

Newsletter

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SCENES FROM KAIKOURA 09



Prof Bill Martin (Dusseldorf)



De-stressing after a hard day's conferencing! (Mt Fyffe, Kaikoura)



KAIKOURA 09

Participants from 10 countries came to Kaikoura this month for the 13th annual NZ phylogenetics conference. The meeting was held at the University's marine lab and brought 50 mathematicians and evolutionary biologists together for 5 days. From our department, Charles Semple, Raaz Sainudiin, James Degnan, Chris Dowden, Mike Steel and students Beata Faller and Mareike Fischer attended. This year the meeting dealt with a wide range of evolutionary topics from purely mathematical results through to applications, such as the evolution of song in North Island saddleback birds and the use of phylogenetics in the thoroughbred horse industry. Highlights included Prof. Bill Martin's keynote talk on *Hydrothermal vents and the origin of life* and Prof. Daniel Huson's *Darwin Rocks* computer program, in which random tunes evolve by the audience selecting ones they like the sound of. The last day coincided with Darwin's 200th birthday and several of the overseas participants were interviewed by TV, radio and newspaper.

- Mike Steel

HoD NEWS

I wish you all well for the new teaching year that is upon us. This will be the last year we teach 100-level 18 point papers.

Several of us attended the recent joint Engineering and Science faculty forum meeting, to hear discussion on our planned 100 level and first professional courses. Our suggested changes for EMTH courses seemed to be well-received.

Congratulations to Ashley Lightfoot, who has been awarded the Lord Rutherford Memorial Research Fellowship for 2009! This fellowship was founded by Arthur and Agnes Sims who, in 1941, made provision of a fund of £10,000 to establish a scholarship(s) to commemorate the late Baron Rutherford of Nelson, a former graduate of the University of Canterbury. The fellowship is offered annually to eligible graduates of a New Zealand university for outstanding merit and promise in the subjects of Physics, Engineering, Chemistry or Mathematics and gives the Fellow an opportunity for further study or research at some institution either in New Zealand or overseas. Ash is planning to further his studies in the USA.

Last year, Tim Candy, another of our students, was awarded this fellowship and is currently studying in Scotland. Earlier winners from this department include James McGowan (1999) and Richard Laugesen (1983). Incidentally, Richard is still a regular academic visitor to this department.

We also had a great selection of talks by our Summer Project students last week. We obviously have an excellent group of students moving through our levels.

I'm looking forward to hearing the presentations from our two HOD candidates and trust you are, too. Other staff developments include the appointment of Philippa Williams as a Senior Tutor in a 0.8 fixed term position. Philippa has been lecturing MATH109-SU and will, amongst other duties, be responsible for the 100-level skills testing programme. Also, Steve Gourdie has been appointed ITCS Manager for the Department. Congratulations to them both.

- David Wall

CONFERENCES & VISITS

Jennifer Brown: Building Networks in Statistics Education Forum, QUT, Brisbane, 9-10 Feb 2009. Talk entitled: *Representing the NZ Tertiary Sector*

Irene David: Building Networks in Statistics Education Forum, QUT, Brisbane, 9-10 Feb 2009

James Degnan: Research visit USA, Dec 2008

James Degnan: Kaikoura 09, 7 – 12 Feb 2009

Raaz Sainudiin: NZ Annual Phylogenetics Meeting, Kaikoura, 6-12 Feb 2009. Talk entitled: *Lumpings of a Kingman-Tajima n -coalisant*.

Raaz Sainudiin: Workshop on High Dimensional Approximation, Sydney, 16-20 Feb 2009. Talk entitled: *Auto-validating Trans-dimensional Rejection Sampler*.

Raaz Sainudiin: Statistics Seminar, University of Wollongong, Australia, 23 Feb 2009. Talk entitled: *Statistical set-processing: Arithmetics over multi-dimensional data-structures*.

WELCOME TO OUR DEPARTMENTAL VISITORS

<u>Visitor</u>	<u>Organization</u>	<u>Host</u>	<u>From</u>	<u>To</u>	<u>Room</u>	<u>Extn</u>
Dr Radu Mihaescu	UC Berkeley	M Steel	8/12/08	1/3/09	720/616	8876
Dr Bhalchandra Thatte	Univ. of Oxford	M Steel	11/1/09	31/3/09	605	8028
Dr Magnus Bordewich	Univ. of Durham	C Semple	12/1/09	27/3/09	720	8337
Dr G Tunncliffe-Wilson	Univ. of Lancaster	C Scarrott	12/1/09	28/2/09	721	8338
Anton Hedin	Univ. of Uppsala	D Bridges	20/1/09	20/3/09	605	8028
Prof. Daniel Huson	Univ. of Tübingen	M Steel	4/2/09	1/3/09	623	7688
Dr Regula Rupp	Univ. of Tübingen	M Steel	4/2/09	1/3/09	623	7688
Prof. Andreas Dress	CAS-MPG Shanghai	M Steel	7/2/09	2/3/09	620	7431
Dr Tanja Stadler	ETH Zurich	M Steel	12/2/09	4/3/09	605	8028
Dr Wolfgang zu Castell-Rüdenhausen	Helmholtz Centre	R Beatson	15/2/09	6/6/09	607	8875
Prof. Carey Priebe	John Hopkins Univ.	D Lee	21/2/09	5/4/09	607	8875

Dr Wolfgang zu Castell-Rüdenhausen (Erskine Fellow)

Dr zu Castell-Rüdenhausen returns to the department as an Erskine Fellow following an earlier visit in 2006. His present position is that of Head of the Computational Mathematics Group at the Institute of Biomathematics and Biometry at the Helmholtz Centre in Munich. His special fields of interest are kernel-based methods with applications to approximation, spatial statistics and machine learning. He will be lecturing in calculus and linear algebra as well as presenting several seminars during his time in the department. During his time here, he will be hosted by Rick Beatson and based in Erskine Room 607 (ext. 8875)



Professor Carey Priebe (Erskine Fellow)



Prof. Priebe's special fields of interest include computational statistics, kernel and mixture estimates, statistical pattern recognition, statistical image analysis and statistical inference for high-dimensional and graph data. While here, he will be lecturing on Bayesian inference: Bayesian theory, methods for computing Bayesian solutions and applications of Bayesian statistics. Since 1994, Carey Priebe has been a professor in the Department of Applied Mathematics & Statistics, John Hopkins University in Baltimore. During his time here, he will be hosted by Dominic Lee and based in Erskine Room 607 (ext 8875).

Professor Andreas Dress

Prof. Dress, Director of the CAS-MPG Partner Institute for Computational Biology in Shanghai, has been a visiting scientist at many renowned universities and is co-editor of 7 international professional journals. He has also been a visiting scientist at the Max Planck Institute for Mathematics in the Sciences in Leipzig since 2003. His current research interests include phylogenetic combinatorics, molecular evolution and the use of topological methods in proteomics and computational chemistry. Prof. Dress is hosted by Mike Steel and is based in Erskine Room 620 (ext 7431).



Professor Daniel Huson



Dr Huson, Professor of Algorithms in Bioinformatics at Tübingen University, Germany, is making a return visit to New Zealand with Dr Regula Rupp, a postdoctoral fellow from Tübingen. Both are attending Kaikoura 09 followed by a departmental visit until 1 March. They are hosted by Mike Steel and will be based in Erskine Room 623 (extn7688).

ALLAN WILSON CENTRE NEWS

In February we've had a series of events sponsored by the Allan Wilson Centre, and visitors.

Kaikoura 09

February 7-12 was Kaikoura 09, the 13th annual NZ phylogenetics meeting, which this year was held at the Marine Lab in Kaikoura, and attracted more than 50 participants, most from overseas, and mostly mathematicians. It was organised by Mike Steel and Charles Semple, with much help from Dietrich Radel. Among the visitors who came for this meeting are Professor Andreas Dress, director of the joint Max Plank - Chinese Academy of Sciences Computational Biology Centre in Shanghai, who is visiting our department for one month, and Professor Daniel Huson (and his postdoc Regula Rupp) from University of Tuebingen, who will also be visiting the department for a number of weeks.

BioEd

February 12th was Darwin's 200th birthday, and many of the Kaikoura participants returned to Christchurch that day to be part of a 160-strong 3-day biology education conference entitled 'BioEd' that was held at the Christchurch Convention Centre. It was one of six coordinated international events celebrating the birth of Charles Darwin: "Darwin 200 Symposia". These meetings are being run under the auspices of the International Union of Biological Sciences (IUBS), Commission on Biological Education (CBE) and the United Nations Educational Scientific and Cultural Organization (UNESCO). Highlights of the meeting included a play ('Collapsing Creation') some talks from well-known authors, and a session on the role of mathematics in genomics and evolution.

During talks on the role of mathematics in the study of evolution at this conference, which was sponsored by the Allan Wilson Centre, the following two quotations came to light. In the first, Darwin recalls his lack of skill in the subject and his later regret in his autobiography:

"During the 3 years which I spent at Cambridge my time was wasted, as far as the academical studies were concerned, as completely as at Edinburgh and at school. I attempted mathematics and even went during the Summer of 1828 with a private tutor (a very dull man) to Barmouth, but I got on very slowly. The work was repugnant to me, chiefly from my not being able to see any meaning in the early steps in algebra. This impatience was very foolish, and in after years I have deeply regretted that I did not proceed far enough at least to understand something of the great leading principles of mathematics, for men thus endowed seem to have an extra sense."

The second quote is in a letter he wrote to William Fox in 1828:

"Dear Fox, I have had no letter from you. I hope it arises from your being 10 fathoms deep in the mathematics, and if you are, God help you, for so am I, only with this difference; I stick fast in the mud at the bottom and there I shall remain."

Workshops

On Monday February 16th there was a 2-hour workshop by the BLUEFERN supercomputing group for AWC and other interested users, and on Tuesday February 17th was the first of three AWC lectures, this one by author Professor Mike Morwood on the "Hobbits in context: the life, times and death of Homo floresiensis", in the Christchurch Art Gallery.

From Saturday February 21st, there is a week-long workshop on theoretical biology at the Cass Field station, which will involve up to 25 students, postdocs and academics.

- Mike Steel

PAPERS ACCEPTED

D S Bridges: *Reflections on function spaces* (Annals of Pure and Applied Logic)

N G Gresnigt & P F Renaud: *On the geometry of the conformal group in spacetime* (Bull. Belgian Math. Soc.)

P L Wilson, H Huang, S Takagi: *Hydrophobic effect in a continuum model of the lipid bilayer* (Journal: Communications in Computational Physics)

PAPERS PUBLISHED

Raaz Sainudiin & Thomas York: *Auto-validating van Neumann rejection sampling from small phylogenetic tree spaces* (Algorithms for Molecular Biology 4:1 2009)

POSTGRADS IN PARTY MOOD



POSTGRADS CHRISTMAS PARTY

At the end of last year, some of our postgrads prepared and cooked a Christmas dinner in the staff room, which was no mean feat! As the Australia & New Zealand Mathematics Convention was being held at that time, outside postgrads attending the conference were invited to share the meal.

PROBLEM CORNER

Last November's problem, three little algebraic problems, were solved by THREE different solvers - rather more than usual! They were Richard Brown, Bob Long, and Peter Humphries. Well done, all! Bob's was the first complete solution received, so he wins the chocolate fish.

This month's is a rather nastier geometric one.

Problem: The interior angles of a convex pentagon are all equal, and all sides have rational lengths. Prove that it must be a regular pentagon.

- Bill Taylor