Institute of Physics

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 stalwarts receive awards from the Institute

Over the years, Peter Bates has been the Lanbria branch's secretary, chair and Paperclip Physics competition organizer. He has also been on the national organizing committee for Paperclip Physics and in January this year he, along with Liz Parvin and Mike Petty, received the Chairs of Branches prize at the Institute annual awards dinner at the Savoy in London.

In a somewhat less formal event on 10 May, the Branch committee held a dinner in Peter's honour at the Bello restaurant in Preston. Peter was presented with a certificate recognizing all his contributions to the Branch and to the Institute. And on the same occasion Alan Christy, who has recently resigned from the committee, was presented with a certificate for his long service of about 25 years, including two terms as chair in the 1980s.

Top right: Margaret and Peter Bates. Bottom right: Alan and Anne Christy.

The editor's lines on the leaves

This issue of *LANBRIA* is once again full of fascinating articles. Don't miss the moving e-interview with Laura Kormos, who was the professional physicist judge at the Lancaster heat of this year's Paperclip Physics competition. She tells her remarkable story, which took her from being an overworked waitress to a leading particle physicist, teaching at Lancaster University and doing research in Japan.

If you have an interesting story to tell – or know of a physicist in our region who has – then please get in contact.

You will also find news about outreach activities and the Galactic Gig roadshow, a report on this year's north-west region Paperclip Physics competition and a second e-interview (with student Gavin Davies).

LANBRIA has just had its third birthday – the first issue was dated Spring 2003 – so it is a good time to take a step back and look at it objectively. It's been lots of fun putting it together, but is it helping to promote the Branch and keep you informed? Do e-mail with your comments and suggestions.

The person I see in the mirror every morning tells me his term of office as chair ends at the AGM this month, but he has asked me to stay on as *LANBRIA* editor. I hope to continue serving you all in this capacity for a bit longer. Long live *LANBRIA*!

Chris Bowdery, editor

Paperclip Physics 2006: four

Every year the Institute runs the Paperclip Physics competition for schools, and this year was no exception. However, there were two changes to tradition for 2006; there were no national finals, so the regional final at the CCLRC Daresbury Laboratory was the ultimate event; and the age range was extended from years 11 and 12 to include Year 10 (fourth form in old money!) With my branch support officer's hat on, I had a role in all the events of the region, so I had, I think, an unique overview enabling me to compare and contrast the branches and try to pick out the good points, and perhaps the improvable ones.

For those unfamiliar with the competition, the teams of students have five minutes to explain a principle of physics or the workings of a household device to a non-scientist judge, using only equipment that can be found in a normal house and without mains services. They are provided with a table measuring 1.5 × 1.0 m, a noticeboard and 30 minutes to set up. Also on the judging panel are a teacher and a professional physicist. At the end of the presentation, the teams have to withstand five minutes of questioning. Each branch forwarded two teams to the final, which, as in previous years, was held at Daresbury.

The aim of the Institute is to stimulate interest in physics and to persuade the pupils to take physics to degree standard. The competition also builds skills in teamwork, presentation development and performance, and the best teams give genuine performances. A Year 11 team that won the Lancaster heat, for instance, set its performance around the family breakfast table to explain pressure in "Breakfast with the Pascals".

The competition is not too serious and we aim to give the teams a fairly fun time. Feedback suggests that ex-team members find the experience useful in gaining entry to, and in organizing themselves and others for collaborative efforts at, university. Generally, they enjoy it. To my relief, all the events ran well this year.

Manchester and Liverpool stuck to their normal methods. Manchester, with a large venue (The Maxwell Hall), was easily able to proceed along the usual lines – with judging immediately following presentation and questions – with the nine out of 12 teams that finally turned up. The downside of this arrangement is that the teams are waiting about while the judges deliberate, so the pace can be slow. But it does give an opportunity for the other professionals to talk to the teams about their presentation and offer gentle correction where necessary, as happened at Manchester when one team got a bit of its physics wrong!

Liverpool is more restricted in size of venue, using the Chadwick lecture theatre. It tends to break the heat into two, with a 40 minute interval for the first set of teams to strike and the second batch to set up. During this time the judges retire to evaluate the first group. This gives more pace to the proceedings, but restricts the time available for talking to the teams. This year only five out of the original nine entrants turned up, so we were able to run all the teams in one session. Using a lecture theatre has one major advantage in that seating is readily available for all who want to attend, so supporters can be encouraged.

Youngsters enter the fray

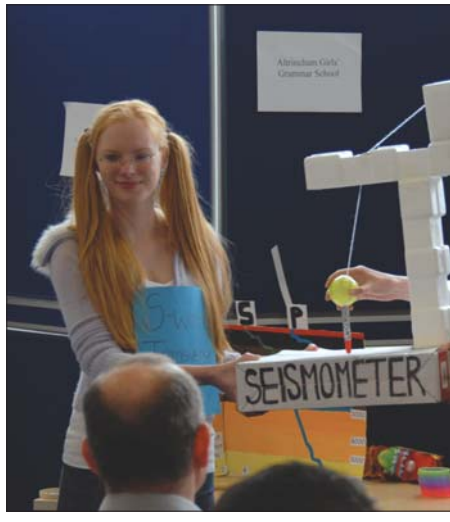
This heat was remarkable for having the youngest entrants ever, two Year 10 teams from Upholland High School, who acquitted themselves very well and clearly enjoyed the experience, but gave the judges a headache in trying to make allowances for what they could be expected to know and their maturity as compared to teenagers who were 13% older than they were with 20% more schooling to draw on.

Lancashire and Cumbria decided to use new (for them) venues this year. Rather than use the facilities of Lancaster and UCAN, they chose to use the National Football Museum at Deepdale, Preston and Lancaster Town Hall Banqueting Hall – the reasoning being that without the national final, the Branch wanted to make the heats more of an event.

The museum venue was fairly small, so we decided to run in two parts, giving the non-participating teams the chance to explore the museum. This worked partially, but one team complained that they had wanted to watch the second session as football was of negligible interest! Obviously, they could, but I had forgotten to make that clear. I also had to tour the museum to tear some of the teams away from the penalty shootout game.

For this and the Lancaster heat, the Branch had added a soft toy as a mascot for the winning teams to take to the final. This went down very well, and both mascots were prominent at the final. Lancashire and Cumbria also provided certificates for all the teams that entered. To my surprise, the schools value certificates – one school, in another heat, specifically asking if they would get one for each entrant and for the team, so they could be given out in assembly. In my view, one of the problems with the heats is the lack of any physical reward for making the finals at the heats. They all get a book, but this is not presented until the finals so that nobody goes empty-handed. Nor actually do they from the heats (everybody receives a "Paperclip Physics" pen), but there is no immediate recognition of the winners. Lancashire and Cumbria also invited along the editor of the *Lancaster Guardian* to present the certificates and mascot for that heat – which got us some coverage in the press.

In contrast to the Football Museum, Lancaster Town Hall Banqueting Room was huge, wood panelled and lushly carpeted, with portraits of Lancaster worthies staring down. This had me trembling in case a team loosed off another



Top: The King's School Macclesfield (Year 12) p science" on the principle of conservation of mo winner of both the Manchester heat and the fin Altrincham Girls' Grammar (Year 12) were winn "Journey to the centre of the Earth". Bottom: Ki "Breakfast with the Pascals". The cat was the m

heats and a regional final

presented "It's not rocket momentum. This team was the al (with perfect physics). Centre: ers of the Liverpool heat with rkbie Kendal (Year 11) do nascot they won at Lancaster.

Top: "And the winner is... the King's School Macclesfield!" The Rev. David Felix announcing the winners at the final. Mr Felix is vicar of All Saints Daresbury Parish Church – the rectory of which was the birthplace of the Rev. Charles Dodgson – and was the non-scientist judge for the final. Centre: Preston heat winners Westholme with "Physics that makes you quake". Bottom: The Van de Graaff was hair-raising on a cold and very dry day at Lancaster!

water-filled rocket to demonstrate momentum conservation! A quiet word was had, and luckily it transpired that the team that was using water ("Breakfast with the Pascals") had brought copious cloths to keep it off the carpet.

Here there was enough room to run a single session and Lancaster had provided several of its outreach toys: a spinning chair, a Van de Graaff generator, a super-long "slinky" and a team to work them all, keeping the competitors entertained with 40 000 V sparks and other excitements during the judging.

CCLRC Daresbury Laboratory provided a good location for the finals. Although it was a long way for the Cumbrian team, access along the motorway is easy; its education centre is a good venue for lunch and the Atrium is an imposing area for the presentations.

The winner was the King's School, Macclesfield, with "It's not rocket science". Each team member received a digital camera, and the team also got a flying bear that sings "Fly Me to the Moon" – in recognition of a soaring achievement! Runner-up was the team from Altrincham Girls' Grammar School.

Pros and cons

The biggest headache for me was finding the judges. Each event needs a non-scientist, a teacher and a professional physicist to judge it. The specification includes being good with teenagers, and being supportive while asking appropriate questions. The non-scientist must pick out any bits they didn't understand and ask for clarification, which can lead to some lethal questions. One team in Manchester that had been talking about electrons and magnetism got asked by a very non-scientist accountant, "What's an electron?"

I was fortunate in being able to delegate most of judge-finding to the branch committees. In particular, many thanks to Ann Marks, Chris Bowdery and Phil Latchem. But there were always the last-minute panics; a family event caused one teacher judge to withdraw at three days' notice, and one professional judge was sent to a meeting (she did find a deputy). Venues, at least, don't have either problem – once booked, you are likely to be able to use them. Again my thanks go to the branch committees for procuring venues, and in particular to Anne Humphries of Daresbury, Steve Barrett, Chris Bowdery and Ian Morrison for the work they put in to organize the venues at Daresbury, Liverpool, Lancaster and Salford.

Is it worth it? Not for me to say. It is costly in both time and money. The competition attracts a disproportionate number of private schools, leading to charges of elitism. In the region roughly 120 pupils from 18 schools took part, so it is arguable that it reaches too small an audience.

On the other hand, feedback suggests that all participants enjoyed the events and staff reported that it also acted to raise the profile of physics and the Institute around their schools, so the effect is not just on those taking part. But it would be difficult to claim that many pupils were moved to change to a physics degree as a result of participation.

I personally think extending the age range made it too difficult to make proper allowances for the gap in maturity and experience between the Year 10 and Year 12 pupils. I would suggest that the branches consider offering separate prizes and certificates for the best teams in each year group in the regional competition. This might encourage more schools without 16–19 provision to take part.

The lack of a national final has taken the edge off the event for the schools – the trip to London or Birmingham in previous years was a prize in itself. Because of this there is, as the branches recognize, a need to make the regional final as much of an event as is possible.

John Bradshaw
NW branch support officer

E-interview with Laura Kormos

Laura Kormos is a lecturer and second year Director of Studies in the physics department at Lancaster University. She has kindly agreed to be interviewed.

What is your background?
I was raised on a farm in Saskatchewan, Canada. After attending high school in Calgary, Alberta, I'd had enough of school and wanted a break before university. The break turned out to last 13 years.

I took my first physics course when I was 30, in British Columbia, Canada. Before that I had done a lot of other things, including directing city choirs and folk groups; writing original four-part choral pieces; working in warehousing, manufacturing, clerical, accounting, and waitressing jobs; and starting a family. After a bad night of waitressing, I decided to become a particle physicist instead.

My children had started school, so it seemed like a reasonable time. Unfortunately, my marriage broke down when I was in the third year of a five-year co-op degree [similar to the UK's sandwich degrees]. I continued on in the programme and raised my children, then aged 9 and 11, alone, whilst obtaining my BSc, MSc, and a PhD in particle physics working on the OPAL experiment at LEP.

How did you first become interested in physics?
When I was 11, our teacher told us that everything in the universe was composed of particles called molecules. She must have noticed me looking very closely at my desk trying to find them, because she added quickly that they were much too small to see with the naked eye. I didn't believe her. Soon after, she brought in a container of iron filings and a magnet. When I saw the iron filings, dumped helter-skelter onto a piece of paper, align themselves along the lines of magnetic force when the magnet was held beneath them, I passed my hand between the paper and the magnet to ensure that nothing I could see or feel was passing between them. It astonished me that there were things – particles and forces – in the world that I couldn't see, yet they had an effect. I knew I wanted to learn more about those particles and forces, because they were clearly important.

Laura Kormos came late to physics: "After a bad night of waitressing, I decided to become a particle physicist instead."

How did you come to work at Lancaster University?
My partner is also a particle physicist. We were separated for a year and a half when I graduated with my PhD ahead of him in Victoria, British Columbia. I got a post-doc position in Kingston, Ontario, about 2000 miles away. After he graduated, we wanted jobs that would allow us to live together. He applied for a position in Liverpool, and I applied for the Lancaster lectureship, which really was a good job for me to get, regardless of the personal considerations.

What research are you doing?
I'm working on the T2K (Tokai to Kamioka) experiment, a long-baseline neutrino experiment in which muon neutrinos produced at an accelerator in Tokai Japan will be aimed towards the far detector, SuperKamiokande, in Kamioka, 295 km away. The purpose of the experiment is to determine the mixing angles for neutrino oscillations. In order to do this, one needs to find out the properties of the neutrino beam before the neutrinos have had a chance to oscillate into other types.

Hence, the UK is involved in constructing the Electromagnetic Calorimeter (ECal) for a near detector, the ND280, which will be situated 280 m downstream of the neutrino production target and will allow us to characterize the muon neutrino beam before oscillation. I am one of two work-package managers responsible for the ECal Hardware work package, and as such I will be ensuring that the ECal is built and delivered according to schedule. Data-taking is to start in 2010.

How do you rate the physics teaching at Lancaster compared to elsewhere?
I don't feel that it's easy to make comparisons, so I don't want to answer this one. I will say that I very much enjoy teaching my students, and value the extra interaction with them that being Director of Study gives me.

Have you had any difficulties being a woman physicist?
Sometimes, in situations where I've been in an all-male research group that has not had women working with them before, I've found the social culture to be rather irksome. I suppose that women often expect different things from men in terms of social behaviour in the workplace. Professionally, however, I've always been treated with respect.

What do you do to relax?
I value my close relationships with my partner and my children, so chatting with them is very rewarding. My partner and I also love to hike, jog, cycle, backpack, and visit heritage sites. I used to do ballet or karate in Canada, but haven't yet got back into it since I moved here.

What books do you like to read?
I like a lot of different books. Jane Austen and Charles Dickens are both favourite authors of mine, as well as James Michener. For something light, I sometimes read something by Maeve Binchy.

Do you feel that female role-models are important in physics?
When I was a student, I personally didn't feel any need for a female role-model, perhaps because I'd already decided what I wanted to do. However, I've found that some of my female students look up to me as a role-model, which is an intimidating circumstance to get used to at first! For them, it does seem to matter.

Outreach events: news round-up

At Westmorland Shopping Centre: children and Einstein (aka Chris Bowdery) charged to high voltage using a Van de Graaff generator.

The Branch sometimes receives requests from schools and our local SETPOINTs to help with science events, or put on physics activities for the general public. Since the last issue of *LANBRIA*, volunteers from the Branch have visited St Patrick's RC Primary School in Heysham (Lancashire), Witherslack Hall School near Grange-over-Sands (Cumbria) and Kingmoor Infant School in Carlisle, and held a Physics Fun Day (with SETPOINT Cumbria) at the Westmorland Shopping Centre, Kendal.

SETPOINT Lancashire has received a £1000 grant from the Institute's Public Engagement Grant Scheme. This is for a Physics At Work event in the autumn which will be using the Einstein Year resources box given to Lancaster University physics department and volunteers from the Branch, possibly plus other Science and Engineering Ambassadors (SEAs) in Lancashire. Watch out for more news about this in LANBRIA and by e-mail.

The 2006 Annual General Meeting

of the Lancashire & Cumbria Branch of the Institute of Physics

will take place at 6.00 p.m. on 14 June 2006
in the Frankland Colloquium Room, Lancaster University

It will start with a talk from Dr Aneta Stefanovska (Lancaster) entitled: "Nonlinear dynamics of the cardiovascular system".
The business part of the meeting starts at 7.00 p.m.

Agenda

1. Minutes of the 2005 AGM
2. Institute strategy: the chief executive
3. Chair's report
4. Treasurer's report
5. Secretary's report
6. Election of officers
   - Chair – Prof. Mike Holmes nominated
   - Secretary – Dr Steve Bailey nominated (for a fourth year)
   - Treasurer – Dr Dick Collins nominated (for a third year)
7. Election of committee members
   The Committee shall comprise the officers and ordinary members, including members in the following capacities:
   - vice-chair
   - a representative for education
   - a representative for media and publicity
   - a representative for industry
   - student representatives
8. Changes to the Branch "Schedule" document
9. Any other business

Galactic Gig: new grant is awarded!

In summer 2004, the Branch received £2000 funding for a week-long outreach presentation for schools in June 2005 – a project that became known as the Galactic Gig (see *LANBRIA* August 2005). The branch added a further £1500 of money from its reserves to make the Gig happen.

We hoped that further shows would be possible and, to that end, a DVD was created to publicize what the Gig is about. It was produced using video footage recorded at Archbishop Hutton Primary School, Warton, near Carnforth – supplemented by subtitles to compensate for deficiencies in the soundtrack. Copies have been sent to all Institute branches and HQ.

In March this year, the Branch applied for £965 of additional funding from the Institute's Public Engagement Grant Scheme for at least five more performances of Galactic Gig in the Lancaster area in 2006. In April we heard that we would be receiving the full amount, which is excellent news!

The money has been used to purchase an Acer video projector (which is at the heart of the Gig and rarely available in primary school assembly halls), with the remainder to be used for equipment transport and costume hire costs.

The first few performances will take place in June, and the rest in the autumn. In addition, a short tour is being planned for July to Lewes and Brighton in the south of England, at the invitation of the South Central branch. We're packing our buckets and spades already!

Galactic Gig team

Chair's corner: physics fans get ready for action

Yes, the long wait is nearly over. Months of preparation are about to pay off. The pundits said it couldn't be done. But we're almost there...

I am, of course, referring to the Branch AGM, which kicks off at 6.00 p.m. on Wednesday 14 June at the Frankland Colloquium Room, Lancaster University. Actually, the AGM proper will occur at about 7.00 p.m., after the talk by Dr Aneta Stefanovska with the heart-pounding title "Nonlinear dynamics of the cardiovascular system". Definitely a night of two halves!

The branch is delighted that the Institute's chief executive, Dr Robert Kirby-Harris, will be coming off the bench (at HQ) to present the Institute's strategy and the latest news. I will be acting as "referee" for the evening, which will be my last duty as Branch chair.

I'm going to let you into a secret now – the Branch officers have only just read the constitution properly! For the past four years we have been running the Branch using what we thought were the correct rules – but we were mistaken. It turns out that all officers and committee members have to be elected annually for a maximum of four years – NOT every other year for a maximum of two terms. Consequently the AGM agenda (opposite) has been changed from the announcement in April's *LANBRIA* – we now need to elect (re-elect?) the secretary.

Do please come along and support the Branch by making the AGM quorate. We guarantee that no-one will be asked to join the committee (unless they explicitly want to!) and there won't be any extra time.

They think it's all over. It will be – unless you come and vote!

Chris Bowdery, outgoing chair

Don't miss the AGM!

E-interview: Gavin Davies on studying in the States

Gavin Davies is a final year MPhys/USA physics student.

How did you first become interested in physics?
I studied physics as an A-level at school. My physics teacher encouraged me to continue studying physics at degree level because of my strong understanding of and enthusiasm for the subject. I was particularly fascinated by particle physics and its role in life. I decided to study physics because it would leave the door open to many different career paths, because of the high level of understanding and numerical skills it would help me show to prospective employers. Physics is a degree that is held in great esteem.

Why did you choose Lancaster?
When I was applying to the universities I was considering also studying a language alongside a physics degree; however, what lured me to Lancaster was the offer of a year in the US. I was also impressed by the very highly rated physics department that Lancaster University has.

Gavin chose Lancaster University for its good reputation in physics and its US exchange scheme.

So you spent your third year in the US?
Yes, I went as part of my degree scheme to Michigan State University – a university 10 times the size of Lancaster. I consider it one of the smartest decisions I've ever made. Beyond physics, I met so many new people and got to travel all over the US.

You have been a Lab in a Lorry volunteer. What did you teach? What did you learn?
For Lab in a Lorry I taught groups of six pupils aged 13–14 about resonance. I got them to discover the effect of this phenomenon by experimenting with sound frequencies to make a glass wobble – and maybe even shatter. Even though I understood the fundamentals of the physics better than the pupils I taught, it still helped me to gain a better understanding of resonance.

What is next for you?
I am hoping to be admitted to Lancaster's postgraduate program. For the next three years I'm planning on studying for a PhD in the high-energy physics field.

What do you do to relax?
In my spare time I enjoy playing, as well as watching, football and rugby. I plan on frequenting the pub this summer to catch most of the World Cup games and am excited that that will start soon. Also, I'm a huge fan of Formula 1 motor racing. Michael Schumacher is the racing driver whom I follow most avidly.

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Please e-mail your contributions to the next issue of this newsletter to

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Programme of branch events: June–Oct 2006

These are the talks organized centrally. There will probably be at least one local members' talk in Keswick later this year.

Lancashire & Cumbria branch Annual General Meeting
Wednesday 14 June, 6.00 p.m.
Speaker: Dr Aneta Stefanovska, Lancaster
Frankland Colloquium Room at Lancaster University
"Nonlinear dynamics of the cardiovascular system"
Reports by officers and the usual elections will follow this talk.

Friday 15 September, 6.00 p.m.
Speaker: (tbc), Imperial College, London
Lancaster Girls' Grammar School
A-level prizegiving lecture:
"What Cassini/Huygens has told us about Saturn"
With an introductory talk about AQA physics by David Baker.

Wednesday 11 October, 6.00 p.m.
Prof. Maxwell Irvine
Chair, Joint Information Systems Committee and West Midlands Regional Innovation Strategy Group; Board member of PHLS and Council member of NERC
Frankland Colloquium Room at Lancaster University
"Is it possible to keep the lights on and save the planet?"
The world is currently more than 80% dependent on fossil fuels. Between the years 2000 and 2050 the global demand for energy is conservatively estimated to double. Are the reserves of current energy sources sufficient to meet demand? What impact will this energy demand have on our environmental, political and economic stability?

The talk will review the energy options for the UK within the global context.

Further autumn talks are being arranged – details to follow.

Visit the branch website at http://lancashire.iop.org