

NEWSLETTER

March 2007

Branch committee members

John Clark Chair
E-mail john.clark@finerandd.com
Tel 01553 679 378
Fax 0871 247 0838

Jeannette Fine Vice-chair
Tel 01553 679 378
Fax 0871 247 0838
E-mail jeannette.fine@finerandd.com

Tom Whyntie Secretary
Tel 07866 162368
E-mail bw273@cam.ac.uk

William Proud Treasurer
Tel 01223 337 205
Fax 01223 350 266
E-mail wgp1000@cam.ac.uk

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The Institute of Physics,
76 Portland Place,
London W1B 1NT, UK.
Tel 020 7470 4800.
Fax 020 7470 4848.

Cambridge Science Week: coming to a lab near you

On Saturday 24 March, the Cavendish Laboratory will hold its annual Science Week event. One of the highlights for older children (14+) and adults is sure to be Prof. Malcolm Longair's talk, "The big and the small", from 2.30 to 3.30 p.m. in the Pippard Lecture Theatre.

There will also be the ever-popular Physics Zone (2.00–5.00 p.m.) for all ages. This will include "Hands-on physics", experiments from Lab in a Lorry and the Astronomy Roadshow Planetarium.

In "Hands-on physics", you can get involved in a wide range of full-participation demonstrations of physics. An exciting range of new activities await you: make a terrific all-terrain stunt vehicle and test your design on our rigorous assault course. Past favourites will return: test the strength of

a vacuum in a tug of war – you against the void. Fly an egg and bring it safely to earth – or maybe not. Be ready for the up-to-the-second discoveries of the incredibly small in the world of nanotechnology and watch a rocket speeding into space.

We won't have the lorry, but we will have the experiments. Carry out stimulating demonstrations of physics, which reveal the beauty of the world and the power of scientific understanding – all relevant to everyday life. You might break a wine glass without even touching it; or make a spiral rainbow; or examine the workings of an oil well. The experiments will be sponsored by the Institute of Physics and the Cavendish Laboratory.

During the Astronomy Roadshow Planetarium you can explore the wonders of the night sky; and learn about the

vast scale of space, the stars and the solar system. The shows are interactive, lively and up to date, with links to the internet, and all are scientifically accurate and fully tested. The roadshow is sponsored by the East Anglia Branch of the Institute of Physics.

The Naked Scientists (it's the science, not the scientist, that's naked) are a media-savvy group of physicians and researchers from Cambridge University who use radio, live lectures and the internet to strip science down to its bare essentials, and promote it publicly. Their award-winning BBC weekly radio programme, *The Naked Scientists*, has up to six million listeners across eastern England, plus an international following on the web.

At Science Week, they will do kitchen physics, and we will see why it's more than just plain old cooking, it's really physics.

Harry Druiff

Young physicists pipped to the post

In December, an 11-strong contingent from the Cambridge University Physics Society went to the Nexus-organised Young Physicists' Conference 2006. This time, the delights of Birmingham were ours to sample, and sample them we did – from the Jongleurs Comedy Club to Thinktank (Birmingham's museum of science) and from the Bullring shopping centre to the Birmingham Repertory Theatre. A great time was had by all.

Unfortunately, Oxford beat our lecture competition entrants, Maciej Hermanowicz and Eva-Maria Hempe, in a closely fought contest – they had clearly raised their game since our triumph last year. Despite this, it was an excellent weekend with plenty of chances to meet students from other universities, experience conference culture, get out of the "bubble" and, of course, find out about some new physics.

We would like to thank

everyone at Nexus, especially Samir Dawoud, for organising such a fantastic event, and the University of Birmingham. We are also grateful to Accelerys, who, in taking a break from putting "nanotechnology at your fingertips" with their wide range of modelling and service solutions, kindly sponsored our delegation (see www.accelerys.com for more information).

We look forward to heading along next year.

Tom Whyntie

Visit the branch website at <http://anglia.iop.org>

December Event report

We timed the December Event badly last year – there was at least one other science-related event in Cambridge that day, so we only had about 100 people, well down on the 300–400 we have had in previous years.

Those who couldn't make it missed out on a lot of fun. Dr Mark Lewney, talking about "Sound: good vibrations", took us from guitar strings to super strings, taking in such diverse items as balloons, whales and noise pollution. Incidentally, he plays a mean guitar and could easily have chosen to have a rock band career.

The planetarium was back by popular demand, although it was not as busy as it has been in the past. I managed to get into the last session and will definitely do so again, if my other commitments permit. It didn't gallop through the universe, but focused on a few aspects of



Dr Mark Lewney plays guitar.

astronomy. It looked at the more common constellations, with side glances at comets and the prospective Mars missions.

In the hands-on experiments, visitors made pan pipes (which I'm told didn't work too well); observed what happened to marshmallows in a vacuum; looked through a

sunscreen under fluorescent light (unsurprisingly, although transparent to visible light, it is opaque under fluorescent light); and measured their carbon footprint (larger than expected, I'm afraid).

The afternoon was rounded off by a game of "Call my audible bluff". The panellists gave talks on subjects as diverse as whispering galleries (a narrow band of reflections near the walls – not foci of an ellipse) and how homing pigeons navigate (by long, narrow features like roads – they really do orbit roundabouts if they are not sure of the correct exit).

The audience won the game by one point, continuing its winning streak. Better luck next time, panel!

We're already working on next year's event. If you have any good ideas e-mail us at jeannette.fine@finerandd.com.

Last chance to win the Paperclip Physics prize

This year, again, there is no national final for Paperclip Physics, but the prizes for the regions are much better.

The East Anglia Branch heats will be held at Selwyn College, Cambridge on 8 March between 10.30 a.m. and 4.00 p.m.

There are 10 teams from eight schools, involving 43 students, taking part this year. We have a reasonable branch coverage, with two teams from last year's winning school, Norwich High School for Girls. They will be challenged by two teams from Oundle School and teams from Bourne Grammar, Peterborough; Peterborough High School; King's School, Peterborough; Perse School for Girls, Cambridge; Netherall School and Sixth Form College; and Stamford School.

There will be two heats in the morning, five teams in each, with the top two teams from each heat meeting in the afternoon final. Each heat and the final has its own panel of three judges – a science teacher, a physicist and a non-scientist.

The competitors have five minutes in which to make the non-scientist understand a concept or principle of physics. The scientist and the teacher are there to make sure that the explanation is good science.

Spectators are welcome, so please come along for all or part of the day to give your support.

This is the last year for Paperclip Physics, as it never seemed to catch on very well. We could certainly do with ideas for a replacement – some sort of competition to get teenagers practising physics. If you have any ideas, please contact Jeannette Fine (jeannette.fine@finerandd.com) or any committee member. It has to be reasonably safe, not too expensive (for the pupils or the organisers), and exciting enough to get teenagers to participate. I know that this is an almost impossible combination. I just hope that one of you can think laterally enough to get us started.

Remember – the idea for Lab in a Lorry came from East Anglia.

Careers surgeries to make welcome return to Cambridge and Ipswich

Some of you may recall that Vishanti Lall, careers officer of the Institute, held careers surgeries in Cambridge and Ipswich about two years ago. Now Lall is returning to both cities, on 14 and 15 March.

Although we know the dates, the locations still need to be confirmed, so please keep an eye on the website (see below) for up-to-date information.

At this point, we believe that the surgeries will be at the University Arms (Regent Street, Cambridge CB2 1AD, tel 01223 351 241) on Wednesday 14 March and the Holiday Inn (London Rd, Ipswich IP2 0UA, tel 0870 400

9045) on Thursday 15 March.

The surgery hours will be from 12.00 to 9.00 p.m., and each session will last for 45 minutes.

Lall is flexible, so, if necessary, it may be possible to arrange sessions outside of these times.

Members of the Institute are entitled to use the careers service regardless of their employment status. Advice can be given on a range of topics including: changing careers, redundancy, taking a career break, retiring, and updating your CV.

One-to-one appointments are useful if:

- you are uncertain about your career path;
- you are returning to work;
- you are made redundant;
- you want to re-evaluate your skills and position in the job market.

You will be required to fill in and submit a personal history form two days prior to attending your appointment. This will give Lall time to prepare for the session.

Careers advice is available at other times at the Institute headquarters in London.

More information can be found at www.iop.org/activity/careers/index.html.

Members can benefit from Cambridge Network events

The Cambridge Network was founded in 1998 by six individuals who were prominent in industry, academia, business and finance in Cambridge. This included Lord Broers, then vice-chancellor of the University of Cambridge, and Herman Hauser, entrepreneur and venture

capitalist.

Its aim is to promote innovation within the region by facilitating the interchange of ideas. The East Anglia Branch of the Institute of Physics is a member of the Cambridge Network, so Institute members are entitled to attend Cambridge

Network events. You can also sign up for regular e-mail updates from the Cambridge Network to receive news on science, technology, innovation and business within the region.

To find out further information, see www.cambridgenetwork.co.uk.

New regional officer is appointed

As you probably know, the EU has split the UK into a number of regions, and much UK and EU money these days follows these regions. Since it is usually a good idea to go with the flow, the Institute is following suit wherever this makes sense. One way in which it has done so is to appoint regional officers, whose remit is to work with regional agencies and other science and technology bodies in industry, education and government to promote physics within their region.

National officers for Ireland have been active for nearly 10 years. The new national officers for Scotland and Wales and the regional officers for the North/North East, North West, Midlands, East Anglia and South West have been in



Dr Esther Haines, the regional officer for the East Anglia area.

post for periods ranging from one month to one year, with an appointment planned for London and the South East. The officers are employed within the membership and business directorate at the Institute, but work from home.

The regional officer for East

Anglia, Dr Esther Haines, took up her position on a part-time basis on 6 November 2006. She has a BSc and PhD in physics from Victoria University of Wellington, New Zealand. Esther has a long association with East Anglia, having been a post-doc at the Cavendish Laboratory and a visitor to the Interdisciplinary Research Centre (IRC) for Superconductivity in Cambridge. In New Zealand she worked for Industrial Research Ltd, a government-owned laboratory carrying out research and development in the energy and manufacturing sectors. Since moving to Cambridge in 1997 and being a visitor at the IRC, she joined the chemistry department with a Daphne Jackson Fellowship, using modelling to understand how

chemical-force microscopy can be used to understand intermolecular interactions.

Since 2003 she has worked part-time for the Women in Science, Engineering and Technology Initiative at the University of Cambridge. She has been associated with the East Anglia Branch since its formation in 2000 as secretary and as a committee member.

So far, much of Esther's time has been taken up with briefing meetings in London to learn more about who does what within the Institute. However, she has managed to attend a Cambridge Network "Making the most of your membership" meeting and one in the Horizon seminar series organised by Research Services Division at the University of Cambridge.

Lecture at Royal Meteorological Society in March

The Royal Meteorological Society (RMetS) is to people interested in the weather (professionally or otherwise), what the Institute of Physics is to people interested in physics. For those of us with an interest in both, the East Anglia local centre of the RMetS will have a lecture on Thursday 22 March, given by Prof. Grant Bigg of the University of Sheffield on "Polar mesocyclones and their impact on the NE Atlantic".

It will be held in the LGMAC seminar room, Department of Environmental Studies, University of East Anglia, Norwich at 7.00 p.m.

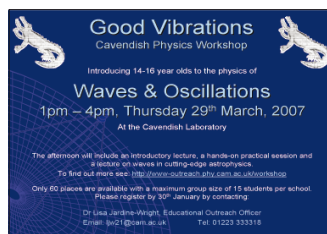
There will also be a lecture on Thursday 3 May by Prof. Paul Hardaker, the recently appointed chief executive of the RMetS, speaking on "I will if you will – the politics of climate change". Prior to his appointment at the RMetS, Paul was at the Met Office, London, and was the special government adviser on meteorology.

For more information, contact James Dent, 15 Station Road, Haddenham, Ely CB6 3XD, tel/fax 01353 741332.

School workshops go on the agenda at the Cavendish

The Cavendish is adding to its outreach activities with the Cavendish Physics Workshops. The first one will be "Waves and oscillations", and will take place at the Cavendish on Thursday 29 March. It is aimed at Key Stage 4 students (14–16 year olds) and is designed to provide them with a conceptual grounding in the subject matter as well as providing an opportunity for inspiration through experimentation.

The afternoon will include an



The first in a series of workshops by the Cavendish is on 29 March.

introductory lecture, a hands-on practical session and a lecture on waves in cutting-edge

astrophysics. Only 60 places were available, with a maximum group size of 15 students per school. The afternoon was fully booked before the 30 January closing date.

We are confident that this will be the start of another successful outreach effort by the Cavendish, and wish the organiser, Dr Lisa Jardine-Wright, educational outreach officer for the physics department, every success on the day.

Cambridge Physics Centre lecture season to end soon

The last Cambridge Physics Centre lecture for the 2006–2007 season is "Plastic electronics" by Prof. Henning Sirringhaus.

It is to be held on Tuesday 20 March at 6.00 p.m. at the Pippard Lecture Theatre, Cavendish Laboratory, Madingley Road, Cambridge.

Many products are made from plastic polymers. You use plastics to carry home your shopping or to play with your rubber duck in the bath, but you

probably have not yet thought about whether plastics can also be used to make electronics.

This talk will discuss how some plastic polymers can replace conventional silicon to make flexible electronic devices such as plastic displays or simple computing chips. It will discuss some of the underlying physics and also when, and in which form, you can expect plastic electronics to appear in your home.

Prof. Sirringhaus is the

Hitachi professor of electron device physics at the Cavendish Laboratory, working in the field of plastic electronics (www-oe.phy.cam.ac.uk/). He is a co-founder of the spin-off company Plastic Logic Ltd (www.plasticlogic.com).

The lecture is free to attend and there is no need to book – just come along.

The Cambridge Physics Centre is supported by the Cavendish Laboratory and the Institute of Physics.

Date for your diary: the AGM is on 13 June

Horizon seminars provide a link

The Horizon seminars are organised by the Research Services Division (RSD) at the University of Cambridge with support from Cambridge Enterprise.

The RSD helps academics identify, secure and manage research funding from external organisations.

The Horizon seminar series forms part of its programme to facilitate interactions between academics and potential sponsors and collaborators. Each seminar focuses on a theme and enables both academics and participants from industry not only to investigate existing opportunities, but also to anticipate where new developments are likely to occur.

Cambridge Enterprise helps commercialise technology developed within the university by assisting academics to engage in consultancy, manage intellectual property rights and set up new ventures.

Esther Haines attended the "Risk, threat and detection" seminar on 5 December 2006 at Magdalene College, Cambridge. Four themes were covered during the day: political security; physical security; digital security; and biological/chemical security.

The chair of the Royal Society Working Group on Detection and Decontamination of Chemical and Biological Weapons, Prof.

Hubert Huppert, director of the Institute of Theoretical Geophysics, introduced the session on political security, which was primarily concerned with counter-terrorism. One of the recommendations of the working group was the formation of a dedicated centre to coordinate work aimed at improving the UK's resistance to chemical or biological incidents. As a result, the MOD Counter Terrorism Science and Technology Centre has been established. Its director, Ken Brigden, described the structure of the centre and the work it has been doing to promote innovation relating to counter-terrorism.

The centre is actively seeking collaboration with national and international partners in science and technology, whether in academia, industry or government, to work together in the global fight against terrorism. For more information see www.ctcentre.mod.uk.

Alan Pratt, director of the Home Office Scientific Development Branch, described the government's counter-terrorism strategy, which is based on four principles: prevent, pursue, protect and prepare (see <http://security.homeoffice.gov.uk/counter-terrorism-strategy/about-the-strategy/?version=1>). Opportunities for physics-related research arise in detection, protection (e.g.

strengthening buildings against blast), identification (e.g. what chemical or biological agent is involved), and modelling. There is more information on the Home Office Scientific Development Branch at <http://scienceandresearch.homeoffice.gov.uk>.

The physical security theme and the biological/chemical security theme covered computer vision: object detection and recognition (Prof. Roberto Cipolla, engineering); iris recognition (Dr John Daugman, computer laboratory); terahertz imaging and spectroscopy (Prof. Sir Michael Pepper, physics); detection of chemical and biological agents (Prof. Chris Lowe, Institute of Biotechnology and Prof. Stephen Elliott, chemistry); and flow and dispersion of hazardous material in cities (Prof. Rex Britter, engineering).

In the digital security session, as well as technical solutions to computer security problems, Prof. Ross Anderson (computer laboratory) pointed out that companies will only adopt computer security measures if it makes economic sense for them to do so. Dr Frank Stajano (computer laboratory) emphasised that users have to be taken into account in the design of security systems – a security feature is worthless if users disable it or use it incorrectly.

Forthcoming Horizon seminar

The next seminar in the Horizon series is "A sensory world: novel sensor technologies and applications" on Tuesday 20 March at New Hall, Cambridge.

There are many applications leading the way in sensor technology: from self-parking cars to diagnostic tools for cancer. Sensor technology is shaping our future. Indeed, some claim that sensors will change our world in this decade in the way that microprocessors did in the 1980s and the internet in the 1990s.

This seminar will showcase a broad selection of sensor technology and systems that have been developed at Cambridge.

It will also cover a wide range of sensor perspectives including the basic technology and science of sensor design; applications for diverse situations and environmental conditions; and the challenges associated with rendering meaning from sensor networks or multiple heterogeneous sensing assets.

Examples of cross-over and cutting-edge applications will be discussed by both academic researchers and industry speakers.

To find out more information, to view the full programme and to obtain a booking form, see www.rsd.cam.ac.uk/events/horizon. Alternatively, tel 01223 765404 or e-mail horizon@rsd.cam.ac.uk.

Norwich Astronomical Society welcomes visitors

We are always glad to let you know about physics-related events in East Anglia, and I don't see what could be more physics-related than astronomy.

The Norwich Astronomical Society has an observatory (and a good one) about 15 miles south of Norwich. For all that it's so close to Norwich, it has lovely dark skies (no jokes about being very much in the dark, please) so if you have ever wished to have a good look at the skies, go along on any Friday evening from 7.30 p.m. onwards. They are a very friendly bunch and welcome

visitors. I believe that they take summer breaks, so you might want to contact Dave Balcombe (drbalcombe@tiscali.co.uk) to check that they are open.

They also have open nights during the winter. These are once a month, on Friday and Saturday evenings. They consist of a lecture starting at 8.00 p.m. and lasting about 40 minutes, followed by an opportunity to look through their telescopes (something I have thoroughly enjoyed on my visits to the observatory).

The remaining lectures for

this winter are:

- "Cosmology" by Mark Thompson, 23 & 24 March. Where did the universe come from? What is its fate, and perhaps more importantly, how on earth do astronomers even begin to answer questions like these? In this lecture, Mark takes us on a journey, not only through space but also through time to try to answer these and other fundamental questions about the origins of the universe.
- "Jupiter" by Mark Turner, 27 & 28 April. From the dawn of the

17th century when Galileo first viewed Jupiter with a telescope, to the Galileo probe of the 1990s and beyond.

If you would like to visit the observatory, the coordinates of the telescopes are: latitude 52° 30 min 42 s; longitude 01° 25 min 11 s.

Or, for those of you who are a bit more earthbound, they are located at Seething Observatory, Toad Lane, Thwaite St Mary, Norfolk. For directions, go to www.norwich.astronomicalsociety.org.uk/info/finding.htm.