

LANBRIA

The newsletter of the Lancashire & Cumbria branch of the Institute of Physics

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See <http://lancashire.iop.org> for
details of committee members,
events and how to join the
Lancashire & Cumbria branch.

Branch elects Michael Holmes as new Chair

At the Branch's Annual General Meeting, held on Wednesday 14 June 2006, Michael Holmes was elected unopposed to the position of Branch Chair.

So who is the new Chair? Mike Holmes is a professor and head of physics in the Department of Physics, Astronomy and Mathematics at the University of Central Lancashire in Preston. He is actively involved with the department's link-up with a Chinese university (see feature "Cultural exchange" on p3), and spends several weeks each year teaching undergraduate physics courses in China.



Michael and Mo Holmes. Michael was elected Chair at the Branch AGM.

The editor's lines on the leaves

Summer has passed, England has won a cricket series against Pakistan while failing to shine in the football World Cup – and now it is time for another issue of the Branch newsletter. There has been some excellent news for the Branch, which has gained a prestigious SETNET award for its outreach activities. We now have to decide how and where to display the magnificent glass pyramid trophy. The Institute's chief executive, Bob Kirby-Harris, has written to congratulate the Branch.

We have a new Chair, Mike Holmes, and this issue includes some information about him. In future I am sure we will have an e-interview with him – and also with Steve Bailey, our secretary.
Chris Bowdery, editor

The deadline for your contributions to the November 2006 issue of this newsletter is:

**Friday
6 October 2006**

Please e-mail your materials to
chris.bowdery@physics.org

Branch receives SETNET award

SETNET, the national organisation that promotes science, engineering, technology and maths, has given the Branch its Contribution to the Science and Engineering Ambassadors Programme award.

This is only the second time that this prestigious award has been made. It is not an annual or regional prize, but is given as SETNET sees fit. It recognises our outreach activities over the last 12 months, such as the Galactic Gig schools roadshow.

The award takes the form of a cut-glass square pyramid, about 23 cm high, engraved with the words "SETNET North West", the name of the award and the year.

The pyramid was presented to Chris Bowdery, outgoing Chair, at the Investors in Education 2006 awards ceremony held by the Lancashire Education and Business Partnership in June.

Kevin Burke, North West regional director of SETNET, made the presentation. Barbara Tigar, manager of SETPOINT Lancashire, was also present.



Left: Chris Bowdery with Kevin Burke and Barbara Tigar of SETNET. Right: the SETNET award itself.

Nuclear decommissioning course is launched

The University of Central Lancashire (UCLan) is launching the country's first Foundation Degree in Nuclear Decommissioning.

Students will be taught on the doorstep of the Sellafield nuclear complex in West Cumbria, where billions of pounds are to be spent on nuclear decommissioning over the next few decades.

Dr Colin Boxall, UCLan's Programme Leader of the Foundation Degree, explained that the qualification was in direct response to the Government's White Paper on decommissioning in 2002, which pledged to spend £50 bn on the clean-up of the UK's nuclear facilities.

"Decommissioning of nuclear installations poses particular challenges to scientists and engineers," he explained.

"An interdisciplinary activity, it requires an understanding of the principles of nuclear physics, engineering, reactor

design, radiation protection, safe working, environmental remediation, waste characterisation, disposal and treatment, business and project management, and the governance and commercial structure of the nuclear industry.

"Through a unique partnership between and UCLan's Westlakes Research Institute, Lakes College West Cumbria and Gen II, this course covers all of these areas, so equipping students with the skills to eventually become effective decommissioning technicians and managers and enter what is going to be one of the most buoyant employment markets of the early 21st century."

Students will study at the Westlakes Research Institute on the Westlakes Science and Technology Park near Whitehaven and Lakes College West Cumbria at Lillyhall.

The first students will start

this September.

Pat Glenday, Principal of Lakes College West Cumbria, said: "We are confident that there will be a great deal of interest in the course, with the current moves towards decommissioning at Sellafield, and the recent publication of the Nuclear Decommissioning Authority's Strategy for future decommissioning activity across the UK."

The course, which can be studied full or part-time, has been designed to make students more employable in this changing industry.

Mike J Smith, Managing Director of GENII Engineering and Technology Training Ltd, who is a delivery partner with UCLan and Lakes College said: "This foundation degree is an excellent example of public and private educators working together to meet the needs of the nuclear sector.

"Participants will benefit from a wealth of experience in

training delivery, built on years of experience working with the Sellafield Site."

Mick Farley, UCLan's director for Cumbria, said: "The degree will provide an opportunity to gain a recognised qualification that will help local people and others to secure jobs in the industry."

Dr Ian D Hudson, the Nuclear Decommissioning Authority's Head of Technology and Skills Development, added:

"Achievement of the first Decommissioning Foundation Degree in England is a real boost for West Cumbria and shows what can be achieved by working in partnership between training providers and industry.

"This achievement will enable the partners and West Cumbria to take a leading role in an area of work that has national importance and will be open to a broad range of small to large companies."

**Media and Public Relations Office,
University of Central Lancashire**

Cultural exchange: how physics students in Beijing joined UCLan

Many physics departments in universities in the UK recruit overseas students from Asia. However, I believe that we at the University of Central Lancashire (UCLan) are unique in operating a franchised degree in Applied Physics (Information Technology) at the Beijing Institute of Technology (BIT) in China.

The idea is quite simple and is based upon the experience gained over many years of a similar franchise operated by our Department of Technology at BIT. We franchise the first two years of our UCLan degree programme to BIT. The students are taught our course, in English, by BIT staff. They are also put through an intensive English language programme for these two years, which is run by UCLan staff on site in China. If they are successful in completing the two-year programme they come to UCLan for their final year (or final two years if they opt for the MPhys). In July 2006 the first cohort of 11 students successfully graduated with BSc (Hons) Applied Physics.

I made the first visit to Beijing in December 2000 and agreed with vice-dean Prof. Hu Haiyan to start work on the project. Both Alan Christy and I have been to BIT more times than we can remember – in fact, it has almost become like a second home. It has been a huge learning experience, not only for the students but also for staff at BIT and at UCLan.

China has a very different culture from the UK's. Frequently we made the wrong assumptions about how things were done. We thought physics laboratories in China would run very much like those in the UK, but getting students to record experimental work in a laboratory notebook and treat errors in the usual way has proved a significant challenge. We also discovered that students usually take the undergraduate course that their parents select, and therefore marketing must be aimed



Programme leader Dr Alan Christy with four of the successful graduates.



UCLan teaching staff celebrating the end of a long assessment week with colleagues from BIT at Prince Li's Palace.

towards parents rather than the students themselves.

Of course the students (or their parents) must pay for this programme, but it has lots of advantages for them; the first two years are much cheaper than coming straight to the UK, and the third year is offered at a discounted rate; and at the end, the student will have gained a UK degree, good English skills and hopefully entry into a UK masters programme. BIT benefits too, since it earns income from the first two years and the scheme allows it to increase its student numbers beyond the limits set by the state. Its staff are also exposed to UK teaching and learning methods. We, of course, benefit from the income and the fact that it is a very interesting

scheme to be involved in.

The programme has caused us huge logistical problems since we have to run an assessment board each year at BIT. It has to be run like a military operation. Our usual assessment board for UK students takes place here at UCLan. We then fly out to BIT and start the process of moderating assessments and examinations. A day or so later we are joined by our external examiner, together with Sue Avanson, our senior administrative officer. There is then a week of intense activity, which results by its end in students completing reassessment and having a transcript to enable them to obtain a UK visa. Some students have to be reassessed during the week and English marks have to

be approved by our languages department back in the UK, giving us problems with the eight-hour time difference. We also review the operation of the programme, agree actions and set a calendar for next year. The latter can be difficult because we have holidays at Christmas and Easter, whereas they have the Spring Festival in February. Next year, our Year 1 students at BIT will be taking Semester 1 examinations on Christmas Day!

Of course, it is not all work. Over the years we have been privileged to visit many of the places of interest not only in Beijing but also in other cities such as Xi'an and Shanghai, and to experience Chinese culture in its many forms. Clearly China is an economic superpower in the making. Every time I go, there are more cars on the roads and more skyscrapers being built; the population is young and there is a huge dynamism which is often lacking in Europe. The visits are, of course, not just one-way and we have had a number of visits from Chinese colleagues to observe our teaching methods and exchange information with their opposite numbers here in the UK. They are always impressed by the greenness of the landscape and the clarity of the air, although they are seldom very complimentary about our food!

What about the students themselves? Feedback has been uniformly good. They have been complimentary about their experiences both at BIT and here in the UK. They have found the early stages of the course challenging, particularly answering examination questions in English, but have developed into much more confident individuals. Most are going on to business-related Masters programmes (one at the LSE) and will return to China with not only a good knowledge of physics, but also an understanding of English and Western culture.

Mike Holmes, Chair

All in the balance: the Universe's first catalyst?

When the Universe was just a picosecond old, some amazing things happened. The cause was a reduction in temperature that led to a phase transition. Not a change from gas to liquid, but a change in the all-pervading Higgs field from a zero-energy ground state to one with non-zero energy. This sudden transition changed everything.

Prior to this, every particle in the Universe was massless and moving at light speed. Then all the quarks and leptons (and anti-particles) and the force-carrying W and Z bosons began to interact with the Higgs field and their progress was impeded – they were no longer massless. (No hadrons existed – all the quarks were free particles.) The heaviest particles almost immediately began to decay to lighter ones and the temperature was too low to generate new heavy ones. Only photons, gluons and gravitons remained massless.

This would be dramatic

enough, but it was only the start. The number of matter particles exactly equalled the number of anti-particles, but this was also about to change. During this so-called electroweak phase transition, the Universe briefly went out of thermal equilibrium and new particle reactions began that allowed matter to turn into antimatter and vice versa. Subtle effects of the weak force caused the “forward” reactions to proceed at a slightly different pace from the “backward” reactions. Thus a tiny imbalance between matter and antimatter grew while the transition was taking place. When it was complete, this imbalance was locked into the Universe. Much later, in terms of picosecond timing, all the antimatter was annihilated – one anti-particle with one particle – leaving a residual amount of matter particles and lots of photons.

Since our Universe today has

about 1 billion photons for every proton and electron, it follows that the imbalance of matter over antimatter was one part in a billion at the end of the electroweak phase transition. The problem for cosmologists is explaining this figure of 10^{-9} . Using the Standard Model of particle physics, theorists obtain a figure of 10^{-18} , which is way too small – a factor of one billion!

Now the truth could require new and unknown interactions to create a much bigger matter/antimatter imbalance, but since they have to operate during the electroweak phase transition, it is hard to see where they are going to come from. (Any earlier cause of an imbalance would be wiped out by the phase transition, it turns out.) So what happened? No-one knows, but this situation is crying out for a catalyst to make a useful set of particle reactions run a billion times faster.

Chris Bowdery

BRANCH EVENTS

Friday 15 September

Building a Universe byte-by-byte

Prof. Brad Gibson (UCLan, Preston)

With an introductory talk on AQA Physics by David Baker. *Lancaster Girls' Grammar School, Regent St, Lancaster, 6.00 p.m.*

Wednesday 11 October

Is it possible to keep the lights on and save the planet?

Prof. Maxwell Irvine (Manchester branch Chair)

The talk will examine the energy options for the UK within the global context and the recent Energy Review. *Cavendish Colloquium Room, Lancaster University, 6.00 p.m.*

Thursday 30 November

Fabulous physics

Daytime schools event joint with SETPOINT Lancashire. Volunteers will be needed to help – watch for e-mail announcements. *Leyland Civic Centre*

Further talks will be arranged so check the website regularly.

NATIONAL & REGIONAL OFFICERS

Salary £30 000 – £35 000 per annum (pro rata for part-time) plus excellent benefits

National officer (Wales) – part-time (17.5 hours per week)

Regional officers (England) – full time in the South East, Midlands, North West; part-time (17.5 hours per week) in East Anglia

The Institute of Physics is seeking graduates, preferably in physics or physical science with a good knowledge of the English/Welsh (as applicable) school, higher education and political system.

You will have experience of creating and sustaining stakeholder partnerships. You will be responsible for the development and management of policy and political debate in relation to physics education and funding, physics outreach activities, partnerships with other science and industry bodies/agencies, and recruitment and retention of members.

For an application form and further information for this post please contact: HR Department, Institute of Physics, 76 Portland Place, London W1B 1NT. Telephone: 020 7470 4800; fax 020 7470 4892; e-mail: recruitment-london@iop.org.

Please note that the closing date for applications is 18 September 2006. Interviews will be held on 25 and 26 September 2006 in London, and will include a short presentation by the candidate.

The Institute is an Equal Opportunities Employer.

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www.iop.org

Got an idea for a branch event? If so, let us know

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