

OCIAM NEWSLETTER

October 2007

EDITORIAL

OCIAM, at the threshold of a new academic year, rages with new blood. No fewer than five new faculty have joined our ranks: Tom Witelski, Mason Porter, Sarah Waters, Paul Dellar and Jim Oliver. Two of them are pre-replacements for the imminently retiring Ockendons, who, despite this, do not show any signs of leaving the building. Much to this editor's smug satisfaction, the other three are replacements for the upgraded Andrew Fowler, who has taken five years' leave of absence to bolster the creation of MACSI, The Mathematics Applications Consortium for Science and Industry (<http://www.macsi.ie>) at the University of Limerick. Rather than advect, he has decided to diffuse, and will henceforth maintain a virtual, indeed quantum mechanical, presence in both Limerick and Oxford.

Research in OCIAM blusters relentlessly onward and upward. But with any such endeavour, a strong teaching programme is essential. Although it has been some time in construction, there is now finally a coherent path through the Oxford mathematical syllabus for the aspiring physical applied mathematician. The third and fourth year courses are also extremely popular amongst undergraduates, and indeed, applied mathematics has become very strong in the curriculum. The latest pillar in the edifice is the new fourth year course, Topics in Fluid Mechanics, which represents the first Oxford course in fluids in the fourth year. For some, this is not before time. For others, it may be a waste of time. But it is marketable; thirty-four undergraduates are currently enrolled in the course.

One of the more dramatic events of the summer was the flooding of Gloucestershire and Oxfordshire in July (see picture). The River Ock, amongst others, burst its banks in Abingdon, and its venerable namesake threatened to burst his, wandering the vaults of OCIAM, demanding that the Geoscience group get on with organizing a workshop on flood management and prediction. This we hope to do next term.



The Thames in flood near Radcot. The water is flowing *from* the field to the left over the (hidden) roadway into the Thames at right.

FUTURE EVENTS

62nd ESGI (European Study Group with Industry) University of Limerick (21st January- 25th January 2008). If you are interested in bringing a problem to the study group then please contact macsi@ul.ie or go to <http://www.macsi.ie/esgi62/>

63rd ESGI (European Study Group with Industry) University of Twente (28th January - 1st February 2008). If you are interested contact swi2008@math.utwente.nl or go to <http://wwwhome.math.utwente.nl/~swi2008/>

MISG2008 (Mathematics in Industry Study Group) University of Wollongong (28th January - 1st February 2008). To register visit <http://www.uow.edu.au/informatics/math/research/misg/index.html>

UK ESGI 2008 (European Study Group with Industry) Heriot-Watt University (7th April- 11th April 2008). If you are interested please go to <http://www.ma.hw.ac.uk/esgi08/>

ECMI 2008, 30 June-4 July 2008
University College London
15th European Conference on Mathematics for Industry <http://www.ecmi2008.org/>
Deadline for mini-symposia proposals: 30 November 2007.

66th ESGI (European Study Group with Industry) Technical University of Denmark, Kongens Lyngby (18th - 22nd August 2008). If you are interested please go to <http://www.ma.hw.ac.uk/esgi08/>

The Alan Tayer Lecture
sponsored by
The Smith Institute

Prof Ian Stewart FRS

Mathematics Institute, University of Warwick
'Symmetries in Biological and Physical Networks.'
5pm on 26 November 2007 in the Bernard Sunley Lecture Theatre at St Catherine's College.

VISITORS

Christopher Matthews visited John Norbury and Graham Sander, 6 May-6 June, 2007.

Natalia Vasylyeva visited John Ockendon from Max-Planck Gesellschaft, Leipzig, May 9-June 9, 2007.

Graeme Wake visited Sam Howison and Jon Chapman, 25 June – 13 July 2007.

Lorenzo Fusi visited John Ockendon from Dipartimento di Matematica "Ulisse Dini", Firenze, Italy, 26 June – 6 July.

Professor L. Mahadevan visited John Ockendon and OCIAM colleagues from Harvard University, 1-7 July 2007.

Michael Gratton visited Tom Witelski from Duke University, USA, September 14-18 and September 21-28, 2007.

Roger Cropp visited John Norbury from Griffith University, Queensland, 19 September – 7 October 2007.

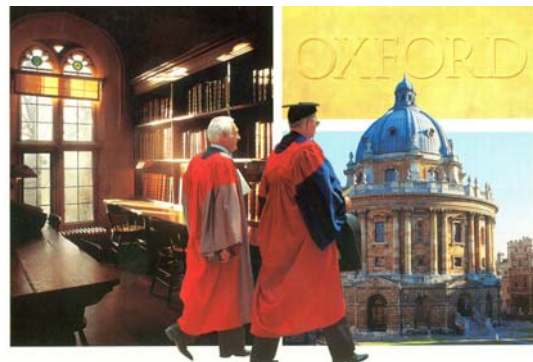
Maria Aguearas visited Jon Chapman from Uiveritat Politecnica, Barcelona, Spain, 19 September – 4 October 2007.

NEWS

Publications

John Allen has contributed to a book entitled "Magnetohydrodynamics: Historical Evolution and Trends", edited by S. Molokov, R. Moreau and H.K. Moffatt (2007, Springer).

John can also be seen below, together with a previous Master of University College, striding across the cover of an Oxford Calendar for 2008.



OCIAM & CMB v. Comlab 2007 Cricket Match

This year's cricket match against the Computing Laboratory took place on 27th July at Jesus Cricket Ground. There was a last-minute change of venue because the extreme weather of the previous few weeks meant that Corpus Christi's ground was 30cm under water. We were lucky to find a free ground at such short notice, and it was observed that we clearly have a friend in Jesus...

On the day of the match the sun was shining, and the Pimm's was being ladled out freely. The caterers had supplied more meat for the barbeque and salad than mathematicians and computer scientists together could consume, and of course there were strawberries and cream for those craving the taste of summer, even if it just lasted a day.

The match itself saw the OCIAM and CMB team batting first, notching up a respectable total of 92 runs, with man of the match Chris Bell making an impressive contribution of 32 (retired). The Computing Laboratory batsmen responded with some heavy hitting in the middle order, but ultimately the OCIAM and CMB bowling attack won through and

the opposition were bowled out for a total of 59 runs, making OCIAM and CMB the winners for the second year running. The man of the match was Chris Bell.



Thanks in particular are due to D. E. Shaw, who sponsored the event, handed out T-shirts and Rubik's cubes, and, with the charming help of Orla Sander, information booklets.

Clare Bailey and Dave Hewett

Feather Report

The Thirteenth Oxford/Cambridge applied maths tournament, aka the Woolly Owl competition, was held in Oxford on June 14th. Intense and vigorous presentations were made by the following young researchers:

Cambridge: Sunny Chiu-Webster, Dominic Vella, Sujoy Ganguly, Andrew Wells, Francois Berrier, John Rudge, Silas Alben, Euan Spence, Berry Groisman, Anders Hansen.

Oxford: Gareth Jones*, Andrejs Novikovs*, Ian Hewitt*, Eric Yu*, Patrick Hewlett*, Dan Nicolau, Robin Wordsworth, David Knezevic, Nick Hale. (OCIAM members starred).

The totally unbiased judges this time were Professors Jean-Marc Vanden-Broeck (UEA, now UCL) and David Parker (Edinburgh). We are delighted to report that they decided that the Owl should roost in our trophy cabinet for a fifth and sixth consecutive year. Rumour has it that the score now stands at Oxford 5, Cambridge 3, the event having been non-competitive from 1983 until 1993 when Prof. Grisha Barenblatt intervened.

I have records going even back to the 1983-93 period, when names like Moffatt, Gill, Batchelor, Tayler and, of course, Crighton were prominent, but I can find no one with perfect memory concerning the owl roost (a website says Cambridge won in 99, 01 and Oxford thereafter). Any information would be gratefully received.

John Ockendon

Gold medals Galore

Three members of OCIAM have now been awarded the IMA Gold Medal – Alan Tayler, John Hammersley and John Ockendon.

John was presented with his medal on June 26th by Peter Grindrod, President of the IMA. John then gave the IMA summer lecture on “Stimulating Mathematics in Industry”. He started by paying tribute to the way his career has been influenced by the two people who were awarded the first IMA Gold Medal in 1982 – Alan Tayler and James Lighthill. He then illustrated the way industrial applications have led to new developments in mathematics and extolled the joys of Study Groups with Industry. On a more sober note he remarked on the lack of recognition that those pursuing research in Mathematics-in-Industry face within conventional mathematics departments. Nevertheless the speed with which the subject is being taken up by countries around the world is very encouraging.

The full text of his lecture will be published in the IMA's “Mathematics Today” early in 2008.

Congratulations to Graham Sander

Long term visiting fellow Graham Sander from the Department of Civil and Building Engineering at Loughborough University, has recently been promoted to the position of Professor of Hydrology.

Nursery Corner

To **Miriam Cisneros Molina** – a baby girl born on 1st June 2007, called Sofia Cisneros-Gomez.

Damien Challet would like to announce the birth of his son, Bertram (below), who was born on the 5th September. He was about two pints and a sherry glass tall and weighed four pints (including the glass).



Challet baby theory.

Book grants for students

Thanks to Springer for giving OCIAM a grant for books for DPhil students. Last year 8 first and second year students benefitted from this scheme which allows them to choose any book from the Springer Maths list.

30 year reunion

The MSc in Mathematical Modelling and Scientific Computing is 30 years old next year. We are planning a celebration on Sept 5, 2008, to which all former students on this course and the MSc in Applied and Computational Mathematics will be invited.

If you would like to be included please contact Helen Lowe on loweh@maths.ox.ac.uk

Maths-in-Industry at Government level

It is encouraging that as powerful an organization as the OECD (Organization for Economic and Cultural Development) should have targeted mathematics-in-industry as part of its Global Science Forum. This apparently came about because of the recognition at high political levels of the ever more important role played by mathematics in boosting national economics. Around 50 delegates from 15 of the 22 member countries attended a broad brush meeting organized by Prof W Jaeger in Heidelberg in March, and following a further smaller meeting in June, a 30 page report has been written. Sources close to the panel say that this report will say many good things about Study Groups and workshops, national and international collaboration; it will also highlight the difficulties faced by interdisciplinary researchers working in traditionally oriented maths departments.

ECMI 2008

You are all encouraged to attend the ECMI biennial conference – last held in the UK in 1988. We have an exciting list of plenary speakers (see below) and we plan a strong industrial presence – particularly from the financial district in the City of London. Please think about organizing a minisymposium at this conference – the deadline for proposals is 30 November.

Plenary speakers:

Andrea Bertozzi, UCLA
Benoit Desjardins, Ecole Normale Supérieure, Paris
Manuel Doblare, Universidad de Zaragoza
Ioannis Karatzas, Columbia University
Miguel Moscoso, Universidad Carlos III de Madrid
Colin Please, University of Southampton
Mario Primicerio, Università degli Studi di Firenze
Yongji Tan, Fudan University
Jonathan Tawn, Lancaster University
Nick Trefethen, Oxford University

Mathematics in the lakes

The Lodore Falls Hotel on Derwent Water in the Lake District was the venue for a first study group on 'Applications of mathematics in the geosciences'. Funded by a grant from the EPSRC, 25 participants met to discuss five different problems in a workshop format. These were: grounding line dynamics, river meandering in bedrock channels, biodegradation of organic solutes, mechanics of river-mouth bar formation, weathering on rock and building stone,



and were led respectively by Duncan Wingham, Colin Stark, Steve Banwart, Vaughan Voller and Heather Viles. The hotel was good, if slightly non-plussed. The workshop was by all accounts good too.



View on the excursion looking back down the Borrowdale valley.

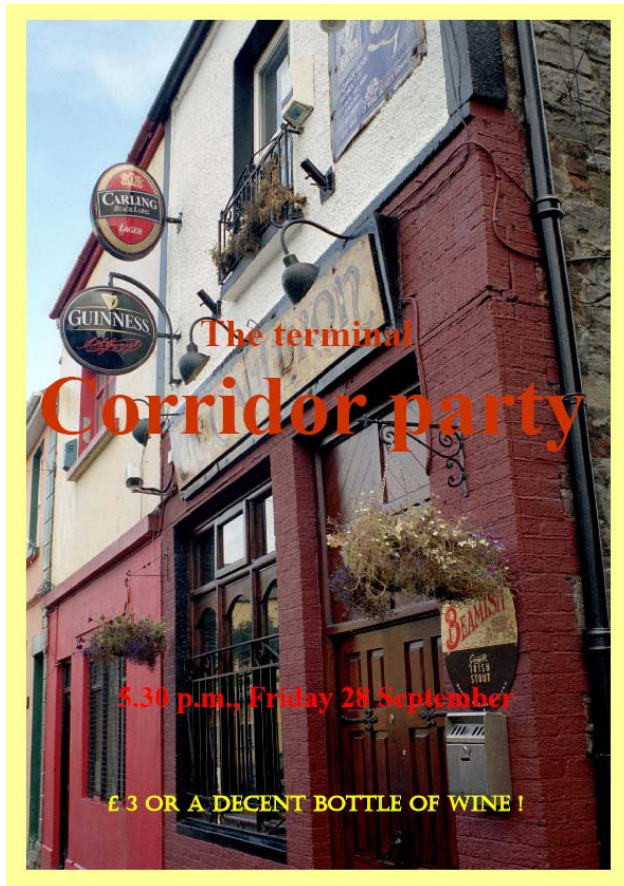
The necessary non-academic festivities included a barbecue, a boat trip and reception (too little champagne though) on Derwent Water, and an afternoon excursion up the valley to a tarn beyond Seathwaite, the wettest place in England (see group photo), ably led by John Boardman, whose patch this is.

ICIAM2007

Ten members of OCIAM were among the 3000 odd attendees at the 7th International Congress for Industrial and Applied Mathematics in Zurich in July. The group consisted of Jon Chapman who was on the scientific committee, 4 other faculty members, 2 postdocs and 3 students. A number of talks were given and attended. In particular Hilary and John Ockendon ran a minisymposium on Study Groups and a report on the resulting discussion will appear in the October issue of the SIAM Newsletter – one conclusion was that the website www.math-in-industry.org should be upgraded to enhance communication between members of the maths-in-industry community worldwide. If you have any

ideas about this please contact Hilary on ockendon@maths.ox.ac.uk. Despite flights home being cancelled/disrupted due to 'severe flooding in London', we did all manage to get back home; some via Docklands and others via several feet of water.

Corridor parties



The poster for the most recent DH corridor party.

A long-standing feature of the elevated intellectual atmosphere on the third floor of Dartington House is the occasional occurrence of corridor parties. Accompanied by an eclectic but entirely suitable pot-pourri of musical tapes, wine and gorgeous nibbles are guzzled in a quietly genial atmosphere in the corridor outside the offices. Originally designed by the inestimable Bruce Malamud, the posters for these parties are now highly prized, not least by their current creator (me). In my new role as omnipresent guru in Limerick, I have been put in charge of corridor parties there, too. The corridor parties will continue in OCIAM of course, health and safety willing. Perhaps, like the Study Groups, they will be exported round the world, forming a global template for the genial contemplation of things academic, late on a Friday afternoon.

Andrew Fowler



Third floor corridor party, with some gatecrashers.

TRAVEL

Oxford to Cambridge by bike, again

The splendidly named Nim Arinaminpathy is a serious cyclist who is also an ex-OCIAM graduate student. With his sister, the equally splendidly-named Yalini, he enticed Andrew Fowler and Heike Gramberg to cycle to Cambridge on the annual British Heart Foundation charity bike ride. Andrew did this on his own two years ago (and back the next day). The distance over winding roads and picturesque hills is 89 miles.



Dawn breaks outside the King's Arms. Not open, alas. Andrew, Nim and Yalini. Photo by Heike.

You rise at dawn, and set off at 7 a.m. at a brisk but sedentary pace down the Banbury Road, and stop for chocolate bars, tea and leg-stretching several times. The best stop is at 60 miles, where there is a pub, where we had lunch, and at least one of us had two necessary pints of Abbot ale. Apart from Nim, who whizzed along at breakneck speeds, the rest of us plodded, being serially overtaken by variously professional-looking fatties with Popeye-sized calves, pumping their grotesque legs round in some minuscule gear. Heike and I sailed serenely into Cambridge, where Nim had been for ages; Yalini didn't quite make it, and arrived in a pick-up bus. We got there at a quarter to six, put our bikes on the truck, got on the coach, and two hours later were back in Oxford. Seemingly pointless, it is an excellent bike ride, and very well organised.

Andrew Fowler



First drinks stop at 25 miles. Heike and Nim. Photo by Yalini.

Karthaus and Vernagtferner

Following in the footsteps of several past OCIAM students, Ian Hewitt accompanied Andrew Fowler in September to a summer school on 'Glaciers and ice sheets in the climate system' at Karthaus, a beautiful little village located high in the Tyrolean alps of northern Italy.

This has been a regular fixture in the glaciological calendar for the past decade and it is easy to see why it is so successful. Ten days of lectures from experts in all fields of ice and climate modeling - the editor amongst them - taught the 30 odd students a great deal and led to many stimulating discussions, these helped along no end by the splendid and apparently inexhaustible supply of local food and wine.

Not to be underestimated beside the lectures and accompanying exercises, the summer school also provided an invaluable opportunity to meet fellow students from across the globe, hopefully laying the seeds for further interaction and research in the future. A great sense of community was built up among the group - aided by many coffee time games

of frisbee and football, morning walks up the nearby hill, and post-bar relaxation in the sauna! Whether one likes the term or not, 'networking' is an important part of our work and this sort of course provides an unrivaled opportunity which I thoroughly recommend to anyone interested in glaciology.



A view from inside the subglacial tunnel beneath Vernagtferner. Note the scalloping of the ice roof. (See P.N. Blumberg and R.L. Curl, Experimental and theoretical studies of dissolution roughness, *J. Fluid Mech.* **65**, 735-751 (1974).)

Of course no trip to the alps would be complete without an excursion, and our haul up to the Italian-Austrian border allowed views north to a famous glacier, Vernagtferner - the site, two weeks previously, of a workshop on glacier hydrology. Attended by the same third floor OCIAM team, three days of talks were followed by an excursion to view the glacier and its monitoring programme. 150 years ago this glacier would 'surge' and dam a neighbouring valley, eventually releasing a catastrophic outburst flood on the towns below. Its retreat since that time must almost be seen to be believed, but thankfully there is still some ice left - enough for us to walk beneath, through a subglacial meltwater channel - a wet but unforgettable experience!



Ian Hewitt (on Vernagtferner)