



2014-2019 A Program Snapshot



Newsletter - A Special Edition

PROGRAM OBJECTIVES

Tata Centre for Technology and Design, IIT Bombay (TCTD, IITB), has been established for the purpose of developing & designing technology solutions to take on the unmet needs of resource-constrained communities within India and across the world. Using an end to end innovation approach, TCTD, IITB acts as a virtual centre with research and academic components that draw faculty members and graduate students from various units across IIT Bombay.

The **objectives** have been:

 To explore and develop a program that places heavy emphasis on affordability and performance in the areas of health care, energy, water, food, agriculture, housing and infrastructure

- To address the challenges faced by resource-constrained communities within India and across the world by developing appropriate solutions
- To conduct research and offer academic exposure in technology and design to graduate students, by operating as an interdepartmental entity within IITB
- To develop Professionals who will be equipped to apply their training in any resource constrained setting
- To offer continuing education courses for the working Professionals covering different stages of the innovation process

Work at TCTD, IIT Bombay 2014 - 2019

It will be five years since Tata Centre for Technology and Design has been at work, at IIT Bombay. This virtual Centre has had its activities spread across the academic, research and immersive spaces, with a support system that has fueled the Centre's progress all along. This special edition of Tata Centre's newsletter Turning Point is a snapshot of the program that it is today.

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A Glimpse of Tata Centre 2014 - 2019



ACADEMIC COMPONENT



The number of Tata Fellows has grown significantly to 95 students since 2014. The content in the Centre's three courses - End to End Innovation - in fall (MNG 629) and spring (MNG 630) and lab course on Technology and Design have changed the perception among the students as their familiarity to development challenges is much more now. These courses have not just trained Tata Fellows, but also managed to interest 122 non-Tata Fellows who have had much to learn.

Image 1: Tata Fellows' selection process



Number of Tata Fellows, from 2014 to

COURSES CONDUCTED

End to End Innovation I & II

ProSeminar Course	Brief of Topics Covered
Core Faculty: Prof. Shishir Jha and Prof. Arti Kalro, Shailesh J Mehta School of Management	 Perspective on Development Unequal by technology, market, policy, culture Centralized Planning vs. Decentralized Development New Product Development Research Methods: Qualitative and quantitative approaches Case studies Go to Market Strategies, Diffusion of Innovation, Systems Thinking Approach using documented & real case studies Effective communication skills Applying ProSeminar to projects by Tata Fellows

Lab course on Technology and Design

A third lab course on Technology and Design, trains the students on various mechanical and electrical fabrication tools and machines. The course emphasizes on project-based learning and students are required to build gadgets with the desired functionality.

Lab Course Technology and Design	Brief of Topics Covered
Core Faculty: Prof. Santosh Noronha and Prof. Arindam Sarkar, Dept. of Chemical Engineering	 Lectures on fundamentals of need, innovation, technology, design, development and deployment of solutions Manufacturing machine and equipment training Hands on practice on the machines in the Product Realisation Lab to build a working prototype Mini projects based on need assessment and clearly defined problem statements Producing a working unit by including testing, demonstrating and assessing its performance Presenting the solution with its business plan

Impact of ProSeminar

Proseminar offers a vantage perspective from the cusp of engineering, social aspects and entrepreneurship. Tata Fellows have benefitted by understanding the significance of Need Validation, Stakeholder Analysis, Technology Development Challenge and End-to-End Innovation. Tata Fellows have expressed that there is clear distinction when they compare themselves to their (non-Tata Fellow) batch-mates in terms of understanding, approaching and solving a human design problem.







Image 2: The academic component with Tata Fellows









Image 3: Guest faculty at the ProSeminar

RESEARCH COMPONENT

Since inception, TCTD, IITB has received an overwhelming number of over 160 project ideas from about 100 IIT Bombay faculty members. The estimated number of approved proposals over the past four years has been 85.





Shailesh J. Mehla School of Management Metallurgical Engineering and Materials Science Department of Electrical Engineering Department of Biosciences and Bicengineering Centre for Technology Alternatives for Rural Areas Department of Chemical Engineering Department of Physics Engineering Center for Environmental Science and Engineering Department of Energy Science and Engineering Department of Earth Sciences Department of Civil Engineering Department of Humanities and Social Sciences IDC School of Design Department of Mechanical Engineering Center for Environmental Science and Engineering Department of Computer Science and Engineering C-USE Centre for Urban Science and Engineering Industrical Engineering and Operations Research Department of Aerospace Engineering



Figure 4: Cross-section of faculty members from across IIT Bombay

Turning Point, January 2019

The amounts spent has depended on the outlay specified in the domain- specific projects. A few domains such as healthcare and waste management have occupied a larger chunk of the pie, as per their needs and the projected impact of the translated solutions. Figure 5 indicates the percentage spread of project amounts allocated to the seven domains.



Figure 5: A piece for every domain

At TCTD, IITB, the progress of the ongoing projects is judged as per the SRL (solution readiness level). This indicator was defined by the Centre in mid-2017 considering the parameters that the projects had adhered to at every stage. The following Chart 1 is self-explanatory. Based on the SRL chart, TCTD, IITB maps out its projects on a regular basis. The current figure of active projects is around 60.



Solution Readiness Level (SRL) - For Project progress

Chart 2

The SRL progress of projects is seen in Figure 7.



Figure 7: SRL Progress

Evolving of Research Projects

The current project proposals are not about basic science, research and publications anymore. Instead, they look into the need that has been identified. The intent to access the market is being seen, the ability to do so is still evolving. The gap between working on research ideas and conducting stakeholders' analysis and need validation is being bridged with the associated IITB research community. The gap between working on research ideas and conducting stakeholders' analysis and need validation is being bridged with the associated research

community with student and various educational institutions – Tata Institute of Social Sciences (TISS), Nagpur Veterinary College, Tatyasaheb Kore College of Engineering and Government Polytechnique College, Kolhapur, MIT-Tata Center, and Chicago Booth School of Management.

PATENTS

TCTD, IITB has had a fair share of projects that have applied for patent disclosure. The following is the list of 18 TCTD, IITB projects that have gone through the invention disclosure process for patent applications since 2014:

LOW POWER TRANSCEIVER FOR WIRELESS COMMUNICATION Faculty: Prof. Jayanta Mukherjee, Dept. of Electrical Engineering Domain: Energy Patent applied for Low power, off-chip inductor-less MICS band receiver **DEVELOPMENT OF ADVANCED DARK** COLOUR COOL ROOF COATINGS **DEVELOPMENT OF** Faculty: Prof. Anand S Khanna, Dept. of Metallurgical Engineering & ADVANCED DARK COLOUR Materials Science COOL ROOF COATINGS Domain: Energy Faculty: Prof. Anand S Khanna, Patent applied for A water based Dept. of Metallurgical Engineering & system for concrete substrates Materials Science Domain: Energy Patent applied for A solvent-based

THROUGH THE EARTH COMMUNICATION FOR UNDERGROUND MINES

Faculty: Prof. Ashutosh Patri & Prof. Jayanta Mukherjee, Dept. of Electrical Engineering Domain: Energy Patent applied for Hybrid Communication System for Underground Mines

HEMOSORB-HAEMOSTATIC DRESSING FOR TRAUMA CARE

system for metal roofing substrates

Faculty: Prof. Rohit Srivastava, Dept of Biosciences and Bioengineering Domain: Healthcare Patent applied for Hemosorb –haeomstatic dressing

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CERVICAL CANCER SCREENING

Faculty: Prof. Santosh Noronha, Dept. of Chemical Engineering Domain: Healthcare Patent applied for Menstrual cup inserter

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PROCESS DESIGN FOR THE RECLAMATION OF WASTE SAND FROM SMALL FOUNDRIES

Faculty: Prof. Gajananrao N Jadhav, Dept of Earth Sciences & Prof. Sanjay Mahajani, Dept of Chemical Engineering Domain: Waste Management Patent applied for Multi stage attrition device for reclamation of waste foundry sand

HUMIDIFICATION-DEHUMIDIFICATION DESALINATION SYSTEM

Faculty: Prof. Shankar Krishnan, Dept. of Mechanical Engineering Inventors: Pankaj Avhad Domain: Water Patent applied for Low Temperature Desalination System



PROCESS DESIGN FOR THE RECLAMATION OF WASTE SAND FROM SMALL FOUNDRIES

Faculty: Prof. Gajananrao N Jadhav, Dept of Earth Sciences & Prof. Sanjay Mahajani, Dept of Chemical Engineering Inventors: Moiz Mohd Khan, Manvendra Singh Domain: Waste Management Patent applied for A method and device for reclaiming green waste foundry sand

GASIFIER BASED COOK-STOVES TO MANAGE GARDEN WASTE

Faculty: Prof. Sanjay Mahajani, Dept of Chemical Engineering Inventors: Dr Sonal Thengane, Prabodh Gadkari Domain: Waste Management Patent applied for Downdraft Gasification Assembly for High Ash Biomass Feedstock

A MOBILE PHONE MICROSCOPE WITH APPLICATIONS IN POINT-OF-CARE DIAGNOSTICS AND HEALTH EDUCATION

Faculty: Prof. Debjani Paul, Dept of Biosciences & Bioengineering Domain: Healthcare Patent applied for A Mobile Phone Microscope

12 DEVELOPING CAR-T CELL TECHNOLOGY PLATFORM FOR CANCER IMMUNOTHERAPY

Faculty: Prof. Rahul Purwar, Dept. of Biosciences & Bioengineering Domain: Healthcare Patent applied for Methods and compositions for treatment of CD19+ cancers using anti CD19 CAR constructs

DESIGN OF PUNCTURE PROOF TIRES AND TUBES

Faculty: Prof. Mahesh Tirumkudulu, Dept of Chemical Engineering Inventor: Prof. Mahesh Tirumkudulu Domain: Energy Patent applied for A Thermally Stable Tire Sealant

ENABLING LIVELIHOOD GENERATION IN TRIBAL & MARGINAL FARMERS THROUGH A COMMERCIALIZATION PROJECT ON UTILIZATION OF AGRO RESIDUES TO GROW EDIBLE MUSHROOMS

Faculty: Prof. Sanjay Mahajani, Dept of Chemical Engineering

Inventor: Chandrakala Sharma

Domain: Food & Agriculture

Patent applied for Development of an efficient protocol for Oyster Mushroom Cultivation in rural areas

FEASIBILITY STUDY OF JAGGERY MAKING AND RELATED PRODUCTS

Faculty: Prof. Sanjay Mahajani, Dept of Chemical Engineering Inventor: Prof. Sanjay Mahajani Domain: Food & Agriculture Patent applied for An apparatus for moulding deformable materials

DEVELOPMENT OF HOUSEHOLD OR COMMUNITY COMPOSTING SYSTEM FOR FOOD WASTE RECYCLING

Faculty: Prof. Anurag Garg Domain: Waste Management Patent applied for Rotary Drum Composting System for Household Wet Biodegradable Waste Stabilization

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FEASIBILITY STUDY OF JAGGERY MAKING AND RELATED PRODUCTS

Faculty: Prof. Sanjay Mahajani, Dept of Chemical Engineering Inventor: Prof. Sanjay Mahajani Domain: Food & Agriculture Patent applied for An Apparatus for Crystallizing Sucrose Present in Jaggery Syrup

TCTD CHEMPLAY

Faculty: Prof. Sanjay Mahajani, Dept of Chemical Engineering; External faculty - Dr Nitin Bhate, Dr Pradnya Gokhale, Mrs Shalilni Kumar Domain: Education TCTD CHEMPLAY, a kit designed to teach important concepts in Chemistry in a play-way manner, is published under a CC BY-NC-ND license.

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EVALUATION OF THE PERFORMANCE OF TRADITIONAL SEED STORAGES AND DESIGN AND DEVELOPMENT OF SEED STORAGE SYSTEM FOR COMMUNITY LEVEL SEED BANKS AND MARGINAL FARMERS

Faculty: Prof. Narendra Shah, CTARA; Prof. Upendra Bhandarkar, Dept of Mechanical Engineering Domain: Agriculture & Food Patent applied for Design and Development of a decentralized seed storage unit 21

LETS LEARN ENGLISH THROUGH STORIES

Faculty: Prof. Alka Hingorani, IDC School of Design

Domain: Education

A series of books that facilitate English language learning (LETS) using stories and illustrations that emphasize self-learning and co-creation, is published under a CC BY- NC-ND license.

TRANSLATION TO PRE-CLINICAL AND CLINICAL TRIALS OF LOW COST BONE AND NEAR NET SHAPE GRAFT FOR DENTAL AND ORTHOPEDIC BONE RECONSTRUCTION

Faculty: Prof. Jayesh Bellare, Deepak Gupta and Atul Kumar Singh, Dept. of Chemical Engineering

Domain: Healthcare

Patent applied for 3D-Printing of scaffold constructs for patient-specific regenerative medicine and in vitro disease models, on 31-03-2017, with IRCC ref no PAT/CL/JB-5/16-17.

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COLLABORATION THROUGH DESIGNERS AND CRAFT COMMUNITIES

Faculty: Prof. Nina Sabnani, IDC School of Design

Domain: Education The Centre-funded movie `Hum Chitra Banate Hain' or `We Make Images' was awarded the



National Award for the Best Animation Film in the non-feature films category at the **64th National Film Awards for 2016**, from the then President of India. This movie also won much critical acclaim and accolades at different national and international events, and many other film festivals.

IMMERSIVE COMPONENT





Image 20: Tata Fellows during a field visit

Field visits to organizations like SEARCH in Gadchiroli, Shashwat in Ambegaon, Jejuri Municipal Corporation and others, are a recent addition to the academic course pedagogy to encourage the students to engage with people in the field, and based on their observations and learnings they conduct need identification

exercises in a resource-constrained community setting and build prototypes to solve the identified problems.





Image 19: TCTD Yatra – an immersion programme for Tata Fellows

TCTD Symposium

TCTD Symposium 2018 was the first annual conclave hosted by TCTD, IITB in January, 2018. The theme - `Innovate to Transform' – was expected to take on the challenges that academic institutions and stakeholders face in driving social innovation for better impact.



Continuing Education Programmes (CEP)

As a part of the Continuing Education and Quality Improvement Programmes at IIT Bombay, the Centre organises five-day courses in End to End Innovation - a unique combination of lectures, case studies, project exercises and lab sessions put together. There have been over 1250 faculty and students from engineering colleges of non-premier cities participating in these workshops.



Image 22: The CEP workshops at TCTD, IITB

Poster presentations



Image 23: Tata Fellows presenting their posters and work

The Tata Fellows exhibit their work through posters, prototypes and other media, every year. The fellows work hard with their respective posters, voicing their opinion about their research work. A wide spectrum of audience attends this the event, ranging from undergraduates to postdoctoral fellows, departmental heads to deans of the academic community, representatives from centres within IITB, the industry, NGOs and consultants.

Kalpana

TCTD, IITB's celebrated event, Kalpana – a prototype-making competition - saw a whopping number of 1500 applicants from all over the country.



Program Review 2014 - 2019, TCTD, IITB

Image 24: Kalpana -

Waste Management seminar

An interactive two day seminar titled "**Towards a Zero Waste Approach: Opportunities & Challenges**", was hosted by Tata Centre for Technology and Design, IIT Bombay, on November 23-24, 2018. Experts and practitioners from academia, community, start-ups, NGOs and governance shared their experiences, ideas and identified existing challenges to re-define research goals towards creating a concerted model for a sustainable waste management.

Key highlights:

- Segregation of waste is critical. Standardization and color coding are relevant to "keep it separate rather than segregate."
- Decentralization can help resolve issues in terms of bulk, space & cost in waste management.
- Sanitary and hazardous wastes and processing them in an eco-friendly manner are challenges. The Red dot campaign and menstrual awareness in India can help better handling of these wastes at the primary source. An alternative technology must be developed to replace the conventional



method of incineration which in turn leads to environmental pollution.

- Tax incentives, star ratings and appreciation play an important role in encouraging residential and other societies to move towards good waste management practices.
- Price sensitivity and technology must coexist in India and hence resource recovery is important.
- Extended producer responsibility (EPR) could play a significant role in shifting from a linear to circular economy.
- Incorporation of Waste management in the course curriculum and identifying it as a skill-based industry would help in developing a better perception towards waste management.
- The critical role and contribution of "waste-pickers" in waste management cannot be undermined by social stigmas.

Overall **policy**, **process**, **behaviour** and **lack** of **suitable enabling technology alternatives** were identified as the major challenges in waste management. Viewing 'waste' as an opportunity and generating value out of it could be a universal start point solution to these issues in India altogether.

Ekta Singh, BSBE Team Zero Waste



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SUPPORTING INFRASTRUCTURE & FACILITIES

- The Product Realization Lab has evolved to include an extensive array of equipment and machines in the Mechanical and Electronics sections. This list keeps getting upgraded as per the requirement of the project activities in various domains.
- A supplementary facility with an infrastructure of 1,115 sq m has been set up in the F1 Shed area of the campus in 2017, with plans to install additional equipment to support the Centre's projects in the Food & Agriculture, Energy, Healthcare and Waste Management domains. This facility is expected to accelerate the prototyping and product development process, as relying on external vendors is timeconsuming.



- An area of 500 sq m has been granted by the Institute in mid-2017 for an integrated waste management facility to house all the waste management projects at TCTD, IIT Bombay, to address domain-based challenges using the IIT Bombay campus as a test bed.
- The Centre has planned to equip itself with a networking setup, a teleconferencing facility and a conference room.





Image 25: The Product Realisation Lab and the additional facility

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INTERACTIONS & COLLABORATIONS

The Centre closely works with its sister institute at the Massachusetts Institute of Technology (MIT)-Tata Center, USA and with other partner organizations and stakeholders throughout India. A joint orientation is organised every year in the month of August in which the 1st year MIT Tata Fellows and IITB Tata Fellows participate.









Image 26: Tata Fellows at an interaction in IIT Bombay

Collaborations with MIT faculty

Faculty members and Tata Fellows from IIT Bombay visit MIT-Tata Center with the purpose to learn from their experiences and to explore possibilities of collaborations in future. They have formally collaborated on projects such as:

Project: Design and fabrication of power electronic controllers for certain home appliance motors IITB PI: Prof. Vivek Agarwal, Tata Fellow: Arpan Hota MIT PI: Prof. James Kirtley, Research Mentor: Reja Amatya, Tata Fellow: Mohammad Qasim

Project: Gasifier based cook-stoves to manage garden waste IITB PI: Prof. Sanjay Mahajani, Research Mentor: Sonal Thengane, Tata Fellow: Mehul Fadnavis and MIT PI: Prof. Ahmed Ghuneim, Research Mentor: Santosh Shanbhogue, Tata Fellows: Cody Jacobucci, Yan Yan

Project: A digital aid for language (Hindi) teaching and learning IITB PI: Prof. Malhar Kulkarni, Tata Fellow: Arijit Mukherjee MIT PI: Prof. David Simchi-Levi, Research Mentor: Chancellor Cynthia Barnhart, Tata Fellow: Michael Beeler

There are informal collaborations for knowledge exchange and support on projects between the two Centres:

Project: Ready-to-use Therapeutic Foods for Malnourished Children IITB PI: Prof. Narendra Shah MIT PI: T. Alan Hatton, Tata Fellow: Tonghan Gu

With Tata Trusts

The Tata Trusts's overarching reach has ensured that a majority of stakeholders are directly or indirectly part of the initiatives and intervention. Social Alpha, an initiative of the Tata Trusts, has been helping with the evaluation of problem statements, reaching out to potential collaborators in field trials / clinical trials, suggestions on commercialisation plans and building a framework on sustainability outcomes.





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MEDIA OUTREACH

A healthcare innovation by a TCTD, IIT Bombay funded project to help reduce the cost of a type of immunotherapy used to treat blood cancer to a tenth of that in the US. healthcare headed by Prof. Rahul Purwar, Dept of Bioengineering and Biosciences - Developing CAR-T cell technology for cancer immunotherapy - was reported about in The Times of India in February 2018.

https://epaper.timesgroup.com/Olive/ODN/TimesOfIndia/shared/ ShowArticle.

Another Centre-supported electrical impedance spectroscopy platform for bacteriological monitoring of water has lent itself to an offshoot application in detecting a heart attack, and this has found electronic and print outreach in the media in June 2018.

https://indianexpress.com/article/cities/mumbai/iit-bombaydevelops-device-to-detect-predict-heart-attack-5216474/

https://www.thebetterindia.com/145817/iit-b-folks-tiny-low-costsensor-predict-detect-heart-attacks/

A waste management project that reclaims green waste sand in a cost-effective method using a scalable approach, headed by Prof. Sanjay Mahajani, Dept of Chemical Engineering, has been updated by the print media in September 2018.

https://researchmatters.in/news/going-green-reclaiming-greensand

The National Award-winning animation film `Hum Chitra Banate Hain' or `We Make Images found its way to the Tata Sky platform and attracted viewers' subscriptions since early 2018, after being reported in several magazines and dailies earlier.

https://indianexpress.com/article/lifestyle/art-and-culture/ninasabnani-animation-short-film-hum-chitra-banate-hai-mumbai-filmfestival-half-ticket-bhil-art-madhya-pradesh-3090276/

http://www.animationmagazine.net/events/hum-chitra-banate-haiwins-indian-national-film-awards-animation-prize/

https://watch.tatasky.com/catchup/Hum-Chitra-Banate-Hain/7658 232?source=RECOMMENDED&pageType=HOME

Turning Point, January 2019





Three graduating Tata Fellows and one former Tata Fellow were awarded the Institute Silver Medals by Prime Minister Narendra Modi at this year's convocation ceremony, in August 2018, to commemorate the Diamond Jubilee year at IIT Bombay. These students were awarded for being the "most outstanding student of all students who completed the requirements for the degree of Master of Technology" in their respective branches.

LAB TO MARKET CONNECT

The research activities are not just limited to funding grants; it also involves initiating dialogue, identifying research problems to work on, and facilitating the projects from lab support to field trials and translation. TCTD, IITB is now working to enhance its capacity and build wheels that can transform the prototypes to market. This has become the underlying objective across several projects that have reached beyond SRL 6.



A project in the Centre's Energy domain is now a successful translation out in the industry. The faculty member, **Prof. Anand Khanna**, Dept. of Metallurgical Engineering & Materials Science, who led the project - **Development of coloured cool coatings** – has now taken lead in forming a private limited company to disseminate the technology solution. Joining him in this venture is Dr Narayanan



Rajagopalan, his PhD graduate who has assisted him on this project right from inception.



The project team working on Cervical cancer screening led by Prof. Santosh Noronha, Dept. of Chemical Engineering, attempted to move the infrastructure currently available in tertiary care hospitals for cervical cancer screening into the field and tried to create a paradigm where paramedics in the field are capable of conducting the whole screening program. This



healthcare intervention from Tata Centre is currently being rolled out in North East India, with support from the Tata Trusts.



The project - Developing CAR-T cell technology platform for cancer immunotherapy - has successfully demonstrated the design, development and validation of CAR-T cells for certain type of blood cancer especially B-ALL at laboratory scale, under Prof. Rahul Purwar, Dept. of Biosciences & Bioengineering. This technology is fairly mature now and progressed



to clinical translation and a spin out company ImmunoACT Pvt Ltd founded and accepted in the SINE-IITB incubator.

Turning Point, January 2019



Prof. Soumyo Mukherji, Dept. of Biosciences & Bioengineering, and his lab research team have worked on the development of the proof-of-concept device of Billiscope for the Jaundice detection in neonates project. To fast-track the clinical trials stage and lab-to-market process, the team has collaborated with a startup, Embryyo Technologies founded



by Nishant Kumar, an IIT Bombay alumnus. Currently, the start-up is working on various medical technologies for diagnosis in maternal and women health, new-born health. After the clinical trials of the Billiscope, the device is expected to be field tested.



Prof. Debjani Paul, Dept. of Biosciences & Bioengineering, has tried to solve the point-of-care detection of sickle-cell and other diseases through her project A mobile phone microscope with applications in point-of-care.

Medprime Technologies, a start-up incubated at SINE, IIT Bombay, is working on using the mobile phone microscope. In the initial phases



the start-up also helped the team's research with prototyping assistance for field-testing the device. The interaction progressed into a collaboration to develop an inverted mobile microscope, as was required for the team's blood analysis research component. The device is in continuous field testing and prototype development phase.

THE WAY AHEAD

With over 55 active projects, TCTD, IITB is looking for assistance in translating several of them in terms of design, business innovation and technology transfer frameworks. The Centre is also identifying partners and supplementing its own facilities, to help with accelerated prototyping. Getting champions and postdoctoral fellows to take the lead in connecting the solutions to the users is hoped. Its association with Social Alpha and other such entities is also being counted upon to get the technologies rolled out from lab to market.

Tata Centre has planned brainstorming on grand challenges that can bring on a few relevant problem statements in each of its seven domains, based on the need from the end users. The focus is to match these stakeholders' discussions with the interests of the IIT Bombay faculty from across the various disciplines, build a need-finding framework and strike better collaborations.



Tata Centre for Technology and Design, IIT Bombay

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