

WORKSHOP ON BODY SIZE, FOOD WEBS AND ECOSYSTEM DYNAMICS



Hamish Greig and Helen Warburton demonstrating electrofishing in the Waimakariri catchment, near Cass



Joel Cohen, one of the invited speakers, enjoying the scenery of the Upper Otira Valley

Michael Plank, in conjunction with Erskine visitor Richard Law, organised a workshop on body size, food webs and ecosystem dynamics (thanks to funding from Marsden grant number 08-UOC-034). The workshop was held from 2-4 April in the Department of Mathematics and Statistics.

We were fortunate to be able to entice 5 highly regarded invited speakers from overseas. The NZ contingent included researchers from NIWA (Wellington and Christchurch) as well as staff and postgraduate students from the School of Biological Sciences and our own Department. As well as a great mix of local and visiting participants, we had a mixture of mathematicians, statisticians, theoretical and applied ecologists, and fisheries biologists. The range of talks was excellent and the workshop has sparked many an idea for future research, so hopefully several fruitful collaborations will ensue.

The workshop also had a field trip, kindly organised by Helen Warburton and Hamish Greig from SBS, to the Cass Field Station. Hamish and Helen showed us some of their field sites and methods, and their passion, knowledge and skill in their research were fantastic to see. Our overseas guests also appreciated the chance to see some of NZ's beautiful scenery. Thanks Helen and Hamish!

- Mike Plank

SIMONE LINZ AWARDED PRESTIGIOUS FELLOWSHIP

Welcome to Dr Simone Linz (University of Tübingen) who will be in the department for the next two years. Simone has been awarded a prestigious Marie Curie International Outgoing Fellowship. The fellowships are for 3 years, two of which are spent at an institution outside Europe. Simone's associated project is in the broad area of phylogenetic networks.

- Charles Semple

WELCOME TO OUR DEPARTMENT VISITORS

Visitor	University/Organization	Host	From	To	Room	Extn
Paul Wright	Austin Community College	C Montelle	04.01.12	17.05.12	605	8028
Ana-Maria Magdalena	NCRE Visitor	NCRE	09.01.12	30.09.12	723	8339
Richard Law (Erskine)	York University	M Plank	15.01.12	24.04.12	710	7694
David Liberles	Wyoming	M Steel	25/1/12	16.6.12	616	8876
Michael Matschiner	Basel	M Steel	01.04.12	31.12.12	616	8876
Rebecca Killick	Lancaster	C Scarrott	23.04.12	29.04.12	605	8028

CANTERBURY MATHEMATICS ASSOCIATION

Raaz Sainuddin and Phil Wilson spoke at the Canterbury Mathematics Association mini-conference for local high school teachers, held in the department on Saturday 24 March.

Around 30 teachers attended their two talks on *Introducing the Math Explorers' Club of Ithaca New York for high schools in Christchurch* and *Narrative Mathematics*, and gave extremely positive feedback.

Phil Wilson

MATH OLYMPIAD GROUP

The number of students in the Christchurch International Math Olympiad Group has increased from three last year to 24.

- Raaz Sainudiin

STUDY GROUPS

For some months, a few study groups have been running and there is a corresponding new rubric added to the department home page About > Study Groups. They include reading groups and special interest groups, attended typically by the members of this and other College of Engineering departments and visitors.

- Igor Rychkov

CONFERENCES AND VISITS



BIRS Conference

Rua Murray attended a 5-day workshop on *Open Dynamical Systems* at the Banff International Research Station, 9-13 April, 2012. An "open" system is one where orbits persist only for finite time, leaving the domain of interest and rendering irrelevant the usual asymptotic objects of study in dynamical systems (attractors, invariant manifolds, invariant measures etc). The new theoretical and computational techniques presented at the meeting find application in a diverse range of areas, including oceanography, ozone hole dynamics, reliability of networks of neurons, relationship between microscopic dynamics and diffusion, efficient mixing in micro-fluids. Videos of most of the talks are available on the BIRS website:

<http://www.birs.ca/events/2012/5-day-workshops/12w5050/videos>

- Rua Murray

Conferences & Visits contin.

Nick Brettell: to present a talk entitled *A Splitter Theorem Relative to a Fixed Base* at the Third Workshop on Graphs and Matroids in Maastricht, The Netherlands, 29 July – 4 August.

James Degnan: gave a seminar talk entitled *Gene Trees in Species Networks* at the National Institute of Mathematics and Biological Synthesis (NIMBioS) at the University of Tennessee on 10 April.

Raaz Sainudiin gave a talk titled *Posterior Expectation of Regular Paved Random Histograms* (Gloria Teng, Jenny Harlow, Dominic Lee and Raazesh Sainudiin), at the Stochastic Networks Workshop, Auckland, 12-13 April 2012.



John Hannah's 'Quest'

As part of his sabbatical year, John Hannah spent March at Quest University in Canada. While there, he taught a whole course (51 contact hours in three and a half weeks) on Mathematics for Liberal Arts students.

Quest recently topped all 5 categories in Canada's 2011 National Survey of Student Engagement – i.e. level of academic challenge, inclusion of enriching educational experiences, intensity of student-faculty interaction, use of active and collaborative learning, and existence of a supportive campus environment. So it was interesting to see how differently they do things from the Canterbury way. The weather was organized to ensure minimum distraction for students (unless they were skiers) but John and his host, Glen van Brummelen (pictured above left with his son and John on a ferry to the "Sunshine Coast") still managed to visit a couple of local attractions. Top right photo shows the view from John's office.

- John Hannah

Raaz Sainudiin has been invited to co-organize IPA 2012: Intervals, Pavings and Applications, Matematiska institutionen, Uppsala Universitet, Uppsala, Sweden, 15-17 October 2012. IPA2012 is a concentrated workshop aimed at sharing and entwining several recent developments in inclusion arithmetic for machine interval experiments. The other co-organizers are Professor Warwick Tucker, research leader of Computer-Aided Proofs in Analysis (CAPA) group in Uppsala, Sweden and Professor Luc Jaulin of ENSTA Bretagne, Brest, France. Raaz has been awarded a 20-day research visitor award that covers all local expenses to work on machine interval experiments with the CAPA group. The workshop is funded by the Royal Swedish Academy of Sciences, the Swedish Research Council and Uppsala University.

Raaz Sainudiin has received a 14-day research visitor award that covers all local expenses to work on a project titled *Toward Spatially Explicit and Behaviourally Sensitive Population Pedigrees of the Rangatira Black Robins* at the Centre for Mathematics and its Applications (CMAP), Ecole Polytechnique, Palaiseau, France. He has also been awarded a Visiting Scientist award to help complete his book co-authored with Dominic Lee on Computational Statistical Experiments for November 2012. The award, from the Theoretical Statistics and Mathematics Unit of the Indian Statistical Institute, Bengaluru, India, will cover all local expenses.

PAPERS SUBMITTED

Allman, E.S., Degnan, J.H. and Rhodes, J.A.: *Species tree inference by the STAR method, and generalizations*

Degnan, J.H., Rosenberg, N.A. and Stadler, T.: *A characterization of the set of species trees that produce anomalous ranked gene trees.*

Montelle, C. (Invited submission: book chapter): *An Ocean of Knowledge Exploring the History of Mathematics in Ancient India from the inside out* (Cambridge Encyclopedia for the History of Ancient Science, Alexander Jones & Liba Taub eds, 48pp

PAPERS ACCEPTED

David, I. and Brown, J.A. 2012: *Beyond Statistical Methods: Teaching Critical Thinking to First-year University Students.* (International Journal of Mathematical Education in Science and Technology).

Harlow, J., Sainudiin, R., and Tucker, W.: *Arithmetic and Algebra of Mapped Regular Pavings* (The 15th GAMM-IMACS International Symposium on Scientific Computing, Computer Arithmetic and Verified Numerical Computations at the Institute of Computational Technologies of the Siberian Department of the Russian Academy of Sciences, Novosibirsk, September 23–29, 2012.

Moradi, M., Brown, J.A., and Hodge, M.C.: *Minimal Sufficiency in Rare Populations* (Journal of Mathematics and System Science)

Sargisson, R.J., McLean, I.G., Brown, J.A., and Bach, H.: *Environmental Determinants of Landmine Detection by Dogs* (The Journal of ERW and Mine Action). FYI, ERW stands for Explosive Remnants of War.

Stadler, T. & Degnan, J.H.: *A polynomial time algorithm for calculating the probability of a ranked gene tree given a species tree.* arXiv: 1203.0204 (Algorithms for Molecular Biology)

Yu, Y., Degnan, J.H. and Nakleh, L.: *The probability of a gene tree topology within a phylogenetic network with applications to hybridization detection* (PLoS Genetics)

PAPERS PUBLISHED

McKubre-Jordens, M. and Sainudiin, R. (eds) *Proceedings of ConstruMath South 2012: Applications of Non-classical Logic* (Centre for Discrete Mathematics and Theoretical Computer Science Research Report Series, CDMTCS-420, 2012 <http://www.cs.auckland.ac.nz/CDMTCS//researchreports/420maarten.pdf>

Williams-Tripp, M., D'Amico, F.J.N., Pagé, C., Bertrand, A., Némoz, M. and Brown, J.A. (2012): *Modeling Rare Species Distribution at the Edge: the case for the Vulnerable Endemic Pyrenean Desman in France* (The Scientific World Journal vol. 2012 (2012) Article ID 612965

MT COOK

This photo of Mt Cook was taken over the holidays by Douglas Bridges, whilst walking into the Hooker Valley.



NEWS FROM THE LIBRARY

1. A tech-happy professor reboots after hearing his teaching advice isn't working (Chronicle of Higher Education) <http://bit.ly/zHYUIN>
2. Flipping out? What you need to know about the Flipped Classroom (Inside Higher Ed) <http://bit.ly/wD7Tbi>
3. Wolfram, a search engine, finds answers within itself (NY Times) <http://nyti.ms/wTYRas>
4. New titles for Physics <http://bit.ly/wafgjA>; new titles for Astronomy <http://bit.ly/xntPcH>
5. How to: Track Down Journal Articles Cited in News Stories (When They Don't Link Directly) (Scientific American) <http://bit.ly/GXzhli>
6. Einstein Archives Online – scientific and non-scientific writings, travel diaries <http://bit.ly/GWcxc2> ca. 7,000 digitised images of Albert Einstein's writings
7. Borrowing e-books proves popular (Voxy.co.nz) <http://bit.ly/HhAnQ1> – though ironically the article shows a Kindle, a device incompatible (at present anyway) for borrowing books from libraries outside the US!
8. eBooks Sites (Christchurch City Libraries) <http://bit.ly/GYZxUP>; compatible devices <http://bit.ly/H1bZ36>
9. [Humour] Scrambled Cabury eggs (xkcd) <http://bit.ly/GZcf9V>
10. New titles for Physics <http://bit.ly/wafgjA>; new titles for Astronomy <http://bit.ly/xntPcH>
11. How to see around corners (Nature; video) <http://bit.ly/Hcrsm5>. Ultra-fast camera can create images of hidden objects using scattered laser light.
12. The Lecture May Be Irreplaceable After All (Chronicle of Higher Education) <http://bit.ly/HWv1p6>
13. Conservative Distrust of Science (Inside Higher Ed) <http://bit.ly/HQHrXJ>
14. Mirror, Mirror On The Wall, Do The Data Tell It All? <http://n.pr/HcRKRC>
15. Paul Graham, the Commons, and How Google Stopped Being Google (The Atlantic) <http://bit.ly/HQ3Gfb>
16. Beach Creatures: Theo Jansen and his Strandbeests (YouTube) <http://bit.ly/HS0xJy> Kinetic sculptures that walk on the beach.
17. New titles for Physics <http://bit.ly/wafgjA>; new titles for Astronomy <http://bit.ly/xntPcH>
18. Research efficiency: Perverse incentives (Nature) <http://bit.ly/lzV24Q>
19. How does it feel to have your scientific paper plagiarized? And what can you do about it? <http://bit.ly/JONjJ>
20. 20 Things You Didn't Know About... Math <http://bit.ly/JONBzW>
21. Weighing the costs of conferencing (ScienceNews) <http://bit.ly/HvfDot>
22. 20 Services Google Thinks Are More Important Than Google Scholar <http://bit.ly/HEnYHB>
23. [Humour] Too lazy to write it yourself? Let the Virtual Academic do it for you <http://bit.ly/HOCQ6O>
24. New titles for Physics <http://bit.ly/wafgjA>; new titles for Astronomy <http://bit.ly/xntPcH>
25. Is blogging and tweeting about research papers worth it? The Verdict <http://bit.ly/Hlw54U>
26. The Emergence of a Citation Cartel (beyond self-citation) <http://bit.ly/HUB3Px>
27. Researchers develop Bookworm-Arxiv searchable scientific journal database <http://vrge.co/JexRtM>
28. How Economics Shapes Science by Paula Stephan – review <http://bit.ly/JiUwI>
29. Astronomer: What a Space: 1999 lunar explosion would really be like <http://bit.ly/JITP7Y>
30. New titles for Physics <http://bit.ly/wafgjA>; new titles for Astronomy <http://bit.ly/xntPcH>

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