Focus areas

- Data science and cybersecurity
- Machine learning
- Immersive analytics and visualisation
- Modelling and optimisation
- Sensing technologies
- Telecommunications technologies
- Robotics and drones

Research capabilities

Monash’s core research capabilities in information and communications are diverse. We have expertise in information management, data wrangling and security, data analytics and machine learning, immersive analytics and visualisation including augmented reality, optimisation, sensors, optical and wireless communications, telecommunications device design and analysis, Application Specific Integrated Circuits (ASICs), Field Programmable Gate Array (FPGA) solutions, EMI shielding work, microwave technologies, coding, data compression and complex modulation schemes. Our researchers are developing new robotics and drones technologies and communications for inspection of remote and difficult to access assets.

Our Centre for Organisational and Social Informatics helps the defence force understand and deploy their data to be able to recreate the justification of key defence decisions.

Our Data Systems and Cyber Security Flagship team resolves errors and inaccuracies in real-time data streams for control of major infrastructure networks and is deployed by major aircraft manufacturers to ensure their aircraft control systems are impregnable to virus and other software attacks.

Our Centre for Data Science help keep Melbourne Airport running, and is critical to a major communications network provider. Our Modelling Optimisation and Visualisation Flagship schedules some of the largest transport organisations in Australia.

Our sensors and sensor networks will enable continuous feedback on the state of major infrastructure assets. Our communication technologies teams have developed world-leading chipless RFID; wireless sensor networks; optical communications; and photonic systems and circuits.
CASE STUDY

Location location location!

We spend more than 85% of our time indoors. Indoor Location Based Services (LBS) are expected to have a bigger impact on our society than maps or GPS. LBS provide information about a person’s or object’s location inside buildings. LBS use recent innovations in indoor positioning systems that provide much more accurate information about an object’s location indoors.

A major challenge that still needs to be addressed before indoor LBS become widely adopted is working out how to efficiently process and query the indoor location data. Monash University researchers Dr Aamir Cheema and Dr David Taniar are developing efficient and scalable technologies to speed up location-based queries. The new technologies have exciting applications including navigation, travel, social networking, gaming, retail and advertising. Dr Cheema’s and Dr Taniar’s research has already garnered interest from shopping centres and marketers.

The innovations arising from this research and LBS will enhance the user experience indoors. This includes navigating a shopping mall, targeted in-store advertising, diversified shopper engagement and personalised guided tours to directing the flow of patients safely and speedily between emergency and the x-ray department.

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Monash Infrastructure

Monash Infrastructure (MI) is a virtual institute that facilitates industry and government engagement with Monash University’s extensive capabilities in infrastructure research.

MI coordinates interdisciplinary teams from engineering, information technologies, business, design and social sciences. Our researchers provide the expertise, resources and access to international knowledge networks to solve infrastructure problems, develop new technologies, build industry capacity and inform government policy and planning.