

ANNOUNCEMENT

IIT Alumni Council announces MegaLab Mumbai Design Competition.

Mumbai, May 15, 2020: The rampant spread of the Covid19 pandemic and the potential for exponential growth of infected individuals in India is throwing up challenges relating to Detecting, Preventing and Treating the disease. There is no certainty of a vaccine in the immediate future and it may not be feasible to keep the country in lockdown mode for long. Given these realities, it is necessary to create testing infrastructure of a scale in Mumbai that has never been attempted before. IIT Alumni Council has taken the lead in this area and has reached out to experts around the world who are engaged in the testing domain including leading researchers, RTqPCR machine manufacturers, test kit manufacturers, pooling algorithm developers and AI based rapid diagnosis based on xrays and ultrasound.

In pursuance of speed working towards solving the testing challenge, the IIT Alumni Council had launched the Pool Testing Competition within 24 hours of the lockdown on March 25th, 2020. Within fifteen days, the IIT Alumni Council started work with our C19 Task Force Doctors Group headed by Dr Mufazzal Lakadawala to act as technology and knowledge partners to a team of volunteers in Mumbai to help create a C19 crisis management infrastructure that would operate without government funding so as to create role model installations that could be replicated by other cities in the country as well as globally. Within hundred hours of being allocated space at the Poddar Hospital in Mumbai, the IIT Alumni Council partner organisations set up digital xray systems that successfully used AI to detect C19. The first result of the contactless technology partnership with Dr Lakadawala's team is the NSCI contactless isolation centre which was launched on April 23rd, within one month of the lockdown. The NSCI centre is now being upgraded to be a full fledged contactless hospital with ICU facilities being built in shipping containers. Within one week of the NSCI centre going live, the IIT Alumni Partner team helped convert a regular passenger luxury bus into a full-fledged C19 lab on wheels using a meticulous 100 hour conversion process timed to perfection using the best available PERT analysis tools. The C19 Test Bus was flagged off on 1st of May, Maharashtra day. On the same day, multiple teams were launched to understand and alter the RTqPCR machine so as to make it amenable to mass testing. Pool testing recommendations were simultaneously issued and trials done on the same. On the 10th of May 2020, we started work on indigenization of the test kits. In order to facilitate this, an end to end indigenous technology stack was created by a partner organization to chart out the 64 steps from virus in the throat to virus zapped by UV post

testing in a RTPCR. On the 12th of May, 2020 – the two incubators EBMI (focused on the genetic testing and biologics value chain) and STWA (focused on global IIT Alumni Cooperation) have rallied the support of hundreds of IIT Faculty members/students and thousands of IIT Alumni towards constructive technological warfare directed at C19.

About MegaLab Mumbai

The MegaLab Mumbai is the latest initiative of the C19 Task Force. Launched on the 15th of May, the initiative aims to design and launch the largest genetic testing laboratory for C19 and other infectious diseases. The objective is to create an end to end capacity to carry out over 10 million tests per month. With pool testing, this would be adequate to test the entire population of Mumbai once every month. The testing infrastructure would comprise of vehicle mounted sample collection stations to be affixed on Ola/Uber kind of cabs connected to C19 test buses or directly with the MegaLab. The MegaLab itself would comprise of robotic contactless sample transport from the vehicles to the testing line, robotic pooling as required followed by high speed RNA extraction using magnetic bead technology and rapid thermocycling followed by fluorescence detection waveforms which would be uploaded to the cloud for detection, big data creation and longitudinal patient studies linked to the Aadhar card as the person identifier. MegaLab is considering various options besides the proven nasal and throat swabs including but not limited to saliva, stool samples etc. One of the aspects being planned is a nested PCR format which will use exponential amplification techniques for very low viral load detection to test sewage samples from Mumbai buildings to find C19 patients in the buildings which could then be sealed if the C19 patient is not declared to the health authorities. Saliva based sampling has the potential to significantly reduce the effort of testing at public places such as airports. This would eliminate the possibility of non-declaration.

The MegaLab R&D and Decision Support teams would connect to supercomputers at four remote IIT campuses which would provide continuous data mining and machine learning based support. The AI hackathon would be launched shortly after the MegaLab Challenge to initialise the supercomputing computers. The IIT Alumni Council is extremely grateful to all the IIT Directors who have facilitated the allocation of resources for this initiative without any charges. We would also like to express our gratitude to Mumbai University for their help in moving expeditiously to provide R&D resources in the area of nanobiosciences for the initiative.

About the Mega Lab Mumbai Challenge.

“In order to address this need for testing scale up, the IIT Alumni Council’s C19 Task Force has posed the following challenge to participants:

Please provide an end to end solution through a consortium of Indian and global partners that comprises of:

1. An end to end digital platform based on using either the aadhar card or a passport as the identifier of the patient/individual. Sample collection units would be prenumbered and automatically linked to the

aadhar card/ passport of the individual. The test results would be visible on the portal on feeding in the aadhar card or passport number using a One time password send to the registered mobile number.

2. A complete trackable contactless sample extraction system wherein the patient/ individual can self-extract a sample for testing using a remote video instructor ideally fitted into a regular vehicle such as a ola/uber cab.
3. A robotic system to seal the sample extracted and get it into a format such that the collected samples can be collected by a robot for shifting to a larger vehicle or directly into the loading bay of the MegaLab Mumbai.
4. A robotic line capable of collecting the samples from a vehicle and loading them into the first line which would act as the feeder line to the RNA extraction line. This line would facilitate pool testing based on an AI system which would advise on the extent and need for pooling. It should be possible to return to the samples to extract a second sample for testing as per the IIT Alumni Council pooling algorithm.
5. The output of the RNA extraction line would be automatically fed into the PCR line with an option for PCR nesting. The output of the PCR line in the form of the sigmoid from the fluorescence readers would be fed into the cloud servers located on the super computing platforms for instantaneous result generation.
6. The team will need to use 100% indigenous test kits and the contents of the same would be as specified in the indigenous technology stack to be released by the IIT Alumni Council. Imported kits would not be permitted.
7. The target cost of the test kits is under Rs 300 per sample. This is the gross price delivered at the MegaLab location exclusive of taxes.

MegaLab Mumbai would be rated for 10 million tests per month based on 20 hours a day and 25 days a month working ie 10 million tests in 500 hours.

The contestants in the Challenge can be any consortium subject to the lead member of the consortium being a company registered with the Registrar of Companies in India having a net worth of Rs 100 crores as per the last audited balance sheet. The contestant consortium should have one partner with experience of running a large diagnostic lab either in India or overseas. The contestant is required to propose a payment for the MegaLab infrastructure at a maximum rate of Rs 150 per test so that the entire test can be done for under Rs 500 including the kit cost of a maximum of Rs 300 per test. This amount quoted could be payable till the cost of the infrastructure is recovered or for three years. However these are all indicative figures solely for the purposes of discussion and public consultation.

It is expressly clarified at the onset that the IIT Alumni Council operates in an open source kind of format and all applications received may be put up on a website for consultation with various stakeholders. No confidentiality of any kind is being provided to the contestants. The proposals received will become the exclusive property of the IIT Alumni Council and the Council may choose to use the information contained therein for designing and operationalizing the MegaLab through any partner organization who may or may not be a contestant in the Challenge. No monopoly of any kind is offered to the MegaLab designer or operator. The objective of this challenge is to solicit expressions of interest which would be evaluated by an eminent jury for appropriateness to the C19 testing need in Mumbai. There is no certainty that the Challenge will lead to any kind of a working arrangement or otherwise between the IIT Alumni Council initiative and the contestant. IIT Alumni Council has not been authorized by any Government Agency or department to run this challenge nor has any kind of government subsidy been sought or assured for the same. The Indian Institutes of Technology are in no way connected with the MegaLab Mumbai other than providing supercomputing and other resources for the Challenge. Faculty members who are engaged are working as volunteers for the IIT Alumni Council in their personal capacities and not on behalf of the IITs. Winning the challenge would in no way confer acceptance of the design or its validation by the IITs or members of the C19 Task Force.

Mega Lab Mumbai Challenge Documentation.

The MegaLab Mumbai Challenge Documentation would be available from the website of the council at www.iitalumni council.org to qualified applicants only. Applicants are required to register interest and file documentation as required in the application form. This would include KYC details of all consortium members and net worth details of the consortium lead partner. At this stage, consortia desirous of participating in the competition are required to send an email to me galab@iitalumni council.org. Emails will be replied to within 24 hours with a tentative docket number and date of formal registration.

“I do look forward to” commented PadmaSri Professor who would chair the Jury for the Challenge.

Mr, of the IIT Alumni Council stated, “It is explicitly clarified that the MegaLab Mumbai Challenge is a unique opportunity for companies to contribute to nation building in India. No monetary award of any kind is offered and the information submitted as part of the Challenge will become the exclusive property of the IIT Alumni Council and may be used to fine tune the MegaLab which may eventually be built by an entity or agency which may have no concern or correlation with any of the contestants. The contribution of the contestants will be visible to all as the applications may be put up on a portal. This will ensure due recognition is given to contestants. Credit worthy participants in the Challenge will be honoured with a commendation certificate. No cash award or commercial contract of any kind is guaranteed or assured to the participants.”

About the Jury

The selection of the Jury for the MegaLab Mumbai Challenge was ratified by the Council of Directors of twenty IITs with Professor Abhay Karandikar of IIT Kanpur as Chairman of the Council. The Jury consisted of eminent faculty members and IIT Alumni from around the world. Here is a brief about them:

	Jury Member	Career Highlights
1.	Professor Manindra Agrawal, IIT Kanpur Chairperson of the Jury	He is a professor at the Department of Computer Science and Engineering and the Deputy Director at the Indian Institute of Technology, Kanpur. He was the recipient of the first Infosys Prize for Mathematics and the Shanti Swarup Bhatnagar Award in Mathematical Sciences in 2003. He has been honored with Padma Shri in 2013.
2.	Professor M Vidyasagar, FRS, IIT Hyderabad	Currently a Distinguished Professor in Electrical Engineering at IIT Hyderabad, he is a leading control theorist and a Fellow of Royal Society. Previously he was the Cecil & Ida Green (II) Chair of Systems Biology Science at the University of Texas at Dallas. He has also headed the Advanced Technology Center at TCS and been the Director of Centre for Artificial Intelligence and Robotics (CAIR), a DRDO defence lab in Bangalore.
3.	Dr Sitabhra Sinha, IMSc Chennai	He is Professor of Theoretical Physics at institute of Mathematical Sciences (IMSc), Chennai and an adjunct faculty member of National Institute of Advanced Studies, Bangalore. He is a PhD from Indian Statistical Institute, Calcutta. His areas of research fall broadly under complex systems, nonlinear dynamics and theoretical & computational biophysics.
4.	Dr Rohinton Dehmubed, Silicon Valley Alumni	He has a BTech from IIT Bombay with a PhD from Columbia University in EE /high speed communications. He is an active researcher with interests in high speed transducers and healthcare pilfer-proof packaging with provenance tracing for high value therapeutics. He is based in Silicon Valley.
5.	Dr Kapil Talwar, Asia Pacific Alumni	He has a BTech from IIT Bombay with a PhD in Chemical Engineering from Washington University. He is an active researcher with interests in green chemistry, cyber security and healthcare.

6.	Shri P Balaji, India Alumni	An Alumni of IITR and IIMA, he heads the Vodafone Foundation & Regulatory Affairs for Vodafone India. He has been CEO of companies like Nokia and Sony Ericsson before joining Vodafone.
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About the Mentors to the Challenge

The selection of the Mentors for the MegaLab Mumbai Challenge was ratified by the Council of Directors of twenty IITs with Professor Abhay Karandikar of IIT Kanpur as Chairman of the Council. The Mentor panel will act as the bridge between the contestants and the jury to help fine tune the proposed solution and if need be try to create a solution by combining the inputs received from multiple consortia. The Mentor Panel consists of eminent IIT Alumni from around the world:

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IIT Alumni Council

IIT Alumni Council is the largest global organization for alumni, students and aspirants of the twenty-three Indian Institutes of Technology. The IIT C19 Task Force was set up in February 2020 by the Global Board of the IIT Alumni Council. The objective of the Task Force is to rally the technological and venture capital prowess of alumni of all the IITs to launch a frontal attack on the Sars Cov2 virus that leads to the Covid19 disease. The IIT C19 Task Force is Chaired by IIT Kanpur alumnus Dr K Vijay Raghavan, Principal Scientific Officer of the Government of India. It is financially supported by PanIIT Fund, a Rs 3,000 crore domestic social fund registered with SEBI under the AIF Regulations 2012

With over 20,000 active technologist participants and over one hundred city chapters, the IIT C19 Task Force set up by the IIT Alumni Council aspires to lead the fight against C19 by supplementing and complimenting the efforts of the central and state governments. The Council has rallied the considerable resources of the global IIT alumni to catalyze technological and financial interventions in Mumbai city, with a focus on central and south Mumbai