Information and Systems (Engineering)

Enabling Capability Platform

Exploiting the information explosion

New information technologies and ways of collecting and using data are rapidly disrupting all aspects of society and changing the way we live, work and relax.

Our homes, workplaces, vehicles and devices are progressively becoming more automated, integrated and connected. Inexpensive networks of sensors on cyber-physical systems can capture real-time data about almost anything we wish to monitor, from the functions of a factory production line to the energy consumption and usage patterns in a family home.

RMIT's **Information and Systems (Engineering) Enabling Capability Platform** (ECP) responds to this technology-driven disruption. This capability platform focuses our cross-disciplinary expertise to help RMIT's research partners understand and exploit emerging opportunities for improving business efficiency and productivity, using fewer energy resources to achieve more, and protecting valuable information from outside cyber attacks.

Most of our internal research affiliates in this ECP are scientists and engineers, however they also work closely with researchers in other disciplines such as business, social science and design to deliver the innovative solutions our partners are seeking. In many instances, our cross-disciplinary expertise in information, systems, technology and design enables our partners to leverage new technologies in ways they had never imagined.

Co-designing solutions to complex problems

RMIT has eight themed Enabling Capability Platforms that serve as streamlined, single points of contact within the University for projects and partnerships requiring outcomes-focused, cross-disciplinary research.

The Information and Systems (Engineering) ECP is creating 'one-stop-shops' to solve research challenges facing industry and government in relation to information and systems engineering. Once research project leaders understand their external partners' specific needs, they assemble teams of research affiliates from within the ECP to address each challenge. When a project requires expertise that falls outside the scope of this capability platform, they connect with other ECPs and harness expertise across the entire University, including teaching and research academics, undergraduate and post-graduate students and alumni.

A Sector Expert Research Advisory Group of industry leaders and other stakeholders will help shape the future direction and priorities of this capability platform.
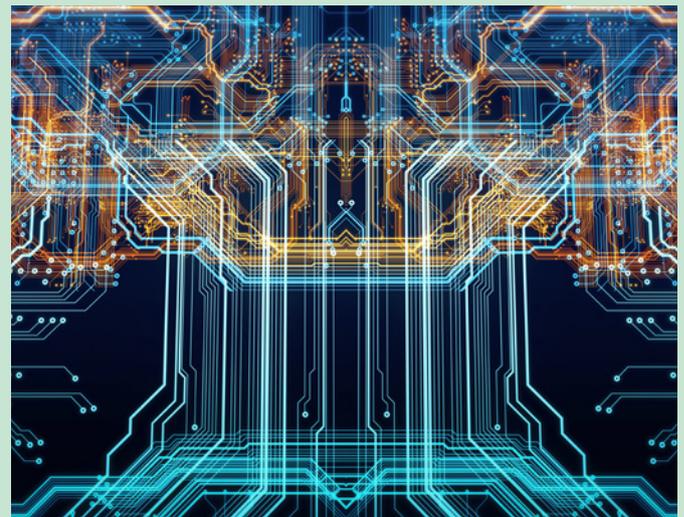
Our vision

Mark Sanderson, Director,
RMIT Information and Systems (Engineering) ECP

We will enable RMIT researchers, our research partners and the wider community to understand and exploit the disruptions resulting from the explosion of sensors, telecommunication, data and automation, as well as facing the related challenges of cyber security.

We will also help industry to capitalise on major advances in energy production and transformation.

Examples of Information and Systems (Engineering) ECP collaborative research projects

RMIT is partnering with a leading property compliance firm and a major inner metropolitan council to develop and trial a new generation intelligent building asset management and inspection system.

The new system combines predictive modelling software with integrated data capture and analytical technologies, including automated sensors. It has the potential to reduce building inspection times by 50 per cent and accurately predict which buildings to prioritise for maintenance or renewal.

This innovation is of significant interest to local government. Around 70 per cent of community buildings in Australia are beyond their original design life and councils are keen to shift from reactive to proactive building maintenance and renewal programs.

This project is being co-funded by RMIT's ECP Opportunity Fund and our industry partners.
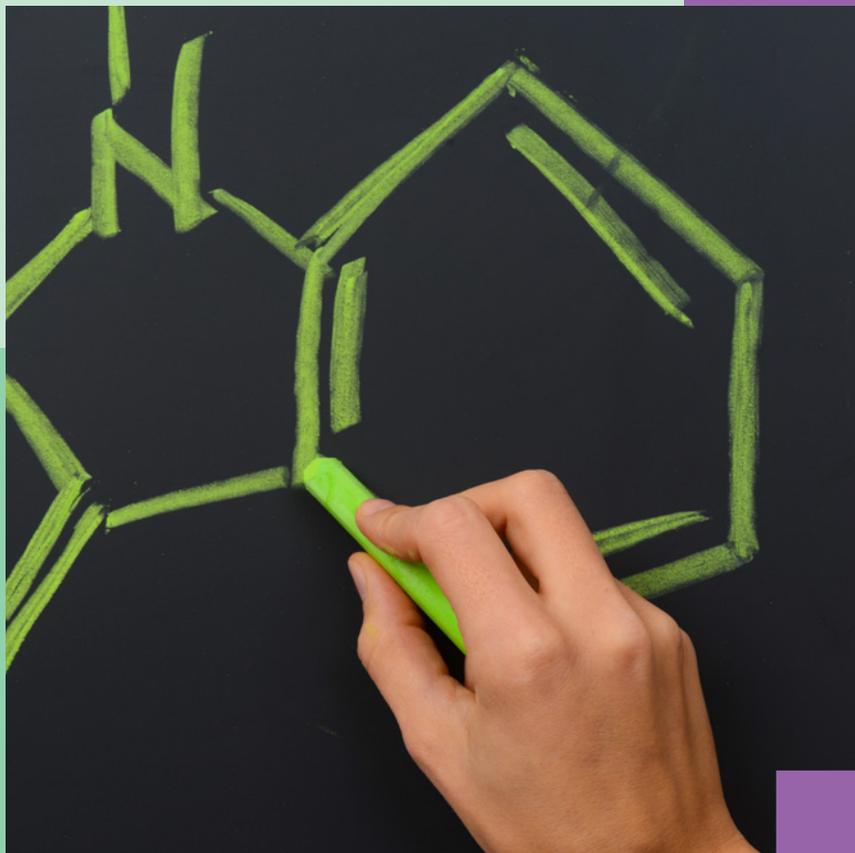
A Computational Biology & Bioinformatics Network (CBBN) has been established at RMIT and is connecting with external networks and industry to support collaborative research partnerships and funding applications for future research programs.

This project includes a focus on accelerating research opportunities and outcomes in glycoinformatics — a relatively new field of bioinformatics that studies the structure, actions and interactions of carbohydrates.

This project is jointly funded by RMIT's ECP Capability Development Fund and a partner research institution.

◆ Key capabilities

Hundreds of expert research affiliates in disciplines ranging from science, engineering and business to media and communication, property, construction, project management, architecture, design, and research and innovation.

Internationally recognised areas of research excellence in:

> information discovery
> artificial intelligence and image processing
> applied mathematics
> condensed matter physics
> civil engineering
> electrical and electronic engineering
> communication and media studies

Additional research strengths in:

> data transmission and signal processing
> remote sensing and measurement
> the Internet of Things
> data analytics
> visualisation
> computational modelling and simulations
> renewable energy and optimising energy productivity
> privacy protection and the mathematics of cyber security
> bioinformatics and glycoinformatics

Research facilities and centres include:

> RMIT Computational Biology & Bioinformatics Network
> RMIT Information Security and Network Science Research Group
> Centre for Advanced Electronics and Sensors
> Centre for Integrated Project Solutions
> Communication Technologies Research Centre

Close relationships with:

> local, state and federal governments
> Industry Growth Centres
> major industries, peak bodies, and research institutions and networks in Australia, Asia and Europe

◆ Research and innovation priorities

Data and sensors

Focusing on data capture, collation and analysis, this area encompasses:

> sensing and gathering data
> data transmission, storage and management
> data fusion
> data analysis
> data visualisation and insight

Automation and intelligence

This area focuses on how to understand and exploit data.

It covers using data-focused computational and mathematical tools to optimally design, predictively model, prescriptively simulate, and intelligently control the operation of complex cyber and physical systems.

Energy production and transformation

This area focuses on the production of energy from advanced and renewable energy sources, and its transformation into electrical form for distribution and consumer usage with maximum efficiency, minimum losses and reduced greenhouse gas emissions.

Cyber security

Focusing on protecting the profusion of computational systems in our society.

This encompasses all aspects of cyber security, including:

> hardware and software development
> privacy and detecting intrusion
> systems design
> management and
> public policy

◆ Key application areas

> Data analytics, including using 'big data' to drive industrial efficiencies
> Energy supply and use
> Images and video innovation
> Data integration
> Interoperability within automated systems
> Cyber-physical systems and automation
> Cyber security

Priority Industry Sectors

MANUFACTURING AND FABRICATION

LOCAL, STATE AND FEDERAL GOVERNMENT

ENERGY RETAIL AND DISTRIBUTION

GLOBAL CORPORATIONS AND SUPPLY CHAINS

RMIT UNIVERSITY