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**Have you an idea for a Branch Event?
If so please contact**
barbara.gabrys@materials.ox.ac.uk

New Committee Members

Michael Hammond & Laura Thomas, have decided it is time for them to bow out and we will welcome Dr Fei Chen & James Kneller at the Branch Committee meeting on 5th October.

Dr Chen studied at the Chinese University of Hong Kong where she developed her fascination with laser physics and received her MA. 'Tunable Reflection DFB Lasers' was the PhD topic at the Université d'Angers, France. She then took up a post-doctoral researcher position at Dublin City University, Ireland, working on a project of developing photochemistry in microfluidic chips as a new resource-efficient synthesis and analysis tool.



Above: Dr Fei Chen

In 2011 she joined the Department of Engineering Photonics at Cranfield University as a Research Fellow. Her work focuses on developing newly multi-wavelength tunable laser sources and geometries for gas spectroscopy and detection.

http://www.cranfield.ac.uk/soe/profiles/f_chen.html

James Kneller is starting his 3rd year of an MSci physics course at Queen Mary (QMUL), and was previously one of the NEXUS reps for London and IOP ambassador to QMUL. He is also QMUL rep for the upcoming Conference for Astronomy and Physics Students (CAPS) Committee. This will be in charge of organising national and international conferences for students across the country. He aims to help organise and promote more events that students will want to do. This includes IOP lectures, visits to research centres and conferences; as well to promote the Institute in general. Mr Kellner was a former treasurer of the QMUL physics society.

EEESTA Seminar ENGINEERING THE OLYMPICS

Weston Auditorium, University of Hertfordshire, Hatfield, on
Wednesday 9 November 2011

Behind the preparation for the Games is an incredible array of engineering and technology, creating a world class environment of construction, infrastructure, transport, hospitality, tourism and more. In all these areas, it is engineers and technicians who are enabling a successful delivery. Senior members of the Olympic Delivery Authority (ODA) will talk about the planning and construction of the 2012 Olympic Games Park which is on time for completion and in some cases under budget. The Legacy of the Olympic Park will also be discussed; a vitally important topic of great public debate. Free event. Further information: -www.eeesta.org.uk/seminars.php - click on Delegate Flyer. **To book a place**, please visit

www.bookwhen.com/eeesta or telephone 0845 474 3341

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Cloaking magnetic fields the first antimagnet.

Spanish researchers have designed what they believe to be a new type of magnetic cloak, which shields objects from external magnetic fields, while at the same time preventing any magnetic internal fields from leaking outside, making the cloak undetectable. The development of such a device, described as an 'antimagnet', could offer many beneficial applications, such as protecting a ship's hull from mines designed to detonate when a magnetic field is detected, or allowing patients with pacemakers or cochlear implants to use medical equipment.

In their study, published, Friday 23 September, in the Institute of Physics and German Physical Society's New Journal of Physics, researchers have proved that such a cloak could be built using practical and available materials and technologies, and used to develop an array of applications. Take, for example, a patient with a pacemaker undergoing an MRI scan. If an MRI's large magnetic field interacts with the pacemaker, it can cause serious damage to both the device and the patient. The metal in the pacemaker could also interact with and distort the MRI's large magnetic field, affecting the machine's detection capabilities.

An Institute of Physics spokesperson said, "The research group have put forward a novel and, most importantly, conceivable plan for a magnetic cloak. The obvious next step will be to translate design into fabrication so some of the wide-ranging applications can be realised."

From, Friday 23 September, the full paper can be downloaded from <http://iopscience.iop.org/1367-2630/13/9/093034/fulltext>

Michael Bishop
IOP Publishing Press Assistant

Ushering in the age of quantum information.

Advances towards manipulating the quantum properties of nature's tiny building blocks – like an electron's spin-state – offer an incredible opportunity for progression in our age of information. Today's computers, which are based on classical mechanics, process information coded in long streams of 1s and 0s. Computers have become faster and faster at processing these values over recent decades but a new report, The age of the qubit: A new era of quantum information in science and technology, published today, Thursday 15 September, by the Institute of Physics (IOP) explains how physicists are working towards computers that can deal with more than one value at a time and force a paradigm shift in the speed and power of computers. Due to quantum states and the probabilistic nature of quantum mechanics, bits of quantum information (qubits) are not just a long line of 1s and 0s being processed one at a time, but rather bundles of 1s and 0s that can be processed all at the same time. IOP's report on quantum information processing includes examples of research teams, many of which are based in the UK, who are now grappling with ways to increase the lasting-power (or coherence) of fragile qubits which are known to collapse when they interact with the environment. While the long-term goal of the first quantum computer is still at least a couple of decades away, the research has spun-off exciting advances in other areas, not least in secure communication.

http://www.iop.org/publications/iop/2011/page_52065.html

Professor Sir Peter Knight, incoming President of IOP, said, "This booklet is the perfect guide to anyone interested in the future potential of quantum information, the nature of the challenges faced by those working towards a quantum computer, and the contemporary gains we're already reaping from the research undertaken over the past couple of decades."

Joe Winters IOP Senior Press Officer

Doing Outreach and Extending Your Outreach are one-day workshops which aim to give Institute members an introduction to physics outreach and enable participants to develop their own outreach and public engagement ideas.

10 November 2011: Extending Your Outreach (Institute of Physics, London)

An introduction to public engagement and outreach activities for members wanting to build confidence and find out how to get involved.

22 November 2011: Doing Outreach (Institute of Physics, London)

An opportunity for members with some experience of taking part in public engagement and outreach activities to work with others to develop ideas for their own events, consider ways of reaching different audiences and discover what funders are looking for.

For more information on the workshops and the travel bursaries, and to book your place at a workshop please visit www.iop.org/outreachworkshops

Caitlin Watson
Head of public engagement IOP

REMS CAPITAL RING WALK

Another damp but good walk

On 27 August 2011 Margaret Stedman took us from Greenford to South Kenton. These walks are through parks and open spaces in the suburbs of London but not as far out as the Loop walks. The first part was along a Grand Union Canal path where we saw a large terrapin sunning itself.



Photographer: Mike Quinton.

A little while later we struggled up Horsenden Hill with good views over London.



Above: On Horsenden Hill. Photographer: Mike Quinton.

When the heavens opened and we donned wet weather clothes. To the south was the Dorking Gap in the North Downs, Heathrow airport and further west Windsor Castle. After some pavement walking through Sudbury Hill, we should have ascended Piggy Lane to Harrow-on-the-Hill but the waymark was missing and we were looking for somewhere to have lunch. We actually walked two sides of a triangle. After the struggle up the main road into Harrow, we were delighted to find a good Italian restaurant (La Collina) where we had a reasonable rest with good food. Next door is the "Old Etonian" (in Harrow!) which also serves good food. There was said to be a pub down West Road but we did not want more hills at that stage. West Road is a little like the famous Gold Hill in Shaftsbury.



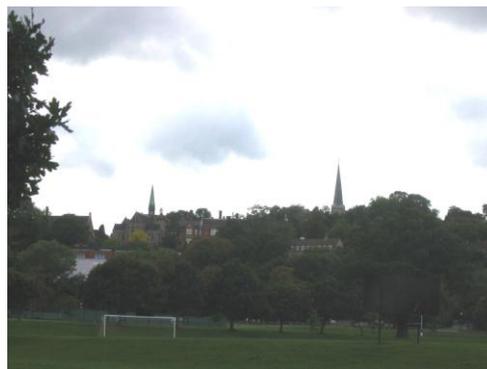
West Road, Harrow. Photographer: George Freeman.

The oldest building is on the highest part of this narrow hill and is St Mary's Church which has Norman foundations and still has the Norman Pillars. Other buildings range from the Georgian and Regency periods to the present but most are much altered. The school is in the middle of the town in Victorian buildings (some of us hated the style).



Harrow School. Photographer: George Freeman.

The views from the hill of the city showed there was not far for the pupils to go from school to work. We descended the hill, through the sports fields and along a very slippery path to South Kenton.



Left: Harrow from the sports field showing St Mary's (right) and the Victorian church. Photographer: George Freeman.

A hilly but good day. George Freeman

Physics for All – let's get back to the '80s

1989: The Berlin Wall fell, Chinese students revolted on Tiananmen Square, Harry met Sally, Jason and Kylie stormed the UK charts..... and a steady decline in the uptake of physics post-16 spread across UK schools, which the UK has still not recovered from.

The UK suffers from too few students choosing to take physics post-16 and that is why the Institute of Physics (IOP) is asking its members to help convince head teachers and school governing bodies to open up physics opportunities for all.

Launching 'Physics for All' on Monday 12 September, at the British Science Festival in Bradford, IOP is highlighting the chronic shortage of specialist physics teachers in the UK and the number of students who are still deprived of the opportunity to engage with this most fundamental of twenty first century subjects.

Dr Robert Kirby-Harris, Chief Executive at the IOP, has announced, "A-level numbers need to return to the level of 1980s – an ambitious target but an essential one, if we want to build an economy based on a highly-skilled, numerate and innovative workforce, and to provide the best opportunities for our young people."

IOP is encouraging its members, and everyone else who has an interest in physics education, to act as local ambassadors for physics in their relationship with their neighbourhood schools.

With an increasing amount of decision-making being devolved to individual schools, it's imperative that parents, grandparents, volunteers and local governors pick up the baton for physics and press local educational leaders on the number of students entered for physics examinations, the proportion of girls taking physics and how many specialist physics teachers their local school employs.

To this end, IOP is publishing 'prompt cards' which contain key questions to ask local schools. Different versions are being provided for English, Northern Irish, Scottish and Welsh schools. To download a prompt card for your nation, go to www.iop.org/physicsforall

Governments, businesses, learned societies and universities have all successfully stressed the need for more students to take 'facilitating subjects' like physics, and, as Dr Kirby-Harris says, "Now it looks as though the tide has turned. Numbers of A-level and Higher physics students continue to increase but I don't believe that we can just sit back and say 'job done'."

IOP wants to see schools prioritise the provision of a good physics education to ensure students are not deprived of the opportunities an exciting foundation in the subject offers – we hope you can join us.

Joseph Winters
Senior Press Officer Institute of Physics

Physics PGCE see the IOP Video at: -

http://www.iop.org/resources/videos/education/training/page_51698.html

I am thinking of becoming a physics teacher

See: -

<http://www.iop.org/education/teach/index.html>

Teaching Advanced Physics (TAP)

See:-

http://www.iop.org/education/teacher/resources/teaching-advanced-physics/page_44149.html

REMS visit to Paris, 25th July to 29th July 2011

At the end of July, REMS organised a visit to Paris, led by Stanley Melinek.

The itinerary aimed to avoid the obvious attractions most people would already have seen. Not all items on the planned programme were included. Some were dropped in favour of more attractive alternatives, others because of lack of time.

The first visit was to the Les Egouts (Sewers), which documented the history of Paris sewers and the modern system of water purification and sewage treatment. The two systems are separate, with treated sewage being discharged into the Seine, not fed into the water supply. In the afternoon we visited Père Lachaise cemetery, hunting, with limited success, among the myriad tombstones, for famous people. In the evening, we went to an organ recital at Notre Dame.



Les Egouts (Sewers) Photo from Tessa Belling.

On the second day we had lunch followed by a walk through the Bois de Boulogne and a visit to the greenhouses in the botanical gardens which contained, in addition to many tropical plants, a fish pond and an aviary.

Next day we walked along the Canal Saint-Martin in the morning followed by a canal trip in the afternoon.

A walk was planned for the fourth day, starting from the Parc de Sceaux just outside Paris. However, the park was so attractive that we stayed there most of the day.



Gardens of chateau de Sceaux Photo from Tessa Belling.

Four of us still managed to complete the walk into Paris. Two of us managed a brief visit to the Musée des Arts et Métiers just before it closed in the evening. The museum included an interesting collection of early typewriters, early gramophones and early computers.

On the last day we visited the Albert Kahn photography museum, which had an exhibition on life in Japan. The museum also has a very nice garden, most of it in oriental style.

The group had a preference for outdoor activities. We also enjoyed meals at a number of different restaurants, including two in the Jewish quarter of the Marais.

The group was happy to take things at a very leisurely pace. The weather was mostly fine with occasional rain but mostly sunny towards the end of the week. If there is one thing I learned, it is not to try to cram too many activities into the day.

Stanley Melinek



Left:
Canal Saint-Martin
Photo from Tessa Belling.

School maths fails to prepare future physicists and engineers

Many physics and engineering academics feel that new undergraduates in their subjects are entering university ill-prepared for their courses, and not achieving their full potential, because of a lack of fluency in maths.

A new report, *Mind the Gap: Mathematics and the transition from A-levels to physics and engineering degrees*, prepared for the Institute of Physics (IOP) by EdComs, suggests that exams and specifications have weakened the crucial relationship between maths and the physical sciences. Gathering the opinions of both physics and engineering academics, and first- and second-year undergraduates in physics, engineering and computer science, the report highlights many academics' belief that current maths and physics provision at A-level leads to students learning by rote rather than developing their own independent techniques.

As one engineering academic said in interview, "Deep down, the problem is, mathematics is a language that they don't speak because they are not taught to speak it... You can imagine when you present physics material, which is all equations, they just go bonkers. "You need to have competence in mathematics to explain the concepts. They say the equations are so difficult but they don't get the point that it is not the equations that are difficult; it is the concept that is difficult. You can harness extremely complicated concepts into one equation, this is the power of mathematics. They don't seem to get that because they are not being taught in that way."

A physics student, also interviewed for the report, agreed, "The lack of any proper maths at A-level physics meant that I felt quite overwhelmed and had to learn the skill of deriving physical meaning from maths, something I'm still having to pick up on." There was close to unanimous agreement, as 92% of the academics contacted agreed, that the lack of fluency in maths would have a detrimental effect on the prospects of the young physical scientists.

A physics academic said, "If they haven't really got to that level of fluency of understanding what somebody else is writing, let alone writing it themselves, yes, they are at a serious disadvantage." The report is based on an online survey of around 400 undergraduates and 40 academic physicists and engineers, along with a series of one-to-one interviews with academics and physics and engineering undergraduates.

More than half of the academics contacted asserted that their first year undergraduates were not very/not at all well prepared to cope with the maths content of their degrees and, although only a fifth of the students felt mathematically ill-prepared for their courses, many of the students' comments from interviews acknowledged a gulf between the maths they were taught at school and their degree's requirements.

One engineering academic said, "They don't usually admit that they've got a problem. They don't quite understand what problem they've got. They know they are not quite understanding it but they can't pinpoint where the problem lies." A common complaint from both academics and students was the treatment of maths and physics in school as two distinct subjects; there is seen to be minimal crossover in terms of syllabus content, when in reality there should be a great deal.

Elizabeth Swinbank, Chair of the IOP's Maths in Physics working group, said, "The Institute of Physics has, for some time, been concerned that physics and mathematics A-levels do not provide sufficient mathematical preparation for those who continue with their physics at university either within a physics degree or in other cognate disciplines." It established a 'Maths in Physics' working group to review this concern and to establish some hard evidence relating to it." Philip Diamond, Associate Director of Education and Planning at IOP, said, "The Institute will be discussing the implications of the report with the Government and the examination agencies."

In response to the publication of the report, the Schools Minister Nick Gibb commented, "We need to ensure that our curriculum and qualifications are robust and rigorous and that they keep pace with the demands of employers and universities. This research reflects widespread concerns that A levels are still not preparing students sufficiently well for the study of a science degree course at university, with insufficient maths preparation in science in particular.

"We will look at this report carefully but our reforms to date are designed to address some of these very serious concerns. We are overhauling the National Curriculum so teaching focuses on the core, essential knowledge that students need for further study. We will set out proposals shortly to put universities at the heart of developing A levels in the future. And we want to attract the brightest and best science and maths graduates into teaching with bursaries of up to £20,000 – to inspire future generations of undergraduates."

Joe Winters, IOP Press Officer

The Institute has launched a new web-site - <http://www.myphysicscourse.org/> - to help students find the right degree. Not only can students look up a particular university, they can also browse courses by subject combinations, search by grades required, or by distance from a given postcode.

To Infinity and Beyond: Mission Discovery Space Camp 2011

Space isn't just big – it's big business. In the UK alone the space sector is worth £7.5 billion, employs 70,000 people and has been growing at an average annual rate of 3 percent. With numbers like these it is clear why the Government wants to invest – with the aim of growing it into a £40 billion industry in the coming years.

But achieving this ambitious goal will take more than just money – the UK will also need to inspire the next generation of scientists to work in the field. With this aim, last month the Institute of Physics (IOP) sponsored three students at the International Space School Education Trust's (ISSET) Mission Discovery Space Camp at Imperial College.

To ensure that the attendees received the best possible experience, the ISSET works with people who have been at the forefront of space exploration. This year saw past Director of NASA's Kennedy Space Centre, Jay Honeycutt, former NASA astronaut, Mike McCulley, and Senior Astronaut Trainer, Michelle Ham, coming all the way from the USA to help run the camp.

The week began with the students finding out their mission: to design an experiment to be taken into space. Their efforts would be judged with eight entries going through to a final round, where they would have to explain their idea to the whole camp.



To help with the task, presentations were given throughout the week from specialists like, Ian Jones, a leading satellite communications expert. Divided up into groups of about five, they set about the mission with the added assistance of Imperial College mentors.

The IOP students decided to investigate the effect of micro gravity and the sun's radiation on cockroaches. They believed that the creature's immunity to radiation poisoning might offer new insights into diseases like cancer. Although the IOP students did not make it through to the final round, they thoroughly enjoyed their time at space camp. With an excellent presentation, first prize was awarded to an ingenious experiment aimed at helping protect astronauts from the sun's harmful radiation.



Joshua Scott, Praveen Dcruz, Mike Honey Cutt, Hadi Ali & IC Mentor, Ben Gan

Continued from page 5

After the event, IOP student Praveen Dacruz said, "It's been great fun, I've learnt loads and it's motivated me to get on with my studies as in the future I'd love to work in the space sector". Fellow IOP student, Hadi Ali, added, "What's been amazing about the week is not only that we got to meet a NASA astronaut, but we've learnt about how to achieve a goal by working as a team".

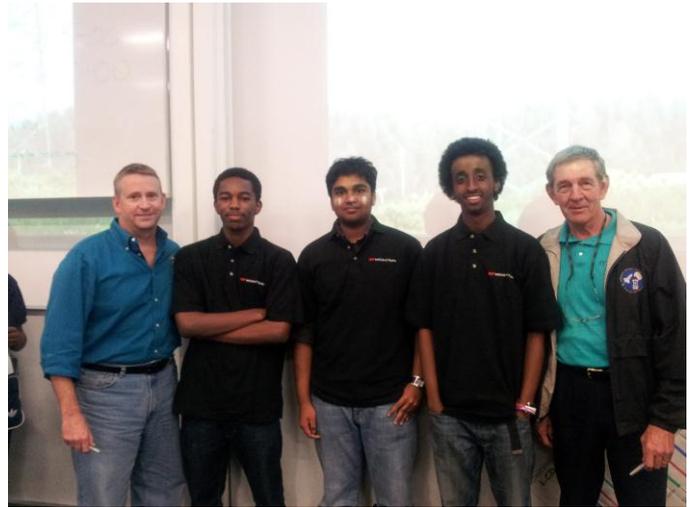
For the UK to grow its space sector it is vital that organisations like the IOP get involved in grass-roots projects like these, helping to ensure that the UK continues to produce world-class scientists. If there was any doubt about the merits of the Institute's involvement then it was dispelled when IOP student Joshua Scott said, "this has been a great opportunity, and is the sort of thing that helps to inspire more people to get involved in science".

Lee Crouch
Regional Officer, South East
Institute of Physics

Marvin and Milo Adventures in Science, published by Macmillan, Friday, 2 September 2011.

Forty-five of the popular 'Do Try This at Home' cartoons previously published in the members magazine 'Interactions' are now available in book format, ISBN-10: 0230758495 and £5.99 when I checked the Amazon site. (RRP £9.99). Each comic strip features Marvin the cat and Milo the dog, who conduct simple physics experiments using everyday household objects

"The book is intended for anyone from parents, grandparents, teachers, leaders of youth groups to children themselves. There is nothing childish about the cartoons, they are simply written in a way that doesn't require any prior science knowledge - they're about encouraging people to have a go at the physics" said IOP's Head of Public Engagement, Caitlin Watson.



IOP Sponsored Students with Ken Ham & Mike McCulley

LAPS: London's A-level Physics Society *The network for students studying A-level physics in the capital*

Get your students to join the IOPs 16-19 membership and if they study in London they will also become a LAPS member.

How will my students benefit?

As a LAPS member students will regularly be informed about lectures and events taking place in London. They will also have access to a discussion forum where they can ask questions and share ideas with other physics students.

What's in it for me, the teacher?

We are all too aware of how difficult it is to arrange for our students to benefit from the great wealth of things on offer in London. So this is an offer of assistance with updates about events outside school. As a teacher you can access this information on TalkPhysics. <http://www.talkphysics.org/>

How much will it cost?

Nothing. Students will need to travel around London (for journeys between school or home and the venue) but even these expenses can be reimbursed if required. In special circumstances the IOP will cover the cost of any fees required for an event.

What do I do next?

To join, students will need to register on IOPs 16-19 membership website: www.iop.org/16-19. Information posted onto the website will also be uploaded on www.TalkPhysics.org

Who is organising LAPS?

Niloufar Wijetunge is one of the Institute of Physics Network Coordinators for London and organises free events for teachers and students as well as teaching full-time at Holland Park School.

If you have any questions please contact : -
Niloufar@Wijetunge.com

Branch Dinner

The 2011 Branch dinner will be held in the ornate Herschel Room at the Institute of Physics, 76 Portland Place, London W1B 1NT at **8.00 p.m. on Wednesday 16th November 2011** after the evening lecture given by Professor Sir Peter Knight.

The menu will be:

Chalk Farm smoked salmon, scrambled duck egg and Caviar
Beetroot Risotto, thyme and parmesan (V)

Free range chicken breast with sage crust , wild mushroom stew and herb broth
Sea Bass with wilted spinach and clam cream
Savoy cabbage stuffed with portobello mushrooms and wild truffle cream (V)

Apple tart tatin with Devonshire clotted cream
Coffee & Petit Fours Wine - Tarabilla Sauvignon and Tarabilla Tempranillo

Jugs of iced water included. Vegetables in season will accompany the main course.

The cost of the dinner (including wine) will be £34.00 per head.

Guests are most welcome.

Tickets will not be issued so please include your e-mail address or a self-addressed prepaid envelope so that your booking can be confirmed. Dinner attendees will be automatically added to the list of potential attendees for the evening lecture. Bookings (and cancellations) can be made up to midday on Wednesday 9th November 2011.

Since numbers are limited, late bookers should enquire about availability.

If you would like to attend please complete the form on page 6 and e-mail, or post, it to:

Dr Mark Telling (Treasurer, L&SE Branch),
Rm 1-49, R3,
ISIS Facility,
OXON, OX11 0QX

E-mail: mark.telling@stfc.ac.uk

We look forward to seeing you,

I wish to attend the Branch dinner on Wednesday 16th November 2011.

I will be accompanied by ____ guests.

Please state each diner's requirements:

Full Name	Starter: Salmon	Starter: Risotto	Main: Chicken	Main: Fish	Main: Savoy

Special dietary requirements: _____

If possible, I/we would like to sit near: _____ or _____

I enclose my cheque, made payable to "The Institute of Physics", for ____ persons @ £34.00 per head. Total = £ _____

I enclose a self-addressed, prepaid envelope for acknowledgement of this booking (please tick)

Name: _____

Contact telephone no. (in case of queries) _____

E-mail address: _____

This e-newsletter has been produced by The London & South East Branch IOP

The contents do not necessarily represent the views or policies of the Institute of Physics, except where explicitly stated.

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W1B 1NT, UK.
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Fax 020 7470 4848.

Upcoming Events At [The IOP](#), 76 Portland Place at 6.30pm

5 October 2011 The Turin Shroud – a physicist's view.
Book at londonsoutheast@physics.org

**Upcoming Events At [The University of Hertfordshire](#)
Lindop Building at 7:30pm.**

5 October 2011 Making Waves

**Upcoming Events At [The Open University](#) Berrill Lecture Theatre
at 7:30pm.**

11 October 2011 Exoplanets and how to find them

**Upcoming Events At [The University of Kent](#) at 7.30pm
Rutherford Lecture Theatre 1**

11 October 2011 Hybrid Imaging: A Multidisciplinary Imaging Technique Of The 21st Century.