

MATHEMATICS AND STATISTICS NEWSLETTER

October 2001

WELCOME

- to Dr Yoko Watamori, from Osaka Womens' University, who will be here until September 2002. Yoko has interests in directional statistics and asymptotics. She will be working with Peter Jupp on relationships between geometry and statistics.
- to Dr. Juergen Dreher who has joined the Solar Theory Group as a Postdoc. Juergen is funded for one year by the European PLATON Research Training Network coordinated by Thomas Neukirch. He did his Diploma and PhD in Physics at the Ruhr-University Bochum in Germany. After a short period as a Postdoc in Bochum, Juergen worked for some time in the software industry in Denmark and Germany. He has done research on various topics in solar system plasma physics, and has a large experience in numerical methods. In his present position he will work on coronal heating.
- to our new crop of research students this season!
 - Joining the Solar Group we have:
 - Robert Close* who graduated from St Andrews in Mathematics (1st class) and has a CASE studentship between RAL and St Andrews to work with Richard Harrison (Honorary Professor) and Eric Priest on the solar magnetic carpet.
 - Lorna James* graduated from Royal Holloway (1st class) and will be working with Bernie Roberts on coronal oscillations.
 - Robert Kevis* graduated from Exeter University in Mathematics (1st class). He will be working with Alan Hood on MHD simulations.
 - David Pontin* graduated from St Andrews in Maths and Theoretical Physics (1st class) and will be working on 3D reconnection of magnetic flux tubes with Eric Priest.

Paul Wood gained his degree in Mathematics (1st class) from St Andrews and will be working with Thomas Neukirch on eruptive processes or particle acceleration in flares.

- Joining the Plasma Group:

Peter Burns is a graduate in Theoretical Physics from the University of Manchester and has taken up a studentship funded by UKAEA Fusion for work on radio frequency heating of spherical tokamaks. His task is to produce theory and computer codes relevant to MAST (Megamp Spherical Tokamak), a major experiment at Culham. Peter is a keen golfer, in an altogether different class from his supervisor, Alan Cairns.

- Joining the Waves, Vortices and Turbulence Group:

Robert Smith graduated from St Andrews and he has come back to work on a novel approach to weather forecasting (undoubtedly a tall order!).

- Joining the CCS (Centre for Conservation Science):

Christian Asseburg graduated in Mathematics from St Andrews. He will pursue his Ph.D. under the joint supervision of Simon Wood and Carmen Fernandez, together with John Harwood from Environmental Biology. Christian will work on Bayesian fitting of dynamic population models in the context of the sustainability and management of the Grand Bank cod fishery.

- Joining Statistics:

S. Ying Yeh and *Y. Siddiqui* who have joined the Statistics group as MSc students.

- Joining the Algebra Group:

Catarina Carvalho who graduated from Lisbon, Portugal and will be working on computational group theory in the GAP group.

Erzsebet Dombi who graduated from Szeged, Hungary will be working on semigroups. Erzsebet has won an ORS award to fund her studies.

Katrin Gehles who graduated from Bamberg, Germany and *Elisabeth Kimber* who graduated from Oxford will be joining the Algebra group as MSc students.

Nelson Silva who graduated from Lisbon, Portugal and will be studying computational semigroup theory in the GAP group.

WELCOME RECEPTION

- The School's annual reception to welcome new postgraduates will take place in the Physics Common Room at 5.15 pm on Thursday 11th October. All postgraduates and all categories of staff, old or new, are encouraged to come along and enjoy a glass or two of wine.
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CONGRATULATIONS

- to the six members of teaching staff, Graham Bell, Colin Campbell, Ken Falconer, Eddie Robertson, Nik Ruskuc and Frank Smith, who have now been accepted for membership of the Institute of Teaching and Learning through the fast track entry scheme (which saw them writing 5 essays about aspects of their teaching). It remains to be seen how this may benefit the individuals and the School!
 - to Steffen Winter, a non-graduating honours student from Greifswald, who spent the Fall 2000 and Spring 2001 semesters in St Andrews. Steffen wrote an M.Sci. project under the supervision of L Olsen. and has now had his project accepted as a Diploma dissertation at Ernst-Moritz-Arndt-Universitat in Greifswald. Steffen was invited to present his project at a conference for German Diploma students in Aarchen where he won a second prize for the project. The prize is an invitation to stay at the conference center in Oberwolfach for one week.
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NEWS

- Alan Cairns spent a week at UKAEA Fusion, Culham, in September as part of his long-term collaboration with workers there. While he was in that part of the world he was also invited to attend a meeting at the Rutherford Appleton Laboratory regarding the setting up of a Centre for Fundamental Physics. This is intended to encourage collaborations involving university researchers and staff from the various central facilities at RAL and Daresbury.
- Danielle Bewsher gave a seminar on 'Solar Transition Region Blinkers' at the Mullard Space Science Laboratory in September.

- From the 9th-15th September, the Solar Group hosted an Advanced Summer School on Solar System Plasmas in the Mathematical Institute. This was part of a series of biannual schools in the area of Solar Terrestrial Physics, aimed at PhD students in their second year, that are funded by PPARC.

The scientific objective of the school focused on plasma processes on the Sun and in the Earth's Magnetosphere, with special lectures about the Solar Wind, Planetary Magnetospheres and future Satellite missions.

The school was attended by 43 PhD students and young postdocs from around the UK and Europe, as well as 12 guest lecturers. There were sessions for the delegates to present their own work in the form of posters and oral presentations.

The school was organised by Daniel Brown, Alan Hood, Gill Gardner, Istvan Ballai, Duncan Mackay, Thomas Wiegmann and Danielle Bewsher. Local lecturers included Thomas Neukirch and Clare Parnell. External lecturers with a former St Andrews connection included Peter Cargill, Valery Nakariakov, Ian Mann, David Fearn and Richard Harrison.

- Kenneth Falconer gave a talk entitled 'Fractals - Shapes and Shadows' at the recent British Association meeting in Glasgow.
- CREEM - The Centre for Research into Ecological and Environmental Modelling - is steadily increasing its profile. Through the Research Unit for Wildlife Population Assessment (RUWPA), it hosted the first International Conference on Distance Sampling this summer, with around 80 attendees from around the world. It also ran its annual training workshops before and after the conference, with over 20 attendees at both the introductory and the advanced workshops. The distance sampling software developed by the group now has over 3000 registered users from over 110 countries, and the listserver run by the group has around 600 members. An introductory book on the topic was published by OUP just in time for the conference, and staff are making good progress on a companion advanced volume, due to be submitted to OUP next summer. Meantime, work is almost complete on an advanced student textbook on estimating animal abundance.
- RUWPA continues to attract research grants and contract work for a variety of wildlife assessment problems. These include

- two EC-funded post-docs joint with the Ecological Dynamics Group working on fisheries problems,
- surveys of Antarctic pack ice seals and North Atlantic harp seals,
- a number of projects relating to cetacean surveys from around the world, and to studies of elephants in West Africa, tigers in India, and red, roe and sika deer in Scotland.

RUWPA continues to receive rolling funding from the International Whaling Commission (IWC) for advice and analyses of cetacean survey datasets, much of which concerns the issue of Antarctic minke whale abundance. Recent estimates of abundance have been surprisingly low, and the interpretation of these estimates is generating controversy in the IWC and beyond.

RUWPA staff continue to be involved in a wide range of international meetings in the field of population assessment, and recent research collaborations have involved scientists from Australia, West African countries, Portugal, Germany, Spain, France, Norway, Denmark, Iceland, the USA, Canada, Ireland, and the UK.

- The Ecological Dynamics Group has so far attracted 5 years of NERC postdoctoral funding for Dr. Liz Clarke for the statistical side of a multi-disciplinary project investigating large scale physical/biological dynamics of calanus populations across the North Atlantic. Calanus is a key climate change indicator and dominant zooplankton species across much of the North Sea. At the same time Syngenta-funded postdoc Vasya Demyanov is producing improved impact assessment methodology by combining statistical and population dynamic approaches to modelling, while EC-funded postdoc Mike Lonergan and PhD student Camilla Dixon are working on Fisheries assessment problems. The EC fisheries work has so far resulted in a package mgcv, for improved Generalized Additive Modelling methods that has been adopted as a core part of the statistical language and environment R (Gnu S), which is currently becoming the statistical computing language of choice across much of the applied statistics community. Members of the Ecological Dynamics Group were out in force at the Royal Statistical Society meeting in Glasgow in June, with talks given by Camilla Dixon, Liz Clarke and Simon Wood. Simon Wood has recently joined the NERC Marine Science Peer Review Panel and the Steering group for the joint EPSRC/NERC program in Environmental Mathematics and Statis-

tics.

- The Centre for Conservation Science (CCS), a joint Centre between CREEM and biologists at Stirling, is well into its first year, and making progress on a range of projects, including: range expansion of sika deer in Scotland, and their likely impact on native red deer; management of *Rhododendron ponticum* in Scotland; management policy for mink in the Outer Hebrides; hen harrier / red grouse interactions on Scottish moors; modelling UK grey seal population dynamics, and their effects on salmon; modelling Canadian harp seal dynamics, and their impact on cod.
- CREEM staff are also heavily involved with the new MRes degrees in Environmental Biology. In the first year of these two degrees run jointly with Dundee, 14 students have registered.
- In a series of Wednesday afternoon sessions through October, Carmen Fernandez is training a number of CREEM staff in the use of Markov chain Monte Carlo methods.
- CREEM (which includes the St Andrews unit of CCS) is already benefiting from the SHEFC infrastructure award, through hiring Phil Le Feuvre as computing officer and Cathy Brown as secretary, and through the purchase of equipment. Work is expected to start in November on the Scott Lang Building, to provide a tailor-made location for the Centre (which will also ease the critical space problems we are currently experiencing in the Mathematical Institute). The Centre will include a pc classroom and a seminar room with video-conference facilities, and a resource room to facilitate interdisciplinary research projects. The move of CREEM staff to the Scott Lang is tentatively scheduled for February.
- In September the Algebra group was visited by Professor Sinisa Crvenkovic from the University of Novi Sad, Yugoslavia. Professor Crvenkovic and Nik Ruskuc continued a long-standing collaboration by solving a crucial special case of an old open problem called Berman Conjecture, which they started investigating in Nik's student days in Novi Sad. Professor Crvenkovic also delivered two lectures. The visit was funded by an LMS grant from the International Short Visits scheme.
- Edmund Robertson was an invited participant at the Computational Group Theory meeting at the Mathematisches Forschungsinstitut Oberwolfach, Germany from 29 July 2001 to 4 August 2001. Former members of the

School, Werner Nickel and Goetz Pfeiffer were also invited participants at this meeting.

- Groups St Andrews 2001 was held in Oxford from 5 August to 11 August 2001. This was the sixth in the series of four yearly Groups St Andrews conferences organised by Colin Campbell and Edmund Robertson. There were around 250 participants at the conference. Isabel Araujo, Peter Campbell were among the participants. At the Conference dinner, an invitation was extended to all the participants to come to St Andrews for Groups St Andrews 2005.

Edmund and Colin began a joint research project with George Havas (Queensland) during the Oxford Conference and the collaboration continued during the following two weeks when George visited St Andrews. George continued his round the world trip, flying out of Boston two days before the terrorist attacks.

- Peter Jupp visited the Open University for a few days in September for discussions on differential geometry in statistics. While there, he gave a seminar on ‘Applications of Directional Statistics in Astronomy’ to a mixed audience of statisticians and astronomers.
 - Thomas Neukirch attended the 4. MHD Tage (MHD Days) at the Ruhr-University Bochum on 1st and 2nd of October. Thomas gave an invited talk with the title ‘MHD equilibria: Solar and astrophysical applications’. The meeting is the German equivalent of the annual UK MHD meetings. A very interesting part of the meeting covered the use of MHD in industrial applications and the status of present laboratory dynamo experiments. He also gave an interview on the influence of solar magnetic fields on our daily life for a German radio science programme. Although only science related questions were asked, Thomas is not sure whether he might have been picked out of a total of 30 participants due to his association with St. Andrews...
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SEMINARS

- Solar Group Seminars (Math. Rm 3B - 1.30pm)
 - Wednesday 10 October: Eric Priest, “Magnetic Reconnection and Coronal Heating”
 - Wednesday 17 October: Bernard Roberts, “MHD Waves”
 - Wednesday 24 October: Slava Titov (Ruhr-University, Bochum), “Equilibrium and Structure of Twisted Configurations in Sigmoidal Flares”
 - Wednesday 31 October: Thomas Neukirch, “MHD Instabilities”
 - Statistics Seminar (Math. L.T. C - 2pm)
 - Friday 26 October: Dr. Guy Nason (Department of Mathematics, University of Bristol), “Bayesian Wavelet Shrinkage With Confidence”
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NEXT ISSUE

- Please send any material for the next newsletter to mcsnews@mcs by 12pm Thursday 8th November.