

NEWSLETTER

April 2009

Exhibition raises lots of interest

More than 30000 visitors attended the BT Young Scientist and Technology Exhibition held at the RDS 8–10 January.

The Institute of Physics had a stand at the exhibition and it included everything that you ever wanted to know about physics but didn't dare to ask. There were spectacular light, sound and energy demonstrations including a flame tube modulated by sound waves, fibre-optic spectrometers, high T_c superconductors, fuel cells, holograms, laser optics, a pulse oximeter, endoscopes and more.

Throughout the three days more than 58 different volunteers (from the physics departments at TCD, DCU, DIT, NUIM, UCD, NUIG, QUB, UCC, UL and some school students from Belvedere College) helped to demonstrate at the Institute's stand, where they all engaged and entertained the public with unfailing enthusiasm.

The winner of the Institute of Physics Special Award at the exhibition was Sharon Howley



Left: hair-raising effects were demonstrated at the BT Young Scientist and Technology Exhibition. Right: Sharon Howley, pictured with Prof. Jocelyn Bell Burnell (left), won the Institute's physics prize.



for a project entitled "Music strings: an investigation into the effect of temperature on pitch/frequency". From Scoil Mhuire, Co Clare, Sharon's project investigated the effect of temperature on pitch/frequency with different string types. She subjected strings to varying

temperatures for different lengths of time and measured the temperature-induced frequency shift. She came up with some interesting results, not least of which was that the strings had differing stabilisation rates.

President of the Institute

Dame Jocelyn Bell Burnell made the presentation of the prize at a very exciting awards ceremony on Friday 9 January.

Sharon also came first in the individual intermediate section of the chemical, physical and mathematical sciences group. **Alison Hackett**, IOP representative

UCC triumph in new physics quiz

UCC were the winners of the Institute of Physics in Ireland and Nexus first ever Intersvarsity Physics Quiz held on the Friday evening of 27 February in TCD.

Teams of five entered from TCD, DCU, DIT, NUIM, UCC, NUIG, QUB and UCD making it a truly all-Ireland intersvarsity event.

Dr John White from UCD performed the quizmaster duties excellently and with not a little humour during the proceedings. The questions were split equally between physics and general knowledge.

It turned out to be an



Diarmuid Good, Donal O'Donoghue, Kaya Luken, Tim Quinlan and Tara Hennessey triumph at the first ever Intersvarsity Physics Quiz.

extremely close competition with UCC and NUIG battling it out in the final head-to-head round to win the silver

trophy, with the last question determining who would be the winning team.

Next year's quiz will be run

Try answering a few questions (answers on p3):

1. What is the name of the component in the Delorean (car in *Back to the Future*) that allows it to travel through time?
2. Which metal was Danish Astronomer Tycho Brahe's nose made of?
3. What Irish physicist said: "Theoretical physicists live in a classical world, looking out into a quantum-mechanical world"?

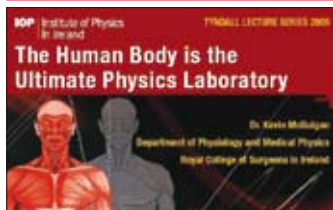
at UCC. Pictures from the event and the quiz can be viewed on the branch's website at www.iopireland.org.

Students receive their Leaving Certificate

The Institute's award for the highest level of achievement in physics in the 2008 physics examination in the Leaving Certificate was shared between three students: Paul Fitzgerald from Christian Brothers College in Cork; James Long from the Crescent College Comprehensive in Limerick; and Fionnuala Connolly from the Dominican College in Galway. The medals were presented at ceremonies at their local universities. The award for the highest level of achievement in the GCE A-levels goes to Matthew R Nicholl of Foyle & Londonderry College.



Three winners proudly holding their Leaving Certificate silver medals: Paul Fitzgerald (left) pictured with his teacher at the University of Limerick on 3 February. Fionnuala Connolly (right) was accompanied by her physics teachers, Aislinn and...



Tyndall Lecture travels Ireland

The Tyndall Lecture for schools, which ran in January–February, had approximately 1500 students attend at seven venues across Ireland.

The talk entitled “The human body is the ultimate physics laboratory”, was given by Dr Kevin McGuigan from the Royal College of Surgeons in Ireland.

“Physics is the Cinderella of the sciences when talking about human body function. Physics is taken for granted and often undervalued compared to its two ugly sisters – chemistry and biology,” stated McGuigan.

The lecture explored how the same physical principles determine the size of an aneurysm, the characteristic tone of flatulence or the curvature of a David Beckham free kick. Using the latest images, movies and demonstrations, the audience was shown why perspiration is much more socially acceptable compared to the cooling methods used by other animals. The talk was a veritable “tour de force” of the human body.

Physics teachers enjoy new course

The Teacher Network coordinators of the Institute of Physics designed a new course to support recently qualified, as well as returning, physics teachers at second level. The programme was aimed at those who have completed the Second Level Support Services (SLSS), Physics Teachers Induction course and who may be in their second or third year of teaching senior-cycle physics.

The course was first run at University College Dublin (UCD) last autumn in association with SLSS and UCD Physics. It was hoped that the course would be of value to all physics teachers and indeed some very experienced teachers attended and enjoyed it.

The course placed the 24 mandatory Leaving Certificate experiments at the centre of the scheme and explored the physics concepts at the core of the experiments. At each session the experiments were demonstrated and the participants were given a “hands-on” opportunity to perform the experiment.

The Institute is especially grateful to UCD for making a laboratory available for each of the four sessions, which took place on Tuesday evenings during October 2008. The course promoted a variety of teaching methods that included demonstrations and multimedia.



Recently qualified and returning physics teachers attend one of the 24 Leaving Certificate experiments at UCD, held over four sessions.

As well as taking an in-depth look at the experiments and the related theory, participants received a printed course manual and many other useful resources in digital format. They were also introduced to the Virtual Physics Laboratory suite of simulations.

On the last night, the teachers were treated to a dazzling display of “Science on stage” by Michael Grehan, Brian Masterson, Rory Geoghegan, Noel Cunningham, Damiene Letmon and course tutors Paul Nugent and David Keenahan.

Participants have since formed an informal support network to share teaching experiences and useful resources with each other.

For further information about forthcoming courses, contact David or Paul.

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ificate and GCE A-level silver awards



er Frank Cotter receiving his award from Dr Sile Nic Chormaic at UCC on 29 January. James Long (middle) receives his award from Prof. Noel Buckley at ing McCarthy and Lorraine O'Dwyer, when she received her award from Prof. Tom Glynn at National University of Ireland, Galway, on 23 January.

ASE conference proves impressive

The Association for Science Education (ASE) Annual Conference 2009 was held at the University of Reading in January.

More than 2500 science teachers attended the three-day conference, which offered more than 350 talks, workshops, seminars, courses and a major exhibition of science textbooks, resources and apparatus.

Sue McGrath and I (both recently appointed as Teacher Network coordinators), attended and we were treated to impressive physics activities.

A great start to this, my first ASE conference, was an excellent physics workshop by Geoff Auty and Chris Embrey, entitled "And if it doesn't work, it's physics". Demonstrations were implemented with ordinary and affordable equipment and they revealed physics principles in an eye-catching way. Warm applause greeted the divergence of gold leaves on an electroscope after charge travelled to it along a length of string (at a funeral pace).

A suspended Ping-Pong ball drew laughter from the crowd as it oscillated in an electric field between parallel plates at 4 kV. Hats off to these entertaining scientists as they bowed out with tinfoil cake cases flipping

in formation from the dome of a van de Graaff generator.

Refreshments at the Institute's drop-in area gave delegates a chance to meet and exchange stories and tips, and to play with this season's favourite novelty, the "fun fly stick".

A group of Teacher Network coordinators examined a novel idea concerning the construction of inexpensive infrared light gates from a computer mouse. By soldering one photoresistor to the left mouse button and another to the right, one could obtain cheap optical photogates. With a range of excellent stopwatch software available on the web, we could equip ourselves to do several mechanics experiments.

The "Best of physics education" session dissolved in laughter at the sight of Gary Williams in an inflatable Santa costume preparing to drink a yard of ale. Later on we giggled like young children at the funny thermal images shown by David Smith. The "New ideas session" got off to a great start when Gary placed a metal tray on a rubber base and then put a sheet of clingfilm on the tray (having first stroked it several times with the back of his hand). A volunteer from the audience

was invited to approach the tray with a bent knuckle – you could have heard a pin drop. A huge crack was heard as the volunteer approached the tray.

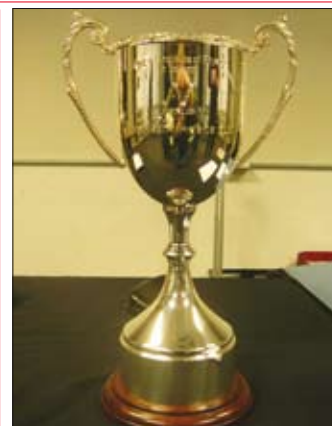
A personal favourite from this session was the elegant rainbow displayed on the wall of the room, when a triangular glass prism was suitably positioned above the focusing lens of an old-fashioned overhead projector. Two white pages placed on the illuminated plane of the projector functioned perfectly as a slit.

Perhaps the most enjoyable workshop of the whole weekend was when we constructed a compressed-air rocket launcher. Under the direction of Terry Horsman, 40 of us, working in pairs, brought rocket science to *Bob the Builder*.

I still recall the warm glow of oohs and ahhs at a fireworks display on a dark night and I remember those same excited sounds as sober physicists in daylight watched with pride as their paper rockets soared and screeched above a green field.

Congratulations and thanks go to all at the Institute who made this year's ASE conference such an enjoyable event.

David Keenahan, Teacher Network coordinator



Quiz answers, p1

Here are the answers to the questions on p1:

1. Flux capacitor
2. Gold
3. John Bell

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Ireland receives 2008 IPhO awards

The 39th International Physics Olympiad took place last July in Vietnam in the My Dinh National Convention Centre, Hanoi.

Congratulations go to Mark Moriarty who was awarded a bronze medal and to Alan Bloomer, Stephanie Hyland and Jonathan McKenzie, each of whom won an Honourable Mention Award in this extremely challenging competition.

Almost 90 teams from countries all over the world took part in the IPhO event.

The contest takes the form of a five-hour theoretical exam involving three physics problems and a five-hour experimental exam. For those curious about the standard of physics, most of the questions asked in 2008 (and the outline solutions) are posted on the IPhO website (<http://ipho2008.hnue.edu.vn/>).

Social programme highlights for the students included visits to Vietnam's oldest university at Van Mieu Quoc Tu Giam, founded in 1076 AD, and the Ho Chi Minh museum in the old quarter of Hanoi.

The students also visited a technically complex water puppet show, Vietnamese villages specialising in pottery and silk production, as well as the UNESCO World Heritage Site of Halong Bay where they spent an afternoon afloat amid almost 2000 odd-shaped towering stone islands.



The 2008 Irish IPhO team: Mark Moriarty, Stephanie Hyland, Robert Richardson, Alan Bloomer and Jonathan McKenzie.

It was against this exotic background that the five Irish students competed with around 350 world-class young physicists. On the Irish team were Alan Bloomer (Waterford), Stephanie Hyland (Blackrock), Jonathan McKenzie (Banbridge), Mark Moriarty (Cork) and Robert Richardson (Galway). The team leaders were James Fryar from Dublin City University (DCU) and David Rea from St Colman's College, Fermoy.

In the words of the late IPhO president, Prof. Waldemar Gorkowski, these Hibernian warriors competed among "one hectare of physics students" in the examination centre.

Some of this year's questions had an engaging local theme. Rice is the staple food of most people in Vietnam. The hilly parts of northern Vietnam have abundant streams and the villages there make extensive use of water-powered

rice-pounding mortars (as in mortar and pestle). These are used to separate the husk from the bran, to make white rice from paddy rice. The operating cycle of such a mortar formed the basis of the first theory task.

There followed an interesting question on Cherenkov light and a ring imaging detector (cf. Tamm and Frank, 1937), and finally a lengthy thermodynamics question on atmospheric stability, air parcels and the build-up of atmospheric pollutants, including the carbon monoxide emitted by motorbikes in Hanoi during the morning rush hour.

The laboratory task involved using simple but cleverly customised everyday items of equipment to determine the melting point of a crystalline solid by a differential method, and later to measure the efficiency of a solar cell.

Residential training took place in DCU during the spring and early summer, directed by Eilish McLoughlin, James Fryar, Paul van Kampen, David Rea and assisted by staff from the school of physics. Practice in problem solving took place by e-mail.

The Institute of Physics in Ireland is pleased to have supported the students during the IPhO event and the branch wishes to congratulate everyone involved in making this a national success in physics.

David Rea, St Colman's College



The Institute of Physics sets up a physics communicators group.

Group discusses Institute events

An interim committee met recently to discuss future events at the Institute. As part of the discussion the group's aim was solidified: "To support members in promoting an awareness of the role of physics in society."

Committee posts were also decided: Averil Macdonald (chair and *My/OP*); Martyn Bull (secretary); Alun Vaughan (treasurer); Bob Fairbrother and Bob Boutland (newsletter – currently in progress); Paul Millar (web); Keith Williams (education group link); Laura Grant (members survey); and Francisca Wheeler (committee member). The chair of the committee will also be a member of the Institute's External Engagement Committee.

Also at the meeting was Elizabeth Jeavans from the Institute's Engaging the Public team and Claire Copeland, science support officer from the Institute's Department of Higher Education and Research.

Visit *My/OP* if you would like to become a group member.

News reports

On the northern front, the Institute has been actively engaging with the Assembly through a recent series of meetings with education minister Cairtriona Ruane, minister for employment and learning Reg Empey and a joint meeting of the three committees for enterprise, education, and employment and learning. The recurring theme throughout has been the long-awaited Northern Ireland *Science, Technology, Engineering and Maths Review* (STEM). This report, due soon, is commissioned by the Department for Employment and Learning and the Department of Education, Northern Ireland,

and is chaired by well-known physicist, Dr Hugh Cormican. It aims to set a blueprint for increased uptake of science at all levels. The branch has contributed to the report, particularly calling for the appointment of a government chief scientist for Northern Ireland as a first step towards implementing the STEM agenda.

In the Republic, Institute representatives met with Dr Jimmy Devins, minister for science. The main thrust of the meeting was towards enhanced research spending for physics. Membership of CERN and the European Organisation for Astronomical Research was discussed and given the potential for industrial returns

with these facilities, the case for Irish membership is still strong.

Education cuts in the south

Of growing concern is the proposed severe scaling down of the Second Level Support Service (SLSS). Strong representations have been made at all levels within the Department of Education and Science, and further afield about the reduction in posts.

Currently there are six national coordinators providing individual support in: physics, chemistry, biology, maths, junior science and home economics. There is no coordinator in place for applied maths or agricultural science.

The teacher education section

of the Department of Education and Science is proposing that from the academic year 2009/10 all of the above subjects will be amalgamated (eight in total) and just one coordinator will be appointed for continuing professional development.

Since 2003 the Institute has employed two part-time Teacher Network coordinators in Ireland whose activities have been closely in step with the SLSS.

Coupled with the autumn announcement of cutbacks in the grants to schools for the teaching of physics and chemistry, this proposal will do serious damage to the strength of this subject and ultimately to the economy of Ireland.

Sheila Gilheany, policy officer