

INDIAN INSTITUTE OF TECHNOLOGY MANDI

भारतीय प्रौद्योगिकी संस्थान मण्डी



5th

CONVOCATION

दीक्षांत समारोह

7th October 2017



INDIAN INSTITUTE OF TECHNOLOGY MANDI

5th Convocation
Saturday, 7th October, 2017



CHIEF GUEST

Shri Banmali Agrawala

President

Infrastructure, Defence and Aerospace
TATA SONS

Shri Subodh Bhargava

Chairperson, Board of Governors, IIT Mandi

&

Former Chairman, TATA Communication Limited

Prof. Timothy A. Gonsalves

Director
IIT Mandi

Indian Institute of Technology Mandi



WELCOME TO IIT MANDI

Indian Institute of Technology Mandi (IIT Mandi) welcomes you to its 5th Convocation Ceremony on 7th October, 2017. As part of this Convocation, 24 Ph.D. scholars, 7 M.S. (by Research), 18 M.Sc. (Chemistry), 4 M.Tech. and 116 B.Tech. students would graduate from IIT Mandi.

IIT Mandi is nestled in the Shivalik Range of the Himalayas, away from the bustle of the metropolis. It is situated about 18 km away from the historic town of Mandi, in Kamand and Salgi near the bank of the river Uhl. Since its inception in 2009, IIT Mandi has reached commendable heights. In this very short span of time, it now has a fully residential campus with world-class academic and research facilities.

CONVOCATION PROGRAM

7th October 2017, 3:30PM

Arrival of Chief Guest in IIT Mandi Robe Room

Start of the Academic Procession

National Anthem

Felicitation to Dignitaries on Dias

Chairman(BoG) Declares the Convocation “Open”

Welcome Speech and Report by the Director, IIT Mandi

Award of Degrees and Medals

Oath Giving

Convocation Address by the Chief Guest

Closing of Convocation Ceremony

National Anthem

Return of Academic Procession

VISION & MISSION OF IIT MANDI

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.



MR. BANMALI AGRAWALA

PRESIDENT

INFRASTRUCTURE, DEFENSE AND AEROSPACE

TATA SONS

MESSAGE FROM THE HONORABLE CHIEF GUEST

Hon'ble Chairman of the Board of Governors, Mr. Subodh Bhargava; Director, Mr. Timothy Gonsalves, members of the Faculty and of course my dear friends,

At the outset please accept my heartiest congratulations on graduating from a globally renowned institution, namely the Indian Institute of Technology. You clearly deserve to be complimented and applauded for all your hard work, for the fact that you are some of the brightest minds that the country has and because you are the future leaders that will create history not only for India but also for the world.

I certainly do not want to take away anything from your moment of celebration but do want to gently remind you that while you now indeed have the potential and the foundation to achieve greatness; you still have to work towards it. The degree that you receive today is no entitlement nor is it a guarantee of success. If anything, I would urge you to carry this degree with a lot of humility because you are privileged to have got the opportunity to receive such world class education over many others who might be equally capable but whose circumstances forced them down a different path.

From tomorrow morning, you will face a new world. Away from the patronage of your parents and teachers, outside the comfort of your home, school and college, you will find a world which is different from what you have experienced so far.

There will be times when you will be treated unfairly, you will be betrayed, you will be lonely, you will be unlucky, you will be ignored, and you will be hurt. These times will teach you the importance of justice, loyalty, friendship, good fortune, listening to others and above all compassion. As you would notice, I did not mention your elite degree even once simply because your degree is absolutely worthless without these basic building blocks of character.

The world that you are now stepping out into is full of opportunities. And within those opportunities across the world, India stands apart. There is no other country in the world that has an economy of the size of 2 trillion \$ and almost 9.5 trillion \$ in PPP terms making it globally the third largest, growing at over 7% per annum, that is a thriving democracy, that has the world's largest skilled workforce and most of the future of the country has yet to be built. But most importantly, the manner in which India is being built is setting an example for the rest of the world to follow. The exponential growth of the digital economy, the sharp drop in cost of clean energy to make it affordable, the significant accomplishments in the Space programs, the sharp reduction in prices of medicines because of generics developed in India, etc. are all examples of how India is leading the world.

Context is always important while understanding anything. The context of Modern India is a lot different than the context of the historical past or even the last seventy years since Independence. The context of the Modern Indian also has to be therefore different. Soon after Independence, after years of foreign rule and subjugation, we had become Diffident. We were enamoured by anything "Imported", we looked up to the Western World and more often than not we were usually seeking something from the outside world. Slowly but surely and with the opening up of the economy our confidence grew and we began to question and challenge status quo. The Diffident India had become Argumentative and so had the Indian. Over the last few years we see the emergence of yet another India which Mr. Jai Panda the Member of Parliament calls the Decisive India. We are now not afraid to make bold decisions, to take chances, to think big and to firmly believe that we can actually lead the world than being led all the time. India no longer has to only seek but can actually give to the rest of the world. Modern Indian is now a Decisive Indian. You my friends are the new Self Confident and Decisive Indians.

Everybody wants to be in a position to make Decisions and here we are in that position. But Making decisions is a lot different than engaging in endless debate. It is a lot more difficult to be a Decisive Indian than an Argumentative Indian.

Making decisions means taking risks, it means being accountable for consequences and to do all of this despite all the uncertainties of a disruptive world.

It is this new Decisive India that all of you are stepping into.

But what is being Decisive all about?

The first element of being Decisive is **Speed**.

In this time and age, Uncertainty, Disruption, Hyper competition, etc. are par for the course. There will never be the “perfect time” to make a decision, there will never be access to all the information to make a decision, there will never be total consensus around any decision, there will never be guarantees for success for any decision or in short there will never be a “perfect decision”.

The key therefore is to make quick decisions and rely on your Intuition. Hopefully your years of upbringing, training and reading would have shaped your Intuition in a certain way. In my experience, most of us are always craving for authority but when it is actually given then we don't know what to do with it. This is usually because we lack the self confidence and clarity of thought to actually make decisions.

I do hope that your education and training has equipped you to think with clarity and make firm decisions quickly.

The second element of being Decisive is to **Fail Fast**.

If Decisions are being made quickly then there are bound to be some failures. The faster one fails the faster one can change direction and move on. The key therefore is not to so fall in love with your decision or idea that it becomes too late or too expensive to change course. The key here is also to not be discouraged by failure but instead be encouraged to learn and move on.

I do hope your training has taught you how to fail and fail fast.

The third Element of being Decisive is **Purpose**.

Decision making by definition, implies making a Choice. It is tempting to try and do many things at the same time. A country like India offers innumerable opportunities. But staying Focused on those opportunities which play to your strengths is critical. At the end of the day you have to be passionate and the best in the world in whatever you choose to do. Make your decisions accordingly. Now that you are equipped with an Elite degree you will be spoilt for choice. Choice of career options, choice of where you want to live, and choice of life style and even choice of matrimonial proposals I suppose! If your Purpose is clear, making choices will be easier.

I do hope your training has taught you on how to find your Purpose.

As you take your first step into this world as a Decisive Indian, allow me to share some of my own learning of over the last thirty years. Just to set the context, I grew up in a "Diffident India" and an "Argumentative India". When I came out of school, one either became a doctor or an engineer or got into government service. These were clearly the Diffident or defensive choices that ensured stable monthly pay cheque.

With increasing global exposure over time and working with Multinationals I realized I too was reasonably intelligent, my ideas were worth listening to and I was respected more for my intellect than for my appearance. I first became CEO when I was forty. Mr. Bhargava was in fact was my first Chairman. Over the last fourteen years that I have now been CEO of three fairly large Indian, European and American companies, I have realized that India and Indians have a strong role to play in the global scheme of almost everything from Politics to Economics and to Business. I firmly believe that India can offer to the world a model where democracy is not a form of governance only for the educated elite, where the youth have the self confidence pursue their passion and where technology has a purpose to drive affordability in order to provide accessibility to all. The most valuable export of India to the world is undoubtedly our frugal thinking and leveraging it with technology can solve so many social challenges that the world faces.

While you go about acquiring new capabilities I would urge you to consider the following:

First acquire Depth before Breadth. It is tempting to want to become a CEO or a General Manager overnight. It is however critical that you first acquire expertise in any one area of choice. You can then broaden the sphere of influence over time but you first have to be known for something unique. You have to be the best in the world at something and you will only excel if you are passionate about what you do.

Remember Excellence is not an option but it is a necessity.

Secondly DO NOT indulge in any career planning. It is critical that you singularly focus on doing the job on hand well. If you succeed in doing well in current tasks, newer opportunities will automatically open up. But if you constantly focus on the next promotion or the next step, without delivering results on the current job, you then run the risk of not only being always disgruntled but also getting left behind because of poor performance. Remember that Outcomes matter .

Thirdly have an Unwavering commitment to Integrity. Beyond the basics of values and ethics, it is important for you to be honest to your own intellect and inner voice. Right from day one, you have to have the confidence to speak your mind and act according to your conscience. You have to be your own self and not a clone of someone else.

Remember, the most difficult part about Leadership is to just be yourself.

Finally, I would like to share with you the most important lesson of my life. For every individual success there is a corresponding sacrifice that some other individual has made. More often than not, the sacrificing individual is a close family member. The bigger the individual personal success the bigger is the corresponding sacrifice that is made by someone else.

In the case of Sachin Tendulkar it was his brother Ajit, in the case of Mahatma Gandhi it was his wife

Kasturba , In case of Ram it was Lakshman and Sita, in the case of Laxman it was his wife Urmila, in your case it has so far your been your parents and in my case it has been my wife Devyani who stood firm by me while I went around the world pursuing my ambitions. The important thing is to acknowledge the sacrifices that others make for you to succeed and be grateful to them. Further, ask yourself what are you sacrificing for someone else to succeed? The sooner you realize that many people have a hand in your success, the better it will be in keeping you grounded.

Friends, you have a lot going for you. A great upbringing, a great education and a phenomenal opportunity are ahead of you. I'm confident that not only will you succeed but you will also inspire others to follow in your footsteps. Wish you all the best and may God Bless you always.

MR. BANMALI AGRAWALA



MR. SUBODH BHARGAVA

CHAIRPERSON, BOARD OF GOVERNORS, IIT MANDI
&
FORMER CHAIRMAN, TATA COMMUNICATIONS LIMITED

Mr. Banmali Agrawala, President, Infrastructure, Defence and Aerospace, Tata Sons and former President and CEO, South Asia, GE, Prof Timothy A Gonsalves, Director IIT Mandi, Members of Board of Governors, IIT Mandi, Members of the Academic Senate, Faculty and Staff Members of the Institute, invited dignitaries, guests, members of the Press and electronic media and most importantly graduating students and their families, ladies and gentlemen: I am happy to join Prof Gonsalves in extending a warm and cordial welcome to you all.

I am delighted to welcome our Chief Guest Mr Banmali Agrawala with whom I had the pleasure of working closely for many years during his tenure as the Managing Director, Wartsila India Ltd. We are indeed grateful to Mr Agrawala for accepting our invitation and more so for honouring his promise and commitment by being with us today within less than seven days of his taking over his new assignment. We are truly privileged to have Mr. Agrawala in our midst this afternoon.

My heartiest congratulations to all the graduating students. It is fulfilment of your aspirations as well as the dreams of your parents and loved ones. This is also an occasion to 'pay-back' – do reflect upon the efforts and sacrifices of your parents for their support and the contribution by the teachers who taught, mentored and inspired you in your learning.

IIT Mandi started its journey in 2009. Over the years the Institute has grown to become an important member of the IIT family. The Director, the faculty, staff and students deserve compliments for their sustained efforts towards the progress of the Institute.

My first visit to IIT Mandi was as Chief Guest in its 1st Convocation in October 2013. It has been my privilege to be associated with IIT Mandi as Chairman since the beginning of this year. I feel encouraged and happy to be a part of this story.

IIT Mandi has completed eight years of its existence. Although the major academic programs and

infrastructure are in place, there is need for sustained efforts in order for the Institute to realise its plans, vision and the mission. Accelerated expansion of infrastructure and academic resources, therefore, will continue to be our highest priority.

Construction of important buildings to cater to the immediate requirements has been completed. However, going forward, timely construction to create envisaged expanded capacity is one of the major challenges for the Team.

I am very happy that the Institute under the dynamic leadership of the Director, Prof Gonsalves has taken a few unique and innovative measures in the areas of academic programs, governance structure, and empowerment of younger faculty and staff and the students. A few of the initiatives are:

IIT Mandi launched its Technology Business Incubator '**CATALYST**' in May 2016. Catalyst has received funding of Rs 4.5 Cr from DST and Rs 30 Lacs from HPCM's Startup Scheme. IIT Mandi has committed space and funds worth about Rs 8 Cr.

CATALYST has addressed also the neighbouring communities by conducting educational and awareness programs for the students and young Himachali entrepreneurs. In a very short period it is already incubating 8 projects engaged in the areas such as software to automate planning of rooftop solar installations, advanced image processing and sensors for precision agriculture.

Another Incubator **EWOK** – Enabling Women of Kamand -- is helping local women to start village scale businesses based on their traditional strengths together with modern mobile and internet connectivity. They are addressing a customer base consisting of the villagers, the IIT community and beyond too.

Gender diversification and women empowerment to make the Institute a favoured location to study has received strong focus. IIT Mandi is spearheading the effort to increase the number of women in BTech in all the IITs from a woeful 8% to 20% by 2020. The number of women joining BTech in IIT Mandi has risen from 4% last year to 15% this year. We have 20% women in our faculty, among the highest in the IIT system.

Keeping in view national priorities IIT Mandi has started three new research centres recently:

BioX Centre: a group of over 20 members of the faculty from the life sciences, physical sciences and engineering are working on Research & Development projects aimed at improving human health, agriculture and the environment. Collaboration amongst different disciplines is the unique feature of this centre. While inaugurating the BioX Centre in May 2017, Prof VijayRaghavan, Secretary DBT, remarked that he had not seen such an example of collaborative inter-disciplinary research in any of the old IITs. IIT Mandi has also led an effort to form the BioX Consortium with IIT Ropar and PGI, Chandigarh.

Energy Centre: will focus on research and development of technology/prototype which will contribute towards achieving the goals that the Government of India has set in the National Electric Mobility Mission

Centre for Fabrication and Design of Microelectronics: a state-of-the-art 400 sqm clean room, about half of which will house Class of 100, is in the final stages of construction. It is expected to be

ready by the end of 2017 and will house about Rs. 30 crores of equipment.

IIT Mandi has active collaborations with many leading universities in Europe and North America. The strategic partnership with the **TU9 in Germany** has seen a large number of exchange visits in both directions, involving many faculty and also students. Already, over a dozen academic workshops have been held in Kamand and in Germany. The partnership is being strengthened to increase the funding for research projects.

I am pleased to note that the **Green Committee** of the Institute is working hard to ensure that the campus develops in harmony with Nature. Large numbers of trees and shrubs have been planted to more than balance the few trees felled during construction. A solid waste management program is in place, including segregation, composting and a bio-gas plant. Much of the campus is a pedestrian zone.

An Institution is only as efficient and effective as the **staff** who run the administration, the labs, the hostels, etc. While faculty and students win awards and achieve global recognition for their achievements, the staff who make this possible are the unsung heroes. I would like to record my deep appreciation for the staff who work tirelessly in this remote location to make IIT Mandi into a leading hub of research, education and innovation. Compared to older IITs, we have relatively few staff in each Section, which has not hampered their support to the growth of IIT Mandi.

On behalf of myself and the Board of Governors of IIT Mandi, I would like to record our appreciation and thanks to the Director Prof Gonsalves and his Team of the Deans and all other faculty members for their leadership, commitment, efforts and the achievements.

Last but not the least, let me turn to the **graduating students** – you entered this Institute after winning stiff competition, you have worked hard with dedication and commitment and have qualified for graduation. Today belongs to you, do celebrate the biggest milestone to date in your lives. Congratulations and best wishes for the next phase of your life in the real world where there is always some good news and some otherwise.

Let me share with you some lessons I learned and unlearned:

- The first may not be most appropriate specially today when for many of you it is the end of your days as student which is: Stay a student all your life. No set curricula, no grading or credits, no attendance. Learn from life. Make learning a life time occupation. Keep asking questions.
- 2nd is that 'credibility' is most important to succeed. Be value driven
- 3rd is the ability to change
- Remain imaginative, realist but always an optimist.
- And finally, failures are inevitable – an event and not a person to live and hound you. Learn from failures.

Once again congratulations and I wish each one of you success in your endeavours and in life.

God Bless. Thank you all.

MR. SUBODH BHARGAVA

BOARDS OF GOVERNORS

Chairperson (Nominee of the visitor)

Shri. Subodh Bhargava
Chairperson, BoG, IIT Mandi

Director (Ex-officio)

Prof. Timothy A Gonsalves
Director, IIT Mandi

Nominees of the State Government

Chief Secretary / Secretary (by designation)
Technical Education, Government of Himachal Pradesh,
Shimla - 171002

Chief Secretary / Secretary (by designation)
Higher Education, Government of Jammu & Kashmir
Srinagar-190001

Nominees of the IIT Council

Prof. S. C. Sahasrabudhe
Former Director (DAIICT)

Prof. (Mrs.) Basabi Bhaumik
Professor, Dept. of Electrical Engineering
Indian Institute of Technology Delhi

Mr. Satish K. Kaura
CMD, Samtel Group

Shri Raj Khilnani
Former Director General
Anti Corruption Bureau

Nominees of the Senate

Prof. Subrata Ray
Distinguished Visiting Professor
School of Engineering

Dr. Pradeep C. Parameswaran
Associate Professor & Associate Dean (Courses)
School of Basic Sciences

Secretary

Mr.Sushil Kumar
Registrar (Ex-Officio), IIT Mandi

DIRECTOR'S REPORT



PROFESSOR TIMOTHY A. GONSALVES
DIRECTOR, IIT MANDI

Mr. Banmali Agrawala, Chief Guest of the Convocation; Mr. Subodh Bhargava, Chairman of the Board of Governors; members of the Board of Governors; members of the Senate, distinguished guests, graduating students and their family members, my faculty and staff colleagues, dear students, invited guests, the members from the media, and, ladies and gentlemen, it is my distinct honour to welcome you all on the occasion of the 5th Convocation of the Indian Institute of Technology Mandi (IIT Mandi). Congratulations to the graduating students on their success. This marks an important milestone in your lives and I hope that your desire to learn and to apply your learning towards societal and scientific needs remains never ending.

Today, we are delighted to have with us Mr. Banmali Agrawala as the Chief Guest of the 5th Convocation of IIT Mandi. Mr. Agrawala is currently the President, Infrastructure, Defence and Aerospace of TATA Sons. Before joining the position on 1st October, 2017, he was the President and CEO for GE South Asia since February 2013. Being an expert in the energy domain, Mr. Agrawala has almost thirty years of experience across the globe. He has also held several leadership positions in the Wartsila Group and in The TATA Power Group.

Mr. Subodh Bhargava was nominated as the 2nd Chairman of the Board of Governors, IIT Mandi in January, 2017. Mr. Bhargava holds the position of Chairman of TATA Communications Ltd. He is a veteran in advising and strategic consulting to growing and/ or start-up businesses. IIT Mandi has gained significantly from his timely support and suggestions even during the short period after his appointment as the Chairman, Board of Governors. Mr. Bhargava has been a friend of IIT Mandi ever since he honoured us as the Chief Guest in our 1st Convocation on 20th October 2013.

GRADUATING RESEARCH STUDENTS

Today, 31 research scholars will be graduating with M.S. (7) or Ph.D. (24) degrees. I am delighted to mention that this is more than double the number of the previous year. Below is the list of these graduates with a short summary of their work.

Ph.D., Doctor of Philosophy

1. Navneet Singh

Ph.D. Supervisor: Dr. Bindu Radhamany

Title of the Thesis: Electronic and Structural Studies of Transition Metal Oxides

Study of fundamental issues related to (a) nanoscale phase separation and the physical properties and the origin of low temperature specific heat in the $\text{La}_{0.2}\text{Sr}_{0.8}\text{MnO}_3$ compound and (b) the link between the local structural parameters and magnetism in quasi one dimensional $\text{Sr}_3\text{NiRhO}_6$ system.

2. Pushpendra Kumar

Ph.D. Supervisor: Dr. Suman Kalyan Pal

Title of the Thesis: Energy and Electron Transfer as Probe of the Interfacial Interaction between Quantum Dot and Organic Molecule

Molecular level understanding of the photo-induced interaction between quantum dot and organic molecule by monitoring energy and electron transfer processes, which take place in the quantum dot-organic molecule interface.

3. Hemant Jalota

Ph.D. Supervisor: Dr. Manoj Thakur

Title of the Thesis: An Efficient Algorithm for Solving Portfolio Optimization Problem using Semi-Continuous Fuzzy Variable

Developed algorithms to solve portfolio optimization problems with practical constraints. Novel repair algorithms are proposed to handle all these constraints without the need of any constraint handling technique. Some new portfolio selection models are proposed.

4. Abhishek Gupta

Ph.D. Supervisor: Dr. Chayan Kanti Nandi

Title of the Thesis: Doped and Functionalized Carbon Dots for Ultrasensitive and Highly Selective Toxic Metal Ions, Biothiols and Neurotransmitter Recognition

Dealt with the easy and fast microwave assisted synthesis of nitrogen or Sulphur doped carbon dots from different biocompatible precursor molecules, its surface functionalization and finally potential applications on highly selective sensing of toxic heavy metal ions and small biomolecules in live cells.

5. Raj Kumar

Ph.D. Supervisor: Dr. Prem Felix Siril

Title of the Thesis: A novel Evaporation Assisted Solvent Antisolvent Interaction Method for the Nanocrystallization of Organic Compounds

Developed a novel evaporation assisted solvent antisolvent interaction (EASAI) method. The applicability was established by successfully preparing nanoparticles of some high energetic compounds and many pharmaceutical drugs with average particle size well below 100 nm.

6. Sunil Kumar

Ph.D. Supervisor: Dr. Subrata Ghosh

Title of the Thesis: Understanding the Structure-optical property Relationship in New Organic Materials: Design, Synthesis and OLED applications

Developed a molecular design strategy to develop dual state emitters and electron donor and acceptor units for deep blue emitters. A mechanistic theory was developed. For the first time a wing flapping type behaviour of phenothiazine ring was observed and reported.

7. Manisha Devi

Ph.D. Supervisor: Dr. Pradeep Parameswaran

Title of the Thesis: Development of New Fluorescent Chemosensors for Various Analytes and Their Evaluation as Molecular Logic Gates

A series of fluorescent chemosensors was developed for the detection of various metal ions (Zn^{2+} , Pb^{2+} and Au^{3+}), anions (CH_3COO^- and F^-), water as well as pH. The photophysical and binding properties of these new fluorescent chemosensors have been explored in detail.

8. Lakshmanan SA

Ph.D. Supervisor: Dr. Bharat Singh Rajpurohit and Dr. Amit Jain (Co-Guide)

Title of the Thesis: Design & Performance Analysis of Grid Connected Solar PV System

Designed the control of grid connected solar PV system to meet the improved dynamic performance by grid connected SPV system, effective grid synchronization and power quality (PQ) improvement.

9. Reena Sharma

Ph.D. Supervisor: Dr. P.C. Ravikumar and Dr. Aditi Halder (Co-guide)

Title of the Thesis: Phytochemical Investigation of Roylea cinerea and its Applications.

Carried out extraction, isolation, characterization and structural elucidation of natural products from

aerial part of *Roylea cinerea*, a medium sized shrub widespread in parts of the Himalaya. Isolated new labdane diterpenoids from different solvent extracts of aerial part of this plant.

10. Rajeev Kumar

Ph.D. Supervisor: Dr. Bharat Singh Rajpurohit

Title of the Thesis: Design and Analysis of Multi-Terminal DC Microgrid.

The thesis deals with the research work carried out for the design, management, protection and analysis of DC micro-grid.

11. Darsi Rambabu

Ph.D. Supervisor: Dr. Abhimanew Dhir and Dr. Pradeep Parmeswaran (Co-guide)

Title of the Thesis: Metal Organic Materials (MOMs) for Environmental, Biological and Catalytic Applications

Design and synthesis of new fluorescent hybrid material for recognition of various environmentally significant anions and molecules like sulfate ion, azo dyes. And materials for degradation of environmental pollutants like p-nitro phenol.

12. Shilpa Sharma

Ph.D. Supervisor: Dr. Pradeep Parameshwaran and Dr. Abhimanew Dhir (Co-Guide)

Title of the Thesis: Synthesis and Photo-physical Properties of Carbazole and Benzimidazole Based Fluorescent Derivatives

Sensing of environmentally and biologically significant ions and molecules by use of AIEE active materials. It was aimed at efficient detection of analytes with our hosts in biological medium like blood serum and cells.

13. Swati Tyagi

Ph.D. Supervisor: Dr. Syed Abbas

Title of the Thesis: Analysis of Neural Network Models of Integer and Non-Integer Order

An investigation of more interesting dynamics in various generalized models of artificial delayed neural networks of both integer order and fractional order to provides insight into the detailed stability analysis of the various delayed models.

14. Yashwant Kashyap

Ph.D. Supervisor: Dr. Anil K Sao

Title of the Thesis: Solar Radiation Assessment and Forecasting Over India in the Presence of Dust and Fog Activity

Estimation and forecasting of solar radiation availability and variability over India based on satellite-derived data and statistical tools. The results are further improved by tracking weather disturbances using satellite images during the presence of dust, fog and clouds.

15. Pankaj Gaur

Ph.D. Supervisor: Dr. Subrata Ghosh

Title of the Thesis: Structurally Engineered Biocompatible Molecular Probes for Live cell-imaging and Localization of Native DNA

The molecular probes with a tailored donor-acceptor conjugated (D- π -A and D- π -A- π -D pull-push systems) molecular architecture have been devised and synthesized to achieve the DNA selectivity and admirable biophysical properties.

16. Srimanta Mandal

Ph.D. Supervisor: Dr. Anil K Sao

Title of the Thesis: Novel Approaches for Super Resolution of Intensity/Range Image Using Sparse Representation

Proposed several novel approaches such as an edge-preserving constraint, employing structural as well as statistical information of patches for learning/selection of dictionary in the framework of sparse representation.

17. Gurinderbir Singh Grewal

Ph.D. Supervisor: Dr. Bharat Singh Rajpurohit

Title of the Thesis: Innovation in Energy Management of Induction Machine Based Industrial Plants

A non-intrusive modified air-gap torque method for experimental estimation of efficiency of induction machine in unbalanced industrial conditions. A low cost, non-intrusive handheld device using PIC microcontroller is fabricated for efficiency estimation in real-time.

18. Reena Singh

PhD Supervisor: Dr. Timothy A. Gonsalves

Title of the Thesis: An Access Control Perspective to Sharing Data In A Federation

Addressed control of access to large volumes of low-value data held by a federation of organisations. The proposed mechanisms work even in the face of intermittent network connections between the organisations.

19. Pravindra Kumar

PhD Supervisor: Dr. Satyajit Thakur

Title of the Thesis: Performance Improvement in Orthogonal Frequency Division Multiplexed Based Optical Communication Systems

Studied the OFDM-PON and OFDM-FSO transmission systems and proposes design solutions to obtain improved performance in terms of bit error rate, receiver sensitivity, link length, spectral efficiency, transmission capacity and maximum achievable rate.

20. Sachin Kumar

PhD Supervisor: Dr. P. Anil Kishan

Title of the Thesis: Design of Thermal Protection System for Reusable Hypersonic Vehicle Using Inverse Approach

Used passive method to modify the flow field in order to reduce the drag and heat transfer to the Reusable Hypersonic Vehicle. Based on his study with a one-dimensional heat transfer model, he designed a light weight passive Thermal Protection System for Reusable Hypersonic Vehicle.

21. Rajan Kumar

PhD Supervisor: Dr. Shripad Mahulikar (Guide) and Dr. Syed Abbas (Co-guide)

Title of the Thesis: Study of Laminar Micro-convective Flow With Variable Fluid Properties

Studied the effects of variable fluid (liquid and gas) of physical properties (density, dynamic viscosity, thermal conductivity, and specific heat at constant pressure) on laminar micro-convective flow through numerical analysis.

22. Robin Khosla

PhD Supervisor: Dr. Satinder Kumar Sharma

Title of the Thesis: Alternate High-k Dielectrics for Next-Generation CMOS Logic and Memory Technology

Investigated the performance, reliability, and lifetime of alternate high- κ dielectrics by non-destructive nanoscopic and microscopic techniques for CMOS logic, embedded read-only memories and ferroelectric non-volatile memory applications.

23. Renu Choudhury

PhD Supervisor: Dr. Arti Kashyap

Title of the Thesis: Magnetism and Magnetoelectric Effect in Thin Films and Bilayers of Chromia

Worked on metal-oxides especially, Cr₂O₃ (Chromia) at the nanoscale and its bilayers with Graphene

and Cobalt. Graphene-Chromia based Spin-FET and Cobal-Chromia based MERAM are proposed devices and studied theoretically at an atomic level.

24. Himmat Singh Kushwaha

Ph.D. Supervisor: Dr. Rahul Vaish

Title of the Thesis: Photocatalytic and Electrocatalytic Investigations on Perovskite-based Catalysts for Energy and Environmental Applications

The aim is to design, realization, functional testing and characterization of double perovskite, $\text{CaCu}_3\text{Ti}_4\text{O}_{12}$ catalyst and in particular their use for energy and environment related applications.

MS (by Research)

1. Tulika Agarwal

MS Thesis Supervisor: Dr. Samar Agnihotri

Title of the thesis: Secure Analog Network Coding in the Presence of a Single Eavesdropper

Addresses two fundamental open problems in Information Theory, namely, relay channel capacity characterization and relay channel secrecy capacity characterization in the presence of adversaries and provides an efficient approach to compute tighter capacity lower-bounds.

2. Munender Kumar

MS Thesis Supervisor: Dr. Renu MRameshan

Title of the thesis: Independent Subspace Analysis for Activity Recognition and fine-grained Classification

Independent subspace analysis aids data representations which are invariant to certain transformations. A parallel version of ISA is designed for activity recognition in videos. Also, a data set for human water activities was created.

3. Vishal Goel

MS Thesis Supervisor: Dr. B. D. Chaudhary and Dr. Sriram Kailasam (Co-guide)

Title of the thesis: A Stream-Based Scalable Approach for Formal Concept Analysis

This thesis proposes a distributed stream-based approach that not only addresses skew but also exploits properties of input data to speedup concept discovery.

4. Kartik Gupta

MS Thesis Supervisor: Dr. Arnav Bhavsar

Title of the thesis: Human Action Analysis: Novel Methods and Perspectives

Experimental analysis of important problems related to human action analysis such as action recognition and temporal action segmentation from depth videos. Analysis of hand grasp and motion attributes for classification of object manipulation actions.

5. Shah Vishrut Sunil

MS Thesis Supervisor: Dr. Mohammad Talha and Dr. Rajeev Kumar (Co-Guide)

Title of the thesis: Numerical and Experimental Study of Bistable Piezoelectric Energy Harvester

In this research a Bistable Piezoelectric Energy Harvester has been proposed. To harvest the energy over the wide frequency range of environmental vibrations, nonlinearity is introduced in the stiffness by mean of two neodymium magnets.

6. Gaurav Chetal

MS Thesis Supervisor: Dr. Tulika Srivastava

Title of the thesis: Quality Control Approaches for Metagenomic Data Analysis

Analysis of the quality filtering measures in genomic and metagenomic datasets.

7. Asuthosh

MS Thesis Supervisor: Dr. Sudhir Pandey

Title of the thesis: Design and Fabrication of Fully Automated Experimental Setups for Characterization of Thermoelectric Materials

Fabrication of low cost experimental setups for measuring the high temperature Seebeck coefficient and thermal conductivity of various materials.

UNIQUE CURRICULUM AND 5 WEEK INDUCTION PROGRAMME

Our B.Tech. curriculum has been designed to produce design engineers and technology-savvy leaders for the future development of India. There is a special focus on real-world team projects throughout. To prepare new B.Tech. students for this curriculum and for them to thrive in the unique ambience of this IIT, a 5-Week Induction Programme (5WIP) has been designed for the 1st year B.Tech. The 2nd edition of the 5WIP, conducted during August 2017, was designed to encourage students to 'learn how to learn', to be inquisitive and explorative as future engineers, to see themselves as a part of the society, and to motivate them to attain a strong physical and mental health. The Modules were developed to instill Engineering Skills, Life Skills, Life Essentials as well as Life Enhancement Skills and Inspiring Activities. A schematic representation of the modules under each scheme is given below:



The batch of B.Tech. 2017 was split into 8 groups of 17-20 students each. Each group was led through interactive sessions by faculty mentors. This led to every student making several close friends from diverse backgrounds during their very first days at IIT Mandi. It led to every student getting to know 5-10 faculty well, and at least 1 faculty whom s/he feels comfortable approaching for any personal issue. In the process, each faculty also got to know at least 17-20 students very well.

This mentorship model is expected to serve as one of the most important resources in the residential campus of IIT Mandi. IIT Mandi is the first among all IITs to carry out such an intensive induction programme fully mentored by a large fraction of the faculty members.

ACADEMIC ACTIVITIES

In 2017, 147 B.Tech. students, 55 M.Sc. students and 64 M.Tech students have admitted to various programmes in IIT Mandi. We now have a total of 997 students including 273 Ph.D./MS research scholars. Programme and branch-wise distribution of the students are as follows:

B.Tech	Civil 70	CSE 204	EE 142	ME 128	Total 544
M.Sc.	Chemistry 50	Physics 17	Mathematics 27		94
M.Tech	SCEE 42	SE 26	SBS 18		86
MS by Research					34
Ph.D.					239

With our commitment to gender diversity and equality for women in all aspects, IIT Mandi made a special effort this year to increase the proportion of women students in B.Tech. I am pleased to inform you that we were successful in attracting 22 aspiring young women engineers, up from 6 last year. This achievement was thanks to the efforts of a large team of women faculty, students and alumni led by our GCS Head, Lishma Anand.

The new academic programmes started in 2017:

- *M.Sc. Physics*
- *M.Tech. in Power Electronics and Drivers*
- *M.Tech in Communications and Signal Processing*

IIT Mandi aims to make its mark by encouraging collaborative research by groups of faculty working in well-funded Research Centres. The new research centres started in 2017:

- *The BioX Centre*: This 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. With a critical mass of over 20 faculty from diverse disciplines, the formal structure of the BioX Centre was approved in December 2016 and the BioX Centre building was inaugurated on May 13, 2017. Some of the major research facilities in place at the Centre are – cell culture facility, tissue culture lab,

fluorescence microscopy, next-generation genome sequencing, bioreactors, flow cytometer, and stop flow for protein studies.

Publications

IIT Mandi researchers published 118 peer-reviewed articles during the academic year 2016-17. The total number of peer reviewed publications from the institute in National and International Journals is 979 (upto March, 2017).

Life after IIT

The Career and Placement Cell took significant initiatives to conduct a number of career sessions throughout the year to make 1st and 2nd B.Tech students aware of the many options open to them. These included sessions by inspiring academicians, motivation towards startups by successful entrepreneurs, lectures by civil servants, in addition to the usual corporate pre-placement talks. In the placement season, more than 83% companies that visited were core companies. Branch-wise placement ratios were 89% in CS, 82% in ME and 76% in EE. Besides, 1 MS (Energy Material), 2 M.Tech., (Energy) and 4 Ph.D. students got placed. The Medal winners of this batch have chosen diverse fields after their B.Tech. Samriddhi Jain, who will be awarded the President of India Gold Medal, is currently working as a Software Development Engineer at Microsoft India Development Center, Hyderabad. Shivangi Kataria, who will be awarded the Institute Silver Medal and Rani Gonsalves Memorial Medal, has opted to pursue higher studies. She is currently enrolled in the Masters programme in Material Sciences and Engineering at Boston University, USA.

Major Academic Achievements

- Dr. Rahul Shrestha and Dr. Shubhajit Roy Chowdhury (SCEE) received the Best Poster award at IEEE INDICON in December, 2016.
- Dr. Shubhajit Roy Chowdhury (SCEE) received the IAAM Young Scientist Medal in 2017 from the International Association for Advanced Materials at the European Sensors and Actuators Summit at Stockholm, Sweden.
- Rajeev Kumar Chauhan (graduating Ph.D.) won the POSOCO Power System Award (PPSA-2017) in March 2017 and the 2nd Prize (Category ENERGY), in IAS CMD Humanitarian Project Contest, 2017.
- Adil Usman (Student) became the first member from India to be a part of the Electrical Machinery Committee (EMC), IEEE Power & Energy Society, 2017-2018. He is also the first student from an IIT to be an Associate Member of the Institute for Defense Studies and Analyses, Ministry of Defense, 2015-2020.

- Abhishek Kumar Gupta (graduating Ph.D.) received the prestigious Newton International Fellowship to pursue his post-doctoral research in UK. He will be working on 'Thermally Activated Delayed Fluorescence Materials for Displays and Photodynamic Therapy' at University of St. Andrews, UK.
- Dr. Rajnish Giri (SBS) has been selected as an Associate, Indian Academy of Sciences and an Editorial Board Member of Scientific Reports (Nature Publishing Group).
- Dr. Varun Dutt (SCEE and SHSS) has been selected as the Editor of special issue on Application of Cognitive Approaches to Cyber Security in the journal “Frontiers in Cognitive Science” in June 2017.
- A project proposal on “A Deep Field Legacy Database” by Ayush Yadav (graduating BTech Student) received funding of \$25,860 from the Space Telescope Science Institute, operated for NASA in the Johns Hopkins University.
- Anshul Thakur (Ph.D. student), Jyothi Jain, Padmanabhan Rajan and A.D. Dileep (both Faculty, SCEE) of the MAS Group won the Judge's Award in the Bird Audio Detection Challenge, conducted by the Machine Listening Lab of Queen Mary University, London in February, 2017.
- Deepak Kumar (Graduating student -M.Sc. (Chemistry)) received Erasmus Mundus Fellowship to join a second Masters programme in Theoretical and Computational Chemistry at the University of Valencia, Spain.

INTERNATIONAL LINKAGES

IIT Mandi is a part of the international academic community and thus believes in exchange of knowledge across national boundaries. International students can pursue graduate full time degree programs at IIT Mandi. Bachelor's, Master's and Ph.D. students affiliated to institutes in other countries can also spend up to a year at IIT Mandi under existing student exchange programme with academic credit transfer. During the past year, IIT Mandi hosted a number of international students, researchers, and faculty. A summary is provided below.

- Zipporah Wanjiku Muthui visited IIT Mandi from University of Nairobi, Kenya between January-April, 2017 for her Ph.D. thesis work.
- Christian Schürings from the University of Koblenz-Landau, Germany visited IIT Mandi for internship between May-July, 2017.
- Justus Wolf from TU Munich visited IIT Mandi under DAAD RISE program between August-September, 2017.
- Katharina Mengel from RWTH Aachen is visiting IIT Mandi between August, 2017 and

March, 2018 under the student-exchange program.

- Simon Riedle and Lennart Schurmann from TU Munich are visiting IIT Mandi between August, 2017 and January, 2018 under the student-exchange program.
- A team of 24 undergraduate students from WPI, USA and two WPI faculty mentors visited IIT Mandi between March-May, 2017 to participate in our ISTP along with our 3rd BTech students.

In the last year, 11 IIT Mandi students visited university partners abroad. These included:

- 3 students visited Blekinge Institute of Technology, Sweden
- 2 students visited TU, Munich, Germany
- 4 students visited RWTH Aachen, Germany;
- 2 students visited Aalto University, Finland.

A large number of IIT Mandi's faculty members also visited institutions in Europe, North America, Australia, South Asia, and Latin America in 2016-17 for attending conferences and for industry and academic collaborations. A number of IIT Mandi's faculty also visited TU9 institutions in Germany in 2017 under the BMBF-IIT Mandi faculty exchange program.

There were a number of meetings and events conducted at IIT Mandi involving visitors from universities abroad. These include the following:

- IIT Mandi hosted researchers from various universities in the UK and India for a workshop on Nanomaterials for energy, health and sustainability from 3rd to 6th of October 2016. The workshop was a collaborative effort between IIT Mandi and the University of Nottingham, UK. Dr. Graham Newton from the University of Nottingham coordinated the workshop.
- Prof. Alan Mickelson of the University of Colorado (Boulder, USA) was the Chief Guest at our 8th Foundation Day on 24 February, 2017.
- Dr. Atul Singh Minhas, University of Liverpool, UK participated in the First workshop on IoT systems organized by the School of Computing and Electrical Engineering (SCEE), IIT Mandi, on 6th March, 2017.
- Massachusetts Institute of Technology (MIT), USA joined hands with IIT Mandi and IIT Delhi to conduct a 10-day social innovation boot camp at IIT Mandi. About 50 students of several IITs and engineering colleges across India, along with students from Australia, ASB Malaysia, and MIT, USA participated in this workshop.
- A short term course and a workshop on Adaptronics was inaugurated at IIT Mandi on September 20, 2017. Prof. Michael Sinapius, TU-Braunschweig and the German Aerospace Centre Braunschweig was a key speaker.

In May 2017, the existing MoU between TU Munich and IIT Mandi was renewed for the next three years. IIT Mandi signed an MoU with the Abdus Salam International Centre for Theoretical Physics (ICTP), Italy in March, 2017 for academic and research cooperation for the next three years.

SPONSORED RESEARCH AND INDUSTRY INTERACTIONS

This year marked a significant increase in the number of sponsored research projects and total funding. The total number of projects sanctioned till date is 162 with a total sanctioned amount of Rs. 60+ crores. A project titled “Sustainable waste water treatment through bio-photoelectro catalysis and bio production” worth Rs. 3.84 Crore has been sanctioned by MHRD-IMPRINT. Led by Dr. Atul Dhar, the project involves faculty from the School of Engineering and the School of Basic Sciences.

Recently, we had a review of 4 projects funded by SCL, Mohali. SCL currently imports all the 35 chemicals used in the fab line for space, defence, railways and other strategic applications. IIT Mandi faculty under these projects have developed 11 chemicals to replace these imports. Preliminary scientific evaluation by SCL indicates that the IIT Mandi formulations outperform the imports in almost all respects and at a much lower price! The team is now exploring options for commercialisation for sale to SCL, and other fabs in India and abroad. Faculty from the School of Basic Sciences and the School of Engineering led by Prof. Ken Gonsalves and Dr. Subrata Ghosh are involved.

BUSINESS INCUBATION

IIT Mandi Catalyst, a Technology Business Incubator (TBI), was launched in May 2016 with an aim to foster entrepreneurship to spawn knowledge-intensive initiatives that would develop innovations useful to the society as a whole. Catalyst is currently supporting commercial and social impact ventures in domains that include Agro-tech, Clean Energy, IT, IOT, Tourism, and Healthcare. Since Jan 2017, Catalyst has received over 100 applications from students/faculty of IIT Mandi and budding entrepreneurs from outside. The current portfolio includes 8 teams. Noteworthy is The Solar Labs, founded by graduating students Siddharth Gangal, Ankush Jindal and Mudit Sahai, who gave up lucrative job offers to pursue their dream in our incubation space. Siddharth Gangal will also be awarded with the Balasundaram Endowment Prize for German in this convocation. Catalyst is funded by DST (5 Crores), IIT Mandi (8 Crores), Vishal Bharat Comnet (10 Lakhs) and HP Government (30 Lakhs).

Catalyst is working with EWOK – Enabling Women in Kamand. Started by several women faculty, EWOK is fostering village-scale businesses by village women. Run by Sandhya Menon, EWOK is incubating about 9 businesses that blend traditional skills with modern technology. EWOK has received Rs. 30 lakhs funding from the HP Government, besides generous donations from alumni and

well-wishers.

CAMPUS DEVELOPMENT

IIT Mandi has witnessed significant growth during the past year in terms of construction activities, mostly in the North Campus. We have added accommodation for about 350 students and 70 families. In the South Campus, about 2,500 sqm of academic space, an indoor Sports Complex and an open air theatre have been completed. Construction of the balance of Phase 1 is in full swing. The Architect/Design Consultant is in the process of completing the planning/designing for an additional 48,000 sqm in Phase 1X. Construction of Phase 1X is likely to be completed by July, 2019.

With the formation of the Green Committee, headed by Dr. B. Viswanathan, the dusty brown of an under-construction campus, is rapidly giving way to lush green walkways, gardens and playing fields. The Green Committee is actively implementing eco-friendly solid waste management and low-energy transport (on foot, by bicycle, electric vehicles and shared vehicles).

EXTRACURRICULAR ACTIVITIES

IIT Mandi encourages students to initiate and participate in various sports and other physical activities and cultural as well as technical events beyond the curriculum. Some of the achievements during the past year:

- IIT Mandi 3rd B.Tech. student Nitesh Kumar won the Gold Medal (MS SL3) for India at FZ Forza Irish Para-Badminton International, 2017. The tournament was held in the National stadium at Dublin, Ireland from 22 to 25th June 2017.
- In the Inter IIT Tech Meet, held in IIT Kanpur, during March, 2017, IIT Mandi ranked 4th in overall championship. The 'Stock Market Analysis' team comprising of Priyansh Saxena, Siddhant Kumar, Abhigyan Khaund and Neha Muthiyan bagged first place.
- Another achievement was the successful organization of TEDx IITMandi on 14th May, 2017. With the help of IIT Mandi faculty, a team of students led by Vivek Sharma and Sagar Ghai from the B.Tech. graduating batch organized the event for the first time at IIT Mandi despite numerous hurdles. In fact, Vivek Sharma will be awarded the Director's Gold Medal for his all-round performance at the institute.
- Three of the projects under AVISHKAR-2017, the intra-college tech fest, were selected for presentation in the 6th International Conference on Engineering and Technology, Science and

Management Innovation (ICETSMI-2017) held in Delhi in 2017 and the students participated in the same.

Regular co-curricular events, such as EXODIA, the annual tech-cult fest of IIT Mandi, VIBGYOR, the art festival, ANUSANDHAN, the research fair, AAGAZ, the annual inter-year sports tournament, Rann Neeti, the annual inter-college sports were organized. The Hiking and Trekking Club organised treks to Dalhousie, Shimla and other places in Himachal. Apart from these, this year witnessed several interesting activities to boost the innovative and intellectual activities and skills of students. Some of these events include ***Innovation Challenge*** (a competition on Website/App Design on Paper based on a problem given on the spot), ***Ideathon*** (think of an idea related to “Digitization in India” in 6 hours), ***Crowdfund*** (a competition, in which participants were given a chance to sell a product to the audience with a fixed amount of virtual money). The ACM Chapter of IIT Mandi organized a special talk on the topic “Software Engineering in Science”.

CONCLUSIONS

After 8 years of hard work and dedication despite inconveniences on every front, IIT Mandi is finally enjoying the luxury of our well-developed, fully residential South Campus in Kamand. The North Campus is developing rapidly and already is home to nearly 300 students and close to 50 families. The graduating students are among the last to have studied through the turbulent years of our infancy. Many of you had an almost nomadic life from Mandi to Kamand. I am sure that the experience of thriving despite the odds will stand you in good stead in your life after IIT. In this regard, IIT Mandi is a microcosm of India: a young democracy with a few world-class achievements, with great hope and andations, and the will to succeed through thick and thin.

SCHOOLS

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

School of Computing and Electrical Engineering

This School brings together faculty involved in the key technologies of the Information Age. These include computer science, communication, VLSI and microelectronics, and electrical energy. The underlying fundamental principles are information theory, theory of computation, communication theory, quantum mechanics and the laws of electromagnetism.

Faculty members and their specialization

Dr. Bharat Singh Rajpurohit (Chairperson; Associate Professor; Image processing)

Dr. Ankush Bag (Assistant Professor; Semiconductor Devices, Epitaxy and Compound Semiconductors)

Dr. Aditya Nigam (Assistant Professor; Biometrics, Computer Vision, Image Processing)

Dr. Anil K. Sao (Associate Professor; Image processing)

Dr. Arnav Bhavsar (Assistant Professor; Image analysis, Computer vision)

Dr. Arti Kashyap (Associate Professor (Joint Appointment); Magnetism and magnetic materials)

Dr. Astrid Kiehn (Visiting Associate Professor; Distributed Algorithms, Verification, Theoretical Computer Science)

Prof. B. D. Chaudhary (Emeritus Professor; Software Technology)

Dr. Bhakti Madhav Joshi (Assistant Professor; Ac drives and control)

Prof. Deepak Khemani (Professor on deputation from IIT Madras, Artificial Intelligence)

Dr. Dileep A. D. (Assistant Professor; Pattern Recognition, Kernel Methods for Pattern Analysis, Machine Learning, Speech Technology, Computer Vision)

Prof. Enakshi Bhattacharya (Professor (on deputation from IIT Madras), MEMS processing and sensors)

Dr. Gopi Srikanth Reddy (Asst. Professor, Communications: Antennas and Wave Propagation, RF and Microwave Passive component Design)

Dr. Hitesh Shrimali (Assistant Professor; Analog and Mixed signal VLSI design, analog-to-digital converters and design of radiation hard circuits (space application))

Dr. Kailash Srivatava (Visiting Professor; Power systems)

Dr. Kunal Ghosh (Assistant Professor; Solar Photovoltaics)

Dr. Narendra Karmarkar (Visiting Distinguished Professor)

Dr. Narsa Reddy Tummuru (Assistant Professor; Hybrid Energy Storage Applications in Future Microgrids, Efficient Power Electronic Interfaces in Renewable Energy Applications and Smartgrid Communication Networks)

Dr. Padmanabhan Rajan (Assistant Professor; Speech processing, speaker recognition)

Dr. Pooja Vyavahare (DST INSPIRE Faculty Fellow; Distributed Computation, Network Analysis, Algorithm Design)

Dr. Rahul Shrestha (Asst. Professor, Specialization: VLSI Design and Circuits & Systems for Signal Processing and Wireless Communication)

Dr. Rajinikumar Ramalingam (Asst. Professor, Sensor, Cryo Instrumentation and measurements, Characterization of Superconductors and electronic devices at cryogenic temperatures, Fiber optic sensing, Optical cooling methods.)

Dr. Ramesh Oruganti (Emeritus Professor; Power Electronics, Solar photovoltaic energy systems)

Dr. Renu M. Rameshan (Assistant Professor; Image Processing)

Dr. Samar Agnihotri (Assistant Professor; Information Theory, Wireless Communications)

Dr. Satinder Kumar Sharma(Associate Professor; nanoelectronics, Sensors, Photovoltaic & self assembly)

Dr. Satyajit Thakor(Assistant Professor; Communication Theory, information Theory, Network Coding)

Dr. Shubhajit Roy Chowdhury (Assistant Professor; Biomedical Embedded Systems, Non invasive diagnostic systems, Near Infrared Spectroscopy, VLSI Architectures)

Dr. Siddhartha Sharma (Assistant Professor, Resource allocation in Wireless Networks, Wireless Energy Harvesting and Crowd sensing)

Dr. Srikant Srinivasan (Assistant Professor, Big-Data acquisition and analysis, Nanoelectronics, Spintronics)

Dr. Sriram Kailasam (Assistant Professor; Distributed Systems (Cloud Computing)

Dr. Subashish Datta (Assistant Professor; Control Theory)

Prof. Timothy A. Gonsalves (Professor; Computer networks and distributed software systems)

Dr. Tushar Jain (Assistant Professor; Control theory, fault tolerant control, industrial process control)

Dr. Varun Dutt (Assistant Professor (Joint Appointment);Artificial intelligence, Human-Computer Interaction, Judgment and Decision)

Prof. Yvonne Dittrich(Adjunct Professor; Software Development and Software Engineering)

School of Basic Sciences

This School includes Mathematics, Physics, Chemistry and Life-Sciences. While some faculty may work in pure research, others work on applied research in collaboration with colleagues in the Engineering Schools.

Faculty members and their specialization

Dr. Prasanth P. Jose (Chairperson; Assistant Professor; Soft Condensed Matter Physics)

Dr. Subrata Ghosh (Associate Professor; Organic Chemistry)

Dr. Suman Kalyan Pal (Associate Professor; Fast and Ultrafast Laser Spectroscopy)

Dr. Aditi Halder (Assistant Professor; Design and Development of New Functional Nanomaterials for the Application of Renewable Energy, Nano-Electronics and Sensors)

Dr. Abhimanew Dhir (DST INSPIRE Faculty Fellow; Supramolecular Chemistry)

Dr. Ajay Soni (Assistant Professor; Nanomaterials and Experimental Condense Matter Physics)

Dr. Amit Jaiswal (Assistant Professor; Nano-Biotechnology)

Dr. Amit Prasad (Assistant Professor; Immunology/Microbiology)

Dr. Aniruddha Chakraborty (Associate Professor; Theoretical Chemistry)

Dr. Arti Kashyap (Associate Professor; Magnetism and Magnetic Materials)

Dr. Bindu Radhamay (Assistant professor; X-ray spectroscopy)

Dr. C. S. Yadav (Assistant Professor; Low Temperature Physics)

Dr. Chayan K. Nandi (Associate Professor; Physical Chemistry)

Dr. Hari Varma (Assistant Professor; Atomic and Molecular Physics)

Dr. Kaustav Mukherjee (Assistant Professor; Experimental Condensed Matter Physics)

Prof. Kenneth Gonsalves (Visiting Distinguished Professor; Materials Synthesis)

Dr. Manoj Thakur (Assistant Professor; Optimization, Soft Computing, Machine Learning with applications to Computational Finance, Protein Function and Structural Analysis)

Dr. Muslim Malik (Assistant Professor; Differential Equations)

Dr. Nitu Kumari (Assistant Professor; Applied Mathematics)

Dr. Neha Garg (DST INSPIRE Faculty Fellow; Cancer Biology, Stem Cells)

Dr. Pradeep Kumar (Visiting Assistant Professor; Raman and Infrared Spectroscopy)

Dr. Pradeep Parameswaran (Associate Professor; Inorganic, Materials, Nano-Chemistry)

Dr. Pradyumna Kumar Pathak (Assistant Professor; Quantum Optics, Quantum Information and Nanophotonics)

Dr. Prem Felix Siril (Associate Professor; Chemistry of Nanomaterials)

Dr. Prosenjit Mondal (Assistant Professor; Molecular Endocrinology and Metabolism)

Dr. Rajanish Giri (Assistant Professor; Biophysics and Protein Folding, Intrinsically Disordered Proteins, Chimeric Antigen Receptor based Cancer Immunotherapy, Protein Engineering)

Dr. Rajendra K. Ray (Assistant Professor; Computational Fluid Dynamics, Numerical Methods for PDEs)

Dr. Sarita Azad (Assistant Professor; Statistical Time Series Analysis)

Dr. Sweta Tripathi (Ramalingaswami Faculty Fellow; Virology, Innate Immunity, Cancer Biology)

Dr. Shyam Kumar Masakapalli (Assistant Professor; Metabolic Systems Biology – Fluxomics and Metabolomics, Plant and Microbial Metabolism, NMR and GC-MS)

Dr. Syed Abbas (Assistant Professor; Differential Equations and Ecological Modelling)

Dr. Tulika Prakash Srivastava (Assistant Professor; Bioinformatics, Systems Biology, Metagenomics, Comparative Genomics, Protein Function, and Structural Analysis)

Dr. Venkata Krishnan (Assistant Professor; Materials Chemistry, X-ray Science)

School of Engineering

This School covers tangible physical structures and artifacts such as transport vehicles, transport systems, machines, materials, manufacturing, designs etc. The underlying principles are classical mechanics, atomic physics, and thermodynamics. Many faculties from the traditional departments of Mechanical, Civil, Aerospace, and Metallurgy Engineering are a part of this School.

Faculty members and their specialization

Dr. Rajeev Kumar (Chairperson; Associate Professor; Solid Mechanics, Vibration, FEM, Optimization)

Dr. Rahul Vaish (Associate Professor; Glasses & Glass-ceramics)

Dr. Atul Dhar (Assistant Professor; Alternative Fuels & Emission Control)

Dr. Arpan Gupta (Assistant Professor; Acoustics, Vibration, Bio-mechanics, Computational methods - FEM, CFD, Lattice Boltzmann Method)

Dr. Deepak Swami (Assistant Professor; Groundwater Flow and Transport Modelling, Water Resources Development and Management, Disaster Mitigation specially related to Floods and Flash flood)

Dr. Dericks Praise Shukla (Assistant Professor; Remote Sensing & GIS, Hydro-geo-chemistry, Water contamination mostly as and other Heavy metals, Natural Hazards Assessment and Mapping)

Dr. Dhiraj V. Patil (Assistant Professor; Lattice-Boltzmann Method, Multi-physics, Multiphase Flows and Complex Fluids Rheology)

Dr. Gaurav Bhutani (Assistant Professor; Fluid and thermal sciences)

Dr. Himanshu Pathak (Assistant Professor; Extended Finite Element Method, Meshfree Methods, Fracture Mechanics and Functionally Graded Materials)

Dr. Jaspreet Kaur Randhawa (Assistant Professor; Nanomaterials)

Dr. Kasiviswanathan K S (Assistant Professor; Water Resources Engineering)

Dr. Kaustav Sarkar (Assistant Professor; Durability Design of Concrete, Sustainable Concrete Production, Finite-Element Analysis, Soft-computing)

Dr. P. Anil Kishan (Assistant Professor; Computational Fluid Dynamics)

Dr. Maheshreddy Gade (Assistant Professor; Earthquake Engineering and Engineering Seismology)

Dr. Mousumi Mukherjee (Assistant Professor; Geotechnical Engineering)

Dr. Mohammad Talha (Assistant Professor; Solid Mechanics, Composite Structures, Functionally Graded Materials, Structural Mechanics)

Dr. Pradeep Kumar (Assistant Professor; Fluid and Thermal Science)

Dr. Rajesh Ghosh (Assistant Professor; Solid Mechanics, Biomechanics, Finite Element Analysis)

Dr. Rajneesh Sharma (Assistant Professor; Image based Finite element Methods, Cohesive Zone Modeling, Insitu Characterization of Fracture Process, Homogenization and Multiscale Modeling, Analysis and Design of Composites under Extreme Loading Environments)

Dr. Rik Rani Koner (Assistant Professor; Hybrid Material)

Dr. Sandip Saha (Assistant Professor; Earthquake Engineering)

Dr. Satvasheel Powar (Assistant Professor; Dye-sensitized Solar Cells, Perovskite Solar Cells)

Dr. Subrata Ray (Distinguished Visiting Professor; Physical metallurgy, Composites and Tribology)

Dr. Subhamoy Sen (Assistant Professor; Structural Engineering)

Dr. Sudhir Kumar Pandey (Assistant Professor; Condensed Matter Physics & Material Science)

Dr. Sumit Sinha Ray (Assistant Professor; Filtration and Separation, Heat Transfer, Energy Storage)

Dr. Sunny Zafar (Assistant Professor; Microwave Material Processing, Surface Engineering, Experimental Tribology and Advanced Welding and Manufacturing Processes)

Dr. Venkata Uday Kala (Assistant Professor; Geotechnical Engineering)

Dr. Viswanath Balakrishnan (Assistant Professor; Growth of Functional Materials/Thin Films, Electron Microscopy & in-situ Exploration of structure-property Relationships)

Dr. Vishal Singh Chauhan (Assistant Professor; Design Engineering, Electromagnetic Radiation during Deformation of metals and alloys, Solid Mechanics, FEM)

School of Humanities and Social Sciences

Modern engineers work in teams to create, improve and apply technology for the good of society. A good understanding of language, culture, sociology, economics, management, ecology, etc. is essential for the well-rounded engineer and development of technologies, products and processes that will see widespread use. This School is thus an important part of IIT Mandi.

Faculty members and their specialization

Dr. Rajeshwari Dutt (Chairperson; Assistant Professor; Latin America, Social and Cultural History, Indigenous studies)

Dr. Aruna Bommareddi (Assistant Professor; Comparative Literature, Indian Literatures in English)

Dr. Ashok Kumar M (Assistant Professor; Sociology of Religion, Caste and Christianity)

Prof. Bhavender Paul (Adjunct Professor; Management Strategy, Managerial Finance, Biotechnology & Pharmaceutical Technology)

Dr. Devika Sethi (Assistant Professor; Modern Indian History, Colonialism and Decolonization, Free Speech and Censorship)

Dr. Gokul Somasekharan (Teaching Fellow; Specialization: German Literature)

Dr. Ingrid Shockey (Adjunct Assoc Prof. Specialization: Environmental Sociology)

Dr. Manu V. Devadevan (Assistant Professor; Literary practices in South Asia, Political and economic processes in premodern South Asia & South Asian Epigraphy)

Dr. Puran Singh (Assistant Professor; Corporate Finance, Microfinance)

Dr. Ramna (Assistant Professor; Development Economics)

Dr. Shail Shankar (Assistant Professor; Identity and Group Dynamics, Health and Well Being)

Dr. Shyamasree Dasgupta(Assistant Professor; Energy and Environmental Economics, Economics of Climate Change, Applied Econometrics)

Dr. Suman Sigroha (Assistant Professor; Colonialism, Post-colonialism, Imperialism, and Romance Literature)

Dr. Surya Prakash Upadhyay(Assistant Professor; Sociology of Religion, Urban Sociology, Post-Reform India) Economic Processes in Pre-modern South Asia & South Asian Epigraphy)

Dr. Varun Dutt(Assistant Professor (Joint Appointment); Judgment and Decision Making, Environmental Decision Making, Artificial Intelligence, Human-Computer Interaction)

Medals and Prizes

PRESIDENT OF INDIA GOLD MEDAL



Ms. Samriddhi Jain
(B13136)

Computer Science and Engineering

DIRECTOR'S GOLD MEDAL



Mr. Vivek Sharma
(B13239)

Electrical Engineering

INSTITUTE SILVER MEDALS



Ms. Samriddhi Jain
(B13136)

Computer Science and Engineering



Ms. Shivangi Kataria
(B13229)

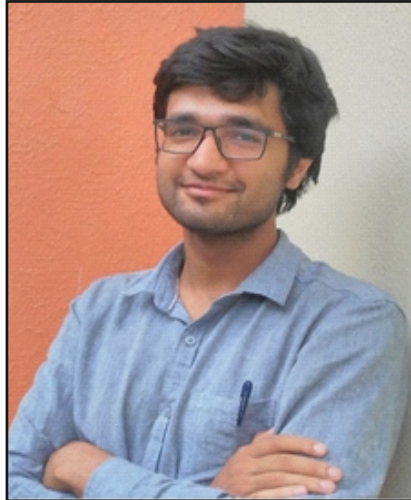
Electrical Engineering



Mr. Prince Garg
(B13324)

Mechanical Engineering

BALASUNDARAM ENDOWMENT PRIZE FOR GERMAN



Mr. Siddharth Gangal
(B13232)

Electrical Engineering

RANI GONSALVES MEMORIAL MEDAL



Ms. Shivangi Kataria
(B13229)

Electrical Engineering

OUTSTANDING ACADEMIC ACHIEVEMENT AWARD



Mr. Mohamad Ashraf
(V15015)

M.Sc Chemistry

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S14007	SHAH VISHRUT SUNIL
S15014	GAURAV CHETAL

Master of Science (Chemistry)

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V15003	GANGA SINGH
V15004	DEEPAK KUMAR
V15005	SANJHAL JAIN
V15006	NAVNEET MATHAROO
V15007	SHUBHAM BISWAS
V15008	SWADHAPRIYA BHUKTA
V15009	TAPAS ADHIKARY
V15010	ANU KUMARI
V15011	KANIKA BHARTI
V15012	SHIVANI VERMA
V15013	VICKY VARMA
V15014	ANKITA DHIMAN
V15015	MOHAMMAD ASHRAF
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V15017	SUDHANSHU SHARMA
V15018	TUSHAR VERMA

Master of Technology

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T15002	VIKRANT
T15004	ABHIJEET SETH
T15005	RAJGAURAV

Doctor of Philosophy

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D11021	MANISHA DEVI
D11037	LAKSHMANAN SA
D11039	REENA SHARMA
D11043	RAJEEV KUMAR CHAUHAN
D12055	DARSIRAMBABU
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D13008	VINAYAK ABROL
D13002	RAJAN KUMAR
D12081	HIMMAT SINGH KUSHWAHA
D12084	RINU CHAUDHURY

CONVOCATION DRESS



The tradition of wearing a specific convocation dress has been adopted world-wide for the graduating class. The attire used on this occasion has specific values attached to it. IIT Mandi convocation dress, especially designed by NIFT, Kangra, is a simple but elegant cape, which can be conveniently worn over any other normal dress. The colours of the capes are inspired by those present in IIT Mandi logo. To give the dress a special flavour of local tradition, IIT Mandi has designed a special pattern inspired by Himachali traditional dresses. This pattern is used as a border on the convocation cape. Finally, the cape carries the IIT Mandi logo embroidered on it. A special brooch has been designed which is worn with the cape to give it a professional appearance.

IIT MANDI GRADUATES' PLEDGE

We, the graduates and post-graduates of the Indian Institute of Technology Mandi, hereby pledge That we will be scrupulously honest in all our activities and act with integrity at all times to uphold the honour and dignity of our profession and of our Institute; That we will actively protect and promote the well-being of our environment; That we will uphold and promote the unity and secular ideals of our country; That we will utilize our knowledge in the service of our country in its march towards a just, inclusive, and sustainable society.

VALEDICTORIAN'S ADDRESS



A very good evening to one and all present here for the 5th convocation ceremony of IIT Mandi.

On the behalf of Batch of 2017, it gives me great pleasure to extend a warm welcome to Respected Chief Guest, Mr. Banmali Agarwala; Shri Subodh Bhargava, Chairman Board of Governors, IIT Mandi & Former Chairman, Tata Communication Limited; Prof. Timothy Gonsalves, Director IIT Mandi; the members of board of governors and members of Senate of the Institute, distinguished guests, family members of graduating students, faculty & staff members.

I was quite surprised and honoured at the same time when I had received the invitation to deliver the valedictory speech because a guy who used to hold the mic for rapping and singing was asked to deliver a speech, so please bear with me in case you come across any poetic references ahead.

On a serious note, today is a big day for all the students of Batch of 2017. Today, as we all walk out of this hall, a journey will come to an end. A journey that began four years back from Mandi and ended up in Kamand. Although the ride was bumpy, full of ups and downs, and sharp curves; we all did enjoy the ride as those four-years were like a Four-Year transform ... transforming all of us from a student to a professional, from a teenager to an adult.

As I was traveling back to the campus, the reminisces of the day when we all were coming to this place for the first time with our parents and lots of expectations, flashed in my mind. From that day to today, we all have come a long way. Being the 5th graduating batch of IIT Mandi, we've seen this institute grow from one academic building to five, from a basketball court and cricket nets to full-fledged fields and indoor sports stadium, from a batch of freshmen to a family that spreads across the batches.

Throughout that long journey we all created some memories, and although those days can't be brought back, memories are there and we will continue to cherish them throughout our life.

One such memory is of staying in Suvalsar hostel in Mandi campus. Our batch was the last to stay in Mandi campus and that too for almost 2 years. Those years taught us how to wake up at 7.55 A.M, have breakfast and still make it to the 8 A.M class which you may call as efficient time-management. It even raised our creativity index as we started events of our own in the Mandi campus since we were too lazy to go to Kamand, and most importantly brought all the batchmates together as a family. Ten years from now when we will discuss with our friends how stupid we looked back in college or how much we miss all those movie marathons, the memories of Mandi campus will surely pop-up.

Be it the beauty of this place, teachings of the faculty members or the love of the students, there is something that all of us like about this college. Assuming an average lifespan of 60 years, I can proudly say that almost 6.5% of my life was well spent here in the Himalayas and I am sure that my fellow batchmates would agree with me.

It would be no surprise if I say that new IITs like ours are almost similar to next-gen startups. Although the struggle is a lot more as one has to start off with a culture, which didn't use to exist, but the learning that one gets at the price of those struggles makes us the person who we are today.

Our batch just like our senior batches played its small part in helping to take this institute to great heights. Be it the research publications, hefty placement offers, first-ever TEDx event and coming up with the first company to be funded by IIT Mandi Catalyst, every student of our batch tried to make his/her contribution to the growth of IIT Mandi and this would have never have been possible without the guidance and help of our faculties and staff at IIT Mandi who are always there to help you, irrespective of the circumstances. I am pretty sure that students of upcoming batches with their immense efforts will continue to add up more jewels to the crown of IIT Mandi.

Before concluding my speech, I would like to talk about two major things that I learned from this place.

First, Nothing is Impossible. Although we hear that quote quite often, we forget to apply that in our life when it's needed. But this place gave me a real-life example of that. If one can build an institute of national importance in a terrain like this, and take it to the levels that we have reached in such a short span of time, then we can also start our career and lead our own path, take inspiration from this place and rise above failure with our hard work and persistence.

Second learning is that there is no end to success. This is one of the things that I learned while trekking through the mountains around this place and I am sure many of my friends here would

relate to this. Whenever you start a trek, you plan to climb up the biggest peak in your vision and start moving, however, on reaching the top, we realize that there is another peak much higher than this one and we must try climbing up that peak too and this loop continues on and on and depending on your stamina and skills you may or may not be able to reach up to the highest peak. That's how life is: we think that we have accomplished something and that's the end and we can stop and enjoy that. But another opportunity comes up and you must be ready to take that up and accomplish that too and continue to do the same until you reach **your** highest summit!

In the end, I would just like to say that, this institute acted as our second home for the last four years and it should be our responsibility to make it proud wherever we go.

Best wishes to you all for your future endeavors.

Continue to believe in yourself.

Plan to win, prepare to win and expect to win.

Thank You !

Vivek Sharma

B13239

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Dr. Subrata Ghosh	Chair
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Dr. Dileep	Chair
Dr. Vishal Singh Chauhan	Chair
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