



THE UNIVERSITY OF
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ALUMNI & FRIENDS 2015

SCHOOL OF MATHEMATICS & STATISTICS

THE ALUMNI NEWSLETTER OF THE SCHOOL OF MATHEMATICS & STATISTICS, BRINGING PAST STUDENTS TOGETHER.

Message from the Head

Professor Aleks Owczarek

We entered 2015 as the newly minted 'School of Mathematics and Statistics' having changed from a department to a school. I think I am safe in saying that this change hasn't resulted in any substantial shift yet impressive as it may sound!



New academic staff in Professor Christian Haesemeyer, Associate Professor James McCaw and Drs James Osborne, Daniel Murfet, and Marcy Robertson joined us in 2015. Professor Kari Vilonen and Dr Ting Xue started with us part time and will move to full time during 2016. Professor Edmund Crampin will be moving his primary affiliation to the School during the second part of 2015 from the School of Engineering. New academic staff in a range of research areas are expected to arrive in 2016, which will make next year just as invigorating as this one.

Staff have continued to be recognized for their excellence with Associate Professors Antoinette Tordesillas and Aihua Xia being promoted to the rank of full professor, and Dr Deb King having been promoted to Associate Professor.

The results of the annual Australian Research Council Discovery Projects and DECRA's have just been announced. We have continued being successful with four Discovery and two DECRA grants being awarded to members of the School. Other staff also participated in successful NMHRC grants. Such continued grant funding success allows us to expand our research profile.

It will be with some sadness that we will see off our first female Professor, Kerry Landman, to (pseudo) retirement at the end of 2015. I am sure Kerry will maintain a strong connection with the School in the years to come. We wish her the very best for her post-university life.

I will leave you with news of a most exciting venture. This year the School launched MATRIX@Melbourne, an international research institute in the mathematical sciences in the spirit of Oberwolfach, MSRI, The Newton Institute, Banff, or the IMA where top researchers from around the world can gather at specialised workshops interacting with Australian researchers including students and postdoctoral fellows. This is the first institute of its kind in Australia and was instigated with the help of ACEMS. Professor Jan de Gier will be the inaugural Director. In 2016, MATRIX activities will be hosted at the regional campus of The University of Melbourne at Creswick, Victoria.

New Professor - Antoinette Tordesillas

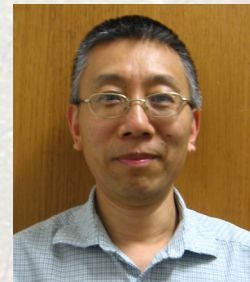


Antoinette's research crosses the domains of mathematics, engineering, physics and geophysics. She studied Applied Mathematics at the U Adelaide (BSc Honours 1987) and at U Wollongong (PhD 1992), and was awarded the Michell Medal by ANZIAM in 2000. She has been chief investigator on a range of problems relating to: off-road vehicle mobility in terrestrial and extraterrestrial environments, geotechnical structures, sensor networks, earthquake mechanics, unconventional reservoir characterisation, and design of sustainable construction materials. Her recent work is focused on multiscale material characterisation and modeling from data, fuelled by continuing breakthroughs in high-resolution measurements. These efforts involve international collaborations with multidisciplinary teams from the experimental and high performance computing fronts, with funding from the US Army, US Air Force, NASA and the ARC.

Antoinette finds sharing the excitement of research and discovery with her students to be extremely rewarding. This year, her PhD students were engaged in scholarly debate at various forums including: "Mining Data for Early Prediction of Geological Failure" (a biannual event that she initiated, held in 2015 under the auspices of the Australian Academy of Science), and "Pore Morphology in Deforming Geomaterials: Observation, Characterisation, and Modeling to Improve Performance of Critical Urban Systems" (held at Stanford University as part of the Engineering Mechanics Institute conference). She has published at the teaching-research nexus of engineering mathematics with undergraduate, honours and masters level students and with Dr Christine Mangelsdorf (Melbourne University).

She holds leadership roles on major committees across science, technology, engineering, and mathematics (STEM) fields, where she actively promotes the achievements of women scholars and gender balance among speakers at high-profile international conferences. She is secretary of the governing board of Association pour l'Etude de la MicroMécanique des Milieux Granulaires, the pre-eminent society in the science of granular media. She recently served as co-editor and co-author of a 2015 commissioned report identifying future trends by the U.S. National Committee on Theoretical and Applied Mechanics.

New Professor - Aihua Xia



Aihua Xia studied his BSc in Mathematics (1986) and MSc in Stochastic Processes (1988) at East China Normal University. He worked at East China Normal University as a tutor from 1988-1990 and a lecturer from 1990-1991. He completed his PhD in Probability Theory at the University of Western Australia and the University of Melbourne from 1991-1994, later working as a lecturer at the University of New South Wales from 1995-2000. He was appointed as a senior lecturer in 2001 and associate professor in 2002 at the University of Melbourne.

Aihua's research interests are in Probability Theory. He has made contributions in point processes, extreme value theory, limit theory of stochastic processes, Stein's method and probability approximations, Markov processes, queueing networks, social studies, computational biology, wireless network signals and image processing.

He is particularly passionate about the theoretical aspects in problems of practical interest. For example, the 'law of small numbers' asserts that if random events occur in time or space with small probability and weak dependence (e.g. traffic accidents, bush fires, floods, electricity blackouts), then the number of events that take place in time or space should approximately follow the Poisson distribution. In practice, most random phenomena occur with probabilities fluctuating significantly over time and with short- or long-range dependence. Aihua's research has led to new models that can capture the main characteristics of a wide range of random phenomena with greater accuracy. He was awarded the Moran Medal by the Australian Academy of Science in 2001.

Throughout his career, Aihua has taught 20 different subjects, including probability, statistics and mathematics subjects in and outside of his discipline.

Aihua runs a weekly probability reading session for postgraduate students and academics. He enjoys gardening, bush walking and travelling with his family in his free time.

Kerry Landman Retires



Professor Kerry Landman retires after nearly 30 years of service to the University of Melbourne.

Kerry obtained a PhD in mathematics from the University of Melbourne in 1979, under the supervision of Professor Simon Rosenblat. She then spent six years working as an applied mathematician in the USA, at MIT, the Environmental Protection Agency and Southern Methodist University.

Kerry returned to Melbourne to join Siromath, a mathematical sciences consulting firm. In 1986, Kerry was appointed as a lecturer in the Mathematics Department at the University of Melbourne. She was promoted to senior lecturer in 1988, Associate Professor in 1996, and Professor in 2007.

Her research career has been devoted to the application of mathematical modelling in industrial, environmental, biological and medical areas. Since 2003, Kerry developed theoretical models that can be applied to developmental biology and tissue engineering. She collaborated with several experimental laboratories, one of which is the Murdoch Childrens Research Institute, where she worked with developmental biologist Dr Don Newgreen on the development of the nervous system of the intestine.

Kerry was also the Director of the Mathematics-in-Industry Study Group (MISG) from 1993-1997 and an ARC Australian Professorial Fellow from 2008-2012. Kerry won the 2014 ANZIAM medal, and to date is the only female to win this award.

Building Renovations

It has been a busy year for renovations and improvements to the School facilities.

With the increase in staff and postgraduate students over the last two years, the School no longer fits into the Richard Berry building. In 2014, the School acquired and renovated the second floor (labelled level 3) of Old Geology South. The entrance is via the staircase near the bike parking area adjacent to Richard Berry. The official opening celebrations took place in the foyer of the second floor on 24th March.



Image: Old Geology South

the Mathematics and Statistics Learning Centre. The renovations will see the development of a Social Learning Space where students will be able to work together at tables and whiteboards, a room for a tutor-on-duty, a quiet study area, and an extra mathematics and statistics tutorial room. At the same time, the Mathematics and Statistics General Office and multiple staff offices are also being upgraded. These renovations should all be completed by the start of 2016.

Old Geology South is now home to 6 academic staff, 6 research fellows and 5 PhD students, working in the broad area of mathematical and computational biology. The space also has a meeting room and staff tearoom.

In April and May, the first floor central corridor, seminar room and surrounding offices of Richard Berry were renovated to provide facilities for the Centre of Excellence ACEMS.

BHP Billiton moved out of its rented space on the ground floor of Richard Berry, which gave the School an opportunity to redevelop this space and some of

ACEMS

The Australian Research Council Centre of Excellence for Mathematical and Statistical Frontiers (ACEMS) moved into its second year of operation in 2015. ACEMS was created in July 2014 with \$20 million of funding from the Australian Research Council, with an additional \$7 million in funding from the universities involved.

ACEMS is hosted in the School of Mathematics and Statistics, but there are five other nodes, at Queensland University of Technology (QUT), University of Technology Sydney (UTS), The University of Adelaide, The University of Queensland, and the University of New South Wales (UNSW). Altogether, there are nineteen Chief Investigators spread across those nodes, all who have teams of postdoctoral fellows and postgraduate students working on research problems of interest to ACEMS.



Image: ACEMS Staff

ACEMS Director Peter Hall is one of the world's foremost statisticians, having made fundamental contributions to many areas of this fascinating discipline, most recently in the general field of non-parametric statistics. The Centre currently has an Acting Director, Peter Taylor, who studies systems driven by random, or stochastic, effects. It is crucial for society's wellbeing, in economic and other terms, that such stochastic systems are understood so their operations can be monitored and better controlled.

ACEMS Deputy Director Jan De Gier is researching stochastic interacting particle models. Aside from their use in the study of fundamental aspects of physical systems out of equilibrium, they also play a major role in understanding emerging collaborative behaviour in a wide variety of transport phenomena, including urban traffic, queuing problems and biological processes.

The other two ACEMS Chief Investigators at the University of Melbourne node are Peter Forrester and Aurore Delaigle. Peter's ACEMS research is focused on randomness in prime numbers and big data. Big data is also a key element in Aurore's research. The goal of her project is develop statistical techniques to help analyse massive datasets.



Image: Mathematical Play Grid

In addition to its research, ACEMS has made it a priority to reach out to students at primary and secondary schools in the Melbourne area. ACEMS supplied the funding for a mathematical play grid at the Brunswick South-West primary school. The aim of the area is to expose students to mathematical concepts in a fun, play environment.

ACEMS also sponsored a series of workshops for students and teachers from some Melbourne-area secondary schools. The workshops, called "Doing Maths like a Mathematician" were designed to show both teachers and students how maths could be taught in a fun but challenging environment.



Image: 'Doing Maths like a Mathematician' event