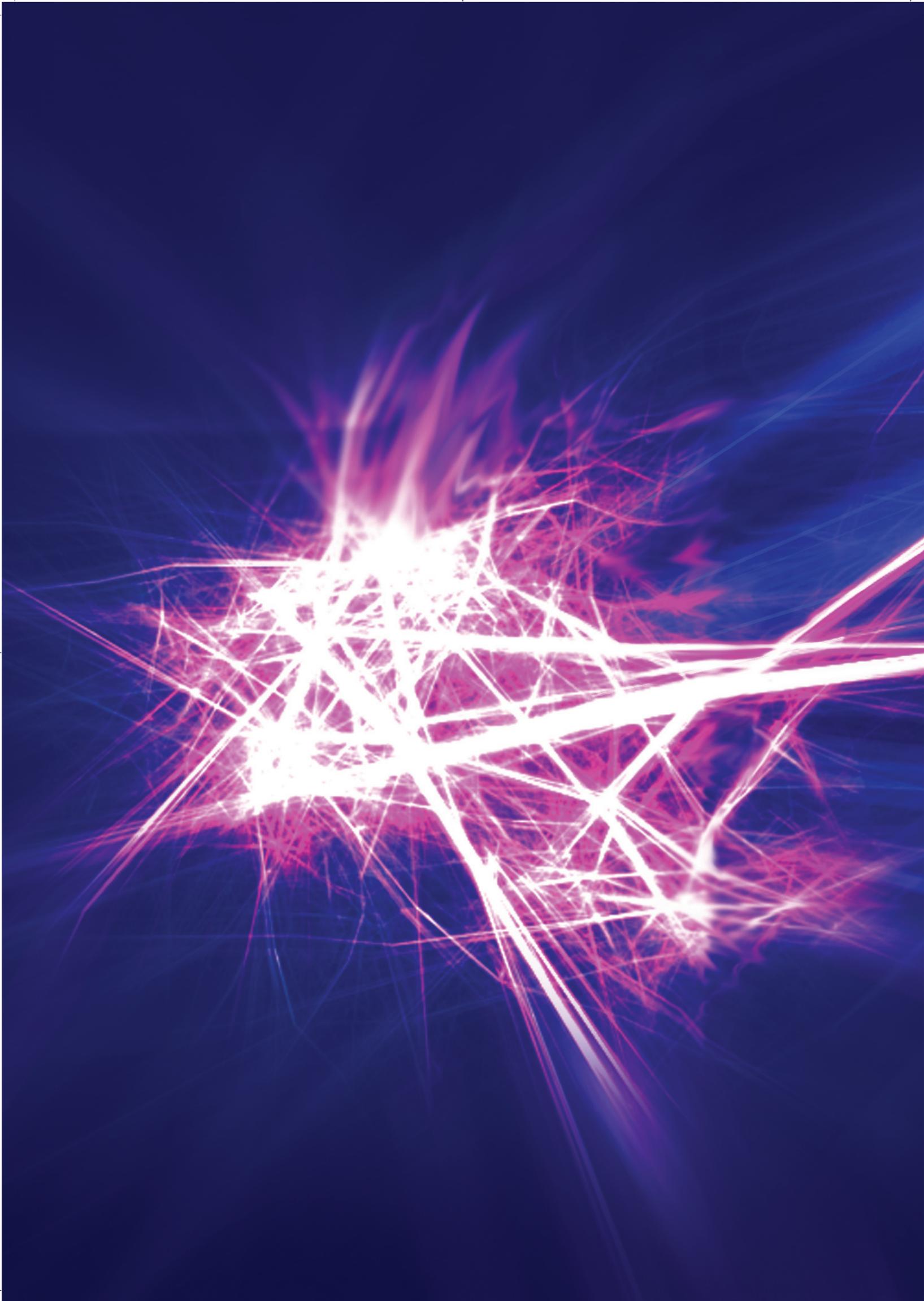


Employer Engagement: Case Studies for adoption in HEI Mathematical Sciences

Edited by Dr. Edmund Chadwick, University of Salford, and Makhan Singh, IMA.





Following is a list of the case studies, and the area of impact of the employer engagement.

Contents....

1. Annual Teachers' Conference at the Mathematics Department, King's College London
2. Higher education undergraduate curriculum developments which enhance student knowledge, progression and skills
3. Maths Careers: bringing to students employer knowledge and employability skills
4. Making Maths Graduates More Employable: an enhanced role for tutors
5. Maths Graduates: Where are they now? An employability initiative at Greenwich
6. Maths At Work
7. Employer-Related Projects
8. Employer Engagement with the Mathematical Sciences Undergraduate Curriculum
9. Mathematics for Secondary Teaching
10. Continuing Professional Development for Maths Teachers
11. Supporting career options for mathematics students at the University of Birmingham
12. Industrial Advisory Board at London Metropolitan University



Maths HEI Employer Engagement

Introduction:

Arising from the National HE STEM Programme as part of a Practice Transfer Partnership (PTP) proposal on Employer Engagement in mathematics, this booklet was undertaken by Dr. Edmund Chadwick of the University of Salford in collaboration with the Institute of Mathematics and its Applications (IMA) through Makhan Singh, the IMA project manager of the HE STEM maths strand.

This booklet contributes to and complements other work in the mathematics community on collating employer engagement activities; for example by the IMA on the www.mathscareers.org.uk website (visit the HEI /Ambassadors section) which contains a wealth of videos and case studies around employer engagement relevant to HEI mathematical sciences departments (both academic staff and undergraduate audiences).

The aim of this work is to collate employer engagement activities in mathematics at partner Higher Education Institutes (HEIs), with the intention of encouraging other HEIs to adopt the practice, spreading take up and fostering employer engagement in mathematics. So, the work is primarily for those HEIs looking to adopt in their own institution exciting and innovative ideas on employer engagement. Also of interest, Dr. Jeff Waldock of Sheffield Hallam University and Peter Rowlett of the Maths, Stats and OR Network are editing a booklet on 'Employer Engagement in Undergraduate Mathematics'. This provides in depth articles about HE curriculum work supported under the National HE STEM Programme and focuses on work which either involved employers in curriculum delivery or worked with employers to develop good practice advice or curriculum resources that you can use. This booklet will be available via www.mathstore.ac.uk/hestem.

There are twelve activities in total, presented in the form of a short one-page description case study, sufficient to explain the idea and provide enough information, including contact details and pointers, to enable the reader to adopt the practice.

The case studies present a broad range of employer engagement activities in all its forms, impinging on curriculum (employer involvement in course development, projects and assessment), careers advice, outreach activities, placements and employer Continuing Professional Development (CPD). Employers have also been used in steering committees, for example Industrial Advisory Panels (IAP's) and Industrial Liaison Committees (ILC's). All types of employers and employees have been involved, from senior managers to recent graduates, blue chip companies to small start-ups, business and industry to teaching which is a major employer of mathematics graduates. HEI's, employers and teachers together have a role to play in informing students at an early stage of the exciting and upcoming applications of mathematics in the workplace, and the first case study endeavours to do this, presented next.

Annual Teachers' Conference at the Mathematics Department, King's College London

For the last ten years, the Mathematics Department has invited mathematics and science teachers in secondary education, from the state and private sector, to an annual, one-day Teachers' Conference. The conference is free and helps teachers to keep up to date with developments in mathematics and facilitates the development and maintenance of relationships with schools.

The morning session consists of two scientific presentations given by members of the Department, and the afternoon session is devoted to issues related to mathematics education in the broadest possible sense, and includes presentations, and panel and open discussions. In addition, time and space are provided in the programme for teachers to mingle and speak with staff in a relaxed atmosphere over lunch.

The morning sessions are pitched to the interests of our audience and expose teachers to problems and questions which are either on the current research agenda of our staff, or considered of outstanding importance or beauty in mathematics. Examples of recent presentations include, "Systemic Risk and the Mathematics of Falling Dominoes", "Elliptic Curves and Fermat's Last Theorem" and "The New

Role of Maths in Post-Genome Biology and Medicine". These sessions are an effective vehicle to convey the idea that Mathematics is a vibrant, intellectually challenging subject that is rewarding and highly relevant in many areas of science, technology, and the wider economy.

In the afternoon's mathematics education session, we attempt to address issues which reflect on the participants' role as mathematics or science teachers, and often include discussions about developments in science education and the curriculum. Recent sessions have included the panel discussion "A*, FM, AEA and All That: the Best Way for Universities to Choose the Best Students" and presentation and discussion entitled "Carrying on with Mathematics" about the transitions from A-level to degree level mathematics, and further to postgraduate degrees in mathematics.

The event is always well attended by teachers across the UK, and the feedback is very positive. It is an excellent opportunity to engage with teachers and to maintain a positive relationship with schools who have attended in the past, as well as to build connections with new schools. It has also contributed to maintaining a strong applicant base, in terms of both quality and quantity of students, over the years. In fact, the College is now planning a general College-wide Teachers' Conference in recognition of the popularity and success of the event held by the Mathematics Department.

Professor Reimer Kühn, Department of Mathematics

Contact:

Saffron Hutt, Programmes Manager

King's College London

saffron.hutt@kcl.ac.uk



Higher education undergraduate curriculum developments which enhance student knowledge, progression and skills

The Mathematics programme at Liverpool Hope University follows three related themes:

- Mathematical Thinking Approach: which is an analytical theme and an essential basis for mathematical ideas
- Mathematical Modelling Approach: mathematical and numerical/computational approaches to modelling and problem solving
- Applicable Approach: Applying mathematical understanding to real-world problems.

The pathway provides opportunities for students to understand mathematics in real-world contexts. It is intended to be theory as well as practice-based. Students are given opportunities to model real world processes using, for example, statistical and optimisation techniques as well as exploring the history of mathematics. Further, they learn to use a number of mathematical software for solving real-world problems and for investigating mathematics concepts including, for example, MatLab, sciLab, Mathematica, R Statistical package.

One key feature of the pathway is small group size. Peer group support, coupled with the pastoral and academic guidance from the teaching team enables to maintain a vibrant learning community. Skills and understandings developed in this pathway will support students' learning and academic development in the area of study for their combined honours subject, for example Biology, Accountancy, in the use of quantitative methods in research projects.

Another key feature of the programme is the 'industrial professional projects' that the students conduct in their final year. The students work in teams of up to 6 under the guidance of a mentor who helps and guides the learners in the modelling process, analysis and computational work associated with a real-world industrial problem (which is identified and defined by the groups in consultation with the tutor and industrial practitioners). A progress report from each team is scheduled during the period. In addition, each team is expected to make an oral final presentation and submit a written report at the end of the course. Local Companies working within the Merseyside region have provided their support and assisted with course development.

The course has been devised with a diverse focus across the discipline of mathematics including for example calculus, statistics, probability theory, mathematical modelling, operations research, and history of mathematics. Students who follow this pathway could pursue further study such as Masters' in Mathematics, Computer Science or cognate areas or PGCE in mathematics (both secondary and primary) or research (PhD/MPhil) in mathematics as well as employment in industry, commerce and finance, or academia.

Contact:
Professor Atulya Nagar
Head of Department of Mathematics and Computer Science
Liverpool Hope University
nagara@hope.ac.uk



Maths Careers: bringing to students employer knowledge and employability skills

King's College London Maths Department and Careers Service develop a new and innovative way to engage their students

At the beginning of 2011/12, the Mathematics Department recognised that its students were not utilising the central Careers Service and its comprehensive portfolio of employers delivering a variety of sessions. Discussions with students, including the student Maths Society, and the Careers Service highlighted the need for an embedded departmental programme, bringing the multiple benefits of employer engagement, improving student knowledge of the employment market and development of professional skills. Therefore, seven sessions were developed in line with the graduate recruitment cycle and in consultation with the Maths Society. These two factors were key to the success of the programme as student endorsement resulted in strong attendance with a high of 80 at one session. Sessions covered a diverse range of topics, from sourcing internships to making successful applications and presentation skills, which complemented elements of teaching within the curriculum.

This allowed students and employers to engage at mutually beneficial times, with students putting into practice what they had learnt immediately. Sessions were co-hosted and delivered by employers and Careers staff with content approved in advance to ensure relevance.

By inviting the Careers Service to deliver the programme, the Department had access to employers keen to engage with Maths students. It was important for students to feel the sessions were relevant to them. To emphasise this, the sessions were held within the Department rather than in central rooms and were promoted by the Department rather than via the Careers Service.

Employers are placing increased emphasis on experience gained via summer internships. In response to this first and second years were targeted to reflect the current recruitment trend and to encourage employer engagement.

“ Employers are placing increased emphasis on experience ”

To launch the series an employer “speed meet” was held to allow students to begin considering their options by meeting employers from a variety of companies and professions. These ranged from small specialist actuaries and medium-sized accountancy firms, through to the investment bank Deutsche Bank. Employer feedback was extremely positive; they liked the fresh format, which allowed students to gain knowledge and ask questions in an informal, relaxed environment. This gave students the advantage of learning about areas they may not be familiar, increasing their own awareness of the options open to them.

Following the success of this series, planning is underway for a longer programme spanning the academic year, again timed around the key milestones of the graduate recruitment cycle. Employers and students have already expressed interest in this.



Contact:
Deena Panthaky, Careers Adviser
deena.panthaky@kcl.ac.uk
Saffron Hutt, Programmes Manager
King's College London

Making Maths Graduates More Employable: an enhanced role for tutors

The mathematics department at Greenwich has an intake of 120 students each year, many of whom come from non-traditional academic backgrounds. Their mathematics degrees give them valuable technical and transferable skills, and the department particularly seeks to produce graduates with the teamwork and communications skills which employers require. However, many of our graduates lack confidence in their ability to find top graduate jobs.

Funding was obtained from the National HE STEM Programme South-East Spoke for a project which involved the department to work with a specialist company to deliver a range of activities for final year undergraduates to enhance their employability, and to organise training events for the department's staff so that such activities could be delivered internally in future. The company was the Adab Trust, an organisation dedicated to achieving graduate level employment outcomes for students from Black, Asian and Minority Ethnic communities, who understood the specific issues facing many Greenwich graduates.

“Staff saw students gain in confidence”

We ran a series of masterclasses with very senior staff from major companies such as State Street Bank and Quintain Estates (a large local employer) together with workshops and CV clinics. Students engaged once they realised that these events had been tailored to their specific needs. We came to realise how demoralised our students felt about their employment opportunities in the current financial climate. Fear of failure to achieve a desirable job was leading students to behave like ostriches burying their heads in the sand, doing nothing rather than taking the positive action that would help them succeed in the graduate marketplace. Staff saw students gain in confidence as the series

developed, and found that more students were engaging with the application process. The training events for staff were well attended and, as well as giving insights into ways to engage and help students, provided opportunities for discussion of future strategy mediated by experts in the specific employability needs of our students.

“The project certainly helped build a stronger relationship”

One factor which promoted student engagement was that staff were prominent in their support of the events. Many staff attended the student workshops and this helped persuade students of the value of the activities. The project certainly helped build a stronger relationship between staff and students, and left staff with a much greater understanding both of the employment application process, and of the attitudes and fears of our students preparing to graduate and face an uncertain future in adverse economic conditions.

The project was evaluated by the Adab Trust, who reported very positive student feedback. We feel it has given staff the confidence to deliver a similar programme of events in future without having to call on external organisers; it has improved the relationship between staff and students; it has helped the employment prospects of this summer's graduates; and it has put employability at the top of the agenda for staff and students.

Contact:

Noel-Ann Bradshaw, n.e.bradshaw@greenwich.ac.uk

Kevin Parrot, N.I. Ramesh,

Tony Mann, a.mann@greenwich.ac.uk

University of Greenwich

Maths Graduates: Where are they now? An employability initiative at Greenwich

The mathematics intake at Greenwich is very diverse, with many students from non-traditional backgrounds and a majority of each cohort from black and minority ethnic communities. A number of projects have been implemented to improve the employability of Greenwich maths graduates, including a major initiative working with the Adab Trust, a charity which focuses on improving the prospects of BME graduates, funded by HE STEM. It has become clear that many Greenwich graduates, despite their mathematical abilities and good graduate skills, lack confidence in their career potential and lack awareness of the cultural connections which white middle-class graduates exploit in finding employment.

“Maths Graduates: Where are they now?” was an event (funded by HE STEM) designed to inspire Greenwich maths undergraduates and to raise their career aspirations and confidence. Ten recent graduates came back to the University to talk about their careers. The initiative was possible because tutors are in contact with many graduates through social networking: five years ago we would not have been able to organise an event like this.

The graduates were carefully selected: we wanted to cover a wide range of careers to which students could aspire (including actuarial work, mathematical modelling, logistics, web technologies and teaching), to choose graduates to

whom the students could relate easily, and to show that it isn't only the top undergraduates who can get desirable jobs. We chose outgoing, confident graduates who we knew would relate well to undergraduates.

The outcome exceeded all our expectations. While previously the least confident students, who had most to gain from such events, had been reluctant to attend employability workshops and masterclasses, this event attracted a larger audience than any other we have organised, and generated enormous enthusiasm.

“The outcome exceeded all our expectations”

There was a noticeable buzz amongst undergraduates over the next few days, many made personal contact with the graduates involved, and attendance at subsequent employability workshops was much higher. This seems to have been the “breakthrough” event which encouraged nervous students to engage. Our view is that many students are so discouraged by the current economic climate and so pessimistic about career prospects that they are too demoralised to engage with the very initiatives and activities that would help them. “Maths Graduates: Where are they now?” used the social side of the event – meeting people they had known or heard of as Greenwich undergraduates – to break through this irrational but natural reluctance, and has made a real difference to the attitude and career prospects of our undergraduates.

Contact:

Noel-Ann Bradshaw, n.e.bradshaw@greenwich.ac.uk
N.I. Ramesh and Elena Moreno
University of Greenwich



Maths At Work

The Maths at Work day held at the University of Salford is an outreach event for year 12 students to develop their awareness of the usefulness of mathematics in the world of work, and consequently to inspire them to go on to become professional mathematicians.

The day starts with an introduction by the IMA on the versatile and ubiquitous nature of mathematics in the workplace, and its importance in business and industry in driving and sustaining the nation's economy.

This is followed by a keynote lecture by a University of Salford maths professor on the various applications they have investigated in their research, and the implications of their research.

The students then get to tackle some real-life maths problems in groups in a 50 minute session, and the groups with the best solutions are given prizes at the end of the day. These comprise of a set of problems each requiring about five-minutes each to solve, and university students are employed to help groups.

At lunch there is an opportunity for the students to meet the university students and staff, and also to meet four

employers all mathematics graduates invited to the day, some of whom informally describe simulations on their laptops associated with their jobs.

These employers then go on to give short formal presentations of their work, describing their company and its structure, how the company uses mathematics, and how they use mathematics in their day-to-day job. The day ends with a plenary question and answer session and prize giving.

Advance planning is required, to get in place employers, university student helpers and staff, and students from the schools. Other issues to consider are rooms and room bookings, refreshments, transport, CRB checks, and Health and Safety risk assessments.

Maths At Work days have been tried and tested by many universities, emerging from a pilot project developed by the More Maths Grads initiative in conjunction with the Further Mathematics Support Programme. Each university adapts the framework to their own strengths giving a different and unique flavour at each HEI.

Contact:
Dr. Edmund Chadwick
Programme Leader BSc Mathematics
University of Salford
e.a.chadwick@salford.ac.uk



Employer-Related Projects

In the academic year 2011/12 the Department of Mathematics at Leicester first ran the final year module Employer-Related Project. The running of this module was part of a HESTEM-funded project Identifying Skill Gaps of Employers and Mathematics Undergraduates. The module attracted 20 students, and has been very successful.

There are three key components to the module: (a) the students took part in a business simulation game in Semester 1 (worth 10% of the module mark), run by an external consultant; (b) the students attended an employability workshop, run by the Bizbuilder, the commercial part of the Leicester Chamber of Commerce; (c) all projects had an external client – someone the student has to answer to. The success of (a) and (b) means that we will be running these as part of the same module next year.

The external clients for these projects come from a number of different business sectors, for example: Alstom, an engineering firm, Northamptonshire Police, University of Leicester Estates Department, Apical (developing imaging software), various credit unions, EON, and Vichag Clean Energy Solutions (a local incubator of green energy technologies). Colleagues from these companies were invited to a lunch and workshop in which we discussed interaction with our student, and they judged the presentations related to the business simulation in (a) above. Prizes were awarded.

“We have a number of very positive statements”

Of the companies that we were involved with, one has taken a student for a summer internship, and another has given a student a job. We have a number of very positive statements made by our business partners, for instance, from Alstom,

“We were very impressed with their technical skills, enthusiasm & pro-active work attitude and delighted with the technical progress each of them made. They all exceeded our expectations and made a positive contribution to the work of the group as well as gaining valuable experience themselves. This positive experience strongly encourages us to bring more students into internships in years to come.”

There are a number of challenges in running such a project. A uniform assessment scheme is difficult if business partners want different sorts of output from the project. This year we have been quite flexible, but this has caused some anxiety for students who want clarity. Also, coordination with companies has caused some problem, because the level of commitment required to run the project has not been well communicated.

However, this has been a fantastic experience for all of us, and I would encourage others to try to develop such a project. Colleagues at the Chamber of Commerce have been most helpful, and we are happy to facilitate contact with the local chamber.

Contact:
Professor Jeremy Levesley
Head of Department
of Mathematics
University of Leicester
jl1@le.ac.uk



Employer Engagement with the Mathematical Sciences Undergraduate Curriculum

Experience at the School of Physics Astronomy and Mathematics, University of Hertfordshire.

The School of Physics Astronomy and Mathematics (PAM) of the University of Hertfordshire has been actively involved in the development of programmes and strategies that enable students to gain a better perspective of the needs and expectations of employers, and at the same time provide the latter with opportunities to gain an understanding of the curriculum that the students follow.

Here I would like to pinpoint two such initiatives that, as it turns out, seem to complement each other very well. As it is the case in many other institutions around the country, the third year students in the physics, astrophysics and mathematics programmes undertake a compulsory project as an integral part of their degree. The idea behind the project is to provide the students with the opportunity of getting involved in tackling a larger problem than would normally be possible in any of the other modules in their curriculum. Traditionally projects are proposed by academic members of staff; however, more recently we have started promoting an Industrial Group Project scheme where the project is proposed by a company or industry.

These projects run on a year-long basis, starting in Semester A (October to December) and continuing during Semester B (January-March/April) and it requires the same amount of work expected for a regular module, approximately 300 hours (worth 30 credits). During the course of the project the students have to prepare an initial plan where they describe the aims of the project and an initial outline making clear what it is they intend to do and how to achieve it. The industrial partner acts as a client and the students are given support by a member of staff. Towards the end of Semester A, the students present their progress in a poster session, where they have the opportunity to interact with their fellow students and most importantly with the industrial partner. Finally, the students have to prepare a report that is assessed by PAM with input from the industrial proposer. The Industrial Group Project provides the students with experience in working on a real world problem and widens their perspectives in terms of possible careers as well as allows them to realise what skills are needed in the workforce. Students that have taken part in the scheme are very positive about it and indeed do recommend it to other students.

From the point of view of the employers, these projects provide a window to engage with the students and for that matter with PAM both in regards to the project proposed, but also with the curriculum and its development. With that in mind, PAM has used this as an opportunity to capture the experience of industrial partners by involving them (to the extent their time allows) with the Industrial Liaison Committee. The industrialists on the committee have an awareness of the skills employers need in new graduates, whereas the academics have a view of what constitutes a good, broad-based education, whose primary role is to advise the School on several matters such as its teaching provision for example, with particular emphasis on the suitability of its degree programmes as training for careers in physics and mathematics.

Contact:

Dr. Jesus Rogel-Salazar, Chair of the Industrial Liaison Board
School of Physics, Astronomy and Mathematics, University of Hertfordshire
j.rogel@herts.ac.uk



Mathematics for Secondary Teaching

Mathematics for Secondary Teaching is a degree scheme that was introduced at the University of Essex in 2003. Its origins stem from the fact that we observed a large number of our students developing an interest in teaching during their time as undergraduate students and our desire to help them gain access to teacher training upon graduation.

Students on the Mathematics for secondary Teaching degree complete exactly the same modules as first and second year Mathematics undergraduates. The difference only comes in the final year where students must complete a Mathematics Teaching Project in place of optional modules available to Mathematics students. This flexibility allows our students to easily switch to this scheme during their first two undergraduate years (or switch off of it if they decide teaching is actually not for them!)

The Teaching Project does not try to teach our students how to teach but rather provides a framework for preparing the students for teacher training while supporting their applications to such schemes. We do this by requiring that all students on this degree scheme undertake a placement at a local secondary school over the course of one term where they observe a series of lessons and reflect on them in relation to a series of educational papers that were

selected in conjunction with a colleague who specialises in Mathematics Education.

The placement and reflection are followed up with a series of problem solving activities where the students have to work in small groups to not only solve the problems given but, more importantly, analyse their thinking when doing so, the goal being to identify, for example, how they knew when to abandon their current approach when stuck and how to identify where they should re-start from.

Both the placement and the group work combine to provide the students with the practical experience needed before advancing for teacher training schemes. They should also have a better understanding, not only of what being a teacher entails, but also of some of the difficulties their future students are going to encounter when meeting new Mathematical concepts and problems.

Before running such a module advanced planning is required to establish links with local schools where placements can take place along with the provisions for CRB checking of students. Finally, there are also timetabling considerations as students need a day to half a day a week off campus.

Contact:
Dr Christopher Saker
Scheme Director for BSc
Mathematics for Secondary Teaching
University of Essex
Email: cjsake@essex.ac.uk



Continuing Professional Development for Maths Teachers

The School of Computing, Maths and Digital Technology at Manchester Metropolitan University (MMU) have now been running a successful schools liaison forum for almost ten years. Activities include both inspirational talks, either at the university or at the school/college, and workshops for both teachers and pupils. More details can be found at the schools liaison web pages: <http://www.scmdt.mmu.ac.uk/schools/>.

The latest activity, "Enlivening Mathematics Teaching through Applied Research", showcasing contemporary mathematical research and its practical applications in the classroom, is being run in partnership with the Science Learning Centre in the North West and is based at the Didsbury campus in South Manchester.

Mathematics school teachers at Key Stages 3, 4 and 5 will be shown how Mathematics is being researched at MMU and how this work can inspire not only the teachers but also the pupils studying Maths at school/college. The workshop consists of eight one hour talks which will be run in four parallel sessions. The talks are entitled "Fun with Robotics", "Who Wants to be a Millionaire: the Maths and Stats of Shares and Options", "Maths in a Box", "Fun with Maths", "Neural Dynamics: From the Brain to Super Fast Computing", "Some Counter Intuitive Maths", "Maths and Fluids" and "The Maths of Travel".

The workshop will be attended by six academic research staff from MMU and will provide an excellent forum for interaction with Maths school/college teachers. On the 18th May 2012, more than fifty delegates will be attended the first workshop of this kind run by MMU. It is hoped that the teachers will follow up the workshop by inviting the researchers to their school to deliver the same talks to the Maths KS3, KS4 and KS5 pupils.

It is expected that this will become an annual event in which the number of delegates will increase year on year.

Contact:

Dr. Stephen Lynch

Programme Leader BSc Mathematics

STEM Ambassador

Manchester Metropolitan University

s.lynch@mmu.ac.uk

<http://www.scmdt.mmu.ac.uk/staff/staffbiog/default.asp?StaffID=433>



Supporting career options for mathematics students at the University of Birmingham

Over the last two years, we have organized a variety of careers and employability activities, involving employers, offering focussed support and guidance to students in the School of Mathematics. These are in addition to more general events run by the Careers and Employability Centre at the University of Birmingham. Below is a summary of a selection of these activities with comments on the motivation for these events, how successful they were and possible reasons for this.

We run a yearly Maths Careers Fair, the main motivation for which is to kick-start or invigorate the career planning of our students. The students find out about a range of graduate employment opportunities particularly suited to maths graduates and are able to access advice on successful applications from the employers. We particularly encourage penultimate year students to participate, so they can get advice on opportunities for internships and work experience. We have not experienced difficulty in attracting enough employers to our fair, though it would be beneficial to attract a broader range of employers to display the diversity of opportunities open for maths graduates. The attendance of students is very high and student feedback for the event is generally positive. This careers fair was used as a platform to run a workshop to inform us of employability skills desired by graduate employers.

We have successfully embedded a CV task in to one of our final year courses, where the students are required to produce a CV targeted to a graduate role that is of interest to them. This, we believe, is particularly effective in connecting with students who have not engaged much in career planning until this time. For the future, we have plans to involve employers in this and related tasks.

A series of employer-led skills workshops to support our students through the application process for graduate positions and internships has been organized. A range

of employers have run a workshop and topics covered include: application forms; psychometric tests; interviews; and assessment centres. Though students who have attended such workshops have given very positive feedback, we have found that student participation is often not very high. We wonder whether this is because students do not think the workshop is really for them unless they are particularly interested in the employer.

We have invited some employers to hold a stand in the School of Mathematics, so that they can promote opportunities and offer application advice to passing students. Though it seems that this would be a good opportunity for students we have found that the take up for these stands has been disappointing.

Although not all activities have been particularly well attended, we believe the increased focus on careers within the School of Mathematics has led to a significant positive effect in the awareness and engagement in careers from our students. These are first steps in plans to actively improve student engagement with employers.

Contact:

Dr Simon M. Goodwin
Senior Lecturer and Director of Employability
School of Mathematics
University of Birmingham
s.m.goodwin@birmingham.ac.uk



Industrial Advisory Board at London Metropolitan University:

Reviewing the curriculum content of the London Metropolitan University Mathematics Degree from an employer's perspective.

London Metropolitan University (and its predecessors) have offered graduate level studies in Mathematics for well over 40 years. London Metropolitan University has recently conducted a major review of its mathematical sciences undergraduate provision and new courses will be offered to students in 2012-13. It was felt important that design of the curriculum should have input from employers; with course designers collaborating with representatives of industry to ensure that their teaching is also relevant and up-to-date.

“capture their thoughts
and feedback”

Around September 2010, The Academic Leader (AGL) for the Mathematics Area had a conversation with a member representative of the Institute of Mathematics and its Applications (IMA) where the AGL had mentioned that the Faculty of Computing (FoC) at London Metropolitan University would like to set up an industrial board i.e. industry panel to help advise periodically on our mathematics degree course contents. As a result a few days later the AGL was contacted by Makhan Singh (IMA Project Manager for the National HE STEM Programme) with an offer of help to set up an Industrial Panel project to review the maths degrees and their curriculum content in the context of meeting the needs of employers. Following several meetings held between the Academic Leader (AGL) and Makhan Singh, the remit and scope for the project had been established (i.e. in essence setting up a panel of several employers to review the London Metropolitan University mathematics degree).

“employers stepped forward and
agreed to participate”

The IMA then set about approaching employers on behalf of the Faculty of Computing at the London Metropolitan University, to gauge interest and support for the project; targeting employers who had previously shown a willingness to participate in such activities (i.e. career profile interviews on the Maths Careers website – www.mathscareers.org.uk). This method proved to be very successful as five (enthusiastic) employers stepped forward and agreed to participate to share their knowledge and time (as volunteers) for the project brief – reviewing the curriculum content of the London Metropolitan University Mathematics Degree from an employer's perspective.

The Industrial Panel was made up of an eclectic mix of people, from a range of backgrounds, experiences, age and gender. Employers involved were Corda, Unilever, NHS, Walsh Group and ex-Rolls Royce.

All five employers were sent the maths degree curriculum content for review on a USB alongside a review template. The employers were then given a period of 6 to 8 weeks to review the curriculum and to fill out a review questionnaire to capture their thoughts and feedback. A meeting with the Industrial Panel was then arranged. This meeting took place on 9th June 2011 at London Metropolitan University, where

Employer Engagement with HEI Mathematical Sciences: a booklet of 12 case studies to inspire

discussion and feedback was given to the Academic Leader of Maths, Dr Pargat Singh Calay as well as the Dean of the faculty. The meeting was chaired by Professor Nigel Steele (Emeritus Professor Coventry University) who in consultation with Dr Pargat Singh Calay also wrote the terms of reference for the group.

A key outcome of the Industrial Panel has been that advice and comments provided at the meeting have been considered when developing the new degree programmes and curriculum content, all of which will be fed into our new Work Related Learning module in which students will undertake industrial/commercial work style projects to recreate a working environment. Discussions with members of the Industrial Panel have since taken place to come back to London Metropolitan University as guest speakers.

A further important outcome of the Industrial Panel work was that two of the panel members have since accepted the invitation to be the industrial advisors on the university validation panel.

Some of the Industrial Panel employers agreed to provide industrial projects as and when needed; again an excellent outcome to maintain partnership between employers and London Metropolitan University.

The feedback from the Industrial Panel has been invaluable and the idea that this forum will continue as a long term partnership (even beyond the lifetime of the National HE STEM Programme) will itself be a key performance indicator of sustainability and legacy. The Industrial Panel was originally set up with the prime objective of reviewing the curriculum content of the London Metropolitan University Mathematics Degree from an employer's perspective. However the Industrial Panel has gone beyond this remit; it has been an exciting project where ripple effects have occurred whereby several unexpected new outcomes have developed including Industrial Panel members being industrial advisors on the university validation panel and offering new ideas for upskilling the workforce (i.e. short courses).

Overall the experience has been a very positive one and at this early stage of its creation the London Metropolitan University team can see the long term benefits of maintaining this group.

“Overall the experience has been a very positive one”

Contact:
Dr. Pargat Singh Calay
Academic Leader of Mathematics
London Metropolitan University
p.calay@londonmet.ac.uk

For more information see:
<http://www.hestem.ac.uk/activity/industrial-panel-mathematics-degree-review>





Final Thoughts

The case studies in this booklet cover a broad range of employer engagement activities in HEI's.

One question on the mind of many adopters is: where do I get the employers from? The case studies indicate that sources include graduate alumni, research contacts, local companies, and contacts suggested by professional bodies, other academics, friends, and friends of friends in particular through social networks. Once contacts have been started, the case studies also indicate how these grow and develop, with knock-on effects where the contacts are used to contribute in other areas of employer engagement from the original one assigned. For example, an employer initially invited to present a talk to undergraduates may subsequently be used in outreach events, or used to help presentations, or offer internal placements, or be interested in sitting on an ILC.

This document provides a snapshot of employer engagement in mathematics departments at the present time, but it is clear this is a developing process and we hope to add to the case studies, and make them available in an easily accessible repository. The aim is for long-term sustainability by the mathematics community itself continuing to upkeep and develop a bank of ideas for employer engagement in mathematics.

Contact:
Dr. Edmund Chadwick
Programme Leader, Bsc Mathematics
University of Salford
e.a.chadwick@salford.ac.uk

