

InFoST December 2017 Edition

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A Message from the Executive Dean

Another year and the final InFoST for 2017. A time to reflect on a very busy and successful year.

This year the discipline groups were extremely busy with Engineering reviewing all their degrees and shepherding new curricula and courses for all their programs. The new common core means a significant reduction in the number of courses while maintaining student choice in mechanical, civil, mining and mechatronics engineering, and further options in civil with environmental and structural engineering. This was quite a bit of work but we had to add the 5-year accreditation review with Engineers Australia to the mix and that is certainly never taken lightly. However, despite the demands we have been re-accredited for the next 5 years and commended for our degree

structure and our links with industry partners, so well done all.

As a side dish, we also reviewed the postgraduate program in Maintenance and Reliability Engineering and again the review commended the degree and its fully online delivery while making some good suggestions for improvements, which will be followed up over the next 12 months.

The new Information Technology degree, which was winning awards last year for its innovative design, was introduced to first year this year and has proved a hit with students and staff. Our long-term issues with introductory courses in programming seem to be a thing of the past as the new algorithm based, problem-solving course has been well received and very well passed. With this course starting in the partners next year we anticipate similar favourable reactions with our major International cohort.

Science has not been left out of the workload expectations with 3 programs under review, Environmental and Conservation Science, Geosciences and our popular Brewing programs. All came through the process well and a number of changes have been made or are in progress to develop new options in mining rehabilitation between the Geo and Environmental Sciences and to bring some of our postgraduate brewing courses into our undergraduate program.

After another whirlwind tour of China in September to welcome new students into our partner degrees, we began development of a new offering in Nutritional Science with Shenzhen Polytechnic to start in 2018. This has meant some rapid work between the Head of School, Applied and Biomedical Sciences and our Associate Dean, Engagement to put it all together but they have succeeded and we anticipate that we will meet the deadlines for a September 2018 start in China.

It has been an excellent year for promotion with Barbie Panther, Richard Dazeley and Vince Verheyen achieving Associate Professorships while Fiona Hogan and Manoj Khandelwal were elevated to senior lecturers.

Florry has been awarded a Citation for Outstanding Contribution to Student Learning by the Australian Award for University Teaching. This is national recognition of teaching prowess and we are very proud that Florry has joined our other national awardees Jess Reeves, Richard Dazeley and Barbie Panther in receiving recognition for their excellent teaching prowess.

Our research effort is also increasing with new grants and contracts in environmental science and conservation, water use and conservation, geotechnical and geohydrology of brown coal, structural engineering, carbon capture, sustainable uses of brown coal, cyber security, biomolecular studies of heart disease, cancer, medical microbiology, optimisation and climate change and cyclones.

We have had another ARC win plus 3 LEIF successes this year. In short, our approach to increase mentoring of our ERA and middle year researchers, build research grouping and developing industry linkages is showing more than promise.

Retirements, resignations and replacements

The end of 2017 sees the retirement of five long-serving members of staff: Julie Worrall, Jenny Canovan, Paul Bennett, Phil Smith and Glenn Stevens, as well as the departure of Julien Ugon.

We also extend a warm welcome to the new staff members who have joined us, Brie Dendle and Geoff Rogers.

Julie Worrall

Julie has been with FedUni and its predecessors for over 15 years as a Technical Officer specialising in Food and Nutritional Science and Microbiology at the Mt Helen campus. FedUni has benefitted from Julie's extensive experience as an analytical and microbiology technician with organisations such as McCain Food, National Foods and Kraft Foods. While we will miss Julie's expertise, we wish her all the best in her retirement.

Paul Bennett

Paul Bennett is another long-serving member of FoST, with over 25 years with FedUni. Paul will be retiring from his role as Engineering Technical Officer. Best wishes to Paul and enjoy your retirement.

Glenn Stevens

Glenn Stevens has been with FedUni for over 30 years, and over that time has seen many changes in the field of computer networking and internet technology and security. Following on from his early experience in the industrial control field as a programmer and controls engineer, Glenn joined Ballarat College of Advanced Education (BCAE) as a physics lecturer, before moving into the maths and computing department. During his time with the university, Glenn has taught with an underlying philosophy of learning through practical application, from which countless students have benefitted.

While Glenn will miss the interaction with students and colleagues he is looking forward to spending more time with his wife Annaleise and their three children, and we wish him all the best for an enjoyable retirement.

Phil Smith

Phil will be retiring from his position as lecturer in the areas of introductory and advance programming and HLA. Phil has had a strong influence to both staff and students during his time with the university. New academic staff over the years were told to sit in on one of Phil's lectures and learn from the best!

We wish Phil all the very best for an enjoyable retirement.

Jenny Canovan

Jenny commenced work in the Gippsland School of Applied Science, Monash University in January 1996, which became the School of Applied Sciences and Engineering in 2003. Jenny had many titles over the years, including School Administration Officer, Secretary, HR and Office Manager and Administrative Coordinator. In short, she knew everyone and everything!

In 2009, Jenny became the Project Manager for the newly created Gippsland Access and Participation (GAP) Project. Now her influence extended beyond the university into schools, community and government. In addition to her well-known administrative skills, Jenny displayed a wide range of new talents! Her tenacity, creativity and versatility came to the fore as she worked to manage a diverse team, aiming to provide new STEM educational opportunities for regional and indigenous students.

Over the last 9 nine years, Jenny has developed a deep understanding of the challenges faced by rural and remote teachers and students. She has played a significant role in ensuring that teachers are better supported in their professional development, students have greater access to activities that enhance their STEM studies and widen their aspirational horizons, and the community have increased exposure to interesting events and inspirational speakers. Convincing Australia's Chief Scientist to visit the campus and give a public address was a highlight!

Throughout this time, Jenny has shown that she will give anything a go. Whenever there is work to be done, whether or not it is in her job description, she pitches in and helps. Most importantly, Jenny has been a good friend to all and has helped to keep us steady through periods of turbulence. She knows when to talk, when to listen, and when we simply need to have a laugh. Gippsland campus will not be the same without her!

Julien Ugon

Julien Ugon joined the University of Ballarat as a maths PhD student of Professor Alex Rubinov in 2002. After completing his PhD, Julien continued as a researcher in CIAO, dealing with applications of optimisation in collaboration with a number of industry partners. Julien combined his research with teaching of IT and maths subjects.

During his 15 years with CIAO and the university, Julien has become a well-established and internationally recognised researcher in optimisation. He has published more than 35 papers, and his Scopus H-index has reached 10; a significant achievement for a researcher of his age. He recently led an international team of 6 researchers, including 3 professors from France, Spain and Israel, and was awarded an ARC Discovery grant.

Julien has strongly contributed to the success of CIAO as both a researcher and a manager in his roles as acting director and deputy director. His contribution will continue in his coming roles as an honorary senior research fellow.

As a teacher, Julien has a unique ability to connect with students from a wide range of abilities and interests. Students enrolled in first year enabling maths describe him as 'enthusiastic, approachable, caring and knowledgeable'. Third year online maths students, who appreciate his 'ability to assist students with the difficult online mode of learning', also recognise these same qualities.

As a colleague, Julien is always friendly and reliable, ready to offer help whether it is about research, teaching or administration. We wish him well for the future and look forward to his continued interactions with CIAO. He is welcome back on campus any time!

Brie Dendle

A Ballarat local of 16 years, Brie joined FedUni in September as the Coordinator of Laboratory Services at Mt Helen campus. Brie has an extensive background in diagnostic pathology, having worked in the industry for 16 years in a variety of roles including multi-skilled scientist, laboratory manager, quality manager and OHS coordinator.

Geoff Rogers

Joining us in October from a background in pathology, Geoff will be providing technical support to food and chemical sciences, as well as supporting the instrumentation in Y Building.

Academic promotions

Congratulations to the recipients of the following academic promotions effective from 1 January 2018:

Promoted to Academic Level C

Dr Manoj Khandelwal

Dr Fiona Hogan

Promoted to Academic Level D

Dr Barbie Panther

Dr Richard Dazeley

Dr Vincent Verheyen

Awards season

In recognition of its performance and the ongoing efforts of staff to improve programs, the School of Engineering and IT has been nominated for two significant awards for the IT discipline.

The Australian Financial Review Higher Education Awards are a prestigious set of awards across the range of Higher Education activity. This year our Bachelor of IT (Professional Practice) has reached a shortlist of 5 finalists in the Industry Engagement category. Special thanks to Mark, Andy Smith, Steve Davies (IBM) and Shirley Fraser for their efforts in preparing the application. The winner will be announced at a gala dinner in late August. Further information (and a list of our competitors) is available at <http://www.afr.com/leadership/top-higher-education-achievers-named-in-afr-awards-20170727-qxk5d0>

In addition to this, Dr Richard Dazeley has been nominated by the ACS for SEARCC International ICT Educator of the Year award. This follows on from his national award in 2016. Finalists for this award will be notified later this month and the winners are announced in mid-September. Being nominated for this peak ICT award is a significant achievement and, along with the AFR award, adds to the now obvious recognition of the quality of our IT discipline.

FedUni academic among nation's top Uni teachers

Federation University Australia's Associate Professor Singarayer Florentine (Florry) has been recognised as one of the nation's top teachers by being awarded the prestigious Citation for Outstanding Contribution to Student Learning by the Australian Award for University Teaching.

Florry, of the School of Applied and Biomedical Sciences, was recognised for his development of highly innovative curricula, resources, services and practical experience in the field of restoration ecology that are linked to high-quality work readiness student outcomes.

Florry's research has identified that restoration and rehabilitation are the most significant practical opportunities for meeting global conservation goals for current and future environmental students, employees and managers. He has developed flexible internal and external curriculum learning opportunities, innovative experiences and criterion-designed authentic assessments that connect to real-world issues.

These innovative approaches have also been recognised by FedUni, with the 2016 Vice-Chancellor Award for Outstanding Contributions to Student Learning.

Florry said one of the strengths of his teaching was the emphasis he places on applied aspects of the course.

"I believe it is very important to draw on a variety of speakers from industry and other organisations, and to organise short field visits to relevant sites within the local region where possible," Florry said.

"Restoration and rehabilitation courses are especially amenable to this approach. The range and quality of the guest lecturers have been quite exceptional, and have included speakers who have internationally recognised credentials."

Professor Mark Sandeman, Executive Dean, Faculty of Science and Technology, said the award was "well deserved recognition for all of Florry's efforts in teaching and supervision over many years".

Associate Professor Nina Fotinatos, Director of the University's Centre for Learning Innovation and Professional Practice (CLIPP) said: "These national citation awards are extremely competitive and are underpinned by a rigorous Australian Higher Education sector peer-review assessment process.

"Singarayer Florentine's extensive experience, knowledge, leadership and innovation in the field have been well recognised by the attainment of this national and prestigious award," Associate Professor Fotinatos said.

"The award funding will enable Singarayer Florentine to further disseminate best practice in the field and expand his innovations to the broader higher education community."

Florry's innovative curriculum approach has also been recognised internationally by the University of Brunei, Darussalam.

He was invited to deliver two one-week workshops on tropical rainforest restoration. He also ran two three-day workshops on tropical rainforest restoration at the Centre for Rainforest Studies.

The curriculum has also been recognised and endorsed by the Castlemaine Goldfield Mines, Ballarat, as being highly relevant to the mine rehabilitation industry.

Alumni Awards 2017

The 2017 Alumni Awards ceremony was held in August at the Caro Convention Centre. These awards are formal recognition and acknowledgement of prominent Federation University alumni, both domestic and international, for their achievements within their chosen field of study and beyond, in at least one of the following categories:

Outstanding professional achievement

Outstanding academic or research achievement

Outstanding service to Federation University Australia or its predecessor institutions

Outstanding service to the community

In 2017 FoST is proud to honour the achievements of its alumni Leon Newnham (Alumnus of the Year) and R W (Dick) Richards (Distinguished Alumnus-posthumous).

Leon has distinguished himself in the field of information technology in the ten years since graduating from Federation University.

Whilst an honours student, Leon's research project involved the use of podcasting for enhancing student study opportunities. In 2007 he volunteered his time to teach staff in the school of Nursing how to podcast their lectures in order to enhance study opportunities for nursing students at the Horsham campus.

Leon is a great ambassador for FedUni and has given freely of his time during and after his study to assist in events such as mentoring, orientation, marketing events and speaking with prospective students.

He began his professional career with IBM during his studies. He then moved to London, working for Price-Waterhouse Coopers before returning to Melbourne. In 2010, he took a position in Los Angeles as Project Manager for Vista Entertainment Solutions, the leading supplier of cinema management software worldwide, where in 2016 he was appointed as President.

Dick Richards was an Australian science teacher who joined the Ballarat School of Mines in 1914, where he gave 44 years of service, 12 of them as Principal.

During his career he developed many pieces of experimental equipment and during World War II acted as a scientific adviser in the production of optical apparatus in Australia.

Dick's work was honoured through the naming of the Ballarat School of Mines- R W Richards Medal, which is awarded annually to a Bachelor of Applied Science graduate.

Dick Richards was granted leave from his SMB post and spent three freezing years in Antarctica from 1914-1917 as part of an Exploration Expedition. Travelling with Sir Ernest Shackleton, Richards' ship Aurora, tethered offshore, was blown away in a gale leaving Richards marooned for two years with nine other men. He was awarded the Albert Medal (now known as the George Cross) in 1923 for his efforts on

the ice to save the lives of two fellow explorers. He outlived all other members of the expedition, and became the last survivor of the so-called 'Heroic Age'. This award was accepted on behalf of Mr. Richards by his daughter, Patricia Lathlean.



Federation University Alumni Award recipients (L-R): Associate Professor Ann Gervasoni, Leon Newnham, Saeed Al Muharrami, Martin Andanar, Dr Kenneth Ogden, Patricia Lathlean (daughter of R W Richards)

2017 HDR Research Conference

On 27 July 2017, the HDR Research Conference was held at the Mt Helen campus.

With the 2017 theme 'Making your vision a reality' this conference provides HDR students with the opportunity to communicate their research in a supportive environment, receiving valuable feedback and honing key skills that will be utilised during the rest of their candidature and beyond.

The conference is also a way to enhance the research culture of Federation University, as well as recognising and celebrating the achievements of the university's emerging researchers. The number of oral and poster presentations that featured at this year's conference is a demonstration of the quality and diversity of research carried out by Federation University HDR students.

FoST is proud to have been strongly represented at the conference and would like to congratulate all student on their performance, particularly:

Adam Bignold – 1st prize (oral presentation)

Jacqui Panozzo – 3rd prize (oral presentation)

Michelle Maier – 3rd prize (oral presentation)

Farah Ahmady – honourable mention (oral presentation)

Ingrid Wise – honourable mention (oral presentation)

Joji Abraham – 2nd prize (poster presentation)

Final year engineering student presentations

On 26 October 2017 members of the university community, regional engineers and members of the public attended the annual Engineering research project presentations by four

selected students from civil and mechanical and mining engineering programs, School of Engineering and IT.

The diverse topics presented included green waste co-generation, road base abrasion properties, concrete-grade sand production and building foundations on clay soils.

The event was jointly organised and sponsored by Engineer Australia Ballarat group and Federation University's School of Engineering and IT. All research projects presented were industry based and clearly demonstrated their potential applications in engineering practice, both locally and globally.

Each presenter received a certificate and gift voucher from Engineers Australia, in appreciation of their participation in this event.



Presenters with event sponsors (L-R): Henk Dedeugd (EA Ballarat Group Chairman), Pavani Valluri (Mechanical Engineering), Tali Romanowska (Civil Engineering), Dr Samudra Jayasekera (event host/organiser, FedUni), Aaron Reed (Mining Engineering), Michael Neal (Civil Engineering), Mike Caldwell (EA Ballarat Group Treasurer)

These scholarships are aimed at preparing students to be job ready, in roles of Australia's digital future that IBM has termed 'new collar jobs'.

Vice Chancellor Helen Bartlett thanked IBM for facilitating the scholarship program and their support of Federation University students since 2001.

"Since the program's inception IBM has invested well over \$7 million in scholarships with more than 200 students successfully graduating, many of whom have gone on to full time employment with IBM in Ballarat" Professor Bartlett said.

The 2017 IBM Information Technology Scholarship Program Recipients are:

David Myers	Thomas Hogg
Andrew Greig	Corey Page
Lucas Smith	Jordan Ribbink
Jorrod Michell	Joseph Thorpe
Samuel Rasmussen	Samuel Pike
Darryl Wall	Beau Nieuwveld
Thomas Bannister	David Hagan
Scott Ryan	Daniel Cooper
Kewen Ding	Thomas Brooks
Joshua Power	Jordan Thomas
Benjamin Skelly	

FoST congratulates the scholarship recipients and wishes them well in the remainder of their studies and the future.

IBM Information Technology Scholarships



Federation University Vice Chancellor Helen Bartlett and IBM representative, with award recipients

As part of Federation University's partnership with IBM, 21 students received a \$35,000 scholarship to support them in their second year of studies in a Bachelor of Information Technology.

Aalborg University awards fellowship to Dr Guillermo Pineda-Villavicencio

Centre for Informatics and Applied Optimisation (CIAO) researcher Dr Guillermo Pineda-Villavicencio was awarded a one-month fellowship by the Department of Mathematical Sciences at Aalborg University, Denmark, valued at AU\$10,000.

During his visit to Denmark, Guillermo worked on joint projects with his long-term collaborator Associate Professor Leif K Jorgensen. Research collaboration between Associate Professor Jorgensen and Guillermo has already resulted in two published papers in leading international journals, with this fellowship expected to further advance a number of ongoing research projects between them.

University to conduct major microbiota research

Federation University Australia has signed an agreement with Vedanta Biosciences to conduct research investigating the role of the gut microbiota in infant health in Papua New Guinea.

The \$127,000 project will be led by Dr Andrew Greenhill of FoST, Gippsland campus.

Dr Greenhill will lead a collaboration between FedUni, the Papua New Guinea Institute of Medical Research, James Cook University and international collaborators to determine whether the community composition of the gut microbiota correlates with risk of infection or other adverse health outcomes.

"The gut microbiome has received a lot of attention in recent years, but to date most studies have focused on the impact the microbiome might have on people living in high income countries, in particular in relation to non-communicable disease such as obesity and immune disorders," Dr Greenhill said.

"We believe there are likely to be interactions between the gut microbiota and infectious diseases as well.

"Our preliminary work in Papua New Guinea has revealed some interesting patterns to date, but has not addressed this specific issue. The infant mortality rate in Papua New Guinea remains higher than in most other countries in the Asia-Pacific region, and diarrhoeal diseases are a common cause of illness and death in young children," Dr Greenhill said.

"This grant provides us with the opportunity to explore relationships between the development of the gut microbiome and immunity in children in the first 12-15 months of life."

Congratulations to Andrew on this great acknowledgement of the quality of his work.

CIAO researcher travels to the Czech Republic and Israel

In September-October 2017 Centre for Informatics and Applied Optimisation (CIAO) Research Director Associate Professor Alex Kruger travelled to the Czech Republic and Israel.

In Prague, he collaborated with Partner Investigator on the current ARC Discovery project and CIAO Adjunct Professor Jiří Outrata's 70th birthday.

In Israel, Alex gave an invited lecture at Tel Aviv University, an invited talk at the *German-Israeli Research Workshop on Optimisation* at Technion in Haifa, participated in the *Optimisation Industrial Day* at ORT Braude College in Karmiel, and collaborated with colleagues in Tel Aviv, Haifa and Karmiel.

Special issues of the high ranked international journal *Optimisation* dedicated to the conferences in Prague and Tel Aviv are currently in preparation. The discussions held at ORT Braude College are likely to lead to joint projects involving CIAO and College researchers.

International optimisation community celebrates 70th birthday of CIAO honorary researcher

Centre for Informatics and Applied Optimisation (CIAO) long-time collaborator and Adjunct Professor Jiří Outrata celebrated his 70th birthday on 13 June 2017. Professor Outrata is Senior Researcher in the Institute of Information Theory and Automation of the Czech Academy of Sciences.

He is a leading expert in non-smooth optimisation and variational analysis. He has published 3 books and about 100 journal papers, supervised a number of PhD students and won numerous Czech and international research grants. Among his awards in the Honorary Medal of Bernard Bolzano.

Jiří's activities are not limited to mathematics. He has devoted a great part of his life to top sailing. He has participated at several World and European Championships and Finn World Masters. He has become three times World Champion and won a number of other top rankings. In the past, he participated regularly in national alpine ski contests and international combined ski/yachting regattas.

Professor Outrata has visited Ballarat many times, the last time in January 2017. He has been involved as a Partner Investigator in two ARC Discovery projects and co-authored 4 papers with Associate Professor Alex Kruger. CIAO congratulates Jiří on his birthday and wishes him many more achievements in mathematics and in sports.

On 19-22 September 2017 world leaders in optimisation gathered at Charles University in Prague for the 11th International Conference on Parametric Optimisation and Related Topics (ParaoptXI), dedicated to Jiří Outrata's 70th birthday. Associate Professor Kruger delivered a plenary lecture and a special issue of the high ranked international journal *Optimisation* dedicated to the conference and Jiří Outrata is currently in preparation.



CIAO collaborator and Adjunct Professor Jiří Outrata

FedUni researcher receives funding to advance climate extremes research

Dr Savin Chand has received a grant of \$183,211 from the Department of Environment and Energy to advance tropical cyclone research.

This research grant is part of the CSIRO's and the Australian Bureau of Meteorology's National Environment Science Programme Project 2.8 Extreme Weather Projection.

Savin's role in this Project 2.8 will be to assess characteristics of tropical cyclones, as well as associated extreme weather in general, in the changing climate.

In particular, he will look at factors affecting regional-scale changes in tropical cyclone tracks globally, with emphasis over Australia, and determine potential shifts – if any – as a result of tropical expansion. Savin will be working closely with his collaborators from the CSIRO and the Australian Bureau of Meteorology.

In January 2017, Dr Savin Chand's cutting-edge research in the journal *Nature Climate Change* has received widespread scientific and media attention. This work has played an instrumental role in Savin's successful bid for the research grant, which will now help advance tropical cyclone research further.

Savin is currently leading the Climate Informatics Research Group, which is formed within the Centre for Informatics and Applied Optimisation at Federation University Australia.

FedUni receives further Australian Research Council grants

Senior academics from Federation University Australia have been featured in three leading Australian Research Council grants.

Awarded through the Linkage Infrastructure, Equipment and Facilities (LIEF) scheme, the grants have been allocated to many academics throughout Australian universities.

Dr Jess Reeves is a chief investigator in the successful LIEF grant for a national facility for the analysis of pyrogenic carbon.

"The new methodology will enable far more rapid, robust and cost effective measurements of the abundance and composition of carbon produced by biomass burning and fossil fuel combustion," Dr Reeves said.

"This is particularly important for dating ancient fire events, either due to wild fire or lit by people. It is also significant for assessments of soil carbon sequestration."

The team, led by Professor Michael Bird of James Cook University, comprises leading archeologists, paleoecologists and soil scientists from nine Australian universities.

In another project, Professor Leigh Sullivan, Professor Mohammad Murshed, Professor Guojun Lu, Associate Professor Peter Dahlhaus and Associate Professor Singarayer Florentine are part of a large cross-university \$659,000 research group aiming to develop an earth

systems monitoring facility using unmanned aerial vehicles and world-leading sensor technology.

Professor Peter Gell also is part of a research group awarded funding of \$464,000 to establish a facility to enhance Australian capacity to analyse the stable isotope composition of silicate minerals.

"The facility will enable the Australian archeology, and earth and environmental science communities to better utilise stable isotopes of silicate minerals such as clay and opal and the hard structures laid down by algae, grasses and sponges for example," Professor Gell said.

Applications range from understanding ore deposit formation, to fingerprinting sediment and human artefacts and to reconstructing long term climate change."

Professor Leigh Sullivan, Deputy Vice-Chancellor (Research and Innovation), congratulated all of the FedUni researchers on their grants.

"Our FedUni researchers will play a major role in the success of these projects," Professor Sullivan said.

"The University will continue to expand its research footprint in the pursuit of large-scale projects such as these."

November 2017 ARC major grants announcement

FoST's Dr Julien Ugon has received a prestigious Australian Research Council (ARC) grant to further his mathematical research into optimisation techniques.

The funding is provided by the Australian Government through the ARC's Discovery Program DP18 scheme. The grant will total up to \$362,045 and run from 2018 to 2020. The full title of the project is 'An optimisation-based framework for non-classical Chebyshev approximation'.

Dr Ugon will work with partner organisations in Spain, France and Israel, as well as collaborate with Swinburne and RMIT universities.

FOST researchers invited to present research to the US Defence Research Laboratories

Three groups of Faculty of Science and Technology researchers attended an invitation-only workshop to present their research to the representatives of the US Defence Research Laboratories in South Australia recently. The Robotics and Autonomy Workshop (RAW) was hosted by the Defence Science Institute (DSI) with the support of the US Army's International Technology Center-Pacific (ITC-PAC) and Defence Science Technology (DST) Group over two days in Adelaide on 6-7 November 2017.

On behalf of Federation Learning Agents Group (FLAG) across the Centre for Informatics and Applied Optimisation (CIAO) and the Centre for Multimedia Computing, Communications, and Artificial Intelligence Research (MCCAIR), Associate Professor Peter Vamplew gave a

presentation on creating trusted autonomous agents using multi-objective reinforcement learning. The presentation outlined several projects to investigate the application of FLAG's expertise in multi-objective reinforcement learning to various aspects impacting on human trust in autonomous systems.

Professor Manzur Murshed and Associate Professor Shyh Wei Teng presented their research at MCCAIR with Professor Guojun Lu on developing a novel 'application-focused' video coding technology to improve video analytics in compressed domain by provisioning 1) Adaptability-reconfigurable coder to generate on-demand metadata for targeted applications; 2) Intelligence – on-board video analytics to design low-cost "smart" sensors; and 3) Stealth – event-driven video transmission in ad-hoc networks susceptible to noises and eavesdropping. The presentation outlined potential defence applications in autonomous video surveillance, ground vehicle robotics and aerial drones, remote sensing, and human-machine teaming.

Mr Sunil Aryal presented Professor Kai Ming Ting's research at MCCAIR on the impact of sample size and dissimilarity on learning in dynamic and uncertain environments, which aims to establish a theoretical understanding of the impact of dissimilarity measures on the sample size requirement of learning algorithms to achieve optimal accuracy, particularly in nearest neighbour anomaly detection. With this understanding, the research further aims to create fast and effective algorithms to detect anomalies in dynamic and uncertain environments.

Liam Mudge – Let's Torque competition finalist



FoST is delighted to report that Liam Mudge presented at the 2017 'Let's Torque' – a Victorian STEM public speaking competition held recently in Melbourne.

Liam is currently studying Mechanical Engineering at our Mt Helen campus and was the only student from Federation University and the only student from a regional university to present at this event.

Liam has succeeded to be one of the seven finalists and has won a tour of 'Lab 22 at CSIRO'. Liam's final presentation was entitled 'Human Energy Harvesting', which is also the research topic for his final thesis. We congratulate Liam on his achievement.

FedUni academics develop remote health monitoring system

FoST academics Associate Professor Andrew Stranieri and Dr Venki Balasubramanian have received second prize from the LaTrobe Pre-Accelerator program and entry to the full Accelerator program for their work in developing a remote health monitoring system.

Their system monitors patient's vital signs by means of wearable sensors, which transmit the data to a server for analysis. In the case of patient deterioration or the need for assistance, medical staff are alerted by mobile phone alarms or alerts to prompt a rapid response.

The result of almost ten years work, Assoc. Prof. Stranieri and Dr Balasubramanian trialed the system in 2016 in an Indian hospital with greater nurse-to-patient ratios than are seen in Australia.

The system may also have future applications in other hospital settings, aged care and in the growing area of hospital in the home, which is currently offered by many Australian hospitals, allowing patients to recover in their own homes rather than in hospital.

Benefits could also extend to patients with chronic health conditions such as COPD and cystic fibrosis, with the monitoring of blood oxygen levels and respiratory rates.

This tech start-up was recently granted \$10,000 by Latrobe University, who will also provide 12 weeks of business mentoring and assistance from their engineering, law, science and nursing faculties to establish the business.

This funding will speed up plans for a commercial release of this system, as well as allowing a larger trial to be carried out at an Indian hospital over a period of at least three months with 12-14 participants at any one time.

Congratulations to Andrew and Venki on their great achievement.

2017 Vice-Chancellor's Awards for Excellence

For his commendable achievements in 2017 Dr Savin Chand from the Centre for Informatics and Applied Optimisation has been selected as a recipient of the 2017 Vice-Chancellor's Awards for Excellence. His achievements in 2017 include:

- Nature Climate Change research paper as a lead author; and
- NESP Earth Systems and Climate Change research grant

Savin received significant public attention as a result of his achievements with a high level of impact on a local and international level. The topic of his research is relevant to society and he is highly regarded in his field as a research leader.

Recipients of this year's Vice-Chancellor's Awards for Excellence were presented with their awards at the University's end-of-year function.

Faculty teaching and research at Nanya Station

As well as hosting three undergraduate field trips there have been a number of exciting recent developments in regard to collaborative research at the University's Nanya Research Station.

Arid woodland regeneration grant

Martin Westbrooke, Singarayer Florentine (Florry), Grant Palmer and Tim Simpson have received a \$100,000 grant from the NSW Environmental Trust, which will support their ongoing research into arid woodland regeneration and endangered species management. The work centres on amelioration of overstorey and perennial understorey species within Belah woodland.

Research submissions

An EOI for funding under the NSW Environmental Trust Research Program entitled *Achieving conservation outcomes under conservative rangeland grazing* was one of 27 from 141 submissions invited to submit a full application. This has been completed and the outcome is expected in November.

Endangered plant species research

Martin and Florry are working collaboratively with NSW Office of Environment and Heritage staff Dr Michael Todd and Dr Geoff Robertson on research into factors affecting the long-term survival of populations of *Austrostipa nullanulla* (Nanya has one of only two known populations in NSW) and *Acacia acanthoclada*, a rare shrub of the Mallee known only from records around Nanya and at Mungo National Park.

Malleefowl research and management

Funding of \$160,000 has also been received from the NSW Office of Environment and Heritage Iconic Species Program to support research and management of Malleefowl populations. Nanya is also part of a national research program investigating the value of Fox and Cat control in conservation of Malleefowl. This project also involves Parks Victoria, the University of Melbourne, Victorian Malleefowl Recovery Group, National Malleefowl Recovery Team, Australian Wildlife Conservancy, Bush Heritage Australia, DEWNR (SA), OEH (NSW) and a number of private landholders. A component of this is the trialing of Canid Pest Ejectors (CPEs) a promising new development in Fox control.

Nyngai yvonniae

Collaborative project developed with Helen Waudby of NSW OEH relating to conservation of the threatened marsupial species *Nyngai yvonniae*. This will investigate its habitat preferences in relation to time since fire. If successful, funding to FedUni will total approximately \$200k.

Student excursions

SCENV2200 Arid Zone Ecology 28 September – 2 October 2017

A total of 14 students attended the arid zone ecology course excursion. Students conducted studies of the distribution of flora species around earth tanks (Landscaped and Open).

Studies included:

1. Impact of grazing on post-fire regeneration in Mallee communities.
2. Recovery of Mallee vegetation following disturbance from seismic lines.
3. Relationship between stem diameter and time since fire to estimate the age of stands of Mallee for which the time of last fire is not known.
4. The impact of chaining on Belah woodland.
5. Mulga seedling recruitment.

SCENV3202 Wildlife Ecology and Conservation 2-6, 7-11 October 2017

A total of 59 students attended these excursions supported by Fiona Hogan, Sharon Reid, Meagan Dewar, Greg Horrocks and Ashley Olson.

Major Activity:

Investigation of the impact of disturbance (fire and anthropogenic) on reptile and small mammal communities within the arid zone. This was undertaken by using pitfall traps at four different fire age sites with 4 replicates at each site and two disturbed Belah sites with three replicates at each site. The students also carried out bird and animal scat surveys to look at the influence of artificial water points on animal abundance. Mammals collected at each location were identified and released at site. Lizards captured were collected, returned to Nanya field station for identification and measuring then released at site of capture. Students also conducted habitat assessment surveys at each pitfall site and bird and scat surveys.



FoST graduates awarded mining commendations

Mining, mineral processing and geology graduates from FoST have been highly honoured at the AusIMM GB O'Malley student preliminary selection event in Ballarat.

The GB O'Malley Medal Award is considered the highest student commendation. It is awarded annually to a student member of the AusIMM for the best preparation of a technical paper.

The FoST students who received recommendation awards are:

- Sean Murphy, Bachelor of Science, major in Mineral Processing and minor in Environmental Geoscience.

- Ryan Marshall, Bachelor of Engineering (Mining) Honours.
- Austell Lanyon, Bachelor of Science, major in Mineral Processing and minor in Earth Materials.

The GB O'Malley Medal Award was established in 1986 in honour of GB O'Malley, who was a highly respected AusIMM member from 1927 to 1976.

The University has a long record of teaching and mentoring highly successful mining, mineral processing and geology students. We are pleased to congratulate the FoST graduates who have been honoured by the recent GB O'Malley student selection event awards. They are outstanding students and we know they will succeed extremely well in their chosen careers. Well done.

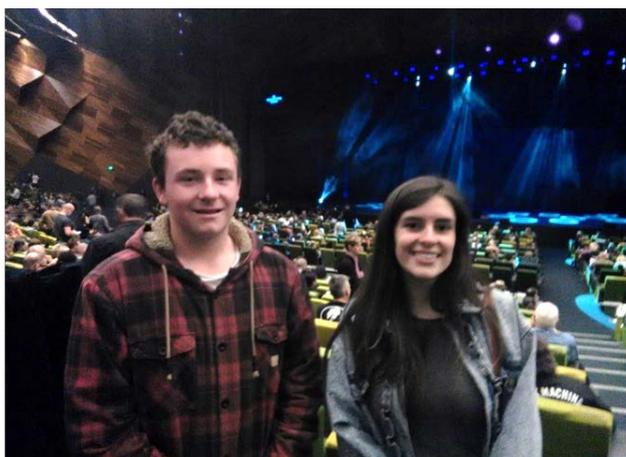
FoST Engagement

Touring the cosmos with Brian Cox

When they heard that well-known British particle physicist and popular science communicator, Professor Brian Cox was coming to Melbourne our STEM Outreach team made sure that Victorian regional secondary students were provided with the opportunity to see Professor Cox in person.

Gisborne Secondary College students Teagan Bunn and Brendan Crozier's competition entries were selected by a panel of three of the School of Applied and Biomedical Sciences academic staff and were accompanied by their Science teacher Angela to the Plenary in Melbourne on the 3 November. Angela told us that 'Brian is an amazing speaker. He provided us with so much information and the most beautiful images of the galaxy. Thanks to the Faculty of Science and Technology at Federation University for providing the opportunity.'

Entries from across Victoria were received and students from Marist-Sion College Warragul, Lavalla Catholic College Traralgon and the Maryborough Education Centre students were also recipients of tickets.



Brendan and Teagan eagerly await the beginning of a spectacular tour through the cosmos with Prof. Brian Cox

Wrigglers, sliders, crawlers, suckers and chewers

Sarah Preston's enthusiasm for parasites is highly infectious! A Veterinary scientist, Dr Preston has welcomed visiting school students to the faculty labs throughout the year. Working with farm animal 'poo', they learned how to extract parasite eggs and induce exsheathing- removing the protective covering that helps a parasite survive in the environment. Students also watched the adult behavior of the likeable Barber's Pole worm, *Haemonchus contortus*.

Working in labs and using specialised equipment provides students with a hands on university experience and Dr Preston hopes their new-found knowledge will encourage them to consider a challenging career in animal health.



The best three days of the school holidays

The Conoco Philips Science Experience (TSE) is a popular annual event held on both our Gippsland and Ballarat campuses. Year 9 and 10 students from around the state spend three fascinating days exploring STEM (Science, Technology, Engineering and Maths) under the expert guidance of FedUni scientists and students.

The diverse program engages and challenges students with a range of lab activities, industry site visits, field trips, and research talks that cover forensic chemistry, geospatial science, botany, robotics, engineering and computer graphics.

Participants also make new friends, discovering shared interests as they consider those areas of STEM that they would like to pursue in their future studies and job planning.



Off they go for the traditional TSE Run starting from the Federation Wall at FedUni's Mt Heelen campus.

FedUni finds a way to navigate the male genome responsible for heart disease

A new study led by biomedical researchers at Federation University Australia has discovered unique portions of genetic material known as long non-coding RNAs on the Y chromosome that could contribute to the onset of heart disease in men.

The world-first study found a novel non-coding RNA within the male Y chromosome named Inc-KDM5D-4, and investigated its role in fat production in the liver.

Long-coding RNAs are genes previously thought of as junk since they did not code for proteins. They are now known to be responsible for activating many critical biological responses. When they do not function properly, they can cause diseases and disorders in humans.

Researchers found changes in the level of KDM5D-4 led to increased lipid droplets that lead to the inflammatory processes that underpin diseases within arteries in men.

The new FedUni study builds on previous research that concluded the Y chromosome could be a blueprint in determining men's health beyond its traditionally perceived role in determination of sex.

Now FedUni researchers believe that genetic mutations on the Y chromosome can put males at an increased risk of coronary heart disease.

According to the Australian Heart Foundation, coronary heart disease affects 1.2 million Australians and is the single leading cause of death in the country.

The study was a PhD project conducted by Elsa Molina and led by Professor Fadi Charchar together with the University of Tasmania, the University of Manchester, the University of Melbourne and the University of Leicester.

Professor Charchar said carrying a particular type of Y chromosome can make a vital difference to many important biological functions, including a person's health.

'It is becoming increasingly clear that the biological functions of the Y chromosome transcend the male fertility and reproduction. Our study is the first of its kind to unravel the role the Y chromosome plays in the critical orchestration of complex biological processes in men,' Professor Charchar said.

'By better understanding the Y chromosome – one of the smaller human chromosomes in the human body – we can identify men who are susceptible to cardiovascular diseases and begin early intervention.

'This study funded by the National Health and Medical Research Council paves the way for further research and the potential to develop new and targeted gene therapies, not only for men but both sexes.'

2017 FoST Graduation Ceremony

The 2017 Faculty of Science and Technology Graduation Ceremony was held at Mt Helen on Wednesday 6

December, during which FoST graduates were acknowledged and congratulated for their hard work during their studies.

Former Director of GHERG Professor Rae Mackay was granted the title of Emeritus Professor of Federation University, while HDR students Daniel Clements, Christian Kopp, Pradnya Kulkarni and Julie Ross were admitted to the degree of Doctor of Philosophy.

In 2017, the University Medal was awarded to Sofia-Mae Neri Sabas. The University Medal is the highest academic award that can be bestowed on a graduating student by the University, and is awarded to a graduate who has consistently demonstrated exceptional academic achievement throughout their studies.

After achieving excellent results in the Bachelor of Information Technology in Semester 1, Sofia-Mae was transferred into the Bachelor of Information Technology (Professional Practice). As part of this program Sofia-Mae was awarded a scholarship and completed an internship with IBM whilst studying.

Sofia Mae has been a diligent and hardworking student with good overall results and has received 4 Letters of Commendation for excellent performance overall in a semester during her program and further letters of commendations for individual courses. Sofia-Mae had an average score across all coursework of 90.35%.

Sofia-Mae proved her suitability for nomination for the University medal in both her coursework results and her performance in her professional interaction with IBM.

Congratulations to all graduates on their achievements, with best wishes as they embark on the next phase of their lives as Alumni of the University.

FoST Staff Awards

Congratulations to the following faculty staff on receiving awards at our recently held Planning Day:

International Engagement

Andrew Stranieri, Venki Balasubramanian and Wendy Wright.

Learning and Teaching

1st year IT team – Cameron Foale, Amy Meade, Glenn Stevens, Leigh Achterbosch, Sasha Ivkovic, Shane Moore and Mehmood Chadhar

Nanya team – Ashley Olson, Fiona Hogan, Grant Palmer, Greg Horrocks, Meagan Dewar, Meagan Good, Sharon Reid and Florry.

Research

Ean Tat Ooi and Fiona Hogan.

Service

SABS Gippsland Technical team – Ben Webb, Catherine Chambers, Jayne Sherrard, Margo Dundek and Rachel Rachielle.