

YORKSHIRE PHYSICS NEWS



The newsletter of the Yorkshire branch of the Institute of Physics

Spring 2006

Robot ships set sail from York

Picture a computer with no keyboard, mouse or monitor – just projected light, and a space that behaves like magic.

But this is no figment of the imagination. It is Robot Ships, a unique exhibit that was designed and produced by the Department of Electronics at the University of York, and recently unveiled to the public at Connect – the new science and technology gallery at the Royal Museum in Edinburgh.

Robot Ships, which went live on 16 February 2006, uses the technology of video-augmented environments to create a tabletop ocean. Simply by touch, users can help or hinder robotic boats to work together to clean up oil spills, caused by virtual ocean tankers running aground on islands in the tabletop ocean.

The autonomous seeker robots search for toxic spills which are then cleaned up by cleaning ships. The exhibit



Past work on video-augmented environments: audio is triggered by photo placement and controlled by moving the photos.

illustrates how robots of the future could co-operate in a way that is based on the behaviour of living things.

Connect forms part of National Museums of Scotland's 15-year vision for the development of its flagship Edinburgh site. It will be

a free and permanent addition to the Royal Museum and uses a blend of iconic historical objects, multimedia and interactive exhibits to cover topics ranging from energy and power, space technology and transport to robots and genetics. It has been designed to have wide appeal, and act as an important new educational resource for families and schools.

Robot Ships was commissioned by Connect Gallery project manager Lyndsey Clarke following the success of earlier video-augmented environments produced in the Electronics Department at York.

The York project team – Justen Hyde, John Mateer, Dan Parnham, Prof. John Robinson and Steve Smith – created the exhibit, working with a furniture designer, a graphic designer, a learning consultant, audiovisual professionals and the museum.

Prof. Robinson said: "The

technology behind Robot Ships is computer vision – a video camera watches everything that happens on the table and real-time processing works out how the boats' world is affected.

"Earlier public 'video-augmented environments' have been in carefully controlled lighting, usually in darkened rooms. But Robot Ships must work continuously in a gallery whose ceiling is mainly a large skylight. This meant we had to devise new video analysis methods to adapt reliably to changing illumination and shadows."

The process of creating Robot Ships has provided new research insights that the team is already using in other video-augmented environments. Robot Ships also relies on "OpenIllusionist", an Open Source programming library invented by team members Dan Parnham and Justen Hyde.

Branch matters: your committee needs you!

The Yorkshire branch is looking for new members for its committee. Many exciting projects have been going on throughout the Yorkshire and Humber area, including science and art initiatives, teachers' events and interesting new demonstration lectures and talks, but none of these will be able to continue, nor new things be developed, without YOU – the Yorkshire members.

The future is pretty exciting for the Yorkshire branch – we have a host of ideas that we would like to realize, including

an interactive schools' environmental exhibition and even more events for students. We are also looking at ways in which we can better support teachers in the region and involve members who maintain an interest in physics even though they are not working in the field. A regional office of the Institute is being set up in Yorkshire and the North East, with full-time staff members to help us develop the Institute's work in the region.

Committee membership is not arduous; we get together four or

five times a year for meetings at York University and then again for several social events. All committee members are volunteers, so everyone has flexible levels of commitment. At present the committee consists of a wide variety of people who specialize in different areas of physics and related fields, and whose ages vary widely. We would like to retain this diversity, and are looking for enthusiastic people from all professions and backgrounds. We are especially looking for people to represent physics in

industry, to ensure that we are covering this section of our membership's needs.

Come along to a meeting and see what we're like – then see if you would like to join us for what is going to be a really exciting time.

If you would like to have a chat about how you can get involved, please contact Chris Butlin on 01904 607169 or at ChrisAButlin@aol.com, or speak to one of the other committee members. All our contact details can be found on the website at <http://yorkshire.iop.org>.

Astrophysics hits schools

An interest in the universe, the stars and space travel is the reason that many young people get into physics, and these topics are being given increased emphasis in the new GCSE specifications. The Yorkshire and Humber Science Learning Centre has devised a two-day course to help teachers tackle the subject.

Day one will cover the fundamentals of astrophysics, such as the origins and expansion of the universe and the life cycle of stars, and also outline some recent advances in cosmology, astronomy and space science. Day two will focus on observation and further applications of astronomy, including post-16 topics. There will be opportunities to develop and evaluate new teaching techniques, such as effective



Space science fascinates pupils.

use of the Faulkes robotic telescope for live observations in the classroom.

The course leader is Dr Roger New, who is a principal lecturer in applied physics at Sheffield

Hallam University and works across a range of topics from physical instrumentation to astronomy. Roger's work encompasses solar research, teaching, and promoting scientific engagement with teachers and the public.

During the course, participants can expect to develop their knowledge and understanding of astrophysics topics in Key Stage 4 science, use new teaching resources and approaches and explore contemporary issues with scientists who work in the area.

The course is being run on 23 November and 15 December at the Science Learning Centre in Sheffield. For more details, including current prices and availability, see www.science-learningcentres.org.uk or phone 0114 225 4891.

York Uni Physics Christmas Ball

The Physics Christmas Ball is a well established tradition at York University, and usually attracts a varied crowd that ranges from first years through to post-grads, and even the odd lecturer and their significant other. The ball is normally organized solely by Physoc, but for Christmas 2005, thanks to Institute funding, we planned a much larger event.

The doors at the York Moathouse Hotel opened to 135 guests and after hitting the bar, the masses headed through to the Henley Regatta Suite where they were greeted by 13 tables, each of which had been given the name of an eminent physicist. Table number one was dubbed Einstein, in keeping with Einstein Year. We hoped to avoid a long debate as to whether the table names were in a suitable hierarchy – did Newton really deserve table number two? – and we think the night passed safely.

While I was doing the rounds of the tables to take photos it became clear just how many first years were attending, which from such a large year is great. Hopefully we have welcomed



Who says that physicists don't know how to party?!

them to our "gang" and inspired them to continue the tradition. Also present in large numbers were the usual crowd of post-grads and finalist students, for most of whom this truly has been an annual event.

After everyone had taken their seats, the traditional "blowing up of rocket balloons and seeing who we can hit on the head" began. This was followed by a four-course carvery dinner and a plentiful supply of wine.

Our after-dinner speech was given by York's very own Prof. Jim Matthews. He spoke briefly about his time in the department and even added some nuggets of physics comedy... such a thing does exist! He was later presented with a bottle of

whiskey for doing such a fine job, which I am convinced has long since been finished off.

The party could now truly begin, and what better way to do it than by opening the dancefloor. The Chrissie Cullen Ceilidh Band soon had everyone dancing round in circles and "Stripping the Willow". The night concluded in the main function room with a late-night disco.

Many thanks to all those who came and made it such a good evening – possibly the largest physics ball ever. Not to brag at all (ah, go on then), it was even larger than the Nexus tenth anniversary ball, which just goes to show that York really knows how to party. Bring on next year! **Harvey Bennet**

Competition: could you win the Golden Bunsen?

Do you know your boron from your beryllium? Can you tell a quark from a quasar? Can you move an egg across a table without using your hands?

If you think that you've got what it takes and can get together a team of up to five people between the ages of 11 and 15 (school year groups 7–10), then the Golden Bunsen Competition 2006 may be for you! Temple Moor High School Science College invites all budding scientists in the Leeds Schools area to compete in two challenging tasks for the Golden Bunsen on 29 June 2006.

A few weeks beforehand, each team will be sent a scientific question to answer. The team must then devise and practise a relevant experiment that can be performed on the night of the competition. The main event will consist of the experimental challenge and a five-minute presentation by each team on their experiment and results.

Prestigious judges from across the region will judge each team on their originality, teamwork, scientific rigour and quality of presentation. Two teams (one from years 7–8 and one from years 9–10) will then be awarded the much coveted Golden Bunsen 2006, as well as other prizes still to be revealed.

For more information about the competition, or to register your school group, please get in touch with Susan Merrey (Science College co-ordinator) at Temple Moor High School, tel. 0113 3368 204.

YORKSHIRE AGM

This year's AGM and the accompanying summer lecture will be held at York University on Monday 5 June. The lecture will be on the astronomer John Goodricke, and is to be given by Martin Lunn, curator of astronomy at the Yorkshire Museum. Full details of both will follow nearer the date.

Chris A Butlin
Honorary Branch Secretary

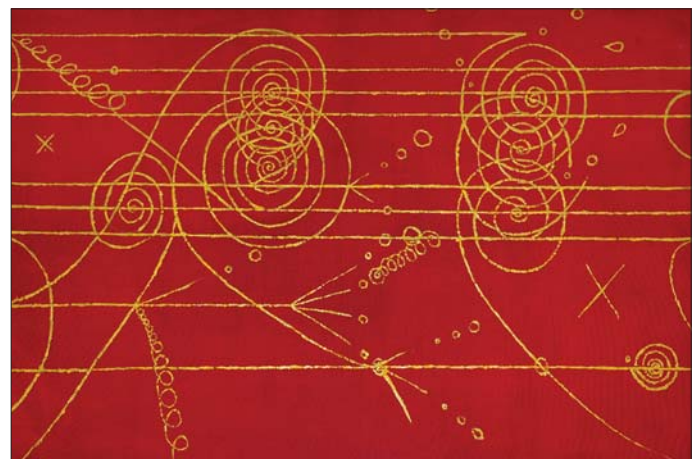
Einstein: life, science and art

Have you ever wondered about the fate of the universe, whether anything can travel faster than the speed of light, or how Einstein's imagination changed the evolution of science? These were some of the questions that were posed at events held in Sheffield celebrating International Year of Physics and the UK's Einstein Year.

Science and art lessons were merged for Sheffield pupils in a special event at the Millennium Galleries on Wednesday 18 May 2005. "Einstein: Life, Science and Art" was organized by the Department of Physics and Astronomy at the University of Sheffield to explain how Albert Einstein's genius has affected science and to show how science can be represented artistically. The programme of events, which 50 local schoolchildren from Firth Park Arts College attended, included an exhibition of works by local artist Chris Crossley that were inspired by Einstein and science. The event was repeated in the evening in front of a sell-out audience of science and art enthusiasts from across the region.

Five speakers from the University of Sheffield's Department of Physics and Astronomy opened the event with a series of short talks about Einstein and his work. Dr Tim Searle focused on "Einstein, The Man" while Prof. David Hughes, Dr Richard de Grijs, Dr Anne Green and Dr Susan Cartwright talked about various aspects of Einstein's work and theories including the fate of the universe, bending starlight and space and travelling faster than the speed of light. Following the talks, the audience had the chance to put questions to the panel of experts and to meet Chris Crossley.

The event, which was organized by Dr John Williams together with two postgraduates, Jessica Fitzpatrick and Marieke



Top left: The Einstein-inspired painting commissioned from Chris Crossley. Top right: Chris Crossley discussing his painting. Bottom left: Pupils inspired to create their own artwork. Bottom right: Particle tracks, as shown here, inspired the artist to produce his painting.

Navin, was sponsored by the Institute of Physics and the Department of Physics and Astronomy at the University of Sheffield. It gave the young afternoon audience a chance to get hands-on experience of both science and art by participating in science experiments and art projects on-site.

Chris Crossley said: "The artworks on display are all from my 'Positronic Dance' series of paintings, which aims to make the micro-cosmic world of theoretical physics understandable. My art is the stuff of both science fiction and

science fact, and I hope that the young people who attended the event were inspired to see science in a different, more artistic, light."

Dr Searle said: "I was delighted to be involved with the 'Einstein: Life, Science and Art' event. Albert Einstein was a fascinating man whose pioneering theories have altered science and mathematics irrevocably. This event was a great opportunity to introduce some of Einstein's ideas to young school pupils from Sheffield, and to show them that science and art needn't be kept

apart. I anticipate that both the school pupils and the wider audience in the evening found the speakers and the artist's works to be an enlightening and entertaining fusion of creativity and science."

The event was so successful that it was repeated later in the year at the University of Sheffield. To commemorate the Einstein events, Chris Crossley was commissioned to produce a painting which was presented to the Department of Physics and Astronomy at this later event.

Thanks to Ian M Spooner and John M Williams, University of Sheffield

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

Paintballing with Physoc: York versus Lancaster

With the snow-covered ground and the scent of war in the air, the atmosphere was eerily reminiscent of Bastogne and momentarily filled 60 young physicists with a deep sense of foreboding. But the bad weather couldn't hamper the spirit of those who took part in the annual Institute of Physics and Physoc paintballing trip.

This year, Lancaster was invited to participate in the day for a full-on Roses-style showdown. Much to the delight of the event organizers, equal numbers of male and female participants turned up.

After the mandatory "sign-your-life-away-here" forms had been completed and the standard safety briefing given, the 30-apiece squads of York and Lancaster headed into the forests of Yorkshire to shoot



War of the Roses, 2006 style: the troupes stand by for battle.



each other. I, naturally, got shot in the face with a paintball. Fun stopped there, OUCH!

The order of the day comprised eight games played over four arenas with 15 minutes either way and then a 20-minute break, separating the next game from the previous game-couplet. The games included Capture the Flag, Bomb the Village, Pyramids and Destroy the Radar. It was on

these hallowed battlegrounds that heroes were made and ultimately destroyed. (Did I mention I was shot in the face?)

The price of glory that day was some incredibly muddy shoes and soaked-through derrieres. It must be said, however, that certain presidential members of York Physoc could have been wearing Teflon-covered overalls, judging by the pristine condition of their

clothes at the end of the day. I find crawling through puddles is all part of the fun, but that's just an opinion.

York took an early lead and looked set to take the day before their trouncing in the Pyramids speed-ball finale, which catapulted Lancaster from the abyss of defeat into the stratosphere of... well, a draw. A disappointing (if diplomatic) result, to say the least.

It is safe to say that all those who participated had an excellent day out and a thoroughly good time, although the matter of whether Lancaster can beat York or whether history will repeat itself (à la 1485) must now be resolved by next year's crop of budding young Einsteins. One thing's for sure though, I'm signing up!

Anthony Jude De-Gol

BRANCH SOCIAL EVENING: THURSDAY 25 MAY 2006

TOUR OF THE HUMBER BRIDGE WITH DINNER AT HOME FARM TRAVEL LODGE

This year's annual social visit will be to the Humber Bridge. This beautiful structure, until recently the world's longest suspension bridge, is celebrating its 25th anniversary, having opened in 1981. The visit (free of charge) will start at 7.15 p.m. with a talk by the bridgmaster, Peter Hill, followed by a tour of the bridge control room facility and then a tour of parts of the bridge including some of the internal



structure. It will be possible for us to use the car park immediately behind the bridge control room (note that this is not accessible from the bridge road itself – maps will be

provided). Immediately next to the bridge is the Home Farm Travel Lodge, whose dining room overlooks the bridge and the river. They are open all day and we will reserve a dining area from 6.00 p.m. Following the meal (you pay as required) it is only a few hundred yards from Home Farm car park to the Bridge car park.

Please note that it will only be possible to accommodate a party of up to 25. Any accompanying children must be over 14 years of age. Access around and inside the bridge

involves climbing/descending 5 m vertical ladders and squeezing through narrow spaces – read the additional note in *Yorkshire Physics News*.

If you would like to attend, please fill in the reply slip below (photocopy it if you don't want to cut up your copy of *Yorkshire Physics News*!) and send to the Honorary Secretary at the address below. He will send confirmation with a map of the locations of the Bridge car park and Home Farm, plus a menu for pre-booking your dinner. Closing date Friday 12 May.

Application for visit to Humber Bridge on 25 May 2006
Closing date: 12 May 2006

Name

Address

Postcode

Tel

E-mail

Number of tickets required

Tick box if you are happy for your address and e-mail details to be added to the branch database.

Return to: Chris A Butlin, Honorary Secretary, Institute of Physics Yorkshire Branch, 16 Wheelwright Close, Sutton upon Derwent, York YO41 4JZ
Tel: 01904 607169
E-mail: ChrisAButlin@aol.com