Division of Information Technology, Engineering and the Environment
We are poised for action. Supported by a framework of exceptional research and teaching, we can see limitless opportunities for industry, sparked by innovation and technology.

/ PROFESSOR SIMON BEECHAM
Welcome

The University of South Australia's Division of Information Technology, Engineering and the Environment collaborates with industry and the community through innovative research that delivers real-world impact.

We connect students, partners and researchers, and align the most up-to-date industry knowledge with the ambition to learn through experience. We do this from a unique location adjacent to Technology Park at Mawson Lakes; a vibrant nexus of world renowned high-tech organisations, boasting names such as Saab Technologies Australia, Boeing Headquarters and Codan Limited.

Our vision is intensified by the establishment of the Future Industries Institute (FII); a multi-million dollar research institute that will grow our international competitive capability in engineering and the physical sciences.

I'm very proud of our achievements and look forward to the great discoveries that lie ahead. I invite you to work with us because together we can create a brighter future. Read on and discover the great work we have accomplished to date.

Professor Simon Beecham
Pro Vice Chancellor
Information Technology, Engineering and the Environment

Acknowledgement of Country

UniSA respects the Kaurna, Boandik and Barngala peoples' spiritual relationship with their country. We also acknowledge the diversity of Aboriginal peoples, past and present.

Find out more about the University's commitment to reconciliation at unisa.edu.au/RAP

*2015/16 QS TOP 50 UNIVERSITIES AGED UNDER 50
We engage with local councils to drive innovation and deliver environmental, economic and social benefits to the Salisbury region and wider community. We share facilities such as the Mawson Centre, a focal point for residents which houses a library, lecture theatre, study spaces, cafe, computer pools and offices.

We are an integral part of Mawson Lakes, which is one of the most successful and largest communities in South Australia. It is a community of 12,000+ residents who have embraced innovation and sustainability – a place where people can work, live and play. Homes use recycled water systems and are designed to reduce carbon footprint outputs by 20 per cent more than the Adelaide average. We promote sustainability, with award-winning, five-star green rated buildings and wetlands on campus.

We stand alongside Technology Park, a hub of more than 80 companies that spans industries including defence, aerospace, advanced electronics, engineering, communication and information technology. This world-class location provides the perfect environment for collaboration between these businesses and the University.
$965 MILLION NORTHERN CONNECTOR ROAD PROJECT

17 MINUTES TRAVEL BY EXPRESS TRAIN

UNIVERSITY OF SOUTH AUSTRALIA, MAWSON LAKES
Division of Information Technology Engineering and the Environment

14KMS FROM THE CITY
Defence Science and Technology Group (DST Group)
Our Division has a long running partnership with the second largest public-funded research and development organisation in Australia, the DST Group, part of Australia’s Department of Defence. We’ve engaged with the Aerospace, Joint and Operations Analysis, Maritime, National Security and Intelligence, Surveillance and Reconnaissance divisions on projects worth $4m over the past four years. Recently, our researchers signed a contract to create ‘An Efficient Algorithm for Three-Dimensional Passive Sonar Tracking’.

The Goyder Institute for Water Research
The Goyder Institute is a partnership between the South Australian Government, CSIRO, the University of South Australia and two other universities that has spanned the past five years.

Professor Simon Beecham is project leader of a $6.6m climate change project in South Australia, coordinated through the Institute, that will improve State Government coordination of planning and policy responses to climate change in South Australia.

Department of Planning, Transport and Infrastructure (DPTI)
The Department of Planning, Transport and Infrastructure is one of South Australia’s largest organisations with an annual operating budget over $1.1b. The Department generously provides a number of scholarships and placements for our engineering students. In 2014, 28 civil engineering students were assigned to the South Road and Sturt Road intersection upgrade owned by DPTI. Students ran their own consulting company to deliver reports and results on the project upgrade.
A number of our civil engineering graduates have found employment with the DPTI. This continues to positively charge the relationship between both organisations and our ongoing collaboration.

**Hewlett Packard Enterprise**
The Division has partnered with global IT giant Hewlett Packard Enterprise to support South Australia’s IT innovators, including students and industry, with a new space. The Innovation and Collaboration Centre, opened in November 2015 as a place to exchange and explore ideas. The partnership also incorporates an IT Honours program that integrates world-class education with industry experience through a built-in 12 month paid internship.

**IBM**
Our School of Information Technology and Mathematical Sciences is partnering with IBM in one of the State Government’s Innovation Information and Communications Response projects using IBM Watson to develop a Business Advisory Hub.

**WORKING WITH AMIRA INTERNATIONAL**
WE’VE PROVIDED $1B IN BENEFITS TO THE MINERAL RESOURCES SECTOR, REPRESENTING A 22:1 RETURN ON INDUSTRY INVESTMENT.

*Excellence in Research for Australia 2015*
Professor Emily Hilder holds a prestigious ranking as one of ‘The Analytical Scientist’s Top 40 Under 40 Power List’ and is a Fellow of the Royal Australian Chemical Institute. With 124 published works, including book chapters and journal articles, she has secured almost $17.3m in competitive grant funding from the Australian Research Council since 2004.

Professor Hilder’s research focuses on the design and application of new polymeric materials for use in a wide range of industrial settings including the application of these new technologies for bio-analysis and disease diagnosis.

She completed her undergraduate education at the University of Tasmania with majors in chemistry and mathematics and was awarded a first class honours in chemistry before going on to complete her PhD in analytical chemistry.
During her career, she has won awards and acknowledgements for her research around the world, including Tasmania’s Young Tall Poppy in 2009 and the LCGC (North America) Emerging Leader in Chromatography for 2012. She was named in the 2013 and 2015 Analytical Scientist inaugural Power List of the World’s 100 Most Influential Analytical Scientists.

Professor Hilder’s success continues in 2016, named as one of the Advertiser’s 20 South Australians to watch in the year ahead.

I’m excited about the opportunity that this role provides in leading the development of our best young researchers for careers outside academia and to contribute to the transformation of industry in Australia at the same time.

/ PROFESSOR EMILY HILDER
A new ERA

Australia’s future relies on research impact; turning ideas into successful products.

Our research can improve productivity, society and have a positive effect on global trends. These powerful results are formed on strong partnerships with industry and our ongoing commitment to collaboration.

We search for new ideas and products to solve key challenges in areas of national and international significance. In 2015, the Australian Research Council, the body responsible for administering Excellence in Research for Australia (ERA) recognised the following research areas in our Division at world-class standard or above:

- Applied Mathematics
- Artificial Intelligence and Image Processing
- Biochemistry and Cell Biology
- Civil Engineering
- Distributed Computing
- Electrical and Electronic Engineering
- Environmental Science and Management
- Information Systems
- Materials Engineering
- Mechanical Engineering
- Physical Chemistry (including structural)
- Resources Engineering and Extractive Metallurgy.

97% OF THE UNIVERSITY OF SOUTH AUSTRALIA’S EVALUATED RESEARCH IS RATED AT WORLD-CLASS OR ABOVE.
SA’S NO.1 FOR ENGINEERING RESEARCH IN ERA 2015*  
*The only university in SA to have all of its assessed Engineering research rated well above world class, Excellence in Research Australia 2015.*
INVESTMENT REWARDED

Researchers were awarded the prestigious 2015 Australian Museum Eureka Prize for their work in ‘freezing salt to store solar power’.

GLOBAL GIANT INVESTS IN TALKING CARS

Codha Wireless, in partnership with NXP and Audi, is preparing to mass-produce vehicle-to-vehicle and vehicle-to-infrastructure chipsets. The technology will help to improve road safety by creating secure cars that talk to each other.

$1.1 MILLION
To reduce Adelaide’s carbon footprint in a joint collaboration with the Cooperative Research Centre for Low Carbon Living.

$88 MILLION
Funding to lead a five-year project for Data to Decisions Cooperative Research Centre to boost national security.
HEALTHIER FARMS
Our researchers have helped to improve the livelihoods of farmers in Iraq and Syria; teaching them conservation agricultural practices such as zero-till farming. Zero-till farming helps to conserve water and produce better and less variable grain yields in drought affected conditions.

HARNESSING THE SUN. EFFICIENTLY.
Partnering with Heliosstat SA, we use ultra-thin film technologies to create superior heliostat units which maximise efficiency in capturing the sun’s rays and converting energy to electricity.

LIFE-CHANGING TECHNOLOGIES
We are using augmented reality expertise to progress development of the ground-breaking bionic eye.

SAVING LIVES WITH SOLAR
Working with Italian organisation CESVI and St Albert’s Mission Hospital in Zimbabwe to develop solar-powered taxis that will transport women to hospital safely so they can give birth.

$167 MILLION
Funding as lead institute for Cooperative Research Centres in cell therapy manufacturing and wound management, underpinning significant innovations in treatments for diabetes, wounds and transplant patients.

HEALTHIER FARMS
Inspiration, curiosity and passion

Professor Julie Mills is Head of the School of Natural and Built Environments. Prior to this she held roles including Associate Head of School, Discipline Leader and Program Director of Civil Engineering (2000-2014).

Before joining the University Professor Mills had 15 years of professional engineering experience working in industry, primarily as a Structural Engineer on projects ranging from power stations to houses.

Professor Mills' teaching has been rewarded with several national and university awards, the highlight being the National Teaching Excellence Award from the Australasian Association for Engineering Education in 2009.

FIVE STARS FOR EXCELLENCE IN BUILT ENVIRONMENT INCLUDING CIVIL ENGINEERING.*

*QS Stars Ranking/accreditation assessment
Professor Mills’ diverse research interests include engineering education, gender studies and structural engineering for which she has received national competitive grants. Professor Mills has numerous journal publications and has co-authored two books: Gender Inclusive Engineering Education published in 2010 and Knowledge, Sex and Power: Gender, work and engineering published in 2013.
Teaching

**HIGHEST RANKED UNIVERSITY IN AUSTRALIA**
(and tenth in the world) for the international diversity of our academic staff, who come from 75 nations.^^

**NUMBER ONE IN SOUTH AUSTRALIA**
For full-time employment in the disciplines of science and mathematics.*

**DESTINATION FIJI**
We’re on board with the New Colombo Plan, worth over $400,000, that will send students to Fiji to study or work overseas for the next three years.

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**STRATEGIC PARTNERSHIPS**
49 of our IT students and graduates recruited by Hewlett-Packard Enterprise in 2015.^

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*Quality Indicators for Learning and Teaching
*2015 HPE Strategic Partnership Summary
**Australian Graduate Survey
^^QS World University Rankings 2015
91% of the University of South Australia’s graduates going on to full-time work are employed in a professional occupation within four months of completing their degree.”

**BREAKING NEW GROUND**

Together with Santos, we successfully designed and constructed the world’s longest bike. The 41.9 metre bike rode 100 metres on 17 January 2015 to break the Guinness World Record.

**ROBOTIC CHAMPIONS**

Our engineering students won the 2015 National Instruments Autonomous Robotics Competition, defeating 21 competing teams.

**ONLY THE BEST**

Home to the largest structural strong-floor in Australia. A 33 metre x 17 metre reaction-loading floor with a 10 ton gantry crane is used by industry and civil engineering students to test structures and structural elements.
Common Ground

Common Ground is a residential construction project that provides secure accommodation to Adelaide’s most disadvantaged people. The building comprises 52 apartments over seven levels and took 41 weeks to build and deliver. Construction management graduate James Clark oversaw the project’s design and construction from start to finish and won a Professional Excellence Award in Residential Construction from the Australian Institute of Building (AIB) for his contribution to the project.

Phone charging bike

Our mechatronic engineering students developed a bicycle that charges a mobile phone while riding. An electric generator connected to the rear wheel captures the bike’s energy via friction. The energy is converted and charges your phone as you ride, taking only 74 minutes to fully charge. More than 16 per cent of Australians cycle to work. If everyone who cycled to work charged their phone, we could save over 10GW and $4.72 million nationally per year.

Cutting-edge internship

Imogen Domin set off to America in May 2015 to undertake a cutting-edge internship at the world’s largest aeronautical school – the Embry-Riddle Aeronautical University.

Imogen, a Bachelor of Aviation graduate who is completing a Graduate Diploma in Human Factors and Safety Management Systems, was the first Australian student to participate in the NextGen Test Bed International Harmonization internship in Florida.

She was one of only eight students selected internationally to work at the NextGen Test Bed, a research and demonstration facility governed by the Federal Aviation Administration in the United States.
Securing success in graduates’ IT start-up

Graduates are turning their innovative ideas into cutting-edge business projects, securing start-up funding of up to $50,000 each, provided by the State Government. Information technology graduates Jordan Green and Emily Rich are pleased to have received the five-figure sum towards their start-up business named Jemsoft.

Jemsoft’s product is a patented intelligent security solution incorporating hardware and software components for high risk retail locations. The system is a small unit that uses real-time analysis of customers approaching a store to mitigate the risk of armed hold-ups. It works by making an evaluation on whether or not the individual approaching represents a threat using proprietary algorithms utilising computer vision.

In 2015 the company signed a contract with Google U.S. and is supporting the Conservation of Orang-utan nests in the forest canopies of Borneo using drone-captured footage.


Emily Rich. Graduate, Bachelor of Information Technology (Networking and Cybersecurity)
Sci•C•Ed HOUSED IN THE NEW HEALTH AND INNOVATION BUILDING, WILL PROVIDE AN INTERACTIVE SPACE FOR VISITORS TO EXPLORE THE WONDERS OF SCIENCE AND TRANSFORM PUBLIC PERCEPTION OF SCIENCE, TECHNOLOGY AND INNOVATION.
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