



INDIAN INSTITUTE OF TECHNOLOGY
MANDI

1st CONVOCAATION
2013





CHIEF GUEST

SHRI SUBODH BHARGAVA

CHAIRMAN, TATA COMMUNICATIONS LIMITED

SHRI M. NATARAJAN

CHAIRMAN, BOARD OF GOVERNORS, IIT MANDI

PROF. TIMOTHY A. GONSALVES

DIRECTOR, IIT MANDI

WELCOME TO IIT MANDI

Indian Institute of Technology (IIT) Mandi, the youngest of all IITs and the only IIT in the Himalayas, welcomes you to its first convocation ceremony on 20th October, 2013. As part of this convocation, 94 B. Tech. students, 1 M.S. student, and 1 Ph.D. student would graduate from IIT Mandi.

IIT Mandi, known for its flexible academic curriculum, is also the first among the new IITs to shift to its permanent campus in Kamand (18 kilometers from the Mandi town). In July-September 2012, around 120 B.Tech students, some faculty members, and a few research scholars moved to the fully residential permanent campus in Kamand. It is expected that all activities of IIT Mandi will be carried out at its Kamand campus by April, 2014. The fully constructed Kamand campus in the serene landscape by the river Uhl will offer a world-class academic environment with a high quality of life in a setting of natural splendor.



CONVOCATION PROGRAMME

The activities commence at **10:00 am** and end at **1:00 pm**

Chief Guest, and Chairman, Board of Governors arrive and are received by the Director

Academic Procession proceeds to the Convocation Pandal

Vande Mataram by the Choir

Convocation is declared open by the Chairman, Board of Governors

Director's Report and Welcome Address

Address by the Chairman, Board of Governors

Convocation Address by the Chief Guest

Award of Degrees by Director

Award of Medals and Prizes by the Chief Guest



Chairman, BOG signs the scroll of Award of Degrees

Graduate Pledge by the new Graduates and Post-graduates

Valedictorian's Address

Convocation is declared closed by the Chairman, Board of Governors

National Anthem

Academic Procession departs



IIT MANDI



IIT MANDI IN FUTURE

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.





MESSAGE FROM THE PRESIDENT OF INDIA



SHRI PRANAB MUKHERJEE
PRESIDENT OF INDIA

The President of India, Shri Pranab Mukherjee, is happy to know that the Indian Institute of Technology (IIT), Mandi is organizing its First Convocation Ceremony on October 20, 2013.



The President extends his warm greetings and felicitations to the organizers, participants and the graduating students of the Institute and sends his best wishes for the success of the Convocation Ceremony.

SHRI PRANAB MUKHERJEE
PRESIDENT OF INDIA



MINISTER OF
HUMAN RESOURCE DEVELOPMENT
GOVERNMENT OF INDIA



मंत्री
मानव संसाधन विकास
भारत सरकार

M. M. Pallam Raju
एम. एम. पल्लम राजू

MESSAGE FROM MHRD



DR. M. M. PALLAM RAJU
MINISTER OF HUMAN RESOURCE DEVELOPMENT, GOVERNMENT OF INDIA



I am pleased to know that the 1st Convocation of IIT Mandi is taking place on 20th October 2013. I commend the faculty, staff and students of IIT Mandi for their yeoman efforts in creating a fully-functioning IIT in the Himalayas within a short span of four years. Having visited IIT Mandi to inaugurate the new Advanced Materials Research Centre Building in its Kamand campus in March 2013, I appreciate that this is an idyllic setting for high-order academic pursuits though the difficult terrain and remote location pose their own challenges. My congratulations to the graduating students on their achievement in earning a degree from one of the prestigious IITs, taking any obstacles in their stride.

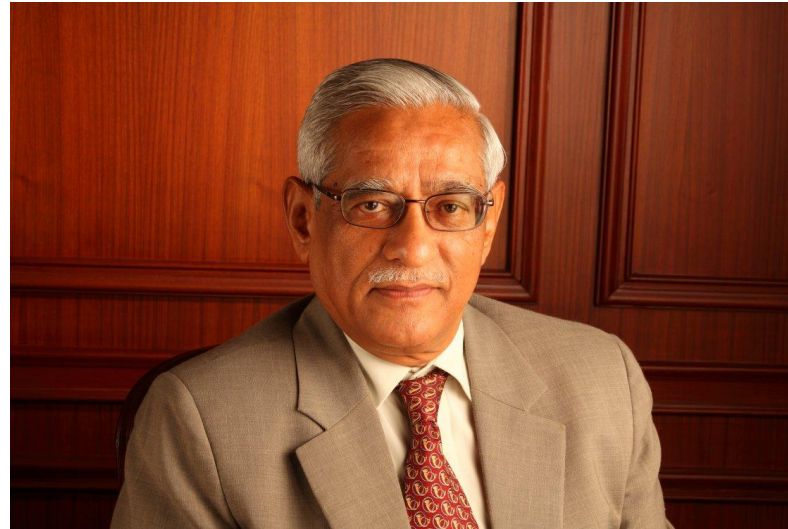
India is a country with tremendous opportunities for bright young engineers. I expect that many of the students graduating from IIT Mandi today will take advantage of these opportunities to make a significant difference to the lives and well-being of all Indians. I hope that some of you will be drawn into the teaching profession to train and inspire future generations of young Indians. Whatever the path you choose, follow it with passion, dedication and a commitment to serve your fellow Indians.


(PALLAM RAJU)

DR. M. M. PALLAM RAJU
MINISTER OF HUMAN RESOURCE DEVELOPMENT, GOVERNMENT OF INDIA

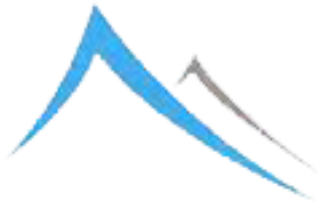


CHIEF GUEST



SHRI SUBODH BHARGAVA
CHAIRMAN, TATA COMMUNICATIONS LIMITED

Shri Subodh Bhargava received degree in Mechanical Engineering from the erstwhile University of Roorkee in 1962 and began his professional career with Balmer Lawrie and Company at Calcutta. Thereafter, he joined the Eicher Group of Companies in 1975, and quickly rose up the ladder to become the Chairman and Chief Executive of the Group in 1997, a position he held till his retirement in 2000.



Shri Bhargava was the President of Association of Indian Automobile Manufacturers and Vice President of Tractor Manufacturers Association in which capacity he made exemplary contribution to the Indian Automobile Industry. He provided valuable service to the nation in developing and nurturing the automobile industry through total quality management, research and development, and technology and customer. His stewardship of the Eicher Group led to a paradigm shift in the basic approach of the Company by diversifying from a single-product and single-location enterprise to a multi-product and multi-location conglomerate of global stature.

The Confederation of Indian Industry deservedly honored Shri Bhargava for his enterprise by electing him as its President during 1994-95. He was a key spokesperson for Indian industry, contributing to and influencing government policy at the National level while simultaneously working with industry through adopting value and ethics based practices, exemplary corporate governance, innovation and globalization to evolve new responses to the changing environment.

Shri Bhargava was a Member of several Government appointed Task Forces and Committees, like the Justice Eradi Committee for Insolvency Laws, the Nair Committee to study the Future Perspectives for Sustainable Growth of Ordinance Factories, the Committee of the Technology Development Board, the Professor Iswar Dayal Committee on the future Perspective for Management Education in India, and the Professor P. Rama Rao Review Committee for the Indian Institutes of Technology.

He was a Member, Senate of University of Roorkee; Member, Board of Governors of IIM, Indore; IIM, Lucknow; Indian Institute of Foreign Trade, New Delhi; and, Entrepreneur Development Institute, Ahmedabad.



He is currently the Chairman of Tata Communications Ltd.; GlaxoSmithKline Healthcare Limited, TRF Ltd.; Tata Communications International Pte Ltd.; Advisory Board, Wartsila India Ltd. and a Member on the Boards of Tata Steel Ltd; Tata Motors Ltd, Larsen & Toubro Ltd; Batliboi Ltd; SunBorne Energy Holding LLC; Bhartiya Yuva Shakti Trust; National Centre for Promoting Employment for Disabled Persons; Centre for Policy Research; Technology Development Board; IIM, Kashipur and other Institutions for Graduate Engineering and Bachelors and Master's Degree programmes in Business Management

Shri Bhargava was conferred the first “Distinguished Alumnus Award” in 2005 by IIT (Roorkee); and, in 2011 the “Gaurav Shri Award” was conferred by Agra University upon him. He has also been recognized as the “Best Independent Director 2011” by Asian Center for Corporate Governance and Association chaired by Mr. Mervyn King. Shri Bhargava has been recognized and honored for excellence in entrepreneurship, innovation and leadership by Horasis (The Global Visions Community) and was awarded the “Global India Business Leader of the Year - 2013.”

In addition to his services to the Country as a technocrat-manager, Shri Bhargava is also a philanthropist of repute.



MESSAGE FROM CHIEF GUEST

My hearty congratulations to the graduating students for successfully completing their courses and my best wishes for many more successes in the next phase of their life's journey.

Dear students, your most enjoyable inning has just ended. Truly speaking, it is now the beginning. I can imagine the air of expectancy around each one of you when you were preparing to leave the Institute - eager to step into real life with hope and determination to be successful.

At personal level, each one of you would have your dreams, ambitions, fantasies, and anxieties regarding the future. Your new world is going to be different. Some dreams may come true and some may not. In life, there is always some good news and some bad news. There may be an odd exception as well.

Your life ahead in the real world is going to be more fun than it has been at the Institute. The fact is that real life tends to be ambiguous and unstructured, where changes keep taking place all the time. There are more and more uncertainties and yet the life has to go on.

Let me share with you some lessons I learned and unlearned from the real life experiences:

The first lesson may sound strange and, perhaps, not the most appropriate especially today when, for many of you, it is the end of your days as student.

However, since it is the most important learning experience from life, I would share the same. It is *to stay a student all your life*. In real life, there is no set curriculum, no credits or marks, no grading, no minimum or prescribed attendance etc. You choose and decide to *learn from life* – make learning a lifelong occupation –



means keep alive the same sense of impatience, be inquisitive, and ask questions as you have been as a student. Beware always of the gap between what you know and what you need to know and can know. Admire those who know better – at home in family, your parents and elders, and at work, your superiors. Observe, listen. In a confused and muddled world only the students survive and grow.

The second lesson is that in life nothing is more valuable than your values. What are values? These are cherished beliefs and the guiding principles which direct all your actions, and determine the means and the processes to adopt to realize your plans, targets, ambitions, and dreams.

Values are actually much more. They “determine the boundaries not only to act within but also to think within.” Bhavna, the thought behind is more important than Bhav, the expression or the action.

We discover or draw our values from various influences:

Education System: The early Vedic “Gurukul model” taught respect, trust, complete faith, discipline, and the complete surrender of ego to the guru – the knowledge, nature, and other living beings. The present system means marks theory, memory, doing well by hook or crook, or by any means necessary.

Home and neighborhood: Relationships, emotions, love, security, hurt, neglect, care. What feels good and what does not?

External Environment and Information: Global and National.

Your values are your ‘brand’. To enjoy trust and confidence, you need to have credibility for which you need to perform and behave consistently as per your values and beliefs.

The third lesson is the ability to change, which today is the only constant - anticipate, recognize, need,



ability, adapt, facilitate, and *enjoy*.

The fourth lesson is that your imagination is your most valuable asset – brings innovation and entrepreneurship. Your passion and risk taking ability will help the most in this respect.

The fifth lesson that I learnt is to cope with and learn from failures. Do not fear failure. From an early age, we are plagued with anxiety about performance and success. The truth is, one usually has to fail to succeed.

Anyone with a resume of accomplishments also has a resume of failures, humiliation and setbacks. Entrepreneur Steve Jobs and Astronaut Neil Armstrong have recorded their respective failures in life before they succeeded. J. K. Rowling the “Harry Potter” author eulogized her own valuable failures as, “failure gave me an inner security that I had never attained by passing examinations. Failure taught me things about myself that I could have learnt no other way.”

The last but not the least is the lesson I learnt is to remain a ‘realist’ but be an optimist .Optimism always forced me to look beyond to engage with the future. Not to brude or gloat over the past. Gave the power to think positive – a desire to be a part of the solution not only be a part of the problem.

Despite operating in a competitive environment you will have to make others successful and also face failure. Failure is an event and not a person to live and hound. Yesterday ended last night and so did the failure.

You must believe in yourself. You must believe that you will win. You must have the skills and confidence. Plan to win, prepare to win, and expect to win.

Best Wishes. Thank You.

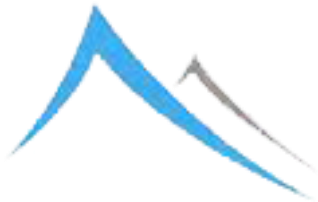


MESSAGE FROM CHAIRMAN, BOARD OF GOVERNORS, IIT MANDI



SHRI M. NATARAJAN
CHAIRMAN, BOARD OF GOVERNORS, IIT MANDI

Respected Chief Guest, Members of Board of Governors, Director IIT Mandi and Directors of other IITs, members of the Faculty, distinguished invitees, research scholars, dear students, parents of students receiving degrees, members of IIT Mandi staff, ladies and gentlemen, a very good morning to every one of you. I am indeed delighted to be amidst you, on this memorable day of the first convocation of IIT Mandi.



As IIT Mandi's first Chairman, BoG, I am honored to extend a hearty welcome to each one of you.

Established in 2009, IIT Mandi is the country's newest IIT, the only institute of its kind for the advancement of knowledge and education in science and technology in this beautiful Himalayan landscape. In a short span of 4 years, the institute has grown in strength, accommodating 455 students in B. Tech. programmes, 28 students in MS, and 81 students as Ph.D. Research scholars. Thanks to the Government of Himachal Pradesh, which generously accommodated the IIT in Vallabh College Campus, where the IIT started functioning from its transit campus at Mandi in 2010. This certainly helped kick start activities, while scouting for over 500 acres of forested land on the banks of river Uhl for the institute's permanent campus at Kamand. The sustained efforts by all concerned led to the acquisition of this land and development of the architectural plan of the entire campus. The construction activities of phase 1, comprising of new buildings for Hostels, Administrative Block, mess, labs, and classrooms are nearing completion. While it may take a couple of more years for the campus to be fully built, the academic and research activities are already flourishing here with vigour and vitality. I would like to convey my thanks to the Director, the faculty, staff and the enthusiastic student and research community for pursuing their activities unmindful of inconveniences and hardships.

A growing economy like India has challenges not only in cutting edge science and technologies in disciplines such as space, atomic energy, defense, communications, renewable energy and medicine, but also in housing and living conditions, food and nutrition, water and sanitation, healthcare, agriculture and transportation. It is vital to study and capitalize on traditional knowledge relating to medicine, architecture, arts, crafts and culture.

Dear faculty, scholars and students, India is a vibrant democracy, looking to opportunities to use developments in science and technologies as primary tools for delivering on economic growth and



bridging social disparities. The intellectual exercise of creative minds equipped with knowledge and expertise can find pragmatic solutions to our problems and provide for a variety of products, services, and systems to our society. While our growth in successive 5 year plans is impressive, the rising population and its aspirations demand innovative solutions that are practical and affordable.

We are a 5000 year old civilization with rich traditional knowledge and skill sets. We must find an appropriate blend of old and new knowledge and expertise to arrive at innovative solutions to some of our problems and lift the country from the malaise of poverty and hunger that stalks over a third of our population. It is not uncommon for us to blame the political class for the inadequacy of our development. However, for us to really change, things we need to look inward. Our country can only achieve development through outstanding contributions of intelligent, well qualified, and professionally committed work force that looks for opportunities in challenges within a resource limited environment.

I am confident the constant efforts of the faculty to present innovative teaching and research will help to build our knowledge and skill sets. I would also urge each one of you to appreciate the talent in every individual and seek ways and means of working effectively as a team member and as a leader. I have no doubts that as you enter the society as new graduates or scholars, you will make a strong impact, and at later stages share your experiences and expertise with your alma mater. It is only through your constant engagement that IIT Mandi can become the torch bearer for science and technologies and for the advancement of the nation and society at large.

May I take this opportunity to wish each one of you, graduating, post-graduating, or receiving a PhD degree, the very best in the years ahead for professional accomplishments and for a happy, healthy, peaceful, and prosperous life. May God Almighty bless each one of you and be with you in all your good deeds.





अशोक ठाकुर
सचिव
ASHOK THAKUR
SECRETARY

भारत सरकार
मानव संसाधन विकास मंत्रालय
उच्चतर शिक्षा विभाग
Government of India
Ministry of Human Resource Development
Department of Higher Education

MESSAGE FROM SECRETARY, MHRD



SHRI ASHOK THAKUR
SECRETARY, MINISTRY OF HUMAN RESOURCE DEVELOPMENT, GOVERNMENT OF INDIA



It gives me great pleasure in wishing the Director, the faculty members and the students of IIT Mandi on the occasion of the first convocation of IIT Mandi on 20th October, 2013. It is on account of the vision of the Board of Governors of the IIT and the hard work of Director of the Institute, Prof. Timothy A. Gonsalves and his team that the Institute in a short span of time has been able reach its present heights in spite of the difficult terrain and challenging circumstances.

IIT Mandi has been the first amongst the new IITs to step into its permanent campus at Kamand. In the years to come, it promises to grow into a University offering technological solutions to all the States located in the Himalayan region right from J&K to Arunachal Pradesh on issues such as the solution to the fragile eco system of the Himalayas and creating sustainable livelihoods. I see it playing a lead role in domains such as IT, food processing, tourism, hydro-electric power, non-conventional energy system, highway construction and tunneling technologies, etc. which are high priority areas for these mountain States.

I once again wish the Chairman, Shri M. Natarajan, Director, Prof. Timothy A. Gonsalves, Faculty and all the students passing out, my best wishes on this happy occasion.



SHRI ASHOK THAKUR
SECRETARY, MHRD



DIRECTOR'S REPORT



PROF. TIMOTHY A. GONSALVES

Mr. Subodh Bhargava, Chief Guest of the Convocation, Mr. M. Natarajan, Chairman 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, media persons, ladies and gentlemen – it gives me great pleasure to extend a very warm welcome to you on the occasion of the First Convocation of the Indian Institute of Technology Mandi.

As the graduating students stand here today at IIT Mandi ready to set out to the world beyond, each of us present here is privileged. For in each student who is graduating we can see a brave, new world. Each of the students who will receive their degrees here today has made us proud.

Today is a moment of celebration and hope and I thank all those present here for being witnesses to this momentous occasion.

Today, we have with us Mr. Subodh Bhargava, Chairman of Tata Communications Ltd. and former MD of Eicher Motors, who graciously accepted our invitation to be the Chief Guest on our 1st Convocation. It is a privilege to have Mr. Bhargava here today not only for his many achievements but also for the model he presents to the students of the various ways in which an engineer can make major, lasting contributions to society.



IIT MANDI – AN ODYSSEY TO THE FUTURE

For IIT Mandi, it has been a challenging but rewarding journey of four years. IIT Mandi has grown steadily and surely towards its vision to become globally renowned while catering to the needs of society, both local and global. I would like to share with you a brief account of our journey over the last four years, highlighting significant milestones.

Our successes have resulted from the concerted effort of all sections of the IIT Mandi family – the faculty, the staff and the students. It has also been made possible by the generous help given to us by other institutes. IIT Roorkee served as the mentoring Institute of IIT Mandi. The B. Tech. students graduating here today took their initial steps as budding engineers in IIT Roorkee where they spent their first year in 2009. After moving to Mandi in 2010, we were privileged to have the best of neighbours in Vallabh Government College who graciously and generously gave us the space and infrastructure we needed to begin operating in Mandi. Faculty from a number of other IITs have given unstintingly of their time to help us towards our vision. The continuous support of numerous people in the Government of India and the Government of Himachal Pradesh have been critical to our growth.

IIT Mandi has the distinction of being the first (and currently the only) new IIT to develop and use its main campus. We have adopted a 3-stage approach:

1. *Renovate and use the existing Animal Husbandry buildings.* E.g., the renovated Stable Complex houses a sophisticated X-ray Diffractometer, a PC Lab and a 120-seat Electronic classroom with 100



**HIGH RESOLUTION X-RAY
DIFFRACTOMETER (HR-XRD) AT AMRC**



Mb/s Internet connectivity

2. *Rapidly construct a few pre-engineered buildings.* Currently 10,000 sqm that houses over 250 students and 25 faculty plus staff
3. *Over a longer period, construct the bulk of the buildings.* 1,25,000 sqm of space to accommodate 1,800 students, 160 faculty and staff, serving the growing IIT until 2018

This approach enabled us to quickly capitalise on the attractions of our unique location. At an early stage, we have reached the point where some of our students enjoy the benefits of a residential campus that is the hallmark of the IITs. In each stage, we learn from the mistakes of the previous one for better and better infrastructure.

ACADEMIC ACTIVITIES

Despite the challenges of constructing and occupying our permanent campus, the academic activities of the Institute have flourished. Currently, we have 564 students including 109 research scholars in the Mandi and Kamand campuses. Offering B. Tech. in the three disciplines of Mechanical, Electrical and Computer Engineering and M.S. and Ph.D. in a wide variety of disciplines, IIT Mandi is firmly committed to excellence in teaching and research. Our innovative curriculum and organisation with an emphasis on interdisciplinarity helps our faculty to collaborate and teach across disciplinary boundaries.

RESEARCH

We place a great emphasis on the development of our research scholars. The first research scholars joined in October 2010, soon after we started operating in Mandi. Despite the difficulties of doing globally



competitive research in a nascent Institute, I am pleased to report that one of these pioneers, T. Shejin, will be graduating today. Guided by Dr. Anil Sao of the School of Computing & Electrical Engineering, Shejin will receive the first M.S. degree from IIT Mandi for his thesis titled *Significance of Dictionary for Sparse Coding based Face Recognition*. This thesis justifies the significance of dictionary by proposing and analyzing the novel WD Face dictionary on various aspects of sparse-coding based face recognition. Shejin is now an imaging researcher with DigitalOptics Corporation in the Republic of Ireland.

Today, we will also award our first PhD degree, to Priyanka Manchanda for her thesis *Magnetic Properties of Multilayers and Some Bulk Alloys: An Ab-Initio Study*. She was guided by Dr. Arti Kashyap of the School of Basic Sciences. Magnetic multilayers, used in applications such as ultrahigh density magnetic recording, spin valves and read heads of disk drives are studied with *ab-initio* techniques. She has also studied control of magnetic properties with the application of external electric field in thin films and in organometallic systems. Priyanka will take up a postdoc fellowship in the University of Nebraska.

IIT Mandi organized its first Research Fair on 26th June 2013. About 40 of our research scholars showcased their research. They gave enthusiastic oral and poster presentations on their research in front of faculty and students.

As the only IIT in the Himalayas, IIT Mandi is uniquely positioned for R&D that will benefit the people of the Himalayan region, along with globally important research. This is reflected in our research thrust areas that include:

- ✧ Green and renewable energy technologies
- ✧ Technologies for the Himalayan region
- ✧ Materials for electrical, electronics and bio applications



- ✧ Condensed matter physics
- ✧ Next generation networking and communications
- ✧ Speech, vision and image processing

Future thrust areas include integrated mountain development, environmental engineering and policy, and life sciences and bio-technology.

Our faculty has been successful in competing for research grants from several agencies including DST, DRDO, DBT, DAE, NIXI and Intel. They have over 20 grants totalling about Rs. 8 crores. Noteworthy projects include:

- ✧ Rs. 76 lakhs from DIT for development of text to speech systems in Indian languages (Rajasthani). PI: Dr. Anil Sao
- ✧ Rs. 80 lakhs from DST for the Centre for Innovative Technologies for the Himalayan Region. Village-scale industries for economic exploitation of pine needles is a major activity. PI: Dr. Arti Kashyap + 3 other faculty
- ✧ Rs. 85 lakhs from DST for the Indo-UK Advanced Technology Centre for Next Generation Networks. 7 faculty. Collaborating with 6 other Indian and 9 UK universities.
- ✧ \$315,000 from Intel, USA to develop novel resists for EUVL at the 16 nm node and beyond, for use in VLSI fabs. PI: Dr. K. Gonsalves + 3 other faculty



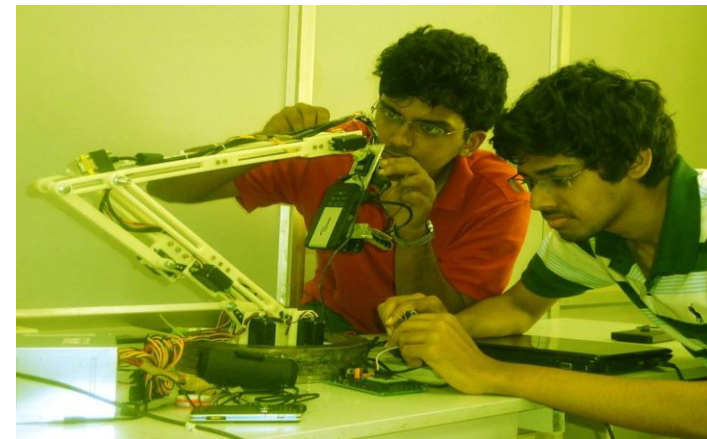
TEACHING

With globalisation, the Internet Age, and the march of technology, the life of an engineer is changing rapidly. Today's graduate needs to be flexible, to be able to learn quickly, and to be able to innovate to produce products that cater to local needs and global standards. We have designed the B. Tech. curriculum from the ground up to produce technology-savvy leaders and product designers for the future India. The curriculum has a broad base of courses in sciences, engineering, humanities, creative arts and management. Students have considerable flexibility to specialise in some aspects of their major discipline and optionally in 1 or 2 minor areas. Two of the innovative features of the curriculum are *Practicums* and the *Design & Innovation stream*.

A Practicum is a lab-based course that precedes the corresponding theory course. It encourages self-learning by doing. In some cases, there is no formal theory course.

The Design & Innovation Stream exposes students to various facets of real-world engineering activities throughout their 4 years. Students learn to work in teams to conceive, solve and deploy useful products. This Stream comprises:

1. *Reverse Engineering* in 1st year: understand existing products
2. *Design Practicum* in 2nd year: given a need of society, devise a solution and build a working prototype by the end of the semester



**B.TECH PROJECT CALLED "JUNIOR"
WON 2ND PRIZE AT JED-I AT IISc**



3. *Interactive Socio-technical Practicum* in 3rd year: explore the interaction of technology and society
Major Technical Project in 4th year: capstone project of the B. Tech. programme demonstrating a high degree of technical competence in the discipline.

This curriculum is a work-in-progress, and its efficacy can be judged only after a few batches have graduated. However, our B. Tech. 2009 batch has already notched up a number of notable achievements that make us optimistic for the future:

- ⤴ The IIT Mandi website was designed by 1st year students in early 2010 and run by them for several years
- ⤴ The Online faculty application portal, started as a 3rd semester Practicum project. It became extremely popular as the students supported over 3,000 applicants in early 2011, and is the most successful example of automation of IIT Mandi
- ⤴ Design Practicum projects by 2nd year students: Intelligent drip-irrigation system, Automatic clothes drier, Temperature-controlled magnetic stirrer, 6 different mobile chargers, and many others
- ⤴ Second prize (Rs. 70,000) in the Joy of Engineering Design and Innovation (JED-I) held at IISc, Bangalore. Their entry was a Robotic Arm-Controlled Projected Augmented Reality Interface
- ⤴ Other notable projects include a polling and opinion ranking system, optimisation of building structures for our Kamand campus, and the energy project.
- ⤴ *Road to Rutas* industry simulation competition at IIT Indore: IIT Mandi won the first prize consecutively for two years, 2010 and 2011, against tough competition from the likes of IIT Bombay, BITS Pilani, and IIT Kharagpur
- ⤴ Initiated *Exodia*, the annual technical-cultural fest of IIT Mandi



- ⤴ Initiated assorted cultural, literary, sports and technical events, and student magazines
- ⤴ Volunteering for NSS activities such as Blood Donation Camps, teaching underprivileged children, etc.

It is clear that our students are an outstanding lot. In this Convocation, we are awarding prizes to those who stand out exceptionally. I congratulate the proud recipients of IIT Mandi's first Institute awards.

INTERNATIONAL LINKAGES

Partnerships with leading institutes abroad are an important part of the educational setup of IIT. Foremost among these are the TU9 Universities in Germany, renowned for their rigorous approach to engineering and science. We also have collaborations with smaller, newer institutions that have diverse approaches to education – Blekinge Institute of Technology (BTH) in Sweden, the IT University in Copenhagen, and WPI in Massachusetts. A number of our students, UG and PG, have visited some of these Universities.

Innovation in engineering and in research requires thinking out of the box. This is facilitated by exposure people from widely different cultures, who are likely to approach a problem in very different ways. To this end, we have taken advantage of our serene location and institutional philosophy to attract a number of faculty and students from foreign countries. During 2013, a total of 6 foreign faculty are on extended visits to IIT Mandi for teaching and research.

This year we are running the 3rd year ISTP course in collaboration with WPI, USA. Fifteen WPI students spent 2 months in Kamand working on socially-relevant projects with our students.

Since 2011, we have been running a global software engineering course jointly with the IT University, Copenhagen. The class consisting of students from both sides is taught by faculty from the two institutions.



Students work on term-projects in teams consisting of members from Mandi and Copenhagen.

These foreign faculty and students form a significant multi-cultural presence in our small community.

Besides foreign faculty, we have a number of the best Indian faculty from other IITs visiting especially during May-June. Many of them continue their interactions in research and remote teaching throughout the year.

CONNECTING WITH INDUSTRY

Our faculty are active in organising workshops and conferences to bring industry and academia together.

Recent workshops include:

- ✦ “CII-IIT Industry Conclave”, June 2012
- ✦ A Workshop on “Strategic Research Vision to Build a Smarter Grid”, June 27-29, 2013.
- ✦ A Workshop on “Turbomachinery aerodynamics: design and optimization using CFD”, June 21-24, 2013. Organized by GearedOx, a start-up from IIT Mandi.
- ✦ IIT Mandi hosted the IUATC Workshop on 8-9 March 2013, and the 2nd workshop on Text-to-speech synthesis (TTS) in the Kamand campus on 14-15 June 2013.
- ✦ The “1st National Symposium Nanobiotechnology” was held in June 2012, and the *Society for Nanobiotechnology* was formed with headquarters at IIT Mandi.
- ✦ A 1-week short course on “Computer Aided Drafting for Engineers and Designers”

Experts from industry are invited for guest lectures in on-going courses, and some of them teach courses on



specialised topics. We have sponsored research projects worth over Rs. 2 crores from industry.

PLACEMENTS

The first placements of IIT Mandi students took place this past year. Despite its remote location many top companies visited IIT Mandi and hired our students. These included Altair Engineering, Benchmark, CAD Studio, Cisco, Cognizant, DRDO, Finisar, HPCL, Infosys, Microsoft, Nucleus Software, Samsung, Amazon and others. In all, 88% of our students were placed with an average package of 7.7 lakhs and the highest package of 18 lakhs. Some of our students have gone on for higher studies in research at Carnegie Mellon University, University of Toronto, Penn State and Georgia Tech, and for MBA in IIM and Delhi University.

FACULTY ACHIEVEMENTS AND AWARDS

Exceptional students flourish under exceptional faculty. During the past 3 years, research by our faculty has resulted in over 140 publications in peer-reviewed journals and book chapters. Our faculty have received a number of awards and honours, some are listed below:

Dr. Rahul Vaish received the INSA medal for Young Scientists (2013), and the IEI Young Engineers Award (2012-13)

Dr. Varun Dutt was invited as a lead author of Chapter 2 “Integrated Risk and Uncertainty” in the United Nation's Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report, Addis Ababa, Ethiopia, July, 2013

Dr. Bharat Singh Rajpurohit received the IEI Young Engineers Award 2013-2014 in Electrical Engineering. He received an Alexander V. Humboldt Foundation Fellowship to visit the Technical University of



Dresden, Germany during July 2013

Dr. Sarita Azad received the President's Award for Excellence in 2011 at the Institute for Defence Studies and Analyses (IDSA), New Delhi.

Dr. Ashok Kumar Mocherla received an M. Louise C. Gloeckner Research Fellowship to visit the Drexel University College of Medicine, USA during June-July 2013

In a new, growing IIT, faculty take-up many “Institute building” tasks. Many faculty have enthusiastically given of their time well beyond the call of duty for building the academic programmes, the hostels, extra-curricular activities, planning the new campus, etc. They have not grudged the sacrifice of time from the more usual academic pursuits. Without their unstinting efforts, we would not be where we are today.

CONCLUSION

As I stand here today at the end of these four momentous years, I am deeply thankful to everyone who has made this journey possible. Today, the journey of the graduating students towards an IIT education is complete. You graduands are now embarking on the journey towards the rest of your life. In the years ahead, you will often recall the moments you have known at IIT, the friendships made, the wise words and helping hands of your teachers. You are going forth into the world to make your mark, to serve your fellow humans, especially those less advantaged than you. In your journey into the future, always cherish the years that you spent in this nascent institute, and hold high the banner of IIT Mandi. May the world welcome you with open arms and know the keen minds and the caring hearts that we have all come to love and cherish.





Addendum to Director's Report

Ranjit Singh will receive the M.S. degree for his thesis titled *Modeling and Performance Analysis of Three Phase Grid Connected Solar Photovoltaic System*. He was guided by Dr. B. S. Rajpurohit of the School of Computing & Electrical Engineering. Ranjit has proposed several efficient and intelligent maximum power point tracking algorithms for a grid connected solar photovoltaic system. He is interested in pursuing an academic career.

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Distinguished Visiting Professor
Indian Institute of Technology Mandi

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SECRETARY

Dr. R. C. Sawhney
Registrar (I/c)
Indian Institute of Technology Mandi



SCHOOLS

The Indian Institute of Technology (IIT) Mandi encourages the synergistic mingling of minds. The faculty are organised in broad multi-disciplinary schools. The offices and labs of the different schools are mixed and shared. While some faculty work in pure research, others work on applied research in collaboration with industry. IIT Mandi has a strategic focus on partnerships with like-minded institutions and industries in India and abroad.

School of Computing & Electrical Engineering

This school brings together faculty involved in the key technologies of the Information Age. These include computer science, communications, VLSI, microelectronics, and electrical energy. The faculty are interested in delving into the underlying fundamental principles of information theory, theory of computation, artificial intelligence, communication theory, quantum mechanics, and the laws of electromagnetism and applying the understanding gained to pressing needs of society, through initiatives such as Information and Communications Technology (ICT) for sustainable development, and green and renewable energy technologies.



FACULTY



Faculty members and their specialisation

- Dr. Anil K. Sao (Chairperson; Image processing)
- Dr. Samar Agnihotri (Information Theory, Communication Complexity, Wireless Communications)
- Dr. Tricha Anjali (Computer Networks, Wireless Networks)
- Dr. Sukumar Bhattacharya (Web-scale Information Retrieval)
- Dr. Arnav Bhavsar (Image Analysis, Computer Vision)
- Dr. Dileep A. D. (Pattern Recognition, Kernel Methods for Pattern Analysis, Machine Learning, Speech Technology, Computer Vision)
- Dr. Varun Dutt (Artificial Intelligence, Judgment and Decision Making, and Environmental Decision Making)
- Dr. Timothy A. Gonsalves (Computer networks and distributed software systems)
- Dr. Arti Kashyap (Magnetism and magnetic materials)
- Dr. Paola Di Maio (Complex systems (socio-technical) and Web Intelligence)
- Dr. Tanmoy Maiti (Electronic Materials and Devices, Nanophotonics)
- Dr. Ramesh Oruganti (Power Electronics, Solar photovoltaic energy systems)
- Dr. Bharat Singh Rajpurohit (Power Electronics Application to Power Systems)
- Dr. Satinder Kumar Sharma (Nanoelectronics, Sensors, Photovoltaic & Self Assembly)
- Dr. Anand Srivastava (Optical and Access Networks)



School of Engineering

This school covers tangible physical structures and artefacts such as transport vehicles, transport systems, machines, materials, manufacturing, designs etc. The underlying principles are classical mechanics, atomic physics, and thermodynamics. Faculty from the traditional departments of mechanical, civil, aerospace, metallurgy, and material engineering are part of this school.

Faculty members and their specialisation

- Dr. Rahul Vaish (Chairperson; Glasses & Glass-ceramics)
- Dr. Ankit Bansal (Radiative Heat Transfer)
- Dr. Vishal Singh Chauhan (Design Engg., Electromagnetic Radiation during Deformation of metals and alloys, Solid Mechanics, FEM)
- Dr. Akansha Dwivedi (Multifunctional Electroceramic Materials & Devices)
- Dr. P. Anil Kishan (Computational Fluid Dynamics)
- Dr. Rajeev Kumar (Solid Mechanics, Vibration, FEM, Optimization)
- Dr. Shripad P. Mahulikar (Heat Transfer, Thermodynamics, Aerospace)
- Dr. Sudhir Kumar Pandey (Condensed Matter Physics and Material Science)
- Dr. Subrata Ray (Physical metallurgy, Composites and Tribology)
- Dr. Om Prakash Singh (Heat and mass transfer, Double diffusive convection, IC engine)



School of Basic Sciences

The School of Basic Sciences includes mathematics, physics, chemistry, and life sciences. The faculty are involved in theoretical and experimental research. They work closely with their engineering colleagues on R&D projects.

Faculty members and their specialisation

- Dr. Subrata Ghosh (Chairperson; Organic Chemistry)
- Dr. Syed Abbas (Differential Equations and Ecological modelling)
- Dr. Sarita Azad (Statistical Time Series Analysis)
- Dr. A. Chakraborty (Theoretical Chemistry)
- Dr. P. C. Deshmukh (Atomic and Molecular Physics)
- Dr. Abhimanew Dhir (Supramolecular Chemistry)
- Dr. Kenneth Gonsalves (Materials Synthesis)
- Dr. Prasanth P. Jose (soft condensed matter physics)
- Dr. Arti Kashyap (Magnetism and magnetic materials)
- Dr. Venkata Krishnan (Materials Chemistry, X-ray Science)
- Dr. Nitu Kumari (Applied Mathematics)



- Dr. Lalit Malhotra (Thin Film Physics and Technology)
- Dr. Kaustav Mukherjee (Experimental Condensed Matter Physics)
- Dr. Chayan K. Nandi (Physical Chemistry)
- Dr. Suman Kalyan Pal (Fast and Ultrafast Laser Spectroscopy)
- Dr. Pradeep Parameswaran (Inorganic/Materials/Nano-Chemistry)
- Dr. Pradyumna Kumar Pathak (Quantum Optics, Quantum Information, and Nanophotonics)
- Dr. Bindu Radhamany (X-ray spectroscopy)
- Dr. P. C. Ravikumar (Organic Chemistry)
- Dr. Rajendra K. Ray (Computational Fluid Dynamics, Numerical Methods for PDEs)
- Dr. Ramesh Chand Sawhney (Endocrinology & Metabolism, High Altitude Physiology, Herbal Medicines)
- Dr. Prem Felix Siril (Chemistry of Nanomaterials)
- Dr. Ajay Soni (Nanomaterials and Experimental Condense Matter Physics)
- Dr. Tulika Prakash Srivastava (Bioinformatics, Systems Biology, Metagenomics, Comparative Genomics, Protein Function, and Structural analysis)
- Dr. Manoj Thakur (Optimization, Soft Computing, Machine Learning & its Application to Computational Finance, Protein Function and Structural analysis)
- Dr. Hari Varma (Atomic and Molecular physics)
- Dr. C. S. Yadav (Low Temperature Physics)



School of Humanities and Social Sciences

Modern engineers work in teams to create, improve, and apply technology for the benefit of society. For modern engineers developing technologies, products, and processes that will see widespread use, a good understanding of language, history, culture, policy, sociology, economics, management, ecology, and psychology is essential. This school is thus an important part of IIT Mandi. Along with the goal to train the engineering students, the school aims to conduct advanced research in history, language, literature, cultural studies, psychology, economics, management, and policy studies, etc.

Faculty members and their specialisation

- Dr. Ashok Kumar M(Chairperson; Sociology of Religion, Caste and Christianity in India)
- Dr. Manu V. Devadevan (Literary practices in South Asia, Political and economic processes in pre-modern South Asia & South Asian Epigraphy)
- Dr. Rajeshwari Dutt (Latin America, Social and Cultural History, Indigenous studies)
- Dr. Varun Dutt (Artificial Intelligence, Judgment and Decision Making, and Environmental Decision Making)
- Dr. Bhavender Paul (Management Strategy, Managerial Finance, Biotechnology & Pharmaceutical Technology)
- Dr. Ramna (Development Economics)



- Dr. Shail Shankar (Identity and group dynamics, Health and Well Being)
- Dr. Balasundaram Subramanian (German Studies and Political Philosophy)
- Dr. Suman (Colonialism, Postcolonialism, Imperialism, and Romance Literature)
- Ms. Delia Hornfeck (German as a Foreign Language, TELC Lizenz, Dipl Soz.)



MEDALS AND PRIZES

PRESIDENT OF INDIA GOLD MEDAL

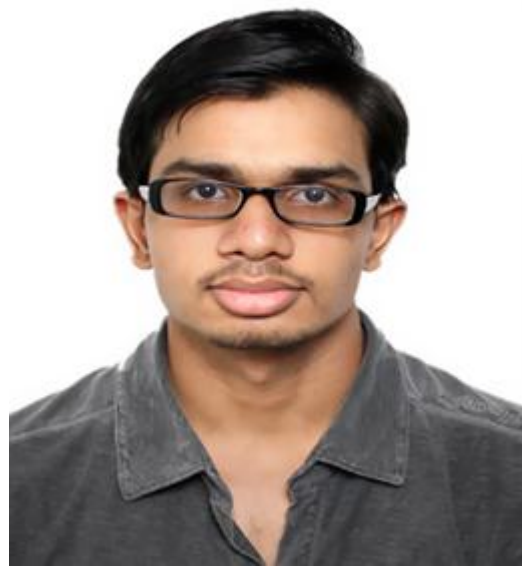


DEVINDER YADAV B09009

COMPUTER SCIENCE AND ENGINEERING



DIRECTOR'S GOLD MEDAL



SAURABH JAIN B09069

ELECTRICAL ENGINEERING



INSTITUTE SILVER MEDALS



DEVINDER YADAV B09009

COMPUTER SCIENCE & ENGINEERING



V VIGNESH B09075

ELECTRICAL ENGINEERING



MRINMOY BISWAS B09122

MECHANICAL ENGINEERING

BALASUNDARAM ENDOWMENT PRIZE FOR GERMAN



AMANJOT KAUR B09004

COMPUTER SCIENCE & ENGINEERING



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M.S. STUDENTS

Master of Science (By Research)

NAME

ENROLMENT NO.

Shejin T

S10003

Title of thesis: *Significance of Dictionary for Sparse Coding based Face Recognition*

A large variety of systems require authentication/validation of the person using it in order to confirm that a legitimate person is accessing the services provided. Examples of such systems are ATM, Computers, border control etc. Automatic recognition of human identity from his/her face images is called face recognition. Recently, a novel pattern recognition frame work, which relies on a concept called sparse representation, is applied to automatic face recognition. ‘Dictionary’, which represents the training face images, is a very crucial part of such a system. The significance of dictionary is overlooked in the literature



and related work with an assumption that a very large number of training data is available. This assumption may not be true in the real world scenario. Our research was on establishing the significance of dictionary in sparse coding based face recognition. As a result of the work, a new dictionary is proposed, analyzed and proved to outperform the existing dictionaries in terms of recognition rate in sparse coding based face recognition scenario. Further, a more general face recognition system is proposed in sparse coding framework, which can accommodate pose variations in the acquired images, with the help of the proposed dictionary.

Annual Progress Committee

Dr. Anil Kumar Sao (Guide)
Dr. Sukumar Bhattacharya (Chair)
Dr. Varun Dutt
Dr. Ankit Bansal
Dr. Samar Agnihotri



PH.D. STUDENTS

Doctor of Philosophy

NAME

ENROLMENT NO.

Priyanka Manchanda

D11048

Title of thesis: *Magnetic properties of multilayers and some bulk alloys: An ab-initio study*

Magnetic multilayers and thin-films consist of magnetic and non-magnetic materials and possess exotic scientific properties such as oscillatory interlayer exchange coupling and giant magneto-resistance. These magnetic multilayers are used in many applications such as ultrahigh density magnetic recording, spin valves and read head of hard disks. In this thesis, we have explored various magnetic thin films and multilayers to study the magnetization and magnetic anisotropy, that is, ease to change the magnetization direction. The main focus is to study the magnetic multilayer of 3d/4d and 3d/5d transition metal elements.

Such systems exhibit high magnetic moment and magnetic anisotropy and therefore are useful in many applications. Further, control of magnetic properties with the application of external electric field is studied. The significant change in magnetic moment and magnetic anisotropy energy is observed in the presence of external electric field. Such systems can be used in electric-field controlled magnetic data storage and switching devices.



Doctoral Committee

Dr. Arti Kashyap (Guide)

Dr. Hari Varma (Chair)

Dr. Bindu Radhamany

Dr. Suman Kalyan Pal

Dr. Sudhir Kumar Pandey



CONVOCAATION 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.



CONVOCAATION DRESS



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 be environmentally responsible and 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

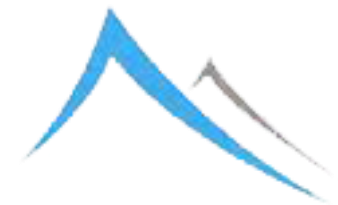
Respected Chief Guest, Shri Subodh Bhargava, Guests of Honour, Shri M. Natarajan, Chairman Board of Governors, members of Board of Governors, and the members of the Senate of the Institute, distinguished guests, the graduating students and their family members, my faculty and staff colleagues, dear students, media persons, friends, ladies and gentlemen - it gives me a great pleasure to extend a very warm welcome to you all on the occasion of the First Convocation Ceremony of the Indian Institute of Technology Mandi.

Let me start by narrating my experience with IIT Mandi. Before joining the institute I had no idea about the place and that it even existed in Himachal.

New IITs had never been a part of my plan and I was all set to take a drop and prepare for JEE again, since my rank would not allow me to get computer science in any of the old IITs. But my parents encouraged me to apply for at least one new IIT and so I did. But even then I had only opted for IIT Indore CSE as a choice since it was closer to home and in a relatively decent city. But fate had something else planned for me, there was a printing mistake in my counselling brochure, the codes of IIT Indore and IIT Mandi had been exchanged and so I ended up getting CSE at IIT Mandi. I still remember how shocked I was and afraid of what the future held for me



RAJ KAMAL SINGH
B. Tech. CSE, 2013



when I was informed about this. But looking back today, when I can connect all the dots, I have no doubt that it was the best thing that could have happened to me.

We've all had similar beginnings here. As the first ever batch to come to Mandi, most of us did not know much about IIT at Mandi. And most of us were skeptical about the future prospects of becoming a member of the first batch of a new IIT in a remote location. There were so many uncertainties and no guarantee of success. We were all in a way risking the founding years of our careers on an adventure, much like the founding members of a startup do. And looking back now, as we are out there in the world, working as engineers, pursuing higher studies and making a difference, I can confidently say that it all turned out well.

IIT Mandi has been a journey of transformation for all of us. We've had an experience of venturing into the unknown and emerging out successfully. We have been an integral part of the building up of our institute from the very beginning both in terms of people and infrastructure. Things were never easy for us in either the academic or the non-academic arenas. While people in other colleges have an existing extra-curricular setup waiting for them to excel through, we had to setup everything from scratch. Our academic curriculum was also designed from scratch and stabilized. We knew it wasn't going to be easy to cope up with the new environment and excel. This new start, however, helped us gain unique knowledge and experience that set us apart from our counterparts in other institutes. At IIT Mandi, with so many things to setup and handle, juggling responsibilities was a norm. The average number of courses that our batch did per semester was higher than what most of our contemporaries in other IITs had to. The extra-curricular responsibilities that we undertook as a part of growth of the institute were also extraordinary. Developing multiple projects along with managing responsibilities in several extra-curricular activities was more of a norm than an exception. This, I personally believe has proved to be a great gift. Today, I see my fellow new hires finding it stressful having to participate in more than one project at a time in the workplace, while I easily cruise



through on juggling responsibilities in multiple projects and work areas at the same time.

The defining quality of our batch is that each and every one of us sitting here is capable of handling extreme stress in constantly changing environments with no clear knowledge or instructions on how to proceed. We know how to forge our own path even when no precedent exists. It's true that being a part of the first batch at a new IIT in a remote place was tough, but the journey has refined our capabilities as a result. On the lines of what Robert Frost says in his poem, we went down the road not taken before and it certainly made all the difference for us.

Today we are here, with a graduation degree in our hands, prepared to move on in life, nicely dressed up in traditional attire, living up to our goal of becoming an IITian with a difference. It is one of the biggest days of our lives. This assembly is brimming with emotions. Emotions of Joy, nostalgia coupled with a little sadness, a sense of achievement and for some the sense of freedom of finally graduating from here. Today we step out into the world. Just like we had the responsibility and opportunity of building up our institute from scratch, we now have a similar responsibility of making a name for our alma mater. Every organization is known by its products. For an educational institute, it's the alumni. We are the first ever products of our institute, and it is up to us to take its name and reputation to big heights.

This responsibility is very challenging on its own, but I am very confident that IIT Mandi has prepared us well to bear it. The first time I introduced myself to my team at my company, they didn't know that a place called Mandi existed and I also got the usual skeptical question of "When did that IIT open". But today as I rub shoulders with graduates from other well-known older institutes, excelling at what I do and earn their respect, I feel the satisfaction of fulfilling a part of my responsibility to my alma mater.

Out in the world, all of us are again faced with the familiar situation that we faced 4 years ago. We are going



out in the unknown, faced with uncertainties about what the future holds for us. The going will never be easy for us. Wherever we go, we will be considered underdogs. We will never have the perks that come with an established brand. But it will be up to us to establish the brand of IIT Mandi. And what is the fun in having an easy ride anyways? Being an underdog gives us the drive that none of the people from established institutes have. And I have no doubt that each and every single one of us is capable of enormous achievements.

I would also like to thank all the faculty and staff of IIT Mandi who helped us in our journey of 4 years. Just like us, they were also on a similar adventure and I would like to thank all of them for coming through for us. The staff was always working hard to provision and maintain facilities for us even though their task was made tougher by the temporary nature of the whole setup. The faculty members were always there to guide and motivate us when we were lost or were having a tough time. The major perk of being at IIT Mandi was that with such a small, closely-knit community, we all knew each other well. Nowhere else do you get to meet your director and the deans on such a regular basis and interact with faculty members on such a personal level.

As I draw up to a close, I will urge my classmates to never underestimate what we are capable of, never underestimate the power we have to be successful. We are all lucky to have had an opportunity of being the first batch of IIT Mandi, and the experience we gained as a result has helped us become more capable than the rest. So let's just go out there in the world and show them what IIT Mandi graduates are capable of. All the best for your future endeavors dear students and once again a big thank you to my Alma mater IIT Mandi for having instilled in me the virtues of being an IITian.



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