ANNUAL REPORT

Department of INFRASTRUCTURE ENGINEERING
Developing future leaders who solve society’s infrastructure challenges, and lead the transformation of societies through the provision of world-class Teaching, Research and Engagement.
I am very pleased to present our Department of Infrastructure Engineering 2015 report and achievements.

In 2015, we continued to work towards strengthening the Infrastructure Engineering identity and to improve our visibility and profile as an integrated Department with three disciplines, both within the University community and also among our global peers. The high quality researchers, academic staff and students we attracted demonstrate a productive and inclusive environment for all and put the Department in a unique place.

The Department is working on its growth strategy plan in line with Melbourne School of Engineering’s vision on growth strategy, to expand our research and teaching capabilities and student experience. In line with the MSE 2025 vision, the Department is developing its work plan and future direction, incorporating all its research capabilities across three disciplines. The main focus is on more impact, an integrated approach and wider engagement and collaboration with industry, government, and community.

In line with the School of Engineering and the University strategic planning, our intensive strategic planning day gave rise to several fruitful discussions on our future priorities. We are now at the halfway point of our 2013-2017 strategic plan, and this was a good opportunity to reflect on the work we are doing in a rapidly changing global environment. As part of the plan, the Department’s industry engagement committee is developing a strategy for industry and international engagement, focusing on department-wide priorities. In line with these plans, the Department continues to drive major research themes across a range of interests from water productivity to infrastructure designs and protection, to urban sustainability and connectedness and to disaster management.

One of the highlights of 2015 was welcoming our new academic staff who commenced in 2015: Prof. Anne Steinemann, Professor of Civil Engineering and Chair of Sustainable Cities; Prof. Stephen Matthias, Chair of Reservoir Engineering; Prof. Majid Sarvi, Professor in Transport Engineering; Dr Mahdi Disfani, Lecturer in Geotechnical Engineering; Dr Kourosh Khoshelham, Lecturer in Geomatics; Dr Behzad Rismanchi, Lecturer in Building Energy Engineering; Dr Marco Ghisalberti, Senior Lecturer in Environmental Fluid Mechanics, and Dr Elisa Lumantarna, Lecturer in Building Energy Engineering. We also welcomed several Research Fellows. All of these high quality and outstanding appointments are in line with our strategic plan.

Four of our staff received well-deserved promotions, and I congratulate Dr Mohsen Kalantari, A/Prof. Tuan Ngo, Prof. Colin Duffield and A/Prof. Yongping Wei. I would also like to welcome Ms Eileen Doufas-Shea who succeeded Ms Rose Macey as Executive Assistant to the Head, and to thank her for her tireless and intelligent support throughout 2015. A warm welcome also to our new Academic Liaison Coordinators, Ms Hai Do and Ms Claire Grist, who together have been working hard to support students enrolling in IE subjects and courses.

The Department continues to drive major research themes across a range of interests from water productivity to infrastructure designs and protection, to urban sustainability and connectedness and to disaster management.

The Department is developing a strategy towards renewal of energy and building materials. We also sought to deepen our engagement with staff and students, delivering activities that acknowledged the research undertaken by RHDs and early career researchers in the Department, as well as increasing engagement with new and existing staff, including our honorary staff. In August we hosted a luncheon for honorary staff. The event was well attended from industry and academia, and several interesting ideas were suggested for the future in a lively and overwhelmingly positive discussion. I warmly thank all those who were involved and we look forward very much to working with you all in future.

Two of our illustrious honorary staff received major recognitions in 2015. I congratulate the Honourable Gary Nairn, Chair of the Advisory Committee to the Centre for Spatial Data Infrastructures and Land Administration, who was made an Officer of the Order of Australia (AO) in the 2015 Queen’s Birthday Honours, and A/Prof. Geoffrey S. Sutherland, who received the Medal of the Order of Australia (OAM) in the 2015 Australia Day Honours. I also congratulate Emeritus Professor Tom McMahon, who was inducted into the Engineers Australia Hall of Fame. These recognitions of our colleagues’ contribution to engineering reflects the vitality and strength of our department. We are fortunate to have such brilliant and generous engineers as our colleagues and friends.

As part of the School of Engineering new executive structure I have taken on the role of Associate Dean International, developing several major partnerships with institutions around the world. I thank our professional and academic colleagues across the School and University for their valuable assistance in this space.

The Department conducted an international Symposium on Smart-Future Cities: The Role of 3D Land, Property and Cadastre Information in early February. The event was well attended by Government officials and related Industry as well as several universities, with representatives from several countries. We also hosted the 2nd International Symposium on Disaster Management, with the theme Working Together for a Safer World, with dignitaries and notable experts from around the world. Officially opened by The Hon. Jane Garrett (Minister for Emergency Services; Minister for Consumer Affairs, Gaming and Liquor Regulation) the latest innovations, research and practice related to disaster management were presented. Special thanks to our CDMP5 team for organizing such a successful event.

The department has been successful in securing several ARC Linkage Grants this year, including on aesthetic materials for protection from extreme loads; on drought, climate change and water scarcity; on geopolymers and ground improvement; and a grant to develop an urban analytics data infrastructure building on the Australian Urban Research Infrastructure Network.

Our Department has had a successful year, with funding being awarded for several new initiatives. Our new ARC Training Centre for Advanced Manufacturing in Prefabricated Housing, under the leadership of Prof Priyan Mendis and A/Prof. Tuan Ngo, is one of these new initiatives. This centre will help to create a globally competitive prefabricated housing industry in Australia, which will create a sustainable training ecosystem between industry and universities to unlock the potential growth of Australia’s prefabricated building industry. The funding provides for 14 PhDs and 6 post-doctoral positions for four years. Dr Lihai Zhang’s successful integration of structural engineering and biometrical outcomes was recognized with a Johnson & Johnson Medical research grant and a research grant from the Victorian Orthopaedic Research Trust. Prof. Colin Duffield has been granted a RAPID research grant for his work in Indonesia with different institutions.

Several of our academic staff have received awards for their outstanding contributions to research across disciplines. A/Prof. Tuan Ngo and Dr Jonathan Tran received a Defence Capability Improvement Award for their work in optimising structural systems at the Defence Materials Technology Centre (DMTC) conference in Canberra.
At MODSIM2015, Prof Andrew Western was presented with a MSSANZ 2015 Biennial Medallist and Fellow Award, and Dr Tim Peterson was a recipient of a 2015 Early Career Research Excellence Award.

Dr Guillermo Narsilio, in collaboration with a colleague from the School of Mathematics and Statistics, was awarded funding for a workshop on ‘Mining Data for Detection and Prediction of Failure in Geomaterials’ at the Australian Academy of Science. This represents a significant step forward for Engineering in the sciences in Australia. At the 11th annual Victorian Spatial Excellence Awards (VSEA) presented by the Spatial and Surveying Sciences Institute (SSSI), the RISER project, including A/Prof. Allison Kealy and Prof. Matt Duckham, won two awards for spatial excellence, while I was humbled by the Institute’s award for ‘Professional of the Year’.

Our postgraduate students have also been successful, with two prestigious scholarships being awarded to Joost van der Linden and Olga Mikhaylova. Congratulations to both of these outstanding students.

Professor Anne Steinemann has gained recent media recognition for her study of volatile organic compounds in common household products. Several colleagues have delivered keynotes at different international conferences, and also several media contributions. Our Surveying and Geomatics Collection has been selected to be part of a summer exhibition at the Ian Potter Gallery, and together with the many academic conferences and visits we are a significant international presence. I congratulate everyone on their work in such initiatives both within and outside academia.

The Department’s laboratories recently received significant funding from MSE to support new infrastructure, and Dr Mahdi Disfani and A/Prof. Graham Moore were granted funding to prepare pre-laboratory online learning materials and protocols for MSE.

I thank all of our academic and professional colleagues for their work throughout the year, teaching, supervising, demonstrating, arranging field trips and being generous with their time, expertise and guidance to our students and colleagues. In particular, I thank Prof. Andrew Western (Deputy Head) and our Discipline Leaders for their leadership and hard work: Prof. Colin Duffield for Civil Engineering; Prof. Stephan Winter for Geomatics; and A/Prof. Mike Stewardson for Environmental and Hydrology Resources; and A/Prof Graham Moore, Chair Education Committee.

I thank our students, not only for their work on our own research but also their contributions in many other ways, helping their fellow students and taking an active part in the life of the Department. Special thanks to the Graduate Infrastructure Engineering Students (GIES) team for their excellent contribution to the life of the Department.

I also take this opportunity to thank our Industry Advisory Group members and all our industry partners for their support and expertise. Particularly, I would like to thank Mr Chris McRae, the Chair of the IAG, for his outstanding leadership.

I would also thank others who helped ease me into the operation of the department, and my several new roles through the year. Our department EAs, Eileen Shea and Pauline Woolcock and their assistant team, Chris Charman and Jenny Smith, all who have been indispensable. In addition to Head of Department role, my responsibility as Associate Dean-International would have been impossible without my EA Eileen Shea and her team. At the same time I was Director of Centre for Disaster Management and Public Safety, and kept ahead of that job only through the great contribution of Centre Manager Ged Griffin and the senior advisory team.

At the beginning of 2016 we started the year by focusing more on our growth strategic plan as part of MSE 2025 vision, and welcomed a new theme, Ocean Engineering with a great academic team to the department.

Special thanks to all colleagues and senior executives across the University, and in particular the School of Engineering, the Dean Prof Iven Mareels, Deputy Dean Prof Peter Scales and their team for their ongoing operational support and contribution to the life of the Department.

It’s an exciting and dynamic time indeed.

Prof. Abbas Rajabifard
Head of Department
Industry Advisory Group (IAG)

The Department continues to benefit from the guidance of the external members of its Industry Advisory Group, which meets three times a year.

Industry

Mr Chris McRae (IAG Chair)
Executive Director, Land Victoria, Department of Environment, Land, Water and Planning

Mr Garry Liddle (IAG Deputy Chair)
Deputy Secretary Transport, Department of Economic Development, Jobs, Transport and Resources-Victoria (DTPLI)

Mr Mark Allen
Strategic Project Manager, City Design, City of Melbourne

Mr Peter Ryan
Managing Director
WBHO Infrastructure

The Hon Gary Nairn
(Former Federal Minister), Consultant to AAM Group

Mr Dominic Ancaro
Director, Navire

Mr Glenn Cockerton
Managing Director
Spatial Vision Innovations

Ms Catherine Eymin
Director, Infrastructure
Yarra Trams

Mr Mark Judd
Manager, Innovation Select Solutions
Geomatic Technologies

Dr Rory Nathan
Technical Director, Jacobs SKM

Mr Dean McIntyre
Manager-Victoria, GHD

Ms Sharon David, Executive Director
Water Resources, Water & Catchments (DELWP)

Mr Graham Hawke, Deputy Director, Environment and Research Division, Bureau of Meteorology

Academia

Professor Abbas Rajabifard
Head of Department

Professor Peter Scales
Deputy Dean, Melbourne School of Engineering

Professor Andrew Western
Deputy Head of Department

Professor Stephan Winter
Discipline Leader, Geomatics

Assoc Professor Colin Duffield
Discipline Leader, Civil

Assoc Professor Michael Stewardson
Discipline Leader, Environmental Hydrology & Water Resources

Ms Pauline Woolcock, Secretary

IAG 2015 Members

Our Industry Advisory Group meets in March, August and November. The March meeting in 2015 was dedicated to IAG-Disciplines meetings.
Department Staff

SENIOR EXECUTIVE COMMITTEE
Prof. Abbas Rajabifard, Head of Department and Associate Dean (International)
Prof. Andrew Western, Deputy Head of Department & Chair, Research Committee
Prof. Stephan Winter, Discipline Leader, Geomatics
Assoc. Prof. Colin Duffield, Discipline Leader, Civil & Deputy Chair, Industry Engagement Committee
Assoc. Prof. Michael Stewardson, Discipline Leader, Environmental Hydrology and Water Resources & Chair, Industry Engagement Committee
Assoc. Prof. Graham Moore, Chair of Education Committee

ACADEMIC STAFF (T&R AND RESEARCH)

Civil Discipline
Prof. Colin Duffield
Prof. Ian Johnston
Prof. Stephan Matthai
Prof. Priyan Mendis
Prof Anne Steinemann
Prof. Majid Sarvi
Assoc. Prof. Nelson Lam
Assoc. Prof. Lu Aye
Assoc. Prof. Helen Goldsworthy
Assoc. Prof. Russell Thompson
Assoc. Prof. Tuan Ngo
Dr Behzad Rismanchi
Dr Sam Yuan
Dr Lihai Zhang
Dr Guillermo Narsilio (Future Fellow)
Dr Felix Kin Peng Hui
Dr Elisa Lumantarna
Dr Jonathan Phuong Tran (Research Fellow)
Dr Rachel San Nicolas (Research Fellow)
Dr Asal Bidarmaghz (Research Fellow)
Dr Massoud Sofi (Research Fellow)

Environmental Hydrology & Water Resources Discipline
Prof Andrew Western
Prof. Hector Malano
Prof. Stanley Grant
Assoc. Prof. Michael Stewardson
Assoc. Prof. Graham A Moore (Teaching Specialist)
Dr Meenakshi Arora
Dr Dongryeol Ryu
Dr Marco Ghisalberti
Dr Angus Webb
Dr Murray Peel (Future Fellow)
Dr Yongjian Wei (Future Fellow)
Dr Justin Costellow (Senior Research Fellow)
Dr Auriel Horne (Research Fellow)
Dr Tim Peterson (Research Fellow)
Dr Chun-Hsu Su (Research Fellow)
Dr Lisa Low (Research Fellow)
Dr Joanna Szmis (Research Fellow)
Ms Eleanor Gee (Research Fellow)
Ms Simranjit Kaur (Research Assistant)

Geomatics Discipline
Prof. Abbas Rajabifard
Prof. Stephan Winter
Prof. Matt Duckham (until end June)
Assoc. Prof. Allison Kealy
Dr Mohsen Kalantari (until March)
Dr Kourosh Khoshelham
Mr Clifford Ogleby (Teaching Specialist)
Dr Benny (Yiqun) Chen (Research Fellow)
Dr Katie Potts (Research Fellow)
Dr Nicole Ronald (Research Fellow - until end May)
Dr Mihai Tanase (Research Fellow)
Dr Maria Vasardani (Research Fellow)
Dr Ida Jazayeri (Research Fellow)
Dr Ronny Kutadinata (Research Fellow)

PROFESSIONAL STAFF
Ms Eileen Doufas-Shea, Executive Assistant to the Head of Department
Ms Pauline Woolcock, Department Administrator
Ms Hai Do, Academic Support Coordinator
Ms Claire Grist, Academic Support Coordinator
Ms Corine Skey Nankoo, Assistant, Australia China Centre on Water Resources Research
Ms Chris Charman, Administration Assistant
Ms Jenny Smith, Administration Assistant

APPOINTMENTS

Prof. Anne Steinemann, Chair of Sustainable Cities
Prof. Stephan Matthai, Chair of Reservoir Engineering
Prof Majid Sarvi, Chair in Transport Engineering
Dr Kourosh Khoshelham, Lecturer in Spatial Information Geomatics
Dr Marco Ghisalberti, Senior Lecturer in Hydrology & Water Resources
Dr Behzad Rismanchi, Lecturer in Building Energy
Dr Mahdi Miri, DISNARI Lecturer in Geotechnical Engineering
Dr Angus Webb, Senior Lecturer in Hydrology & Water Resources
Dr Elisa Lumantarna, Lecturer Civil Engineering
Dr Elisa Lumantarna, Lecturer Civil Engineering (Feb-July)
Dr Maria Vasardani, Lecturer Geomatics (Feb-July)
Dr Asal Bidarmaghz, Research Fellow Geotechnical
Dr Ronny Kutadinata, Research Fellow Geomatics
Mr Kenny Q, Jing Tan, Teaching Periodic
Mr Hamzeh Zarei, Teaching Periodic
Dr Massoud Sofi, Teaching Periodic
Mr Phil Christopher, Teaching Periodic

PROMOTIONS

Assoc Prof Colin Duffield to Professor
Dr Yongjian Wei to Associate Professor
Dr Tuan Ngo to Associate Professor
Dr Mohsen Kalantari to Senior Lecturer
Visit by Indonesian Delegation, Indonesia-Australia Centre
The Infrastructure Research Cluster of the Indonesia Australia Centre, co-led by Assoc. Prof. Colin Duffield, met in Melbourne in March, and included a visit to the Department. Important themes emerged such as sustainability, disasters, infrastructure planning and the use of non-destructive testing on infrastructure assets. The 30 delegates enjoyed a fruitful planning meeting, a visit to the Centre for Disaster Management and Public Safety—CDMPS—and a demonstration of non-destructive testing.

International Smart Cities Symposium
In February, the Department through CSDILA conducted a successful International Symposium on Smart Future Cities: The Role of 3D Land, Property and Cadastre Information. The event was well attended by people from Government (Federal, State and local levels), related industry and other universities, with representatives from 14 countries.

The IE Department 2015 Strategic Planning Day was held on July 6 to discuss topics including engagement, balancing teaching demand and capacity, delivery strategies, the research process and research training, growth planning including space and staffing requirements and ideas, collaboration opportunities and ECR plans. A broad and enthusiastic discussion was held and ideas developed for the Department.

Keynote Presentation at World Cadastre Summit and Awards, Turkey
Prof. Ian Williamson and Prof. Abbas Rajabifard (above right) were honoured to be invited to deliver keynote addresses at the World Cadastre Summit 2015 Congress and Exhibition Istanbul, in April. This Summit was attended by over 3,000 delegates from 87 countries including 30 ministers. Both Professor Rajabifard and Professor Williamson were recognised with awards for their contribution to the concept of the Cadastre and land administration.

Opening Ceremony Melbourne-Shenzhen Rehabilitation Research Centre
Dr Lihai Zhang participated in the opening ceremony of the Melbourne-Shenzhen Rehabilitation Research Centre in Shenzhen, China. Above: Dr Lihai Zhang (5th from left) and colleagues at the opening of the MSRRC in Shenzhen.

Professor Abbas Rajabifard met with Prof MA Lan (Vice Dean, Research) and his colleagues and students, and MSE colleagues, to introduce MSE2025 and discuss further collaboration opportunities. MSE has a long partnership with Tsinghua including the Australia-China Joint Research Centre on River Basin Management.

Tsinghua University Delegation

Policy Dialogue with partnerships Victoria
Assoc. Prof. Colin Duffield presented at a policy dialogue with Partnerships Victoria held in Melbourne in May. The dialogue engaged Australian private-public partnership experts in discussions that aimed to enrich knowledge, insights, and experiences on such partnerships. It served as a venue for Australia to share its experience, particularly that of the State Government of Victoria. Australia’s rich experiences with institutional framework, procurement policies, evaluation methodologies, and implementation and monitoring of projects were also discussed.

The dialogue was co-organized by the PPP Center, AusTrade and Partnerships Victoria, with support from the Asian Development Bank and the Philippine Embassy in Australia.
2015 United States UCI-PIRE UPP Down Under

The Department hosted lunch for 25 students and staff from the University of California Irvine, UC San Diego, and UCLA during Week 3 of the 2015 UCI-Water PIRE UPP Down Under (Monday 15 June – Saturday 25 July). The group was led by our colleague Professor Stan Grant at UC Irvine.

IE Department and IBM Workshop
The Department held a joint workshop with IBM on 18 August to discuss opportunities, options and research areas for collaboration. The themes for discussion were Smart Cities, Disaster Planning, Response and Management, and Environmental Systems.

Women in IE Lunch
The Department hosted a lunch to discuss opportunities and related issues of importance within our female cohort. Our Equal Opportunity representatives, Assoc Professor Helen Goldsworthy and Dr Murray Peel attended.

Visit to Chile
World experts discuss territorial information and intelligent cities

Smart cities of the future and the importance of generating territorial information for the decisions of politicians and businessmen were some of the topics debated by world experts in geospatial information in the international seminar “Information Territorial for the management public and access citizen”, organised by the Ministry of National Property. Prof Abbas Rajabifard as the keynote speaker stressed the importance of the layers of information of various kinds that are and will be the basis of smart cities.

Prof Rajabifard, with a concept completely modern in what can be achieved with spatial information, pointed out that the role of the agencies concerned to collect this type of data, such as the national system of Territorial Information (SNIT) of the Ministry of national assets in Chile, will have a fundamental role in lands and properties in 3D information.

He based his presentation on the importance of spatial information in response to the emerging needs of people and organisations, as the expectations of consumers, improving the processes and the economy, to pose as a main concept of intelligent cities, the relationship between the Government, industry and citizens.

Women in IE Lunch

Visit by APCO International
In April 2015 the Centre For Disaster Management and Public Safety (CDMPS) welcomed executive management representatives from the Association of Public Safety Communications (APCO) International, President Mr John Wright and First Vice President Mr Brent Lee and British APCO Chief Operating Officer Geoff Naldrett who undertook an inspection of the CDMPS Laboratory and received presentations on the research projects being undertaken.

The visitors expressed their satisfaction with the considerable progress that had been made by the CDMPS in the past 12 months with the establishment of the Centre’s Laboratory and noted the research projects that had particular relationships with mission critical communications.

Steel Design Week
The yearly “steel design week” with URS (now AECOM) as a part of the assessment for CVEN90035 Structural Theory and Design 3 was held in August. The key person from URS leading this activity was Martin Hewitt, Associate Director, Structures at AECOM.
**Lab Tour - August**

Our laboratories are an integral part of our Department and are designed to support research and teaching activities of various subjects. A tour was arranged for all staff to visit our current facilities. This was an opportunity for our staff to get a comprehensive view of the current status of our labs’ instruments and capabilities. Our five laboratories are: Wet lab (Water Resources & Hydrology); Francis Lab (Structure); Vasey Lab (Environmental); Geotechnical Soil and Water Lab; and Sexton Lab (Ecohydraulics).

**Water Group Retreat - July**

The Environmental Hydrology and Water discipline held a retreat 13-15 July to consider various challenges and opportunities that we face the coming five years including the need to increase student numbers, the redevelopment of facilities across MSE, growing the international visibility of the group, and strengthening our RHD program. The retreat was held in a large holiday house overlooking St Andrews Beach, buffeted by waves generated by the Antarctic vortex that also brought snow to the mountains and threatened floods in Melbourne.

**US-Arcadia Visit - Science and Engineering STEM Round Table**

Science and Engineering hosted a round table event for the Arcadia US Study Abroad Delegates. They were addressed by Prof Abbas Rajabifard (Assoc Dean International) and Assoc Professor Graham Moore from Engineering and Assoc Prof Andrew Drinman from the Science Faculty.

**OPEN DAY**

The Department had another successful Open Day on Sunday, 16 August, with almost 4000 visitors to Engineering. The two lab tours were very popular. We also had a huge amount of traffic at our engineering stands in Wilson Hall, and good attendance in display areas in Melbourne School of Design. Special thanks to the open day coordinators from the department, people who delivered information sessions and ran very interesting lab tours.

**Global coverage of Professor Anne Steinemann’s research**

Has been printed in over 300 newspapers, magazines, television, radio, and in podcasts internationally, plus over 200 newspapers in Australia. Professor Steinemann’s television and radio appearances include The Project, ABC Radio Sydney, ABC Radio Tasmania, 3AW Radio, 9 News, Channel 10, ABC Radio Brisbane, PBS News Hour, with larger stories in progress with the BBC and National Geographic.

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**PhD student, Olga Mikhaylova presented her preliminary finding on the geothermal installation at EBSS during the WGC2015**

**Mitko Alexandrov, Sam Amirebrahimi, Bahman Esfandiar, Mohsen Azadbakht and Prof Abbas Rajabifard**

The World Geothermal Congress 2015 was held in Melbourne. The Geothermal Group of the Department of Infrastructure Engineering at the University of Melbourne presented a paper on the shallow geothermal installation at Elizabeth Blackburn School of Sciences, during the conference and also invited participants to see the school after the presentation.

**In 2015 the ARC Linkage Project "Talking about Place" was completed. It is documented at [http://telluswhere.net](http://telluswhere.net), and a video is shown at: [https://youtu.be/8BnAN_53dcQ](https://youtu.be/8BnAN_53dcQ)**

**Dr Mahdi Miri Disfani was elected as the Secretary of Australian Geomechanics Society, Victoria Chapter, for the next two years.**

**Dr Guillermo Narsilio was elected as the Deputy Chair of the Australian Geomechanics Society, Victoria Chapter.**

**Assoc Professor Nelson Lam was interviewed by the national engineering magazine “Jurutera” on one of his many visits to Malaysia in 2015 that culminated in the completion of the draft Malaysia National Annex to Eurocode 8 for the seismic design of structures. The document was released for public consultation by the Malaysian government before becoming part of the building law for Malaysia.**

**Prof Anne Steinemann was appointed to the NSF International/American National Standards Institute, Joint Committee for Health-Based Standards for Consumer Product Emissions.**

**The World Geothermal Congress 2015 was held in Melbourne. The Geothermal Group of the Department of Infrastructure Engineering at the University of Melbourne presented a paper on the shallow geothermal installation at Elizabeth Blackburn School of Sciences, during the conference and also invited participants to see the school after the presentation.**

**PhD student, Olga Mikhaylova presented her preliminary finding on the geothermal installation at EBSS during the WGC2015.”**
2nd International Symposium on Disaster Management

On October 12-14 the Centre for Disaster Management and Public Safety successfully hosted the 2nd International Symposium on Disaster Management, at the University of Melbourne. The event aimed to present and discuss the latest innovations, research and practice related to disaster management, and attracted delegates internationally from 14 countries, and nationally from a range of sectors across Australia. The theme for the event was ‘Working together for a safer world’ and during the event the International Day for Disaster Risk Reduction was celebrated and marked together for a safer world.

Sectors across Australia. The theme for the event was 'Working together for a safer world' and during the event the International Day for Disaster Risk Reduction was celebrated and marked together for a safer world. The theme for the event was ‘Working together for a safer world’ and during the event the International Day for Disaster Risk Reduction was celebrated and marked together for a safer world.

The Symposium was officially opened by The Hon. Jane Garrett (Minister for Emergency Services; Minister for Consumer Affairs, Gaming and Liquor Regulation). The event showcased engineering and IT for tomorrow by presenting the amazing final-year projects that Engineering and IT students develop during the last 6-12 months of their studies. It offers a unique opportunity for the public and school students to see how engineering and IT make a difference to our society and the technologies of the future. Related activities during Expo week included the Industry and Awards Night, where awards for the best final-year projects are delivered. The Endeavour Engineering & IT Exhibition, a student-led event guided by Prof Andrew Western, was held on 22 October. This event on 13-14 July was hosted by Infrastructure Engineering and Mathmetics - Dr Guillermo Narsilio was host and he and Dr Mahdi Miri Difani were presenters. Prof Peter Scales (Acting Dean, Melbourne School of Engineering) and Prof Abbas Rajabifard (Director, Centre for Disaster Management and Public Safety and Head of the Department of Infrastructure Engineering) opened the meeting welcoming 27 attendees from all over the country, ranging from the former Chief Scientist to the Australian Federal Government Prof Robin Batterham to 9 Early Career Researchers and international delegates. This Australian Academy of Science Conference aimed to advance, at the most fundamental level, the state-of-the-science in the observation, modelling and simulation, and prediction of geomaterial failure. With an excellent balance between Mathematicians and Engineers (but still a skewed distribution of researchers/consultants), delegates participated in robust discussions facilitated through guided questions and exchanged ideas and perspectives. Especially invited plenary lecturers, Prof Carlos Santamaria (Georgia Tech/KAUST) and Ronaldo Borja (Stanford) opened each day of the conference. Themed presentations were delivered by both researchers from mathematicians and students and by engineer researchers/consultants who are experienced in the analysis of real-world data and know real engineering problems. For each cluster or theme, generous time was allocated for discussions involving all the floor.

In this way, this meeting introduced new directions and perspectives in the study of geomaterial failure to Australian researchers. More details of the program and the conference itself can be found at the following link, which has been available to the public since June 2015: https://go.unimelb.edu.au/f7pu

Panel Discussion with L-R: Assoc Prof Colin Duffield, Mr Chris Body, Mr Jonathan Coppel, Mr Brian Kelleher

Keynote Speaker - Day 2
Mr Neil Comrie AO APM, Department of Premier and Cabinet, Victoria

Keynote Speaker - Day 3
Mr Craig Lapsley, Commissioner, Emergency Management Victoria

Mr Greg Scott, United Nations International Regional Advisor, Global Geospatial Information Management Initiative

Dr Guillermo Narsilio delivered a seminar about “Geothermal heating and cooling for buildings – achievements and opportunities” during the “Public Sector Week” (22-26 June 2015). The group was invited by the Victorian Department of Economic Development, Jobs, Transport and Resources (DEDJTR) to share lessons learned and provide examples of new businesses and job opportunities arising from this new energy technology while improving the environment.


The Endeavour Engineering & IT Exhibition

The Endeavour Engineering & IT Exhibition, a student-led event guided by Prof Andrew Western, was held on 22 October. This event showcases engineering and IT for tomorrow by presenting the amazing final-year projects that Engineering and IT students develop during the last 6-12 months of their studies. It offers a unique opportunity for the public and school students to see how engineering and IT make a difference to our society and the technologies of the future. Related activities during Expo week included the Industry and Awards Night, where awards for the best final-year projects are delivered.

Prof Abbas Rajabifard presented the best research poster award to Eleanor Doolan, Emma Eltringham, Brett Sheehan and Stephen White for their research project “Archaeological Exploration using Terrestrial and Airborne Photogrammetry and Laser Scanning. A case study: Dzveli, Georgia.”
Earthquake Engineering

The Australian Earthquake Engineering Society and the New Zealand Society of Earthquake Engineering of the Pacific Conference in Earthquake Engineering (PCEE) was held in Sydney from November 6-8. This conference was last held in Australia 20 years ago at the University of Melbourne.

Assoc Prof Helen Goldsworthy was part of a team that formed the organisation committee for the 2015 conference, and was also on the technical committee. This was a major event attracting participants from many countries around the Pacific. Many members of staff and postgraduate students from the University of Melbourne Department of Infrastructure Engineering made presentations at the conference including Elisa Lumantarno, Nelson Lam, Helen Goldsworthy, Anita Amirsardari, Ryan Hoult, Yusak Oktavianus and Tilak Pokharel. During the conference and on behalf of the Australian Earthquake Engineering Society, Assoc Prof Goldsworthy gave a tribute to Nigel Priestley, who died in December 2014. He was an inspirational world-renowned academic who visited the University of Melbourne several times over the last 20 years (once as a Tewkesbury visiting scholar) and gave some very well attended public lectures.

Meeting the rebuilding work being carried out in Nepal:

On the evening prior to the PCEE, Assoc Prof Goldsworthy arranged for key engineers and academics from New Zealand and Australia to meet with representatives of groups within Australia, such as the Friends of Nepal Association and Aussie Action Abroad, who will be helping with the rebuilding work in Nepal after the devastating earthquake that occurred there in April 2015. The most important result from that meeting was a commitment from those present to review designs being proposed for schools and housing. Links were also fostered between these volunteer groups and engineers in Nepal who can assist in ensuring that the correct practices are used when the structures are actually being constructed.

Establishment of a new Earthquake Mitigation Research Unit (EMRU) within the Centre for the Disaster Management and Public Safety

The aim of this unit is to enhance the capacity of countries to prepare for hazardous earthquakes and hence to reduce the overall impact when such an event does occur. The key capabilities are listed as follows:

**Key Capabilities of EMRU:**

- Assessment of earthquake hazards
- Assessment of vulnerabilities of building structures and development of fragility curves
- Development of innovative design approaches and technologies for Australia and other regions of low to moderate seismicity and also for regions of high seismicity
- Experimental testing using the Departmental shaking table
- Advice and assistance in the rebuilding process in current disaster areas.

**KEY OVERSEAS VISITS**

**February**
- Professor Hector Malano attended the International Workshop on Water Security and Groundwater Management in the Age of Climate Change, New Delhi. This workshop sponsored by the Australian Centre for International Agricultural Research (ACIAR) was jointly organised by the University of Melbourne, The Energy and Resources Institute (TERI), The International Water Management Institute (IWMI) and Indian Institute of Tropical Meteorology (IITM).

**March**
- Dr Lihai Zhang, as a founding Director, attended the opening ceremony of the Melbourne-Shenzhen Rehabilitation Research Centre in China.
- Prof Colin Duffield was an invited expert at the UNECE project on PPP Standards for Roads in Singapore. This was a joint program between Lee Kuan Yew School of Public Policy, INSEAD and Singapore Management University. The topic was “Governing PPPs: After the Ri Biin Cutting, then what?”

**April**
- Yusak Oktavianus (PhD student supervised by Assoc Prof Helen Goldsworthy) presented a paper at the New Zealand Society of Earthquake Engineering annual conference held in Rotorua.
- Prof Abbas Rajabfard visited Saudi Arabia as part of the university’s delegations to participate in their internal Educational & Exhibition Conference. He also visited and delivered a talk to Ummu Qura University in Mecca.
- Professor Abbas Rajabfard and Prof Ian Williamson delivered keynote addresses at the World Cadaster Summit 2015 Congress and Exhibition in Istanbul, Turkey.
- Assoc Prof Nelson Lam on a joint invitation from Korea University and the National Seoul University, delivered lectures on earthquake engineering in regions of low to moderate seismicity.

**May**
- Dr Angus Webb travelled to Milwaukee, WI, USA to attend and present at the Annual Meeting of the Society for Freshwater Sciences.
- Tilak Pokharel (PhD student supervised by Assoc Prof Helen Goldsworthy) was part of the Learning from Earthquake mission to Nepal from 29 May-13 June.

**June**
- Professor Stephan Winter and Dr Maria Vasardani attended the Advancing Geographic Information Science Conference in Bar Harbor, USA.
- Dr Guillermo Narsilio was invited to and presented a lecture at the International Symposium on Energy Geotechnics, Universitat Politècnica de Catalunya (UPC), Barcelona, Spain, June 1-3, ISMGE TC808 on Energy Geotechnics.
- Dr Guillermo Narsilio visited Cambridge University in the UK, in particular Prof Kenichi Soga’s group, 4-6 June 2015, under his Fu Fellowship. A joint ARC Linkage Project application resulted from this trip.
- Assoc Professor Russell Thompson attended the 9th International conference on City Logistics in Tenerife.

- Dr Dongyeol Ryu delivered an invited seminar titled “Impact of Irrigation Development and Climatic Factors on Regional-Scale Evapotranspiration in the Krishna River Basin, India” at Sungkyunkwan University, South Korea.

**July**
- Professor Abbas Rajabfard attended a seminar in Chile where world experts discussed the future and importance of generating territorial information for the decisions of politicians and businessmen.

**September**
- Prof Hector Malano, Dr Dongyeol Ryu, Dr Meenakshi Arora and Mr Brian Davidson organised a Special Session on the Impact of Rural and Urban Development on Local-Regional Freshwater Cycles at the 10th Conference on Sustainable Development of Energy, Water and Environment Systems, September 27-October 2 in Dubrovnik, Croatia. The Special Session focused on approaches and methodologies to assess observed or projected changes of the freshwater cycles in coming decades or centuries as a result of land use, land cover changes and urban expansion, and their implications for water resources planning and management. Further details on the conference can be found at: http://www.dubrovnik2015.sdeews.org/dates.php’ (from November 2015 IE Newsletter).
- Prof Abbas Rajabfard and Dr Dongyeol Ryu met with with the Director of the Spatial Information Research Institute of Korea to discuss CDMPs and SIR; research collaboration on land administration, spatial information and disaster management; and draft and confirmation of timing of MOU.
- Prof Stephan Winter attended the Conference on Spatial Information Theory in Santa Fe, USA.
- Dr Guillermo Narsilio (on behalf of Prof Ian Johnston) made a 1-hour “Spotlight presentation” at the 2015 IGSHPA Training, Conference & Expo in Kansas City, MO, USA October 5-8, 2015 (Sheraton Kansas City Hotel at the Crown Center).
- Assoc Prof Nelson Lam delivered the keynote address at the Institution of Structural Engineers World Conference in Singapore.

**October**
- Professor Abbas Rajabfard presented the keynote talk at Smart Korea 2015 in Seoul, South Korea to participate in a joint conference and exhibition.

**November**
- Dr Ronny Kutadinata attended the Disrupting Mobility Summit in Boston, MA, USA.
- Dr Lihai Zhang was a keynote speaker at the 6th International Conference on Computational Methods in Auckland, New Zealand addressing “Osteoporotic bone fracture healing under the locking compression plate system”.
- Prof Stephan Winter attended the ACM SIGSPATIAL GIS Conference in Seattle, USA.
- Dr Guillermo Narsilio, Dr Asal Badarmagh and Dr Mahdi Miri Disfani presented at the XV Panamerican Conference on Soil Mechanics and Geotechnical Engineering (XV PCSMGE), 15-18 Nov. This time, the XV PCSMGE – Buenos Aires 2015 coincided with three important events for hydrogeologists: the 8th South American Conference on Rock Mechanics (CSMRM), the 6th International Symposium of Deformation Characteristics of Soils (IC-BADAX-II) and the XXII Argentinian Congress of Soil Mechanics and Geotechnical Engineering (CAMSIG XXII).
- Dr Guillermo Narsilio also delivered part of a pre-conference course (with colleagues from USA, Brazil and Spain), Co-chair “stream 1C - Geo-engineering for energy & sustainability” of the Panamerican Conference in Buenos Aires, and made presentations at the National University of Cordoba and the Catholic University of Cordoba, in Cordoba.
- Assoc Professor Russell Thompson presented at the Volvo Centre of Excellence on Sustainable Urban Freight Systems Review at Rensselaer Polytechnic Institute in USA.
- Professor Colin Duffield was the University of Melbourne representative in Minister Robb’s business week trade mission to Indonesia. He presented the keynote address at the Infrastructure Policy Dialogue.

**December**
- Professor Andrew Western and Dr Tim Peterson attended the American Geophysical Union (AGU) Fall meeting in San Francisco, USA.
- Dr Angus Webb travelled to New Zealand to attend and present at the Annual Meeting of the Australian Society for Limnology (run in conjunction with New Zealand freshwater Science Society), and to attend research meeting of the newly formed ecological resilience consortium.
On 27 August, the Department hosted a luncheon for Honorary Staff. Forty of the Department’s honorary staff community attended the lunch. Professor Abbas Rajabifard, the Head of Department, opened the event by welcoming Professor Ian Bishop as MC and Honorary and Department staff, who shared their perspectives and discussed closer engagement and contribution. Prof Iven Mareels, the Dean of MSE, presented the MSE 2025 vision and Professor Abbas Rajabifard, Professor Stephan Matthai and Assoc Professor Michael Stewardson brought the guests up-to-date on the strategic directions of the Department. Professor Len Stevens, Professor Tom McMahon and Professor Ian Williamson gave a brief overview of their long association with the Department, both as former staff and as members of the honorary staff community. Mr Chris McRae, Chair of our Industry Advisory Group (IAG), and one of the many honorary staff from industry, gave an overview of the value of a closer association with industry. Discussion groups explored the benefit of increased activity by building opportunity for students (mentoring, guest lectures, increased exposure to industry) and involvement in strategic research collaboration.

Honorary Fellows

On 27 August, the Department hosted a luncheon for Honorary Staff. Forty of the Department’s honorary staff community attended the lunch. Professor Abbas Rajabifard, the Head of Department, opened the event by welcoming Professor Ian Bishop as MC and Honorary and Department staff, who shared their perspectives and discussed closer engagement and contribution. Prof Iven Mareels, the Dean of MSE, presented the MSE 2025 vision and Professor Abbas Rajabifard, Professor Stephan Matthai and Assoc Professor Michael Stewardson brought the guests up-to-date on the strategic directions of the Department. Professor Len Stevens, Professor Tom McMahon and Professor Ian Williamson gave a brief overview of their long association with the Department, both as former staff and as members of the honorary staff community. Mr Chris McRae, Chair of our Industry Advisory Group (IAG), and one of the many honorary staff from industry, gave an overview of the value of a closer association with industry. Discussion groups explored the benefit of increased activity by building opportunity for students (mentoring, guest lectures, increased exposure to industry) and involvement in strategic research collaboration.

New Honorary Appointments 2015

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
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<tr>
<td>Prof Ian Johnston</td>
<td>Honorary (Professorial Fellow)</td>
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<tr>
<td>Dr Stephan Brown</td>
<td>Honorary (Principal Fellow)</td>
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<tr>
<td>Mr Valentine Lehr</td>
<td>Honorary (Senior Fellow)</td>
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<tr>
<td>Mr Chris Body</td>
<td>Honorary (Senior Fellow)</td>
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<tr>
<td>Mr Xiang Cheng</td>
<td>Honorary (Fellow)</td>
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<tr>
<td>Dr Fjalar De Haan</td>
<td>Honorary (Fellow)</td>
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<tr>
<td>Dr Nicole Ronald</td>
<td>Honorary (Fellow)</td>
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<td>Dr Chun-Hsu Su</td>
<td>Honorary (Fellow)</td>
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<tr>
<td>Mr Graham Hawke</td>
<td>Honorary (Fellow)</td>
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Prof Ian Johnston

Professor Ian Johnston retired at the end of 2015 from his position of Professor of Geotechnical Engineering, and his long association with MSE. Professor Johnston will continue his involvement with the geothermal research he has been leading for a number of years and, in particular, the significant Victorian State funding he was awarded in 2012 which was extended for an additional 2 years to 2018. In 2012 he was recognized by the Australian Geomechanics Society as a recipient of the John Jaeger Memorial Award, the highest award of the Australian Geomechanics Society selected once every four years for ‘contributions of the highest order over a lifetime commitment to the geotechnical profession in Australia’. Professor Johnston has brought extensive industry experience to the Department and his contribution and leadership in his field of research as well as his role as trainer/mentor, and career adviser to RHD students will continue to be valued. We thank Professor Johnston for his long-standing commitment and contribution to the Department of Infrastructure Engineering, and the wider University. Professor Johnston has now been appointed as an Honorary Professorial Fellow.
Staff & Associates

Professor Colin Duffield and PhD candidate Gigih Atmo’s paper “Improving investment sustainability for PPP power projects in emerging economies: value for money framework”, published in Built Environment Project and Asset Management, was selected by the journal’s editorial team as a Highly Commended Paper of 2014. The paper was mentioned as one of the most impressive pieces of work the team had seen in 2014.

Dr Mahdi Disfani, together with Dr Guillermo Narsilio and Mr Tabassom Afshar (Sessional Research Assistant at IE), were successful with their application for access to the Australian Synchrotron Imaging and Medical beamline to study the “Micro-scale behaviour of recycled construction and demolition material: focussing on particle shape and breakage”.

The access is for 4 days of beam time and was awarded through a competitive application process.

Dr Guillermo Narsilio and Prof Antoinette Tordesillas from the School of Mathematics and Statistics were awarded funding to organise and host the 2015 event at the Australian Academy of Science. They coordinated a workshop on “Mining Data for Detection and Prediction of Failure in Geomaterials”.

Professor Colin Duffield was an invited speaker at the Australian Club in April, the Cambridge Society in August and at the 2nd International Symposium on Disaster Management in October.

Honours Lists

The Honourable Gary Nairn, who served as Federal Member for Eden Monaro 1996-2007, was appointed an Officer of the Order of Australia (AO) in the General Division in the Queen’s Birthday Honours. Mr Nairn was awarded the appointment for distinguished service to the Parliament of Australia, to the communities of New South Wales and the Northern Territory, to the surveying and spacial sciences, and to disability support groups. Mr Nairn is a member of the Department’s Industry Advisory Group.

Associate Professor Geoffrey S Sutherland OAM was awarded the Medal of the Order of Australia General Division for service to engineering, and to education, in the 2015 Australia Day Honours list. Geoff is an Honorary Principal Fellow of the Department.

Professor Rajabifard was announced as the Victorian Professional of the Year 2015.

The SSSI (Spatial Science and Surveying Institute Australia) Spatial Excellence Awards celebrate the achievements of top spatial information enterprises and individuals, and recognise outstanding achievers who are pre-eminent in their field.

Professor Rajabifard is Head of Department of Infrastructure Engineering, as well as Director of the Centre for Spatial Data Infrastructures & Land Administration (CSDILA) and Associate Dean (International), and has active research in the areas of SDI, Land Administration and land management, spatial enablement, spatial enabled government and societies, disaster management, 3D platforms and virtual jurisdictions.

As a result of the award, Professor Rajabifard is nominated for the National and APSEA awards (Asia-Pacific Spatial Excellent Awards), which will be announced early 2016.

Research Project Award

The RISER project was nominated in the category of Award for Technical Excellence. The project won the award with the judges noting that “In a category filled with excellence, the RISER project stood out as a benchmark of technical excellence that addressed a significant need using a complex mix of technologies requiring significant integration.”

The RISER project also went on to receive the Victorian Government Award for Spatial Excellence, the highest accolade of the awards. As a winner of the VSEA, the RISER project will now go forward to the national Australia Pacific Spatial Excellence Awards (APSEA) to be announced in March 2016 at the national Locate conference.
Thornton-Smith Medal awarded by the Department of Infrastructure Engineering

The Department of Infrastructure Engineering awards the Thornton-Smith Medal every year to a graduate of the Geomatics Discipline who is considered to have made an outstanding contribution to the engineering profession in the field of Geomatics. The medal is in commemoration of James Thornton-Smith, the foundation head of the former Department of Surveying, who was instrumental in the development and introduction of the course program of what has become today Geomatics and Spatial Information.

The 2015 recipient is Mr Ian Ireson, Director Land Registration Services, Land Victoria and Deputy Registrar of Titles. He is Victoria’s representative on the Australian Registrars National Electronic Conveyancing Council as well as holding positions on other state and national committees related to surveying and land administration.

Throughout his career Ian has had a strong commitment to providing e-business solutions and improving services in surveying and land administration including Victoria’s digital cadastral map base, survey marks, aerial photography and online information services for surveying, plan and property information. In the early nineties his skills in this area were well regarded and he provided international consultancy services to the Singapore Government’s Planning, Building Control and Roads Departments. He led the implementation of land titles automation, electronic conveyancing and the water register into Victoria’s business processes.

He is currently responsible for the implementation of national electronic conveyancing, electronic plan lodgement and other national land administration initiatives in Land Victoria and reforming business processes and services to maximise the benefits of these initiatives.

MODSIM 2015

At the Conference dinner on 3 December, Prof Andrew Western was named as a recipient of a MSSANZ 2015 Biennial Medalist and Fellow award.

Dr Tim Peterson was named as a recipient of a 2015 Early Career Research Excellence award.

IE Service Awards

At our Department End-of-Year function in December, Ms Eileen Doufas-Shea and Dr Sam Yuen were each presented with a Service Award to acknowledged their outstanding contribution to the Department.

Best Poster Award - International Symposium

A/Prof Colin Duffield, Prof Stephan Winter, A/Prof. Russell Thompson, Dr Ronny Kutadinata, and RHD students Rahul Deb Das, Subham Jain, Michael Rigby and Zahra Navidikashani, with MSE and Monash colleagues, won the Best Poster Award at Disrupting Mobility, a Global Summit Investigating Sustainable Futures held in Cambridge, MA on November 11-13. Their poster, “Shared, Autonomous, Connected and Electric Urban Transport” showed results of various aspects of the ongoing ARC Linkage Project Integrating Mobility on Demand in Urban Transport Infrastructures.
FUNDING AWARDS

Dr Mahdi Disfani (left) and Assoc Prof Graham Moore (right) were granted funding to prepare pre-laboratory online learning materials and protocols for the Melbourne School of Engineering.

Dr Mahdi Disfani was awarded an ARC Linkage grant for "Development of deep soil mixing technology utilising industrial by-products", led by Swinburne University of Technology. Dr Disfani also received a $20,000 Teaching Grant for his project: Transforming pre-lab and post-lab learning in the MSE with e-learning.

Dr Dongryeol Ryu and colleagues were awarded Melbourne Networked Society Institute seed funding for a proof-of-concept proposal in environmental remote sensing and UAV application to disaster management.

Professor Colin Duffield was awarded a RAPID start research grant for his work in Indonesia with Monash University, ITB and ITS in Indonesia.

Professor Stephan Winter and a larger team of colleagues across MSE were awarded a Carlton Connect Rd 3 seed fund project. While the project is still ongoing, a major work of 2015 was the smart mobility survey in partnership with MIT, SMART, and the Department of Transport in Victoria.

Lake Eyre Basin (LEB)

The management of the Lake Eyre Basin (LEB) was awarded the Thess International River Prize at the RiverSymposium conference in September 2015. This is a very prestigious award worth $500,000 and the LEB is the first prize winner where the emphasis has been on sustainable management and protection of the system rather than rehabilitation of a catchment/basin that has been adversely affected by river regulation or pollution. It is a great example of community-government-science-conservation working together on a huge, cross-border basin and the prize was awarded “for its impeccable efforts to integrate community, government and scientific perspectives to encourage sustainable economic growth while protecting the natural flows of the basin’s rivers from water resource development, mining, pollution and other threats”. Dr Justin Costelloe is a member of the LEB Scientific Advisory Panel that was involved in the nomination of the LEB in conjunction with the Queensland and South Australian Natural Resource Management Boards covering much of the LEB. Dr Costelloe is currently working on a project on the Diamantina River that is investigating key hydrological and eco-hydrological aspects of the complex flow regime of the Diamantina River. It has three major strands that aim to increase understanding of:

- Distribution of waterholes that provide refuge to fish and other aquatic animals.
- Surface water – groundwater interactions in the river and how this affects surface water quality and ecosystems.
- The relationship between flow patterns, soil conditions and riparian tree distribution and regeneration.

Reservoir Engineering Project

Following the successful submission of an EOI to ANLEC, Professor Stephan Matthai’s team has been invited to present the detailed work program for a research and reservoir engineering project entitled “Alternative Modelling and Simulation for Structural and Aquifer Traps”. This project will resolve CO2 injection dynamics and the role of faults in potential storage complexes. The use of unstructured simulation grids will permit the realistic representation of these features in the simulations. Coupled flow - geomechanics and reactive transport simulations will be conducted on models of Gippsland CO2 injection candidate sites. This numerical simulation research will help to clarify the impact of faults on the storage capacity and potential leakage mechanisms of these injection targets.

Another invited research and development proposal entitled “Upscaling saturation functions in heterogeneous porous media” to be funded at $500k/yr over a period of 3 years and jointly submitted with FEI (Canberra, Portland, US) is also awaiting funding.

Three further CO2-sequestration related proposals to ANLEC are under review.

One 1-M AUD per year - 3 year research proposal to the federal governments CCS R&D fund is also under review by Australian government.

Above: Simulation of CO2 injection into a two-dimensional model of a 25 metre wide, 5 metre tall quarry face exposing a highly permeable river-channel with large permeability and porosity variations. CO2 saturation is shown using rainbow shading and permeability using grayscale.

Dr Guillermo Narsilio received teaching funding for new triaxial testing equipment and new geophysical testing equipment.

ARC Lief Grant - Urban analytics data infrastructure

The Centre for Spatial Data Infrastructure and Land Administration (CSDILA) was awarded a one-year ARC Linkage infrastructure, equipment and facilities (LIEF) project, led by Prof. Abbas Rajabifard in collaboration with 5 other research centres. The project aims to develop an urban analytics data infrastructure that builds on the Australian Urban Research Infrastructure Network (AURIN). This digital data infrastructure intends to enable the integration, harmonisation, connectivity and scalability of multi-source urban datasets. This infrastructure is required to underpin the next generation of data-driven modelling and decision-support tools to enable the design of smart, productive and resilient cities. These capabilities are predicated on the adoption of ISO standards, development of new ontological frameworks and an urban data dictionary to enable semantic inferencing of datasets and the development of data structures and services. This framework would then be applied to data relevant to people, land and urban infrastructure to support comparative and multi-dimensional analytics.

This project aims to develop the digital infrastructure required to underpin the next generation of data driven modelling and decision-support tools to enable smart, productive and resilient cities. This project will capitalise and add value to the AURIN platform, create a positive impact on the fragmented data landscape that persists in Australia, and empower new capabilities in urban analytics. This project
Research Initiatives

Reservoir Engineering

In November, Professor Stephan Matthai initiated an inter-institutional research programme involving Prof. Lutz Gross (University of Queensland) and Prof. Andre Reul (ISTERRE and the University of Grenoble, France). This international research proposal is currently in review by the Australian CCS R&D Development Programme. The scope of this initiative is the accurate simulation, forecasting, and monitoring of carbon dioxide behaviour in the subsurface as a prerequisite for safe and cost-effective CO2 abatement. Supporting the Australian clean coal and energy sectors in this quest, with tools and expertise that will boost productivity by transforming traditional discipline-separated workflows, is the goal of this multidisciplinary reservoir engineering – hydrogeophysics – simulation-guided engineering project. Via new multiphysics software integrating 1) fine-grained parallel space-time adaptive injection simulation, 2) forecasting of the CO2-plume geophysical signature, 3) inverse analysis of the plume, and 4) simulation-driven design of injection and monitoring systems, this initiative aims to improve subsurface knowledge and advance the understanding of Australia’s storage capacity. Demonstration and validation of this new carbon dioxide storage methodology will occur with datasets from Otway, Aquistore and a Chinese CCS site.

Under the auspices of the Peter Cook Centre at UoM, and together with Stanford and Cambridge Universities, Prof. Matthai designed a research project on active transport and the associated geochemical CO2 trapping mechanisms in geological reservoirs. These processes are highly dependent on the nature of structural and lithological heterogeneities. However, to date, important cm- to meter scale heterogeneities are not incorporated into storage complex models because they can neither be seismically imaged nor represented by grid cells. The project will determine capillary, dissolution and mineral trapping over time for open and closed saline aquifers accounting for such heterogeneities. A series of coordinated process studies using experimental, (semi-) analytical and numeric approaches will be carried out with the aim to estimate the proportion of CO2 trapping by the different mechanisms over time. The CO2CRC Otway and the SaskPower Aquistore sites will be used as case studies, as there is detailed geological information available. Ultimately, the project will advance the conceptual representation of CO2 trapping over time in saline aquifers (IPCC, 2005) to a (semi-) quantitative representation based on our case studies. This project is currently under review by BHP Billiton.

ENSG, Nancy and RING consortium (France), the company Kidova in Paris (France), and the ETHZ (Switzerland) just launched a collaboration aiming to raise the level of physical realism and subsurface multiphysics simulations creating a next-generation set of numerical simulation tools for geothermal energy extraction from naturally fractured rocks. Thegeophysical simulations developed by Prof. Matthai and co-workers will be at the centre of respective research and development efforts. This new international collaboration will focus on the design of geothermal energy extraction schemes under geological challenging conditions and will involve integrated field studies, laboratory characterisation, geological modelling and numerical simulations.

Transportation Engineering for Smart Cities

In November 2015, Professor Majid Sarvi, Transport Engineering, initiated a comprehensive multi-disciplinary research program in transportation engineering for smart cities in collaboration with several staff across the department, school and the university as well as many reputable international researchers from Europe and USA. The aim is to enable the University of Melbourne to establish itself as a national and international powerhouse in cutting-edge transport engineering research in the context of smart cities. This will be carried out by establishing new connected transport engineering laboratory and research program which will focus on the application of advanced transport engineering modelling, simulation and optimisation, digital technologies, sensor network, interactive visualisation, data analytics and high speed computing in planning, design and operations of the smart cities transport and transport infrastructure.

UAV-borne field experiment

In 2015, the UAV Research Unit of CDMP5 focused on two main objectives: to undertake research on innovative use of the UAV platform in disaster management and environmental sensing and to establish a university-wide platform to facilitate diverse applications of the new technology. Dr. Dongyong Ryu received seed funding from the Melbourne Networked Society Institute (MNSI) for “A Framework for Remote Sensing and Data Analysis Using Fixed and Mobile Sensors in a Combined Sensor Network” with Drs. Kazmierczak and Fuentes and from the DEDITR-UoM Innovation Seed Funding for “UAV-borne Infrared Thermography for Plant Water Stress”. His team conducted a number of UAV-borne field experiments to develop methods to map ground target structures and water stress, and the results were presented by Kate Park and Andrew Nolan at the 2015 MODSIM Conference in Gold Coast, Queensland. Funded by the Melbourne School of Engineering, they added a UAV-mount lightweight LiDAR (AL3-32 of the Phoenix Aerial Systems) to the UAV unit’s equipment. The LiDAR is a very important addition to their existing capability in multispectral (visible, near infrared), hyperspectral and thermal infrared sensing. The Melbourne Unmanned Aircraft Systems Integration Platform (MUASIP) will be launched in February 2016 funded by the Melbourne Collaborative Research Infrastructure Platform (led by Dr. Ryu). MUASIP will provide end-to-end services to the UAV-borne sensing for scientific and engineering research and applications. MUASIP’s contributing partners include Mechanical Engineering, School of Ecosystem and Forest Sciences, School of Geography, School of Science, School of Earth Science, School of Biosciences, Melbourne School of Engineering, Faculty of Science, Faculty of Veterinary and Agricultural Science, and the aerial media company XM2 (www.xm2.com).

Geotechnical Group

Dr Guillermo Narsilio’s ARC Future Fellowship officially started in January 2015. His team will develop new models for studying the performance of ground heat exchangers, including energy piles, to improve the design and efficiency of geothermal systems for cooling and heating buildings, and contributing to reducing energy consumption and greenhouse gas emissions. The team was highlighted by the Melbourne Sustainable Society Institute. See link: http://sustainable.unimelb.edu.au/going-underground-clean-energy and in the Melbourne Energy Institute report (page 11): http://www.energy.unimelb.edu.au/files/site1/docs/2323/MEI-AR-2014_WEB.pdf
Geothermal Heating & Cooling for Buildings Sustainable Energy Pilot Demonstration (SEDP) Program

Prof Ian Johnston and Dr Guillermo Narsilio’s Geothermal energy research is undertaken under the Victorian Government Sustainable Energy Pilot Demonstration (SEPD) Program, and was created to:

1. Collect detailed information from ~ 25 new and retrofit buildings.
2. Develop comprehensive in-ground design data for Victorian conditions.

The factors being investigated in real-life conditions include:
- Geometrical arrangement of components
- Materials used
- Importance of orientation, depth and component spacing
- Ground fluid types and flow rates, and
- Operating characteristics of the Ground source heat pumps GSHPs used.

It is also aimed at demonstrating the efficacy of direct geothermal energy in Australia.

Many full scale projects are coming online and understanding of these systems is leading to more cost effective design of Ground heat exchangerGHE systems.

Geothermal for heating and cooling technology is here today, improving the environment and reducing energy demand. The newborn industry is creating jobs to support this ‘new’ energy technology.

- Public sector (initial) co-investment is crucial to build capacity
- Examples of opportunities have been conveyed to government
- Redevelopments (Fisherman bends, Maribyrnong Defence site)
- Metro rail project: geothermal tunnels and stations
- Integration with other green technologies

New


Melbourne Collaborative Research Infrastructure Platform (MCRIP) Fund: Melbourne Unmanned Aircraft Systems Integration Platform (MUASIP) - $120K (UoM) + $200K (MUASIP Partners) led by D. Ryu and A. Western, and involving several researchers from the department.

Indoor Air Quality, Australia Department of the Environment, Clean Air and Urban Landscapes Hub, $8,880,000.

Investigator: A. Steinemann (with P. Rayner, Science, Lead CI). Purpose: To investigate, measure, and evaluate risks of indoor air pollutants within urban microenvironments and to compare with outdoor air pollutants. 2015-2021.

Melbourne School of Engineering Major Teaching Infrastructure Fund: Field Infiltrometer – ($14K) led by D. Ryu.

Melbourne School of Engineering Strategic Equipment Fund: Light-weight LiDAR for Unmanned Aerial Vehicle – ($208K) led by D. Ryu.


Sustainable, Livable, and Resilient Urban Systems, Australia Commonwealth Scientific and Industrial Research Organisation (CSIRO), $500,000. Lead CI: A. Steinemann. Purpose: To develop and implement principles for sustainable urban systems, including innovations for water and energy sustainability, healthy buildings, and resiliency for extreme events. 2015-2021.


Elizabeth and Frederick White Research Conference on Mining Data for Detection and Prediction of Failure in Geomaterials, Australian Academy of Science. A Torresiellas (Faculty of Sciences) & G Narsilio (Engineering). $10,000 (+ 5,000 from UoM).


Victorian Environmental Flows Monitoring and Assessment Program. Stage 5 - further analysis of the VEFMAP data. M. Stewardson; Arthur Rylah Institute for Environmental Research, $69,778.


The development of an innovative computer-based simulator for the optimization of physiotherapy techniques after orthopaedic surgery. L. Zhang, M. Richardson, M. Pirpiris. Awarded by NanAo People’s Hospital, Shenzhen, Guangdong, P.R. China, $315,000. 2015-2017.


International workshop on adaptation of water resources management to climate change. H. Malano & B Maheshwari. ACIAR Project No 2014-001


Triaxial testing and characteristic curve. M. Disfani and G. Narsilio. 2015. BRTS Pty Ltd.

Geothermal energy: Harnessing and emerging technology, G. Narsilio; ARC, Future Fellowship 2014-2018. $719,954 (+ $300,000 from UoM, totaling >$1M).

Collapse Assessment of Reinforced Concrete Buildings in Regions of Lower Seismicity. Nelson Lam – Discovery Project DP140103350, Australian Research Council (ARC), Non-lead grant with Swinburne University of Technology, 2014-2016.

Cost-Effective Mitigation Strategy Development for Building Related Earthquake Risk. N. Lam and H. Goldsworthy in collaboration with University of Adelaide (leading), Swinburne University of Technology and Geoscience Australia, Bushfire and Natural Hazards CRC, 2014-2020.


Automated groundwater level mapping: a tool for catchment scale estimation of aquifer storage changes, fluxes and hydrogeological properties, ARC Linkage Project LP130100958, A. Western, A. Frost, E. Carrara, X. Cheng, C. McAuley, 2013-2016


Hydrologic modelling for a changing world, ARC Future Fellowship FT120100130, M.C. Peel, 2012-2016.


Collapse Assessment of Reinforced Concrete Buildings in Regions of Lower Seismicity. N. Lam – Discovery Project DP140103350, Australian Research Council (ARC), Non-lead grant with Swinburne University of Technology, 2014-2016.


Webb, Dr James Angus, Long-Term intervention monitoring project monitoring and evaluating the ecological outcomes of commonwealth environmental watering (Goulburn River selected area) Stage 2, UOM Commercial Ltd: 2014-235, $3,289,289.

Predicting water quality at the catchment scale: learning from two decades of monitoring, A. Western. Aust Research Council; Linkage Projects;2014-NOV; LP140100495, $315,000.

Bushfire and Natural Hazard CRC research on earthquake hazards, vulnerability of Australian-designed RC walls, moment-resisting frames, buildings with irregularities including those featuring the use of transfer girders, seismic damage loss modelling

ARC Linkage Grant on development of structural systems using innovative blind-bolted connections, A. Western; D. Ryu; JA Webb; P. Leahy; E. Schreiber; M. Watson; D. Waters; R. Goudney, Aust Research Council, Linkage Projects, 2014-2017; NOV; LP140100495, $315,000.


Planning and managing road transport systems for extreme events through spatial enablement, Sarvi, Rajabifard, Seible, Thompson, Miller, Wall, Leighton, LP140100369, 2014-2017, $560,000.
One of the highlights for the year 2015 for the Centre includes the successful grant from the Australian Research Council’s Linkage Infrastructure, Equipment and Facilities (ARC LIEF) scheme. (see page 25). Titled “Urban Analytics Data Infrastructure”, this grand project won over $1.4m to develop the digital infrastructure required to underpin the next generation of data driven modelling and decision-support tools to enable smart, productive and resilient cities. The Centre will lead this project, which involves 5 other research institutes from the University of New South Wales, the University of Queensland, the University of Western Australia, University of Canberra, and University of Wollongong.

Prof Rajabifard was invited to deliver four keynote addresses internationally in 2015, including at the World Cadastre Summit in Istanbul, Turkey, the 13th South East Asian Survey Congress in Singapore, and Smart Korea congress.

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Research Centres

THE CENTRE FOR SDIs & LAND ADMINISTRATION (CSDILA)
DIRECTOR: PROF. ABBAS RAJABIFARD
ASSOCIATE DIRECTOR: DR MOHSEN KALANTARI

Established in 2001, CSDILA provides a focus for research in spatial data infrastructures (SDIs), spatial enablement and land administration by building on ongoing research relationships and creating new links through extended collaboration at both national and international levels.

The activities of the Centre are based on a three-pillared approach: the development of a Research Program; a focused Postgraduate Training Program; and facilitated knowledge transfer including a Visiting Program. Research in the Centre is conducted by staff members of the University of Melbourne, research fellows, honorary affiliated national and international members, research higher degree students associated with the Centre, and international academic and industrial visitors and collaborators.

The Centre’s Advisory Board comprises distinguished Australian and overseas leaders in spatial science and related technologies from academia and industry. Meetings, reports and information dissemination ensure that the Advisory Board members are informed of the research achievements and directions. Advisory Board members also encourage the promotion of networking linkages and research opportunities between the Centre researchers and their own institutions and contact networks.

The Centre has also continued to contribute significantly to many high-level strategies and development of policies and tools, both nationally and internationally, most important to the realisation of Intergovernmental Committee on Surveying and Mapping’s Cadastre 2034 strategy document. We continue our strong performance in publications with 43 publications in 2015, bringing our total close to 500 publications since the Centre’s inception in late 2001. Over the last five years, there has been an increase in funding and research higher degree (RHD) candidate enrolments; in total, we have now successfully completed 27 RHD students. We have also seen an increase in visitors to the Centre and our website, which attests to the Centre’s strong foundation and provides evidence that the Centre is going from strength to strength and is in a strong position for future major grants.

The Centre has gone from strength to strength in the last year. In terms of knowledge transfer, the Centre and its members have had a very productive year either hosting visitors or contributing to national and international seminars and conferences. In total, Centre members made 10 visits around the world in 2015 and hosted more than 25 individual researchers and several delegations from governments, industry, and academia of different countries. In particular, among our visitors, representatives from Singaporean, Malaysian, Chilean and Korean governments were specifically interested in pursuing future engagement and research collaboration. The visiting component continues to be a successful initiative for the Centre, facilitating the cross-pollination of ideas for better research and training.

In February, the Centre hosted experts from Australia, United Kingdom, The Netherlands, Denmark, the Americas and Asia from various universities and industry organisations as part of the “International Symposium on Smart Future Cities: The Role of 3D Land and Property and Cadastre Information”. This symposium was held on 2nd and 3rd of February in the University of Melbourne.

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The Centre has been, and remains at the forefront, in the development of spatial enablement, SDI and land administration systems that facilitate decision making within the context of sustainable development objectives at local, state, national and multi-national levels.
The Centre for Disaster Management and Public Safety (CDMPS) had a very successful year conducting a range of research, engagement and training activities throughout 2015. The biggest activity of the year was the 2nd International Symposium on Disaster Management event which was hosted and organized by CDMPS at the University of Melbourne in October. The event presented and discussed the latest innovations, research and practice related to disaster management worldwide and attracted international (from 14 countries) and national delegates from a range of sectors across Australia. This event built on engagement activities that took place earlier in the year including a range of visits within Australia and also internationally.

Research visits this year included:

- **April 2015**, Prof. Abbas Rajabifard, Dr. Mohsen Kalantari, Dr. Katie Potts, and Dr. Benny Chen visited the NSW Rural Fire Service Headquarters in Sydney to attend a workshop on bushfires and natural hazards and to view their state-of-the-art incident operations centre. The Operations Centre is equipped with sophisticated interactive digital mapping system to allow discussions of strategy to occur around a live display of the fire-ground, and all data feeds from the other emergency service agencies are displayed for greater cooperation and information flow.

- **May 2015**, Vanessa Guzman Mesa from Los Andes University Colombia (Universidad De Los Andes – Uni-Andes) spent 3 months with CDMPS to conduct research related to Disaster Management.

- **September 2015**, Prof. Abbas Rajabifard and Mr. Ged Griffin travelled to Santiago in Chile for a number of meetings – (1) to meet with the Chilean National Office of Emergency of the Interior Ministry (ONEMI) to discuss collaboration opportunities between ONEMI and the Centre for Disaster Management and Public Safety; (2) to meet with researchers from the Catholic University of Chile to further research collaborations on disaster management; (3) to hold discussions with the Research Center for Integrated Disaster (CIGDEN), a centre that brings together key agencies from the areas planning, civil protection, and infrastructure to develop actions to help mitigate the impact of disasters on the population and urban areas.

- **November 2015**, Dr. Katie Potts travelled to Kathmandu, Nepal to attend and present at the International Workshop On The Role of Land Professionals and SDI in Disaster Risk Reduction: In the Context of Post 2015 Nepal Earthquake.

- **In April**, Hosna Tashakkori Hashemi was awarded the 2015 APCOA Young Public Safety Innovation Award during the 2015 APCO Australasia Conference and Exhibition for her outstanding research regarding Integrated 3D Indoor and Outdoor Situational Awareness for Emergency Management.

- **In May**, the CDMPS team of Alireza Kashian, James Hung and Dr. Benny Chen, supervised by Prof. Abbas Rajabifard and Dr. Mohsen Kalantari, received the runner-up award in the 3rd Australia-Netherlands Water Challenge for their presentation of ‘WarnWave: Social Interaction, Public Awareness and Collaboration at the time of Disaster’, which focused on potential usage of mobile critical moments.

- **In October**, Shihara Perera was awarded first place in the ISDM research poster competition for her submission on Modelling Impact by Hail.

- Throughout the year three committee meetings were held, with an executive committee meeting held on May 13th, and two International Advisory Committee meetings held on March 6th and August 6th.
The Department of Infrastructure Engineering is leading the ARC Centre for Advanced Manufacturing of Prefabricated Housing (ARC-CAMPH) under the ARC Industrial Transformation Training Centre Scheme. $4m in funding over 4 years from the Australian Research Council and matching funding from industry will be made available to establish the ARC-CAMPH.

The Centre is being established as a collaborative venture that will see the University partnering with University of Sydney, Curtin University of Technology, Monash University, industry body PrefabAUS and a group of companies led by Amoveo.

**Aim of the Centre:**
This centre aims to unlock the potential growth of Australia’s prefab building industry by creating a sustainable training ecosystem between industry and Australian Universities that will prepare the next generation of engineers and scientists to apply advanced manufacturing principles to pre-fab modular buildings. This highly trained workforce driven by the needs of the customer will identify innovations in the use of advanced materials, design for direct manufacturing and assembly and automated manufacturing. This customer-focused innovation will secure the Australian industry’s competitive advantage in the pre-fab building global value chain leading to local employment growth and increased exports of finished products, componentry and expertise.

**The Opportunity:**
The Australian construction industry creates more than $150bn contribution to GDP (10%) of which the manufactured modular housing sector currently contributes only $4.6bn (3%). The ARC-CAMPH aims to provide new knowledge, methods and technologies as well as highly skilled PhD and postdoctoral researchers to support the research and development that will propel the sector beyond 10% share of the $150bn market (2013) in the next 5 years. The Training Centre will create a sustainable research partnership between university-based researchers and the Australian prefabricated building industry and composite material manufacturers. This will enable the development of sustainable, reusable, smart, and affordable building systems and contribute to creating a globally competitive prefabricated housing manufacturing industry in Australia.

**Expected outcomes of the Centre activities:**
- Construct 90% faster than traditional methods
- Reduce total costs by 50%
- Create new jobs
- Achieve 100% re-use of componentry
- Recycle 80% of site waste
- Reduce transport, labour, and site preliminaries by 70%
- Expand export opportunities
- Secure and maintain competitive advantage in global value chain
Our annual Postgraduate Conference took place on Friday, 13 November at the Rendezvous Grand Hotel, Flinders Street, Melbourne.

This annual event was most successfully organised by the committee of our Graduate Infrastructure Engineering Society (GIES). The event was well attended by 130 RHD students, staff members and guests.

The keynote speaker was Mr Brendan Driscoll, Director Project Strategy, Melbourne Metro Rail Authority. Guests discussion panelists were: Dr Davood Shojaei, Dr Jessey Lee and Dr Brett Anderson.

Best Journal Paper Prizes in each Discipline were won by: Jing Sun (Civil), Margarita Saft (Environmental) and Hosna Tashakkori (Geomatics).

“Logic will get you from A to B. Imagination will take you everywhere.”

Albert Einstein
Environmental and Civil Engineering graduates Daniel Nordinson and Matthew Oka, who won the 2015 Sir L. Ronald East Student Prize, (Victorian Water Engineering Branch, Engineers Australia), sponsored by Jacobs, for their final year research project ‘Penetration of turbulence into a gravel bed: informing models of hyporheic exchange’, undertaken as part of the ARC Discovery Project ‘The role of turbulence in transporting waterborne material within streamed sediments and across the sediment-water interface’, led by Professor Stanley Grant and supervised by Alexander McCluskey.

Abdallah Ghazlan was awarded a Best Paper Award at the 2nd Australasian Conference on Computational Mechanics (ACCM 2015) in Brisbane for his paper “A Numerical Investigation of the Performance of a Nasfre-like Composite under Blast Loading”, co-authored with Dr Tuan Ngo, Dr Jonathan Tran and A/Prof. Nelson Lam.

This is another achievement for the APTES group, which highlights appreciation of the significant work by top researchers across multiple disciplines.

At the 2015 IE Postgraduate Conference, the Best Journal Publication Awards were won by Jing Sun (Civil), Margarita Saft (Environmental) and Hosna Tashakkori Hashemi (Geomatics).

PhD Candidate Joost van der Linden was awarded granted an ISSMGE Foundation travel award to Stanford University, USA.

PhD Candidate Olga Mikhayalova was awarded an Endeavour Research Fellowship to Cambridge University.

Mohammad Sedeghat joined SKM’s research team winning a university scholarship covering his tuition and fees as an overseas student.

Amir Orangi won a prestigious Australian Federal Government Endeavour fellowship to spend 6 months at the Hong Kong University of Science and Technology to work with Prof Yu-Hsing Wang on developing cost effective geophysical sensors for geotechnical and geoenvironmental (and agricultural) applications.

Shihara Thimanthi Perera won the Best Presentation Award at the 2015 Postgraduate Conference and the Best Poster Award at 2nd International Symposium on Disaster Management.


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Activities

Nepal Earthquake
Several of our students from Nepal responded to the earthquake in their home country by using their research project studies. One RHD, Mr Tilak Pokharel, didn’t expect to put his work into practice so suddenly. Tilak came to the University of Melbourne in 2013 to pursue his PhD in structural and earthquake engineering with one of Australia’s leading experts, Associate Professor Helen Goldsworthy. He was determined to put his training to good use and contacted Associate Professor Goldsworthy. With the help of the Dean of Engineering, Professor Iven Mareels, she arranged funds to send him with a group of Australian and New Zealand engineers travelling to Nepal to help the recovery effort. He flew to some of the hardest-hit areas, including the district of Sindhupalchowk (left). The death toll there was 3,531, and more than 65,000 buildings were damaged.

Tilak was awarded with an International Engagement Strategic Fund for “Learning from Earthquake mission to Nepal” to cover his expenses on his reconnaissance mission to Nepal in the aftermath of the earthquake.

Geomatics RHDs
In June the Geomatics research students went on a research retreat. In five groups they competed for the best research proposal idea. They developed proposals such as a web tool for easy access to the state of a smart city, optimizing individual evacuation routes for a predicted flash flooding, localizing a person indoor based on their verbal place description, or studying the transport capacity in a densifying city.

Staff members in the room were impressed by the enthusiasm and the results produced within the course of a single day.

Thermal Response Testing
RHDS Linden Jensen-Page and Qi Lu (left) ran a Thermal Response Test to estimate the thermal conductivity of the ground at Thornbury.

Another Thermal Response Test was performed on the geothermal boreholes located at the Walter Boas Building of the University (right).

In September the PhD students of the Geomatics Discipline went on a field trip to Belgrave to test a mobile phone app used to survey/collect travel and activities data of its user. The group did a few tasks and visited several places to test the accuracy of the tracking and travel mode prediction of the app.

Inaugural Soccer Match - March
GIES was proactive in the past year through organising and hosting several social events. In early May, GIES annual general meeting was held to elect new committee members. During the year, two BBQ outings and a soccer match were organised for faculty members and the RHD students in the department of Infrastructure Engineering. Towards the end of last year, GIES was affiliated with the Graduate Student Association (GSA) which would subsequently augment exposure within the university and funding.

Our Graduate Infrastructure Engineering Society (GIES) represents the graduate students of the Department. The society organises regular events, providing social cohesion amongst the graduate student group and opportunities to network with industry.

BBQ - September
GIES organised a BBQ in September for staff, students and visitors teams consisting of the different disciplines: civil, environmental and geomatics.
Graduations

2015 Graduates - PhD
Dr Asal Bidarmaghz
Dr Iwona Conlan
Dr Tshewang Lhendup
Dr Raymond Lumantara
Dr Vidal-Paton Cole
Dr Robert Pipunic
Dr Davood Shojaei
Dr Serene Ho
Dr Jane Lai
Dr Saeed Miramini
Dr Rubel Biswas Chowdhury
Dr Eleanor Gee
Dr Madhuwanthi Rupasinghe
Dr Maryam Saydi
Dr Joost Kuckartz
Dr Muneeb Ali
Dr Amir Valizadeh Kivi
Dr Ebadat Ghanbari Parmehr
Dr Azadeh Mousavi
Dr Yuxiang He
Dr Zelalem Tesemma
Dr Kumudu Rathnayaka
Dr Rojit Shahi

“Go confidently in the
direction of your dreams.
Live the life you have imagined”

Henry David Thoreau

Dr Muneeb Ali and Assoc Prof Nelson Lam

Dr Davood Shojaei, Prof. Abbas Rajabifard, Dr Serene Ho

Dr Tshewang Lhendup & Dr Raymond Lumantarna
The Department was privileged to welcome these visitors in 2015

**JANUARY**
- Dr Daniel Steudler
- Prof David Coleman, University of New Brunswick, Canada
- Dr Zhixuan Yang, P.R. China
- Mr Kwak Byungyong, South Korea
- Mr Wonho Song, South Korea

**FEBRUARY**
- Ms Vanessa Guzman Mesa
- Prof Sig Enemark, Denmark
- Dr Yuangfeng Qiu, Wuhan Institute of Technology, P.R. China
- Ms Li Weijian, Agriculture and Forestry University, Fuzhou, P.R. China

**APRIL**
- Prof Zhongjing Wang, Vice Dean (Research), School of Civil Engineer, Tsinghua University, P.R. China
- Mr Salil Goel, India

**MAY**
- Dr Christoph Kirckelley, HafenCity University Hamburg, Germany
- Mr Ugo Verlingue, Bordeaux Sciences Agro, France
- Ms Nibha Gupta, Indian School of Mines, Dhanbad, India

**JUNE**
- Mr Roman Bellanger, Cesi Saint Navarre, France
- Ms Agnès Mustar, ESTP (École Spéciale de Travaux Publics et de l’Industrie de Paris), France
- Mr Francesco-Mallard-Marini, ESTP (École Spéciale de Travaux Publics et de l’Industrie de Paris), France
- Dr Daniel Paez Barajas, Columbia, India

**JULY**
- Mr Salil Goel

**AUGUST**
- A/P Heloisa Firmo, Polytechnic School (POLI), Rio de Janeiro, Brazil
- Prof Zhixuan Yang (P.R. China)
- Mr Ugo Verlingue, Mr Romain Bellanger (France)

**SEPTEMBER**
- Mr Salil Goel
- Ms Garima Lakheriya, India
- Ms Farah Humbadji, Anna Waker Studium, Bolzano, Italy
- A/P Amir Ahmad Dehghani
- Mr Guanghui Ru
- Ms Fuyu Hu

**OCTOBER**
- Mr Salil Goel, India
- Mr Alexander Martin, Karlsruhe Institute of Technology, Germany
- Dr Shohou Li, Nanjing University of Science & Technology, P.R. China
- Ms Juliette LeCroz, ESTP (École Spéciale de Travaux Publics et de l’Industrie de Paris), France
- Dr Ashmita Sengupta, Southern California Coastal Water Research Project (SCCWRP), USA
- Ms Wenxiu Shang, Tsinghua University, P.R. China
- Dr Fleur Loveridge, University of Southampton, UK
- Professors Gever DeNeff, Head of the Department of Construction Management and Engineering at the University of Twente, The Netherlands.

**NOVEMBER**
- A/P Heloisa Firmo
- Mr Kanchala Sundara Reddy, Indian Institute of Technology Madras, India
- Ms Lucia Schotman, University of Technology, Delft, The Netherlands
- Dr. Nicola Ray, Head of “Environment Modeling & Geomatics” Unit (UNEP/GRID-Geneva)
- Ms Leila Hosseini, Iran
- Prof Shervin Davia, USA - Dean’s Lecture
- Prof Lim Tian Kuay, (TK) Singapore National Environment Agency.

**DECEMBER**
- Ms Marjohn Abdulhameed, University of WA
- Professors Abdul Aziz Abdul Samad, UTH Malaysia
- Assoc Prof Noridah Mohamad, UTH Malaysia
- Assoc Prof Abd Al-Mahdi Dehghani, IAU (Gorgan University of Agricultural Sciences & Natural Resources), Iran
- Professor Ray Levitt, Professor of Civil and Environmental Engineering, Stanford University, USA.


C3 OTHER REFEREDED JOURNALS


C3 OTHER REFEREDED LETTERS OR NOTES


D4 MAJOR REFERENCE WORKS


D4 MAJOR REFERENCE WORKS


D4 MAJOR REFERENCE WORKS


D4 MAJOR REFERENCE WORKS


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