The annual conference of HoDoMS 2010 took place on 15-16 April 2010 at the University of Birmingham; it’s permanent home. It was attended by 43 delegates; 35 are currently heads of department in UK universities. Due to the flight restrictions from the volcanic ash infestation, we lost a small number of colleagues. We soldiered on without them, and had a very productive couple of days, being informed about and debating current issues related to research in and the provision of mathematics. The talks from the conference are available at the HoDoMS website (http://www.coventry.ac.uk/ec/HODOMS/hodoms/2010/schedule.html).

We received presentations from

- Michael Grove, who discussed the National HE STEM programme, a three-year initiative funded by HEFCE which aims to increase and widen participation in STEM subjects and enhance the skills and knowledge of the workforce in these areas;
- Liz Willis, from the MSOR Network, who chaired a session on the outcomes of the three mathematics CETLs;
- Mike Walker OBE, CMath FIMA (President of the IMA) and Sue Merchant (Past President of ORSOC), who discussed the impact of people with mathematics training in the work place and how universities might in interact with industry, both in the preparation of students and in engagement in a research context;
- David Arrowsmith and Andrew Osbaldestin FIMA who shared thoughts about the issues faced by heads of mathematical sciences departments, and what HoDoMS might do to support heads in running their departments more effectively;
- Roger Porkess FIMA from the Maths Task Force, a group set up by the Conservative Party to look into UK mathematics education, chaired by Carol Vorderman, who indicated the contents of a report they had recently completed;
- Alice Rogers from ACME, who talked about the current changes to mathematics education in the pre-university arena;
- Malcolm MacCallum FIMA, who was on the Applied Mathematics Panel for RAE 2008, and is part of the steering committee for REF, and,
- David Harman, from EPSRC, who outlined future strategy and the resulting spending plans.

In this short report I would like to highlight some key points which emerged from the presentations and ensuing discussions.
The programme will focus on three strands: to widen participation within the STEM subjects at HE level amongst traditional students; HE curriculum developments focusing upon course delivery and design, student support, knowledge and skills; to encourage those in the workforce and society without a Level 4 qualification to develop enhanced knowledge and skills. The mathematics strand will be facilitated via the IMA (contact David Youdan (David.Youdan@ima.org.uk)), since the learned societies have played an important role in, for instance, More Math Grads. It is not clear to us how it is best for departments to interact with this initiative, but we would encourage colleagues to engage in a collaborative spirit as together we may be able to use the resource on offer to improve our service to our own students as well as potential students from the workforce and wider society.

The MSOR Network
(Liz Willis, http://www.mathstore.ac.uk)

The focus of the presentation was to give the conference information about the three MSOR CETLs, the sigma CETL at Loughborough and Coventry, The Postgraduate Statistics Centre at Lancaster, and the Centre for Open Learning of Mathematics, Science, Computing and Technology at the Open University.

The main focus of the Sigma CETL has been in developing resources for mathematics support, and in particular to move the balance from reactive to proactive activities in order to start to address the problems for the mass of students in need. A key issue here is to effect a culture change amongst staff and students to beneficially influence modes of teaching and learning, within and beyond Coventry and Loughborough, for students from a wide range of disciplines and backgrounds using mathematics and statistics. There are resources to support your students including the mathcentre, www.mathcentre.ac.uk, mathtutor, http://www.mathtutor.ac.uk/ and development is currently underway on a sister site for stats students called stats tutor.

The Postgraduate Statistics Centre at Lancaster has developed a series of activities, a number of which are open to PG statistics students from across the UK. These include the development of collaborations with other institutions to provide specialist training including the RSSCSE http://www.rsscse.org.uk/ and the MSOR Network, http://www.mathstore.ac.uk; the provision of motivational and focussed PG training workshops in a range of disciplines; the inauguration of a Master Class programme in emerging substantive areas with visiting experts, (see http://www.maths.lancs.ac.uk/department/postgraduate/seminars), the inception of a visiting fellow scheme; and an expanded use of web-based teaching, video material and on-line datasets. Further information is available from: http://www.maths.lancs.ac.uk/department/postgraduate/.

The Centre for Open Learning of Mathematics, Science, Computing and Technology (COLMSCT) is helping excellent teachers to develop effective and engaging open learning in mathematics science, computing and technology. Projects which could provide useful information for you include the interactive computer marked assessment (iCMA) initiative; Mathematics in a virtual world: Using Second Life for the teaching and learning of mathematics; and maths online, exploring and piloting of teaching and learning of mathematics in an online environment; to build on internal awareness and academic capability in order to improve the learning opportunities we offer to students. Details of the projects and resulting publications can be found at: http://www.open.ac.uk/colmsct/activities/.

IMA and ORSOC (Mike Walker and Sue Merchant)

Mike Walker began with news from the IMA, including a comment that there was overwhelming support inside the IMA for a merger with the LMS. He continued to discuss university liaison under the guardianship of the University Liaison Officer, by describing how the IMA supports students with, for instance, £400 per year available to student mathematics societies to organise events; co-organisation of the IMA/Greenwich Undergraduate conference; and free e-membership of the IMA for 2011. He highlighted the initiative Essential Modern Mathematics Research – Case Studies, coordinated by Nigel Peake CMath FIMA, in collaboration with EPSRC, which aims to show politicians and scientists the great benefit of current and recent mathematics research.

Mike was Director of Research, Vodafone UK, and gave a very interesting talk which focussed on how mathematicians can contribute to the telecommunications industry. He discussed some of the mathematical foundations of information theory initiated by Shannon in the late 1940s, and moved on to describe modern challenges, such as the application of game theory in resource sharing; graph theory in design and management of networks; and the use of, for instance, quaternions and Cayley numbers for diversity coding of multiple input, multiple output (MIMO) antenna systems (you will need to do some research to get a better feel for what this means). He suggested that mathematicians could be better informed of what was happening in this area by reading, for instance, the IEEE Transactions on Information Theory, and other journals in the electrical engineering literature.

Sue Merchant is a recent past president of ORSOC. The current president is Richard Eglese from Lancaster University. Sue had a long career with the Metropolitan Police, and gave a fascinating insight into the value that an MSOR graduate can add to such an organisation. She focussed in particular on problem solving, but emphasised...
the need to be able to solve the problem as it is – not turn it into some idealised problem more tractable to standard mathematical tricks. The key employability skills stressed were the ability to communicate to non-mathematicians, especially in the clear representation of more abstract concepts. She also stressed the importance of report writing. It is clear that we educators need to continually listen to business and industry and develop the employability skills of our students accordingly.

**HoDoMS – Helping HoDs Manage**

*(Andrew Osbaldestin and David Arrowsmith)*

This session allowed HoDs a little navel gazing time, and we won’t bore you with the details here. What we would say is that it is clear that management, especially in the time of reduced resources to HE, with increased expectations of students related to higher fee paying, is creating a challenge for HoDs. We recognise the need to train HoDs for this complex task, and HoDoMS is considering how it may help the sector in this regard.

**The Maths Taskforce (Roger Porkess)**

The Maths Taskforce is a group under the chair of Carol Vorderman, including Chris Budd CMath FIMA, Pepe Hart, Richard Dunne and Roger Porkess, who were asked by Michael Gove to look at mathematics education in the UK. The group had produced a preliminary report, but this was not to be made public before the General Election. Roger was able to say that they focussed their attention on a number of key themes: micromanagement, trust of teachers, ownership of education, regulation, innovation, and league tables.

Roger described the recent improvement in mathematics uptake, but said that the Taskforce was in favour of compulsory mathematics to the age of 18. It was their belief that mathematics should be declared a subject of critical importance and this should carry some legal weight. He discussed the changes in 11-16 education that are approaching, especially the twin GCSE.

**ACME (Alice Rogers)**

Alice reviewed the work of ACME (The Advisory Committee on Mathematics Education) which was set up in 2002 jointly by the Royal Society and the Joint Mathematics Council, to provide a unified voice to policy makers in issues related to mathematics education in the pre-university sector. It is currently under the chair of Dame Julia Higgins. There are seven members, one of whom has a special remit for HE mathematics.

A key development at the moment is the trial of the twinned pair award at GCSE, which now has a methods in mathematics component (similar to the previous GSCE), but with the addition of an applications of mathematics paper. We certainly welcome the effort to improve the problem-solving capabilities of our young people, and watch this innovation with interest. Allied to the increase in sophistication of the GCSE and also of A-level, we need a better trained cohort of teachers. Thus the professional development of teachers is also a key issue. With this in mind we have recently seen the start of the Masters in Teaching and Learning (MTL), aimed at early career teachers. There is some concern that there is not enough focus on subject knowledge here.

With its origins in the *Smith* report, ACME is focussing on the provision of pathways in the post 16 sector, with the aim to engage all learners in mathematics in some guise. A recent bone of contention has been the new *Uses of Mathematics* A-level. A concern is that providers might opt only to do this A-level rather than the traditional A-level, meaning that students may be unable to pursue mathematics at university. There is a recognition that for students not intending to go on to study mathematics further, but, instead for instance, geography or psychology, such an A-level might be very useful. One suggestion is that providers who offer *Uses of Mathematics* must also offer the traditional A-level. Alice also discussed the *Advanced Extension Award (AEA)*, which is somewhat akin to the *S-level* that those of us over 40 will remember. ACME is pressing for it to be continued, but would like to see it developed.

In the last part of her presentation Alice outlined the *Mathematics Needs Project*, which identifies two themes, the needs of business, and the needs of learners. In particular, research has been commissioned looking at the mathematical content of HE courses, and the published entry requirements, with a likely recommendation that departments should be honest about what the students need in order to successfully complete the programme. ACME believe that HoDoMS has a valuable role to play in the decision making in this arena.

**REF (Malcolm MacCallum)**

Malcolm was on the Applied Mathematics Panel at the last RAE. He is currently director of the Heilbronn Institute at the University of Bristol, and is a Professor at Queen Mary’s University, London. Malcolm believed (it turns out rightly) that the timetable for REF would be pushed back. At the time of the conference applications for the Chair Main Panel B: Physical sciences, engineering and mathematics were still being taken. The current thinking is that the scoring would be divided into *Outputs* (60%), *Environment* (15%) and *Impact* (25%), though it was by no means clear that this would be the final decision. In particular, working parties on the notion of *Impact* were trying to produce a reliable way of measuring this factor. *Impact* would replace Esteem from the RAE.

The RAE did not use citation data or journals, and it is not thought that REF will either. Staff will only be eligible for...
inclusion in REF if they have research specified in their contracts. The rules for early career researchers were going to be as at the RAE.

Malcolm identified that it was advantageous for ratings in the Environment category in RAE to be part of a large unit. It is believed that this will remain true in REF. Submissions to the Impact category, in the form of a number of case studies, would not be allowed to include impact on other academic disciplines. They must refer to impact in the real world. There was some feeling that 25% was too much for an untried element, and that people would be happier with its inclusion if it was weighted more lightly.

There was a belief in the audience that cross disciplinary work was not as highly regarded by the RAE panel as it might have been. Similarly it was thought that medical statistics, where the emphasis is on application, was not valued by the panel as much as novel statistical methods. HoDoMS would be invited to make nominations for the REF panel, and when this time comes we should work hard to ensure a balance of opinion which reflects the variety of work which is being done by mathematicians, whether original research or important applications.

**EPSRC (David Harman)**

David indicated that we were coming towards the end of the current EPSRC delivery plan, which places emphasis on maintaining a healthy research base, developing Mission Programmes, for example, Energy and Nano, and how to better exploit research outputs. There is a strong need for the Mathematics Programme to demonstrate a contribution to the whole EPSRC programme and objectives. The Mathematics Programme priorities are to maintain the capability and health of research base through Responsive Mode, DTA and Fellowships, encouraging transformative research through Programme Grants, and encouraging engagement with Mission Programmes.

The budget for 2010/11 is Research £13.73M, Training £11.4M, and Fellowships £9.34M. Of the £13.73M, £3M is to be spent on programme grants and it is envisaged that these would go to groups with significant EPSRC income already. A further £1.5M would go to platform grants, to increase capability.

The amount of money allocated to the Mathematics Programme is relatively small compared to other programmes and mathematicians are encouraged to engage with cross-disciplinary initiatives such as the Energy Networks Grand Challenge, the call for which recently closed.

The Mathematics Programme is keeping to its principle of supporting people through postdoctoral, Career Acceleration and Leadership Fellowships, and Dream Fellowships, which buy out a researchers time for a year, so that they can re-evaluate or reinvent their research area.

There was a strong feeling that mathematics is something of a Cinderella in EPSRC, and that fundamental mathematical research is being undervalued. Even a crude analysis will show that the amount of money available per capita is much lower than to other subjects inside EPSRC, and that somehow we need to make our case more strongly.

We were informed of the forthcoming International Review of Mathematics, due to take place in the autumn. Much work will need to be done over the summer to prepare the paperwork for the review. There will also be a review of the taught centres, including networks, such as MAGIC. David also informed us about the workshop for Early Career Researchers, which took place in Warwick on the 8th and 9th July. HoDs had to suggest the names of colleagues for attendance.

Looking to the future, David indicated that there was to be a new EPSRC Strategic Plan, with a Delivery Plan under development. The community is to be consulted in early summer, dependent on funding. There are three main goals in the strategic plan, delivering impact, shaping capability, and developing leaders.

**Summary**

This was an excellent conference in which views were frankly given and received. There are a number of key messages which emerge: academic mathematicians need to engage with the development of curriculum in pre-university education, and most particularly in A-level design. We need to improve the funding for the core Mathematics Programme inside EPSRC, as it seems that core funding is leaking away to thematic programmes, inside which it is more difficult for mathematicians to do what they are best at. We need to make sure that the REF recognises good interdisciplinary and application of mathematics, but that the notion of impact does not penalise a subject which is, by its nature, providing foundations for other sciences, but (as foundations often do) remains hidden from the users. We also need to engage with the HE STEM programme, to find ways of developing flexible learning tools, appropriate for our own students, as well as for people in the workforce. With the current economic downturn, it is important that departments find ways of sharing their resources, so that we do not duplicate effort. HoDoMS has a big role to play in all of these issues, and hope to be leading efforts within the UK mathematical sciences community to improve the research and teaching environment for colleagues, and the learning environment for students, wherever they may be.