

OCIAM NEWSLETTER

April 2006

EDITORIAL

This term's newsletter comes somewhat late on account of your editor's collapse with pneumonia while leading the second annual OCIAM expedition to Doolin, Co. Clare (for an account of which see below). Arguably, such diseases are brought on by the incessant stress of working in a top level applied mathematics group in a university which sometimes seems unaware of its indigenous talent. There was no doubt that the major stress of the last term was that accompanying the appointment of the Reader in Applied Mathematics, a job designed to be the pre-replacement for the imminently retiring John Ockendon. We are delighted to announce that Tom Witelski, Professor of Mathematics at Duke University, has been appointed, and will take up his Readership in October 2007. This appointment was a matter of some interest, bringing as it did the wolves to the throat of applied mathematics in Oxford. Luckily, our fearless knights, Sam Howison and Jon Chapman, were able to fend off the powers of darkness, and with renewed strength, they will lead us forth to ever greater deeds in the future. Ashen-faced and weary-limbed after the battle, Sam emerged victorious wearing the OCIAM ring of power, without which the battle might well have been lost.

FUTURE EVENTS

24-27 April 2006

British Applied Mathematics Colloquium at Keele University.
Register at <http://www.keele.ac.uk/depts/ma/bamc06/>

12-16 June 2006

MPI 06 at Olin College USA
The Twenty-Second Annual Mathematical Problems in Industry Workshop
Register at <http://projects.olin.edu/mpi2006/>

16-20 June 2006

CIAM-MITACS Joint Annual Conference
York University, Toronto
Register at <http://www.mitacs.math.ca/AC06/>

10-14 July 2006

UNIVERSITY JUAN CARLOS III DE MADRID
The 14th European Conference on Mathematics for Industry 2006
Register at
<http://congrega.fund.uc3m.es/ecmi2006/home.asp>

14-16 August 2006

57th European Study Group with Industry, Technical University of Denmark
<http://www.mat.dtu.dk/ESGI/57>

4-8 December 2006

Study Group on Industrial Applications
City University Hong Kong
Further information to follow

Nomura Lecture

Professor Stephen Ross, Franco Modigliani Professor of Finance and Economics, Massachusetts Institute of Technology

Behavioural Finance

A Tale of Two Anomalies

Tuesday 18 May 2006 at 5.00pm in the Nelson Mandela Lecture Theatre, Säid Business School, to be followed by a reception in the foyer

BIRTHS AND MARRIAGES

To Tiina Roose and Dave (Mr Tiina) a bouncy baby boy, Maximilian, 8lb 9oz (phew!). An honorary Irishman, as labour took place throughout St Patrick's Day.

Marriages: none to report.

COMINGS AND GOINGS

William Shaw, victor in the inaugural OCIAM debate but mortally wounded in the battle, has succumbed to the pressure and gone off to be Professor of Mathematical Finance at King's College, London.

Aytac Ilhan has followed Rob Hinch into the netherworld of Goldman Sachs.

Pat Hagan, frequent past OCIAM visitor and, memorably, the man who solved the diffusion equation for Beecham's, has moved from the U. S. to London to work for Brevan Howard in the City, where he joins ex-OCIAM student Carlo Smith.

VISITORS

Maria Agueiras is visiting Jon Chapman from 16 January to 16 June. She is from the Università Politecnica de Catalunya, and is working on spiral waves in the complex Ginzburg-Landau equation.

Michael Mackey from McGill University visited Andrew Fowler from 24 January to 7 March. He works on problems in mathematical physiology.

Tom Witelski (Reader-elect) visited Jon Chapman from 28 February to 14 April. He is on the faculty of Duke University, and worked on exponential asymptotics amongst other things.

Yoshihisa Fujimoto is on sabbatical in OCIAM from April 2006 to March 2007, from Meiji University in Tokyo. He works on dynamical systems.

Joan Sola Morales from Universita Politecnica, Barcelona is visiting Hilary Ockendon from 1 March

to 31 May. He works on partial differential equations, and is here to find out about Mathematics in Industry.

NEWS

Study Group 2006 at Bath

As the pinnacle of the applied maths calendar, this year's expedition to Bath for the annual study group was billed to those new to the experience as an insane week of maths, beer and very little sleep. However, due to Chris's Breward and Bell's observance of a Lenten alcohol ban, the absence of the usually sociable Southampton crowd (which also led to a pitiful number of entries in the Colemanballs competition), and a few other notable exceptions, the week quickly degenerated into a mass bridge playing occasion with several new members initiated into the OCIAM lunchtime group. Whilst there were an impressive ten problems, there was only one physical continuum problem, so most of the OCIAM students found themselves working on wax deposition in oil pipelines. This proved to be a formidable problem, and a significant amount of time was spent in the library looking up references on turbulent boundary layers, followed by lots of people standing around going "ermmm...". After three days of this, and an impressive bit of blagging at the Wednesday afternoon progress update, a shout went up from the back of the room, "I've done it!", and so that was that. The highlight of the week however was definitely "The Liquid Nitrogen Show" which, as might be expected, involved lots of things being frozen with liquid nitrogen. The finale of the show was definitely the most impressive, involving a small amount of soapy water which, when the nitrogen was added, led to an explosion of bubbles much to the consternation of people in the front row. All in all a successful, if rather quieter than usual, study group; roll on Nottingham 2007!

Rosemary Dyson

Buckland Day

The 17th of March is not only St. Patrick's Day, but also (this year at least) Buckland Day. Some 30 British glaciologists rolled up to OCIAM for a one day meeting on subjects ranging from the formation of drumlins to the pulsatile floods from the Antarctic Ice Sheet. Ably and amply

supported by the wizard Dartington House staff (Ruth, Laura, Mike, and their merry men) who provided coffee, lunch, tea and Guinness in abundance, the meeting engendered much discussion and was an unqualified success. At 6 p.m., we repaired rapidly to the Lamb and Flag (a much improved pub these days), and thence to Corpus Christi music room for champagne and an eclectic selection of music. Thence to dinner, and thence to the SCR for mellifluous talk into the small hours, washed down by port, Black Bush and Armagnac. Those of us staying overnight reassembled for splendid bacon and egg the next morning, and then spent Saturday morning solving a few more science problems. And Buckland? Fellow of Corpus Christi in 1808, first Oxford Professor of Geology and Mineralogy, discoverer of the Megalosaurus, supporter of Agassiz in his advancement of the Glacial Theory; see <http://www.oum.ox.ac.uk/learning/pdfs/buckland.pdf> for more information.

Doolin expedition 2006

March 2006 saw the second annual expedition to the West of Ireland. The trip was a success, with plenty of Guinness-fuelled merriment and adventure. This year's team was captained by Andrew Fowler and included Sophie Nowicki (from UCL), Rachel Zammett, Chris Bell, Marcus Tindall and Gordon White. See the photo of the participants, washed up on the rocks.



Having arrived in Ireland and taken the obligatory stop off at Durty Nelly's for refreshment, we set off to meet the mathematicians from the University of Limerick. Gordon and Rachel gave two short talks (on sellotape and Mars), and then Stephen O'Brien was our host for the evening, doing a fine job of showing us the delights of downtown. Sophie was in high hopes as her horoscope had promised her an evening of romance and excitement. She was not to be disappointed as later that evening she had the chance to assess the state of an Irishman's plumbing!

The following day we set off for Doolin and Andrew was looking forward to putting his hired car (Fiat Panda) through its paces. Judging by its handling abilities, the Panda proved to be aptly named. Despite this, we still got there in reasonable time.

Upon arrival, it wasn't long before we had the peat fire going and had started the cooking. The cooking was great fun and every dish was prepared straight from fresh ingredients (no sauces from jars during this trip!). Marcus took command in the kitchen and provided a wealth of cooking tips to his happy helpers.

We spent the evenings either reclining in front of the fire or in the local pub where we would find live Irish music and plenty of tasty Guinness.

Between all the drinking and dining we did get up to a few other activities during the week. These included some sight-seeing, some walking and climbing and even some working. Marcus practised his cello, Rachel did some crosswords and Chris managed to arrange a liaison with a special Irish maiden!

All in all a very good trip.

Gordon White

Froudian slip

A number of speakers in OCIAM over the last year have been buffeted more than usual by the (usual) vituperative audience in the matter of pronunciation. Carina Edwards (in a seminar), Rachel Zammett (in her first year presentation) and David Mohrig of M.I.T. (in a workshop) all dared to pronounce the Froude number as Froud. The response of the OCIAM audience is immediate and abrupt. "Frowd", barks Oberfuehrer Ock, "I think you'll find that's Frowd", admonishes the gentle Sam. Only John Bush

in front of an audience of four hundred in St. Catherine's College escaped the bray of censure, as his insects skated over the surface of the pond at (presumably) low Froude number, mysteriously using surface tension to crawl up menisci (what a useless pastime).

The second floor of OCIAM must be the only place in the universe where anybody pronounces Froude as 'Frowd'. Uncaring of the opinion of the entire world population, Webster's dictionary, B.S. Massey's 'Measures in Science and Engineering', and sundry other points of opinion, the OCIAM masters of applied mathematics preach their lore to an unhearing world. What, you say then, of the Slovenian Plemelj, famously mispronounced by Alan Tayer; what of Dirichlet? Meanwhile those of us who do hydraulics will surreptitiously nurture our Froods, knowing that the rest of the world smiles on us.

Andrew Fowler

La Rochelle

John Ockendon and John Hinch from DAMTP spent a pleasant (well, pleasant if you did not overindulge on the oysters) two days in La Rochelle, where an informal Study Group on oil spills in the sea and rivers was admirably organised by Frederic Muttin. The key mathematical modelling is that of a layer of oil, and which may be a centimetre or so thick and 10^5 times as viscous as water, and which is driven by currents against a retaining boom. The boom is roughly cylindrical, of 50 cm in radius, and has a vertical skirt 175 cm in height beneath to prevent leakage of (possibly emulsified) oil. Any design improvement is to be welcomed when in even the most recent spills, 35% oil retrieved is a good result.

Indo-UK Study Group

Jon Chapman, Peter Howell, Tim Myers from Cape Town (ex OCIAM), Andrew Lacey and John Ockendon were entertained regally at the most recent Indo-UK Study Group, organised magnificently by Danesh Patel at the Maharaja Sayaji University of Baroda in Gujarat. Even though the State is normally dry and mostly vegetarian, the food is utterly

delicious and foreigners can legally obtain alcohol if they know where to go.

The problems ranged from transformer modelling (a tremendous homogenisation challenge involving thousands of steel laminae $\frac{1}{2}$ mm thick surrounded by thousands of coils of comparable size operating at frequencies up to Mhz), to bank modelling of a kind not studied in the Nomura Centre: the need in the Indian Cooperative banks is to devise a sustainable strategy in which bank managers who are not allowed to deal in fancy instruments are woken at midnight by farmers desperate to withdraw deposits. There were great problems concerning dam spillway management, fuse blowing and stresses in tyres, and Jon was even able to get some work on protein folding started. India is definitely the country where Study Groups generate the most enthusiastic and warm collaborations (in 38 degrees centigrade too). Next time it will be Bangalore July 2007.

Scholarship

Ashley Pitcher just received a Natural Sciences and Engineering Research Council of Canada Postgraduate Scholarship for doctoral studies in Mathematics, tenable at the University of Oxford. The amount of the award is \$21,000 (Canadian dollars) per year for three years beginning in May 2006. Ashley has also been given an ORS award for 2 years.

Angling news

Cod fishing comes but once a year and this season came upon us on November 19th last year. With a fishing crew made up mostly of members of Balliol College, the OCIAM contingent was lead by Geoff Evatt, chief codder and founding member of the expedition, with Andrew Fowler and myself in support, neither of whom know anything about cod fishing. Chasing cod is no laughing matter - you have to be dedicated. It entails an unfeasibly early start in the morning, meeting in the pitch black outside Balliol College before the birds have even begun to think about the dawn chorus. Then a harem scarem drive through the darkness down to Southampton, stopping to load up on what seemed like a tonne of slimy squid for bait, furnished by Geoff's father, who very selflessly agreed to get up early to meet us even though he wasn't even coming on the trip. Finally we reached the sea to be greeted by the famous Cod Father, Ron Bundy.

All a bit bleary-eyed after the drive, we mustn't have looked the most enthusiastic fishermen, apart from Geoff who was bouncing around with excitement and already had his professional-looking fishing overalls on. We had two boats, so we split up into two teams to have a proper fish-off, the penalty for losing being the drudgery of serving the other team dinner in the evening. It was idyllic when we set off from the harbour, the rays of the rising sun glinting off the smooth undisturbed sea water. Out past the Needles, which rose spectacularly on our left, the sea began to heave more noticeably, as did some of the fishermen, the peaceful ambience of the deep sea interrupted occasionally by some violent retching noises. When we reached the spot where the cod were supposed to be swimming through, we had a quick fishing lesson and dropped our lines over the side. Apparently there is some skill in attaching the bait - you are supposed to attach it so that it looks like a live squid swimming in the current. Bobbing up and down, anchored against the current, we reeled in the occasional dogfish, which you only eat as a last resort, so we threw them back in. They are an interesting fish; a member of the shark family, they have the distinctive dorsal fin. Their skin is unusual too. If you rub it one way, it is totally smooth, whilst if you rub it the other way, it is as rough as sandpaper.

Lunchtime led to all of us on my boat staring wistfully across at Andrew's boat. Andrew, as to be expected, had come properly equipped for lunch, with delicious cheeses and French bread, and even a couple of bottles of fine wine. Our boat had to content themselves with sausage rolls from the service station and a bottle of mineral water. Mind you, there were a couple of people there who couldn't have faced eating anything. After lunch the competition heated up, both boats reeling in a number of dogfish, but still after the elusive winning cod. Eventually we did at least land an edible fish, Tom Brightwell catching a reasonably sized whiting. This proved to be the only edible fish caught all day, and after shifting our pitch for one last ditch attempt for a cod, we decided to raise our anchors and head back just as the sun was dipping towards the horizon. Again spectacular views of the Needles silhouetted against the low sun.

It was only when we got back that I realised how cold I was and how much I stank of fish - not fish that we had caught, but the squid that we had been using as bait. We had a quick debate as to whether we should

buy additional fish for the dinner in the evening, or we should just use the one whiting that we had caught. The general consensus was that as the dinner was supposed to be comprised of our hunting spoils we should serve one fish. Racing back along the motorway, we all hared off to get changed into our black tie and start cooking for dinner. The girls were arriving for pre-dinner drinks at around seven, so we had to get the cooking started quick smart. After a lot of frantic activity, and a scare over how we were going to serve coffee without cafetieres (my fault, as I was supposed to organize people to bring them), we managed to put a delicious five course meal on the table, with silver service provided by the losing boat. The whiting managed to stretch around 35 people, with a tiny morsel on each plate. Awards were presented to the best and worst fishermen, speeches were delivered at length, and finally it came to the current codding president Frank Brinkley to announce his worthy successor for next year's extravaganza. And the winner was - Andrew Fowler! Duly presented with the symbolic medallion signifying the office of cod president, Andrew proceeded to wear it round his forehead like some pagan priest. He raised a toast to the cod, and we saw in the wee hours drinking port and smoking cigars. A most successful day. Here's to codding 2006!

Chris Bell

