

## CAPABILITY STATEMENT

# Infrastructure research and training

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UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA



### The University of Wollongong is a leader in applied infrastructure policy, planning and delivery.

The University of Wollongong's SMART Infrastructure Facility is one of the largest research institutions in the world dedicated to helping governments and businesses better plan for the future.

SMART contributes to infrastructure planning in Australia through truly independent research coupled with deep academic rigour to ensure policy makers and industry receive high quality and timely advice on major projects.

The facility is committed to collaborating with industry to develop innovative solutions and technologies that deliver real impact. Our academic rigour is complemented by our industry experts, resulting in a compelling and productive intellectual partner for industry.

SMART's work is augmented by collaborations with experts across the University's faculties in infrastructure-related fields such as energy generation and storage, water sustainability, environmental engineering, spatial geotechnics and social planning.

When the \$62 million SMART building opened in 2011 as Australia's first multi-disciplinary applied infrastructure research and training facility, it represented a commitment by the Australian and NSW governments to apply a more scientific approach to infrastructure planning.

Since opening, SMART has built an international profile working with government agencies in Australia and around the world, and has developed a strong network of global collaborators.

SMART brings together experts from fields such as rail, infrastructure systems, transport, water, energy, economics and modelling and simulation and provides 30 state-of-the-art laboratories to facilitate this important research.

The facility provides specialist teaching laboratories for 200 postgraduate research students and over 5000 undergraduate students per week.

The dedicated team of researchers tackle infrastructure issues from an integrated and multi-disciplinary perspective, with a focus on how infrastructure and social behaviour intersect to ensure more liveable cities and regions.

SMART's high-level advisory council is led by Dr Ian Watt AO and includes leaders of industry and finance, professional planners, former government infrastructure regulators and heads of government agencies.

### Global connections

The University of Wollongong's infrastructure researchers at SMART and in the faculties are involved in key international partnerships and collaborations addressing some of the big challenges in infrastructure, while SMART also has an international network of honorary and visiting professors.

SMART is a founding member of the International Symposium for Next Generation Infrastructure with University College London, the University of Oxford, Delft University of Technology and Virginia Tech, and hosted the group's first international conference in 2013.

In 2014 SMART researchers working with the Jakarta Emergency Management Agency launched a big data project that uses Twitter tweets to map seasonal flooding in the Indonesian capital. The agency has worked directly with SMART engineers and geographic information systems experts to develop tools to assist authorities to deal more effectively with flood emergencies.

## Infrastructure and research

SMART undertakes academic and commercial research projects. A recent example is Hong Kong's MTR Corporation commissioning the Facility to investigate how social media chatter can be captured and used to boost innovation and customer service.

Collaborating with the University's Faculty of Business and using advanced geosocial techniques developed at SMART, researchers aim to enable MTR to develop a knowledge-sharing platform that will capture, organise and act on information harvested from social networks.

This research project will assist the world-renowned rail service provider to develop strategies for harnessing information published by commuters on social networks such as Twitter, Weibo, WeChat and Facebook and utilise this information to boost innovation and customer service.

SMART, a respected partner and leader in the space of geosocial intelligence (GSI), will custom build a platform to suit MTR's needs.

## Smart laboratories

The SMART Infrastructure Facility consists of 30 state-of-the-art research laboratories. Many of SMART's laboratories and research facilities are also open to outside researchers from industry, academia and other national laboratories.

SMART is also a member of the ICA-OSGeo Labs network – an international collaboration between the International Cartographic Association (ICA) and Open Source Geospatial Foundation (OSGeo).

## Smart research groups

SMART is undertaking research that applies international experience, operational know-how, simulation, modelling and analysis.

**The Advanced Geomatics for Regional and Urban Planning** research group uses GIS mapping, spatial topology, data mining and business intelligence techniques to explore urban and regional development, infrastructure network interdependencies and vulnerabilities.

Drawing from experience in operations research and data mining, the **Computational Intelligence for Optimal Decision and Operation** research group aims to improve or combine existing methods and to develop new solutions for computational intelligence applied to infrastructure management, logistics and supply chains.

The SMART **Economics and Governance** research group aims to be Australia's leading think tank on infrastructure governance, planning, economics, funding and financing.

**The Geo-Social Intelligence for Urban Resilience and Liveability** research group uses methods from ethnography and quantitative sociology mixed with social informatics (mobile technology and social media) to better understand and model social responses to policy or infrastructure changes.

**Social Simulation for Demographic Analysis and Transitions** focuses on three complementary aspects of social simulation: (1) creating and evolving accurate synthetic populations, (2) developing realistic activity models for synthetic individuals and households and (3) integrating these active synthetic individuals into spatially explicit agent-based models.

The research group for **Computer Simulation for Sustainable Transport Systems** aims to enhance our understanding of capacity and robustness of transport networks by examining various elements of transport systems such as road/rail/air traffic, design and operation.

In **Applying Systems of Systems Methodologies**, the research group develops an architecture framework capable of describing and linking all key transport enterprise stakeholder concerns and involvements in the transportation project delivery process.



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