop on Design and Manufacturing of Composites for Engineering Applications was successfully organized by School of Engineering, IIT Mandi from 1st to 5th February 2021 in online mode, given the pandemic situation. Over 120 participants attended the workshop, among which participants were faculty and students from engineering colleges and technical institutes (IITs, NITs, State Government Engineering Colleges) from all over the country. A few participants were from universities abroad (Sapienza University of Rome). Industry personnel from ISRO, TATA Steel, LM Wind Power etc. also participated from in the workshop. Speakers included subject experts from IIT Kanpur, IIT Roorkee, University of Salerno, PSI Switzerland, IIT Bombay, KMUTNB, Thailand, Institute of Research Hydro Québec, Canada and also IIT Mandi.
- Indo-UK symposium on “Fluxomics of Microbe and Plant Systems (FluxMAPS 2021)” was successfully held on 24th-25th March 2021 jointly by Indian Institute of Technology Mandi, India and University of Oxford, UK. The themes covered were Flux Balance Analysis in Plant Systems and 13C Metabolic Flux Analysis in Plant and Microbial Systems. Scientists, faculty and scholars working in relevant areas greatly benefited from the symposium supported by MHRD-SPARC and UKIERI.

