

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.

Einstein Lecture shows the future is interactive

A week-long series of lectures and demonstrations began in spectacular manner on Monday 4 July at Lancaster Girls' Grammar School. The school's Science Festival, incorporating more than 20 individual events based both there and at some of its partner schools in the Lancaster area, played proud host to an Institute of Physics Einstein Lecture entitled "Our planet – our future".

The lecture's presenters were Dr Karen Bultitude, who works with the University of the West of England and has appeared on BBC Learning Zone and Scrappy Races, and Dr Laura Grant, who currently works in outreach programmes at the University of Liverpool and has presented for both the BBC and 4Learning.

An innovative feature of the presentation was that it allowed the audience to choose its own lecture topics from within a general framework (this was compared to the Ask The Audience option in *Who Wants to Be a Millionaire!*). With fingers poised on their interactive handsets, pupils in the packed school hall voted to learn the answers to questions such as: How will cars work in the future? Can scientists build a Sun here on Earth? and Will extreme weather wreak havoc on our world?

Aided by an amazing arsenal



Orange paper balls act like neutrons in an audience-led demonstration of nuclear fission. The lecture was part of the LGGS Science Festival.

of props that included exploding hydrogen balloons and swirling flame tornadoes, Drs Bultitude and Grant delivered an inspiring and thought-provoking lecture to a captivated and appreciative audience.

The presentation focused on environmental issues and the solutions needed to ensure that we can plan for a happy and healthy future on Earth, examining the ways in which science and technology are helping us to understand the impact that modern human life has on our fragile planet.

The Lancaster Girls' Grammar School is very grateful to Karen



Dr Karen Bultitude and Dr Laura Grant demonstrate the behaviour of plastics when heated.

Bultitude and Laura Grant for giving up the time in their busy schedules to deliver the Einstein lecture. It left a long-lasting impression on its audience.

Nigel Marshall

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

On the road with Galactic Gig: th

The Lancashire and Cumbria branch originally started planning an Einstein Year event back in June 2004. Anne Small, one of our committee members, approached an organization called Lancaster Concerts that was keen to write and perform a musical concert that would tour schools in the region, with the branch providing some physics experiments/demos to go with it. Funding of £2000 was requested to pay for the event, which was dubbed "Physics and Music".

Shortly after hearing that our bid had been successful, Lancaster Concerts decided to pull out of the venture. However, we decided that somehow or other we would go ahead with the plan, and do Physics and Music ourselves.

In the autumn of 2004, a small working group of the branch committee was set up to make a new plan and carry it through. A branch member, Robyn Halford, heard about the situation and volunteered her services as a supply physics teacher. And Bob Jones, who has been involved with BA Science Week events in Cumbria (and who works at Lancaster University, as do all the other members of the working group) offered his experience with physics demos for schoolchildren.

How the Gig was born

The working group opted for a tour of primary schools in Lancashire and Cumbria, since the distances involved and the geography of our area mitigated against inviting schools to a single venue. We decided to write a drama to help Years 5 and 6 (upper primary-school age) with their Key Stage 2 topics of the planets and sound, as this fitted in well with the funding we had received for a physics and music event. Scripts were created and merged along the way until the central ideas for what became known as the Galactic Gig were established. These were as follows:

- An extraterrestrial visitor called Zubi arrives on Earth with a spaceship to give Cynthia and Hermione, two Earth girls, a trip

around the solar system;

- Cynthia (Greek for Moon) is doing a project on the planets;
- Hermione (chosen to sound like harmony without being 100% obvious) is a musician and a party-goer;
- Zubi comes from a world with no air and knows nothing about sound;
- Zubi communicates directly by radio waves, and he communicates with Cynthia and Hermione (in their presence) through their mobile phones;
- the planets appear on a screen, getting bigger as the spaceship approaches so the illusion of a journey is maintained – laptop computers, video projector and white reflecting screen are used;
- the same screen is also used to display pictures of musical instruments plus videos of physics (sound) demos and oscilloscope traces, etc;
- music as well as sounds are used – with a sound system;
- dance sequences are involved;
- throughout the show, Einstein acts as a narrator, using raps to get his message across;
- full costumes, props and versatile stage sets to be used.

We arranged to give two performances every day during the week of 13–17 June 2005, at five different primary-school venues. Other primary schools came along to watch as well. The venues were:

Monday 13 June Kirkby Thore School near Penrith in north-east Cumbria (Appleby Primary School visited).

Tuesday 14 June Croftlands Junior School, Ulverston, in south-west Cumbria (Penny Bridge Primary School visited).

Wednesday 15 June Whitefield Primary School, Penwortham, Preston, Lancashire (Penwortham County Primary School visited).

Thursday 16 June Feniscowles Primary School, Blackburn, Lancashire.

Friday 17 June Archbishop Hutton Primary School, Warton, near Carnforth, Lancashire (North Road Primary School, Carnforth, visited).

Each performance lasted about 35 minutes and was



The team, clockwise from back left: John, Bob, Chris, Mark, Steve, Robyn, Ruth and

The Lanbria branch brings physics, m



Above left: pupils from Carnforth watching a demonstration.



Zubi and Einstein (aka Chris and Mark) at Penwortham, Lancashire.



Team members Steve (left) and Robyn (right, at high voltage!)

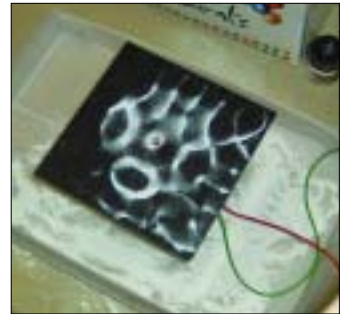


Zubi, Cynthia, Hermione and Einstein performing the Galactic Gig at Warton on 17 Ju

Music and drama to local schools



The van de Graaff generator (left) was a big hit with pupils. Right: a real image of a little pig floats above a pair of convex mirrors.



Experiments with North Road Primary School children. Right is a Chladni's Plate showing sand patterns on a vibrating surface.



Pupils from Archbishop Hutton Primary School enjoying the hands-on activities designed to get them thinking about physics.



followed by hands-on activities in small groups for the children. A complete session took about 90 minutes.

The weather was inauspicious on Monday 13 June, the first day of the Galactic Gig tour – low clouds and rain as we arrived in Kirkby Thore, near Penrith, in Cumbria. The equipment for the show arrived by transit van, driven up from Lancaster University by Bob Jones. We managed to unload it into the school hall despite the drizzle. Everyone was nervous – the actors were still reading through their lines, well aware that we had not had a complete rehearsal with the final visuals. Big questions remained about the seating in the hall and the position of the white screen.

Somehow, though, everything was eventually set up, the actors got into their outfits, Caitlin Watson (Einstein Year

coordinator for the Institute of Physics) arrived from Liverpool and the 30 or so schoolchildren were in their seats. Enter Albert Einstein to introduce the show:

*Hello everybody, how do you do
My name is Einstein, and Albert
too
I'm here today just to give you a
lesson
About space and sound, now
ain't that depressin'
Now just for today we'll take you
on a tour
Round this solar system, and I'll
tell you what's more
We'll show you the planets as
we go
And tell you 'bout sound and
how it does flow
Now let's get started, on with
the show
Catch y'all later, I really must go!*

Forty minutes later, the first ever performance of Galactic Gig was

over. We were all relieved, but there was no time to relax as it was on with the hands-on experiments. On subsequent occasions we set these up before the drama, but on the first day we were not that organized. Finally we were ready, and the pupils really enjoyed learning about vibrating strings, being charged up by a van de Graaff generator, seeing how their singing looked on an oscilloscope and other activities.

By 11.30 a.m. everything had to be put away to allow the school catering staff to set up for lunch. So we headed off to the nearest pub for a meal, where Caitlin provided some immediate feedback about the show and everyone relaxed.

At 1.30 p.m. we were back in the school for another performance, this time for Appleby School pupils. The drama began well, with the

actors positioning themselves better. Suddenly there was a crashing sound – the mobile set had partly collapsed. But the actors carried on regardless and the show was again a success.

At the end of the day the performers drove back across the moors to Lancaster to the cry of "two down, eight more performances to go!"

A total of about 255 pupils from the nine schools watched the Gig. The children appeared enthralled both by the drama and by the hands-on experience afterwards. We very much hope that an early spark of interest in science, and particularly in physics, has been kindled in some of them.

And yes – owing to the cost of equipment hire, prop purchases, van hire, travel etc, we managed to spend all of the £2000! **Chris Bowder** Galactic Gig member

Nonlinearity in Lancaster: an international viewpoint

Our region plays host to many physics students from around the world. One such is Alexandra Pershakova, who comes from Russia and is currently finishing her PhD degree at Lancaster University. Although she is very busy, she kindly agreed to an e-mail interview with LANBRIA.

LANBRIA: What area of physics are you studying at Lancaster?

AP: I do nonlinear dynamics. Basically I model living systems – these happen to be nonlinear, as are most of the phenomena in nature.

LANBRIA: Why did you choose Lancaster?

AP: Well, if you go and search on Google for the subject of nonlinear research, you will eventually come to the Lancaster Nonlinear Group's Web page. Here they write about their interests as a research group, which are actually very multifaceted. This attracted me. You have a choice of doing something particular while next to you there are people doing something completely different within nonlinear dynamics research – you have the chance to get involved in several different projects at the same time. I personally really like it. Also, they are always happy to get new students here, and at the time I found about Lancaster they had some scholarships.

LANBRIA: Where did you study before coming to Lancaster?

AP: At St Petersburg State University in the Applied Mathematics department.



Alexandra Pershakova (far right) with her fellow students.

LANBRIA: What's next for you?

AP: I have no idea. I do not have time to think about it now. I am trying to finish my thesis, while working at the same time to get some money for my living expenses, because I don't have a scholarship now. So as a result the only things I am thinking about now are finishing as soon as possible, getting a full week of sleep, reading some nice books (that I have but don't have time to read) and having a good walk somewhere – in a forest, listening to birds singing, wind whistling, and no noise produced by computers in a lab!

This is probably not what most people would want to hear as the plan for the future for a PhD student, but that is how it is with me!

LANBRIA: Have you been able to visit the hills and lakes of Lancashire and Cumbria? How does it compare with your home

region in Russia?

AP: I haven't really had many chances to visit the lakes. I have been a couple of times there, but I didn't really like the places I have seen. I like a forest where you can hardly see 20 metres in front of you, i.e. when it is really dense. Here I haven't seen many places like that. Hills are quite bald here.

LANBRIA: Have you had any difficulties or good experiences as a female physicist, here or elsewhere?

AP: I haven't really had any bad experiences as can happen to some females – neither here nor anywhere else. Say in Japan, for a woman to become a scientist (or to make any academic career) is impossible. I have never met any difficulties like that in my life yet.

As for good experiences – people often show a lot of respect to you as soon as you

say you are doing a PhD in physics. For many people physics is something really complicated and impossible to understand, so when they meet someone, especially a woman, who is able to understand this, they really admire her. However, for a woman, it is nothing but her normal job, like someone else has his/her thing to do as daily work.

LANBRIA: What has not been good about Lancaster/England?

AP: Lancaster is a very small city; to live in a big place is my personal preference. Living in St Petersburg I got used to having a big variety of things to see and do – cultural events which happen just right next to me. So from this point of view being here is not that attractive for me. Not much choice of events in Lancaster, so you have to go to another city.

LANBRIA: What has been good about Lancaster or England?

AP: I like that in England people are more open to foreigners than in other European countries. I quite like English culture, their "calmness" – it makes me calm as well in some sense. As for Lancaster, it is a good place for those who like walking, lakes, hills. As for me, I like the fact that it is right in between the north of the country and the south, so you have a choice to move in different directions if you like travelling.

LANBRIA: Thankyou very much. All the best for the future.

Planning an event to celebrate Einstein Year?

For information about funding, visit

www.einsteinyear.org/get_involved/funding

Graduation success for branch member Mark

LANBRIA is delighted to report that branch committee member Mark Hetherington graduated from Lancaster University on Monday 11 July 2005 with a 2.2 BSc degree in physics. Mark played a leading role in preparing the visual images for the Galactic Gig and acted the part of Albert Einstein. At the university he was chairman of the film society.

Mark now hopes to go to Warwick to do a PGCE and become a teacher. It is a great disappointment for the branch to lose him in the middle of Einstein Year – take care of him, Midland branch!



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

**Monday
8 August 2005**

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

The editor's lines on the leaves

This issue features a report and lots of photos from the Galactic Gig, the schools roadshow which took place on 13–17 June 2005. As you will see, it was loads of fun and very educational – and not just for the kids! Special thanks are owed to Anne Small, who originated the idea of a Physics and Music show and who went on to coordinate the Gig, and also to Bob Jones who shared the leadership duties. I also wish to thank Robyn Halford for all her contributions in the props and costume department and for being the professional teacher when it came to holding the children's attention. Enormous thanks go to Ruth Perkins and Mark Hetherington, our undergraduate student actors, and also to Steve Bailey who did a bit of just about everything. Sadly we must now say farewell to Mark, who has just graduated from Lancaster.

John Bradshaw, our branch support officer, helped out every day during the week when the Gig was running. We certainly got our fair share of his services in June. Lastly, a big thankyou goes to SETPOINT Lancashire staff Barbara Tigar and David Riding, who provided invaluable assistance in arranging the venues.

This issue also includes an interview with Alexandra Pershakova, a PhD student from Russia at Lancaster University. And Nigel Marshall has penned an article on the front page about the Science Festival that

took place at Lancaster Girls' Grammar School. Nigel is a part-time teacher at the school as well as being project director of Spaced Out and the chief examiner for GCSE Astronomy. Next month we will be bringing you a report from this year's Eureka! competition, which took place on 2 July.

Finally, a special mention is in order for LANBRIA's layout designer in Bristol, who recently got married. Congratulations and best wishes Lucy Patterson!
Chris Bowdery Chair



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IOP EVENTS

24–25 October 2005

PD 2005: a two-day development conference
London

Meet and develop with 100 physicists and engineers from every sector imaginable at PD 2005. For information and to register go to <http://careers.iop.org/pd2005>.

This conference IS NOT about technical aspects of your work. You will not hear anything about the latest techniques or tools available (unless another participant mentions these to you over the excellent dinner on Monday night).

This conference IS about exploring your own skills and talents and enhancing your ability to work in different situations within your organization.

Topics in store for the 2005 event include:

- Setting and achieving personal goals

- Communication skills – how to handle yourself, your manager and your colleagues
- Time management
- Avoiding stress
- Team building
- Delegation
- Chartered status – what it is and how you can get it
- Excellent networking opportunities
- Plus more...

Conference fees will be just £210 for members, with a 50% discount for students. The conference dinner is included in the price but delegates are asked to organize their own accommodation. A list is available. Fees include VAT.

Non-members are also very welcome to attend the event. Fees for non-members are higher at £250, but they can qualify for the member rate if they submit a membership application at the same time as registering for the conference.

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