

Department of Mathematics and Statistics
University of Canterbury

Alumni Newsletter



**National recognition
for UC mathematicians
by NZMS, pg 4**

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Editorial

Welcome to the first of our annual Alumni Newsletters for graduates in Mathematics and Statistics! The last twelve months have certainly made for an exciting and unusual year.

There has been the annual cycle of courses, exams and graduations interleaved, as usual, with the cycle of research seminars, workshops and conferences. But this time these events needed to dodge a succession of earthquakes, aftershocks and snowfalls.

Staff and students have been amazingly resilient through all the disruptions, and I think my abiding memory of this year is going to be the cheerful enthusiasm of students determined to make a success of everything they did. In the following pages you will see some of the year's successes celebrated, as well as updates on other events in the Department of Mathematics and Statistics over the last twelve months. Happy reading!

Dr John Hannah (Editor)
Dept of Mathematics and Statistics

Congratulations

Congratulations to the students who graduated at the graduation ceremony in December 2010.

PhD

Scott Graybill (Bioengineering)
Xin Zhao (Statistics)

BSc(Hons)

Ahmad Fazil Bin Alias (Statistics & Mathematics)
Nicholas Brettell (Mathematics)
William Frost (Mathematical Physics)
Nurul Idris (Mathematics)
Clare O'Connell (Mathematics & Philosophy)

BSc

Norazeh Abd Shukor (Mathematics & Statistics)
Nuradilla Azhari (Mathematics & Statistics)
Rowen de Vries (Physics & Mathematics)
William Frost (Physics & Mathematics)
Adam Gray (Mathematics & Computer Science)
Yang Hu (Statistics)
Alastair Jamieson-Lane (Mathematics)
Jeevananthan Kasinathan Panadam (Physics & Mathematics)
Daniel Laws (Statistics)
Wan Zanariah Binti Md Jahaya (Mathematics & Statistics)
Nurul Afiqah Binti Md Najib (Physics & Mathematics)
Fiona Morrison (Statistics)
Shane Neiman (Statistics)
Jasmine Robinson (Chemistry & Mathematics)
Luke Stevens (Mathematics)
Jesse Unger (Mathematics & Economics)
Paul van Berkel (Mathematics & Physics)
Uthpala Vattala (Statistics)
Matthew Ward (Mathematics & Psychology)
Miaofei Zhao (Statistics & Economics)

BA

Ann Lah (Mathematics & Chinese)

Congratulations to the students who graduated in April 2011.

PhD

Blair Robertson (Mathematics)

BSc(Hons):

Luke Davies (Mathematics)
Jacky Po-Chien Sung (Mathematics & Statistics)
John Tregrove (Mathematics)
Chen Chen (Statistics)

BSc

Luke Davies (Mathematics)
Korinne Brown (Mathematics)
Michael Burrell-Smith (Statistics)
Lisa Hepp (Mathematics)
Luke McFarlane (Mathematics & Computer Science)
Andrew Johnson (Mathematics & Physics)
Catherine Cumpstone (Statistics & Biological Sciences)
Serina Hapi (Mathematics)
Chyau-Feng Tony Cheng (Mathematics & Physics)
Edwin Flores (Mathematics & Computer Science)
Robert King (Mathematics & Computer Science)
Choon Siong Lim (Mathematics & Economics)
Lisa Sands (Mathematics & Statistics)
Nelson Shaw (Mathematics & Computer Science)
Katherine Wilson (Statistics & Psychology)
Chontelle Tuck (Mathematics).

GradDipSc

Tomohiro Uchiyama (Mathematics).

PGDipSc

Guanyu Zheng (Statistics).

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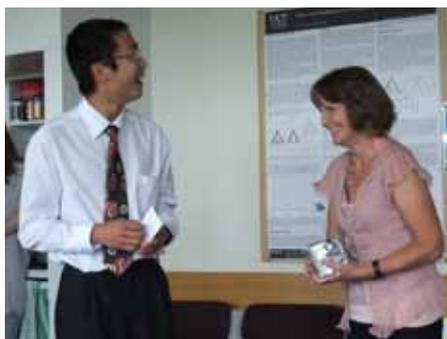
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2010 Graduation afternoon tea and prizegiving

Each year the department holds an afternoon tea for students attending the graduation ceremonies. The 2010 afternoon tea was held on Tuesday 14 December and was combined with a celebration of department prize winners.

We were delighted that Peter Wily was able to attend, to present the first Helen Wily Prize in memory of his late wife. Congratulations to all our prize-winners, including Katy Bergstrom, co-winner of the W B Wilson Prize, who was unable to attend.



Thomas Heyang Li (Page Prize)



Jennifer Harlow (Helen Wily Prize)



Nicholas Brettell (Cook Prize co-winner)



Hun Lee (W B Wilson Prize co-winner)



Simon Todd (Peter Bryant Prize 200-level)



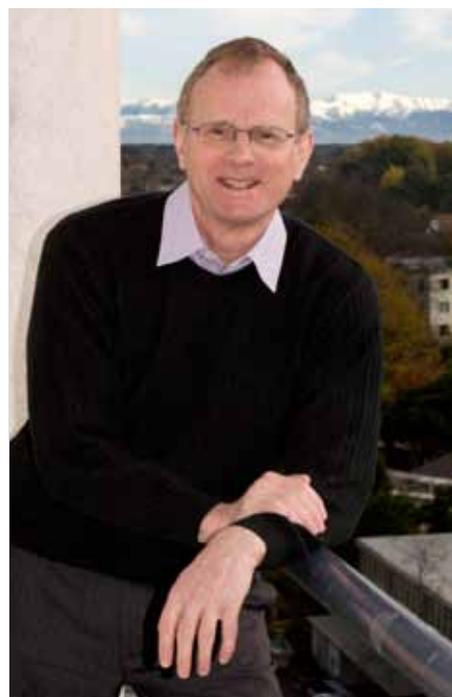
James Hadfield (Cook Prize co-winner)



James Bonifacio (Gordon Petersen Prize)



Joshua Chen (Peter Bryant Prize 100-level)



2011 University of Canterbury Research Medal

The 2011 University of Canterbury Research Medal will be awarded to Professor Douglas Bridges of the Department of Mathematics and Statistics.

The medal will be presented at the Graduation ceremony on the afternoon of 14 December 2011. Professor Bridges is a world authority on constructive mathematics and is a very fitting recipient of the University's premier research award. Congratulations to Douglas and more photos in our next edition!

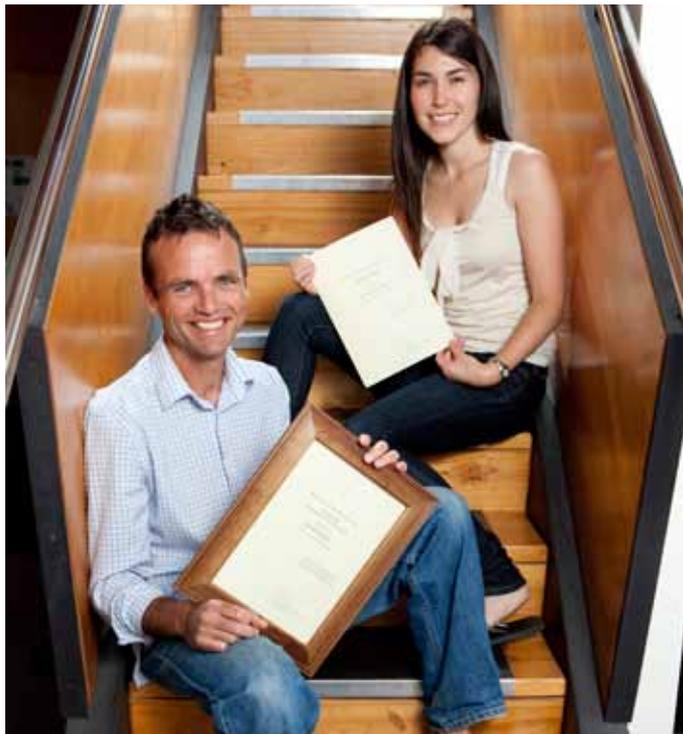
National recognition for UC mathematicians

Professor Charles Semple and PhD mathematics student Rachael Tappenden received two of three awards presented annually by the New Zealand Mathematical Society (NZMS) at the organisation's colloquium in Dunedin in December 2010.

Charles, who is President of the society, was awarded the NZMS Research Award for his contributions to discrete mathematics, the branch of mathematics that provides the theoretical underpinnings to computer science. His particular area of expertise in this area is matroid theory, which involves working with structures that underlie the solution of many optimisation problems.

The award also recognised Charles' work in the field of phylogenetics – the reconstruction and analysis of phylogenetic (evolutionary) trees and networks based on inherited characteristics – and computational biology.

It is the third time a UC academic has received the award since it was established in 1990 to



Charles and Rachael with their awards.

foster mathematical research in New Zealand and to recognise excellence in research carried out by New Zealand mathematicians. The previous UC recipients were Neil Watson (1995) and Mike Steel (1999).

Charles said he was pleased to receive such recognition from his peers “particularly given who has won the award previously”.

“Some big names in New Zealand mathematics have received this

award in the past – Rod Downey, Marston Conder and Gaven Martin – so it is a big honour to be this year's recipient.”

Rachael was presented with the NZMS Aitken Prize, which is awarded to the student who delivered the best student talk at the NZMS colloquium. It is the fourth consecutive time a doctoral student from the UC mathematics and statistics department has collected the award.

Rachael's talk was titled “Extensions of Compressed Sensing” and discussed a way of reconstructing signals and images from small datasets which has applications in medical imaging. “Being able to speak well in public is an important skill to have if you're going into academia so winning this award is a good sign for me. It also means that what I'm doing is interesting.”

Rachael was one of 20 students from around the country who were considered for the award, which comes with a \$500 prize.

Former student
awarded
prestigious
fellowship



Dr Chris Hann, a former student and PhD graduate of the department, has been awarded a prestigious Rutherford Discovery Fellowship totalling \$800,000 over five years to help him develop his research career in New Zealand.

Chris is now a researcher and lecturer in the University's Department of Electrical and Computer Engineering, and was among 10 recipients of the fellowships, which are administered by the Royal Society of New Zealand.

Chris will receive \$160,000 per year over a five-year period. The aim of the scheme, set up by the Government in 2010, is to support researchers in the three to 10 year period after they have completed a doctoral degree. Chris will use the funding to further his work in the development of a system to control rockets.

This work involves building a mathematical model of the rocket as it travels through space, including directly identifying random wind loads to allow prediction and stabilisation of the rocket. This approach will avoid the

need for costly trial and error runs currently used to tune the control systems and significantly reduce the long turnaround time required to launch and accurately position a payload.

Chris received his BSc (Hons) degree with First Class Honours in Mathematics in 1997, and PhD in Mathematics in 2001, from the University of Canterbury.

The chairperson of the selection panel, Professor Margaret Brimble, said the high calibre of the applicants made choosing the final ten a difficult decision. “Those chosen demonstrated exceptional talent and promise. We believe they will be New Zealand's future research leaders and are worthy of this investment.”

Staff News



College Teaching Award

Phillipa Williams (Senior Academic Tutor) won a College of Engineering Teaching Award in the Early Career category.

Comings & goings

After several retirements in recent years (Bob Broughton, Pam Hurst, Ian Coope and Neil Watson most recently) this year has seen several new academic staff joining us.

Jeanette McLeod came to us from the Heilbron Institute in Bristol, England. Her specialist area is combinatorics.

Maarten McKubre-Jordens is a former graduate of the department who did his PhD in Auckland under Gaven Martin. He returned the Canterbury for a post-doctoral fellowship with Douglas Bridges, and is soon to start a two-year lecturing position here. He is interested in non-classical analysis and para-consistent logic.

Elena Moltchanova came to us from Finland. She is interested in statistical modelling, and 50% of her position is dedicated to statistical consultancy work around the campus.

Blair Robertson is a Canterbury graduate who recently completed his PhD under the supervision of Chris Price. He is interested in optimization.



UC Teaching Awards

Professor Jan Evans-Freeman, Pro-Vice-Chancellor (Engineering), presents Irene David with a UC Teaching Award at a function on 14 July at NZi3. These annual awards recognise teaching excellence at the university and Irene was one of 6 UC recipients for 2011. Irene is currently the Director of Teaching - Tutors, and a Senior Academic Tutor.



New book on mathematics

In Clemency Montelle's first book entitled *Chasing Shadows: Mathematics, Astronomy and the Early History of Eclipse Reckoning*, she explores the ways in which 4 major cultures of the ancient world – the ancient Near East, ancient Greece, India and the Islamic Near East – used mathematics to model and predict eclipses. She also looks at the scientific discoveries these societies made and how ideas spread amongst cultures. The book has been published as part of the John Hopkins University Press's *Studies in the History of Mathematics* series.



Roy Kerr Investiture

On 14 April at Government House, Wellington, Professor Emeritus Roy Kerr, was invested by Sir Anand Satyanand, Governor General, as a Companion of The New Zealand Order of Merit (CNZM) for services to Astrophysics. Roy took up the Chair of Mathematics at Canterbury in 1971, on his return from the University of Texas, Austin, and remained there until his retirement in 1993. For ten of those years he was also Head of Department. Professor Charles Semple represented the Department of Mathematics & Statistics at the investiture and the following luncheon, where he gave a speech on behalf of the department.

Earthquakes and recovery



The September and February earthquakes turned lives (and offices) upside down. The office, shown above after the September quake, was relatively easy to fix.

Staff turned up for a working bee, straightening book-shelves and re-shelving books, closing errant drawers and righting furniture, and finally giving everything a good dust! Within a week classes resumed and life was back to normal, apart from occasional aftershocks that felt a bit like a short theme-park ride on the upper floors of the Erskine building, the maths and statistics department's home.

Damage after February's quake was more extensive, of course. While the university did thorough checks on all its buildings, staff rallied round, helping one another with water supplies and clearing up the effects of liquefaction at home.

The disruption of classes was more severe this time, and even when classes resumed it was going to be with reduced contact time. With campus buildings still off-limits, the department met in a colleague's home, to plan its way forward. Even when classes resumed, staff offices in Erskine were off-limits while first safety checks and then remediation were carried out. For many weeks, staff worked in temporary space at home, or in libraries (as they were re-opened), or in other departments (firstly in Civil



and Natural Resources, and then in our current temporary home in Chemistry).

An increased use of online resources saw us through to Easter, but many students and staff were relieved to resume normal lecturing in the second term. The June quake caused some disruption to the end-of-semester examinations, but the thorough checks done after February meant that we were quickly back in our (still temporary) offices.

The department's tutorial rooms and computer labs were up and running in time for the big Semester 2 courses. Remediation of the Erskine office block is progressing well and we expect to be back in our old offices by the end of this year. We are looking forward to a normal 2012!

Combined mathematics-philosophy Kaikoura retreat



In May, Clemency Montelle organised a joint Mathematics-Philosophy retreat for UC and visiting staff and students.

This weekend of academic discussion, fellowship and fresh air, took place at the University's Kaikoura Field Station. The trip was packed, and the scholarly fare included ten talks on various topics including constructive mathematics, history and philosophy of mathematics, mathematics education, experimental statistics, imaging and probability. One talk included some very hard sums consisting of tequila, shot glasses and dice – all in the name of research, of course!



Annual NZ Phylogenetics Meeting – Leigh 2011



A former sawmill on a remote beach north of Auckland may seem an unlikely location for a week-long meeting of biologists and mathematicians.

But the annual “NZ phylogenetics meeting” showcased a range of ‘cutting edge’ research (pun intended), with talks from three UC staff (James Degnan, Charles Semple and Mike Steel) as well as recent departmental visitors (Sebastian Boecker, Tanja Stadler, Vincent Moulton and Katharina Huber). PhD student Joe Zhu was also at the meeting. The meeting - the 16th in an annual series - was

held from 6-11th February in Leigh in a converted sawmill that is now a comfortable lodge/cafe/brewery. Over fifty participants from seven countries attended, with just over half the participants from New Zealand. Talks ranged from the development of new methods for constructing phylogenetic trees and networks, to questions such as why rates of evolution over recent time periods appear faster than

over longer ones (the so-called ‘J-curve’), through to applications in epidemiology, phylogeography and conservation biology. The meeting was organised by David Bryant (Otago) and Stephane Guindon (Auckland). Next year’s meeting will be in the South Island, at a similar time, and organised by Charles Semple and Mike Steel.

MATHSOC



2010 saw the start of a new student venture, the setting up of a club MATHSOC for students in mathematics and statistics. Thanks go to Thomas Li and Robin Candy for this.

Cantamath 2011

Thanks to MATHSOC members Thomas, James, Daniel, Isaac and Julie for making themselves

available during the holidays to help with the booth at Cantamath 2011. They did a superb job of interacting with the students. Cantamath 2011 was sponsored by Casio, The Press and the Ministry of Education. The department was represented at the prizegiving by Rua Murray, who made a speech and presented the prizes.

Photo: James Williams demonstrating his Rubik’s Cube skills at the booth.



Movie Night & BBQ

Mathsoc, with the support of the department, organised the first movie night this year. We watched the movie “Social Network” (about how Mark started Facebook) with fish and chips, hot dogs, drinks and snacks.

About 15 cool people showed up (thanks to the “social network”) and we had a wonderful time.

MATHSOC would love your support. Come to some of our events! Sign up by email: Mathsoc.uc@gmail.com

Thomas Li

Photo: Staff and students enjoyed a Mathsoc BBQ on 16 September.

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