



Tata Centre  
for Technology  
and Design  
IIT Bombay

# TURNING POINT



Tata Centre Newsletter, October 2020

## Teaching end-to-end innovation online

The ProSeminar's course went virtual this August as the course faculty at IIT Bombay and Tata Fellows interacted through the online mode.

The Academic Program at Tata Centre for Technology and Design (TCTD), offered its MNG courses under ProSeminar with a difference, in 2020. The course delivery on End to End Innovation was altered for the year to start in spring semester and then subsequently moved onto to fall. While most of MNG 629 had the Tata Fellows attend the sessions in campus, it also drew to an abrupt close with the pandemic in March.

When the academic sessions resumed in August at IIT Bombay, the course faculty – Prof Arti Kalro and Sarthak Gaurav, SJMSOM - took it upon themselves to deliver the MNG 630 in a planned virtual manner. The course learning objectives were to enable students to apply the conceptual knowledge learnt in Pro-Seminar-I (MNG 629) on real-time projects, learn problem-solving approaches and research designs for need identification and need validation and use these qualitative and quantitative research techniques on their own projects, and understand frameworks used in social entrepreneurship through documented and real case studies and guest interactions.

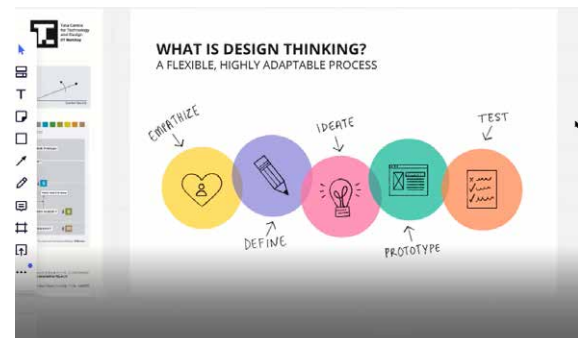
If that meant scheduling core faculty sessions to bring in the course content to the students in an organized way, and ensuring that the students' interest, attendance and interactions were unwavering, it was all done. So with students sitting across the country and the course faculty at IIT Bombay, all managing internet, machine and connectivity issues, the Wednesday and Friday sessions went live.

When guest faculty sessions with speakers such as Prof Murali Sastry, former CEO of IITB-Monash Research Academy, who was logging in from Australia, brought to the students case studies on water purifiers, and Kavita Arvind from Chidiya Udd, Bengaluru, conducted two sessions on Design Thinking, these were very interactive. The breakout sessions where the students were split into groups to discuss and ideate saw a lot of chatter and action.

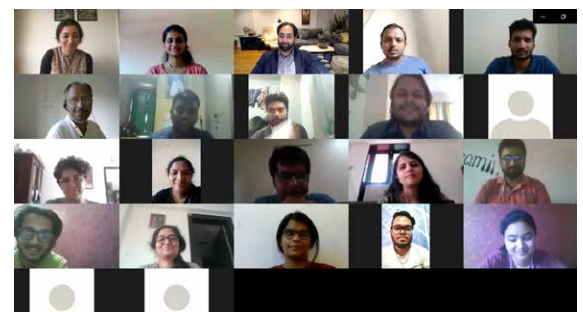
After the recent session on Defining a Framework for Inclusive Innovation with Dr Nevan Hanumara, MIT, with discussions on a business case for ward oxygen, up next, the Tata Fellows are looking forward to

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Session on Design Thinking, conducted by Ms Kavita Arvind from Chidiya Udd, Bengaluru, India



Defining a Framework for Inclusive Innovation, a session by Dr Nevan Hanumara from MIT, USA

revisiting the Covid survey they had conducted in May-July across the country, as assigned to by the Institute. More virtual sessions from guests include the Godrej Chhotukool case study by G Sunderraman from Godrej, Dr Jerry Rao with case studies from the affordable housing sector, and Dr Harish Hande with work at SELCO for the energy sector, are also on the agenda that the group is looking forward to.

**Team TCTD**

# One stop solution for tinnitus

HEALTHCARE

The solution developed is a more accurate matching device and multimodal treatment platform for tinnitus, which provides customised and affordable therapy.



Prof. Maryam Shojaei, Dept. of Electrical Engineering, IIT Bombay

In an interview, Prof. Maryam Shojaei, from the Dept of Electrical Engineering, speaks about her TCTD-supported project Affordable tinnitus detection device and affordable tinnitus treatment E medicine.

## **Q.1. Could you briefly describe the objectives of the project and the developed prototype?**

Tinnitus is a ringing sensation in the ear/ears/head in the absence of an external sound. With the causes seen as idiopathic, tinnitus can occur in any age group with causes and symptoms of disease varying drastically, thereby causing challenges in treatment. The amalgamation of various tinnitus treatment therapies, as suggested by several medical advisory boards, may reduce the impact of tinnitus, but currently there is no systematic means of using

such combinational therapy. The team's aim here has been to develop a more accurate matching device and multimodal treatment platform, and provide affordable customised therapy. Further, the project has also proposed the systematic linking of diagnosis and treatment platform to enhance the effectiveness of overall treatment therapy.

## **Q.2. Please elaborate on the novelty of this solution as compared with the existing solutions.**

Currently, tinnitus matching is performed with the help of the audiometer. The existing intervention techniques for tinnitus treatment and management are unable to cater to individual patients' needs. So, we have developed a one-stop solution for precise tinnitus matching and IoT-based multimodal tinnitus management at an affordable cost. This technology



solution is a digital offering that synchronises diagnosis, prescription and treatment of tinnitus.

Our solution has two main modules: MyTMD (Mobiletinity Tinnitus Matching Device) for precise tinnitus matching and TMe-Solution (Tinnitus Management e-solution) as a multimodal treatment platform. The first such platform, this facilitates systematic linking between diagnostic results obtained by MyTMD and treatment therapies made available by TMe-solution. TMe-solution auto-captures diagnostic parameters measured by MyTMD, and cleverly utilises them for accurate, customised masking therapy. Further, IoT-based TMe-solution provides a unique platform for all types of treatment therapies, which can be customised for individual patients.

### Q.3. What motivated you to take up this project given the niche target segment of users?

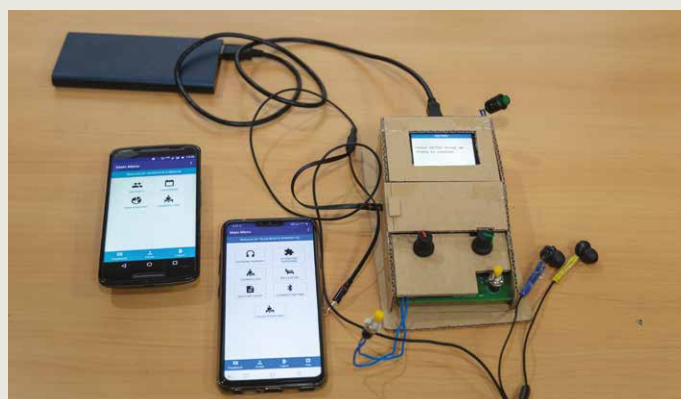
The demoralizing impact of tinnitus on employability and the social involvement of patients has motivated us. This user-friendly platform developed as per international guidelines, offers precise diagnosis and better management. We hope it helps overcome the negative impact of tinnitus and works on the quality of life for the tinnitus sufferer.

### Q.5. How different were the challenges from what was envisaged?

We presumed a smooth and hassle-free development of the prototype with the delivery of the expected results within the time frame. Our energies were also spent in training of manpower, and design, development, validation, testing and evaluation of the solution with respect to existing standards. While the team focussed on having the complete prototype by April 2020, the ongoing pandemic delayed the timeline. The team then focused on the software testing, manuscript to be submitted after field trials, documentation, literature review for clinical trials, system packaging aspects and online survey from users.

### Q.7. What is the current status of the project?

All the lab tests, instrument trials in the acoustic chamber, and benchmarking of the device have



An earlier prototype of the MyTMD along with the TMe-Solution interface



The updated prototype of MyTMD for tinnitus matching and management

successfully been completed. The lab measurement results have met the standard expectations. Our prototype is ready for field tests and by the end of the clinical trials, we should be ready to commercialize.

### Q.8. What survey are you about to undertake in the next few months?

This survey will be conducted with the actual end-users like ENT doctors and audiologists from across Maharashtra. It will help us understand quantitative aspects of the project like user-interface, easiness of operating procedure, functionality, appearance, and pricing. The post-survey testing of the device by ENT doctors and audiologist and the software by patients, could also elicit recorded responses that may help further iterations. With preclinical field testing expected to start by September-end, the collaborating hospitals/ clinics will help in conducting clinical trials and validate the efficacy of the solution. The objective is to get confidence for the solution being 'good to go'.

**The Project Team**



# News & Updates at Tata Centre

## Project reviews at TCTD:

The Executive Committee members and reviewers conducted an exhaustive set of reviews for all 45 active projects that the Centre has supported. Several project teams had news to offer about ready prototypes for field testing, team members from translational projects initiating startups and some more patent applications. A few were also recommended closure based on their lack of progress. The number of active research projects at TCTD now stands at around 35.



## Appointment of Tata Chair Professor:

Prof Maryam Shojaei from the Dept of Electrical Engineering has been nominated for The Tata Chair Professorship in Frugal Engineering. She has been working on the Healthcare project titled Affordable tinnitus detection device and affordable tinnitus treatment E medicine, supported by the Centre. This role would involve initiating new academic programmes and consolidating existing programmes, providing expert guidance in R&D programmes, giving academic and technical leadership in the broad areas of frugal technology, and improving interaction with industry through consultancy work and continuing education programmes.

## PI awarded national fellowship for TCTD-supported solution

Prof Preeti Rao, from the Dept of Electrical Engineering, has been selected to receive the prestigious Abdul Kalam Technology Innovation National Fellowship for three years from October 2020. She has credited this to the work in her TCTD project Spoken language assessment on mobile devices in the Education domain.

## Farewell

Ms Gayathri Thakoor, who held the position of General Manager – Programs, at TCTD, and has been the editor of our newsletter - Turning Point, for over four years, has moved on from the Centre. TCTD wishes her the best in her future endeavours.



## A new patent application granted

TCTD is happy to update that the patent application of its project Translation to pre-clinical and clinical trials of low-cost bone and near net shape graft for dental and orthopedic bone reconstruction has been granted and recorded in the Register of Patents, in mid-October. This project has been helmed by Prof. Jayesh Bellare along with Dr Kunal Khanna and Deepak Gupta, from the Dept of Chemical Engineering. For the Centre, this adds to the list of innovations that have been granted patent status and will now move closer to the communities, in the end to end innovation cycle.

## A collaboration for a Water project

The project - Heavy metal sensing in water using optical fibres - headed by Prof Soumyo Mukherji, from Dept of Biosciences and Bioengineering, has entered into a collaboration with a non-profit Section 8 company to test the developed technology solution in the field. Based on the validation exercise, the team will plan to license the innovation thereafter.

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