



IIT Mandi Scaling the Heights

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IIT Mandi in 2010: Dream or Folly?





Strategy for an IIT

Globally, many paths to prominence as a research University. Eg:

Name	Size	PG	Scope	Yrs	Nature	Strategy
Stuttgart	25K	47%	S&T	185	Public	Industry
Caltech	2K	55%	S&T	125	Private	Nat'l labs
MIT	11K	65%	ST&M	150	Private	Teaching, product, startups, industry, Nat'l labs
Stanford	16K	55%	General	125	Private	Product, startups, industry, Nat'l labs
NUS	37K	27%	General	100	Public	Partnerships, Nat'l labs

→ Technology excellence through focus on local and national needs



Vision

to be a leader in science and technology
education, knowledge creation and
innovation,
in an India that is marching towards a
just, inclusive and sustainable society 4



IIT Mandi Strategy

- **Focus on a few areas** – especially regional and national relevance
- **Partnerships** with like-minded institutions in India and abroad
 - IIT-M, IIT-D, IIT-K, IIT-B, IIT-R, IIT-H, IISc
 - Conclave of VCs of Himachal and J&K
 - TU9 MOU May 2011 – Rs. 3+ crores (€450K+) from India and Germany for exchange of faculty
- **Inter-disciplinary** culture, organisation, academics
- Exploit **Locational advantage**



Towards Innovation

Inter-disciplinary academic culture

Design-oriented B.Tech. curriculum

Real-world team projects from Year 1 to 4

Ingredients:

Learn-by-doing,
teamwork, driven by
needs of society,
strong humanities
component

1st Yr

Reverse
Engineering

2nd Yr

Product
Development

3rd Yr

Technology &
society

4th Yr

Major technical
project – product,
patent, publish

Students develop
practical devices that meet
real-world needs

Innovative Curriculum

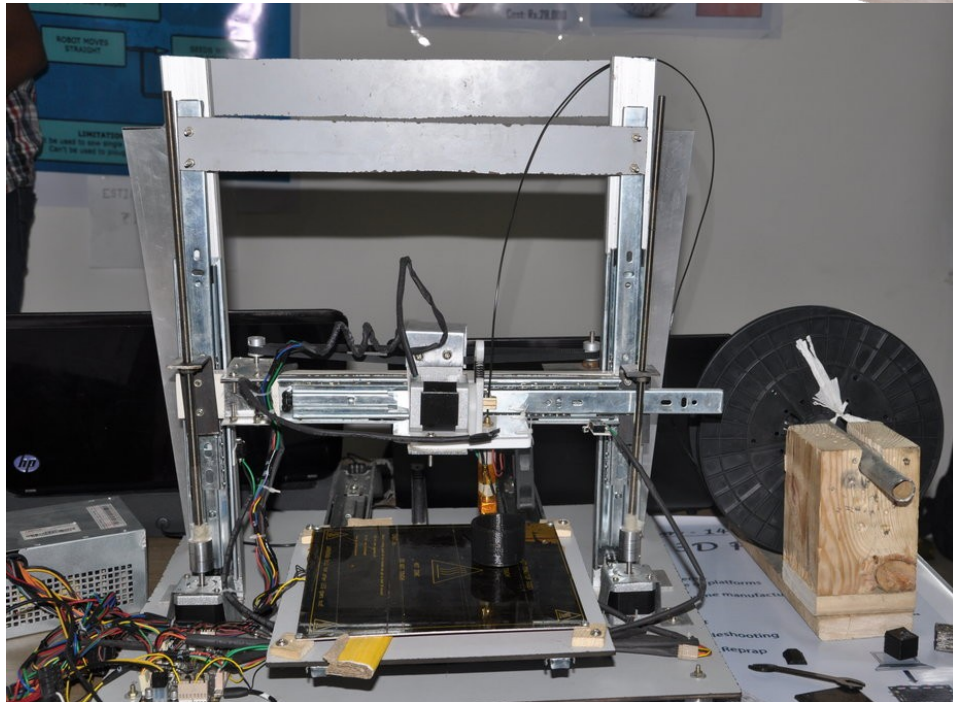
Eg. 2nd B.Tech. students design and build products for society:

Pre-paid EB meter
voice-controlled wheel-
chair
gas-leak detector
intelligent drip irrigation
smart whiteboard
oil-spill remover
clothes drier
...



Innovation by 2nd BTech

Low-cost 3D printer
Rs. 25,000 / \$400



Smart
Cane



*Formula car by
SAE Club*



Socio-Technical Practicum

3rd BTech Practicum

Projects on social impact of
technology

15-25 UG students from WP
US resident in
Kamand for 3 months/year

- Direct solar lighting for village houses
- Quality of milk
- Irrigation in the Himalayas
- Hill farm mechanisation
- Womens education
- ...





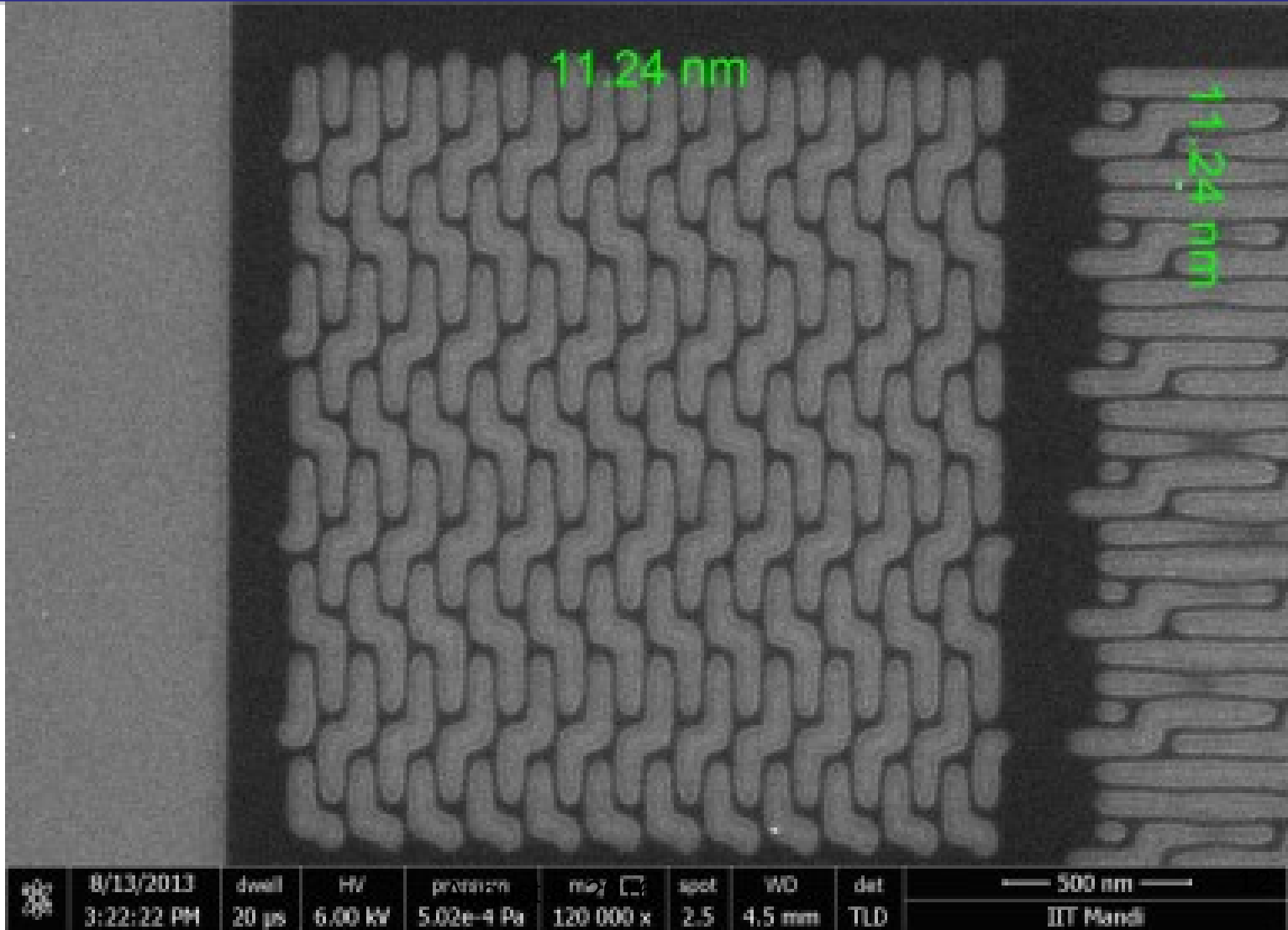
Focus: Materials

Advanced Materials Research Centre

Centre for Fabrication & Design of Microelectronics

- 2 Distinguished Professors + 25 young faculty with expertise in materials
 - from molecules to devices to applications
- National needs: Electronics, electrical, biomedical applications
- Sophisticated instruments installed/ordered
 - 32 cr / \$5m installed + 20 cr / \$3m (ordered/planned)
- \$315,000 from Intel Corp, US for next-generation VLSI photo-resist material
 - State-of-the-art: 22 nm
 - IIT Mandi: 20 nm, working on 16 nm
 - Network of labs in India, Brazil, Mexico & US

FESEM Image of IIT-Mandi Synthesized MAPDST Homopolymer EUV Resist For Next Generation Lithography





MAS: Machine Learning Applications and Systems

Text-to-Speech synthesis systems for 12 Indian languages funded by DIT

Consortium led by IIT-M, **IIT Mandi – Rajasthan**

Visually challenged people will be main stream

Detection of cervical cancer cells

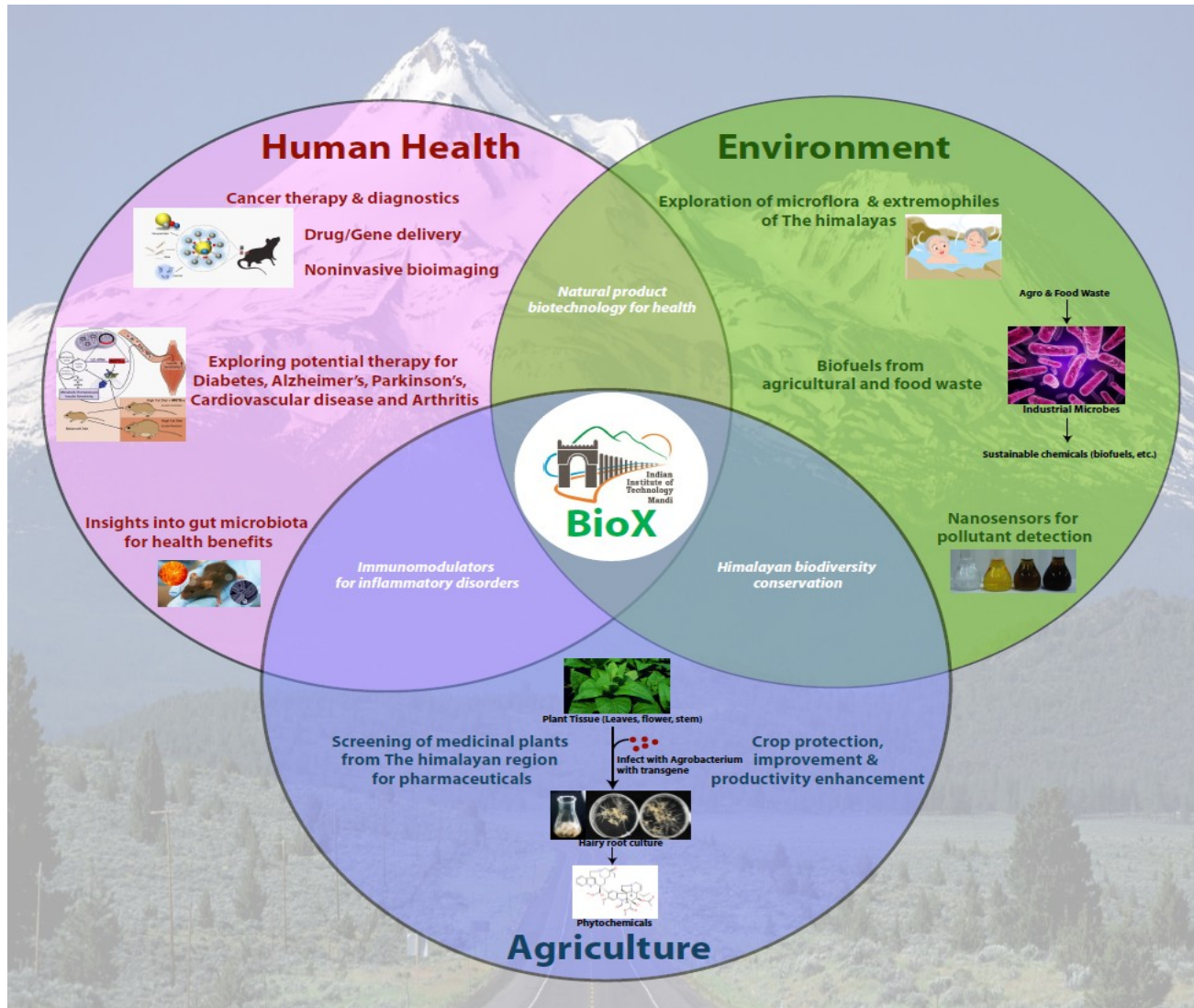
With KIDWAI Memorial Institute of Oncology, Aindra Pvt. Ltd, Bangalore

Interaction with PGI, Chandigarh to develop the systems for diagnosis

Low-cost point-of-care diagnostic devices

2 Mentor Profs + 7 young faculty

BioX – systems biology and synthetic biology



12 faculty
Rs. 2 cr sponsored
projects

Affordable medical
devices for
diagnostics and
therapeutics

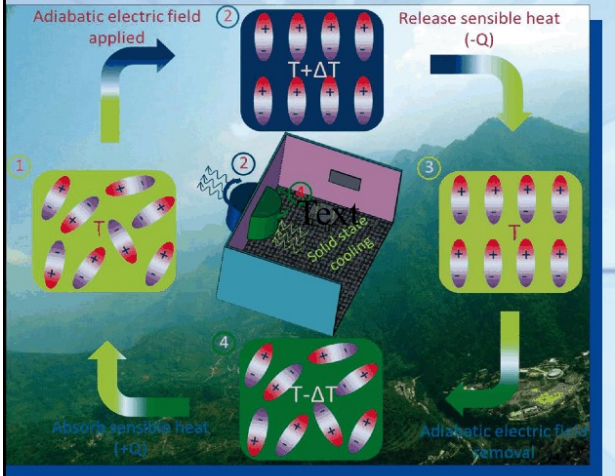
- Solar PV materials and systems
- Renewable energy sources
- Materials for high density energy storage, fuel cells, carbon sequestration, ...
- 12 faculty + 1 mentor professor
 - Rs. 5 crores sponsored projects
 - MTech Energy Engg

Text

Energy Technology

Generation, Conversion, Storage, Distribution

2/2015



Cover Picture: Illustration of the solid-state cooling application and mechanism in ferroelectric materials for possible application in refrigeration and air-conditioning systems (R. Vaish)

www.entechmol.de WILEY-VCH



... Other Research Areas

- Research in assorted other areas:
 - Computer Science
 - Electrical Engineering
 - Mechanical Engineering: thermal, fluids, automotive, fracture mechanics
 - Civil Engineering
 - Maths: fractional differential equations, financial analysis, computational fluid dynamics, chaos theory
 - Physics, Chemistry, Life sciences
 - Humanities: English literature, German, history, economics, management, sociology, psychology



Globalisation

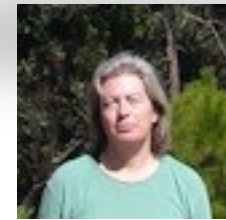


Active MoU with TU9 in Germany since May 2011

Over 20 visits by IIT to TU9, 12 visits from Germany

Funding from India and Germany for exchange visits:

3-month stay by faculty and post-docs in both directions



Foreign visitors at IIT in 2015-16 (a few weeks to a few years):

5 faculty, 30 students – Europe, N. America, Africa





Numbers

	<i>2013</i>	<i>2016</i>	<i>2019</i>	<i>2029</i>
BTech	478 (3)	500 (4)	1200 (4)	2000 (6)
MTech/MSc		100 (6)	700 (12)	1000 (22)
MS/PhD	108	200	1100	2000
Total	586	800	3000	5000
Faculty	55	85	300	500
Technical	20	90	300	500
Admin	25	60	120	270

Alumni: 16 PhD, 32 MS, 425 BTech

Students = number on roll (number of programmes)

Technical = postdocs, project staff, permanent technical staff

Admin = permanent non-technical staff

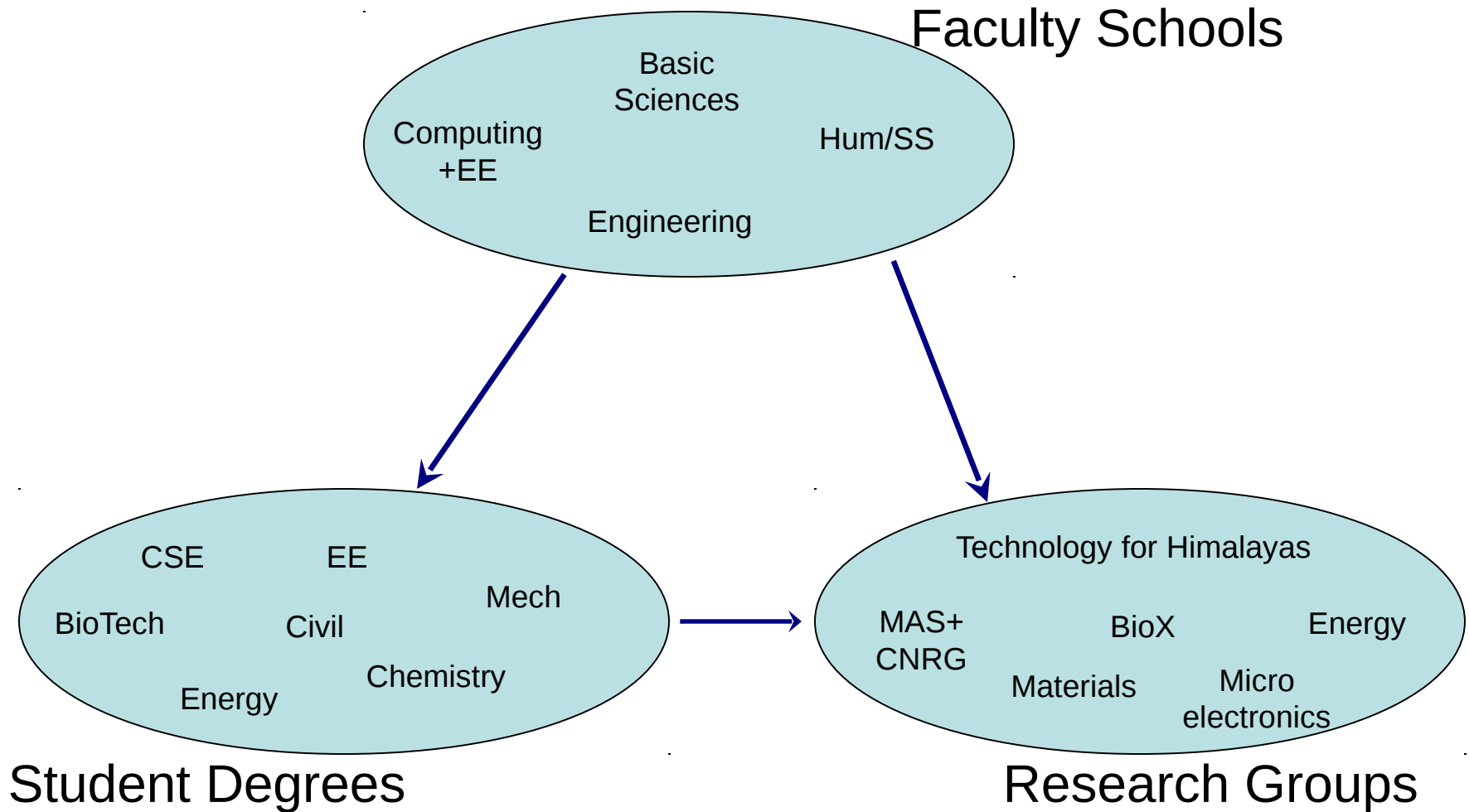
Tentative
18
numbers

Degrees

- 4-yr BTech programmes:
 - Computer Science & Engg
 - Electrical Engg
 - Mechanical Engg
 - Civil Engg

Minors in many areas
- 2-yr MTech/MSc programmes:
 - Energy Materials, Chemistry, Physics, Biotech, Maths, VLSI
- MS (research) and PhD
 - Engineering, sciences and humanities

Academic Organisation





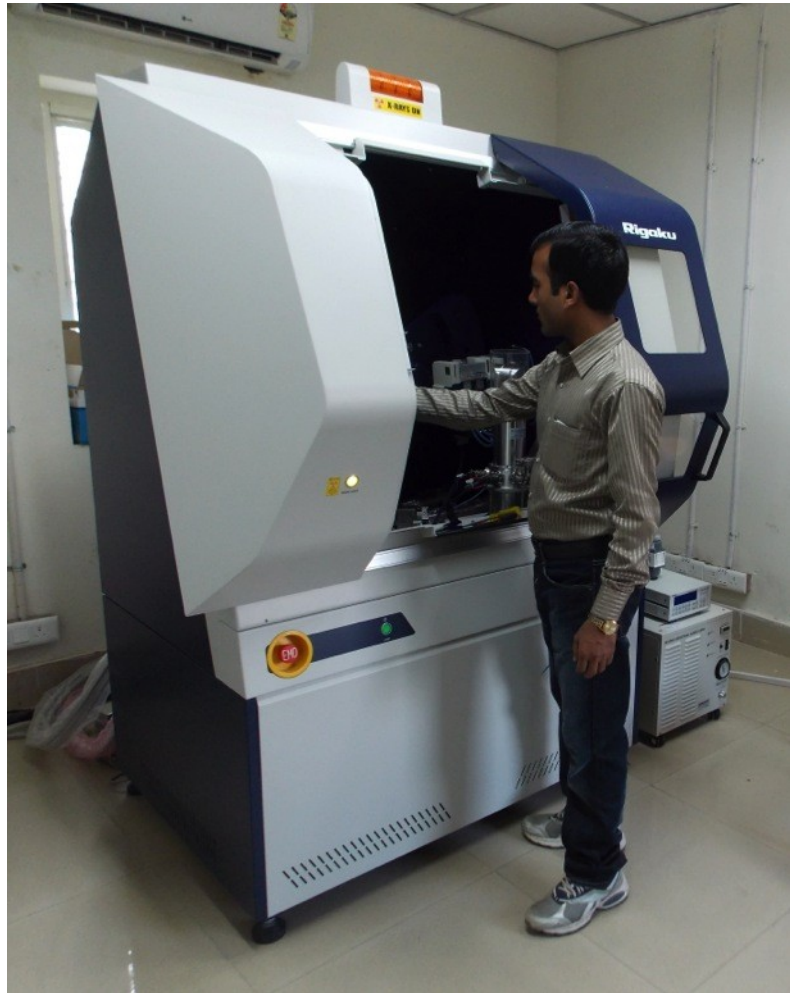


New Campus at Kamand

Our Unique Advantage

- **Strategy: Incrementally build-use**
- Used from May 2012
- Currently, about 25,000 sqm
- 95% students and 50% faculty in the new residential campus
- 1,50,000 sqm under construction
 - 100% of IIT residential by Feb 2016
 - Space for 2,000+ students, 180 faculty, plus staff by end-2017

Rigaku XRD
Rs. 1.75 crores



NKN Electronic
Classroom
100 Mb/s Connectivity

*Renovated Stable
in Kamand*



Kamand Oct '14

North campus

South campus

Kamand

Uhl River



Kamand campus activities



Achievements ...

*1st New IIT to develop its
Residential campus*

25 new buildings
20,000 sqm
750 students
50 faculty

IITiansTech: First alumni startup
1st Aug 2014



Exchange visits with TU9



... Some Achievements

- 90+ highly qualified faculty, mostly young
- Sponsored R&D worth Rs. 32 crores
 - Rs. 9 crores from industry
- Research publications in the best international journals
- 475 alumni in industry, academia, public sector – in India and globally
 - Pradeep Seervi: GATE(EE) topper, 2015
 - Aamir Khan: Civil Services 2nd rank, 2016
 - IITians Tech – 1st startup in 2014, several others since
- Strategic partnership with TU9, Germany



Technology Business Incubator

- E-Cell active for several years
- Entrepreneurship course for BTech
- IITians Tech – 1st startup in 2014, several others since
- Rs. 9 crores R&D funding from industry (US & India)

IIT Mandi Catalyst launched on 15th May 2016

- Rs. 5 crores seed funding from DST
- Rs. 8 crores from IIT (including 1,100 sqm space)
- Land committed by HP Govt



Opportunities at IIT

- **Asst/Assoc Professor (tenure-track)**
 - Engineering: CSE, EE, ME
 - Maths, biology, English, economics, management, ...
- **Visiting Faculty (all levels)**
 - Short-term (we provide local hospitality)
 - Long-term (we provide travel, salary, local hospitality)
 - Research and teaching
- **Exchange students**
 - Especially for socially-relevant projects
 - Our students: for internships, research



Professional Life in IIT

- **Salary equivalent to US academia on PPP basis**
 - No limit on earnings from consultancy
- Rs. 13.5 lakhs initial 3 years (seed grant, PDA, ...)
- Rs. 10 lakhs – 10 crores for establishing labs
- **Largely young faculty →**
 - Initiate labs, curriculum, etc
 - lead the School, student activities, etc.
 - represent IIT in India and abroad
- **Very liberal external funding**
 - Rs. 25+ lakhs with almost 100% success rate
 - Large projects up to several crores
 - Industry eager to fund IITs – liberal terms, with deliverables
- **Projects with bright B.Techs – 2nd, 3rd, 4th years**
- **Outreach to mountain village society**



Residential Life in Kamand

- Sports, shops, 2 banks, 5 canteens, medical unit + ambulance, creche
- Clean, unpolluted fresh air and scenic walks at your doorstep, adventure sports nearby
- Primary school Secondary school later
- Regular bus/car services to Mandi
- Free taxi to/from Delhi annually
- Connectivity:
 - Kullu: 1h15m to campus, 1 flight per day, subject to weather
 - Dharamsala: 3h30m scenic drive to campus, 2 flights per day
 - Chandigarh: 6 hours drive, many flights, trains and buses
 - Delhi: comfortable overnight buses
 - 4-lane NH Chandigarh – Mandi in 3 years → 3-4 hours
 - Even VIP visitors spend at least 24 hours with us!



Scaling the heights



Capitalising on our unique locational advantage

A modest beginning on the arduous journey to
making *Mandi a household name globally*

**We invite you to join in this exciting journey
to build the future**