# ALUMNI & FRIENDS 2016

## SCHOOL OF MATHEMATICS & STATISTICS

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

## Message from the Head
### Professor Aleks Owczarek

As I sit here reflecting on the year past my only concern is that I will not have enough space to list all the highlights.

We started the year in the most sombre way with the passing of the irreplaceable Professor Peter Hall. This has been an enormous loss to our School and University and to the discipline of Statistics. Several events here and around the world have celebrated the life and contributions of Peter. We have advertised a Peter Hall Chair of Mathematical Statistics position. I can now relate to you that the building in which most of the staff reside, the Richard Berry Building, is being renamed the Peter Hall Building. This is a fitting reminder of the academic giant we were lucky enough to have amongst us for all too short a time.

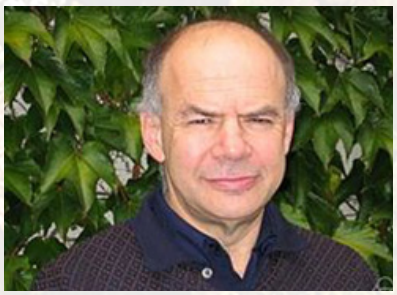
Dr Owen Jones departed this year after accepting the Chair of Operations Research at the University of Cardiff. We also farewelled Professor Hyam Rubinstein, who retired after making so many contributions to the School and the broader discipline.

The centrepiece of the year was the bold move to advertise for three continuing academic positions that were open only to women. The focus was not on any particular research area but rather on the priority of increasing the female leadership in the School. Our School, like others in Australia and globally, suffers from a chronic gender imbalance in its academic staff and more needs to be done to encourage young women to take up and continue with studies in mathematics and statistics. I am very pleased to report that these positions attracted the highest quality of applicants. More generally across eight continuing positions offered, or about to be offered, this year seven have been to women. I am very proud of the fact that this school has led the discipline in Australia and departments within the University in this regard.

We have had eight new academic staff start in 2016: Drs Yao-ban Chan, Joyce Zhang, Jesse Gell-Redman, Serena Dipierro and Thomas Quella, Associate Professors Paul Zinn-Justin and Stephen Leslie (jointly with the School of BioSciences), and Professor Enrico Valdinoci. In fact, Professor Valdinoci arrived as an Associate Professor, was recognised as a highly-cited author by the research metric organisation Thompson-Reuters, and promoted to full Professor all in 2016.

Finally, I must also say goodbye as I am finishing as Head of School after six years on 2 February next year. I will be moving onto the role of Deputy Dean of the Faculty of Science, so won't be far. I have been lucky to lead the School in a time of growth and I see so many opportunities for the school to grow stronger in coming years. I look forward to reading the next Head's report in 2017!

## Hyam Rubinstein Retires



Professor (Joachim) Hyam Rubinstein retires after 42 years of service to the School and the broader discipline. Hyam graduated from Monash University with a BSc (Honours) in mathematics in 1969. In 1974, he received a PhD from the University of California, Berkeley under the supervision of John Stallings. In 1975, he moved back to Melbourne where he undertook a postdoctoral position.

Hyam was appointed as a lecturer in the Department of Mathematics at the University of Melbourne in 1978, promoted to senior lecturer at the end of 1981, and then appointed as Professor of Mathematics in 1982. He served as Head of the Mathematics Department from 1989-1992 and was also Head of the Mathematics and Statistics Department from 2002-2004.

Hyam's main research areas are low dimensional topology, minimal surfaces (combinatorial and smooth), differential geometry, machine learning, and shortest network design, especially applied to underground mining.

Hyam has published over 150 research papers and has received many awards during his career. He was awarded the Australian Mathematical Society Medal in 1987, the Hannan Medal in 2004 and the George Szekeres Medal in 2008. Hyam was made a fellow of the Australian Academy of Science in 2003 and fellow of the American Mathematical Society in 2012.

Hyam has also provided extensive leadership to the mathematics profession in Australia, as President of the Australian Mathematical Society, Chair of the National Committee for the Mathematical Sciences and Chair of the Working Party for the National Strategic Review of Mathematical Sciences Research in Australia.

## Peter Hall Obituary


On 9 January in Melbourne, the statistics community lost one of its greatest statisticians. Peter Hall was born in Sydney in 1951. He completed a BSc at the University of Sydney, a MSc at the Australian National University and a PhD at the University of Oxford. He was a Professor at the University of Melbourne since 2006, and also held a fractional appointment at the University of California, Davis since 2005.

Peter had a massive impact on statisticians worldwide. His work was deep and creative. He wrote more than 600 research papers, most of which appeared in the top statistics or probability journals. The diversity of topics he studied originated from his passion for science. He was fascinated by all sorts of problems, ranging from the most applied biological question to the most theoretical puzzle in number theory. Faced with a new challenge, he got insights by first exploring its fundamental theoretical properties. This is how he managed to unravel the most surprising characteristics of problems and suggest very innovative statistical methods. His constant search for insight and sheer tenacity as a researcher have led him to develop some of the most influential theory in modern statistics.

Peter received the most prestigious awards available to a statistician, including Fellowships of the Royal Society of London and of the Australian Academies of Science and Social Sciences, the election to foreign associate of the US National Academy of Sciences and to Officer of the Order of Australia.

Outside academia, Peter had two great passions: steam trains and photography. He also had a passion for animals and was particularly fond of cats.

Peter was someone really special. He was an extraordinary, kind, gentle and generous person, the type most people don't get the chance to meet in their lifetime. He was an exceptional scientist who made many cutting-edge contributions to statistics. He was strongly committed to his profession generally. He was an outstanding leader, whose enthusiasm and passion for research has been a great source inspiration. His absence will leave a huge hole in the heart of many.

## 1970s Alumni Reunion

A reunion of 1970s honours, masters and PhD students in mathematics and statistics was held on 26 May at University House. 21 people attended the evening and shared memories of their time at the University of Melbourne. Kerry Landman started the informal discussion after dinner commenting on the two biggest changes in the Department since she was a student: teaching style and the number of women.

In the 1970s, all lecturers taught by writing in chalk on blackboards and all students went to lectures. Russell Love gave beautiful lectures using his own immaculate handwriting style known as the 'Love font'. People recalled some of their favourite lecturers, such as Allen Russell and Jerry Koliha. Allen Russell was given a stamp with $\varepsilon$ and $\delta$ on it as he taught a theoretical pure maths subject. Russell Love and Colin Thompson used no notes but wrote everything on the board from memory.

Nowadays, few people use chalk - most lecturers teach using document cameras, computers or whiteboards and many students do not attend lectures. Les Trudzik commented, "We treated university like work; spending all day in classes, the library and the café. Now students treat university like a tourist attraction. Students today miss out on experiencing university life."

Kerry noted that in the 1970s there were no female lecturers, though there were a few female tutors such as Daphne Morley. Now two out of 21 professors are female and recruiting women is a priority area for the School.

In the 1970s, there was a standard and advanced level stream from first to third year. Paul Pearce recalled that the advanced stream was taught in Theatre C, which had 40 hard wooden seats designed to keep students awake and paying attention. The Richard Berry Building used to be Old Anatomy. At the back of Theatre C there was a trap door where the cadavers used to be delivered and dissected.

Mathematical equipment has changed over the years. In the 1970s, students used slide rules, log tables, basic calculators and punch card computers, whereas now students have CAS calculators, personal computers and mobile phones. Alison Harcourt (tutor in 1970s) still has 7 figure log tables and Ken Parker has a circular slide rule.

Many fond memories were shared of the tearoom, which was the 'social hub' of the Department. It was a great source of knowledge about what was going on in the Department and the world. It was tiny but everyone, staff and postgraduate students, went there for morning and afternoon tea every day. The tea-lady Kath poured the tea and coffee, and provided plates of tic-toc biscuits. Christine Brown and Les Trudzik recalled tea room discussions about Monty Python and Lindy Chamberlain. Paul Pearce recalled playing canasta with Daphne Morley at lunch.

In 1975 there was a cricket match at Royal Park, and everyone always enjoyed the annual Christmas pig and beef fests held at Yarra Bend Park. Neville Hathaway helped Colin Thompson by storing meat at his house the night before and assisting with setting up the 'initial conditions'. Rowena Francis recalled having honours parties on the roof of Richard Berry and at roundabouts.

There were lots of questions and discussion about the new 'female only jobs', the Melbourne Model, removing honours degrees, the new masters degree, the merging of the mathematics and statistics departments, and job opportunities for maths and statistics graduates. Neville Hathaway recalled some of the statistical consulting projects he worked on in the 1970s, such as analysing 20 years of data on how many people visited the National Gallery.

An article written by Colin Thompson and Kerry Landman about mathematics in the 1970s at the University of Melbourne is available on the Maths and Statistics alumni website: **ms.unimelb.edu.au/alumni**.

## MATRIX - Paving the Way for Research

MATRIX, Australia's first international residential mathematical research institute, opened its doors in 2016. The institute has been established by the University of Melbourne and Monash University, with seed funding from the ARC Centre of Excellence for Mathematical and Statistical Frontiers (ACEMS). MATRIX is located in Creswick, Victoria and encourages collaboration and excellence in research.

The institute is modelled on a number of successful existing institutes around the world, such as the Mathematical Sciences Research Institute in Berkeley CA, and builds on the foundations established by the Australian Mathematical Sciences Institute (AMSI) which currently supports MATRIX via embedded workshops. "MATRIX is filling a significant gap in the Australian scene and building international collaborations. AMSI looks forward to a continuing close collaboration with this new venture," says AMSI Professor Director Geoff Prince.

MATRIX provides a venue to think through and tackle difficult mathematical problems. It provides facilities for meetings, shared office spaces, administrative support staff and accommodation, so participants can live on-site for the duration of research programs.

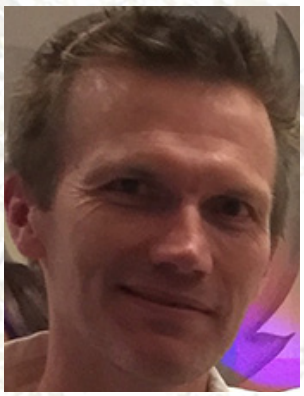
Due to the highly interactive nature of its residential research programs, new collaborations between Australian and overseas-based investigators are easily formed, much more so than with traditional workshops or visits. Many early career researchers participate in our programs, enabling fantastic opportunities for them to intensively engage and network with high-profile overseas researchers.


Five programs have been run since opening this year, with organisers from a variety of Australian universities. The feedback has been overwhelmingly positive. The mathematical sciences are inherently international, and organisers of MATRIX programs usually include at least one overseas investigator. Programs are selected on their scientific excellence as well as participation rate of high profile international participants, among other selection criteria. Our programs have had participants from China, France, Germany, Japan, and the United States, to name a few.

MATRIX leverages the strong links between Monash University and the University of Melbourne. Both universities have exceptional reputations for research in the mathematical sciences, attracting national and international academics. The collaboration has already increased the international exposure of Australian research in the mathematical sciences, and bolsters the prospects for the next Australian Fields Medal.

# Professorial Promotions in the School of Mathematics & Statistics

## Paul Norbury



Paul received his BSc from Melbourne in 1988 and his PhD from Stanford in 1994. He held post-doctoral positions at Warwick (1994-1997), Melbourne (1998-2000), Adelaide (2000-2002) and Melbourne from 2002, until he was appointed in a continuing position in 2004. He spent two years in Boston from 2006-2007 and returned to Melbourne in 2008, the same year that the first of his three sons was born.

Paul's research interests are in geometry and mathematical physics. His main interest is moduli spaces which arise in the areas of gauge theory, singularity theory, Riemann surfaces and enumerative geometry. He has proven results concerning the structure of the moduli space of magnetic monopoles, which in pure mathematics is equivalent to the existence and uniqueness of solutions of PDEs, using techniques from algebraic geometry and analysis. He has also proven structure results for algebraic topological invariants of finite-dimensional moduli spaces, which take the place of non-rigorous infinite dimensional integrals known as path integrals that arise in quantum field theory. He has recently proven basic structure theorems in a field known as topological recursion.

Paul has been profoundly influenced by role models both internationally and from within Melbourne University.

Paul has been a co-organiser of the University of Melbourne Mathematics Competition since 2004 and has taught at the annual national mathematics summer school for high school students. He has organised several conferences, filling the role of director of the combined meeting of the Australian and New Zealand Mathematical Societies in 2014.

He enjoys spending time with his family and participating in endurance sports, continuing a tradition of some members in the School of Mathematics and Statistics.

## Sanming Zhou

Sanming completed his PhD in mathematics at the University of Western Australia in 2000. Prior to moving to Australia, he did a masters degree at Zhengzhou University, China from 1986-1989, taught at Huazhong University of Science and Technology from 1989-1995, and studied at the University of Hong Kong as a PhD student in 1996.

Samning was a Research Fellow from 2000-2002 and an Australian Post-Doctoral Research Fellow in 2003 at the University of Melbourne. He was appointed as a Lecturer in 2004, and promoted to Senior Lecturer in 2005 and Associate Professor and Reader in 2010, all at the University of Melbourne. In 2012 he was awarded a four-year ARC Future Fellowship from the Australian Research Council. In 2003 he was the recipient of a Kirkman Medal of the Institute of Combinatorics and its Applications.

Sanming's research interests embrace both pure and applied aspects of discrete mathematics, including algebraic graph theory, network optimisation, random graph processes and various problems from theoretical computer science. He enjoys developing theories of symmetric graphs using group theory and working on applied topics such as network design and frequency assignment.

Since 2014, Sanming has been serving as the vice president of the Combinatorial Mathematics Society of Australasia, and recently he was nominated as the next president of this society. Sanming was the coordinator for Honours and two masters programs in the school for nearly ten years. He coordinates a weekly seminar on discrete structures and algorithms. Since 2016, he has been serving as the founding director of the Melbourne-Peking Virtual Research Hub for Mathematics and Statistics with Peking University.

In his spare time, Sanming enjoys swimming, reading, calligraphy and outdoors with his family. When he was younger he practiced Qigong (Chi Kung) for several years.

## Enrico Valdinoci

Enrico studied mathematics as an undergraduate at the University of Roma Tre, under the supervision of Luigi Chierchia, and obtained a PhD in mathematics at the University of Texas at Austin, under the supervision of Luis Caffarelli.

After graduating, Enrico was a postdoc at Scuola Normale Superiore in Pisa, then Assistant Professor and Associate Professor at the University of Roma Tor Vergata. He then became a full Professor at the University of Milan. Also, since 2013, he has been leader of a research group at the Weierstrass Institute in Berlin. From 2016, he is professor of mathematics at the University of Melbourne.

Among the several research projects in which he participated and for which he acted as principal investigator, Enrico was also the recipient of an ERC (European Research Council) grant in the years 2012-2016 and of an ARC (Australian Research Council) grant in the years 2017-2020. He is currently one of the Highly Cited Researchers according to the Thomson Reuters list.

Enrico's research interests focus on mathematical analysis, with special emphasis on partial differential equations, nonlocal problems, dynamical systems and problems arising in celestial mechanics, crystallography and biology. He likes both the theoretical aspects of mathematics and the specific applications to real-world problems.

Enrico has a long list of scientific collaborators, which include Rafael de la Llave, Serena Dipierro, Manuel del Pino, Alberto Farina, Matteo Novaga, Xavier Ros-Oton, Ovidiu Savin, etc. He acted as a supervisor for several PhD students, who are now well-established mathematicians, including Alessio Fiscella, Nicola Abatangelo and Matteo Cozzi.

Also, he acted as a mentor for several Postdocs, including Giampiero Palatucci, Annalisa Massaccesi, Stefania Patrizi, Eleonora Cinti and Joaquim Serra. Enrico feels very indebted to all his mentors, collaborators, students and Postdocs for sharing expertise, creativity and enthusiasm.

## Building Renovations

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

To accommodate our new staff and students, the school has taken possession of the front of the Peter Hall Building along Swanston Street and are now renovating it. This area has been converted into five staff offices and an open plan area accommodating 45 masters students and 12 PhD students.

The old masters hot desk room has been converted into a 43 seat computer lab for undergraduate and postgraduate subjects, and the casual tutor's room has been extended to allow for more work spaces, pigeonholes and storage. Also, a new kitchen has been installed in the Staff Tea Room and new carpet has been laid throughout the Peter Hall Building.

A social learning space for undergraduate students, mathSpace, was opened in March. It has many whiteboards and round tables for collaborative learning, as well as a quiet room for private study. There is a tutor on duty service from 12-2 on weekdays to help students with high school level mathematics skills.

*Pictured: mathSpace*

*Pictured: New masters room*

## ARC Centre of Excellence in Exciton Science

A new ARC Centre of Excellence in Exciton Science linking the University of Melbourne, Monash University, RMIT University, UNSW and the University of Sydney has recently opened at the University of Melbourne.

Professor Paul Mulvaney from the School of Chemistry is the Centre Director and Professor John Sader from the School of Mathematics and Statistics is one of the Chief Investigators. John Sader is an applied mathematician with extensive experience in modelling nanomechanics and energy flow in nanoscale systems.

The Exciton Science Centre aims to manipulate the way light energy is absorbed, transported and transformed in advanced molecular materials. The research program spans high-throughput computational screening, single molecule photochemistry and ultrafast spectroscopy and embraces innovative outreach and commercial translation activities. The expected outcomes and benefits of the Exciton Science Centre include new Australian technologies in solar energy conversion, energy-efficient lighting and displays, security labelling and optical sensor platforms for defence.

For more details, see the website: **excitonscience.com**

## Prizes and Promotions

Staff continued to be recognised for their excellence with Associate Professors Paul Norbury, Enrico Valdinoci and Sanming Zhou being promoted to the rank of full professor, as detailed on the previous page, and Drs Christine Mangelsdorf and Davide Ferrari promoted to Senior Lecturer.

Congratulations to all the staff who won awards during 2016. Associate Professor James McCaw was part of a team that won the 2016 Eureka Prize for Infectious Disease Research.

Associate Professor Deborah King (right) was awarded a Citation for Outstanding Contributions to Student Learning in the Australian Awards for University Teaching. Deb has been recognised "For impacting student success through the development and dissemination of innovative teaching and assessment practices in large enrolment mathematics classes."

Deborah King also received the David White Award for Teaching Excellence (Science, Health, Agriculture and Veterinary Science). The award was made in recognition of Deb's outstanding contribution to mathematics education within the university and nationally.

Two staff were also awarded Dean's Awards in 2016. Dr Michael Wheeler received the Dean's Award for Research Excellence (Early Career) for his research in discrete mathematics and algebraic combinatorics, on topics such as MacDonald polynomials and refined Cauchy/Littlewood identities. Dr Christine Mangelsdorf received the Dean's Award for Excellence in Engagement (Science Outreach) for organising 'Real World Maths in Action', a one-day fair for Year 11 and 12 mathematics students and their teachers, held every two years since 2000.

## James McCaw wins Eureka Prize

Associate Professor James McCaw was part of a multidisciplinary team, led by Professor Leann Tilley from Bio21, that won the 2016 Australian Infectious Diseases Research Centre Eureka Prize for Infectious Diseases Research. The Australian Museum Eureka Prizes are awarded annually to reward outstanding achievements in Australian scientific research, leadership and communication.

The multidisciplinary team draws together experts from the Bio21 Molecular Science and Biotechnology Institute, School of Mathematics and Statistics, and School of Population and Global Health at the University of Melbourne.

Malaria kills nearly half a million children each year, and the emergence of resistance to the first-line antimalarial drug, Artemisinin, is looming as a major global health crisis. The team of experimental, mathematical and computational biologists, used a combination of studies of malaria parasite drug responses and mathematical modelling to develop new ways to overcome Artemisinin resistance.


*Pictured: Leann Tilley and James McCaw*

If you have any news to share, or if you've recently moved, please let us know.

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