

Newsletter

Mathematics & Statistics

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CONGRATULATIONS!

EINSTEIN MEDAL

Congratulations to Professor Roy Kerr, former UC Professor of Mathematics, who is the first New Zealander to be awarded the Einstein Medal.

The first recipient of this award, in 1979, was the Physicist Stephen Hawking. Since then, many distinguished scientists and 6 Nobel Prize winners have been awarded this medal, which is presented for outstanding service, discoveries or publications relating to Albert Einstein. Professor Kerr will receive this honour in Switzerland next May for what has become known as the “Kerr Solution” – his discovery, in 1963, of a solution to Einstein’s gravitational field equations.

Photo: Roy Kerr receiving the Companion of the New Zealand Order of Merit from the Governor General in 2011.



December graduates (from left): Warren Howie, Ashley Wallace, Ciaran Doolin, Megan Webber, Liam Scott, William Asiata, Simon Todd, Omar Yusuf and Quan Ho.

CONGRATULATIONS (contin.)

Congratulations to Gloria Teng who defended her PhD Thesis entitled *Statistical Regular Pavings and Their Applications* on 8 January. We wish Gloria well as she returns to Malaysia to take up a permanent lecturing position in data mining at the Faculty of Engineering and Sciences, University Tunku Abdul Rahman, Kuala Lumpur.

Congratulations and best wishes to Joe Zhu, who departed this month to take up a postdoctoral position at Oxford University.

Congratulations to PhD student Steve Manion who has been awarded The Korea Foundation (KF) Postgraduate Studies Fellowship for 2013. This fellowship is provided by the KF and is administered by the Korean Studies Association of Australasia (KSAA) for research students in Australia and New Zealand.

- Raaz Sainudiin

Congratulations to Shakira Suwan who has been awarded a UC Doctoral Scholarship.

- Dominic Lee

Belated congratulations to Simon Todd, who has been awarded the Cook Memorial Prize for 2012.

WELCOME TO OUR NEW PhD STUDENT

Welcome to Giulio Dalla Riva, who graduated MSc(Hons) from the University of Trento, Italy, in July. He will be undertaking a PhD in Mathematical Biology under the supervision of Mike Steel and Charles Semple and will be based in Erskine 523.

Giulio's research interests lie in the application of network theory to the study of ecological phenomena (phylogenetic networks, food webs, evolution, etc), and when not working he enjoys being around mountains, kitchens and poetry slams.



USING MATHS TO PREDICT CANCER CELL BEHAVIOUR

David Wall and his PhD student Liene Daukste have been attracting considerable interest in the cancer cell behaviour research they've been undertaking in collaboration with the Auckland Cancer Society Research Centre.

Mathematical modelling has been used in cancer research for many decades. This particular research involves applying mathematical modelling to contribute to the treatment of skin cancer, which is particularly prevalent in this part of the world. They are also developing tools for detecting vital cancer cell population behaviour for biologists and clinicians who deal with other types of cancer. "Our research focuses on modelling the dynamics of cancer cell populations that have been exposed to cancer treatment, such as irradiation, chemotherapy or a combination of both," said David. "We also model cancer cell populations that haven't been exposed to any cancer treatment, which leads to a better understanding of how cancer grows and can be used to predict the most effective cancer treatment option."

David has found participating in workshops and conferences that join biologists, clinicians and mathematicians under the one roof to be a particularly rewarding aspect of his work.



RUTHERFORD FELLOWSHIP

At a recent workshop at the headquarters of the Royal Society of New Zealand in Wellington, Clemency Montelle, along with other Rutherford Discovery Fellows, got a chance to discuss research and development in New Zealand with the Hon. Steven Joyce, Minister of Tertiary Education.

WELCOME TO OUR DEPARTMENT VISITORS

Visitor	University/Organization	Host	From	To	Room	Extn
Peter Olsson (Erskine)	Chalmers, Sweden	David Wall	3 Jan	3 Apr	710	7694
Teodor Burghelea	Nantes, France	M. Moyers-Gonzalez	14 Jan	9 Feb	605	8028
Katherine St John	CUNY, USA	Mike Steel	21 Jan	15 May	620	7431
Richard Law	York, UK	Mike Plank	16 Jan	18 Apr	605	8028
Amelia Taylor	Colorado College, USA	Mike Steel	21 Jan	20 May	616	8876
Sean Cleary (Erskine)	CUNY, USA	Mike Steel	21 Jan	19 Apr	607	8875
Andreas Pedersen	Aarhus, Denmark	Mike Steel	26 Jan	20 Jun	414	8203

ERSKINE FELLOWS

Welcome to Professor Peter Olsson, who comes to us from the Department of Applied Mechanics at Chalmers University of Technology in Gothenburg, Sweden. Peter's latest research is focused on how cloaking could provide protection of structures from elastic waves - something that may have applications in earthquake protection engineering. While Peter was Deputy VC at Chalmers University of Technology and also PVC at Jonkoping University, he had pivotal roles in decision-making for the teaching of maths for engineers at Swedish universities. While here, he will be teaching into EMTH210 and also providing his expertise for the MEngSt (Engineering Mathematics) proposal.



Welcome to Professors Sean Cleary and Katherine St John from City University of New York, who arrive this month with their son Daniel for a 3-month visit. Sean is an Erskine visitor and will teach into part of MATH240. His research interests include group theory, geometry and topology. Katherine's research interests include computational biology, random structures and algorithms, languages and logic.

– Mike Steel

Welcome also to Dr Amelia Taylor from Colorado College, who is visiting for 4 months, based in Room 616.

- Mike Steel

PAPERS SUBMITTED

Asgari, H., Chen, X. Q. and Sainudiin, R.: *Modelling and Simulation Approaches for Gas Turbine System Optimization* (invited book chapter In Mechanical Engineering, 30 pages)

Bajri, S., Hannah, J., Montelle, C.: *Revisiting Al-Samaw'al's table of binomial coefficients: Greek inspiration, diagrammatic reasoning and mathematical induction*" (43pp, SCIAMVS)

Keller, A. and Montelle, C. (eds.) *Special Edition: Numerical Tables in Sanskrit Sources* (to Indian Journal of History of Science).

Montelle, C.: *The Karanakesari: Mathematical Tables for Computing Eclipse Phenomena* (21pp, to Indian Journal of History of Science).

Smith, F.T. and Wilson, P.L.: *Body-rock or Lift-off in Flow*

PAPERS ACCEPTED

Ackerley, E.J., Cavan, A.E., Wilson, P.L., Berbeco, R.I., and Meyer, J.: *Application of a spring-dashpot system to clinical lung tumor motion data* (Medical Physics).

Steel, M., Linz, S., Huson, D.H. and Sanderson, M.J. (2012). *Identifying a species tree subject to random lateral gene transfer*. (Journal of Theoretical Biology).

PAPERS PUBLISHED

Allman, E.S., Degnan, J.H. and Rhodes, J.A. (2013): *Species tree inference by the STAR method, and generalizations* (J. Computational Biology 20: 50–61).

Asgari, H., Chen, X-Q., Menhaj, M.B. and Sainudiin, R.: *ANN-Based System Identification, Modelling and Control of Gas Turbines – A Review* (J. Advanced Materials Research, 622-623, pp 611-617, 2013.)

Harlow, J., Sainudiin, R. and Tucker, W.: *Mapped Regular Pavings* (J. Reliable Computing. Vol. 16, pp 252-282, 2012)

Hordijk, W. and Steel, M. (2012). *Autocatalytic Sets Extended: Dynamics, Inhibition, and a Generalization*. (Journal of Systems Chemistry, 3(5): 1-12).

Martyn, I. and Steel, M. (2012). *The impact and interplay of long and short branches on phylogenetic information content*. (Journal of Theoretical Biology 314: 157-163).

Montelle, C.: *“Diophantus”, “Greek Numbers”, “Roman Numbers”* (The Encyclopedia of Ancient History, Online, 1999-2012, by John Wiley and Sons).

Montelle, C.: *Translating the Elements into Sanskrit: Jagannatha's Rekhaganita* (Ganita Bharati, Vol. 32 No. 1-2 comb. 2010, 145–166).

Nelson-Saith, S., Dagan, T., Landan, A. Janssen, A., Steel, M. McInerney, J.O., Deppenmeier, U. and Martin W.F. (2012). *Acquisition of 1,000 eubacterial genes physiologically transformed a methanogen at the origin of Haloarchaea*. (Proceedings of the National Academy of Sciences USA 109: 20537-20542.)

Soubrier, J., Steel, M., Lee, M., Der Sarkissian, C., Guindon, S., Ho, S.Y.W., Cooper, A. and the Genographic Consortium (2012). *The influence of rate heterogeneity among sites on the time dependence of molecular rates*. (Molecular Biology and Evolution 29(11): 3345-3358).

Steel M. (2012). *Root location in random trees: A polarity property of all sampling consistent phylogenetic models except one*. (Molecular Phylogenetics and Evolution 65: 345-348).

CONFERENCES AND VISITS

Jeanette McLeod went to 36ACCMCC (the 36th Australasian Conference on Combinatorial Mathematics and Combinatorial Computing) held at the University of New South Wales (Sydney) in December and gave a talk entitled "Divers observations on switching reconstruction".

James Degnan was in Hawaii for a conference, Pacific Symposium in Biocomputing, where he gave a talk on "Evaluating variations on the STAR algorithm for relative efficiency and sample sizes needed to reconstruct species trees". He also made a research visit to the University of Alaska Fairbanks, where he worked with Professors John Rhodes and Elizabeth Allman. Elizabeth Allman will be an Erskine visitor in July and August, and John Rhodes will visit also. In Alaska, the weather was so much warmer than usual for January that, they had to cancel school one day due to rain turning the frozen roads to ice. They call this an "ice day" rather than "snow day" since usually snow and cold weather (where it frequently reaches -40 C) don't cause schools to cancel.

SNAPSHOTS FROM THE DEPARTMENT PRIZEWINNERS & GRADUANDS AFTERNOON TEA – December 2012

Prizewinners



*Gunter Steinke congratulating Yun Choi
(Bryant Prize Level 1)*



*Anna Wilson (Wilson Prize donor) with
David Wall*



*Simon Todd (Cook Prize) & Jamie de Jong
(Wilson Prize)*



*Richard Penny congratulating James Spray
(Statistics NZ Prize)*



Centre: Amy Rice (Bryant Prize Level 2)



Right: Hadleigh Frost (Petersen Prize)

Graduands, Staff and Guests

