DIRECTOR'S REPORT



PROFESSOR TIMOTHY A. GONSALVES DIRECTOR, IIT MANDI

Prof. Ashok Jhunjhunwala, Chief Guest of the 6th Convocation; Mr. Sonam Wangchuk, award winning engineer from Ladakh and Guest of Honour today; Mr. Subodh Bhargava, Chairman of the Board of Governors; Members of the Board of Governors, IIT Mandi; Members of the Academic 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 6th Convocation of the Indian Institute of Technology Mandi. I offer my congratulations to all graduating students on their success. I am sure this is a memorable day for you and your families.

Today, we are delighted to have with us Prof. Ashok Jhunjhunwala as the Chief Guest of the 6th Convocation of IIT Mandi. Prof. Jhunjhunwala was conferred the Padma Shri in 2002, and is recipient of the Shanti Swarup Bhatnagar Award, the Vikram Sarabhai Research Award, the H. K. Firodia Award, the Silicon India Leadership Award, and the Millennium Medal at the Indian Science Congress.

Sonam Wangchuk, Recipient of the Ramon Magasasay award 2018, is an inspiration to us all. He is an innovator and educationist of international renown. He is the founding director of the Students' Educational and Cultural Movement of Ladakh(SECMOL). It is an honour for us to have him visit our campus for the second time this year.

1. <u>GRADUATING STUDENTS</u>

112 B.Tech. students, 20 M.Tech. students, 28 M.Sc. (Chemistry) students, 11 M.Sc. (Mathematics) students and 41 research scholars will be graduating today. Of the 36 research scholars, 9 are being awarded M.S. (by Research) degrees and 27 are being conferred Ph.D degrees. I would like to share with you a brief summary of the research being recognized today by award of these degrees:

1. GRADUATING RESEARCH STUDENTS

Ph.D., Doctor of Philosophy

1. RAJIV KUMAR MAURYA

Ph.D. Supervisor: Dr. Bindu Radhamany Title of the Thesis: Investigation of structural connectivity with the physical properties of ilmenite and pyroxene based oxides Explores the link between structure and electronic properties of ilmenite and pyroxene based compounds.

2. JALIM SINGH

Ph.D. Supervisor: Dr. Prasanth P. Jose

Title of the Thesis: Microscopic Structure and Dynamics of Glass Transition under Phase Separation in a Model Linear Polymer Melt.

Presents theoretical and computational investigations which compare the features of structural glass transition under positive pressure and negative pressure.

3. ABHISHEK KUMAR GUPTA

Ph.D.Supervisor: Dr. Pradeep Parameswaran

Title of the Thesis: Development of New Schiff base Derivatives as Fluorescent Chemosensors, NIR Emitters and Catalysts

Develops a series of Schiff base ligands and their metal complexes for sensing metal ions from solutions, as trans-etherification catalysts for bio-diesel synthesis and as near infrared emitting materials in solid state.

4. DEEPAK KUMAR

Ph.D.Supervisor: Dr. Manoj Thakur

Title of the Thesis: Multi-category Nonparallel Support Vector Machine and Application to Financial Market Prediction

Designs and develops efficient machine learning algorithms for data classification and their applications in developing automated intraday and carry forward trading systems for making investment decisions in financial markets.

5. GOURAB DEY

Ph.D.Supervisor: Dr. Subrata Ghosh

Title of the Thesis: Albumin Specific Molecular Lumino Materials: From Quantification to Bioimaging.

Develops organic materials for detection, quantification and in-vivo imaging of albumin.

6. TRIPTI VATS

Ph.D.Supervisor: Dr. Prem Felix Siril

Title of the Thesis: Unraveling the Potential of Pristine Graphene as a Valuable Catalyst Support Material for Nanoparticles

Proves that pristine grapheme, rather than the traditionally used reduced graphene oxide is a better catalyst support material. Nanoparticles supported on pristine graphene outperformed similar particles supported on reduced graphene oxide for an array of reactions.

7. MOHIT CHAWLA

Ph.D.Supervisor: Dr. Prem Felix Siril Title of the Thesis: Tuning the Morphology and Composition of Metal Based Nanostructures for Enhancing the Catalytic and Sensing Performance Researches development of High Performance Nanomaterials for Catalytic and Sensing Applications.

8. MANGILI VENKATESWARULU

Ph.D. Supervisor: Dr. Subrata Ghosh

Title of the Thesis: Mechanistic Insights into Inter-/Intra-Molecular Thiolysis of Sulfonate Esters: Reaction Dynamics, Orbital Overlap Vs Molecular Reactivity, Induced Proximity Effect and Directed Transannular Interaction

Investigates how the extent of orbital overlap controls molecular reactivity.

9. K LINGESHWAR REDDY

Ph.D. Supervisor: Dr. Venkata Krishnan

Title of the Thesis: Near Infrared Active Upconversion Nanophosphors for Theranostics, Sensing and Photocatalysis

Designs and develops a variety of up-conversion nanomaterials for various applications, such as bioimaging, drug delivery, sensing and photocatalysis.

10.SOHAN LAL

Ph.D. Supervisor: Dr. Sudhir Pandey

Title of the Thesis: Investigation of Structural, Electronic and Magnetic Properties of Spinels by using Density Functional Theory

Reports a comprehensive study and analysis of the structural, electronic and magnetic properties of V and Cr spinels. This is done by deploying not only the standard DFT methodology, also by invoking DFT+U and DFT+DMFT approaches to gain new insight into the workings of these materials.

11.ABDUS SALAM SARKAR

Ph.D. Supervisor: Dr. Suman K. Pal

Title of the Thesis: Emerging Two-Dimensional Materials and Their van der Waals Heterostructures: Chemical Exfoliation to Device Applications

Develops novel two-dimensional (2D) materials and related nanoscale heterojunctions for organic electronic applications. Also explores the intriguing electronic, vibrational and electrical properties of the synthesized 2D materials and their heterojunctions.

12.SANDEEP SHARMA

Ph.D. Supervisor: Dr. Nitu Kumari

Title of the Thesis: Modeling the Dynamics of Waterborne Diseases under the Influence of Environmental Pollution

Formulated deterministic mathematical models to study the impact of pollution on the spread of infectious diseases. This work unfolds a new dimension in disease modeling by considering pollution for the first time.

13.PANKAJ NARULA

Ph.D. Supervisor: Dr. Sarita Azad

Title of the Thesis: Functional Data Analysis of Temperature and Rainfall Observations for Regional Indexing of Climate Change Severity in India

Detects mean change-years of Indian temperature data using functional data analysis (FDA). An Index, a measure of recent hotspots of temperature change, has been constituted using various

outputs of FDA. A driving rain map using rainfall and wind speed has also been developed.

14.SUBIT KUMAR JAIN

Ph.D. Supervisor: Dr. Rajendra Ray

Title of the Thesis: A Class of Non-Linear Coupled Partial Differential Equation based Models for Image Restoration with its Numerical Realization

Focuses on the development of non-linear coupled PDE based mathematical models for image denoising, both additive Gaussian noise and multiplicative speckle noise, from natural or synthetic images, and its application to ultrasound images to check its capacity in handling real medical images.

15.PULKIT SHARMA

Ph.D. Supervisor: Dr. Anil K Sao

Title of the Thesis: Significance of Sparse Representation for Speech Recognition and Speech Synthesis

Exploits the low-dimensional multi-subspace structure of speech signals towards the goal of improving acoustic modeling for automatic speech recognition and the speech synthesis systems. To this aim the work employs tools from sparsity aware signal processing under novel frameworks to enrich the acoustic information present in the speech signal

16.SAURABH SINGH

Ph.D. Supervisor: Dr. Sudhir Pandey

Title of the Thesis: Study of Thermoelectric Properties of Oxide Materials in High-Temperature Region.

Describes a systematic approach on probing and optimizing thermoelectric materials for their applications in high temperature range.

17.VIPUL SHARMA

Ph.D. Supervisor: Dr. Venkata Krishnan

Title of the Thesis: Design and Fabrication of Plant Leaf-inspired Biomimetic Patterned Surfaces for Fog Harvesting, Sensing and Catalysis Applications

Explores the possibilities to utilize natural and bioinspired patterned surfaces of plant leaves for diverse applications, including fog harvesting, surface enhanced Raman scattering based chemical sensing and catalysis.

18.NEERAJ SANKHYAN

Ph.D. Supervisor: Dr. Suman Sigroha

Title of the Thesis: A Thematic Study of English Poetry from the Conflict-Affected States of the Indian Himalayas

Investigates the representations of concerns related to Identity, Ethnicity, Environmental crisis and Feminism in poetry emanating from these regions.

19.VINAYAK ABROL

Ph.D. Supervisor: Dr. Anil K Sao

Title of the thesis: Greedy Dictionary Learning Methods for Sparse Representation of Signals

Discusses greedy methods for matrix factorization in particular geared toward sparsity aware signal processing. Covers both theoretical as well as practical aspects about these methods in the context of many well-known matrix factorization problems with applications in the area of speech and image processing.

20. P. GURU PRASAD REDDY

PhD Supervisor: Dr. Pradeep Parameswaran

Title of the Thesis: Development of New Non-Chemically Amplified Resists for High Resolution Lithography Applications

Develops Organic inorganic hybrid photoresists for high resolution E-beam, EUV and Helium-ion beam lithography applications.

21. SYAMANTAK KHAN

PhD Supervisor: Dr. Chayan K Nandi

Title of the Thesis: New Insights into Carbon Nanodots: Analysis of Ensemble and Single Molecule Fluorescence

Investigates the complex photoluminescence of carbon nanodots both in ensemble and at the single particle level aiming for their application in super-resolution microscopy.

22.AVDHESH KUMAR

PhD Supervisor: Dr. Muslim Malik

Title of the Thesis: A Study of Instantaneous and Non-Instantaneous Impulsive Differential Equations with Applications in Control Problems

Based on impulsive differential Equations with applications in control problems, establishes the necessary and sufficient conditions for the controllability of second order and fractional order differential equations.

23.NIDHI BARANWAL

PhD Supervisor: Prof. Shripad P. Mahulikar (External Main Guide), Dr. M. Talha (Internal Co-Guide)

Title of the Thesis: Infrared Signature of Jet Nozzle in Off-design Operation of Combat Aircraft Engine

Investigates the effect of the nozzle area variation and the engine back-pressure penalty on IR signature and lock-onrange in combat aircrafts, and belongs to the area of stealthtechnology.

24.FARIA REHMAN

Ph.D. Supervisor: Dr. Atul Dhar and Dr. Om Prakash Singh (External Guide)

Title of the Thesis: Characteristics of double-diffusive finger evolution: Numerical, Analytical and Experimental Study

Studies the characteristics of double-diffusive finger evolution and important parameters that govern them. Practical application of this fundamental application would be in nutrient mixing and distribution in ocean ecosystem.

25. NEHA SHARMA

Ph.D. Supervisor: Dr. Varun Dutt

Title of the Thesis: Decisions from Experience: Investigating Individual-Level Decisions in Bandit Problems via Experimentation and Computational Cognitive Modeling.

Explores how different computational models of aggregate choice explain individual decisions in gambles involving risk. Empirically evaluates the role of various cognitive factors such as recency, frequency, choice-set size.

26. SANJAY RATHEE

Ph.D. Supervisor: Dr. Arti Kashyap Title of the Thesis: Distributed Algorithms on Big Data Frameworks for Alignment and Analysis of Big Data generated by Next-Generation Sequencing Presents very accurate and efficient distributed sequence alignment and analysis algorithms. Two distributed sequence alignment algorithms named as AVLR-Mapper and StreamAligner are proposed and implemented.

27. SURAJ SHANKARLAL MEGHWANI

Ph.D. Supervisor: Dr. Manoj Thakur

Title of the Thesis: Multi-objective evolutionary algorithms and their application to financial portfolio optimization

In this thesis multi-objective evolutionary algorithms are developed. Application to financial portfolio optimization problems having several constraints used in practical scenario are studied with theoretical justification. The findings are useful for practitioners for efficient asset allocation and risk management.

M.S. (by Research)

1. PRIYBRATSHARMA

M.S. Thesis Supervisor: Dr. Atul Dhar

Title of the Thesis: Study of Hydrogen fumigation in compression ignition engine

An experimental and numerical study of performance, emissions and combustion characteristics of hydrogen-diesel dual fuel engines.

2. PUNIT KUMAR

M.S. Thesis Supervisor: Dr. P. Anil Kishan

Title of the Thesis: Study of Combustion Characteristics of Premixed and Diffusion Flame with Hydrogen and Methane Fuel

Fabricated a constant volume combustion chamber setup and performed experiments and numerical simulations to find the flame velocity and rate of propagation of flame front.

3. KUMAR GAURAV

M.S. Thesis Supervisor: Dr. Sudhir Pandey

Title of the Thesis: Developing Methodology for Searching Efficient Thermoelectric Materials and Their Utilization in Designing Thermoelectric Generators

Develops a methodology for searching efficient thermoelectric materials by estimating fairly accurate efficiency of thermoelectric generator using the temperature dependent ZT values of various materials. Designs a thermoelectric generator for automobile by considering various realistic parameters.

4. SANJAY SINGH TOMAR

M.S. Thesis Supervisor: Dr. Mohammad Talha

Title of the Thesis: Nonlinear Structural Response of Geometrically Imperfect Skewed Sandwich Fgm Plates with Material Uncertainties

Studies the nonlinear deterministic and stochastic response of the functionally graded skew sandwich plates with initial geometric imperfections.

5. SRISHTI GAUTAM

M.S. Thesis Supervisor: Dr. Arnav Bhavsar & Dr. Anil K Sao

Title of the Thesis: Segmentation and Classification of Nuclei in PAP-smear Images for Automated Cervical Cancer Screening

Contributes in the field of automated cervical cancer detection by proposing machine learning based algorithms along with the much needed comparison between the traditional and deep learning methods.

6. ABHISHEK VISHWANATH BANGUNDE

M.S. Thesis Supervisor: Dr. Rajeev Kumar and Dr. S.C. Jain

Title of the Thesis: Torsional vibration analysis and fatigue life estimation of turbo-generator coupled shaft system under electrical disturbances

Investigatesshaft damage due to torsional vibrations initiated by short circuit and malsynchronization on the power system.

7. SARTHAK NAG

M.S. Thesis Supervisor: Dr. Atul Dhar and Dr. Arpan Gupta Title of the Thesis: Exhaust Gas Recirculation assisted Hydrogen-Diesel Combustion with Exhaust Heat Recovery

Designs automotive exhaust thermoelectric generator to recover engine waste heat, which recovered a maximum power of 18 W. Numerical studies on the AETEG unit also showed the scope of improvement with enhancing the baffle number. Application of EGR showed the possibility of NOx reduction and improvement of hydrogen energy share.

8. MANISH VAISH

M.S. Thesis Supervisor: Dr. Rahul Vaish (Guide), Dr. Vishal S Chauhan (Co-guide) Title of the thesis: Experimental study on thermal energy harvesting using ferroelectric materials This study deals with waste thermal energy harvesting using pyroelectric materials.

9. HARSHA MATHUR

M.S. Thesis Supervisor: Dr. Tushar Jain Title of the thesis: State Feedback Control for Structured Descriptor Systems: A Graph Theoretic Approach

In this thesis, we propose the methodology to design static state feedback control in linear time invariant structured descriptor systems using graph theoretic approach. The digraph representation of open loop and closed loop structured descriptor systems are represented by defining square matrices. In this approach, only the structure of the system is considered with system matrices having indeterminate entries henceforth the designed controller remains robust to parametric perturbations.

2. ACADEMICACTIVITIES

A. Current Students

In 2018, 193 B.Tech. Students, 79M.Sc.students, 110 M.Tech students and 13 M.A. students secured admission at IITMandi.We now have a total of 1276 students including 274 Ph.D., 46 M.S. and 17 I-Ph.D. research scholars. Programme and branch-wise distribution of the students is as follows:

B.Tech.	Civil 97	CSE 239	EE 169	ME 122	Total 627
M.Sc.	Chemistry 48	Physics 40	Mathematics 44		132
M.Tech.	SCEE 68	SE 79	SBS 20		167
М.А.	SHSS 13				13
MS by Research	SCEE 18	SE 28			46
I-Ph.D.	SBS Physics				17
PhD	SCEE 67	SE 67	SBS 119	SHSS 21	274
					1276

B. Life after IIT

In the last year, the Career and Placement Cell has undertaken several initiatives to conduct a number of career-awareness sessions to make1stand 2ndB.Tech.studentsawareofthemanyavenues open to them. These included lectures by inspiring academic and civil servants, motivating sessions by entrepreneurs, informative sessions about various competitive exams by coaching institutes, and corporate pre-placement talks. In the 2017-18 placement season, 58 companies visit our campus at Kamand, which is the highest ever at our Institute till now. Among these companies more than 83% were core companies. Branch-wise placement ratios for B.Tech students were 100% in CS, 66% in ME and 83% in EE. Other than B.Tech. students, 55% of registered post-graduate students also got placed. These included 4 M.S, 2 M.Sc.(Applied mathematics), 5 M.Tech. (VLSI), 1 M.Tech.(Energy engineering with specialization in mechanical) 2 M.Tech.(Mechanical engineering with specialization in energy system)and4Ph.D.Students.

Fully realizing the significance of a strongly-bonded alumni community in having the capacity to enhance both the reputation and the resources of their alma mater, the IIT Mandi community organized the first Alumni meet on 26th May 2018. We hope this was the first of many regular events to enhance interaction between alumni and current students for their mutual benefit.

C. New Degree Programmes

Since August 2017, IIT Mandi initiated as many as 5 new degree programmes. These draw on the expertise and research experience and interests of our 110 faculty members. These programmes are:

- 1. M.Sc. in Physics
- 2. M.Tech. in Power Electronics and Drives (PED)
- 3. M.Tech. in Structural Engineering
- 4. M.Tech. in Communications and Signal Processing (CSP)
- 5. M.A. in Development Studies

These new programmes take IIT Mandi a step closer towards achieving its target of 60 percent postgraduate students in its student strength in the coming years.

D. Publications

IIT Mandi researchers published 292 peer-reviewed articles during the academic year 2017-18. The total number of peer reviewed publications from the institute in National and International journals is 1271 (up to March 2018).

E. Major Academic Achievements of Faculty and Scholars:

Prestigious Awards and Fellowships:

- Dr. Chayan Kanti Nandi has won a Bronze medal for "Excellent Contribution in Research in Chemical Science" from the Research Society of India (CRSI-2019).
- Dr. Bharat Singh Rajpurohit received the "IEEE IAS Outstanding Chapter Chair 2018" award at Portland, USA.
- Mr. Ashwani Kumar, a Ph.D student in the School of Basic Sciences won the prestigious Newton International Fellowship 2018 award for pursuing post-doctoral studies in UK.
- Mr. Mohnish, a student in MSc (Applied Mathematics) has been awarded a fully funded Ph.D. position at the University of Warsaw, Poland.
- Dr. Ajay Soni visited Rensselaer Polytechnic Institute, New York, on the prestigious Bhaskara Advanced Solar Energy Research Fellowship from Indo-US Science and Technology Forum.
- 11 students from IIT Mandi, including Sahil Arora from the graduating batch, were selected for Google Summer of Code (GsoC), a global program focused on bringing more student developers into open source software development.

Technology Development:

• Dr. Varun Dutt, Dr. K.V. Uday, P. Chaturvedi, K. Agrawal, S. Agrawal, and N. Mali had helped district Mandi to set up 10+ landslide monitoring and warning systems in the district that had provided timely alert during a past incident. An International

patent has also been filed for the system.

Engagement in Academic Societies:

- Dr. K.V. Uday was selected to represent the Indian Geotechnical Society as one of 3 Corresponding Members of the International Technical Committee on "Slope Stability in Engineering Practice" of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) for 2018-2021.
- Dr. Shubhajit Roy Chowdhury was invited to join as an Associate Editor in the IEEE Access Journal (Area: low cost hand held electronic devices and systems).
- Dr. Pradeep Kumar, School of Basic Sciences, was selected to join Indian National Young Academy of Science (INYAS) as a member, for five years, beginning January 2018.

Notable Best Paper Awards for Ph.D. students:

- Mr. Atendra Kumar (Co-author: Dr. Rajendra K Ray) received the Best Paper Award in the 7th International Conference on Computational Mathematics, Computational Geometry & Statistics (CMCGS 2018), held in Singapore.
- Mr. Avadhesh Kumar (Co-author: Dr. Muslim Malik), received the Best Presentation award at the 19th International Conference on Mathematics and Mathematical Sciences in Paris, France.
- Ms. Vibha Gupta (Co-author: Dr. Arvan Bhavsar) received the Best Paper award at the IEEE International Workshop on Computer Vision for Microscopy Image Analysis (IEEE CVMI 2018) held at Salt Lake City, USA, in June 2018.

2. <u>INTERNATIONAL LINKAGES</u>

IIT Mandi is a part of an international academic community, and working towards increasing both the scope as well as depth of its international collaborations. 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 programmes with academic credit transfer. During the past year, IIT Mandi hosted many international students for visits and for semester-exchange. In addition to 22 undergraduate students from WPI, USA, who stayed on campus for seven weeks to work on joint socio-technical projects with 3rd year B.Tech. students, 7 students from the UK (Universities of Bath and Loughborough) and Germany (TU Munich, TU Darmstadt and Georg-August University, Goettingen) spent time at our campus for up to a semester.

This year, IIT Mandi worked with other new IITs to attract graduate students from neighboring

countries like Bangladesh and Nepal. Faculty delegates from IIT Mandi and other IITs visited Bangladesh and Nepal for attracting bright students at the graduate level. A total of 112 students applied for the M. Tech., M.S., and Ph.D. admissions across all IITs. Out of these 112 students, 89 students (79.5%) applied exclusively to IIT Mandi. After interviewing candidates, IIT Mandi made 12 offers of admissions to students from Bangladesh and Nepal. Students joining IIT Mandi from Bangladesh and Nepal include the following:

- Mr. Prakash Giri from Nepal joined IIT Mandi in the M.Tech. Program (MES). He is the first Nepalese student to join IIT Mandi.
- Mr. Milon Kundar and Ms. Arzena Khatun joined IIT Mandi in the Ph. D. program in the School of Basic Sciences. They are the first students from Bangladesh to join IIT Mandi.
- Mr. Sabin Kafley from Nepal joined IIT Mandi as Ph.D. student in the School of Computing and Electrical Engineering.

In the last year, several IIT Mandi students visited different university partners abroad for semester-exchange. These include 1 student who went to Aalto University, Finland, 4 who are in TU Munich, Germany, at present, and 1 who is at RWTH Aachen, Germany, at present.

A large number of IIT Mandi faculty also visited institutions in Europe, North America, Australia, South Asia, and Latin America in 2017-18 for attending conferences and for industry and academic collaborations. IIT Mandi faculty members also visited TU9 institutions in Germany in 2018 under the BMBF-IIT Mandi faculty exchange program.

Besides these international students, more than 35 international faculty members visited IIT Mandi for teaching, research, and for presenting their research at different workshops and conference events held on IIT Mandi campus. There were several meetings and events held on IIT Mandi campus involving visitors from universities abroad. These include the following:

BMBF TU9-IIT Mandi Workshop on "Current Trends in Analog Circuit Designing"

As a part of TU9-IIT Mandi exchange programme, IIT Mandi and TU-Berlin organized a BMBF funded workshop on "Current Trends in Analog Circuit Designing" on 25th-26th September 2017. The workshop was organized by Dr. Hitesh Shrimali (IIT Mandi) and Prof. Friedel Gerfers (TU-Berlin).

Conference on Spectroscopy of Emerging Functional Materials (SEFM-2017)

School of Basic Sciences, IIT Mandi and Advanced Material Research Center, IIT Mandi organized a conference on the Spectroscopy of Emerging Functional Materials between 9th October 2017 and 10th October 2017 at IIT Mandi campus. The conference was attended by approximately 120 participants including many eminent scientists of the country and abroad working in this area such as Prof. Tonu Pullerits (Lund University, Sweden), Prof. K. Gonsalves (IIT Mandi) and Dr. Khadga J. Karki (Lund University).

National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG 2017)

The Sixth National Conference on Computer Vision, Pattern Recognition, Image

Processing and Graphics (NCVPRIPG 2017) was held at IIT Mandi from 16th December 2017 to 19th December 2017. Dr. Guna Seetharaman from Naval Research Laboratory, USA, was the General Chair.

National workshop on "Bioprocessing for Energy and Carbon from Agro Residues (BECAR-2018)"

A national workshop on "Bioprocessing for Energy and Carbon from Agro Residues (BECAR-2018)" was organized by the School of Basic Sciences IIT Mandi between 23rd January 2018 and 24th January 2018. The workshop was supported by IIT Mandi and DBT-BMBF (Indo-German) project between IIT Mandi and TU9 Germany. Notable experts like Dr. Anuj K Chandel (University of Sao Paulo-Brazil), Mr. S.P. Jeevan Kumar (ICAR Mau) and Dr. Swati Sharma (KIT, Germany) presented their ongoing DBT-BMBF project work at this event.

4. 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 182 with a total sanctioned amount of Rs. 80+ crores.

A project titled "Smart Agriculture: Farmer Zone" worth INR 9.47 Crore has been sanctioned by DBT. IIT Mandi's share in this project is INR~7.5 crore, which is the largest grant awarded to IIT Mandi till date. IIT Mandi is the lead institution overseeing the integration of science, technology, innovation and farm ecosystem for effective agricultural decision making to address food scarcity and build a sustainable future in India. This project is being led by Dr. Srikant Srinivasan, SCEE and Dr. Shyam Masakapalli, SBS in collaboration with several domestic and international partners from the US and UK. Prof. Timothy Gonsalves is the national coordinator for the execution of this project. Currently the project is already serving 1000 potato farmers spanning Punjab and UP in the 6 months since inception, providing advisories on crop yield, pests and plant varieties delivered directly to farmers through mobile apps.

5. BUSINESS INCUBATION

IIT Mandi Catalyst, a Technology Business Incubator (TBI) on campus, has been successful in attracting entrepreneurs from many parts of the country in last couple of years. Catalyst is all set to be a favoured startup destination that offers a low-cost, peaceful and picturesque environment to early stage startups. Since Jan 2017, Catalyst has committed and disbursed over INR 45 lakhs to startups in the form of grant and seed fund. These startups have generated 31 employment and 11 internship opportunities for young aspiring professionals. As of October 2018, Catalyst has 15 commercial and social /or impact startups in its portfolio from different sectors that include

Agrotech, Ad Tech, Solar Installation, Healthcare, Consumer Internet, Food & Beverage, Advertising, Travel management, Media & Communication, Road Safety, Edutech and Disaster management. To coach and mentor the startups, Catalyst has hosted over 40 mentor sessions in last one year for two batches of startups admitted in Sep 2017 and July 2018.

The 2nd Edition of Himalayan Startup Trek, an annual event of IIT Mandi Catalyst, organized in April 2018, attracted a lot of attention at national level from startup ecosystem players. IIT Mandi hosted about 35 speakers, 40 startups and had a footfall of over 200 during this two dayevent.Notable achievements of catalyst supported startups and their founders include the following:

- 1. The Solar Labs, founded by our alumni and the first startup admitted to Catalyst, won third position during Schneider Electric Awards at Singapore in September 2018.
- 2. Catalyst incubated startups like Med Samaan and 4Play have won entrepreneurship related awards given by the HP state government, the IMF Mountain Film Festival in Goa, the O Orange Flower Awards 2017 and other recognitions.
- 3. UG Fresh, a faculty led startup, was selected for Festival of Innovation and Entrepreneurship Exhibition (FINE) in Rashtrapati Bhavan in March 2018.

In next few years, Catalyst is going to focus majorly on developing entrepreneurship ecosystem in the state of Himachal Pradesh and in Himalayan region. Catalyst plans to make a focused attempt to encourage entrepreneurship in Himalayan region and to enable solutions for social or economic problems. I hope that startup-faculty collaborations increase in years to come and more of our own students at IIT Mandi opt for entrepreneurship as a career option to take advantage of the support being provided by IIT Mandi through Catalyst.

6. <u>CAMPUS DEVELOPMENT</u>

The South campus of IIT Mandi has been developed with great success, and presently about 40,000 sq. mt. area stands constructed. 760 students along with 66 faculty members are residing in the South Campus. This is the first Convocation we are holding in the North Campus. As you can see for yourself, this campus is being developed at great speed. About 50,000 sq. mt. area stands constructed and remaining 80,000 sq. mt. shall be completed by 2019. Around 600 students and 69 Faculty/Staff are residing in this campus at present. Our 88 rooms Guest House is functional, and was put to good use during the recently concluded 3rd Himachal Pradesh Science Congress. The Sports Complex and Hospital are almost ready. There are plans to develop a Hockey field, Tennis courts, a Basketball court and a Volleyball. A bridge Connecting North Campus from Ghoda Farm and a Cycle path connecting the North with the South Campus has also been planned and consultancy work is in progress. Work to construct about 20,000 sq. mt. academic buildings in the North Campus, a hostels for 500 students as well faculty residences in the South Campus is about to begin shortly.

7. EXTRACURRICULARACTIVITIES

IIT Mandi has developed a vibrant culture of learning as well as imbibing life-lessons through participation in competitive as well as non-competitive activities. I am happy to report the following achievements of our B.Tech. students.

- 1) In the Inter IIT Cultural Meet at IIT Kanpur in December 2017, the IIT Mandi team secured first place in the 'Art of Photoshop' event. This event witnessed participation by 18 IIT's students.
- 2) Mr. Nitesh Kumar, our sports champion, added several feathers to his cap as he:
 - a) Won the Bronze medal in singles event and qualified for quarter finals in men's doubles and mixed doubles events in the 4th Turkish Para Badminton International Enes cup 2018.
 - b) Won the Silver medal in men's doubles in the Dubai Para Badminton International championship held between 11th-15th April, 2018.
 - c) Won the Bronze medal in the 2nd National Para Badminton Championship 2018 held at Varanasi between 23rd-25th March 2018.
 - d) Won the Bronze medal in the 3rd Asian Para Games, Indonesia, in October 2018.
- 4) Mr. Tanmay Rustagi, a 1st year B.Tech. student, secured first position in the Himachal Pradesh State Ranking Table Tennis Championship-2018 in Under 21 Boys competition.
- 5) IIT Mandi hosted an inter-college sports festival, Rann Neeti, between 30th September-2nd October 2018. Over 850 students from colleges in HP, Haryana, Punjab, Rajasthan and Delhi participated in 9 different sports, facilities for all of which we have here: Basketball, Football, Cricket, Volleyball, Tennis, Table-Tennis, Athletics, Badminton and Chess. IIT Mandi won the overall championship award.

In additional to these notable achievements, the academic calendar was abuzz with a wonderful array of special events including EXODIA (the annual tech-cult fest of IIT Mandi), VIBGYOR (the art festival), ANUSANDHAN (research fair) and AAGAZ (the annual inter-year sports tournament) Rann Neeti. The Hiking and Trekking Club organised treks to Rani Sui Lake, Chandra Taal and other places in Himachal, thus taking full advantage of our spectacular location.

CONCLUSION

Each Convocation is a time for celebration as our Institute sends forth its best and brightest into the real world where they have to – and will – prove their mettle against competition from all over the globe. It is also a time for commending the entire campus community as their collective efforts make the annual renewal of the Institute – in terms of students, ideas, products – possible. At the same time, it is a time for stock-taking. In my report I have focused on our achievements in the recent past. I hope this will inspire all of your to set the bar even higher