Project Title:	**Machine Learning for Next-Generation Wireless Networks**
Project Number	**IMURA0739**

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Research Clusters:

Highlight which of the Academy's CLUSTERS this project will address?
*(Please nominate JUST **one**. For more information, see www.iitbmonash.org)*

1	*Material Science/Engineering (including Nano, Metallurgy)*
2	*Energy, Green Chem, Chemistry, Catalysis, Reaction Eng*
3	*Math, CFD, Modelling, Manufacturing*
4	***CSE, IT, Optimisation, Data, Sensors, Systems, Signal Processing, Control***
5	*Earth Sciences and Civil Engineering (Geo, Water, Climate)*
6	*Bio, Stem Cells, Bio Chem, Pharma, Food*
7	*Semi-Conductors, Optics, Photonics, Networks, Telecomm, Power Eng*
8	*HSS, Design, Management*

Research Themes:

Highlight which of the Academy's Theme(s) this project will address?
(Feel free to nominate more than one. For more information, see www.iitbmonash.org)

1	***Advanced computational engineering, simulation and manufacture***
2	*Infrastructure Engineering*
3	*Clean Energy*
4	*Water*
5	*Nanotechnology*
6	*Biotechnology and Stem Cell Research*

The research problem

There is a growing demand for introducing artificial intelligence in many of today's systems that will lead to better automation, self-configuration and performance adaptation. For example, introducing artificial intelligence in next generation wireless networks will enable these networks to learn the environment and use that knowledge to make intelligent decisions without requiring human intervention. Machine learning, as one of the most powerful artificial intelligence tools, can enable the introduction of artificial intelligence in next-generation wireless networks. So far, machine learning techniques have been successfully applied in cognitive radio networks and spectrum sharing, and have led to improved network performance. This research project aims to investigate machine learning algorithms for other emerging areas such as Internet of Things (IoT), Device-to-Device (D2D) Communications, Massive MIMO, and Energy Harvesting Networks that will improve the performance of these wireless networks and enable them to function with minimum human intervention.

Project aims

The project aims to develop machine learning algorithms for
1) Internet of Things
2) Device-to-Device communication
3) Massive MIMO
4) Energy harvesting networks.

Expected outcomes

Machine learning algorithms that will introduce intelligent decision making in future wireless networks

How will the project address the Goals of the above Themes?

This project will investigate machine learning algorithms that can enable future wireless networks to function without major human interventions in their decision-making processes.

Capabilities and Degrees Required

MTech in Computer Science/Electrical Engineering/Electronics and Communication Engineering is preferred.
MSc. in Statistics and Probability

Potential Collaborators

Select up to **(4)** keywords from the Academy's approved keyword list **(available at www.iitbmonash.org)** relating to this project to make it easier for the students to apply.