



THE UNIVERSITY OF
MELBOURNE

ALUMNI & FRIENDS 2012

DEPARTMENT OF MATHEMATICS & STATISTICS



Message from the Head

Professor Aleks Owczarek

The year 2012 has been a truly exciting year for the Department. For the second year in a row a PhD student from the Department, this time Michael Wheeler, was awarded the Chancellor's Prize for Excellence in a PhD thesis (one of six awards for excellence made each year). Michael was supervised by Professor Omar Foda, in the area of mathematical physics.

We have welcomed a new continuing appointment as Lecturer in Statistics, Dr Davide Ferrari, from Italy. Professor Peter Hall was awarded the 2012 Samuel S. Wilks Memorial Award for his pioneering and influential contributions in statistics and probability. Professor Terry Speed, who is a Professorial Fellow in the Department based at the Walter and Eliza Hall Institute, was awarded the 2012 Victoria Prize in the Life Sciences for his work in bioinformatics.

Our staff were also recognized by the University for their excellent work, with Dr Craig Westerland and Dr Deborah King both being promoted to the rank of Senior Lecturer and Dr Paul Norbury being promoted to the rank of Associate Professor and Reader.

The move to the Melbourne Model Masters program is now complete with over 60 Master of Science students studying Mathematics and Statistics compared to around 20 Honours students 10 years ago. To support this a new, dedicated Masters student space has been renovated and the first students have now taken up residence.

The year will end on a high with the Behrend lecture given by the President of the American Mathematical society, Professor Eric Friedlander, and a visit by a quartet of high profile mathematicians including Fields medalist, Professor Andrei Okounkov.

The next year promises to be just as exciting as we have plans for hiring new staff in stochastic processes/probability and in pure mathematics.

Paradox

Paradox is the magazine of the Melbourne University Mathematics and Statistics Student Society. Every Paradox issue from 1996 to 2012 is available at

www.ms.unimelb.edu.au/~mums/paradox/archive.html

Each issue contains a problems section (cash prizes offered for the best solutions!), a mathematical humour section, career profiles and interviews with mathematics and statistics alumni, book reviews and some recreational mathematics articles.

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

Peter Hall Wins Samuel S. Wilks Memorial Award



Professor Peter Hall was awarded the prestigious Samuel S. Wilks Memorial Award of the American Statistical Association. Peter was awarded the 2012 Wilks Award for his pioneering and influential contributions to a wide variety of areas of statistics and probability and for his

outstanding service to the profession, with an extensive record of editorial roles, collaborative work, and promotion of statistical science to the wider scientific and educational communities.

American Mathematical Society Names Initial Class of Fellows of the AMS

Professors Chuck Miller, Arun Ram and Hyam Rubinstein have been named in the inaugural list of Fellows of the American Mathematical Society (AMS) for 2013.

The Fellows of the AMS designation recognizes members who have made outstanding contributions to the creation, exposition, advancement, communication, and utilization of mathematics. Among the goals of the program are to create an enlarged class of mathematicians recognized by their peers as distinguished for their contributions to the profession and to honour excellence.

The new AMS Fellows Program recognizes some of the most accomplished mathematicians – AMS members who have contributed to our understanding of deep and important mathematical questions, to applications throughout the scientific world, and to educational excellence.



Chuck Miller



Arun Ram



Hyam Rubinstein

Alumna Ruth Williams Elected to National Academy of Science

Professor Ruth Williams, a 1970's alumna from the Department, was elected to the National Academy of Sciences in the USA on May 1, 2012. Ruth currently holds the position of Distinguished Professor and the Charles Lee Powell Chair in Mathematics at the University of California, San Diego.

Ruth Williams grew up in Bendigo, and attended Melbourne University from 1973-1978, completing a Bachelor of Science (Honours) degree and a Masters Degree in Mathematics. Ruth completed a PhD in Mathematics at Stanford University and was awarded an Honorary Doctor of Science by La Trobe University.

Ruth is a Fellow of the American Academy of Arts and Sciences, the American Association for the Advancement of Science, the Institute of Mathematical Statistics and the Institute for Operations Research and the Management Sciences. She has been a U.S. National Science Foundation Presidential Young Investigator, an Alfred P. Sloan Fellow and a Guggenheim Fellow.

Ruth's research interests lie in probability and stochastic processes. Her current research is concerned with developing new theory and applications for stochastic networks. The stochastic networks typically have entities, such as customers, packets or molecules, that move along paths or routes in a network, wait in buffers, receive processing from various resources, and that are subject to the effects of stochastic variability through such variables as arrival times, processing times, and routing protocols.

In recent work, Ruth has analysed models of the Internet to understand the entrainment effects of using fair bandwidth-sharing policies, and has used insights from queueing theory to study coupled enzymatic processing in protein networks, in collaboration with researchers in synthetic biology.



The Mathematical Sciences Library



Alan Burns in the Mathematical Sciences Library
Image credit: Les Truffle

The Mathematical Sciences Library has existed since the mid-1970s, following the founding of the School of Mathematical Sciences. The School was comprised of the Departments of Mathematics, Statistics, and Computer Science, and was the suggestion of Professor Evan Williams of Statistics. These departments were all separate departments within the Faculty of Science, but were all located in the Richard Berry Building at that time. Statistics and Mathematics appear to have had small libraries prior to that time. The School Library was partly based on these collections, along with bequests of books from Professors J.H. Michell and T.M. Cherry (Mathematics), M.H. Belz (Statistics) and Mr R.J.A. Barnard, a former mathematics lecturer. The Library was originally located on the first floor. When it moved to its location on the ground floor, this required remodelling of Lecture Theatre B (now the Russell Love Theatre).

At that time, the Library was not part of the main University Library network and was funded from the budgets of the three Departments. Its major focus was to support the research activities of the three departments. As such, it was not open to undergraduates (except fourth years) and the holdings were not included on the central University catalogue.

Major changes occurred to the Library in 1993. The University Librarian offered a funding deal to incorporate the Library into the University Library network. The Computer Science Department changed faculties from Science to Engineering, and location to a purpose-built building in Bouverie St. This triggered major renovations to the Richard Berry Building, including the Library, which was given a significant increase in floor space, opened out to the corridor, and given rather more colourful décor. The new Library was available to undergraduates, and became a popular space to study, although frequently not mathematics or statistics, unfortunately.

The third stage of library development occurred in 2011, although its roots date back many years. It had been a long held intention to build a Physical Sciences Library on campus. This was of particular interest to Mathematics and Statistics people, who had long felt dissatisfaction with the fragmentation of the relevant library collections. This was achieved in large measure when, due to a couple of major library moves, space became available in the Eastern Resource Centre (ERC). The bulk of the Mathematical Sciences Library collection, along with those of other Science branches (not to mention the incumbent librarians!) was relocated to the ERC. However, some print journals, which were now replaced

by more convenient electronic versions, were sent to offsite storage and departmental copies of higher degree theses, along with print copies of past examination papers were returned to the Department. Also relocated to the ERC were mathematics and statistics books and journals from the Baillieu Library and the Research (B) collection, which has substantially unified the collection. Although the Department regretted the departure of the library from the building, it was also feeling the need for more space to accommodate increasing numbers of students.

Alan Burns, Librarian

New Masters Student Rooms and Tutorial Rooms

Renovations of the space vacated by the Mathematical Sciences Library progressed rapidly with walls being demolished in the middle of July, the building completed in October, and the rooms fitted out with furniture and computers in November. The old library space has been transformed into two tutorial rooms each comfortably seating 24 students, and two Masters rooms housing a total of 44 Master of Science (Mathematics and Statistics) students.



Image credit: Jeff Briffa

The new Masters rooms provide each student with their own workstation comprising a desk, chair, Macintosh computer, shelving and storage space under the desk. All Masters students in the Department will be housed in the new rooms whilst they work on their research project from the second semester until the end of the two-year degree. In the first semester of the Masters degree, whilst they complete coursework only, the students share desks in another room.



Image credit: Jeff Briffa

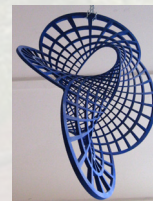
The two new tutorial rooms provide much needed collaborative learning spaces for mathematics and statistics tutorials. Gone are the days when students sit in desks in rows with a tutor solving problems on the blackboard. Nowadays, most first and second year mathematics subjects, run so called "whiteboard tutorials" where students are required to actively

participate during tutorials.

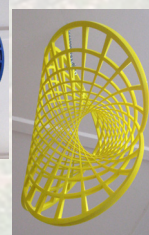
The tutorial rooms are fitted out with whiteboards around all of the walls. Groups of three to four students work at the whiteboards solving problems from the tutorial sheets handed out in the beginning of the class. The tutor moves between groups helping students with any problems and giving feedback on the quality of their solution. Students are given full solutions to the tutorial sheets at the end of class.

The tutorial rooms are also fitted out with round tables to facilitate group work and discussion in mathematics and statistics subjects that do not run whiteboard tutorials.

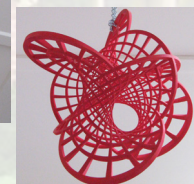
Mathematical Sculptures



Round Möbius Strip



Clifford Torus

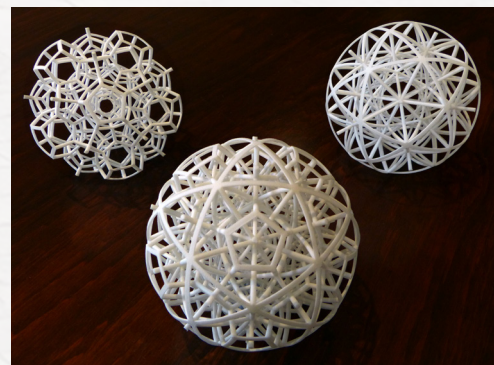


Round Klein Bottle

The Department is now home to five brightly coloured sculptures hanging from the ceiling of the corridor near the new Masters rooms and tutorial rooms. The sculptures were made by Dr Henry Segerman who is a research fellow in the Department working in the area of 3-dimensional geometry and topology.

The sculptures are of a Round Möbius strip, Round Klein bottle, Clifford torus, half of a 120-cell and half of a 600-cell. A Möbius strip is made by making a half twist in a strip of paper and then joining the ends. Its boundary is an unknotted loop in space, so it can be deformed into a circle. If we carry the surface along, we produce a Round Möbius strip. A Round Klein bottle is a closed non-orientable surface made by gluing two copies of a Round Möbius strip along their boundaries. The Clifford torus is a surface in the 3-sphere, the unit sphere in 4D space. The 120-cell and 600-cell are examples of regular 4D polytopes. The 120-cell has 120 dodecahedral 3D faces and the 600-cell has 600 tetrahedral faces.

Henry was also awarded the Best Use of Mathematics prize at the Bridges 2012 Math Art Exhibition for his sculptures of Dual Half 120- and 600-Cells.



Design assistant: Saul Schleimer

Dual Half 120- and 600-Cells