

# IITM - Infrastructure Systems Lab

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India is making great strides and investing heavily in the nation's infrastructure. From basic highways, roads, and transmission lines, to more ambitious metros and bullet trains, the country is building the bloodlines that will power the economy for years to come. Similarly, the country is also looking at smart cities and affordable housing making sure that we are building a nation that we will be better off for the next generation than the ones we inherited. In order to achieve this, we need to go beyond solutions offered by traditional engineering disciplines. We need cross-disciplinary research involving diverse fields such as **electronics, computer science, mechanical engineering, and civil engineering**. Technical experts in the areas of sensors, data analytics, communication, control and engineering design should come together in order to implement complex infrastructure systems. Currently, IIT Madras does not have a research lab where students can perform this type of inter-disciplinary research. IIT Madras is now embarking on an ambitious project to build the nation's first of its kind infrastructure systems laboratory. The lab will prototype and test next generation solutions to solve problems in infrastructure development. The lab will be constructed in two phases. In the near term, it will come in the existing campus for an estimated INR 2 crore spend. In the next phase, a larger facility is being planned in the IIT Madras Thaiyyur campus extension at an \$2 million price tag. If space is not available in the existing campus, possibilities to rent space in the IITM research park will be explored.

This project will build upon existing expertise in related areas in the departments of Civil, Mechanical, Electrical and Computer Science. IIT Madras has for the past nearly two decades a strong program in construction management and construction technology. It has graduated students in its masters program who are leading the nation's infrastructure building. More recently, it has also been doing research in various areas of construction technology where faculty from mechanical engineering, civil engineering, computer science, electrical engineering and material science collaborate to develop cutting edge technologies. From mobile technologies to IOT based devices for project monitoring, from developing new materials such as GFRG for affordable housing to exploring additive manufacturing of houses using 3D printing, from drone based autonomous surveys to autonomous construction using self-assembling of houses using robots, our research program is diverse, and cutting edge, catering to the needs of a growing young nation with ambitious goals for its citizens. [This page](https://icandsr.iitm.ac.in/sites/default/files/pdf/IITMFP.pdf) (<https://icandsr.iitm.ac.in/sites/default/files/pdf/IITMFP.pdf>) provides some of the research in this area. We have even incubated companies from the work being done here.

If you have wanted to contribute to the nation building, this is your opportunity. The class of 92 is looking to lead this project as its anchor project for funding. But we are looking for funding across the board from all alumni who are willing to contribute to this. The current phase is to raise the INR 2 crore funding as part of the Phase 1 of the lab setup. If you have questions or want to help, do write to us. Your monetary contributions are most welcome.

## Proposed Budget

#	Item	Estimate (INR Lakhs)	Purpose
1	6 DOF robotic manipulators - 10 numbers	60	Experiments involving automation and robotics
2	Controllers - Arduinos, Raspberry PI, etc.	10	Data acquisition, control, etc.
3	Sensors and data loggers	20	
4	Computer hardware	10	Servers and high end computing
5	Software	10	BIM, Visualization, etc.
6	LIDAR	20	Laser scanning, measurements, etc
7	3D printers	10	Prototyping
7	Drones	5	Experiments involving monitoring and automated model creation
8	Man power - One Technical manager	15	For setting up of the lab and managing it for two years
9	Miscellaneous - consumables, operating expenses, etc.	40	Racks, furnishing, stationary, etc. Rent of space might have to be included here.
	<b>Total</b>		<b>INR 2 Crore</b>