

# PHYSICS IN SCOTLAND

The newsletter of the Institute of Physics in Scotland

May 2004

## Jim Hough wins Duddell medal

Prof. James Hough, director of the Institute for Gravitational Research, University of Glasgow, has won the Institute's Duddell medal and prize, which was awarded for his seminal contributions to the design and development of gravitational-wave detectors worldwide.

Hough is an international leader in the search for gravitational waves from astrophysical sources. The challenge in detecting the waves is formidable, requiring lasers to sense mirror displacements that are 10 000 times smaller than the nucleus of an atom.

Hough and his colleagues in Glasgow have developed very delicate monolithic fused silica suspensions that maximize the signal-to-noise ratio in the key part of the frequency spectrum.



*Seminal research: Jim Hough with a cryostat for the testing of cooled silicon as a test mass material for future gravitational-wave detectors.*

Such suspensions play an important role in the GEO600 detector being commissioned by Germany and the UK, for which Hough is the UK's principal

investigator. They are also being adopted by the LIGO collaboration in the US for its planned upgrade and are likely to be used by the French-Italian

VIRGO detector in the future.

Hough is also deeply involved in research into the losses associated with mirror coatings and into alternative mirror materials for future detectors.

The enthusiasm, determination and leadership that he has consistently demonstrated in his development of gravitational-wave detectors have kept the UK at the forefront of the field for many years and have brought the prospect of detecting these waves close to reality.

The prestigious Duddell medal and prize is awarded annually for outstanding contributions to the advancement of knowledge through the application of physics, including the invention or design of scientific instruments or by the discovery of materials used in their construction.

## Invaluable team member receives pair of awards

The Salters' Institute, the Institute of Biology, the Royal Society of Chemistry, the Institute of Physics and the Association for Science Education jointly operate a National Science Technicians Awards Scheme in recognition of the vital role that technicians play in science departments.

Last year there were more than 40 nominations, including several from Scotland. Two of these were shortlisted. One, Malcolm Littlejohn from Banchory Academy, was finally selected to receive one of the four Salter awards. He also won an award from the Institute of Physics as a technician who had made a special contribution in the field of physics education.



*Special contribution: Malcolm Littlejohn receives his award from Dr Peter Doyle, master of the Salters' Company, chairman of the Salters' Institute.*

Littlejohn, who appears baffled by all the fuss and praise he has received for his work, is a quiet professional for whom nothing ever seems too much

trouble. He supports the work of the biology, chemistry and physics departments, including stock control, requisitioning of supplies and equipment, budget

management and maintenance of the greenhouse. He designs and builds apparatus and new storage systems and, in the physics department, gives advice and support to students as they embark on their Advanced Higher projects.

He is both a systems manager and a people manager, supervising the technicians covering ICT, home economics, technical studies, art and reprographics. Although he has been in the post for 30 years, Littlejohn still takes the chance to attend training days when he can and is often among those providing the training.

He will receive his Institute award at the annual Stirling Physics meeting in June.

# Exceptional teachers recognized

Two Scottish teachers were among the five winners of this year's Institute of Physics Teachers' awards: Gemmell Millar, retired head of physics at Stewart's Melville College in Edinburgh, and Bob Neill, principal teacher of physics at George Heriot's School, which is also in Edinburgh.

Each year the Institute honours a small number of practising teachers in the primary and secondary sectors. Nominations come from a variety of sources. Selection of the winners is by a panel of teachers and former teachers. The key criterion: the nominee must be an exceptional teacher.

Millar has taught physics in Scotland for 36 years and has embraced the ever-changing face of physics, especially with regard to teaching. He has helped his pupils to gain top-quality results with them rarely gaining less than a B grade at Advanced Higher and Certificate of Sixth Year Studies.



*Inspiring: Gemmell Millar, formerly of Stewart's Melville College.*

He was elected a fellow of the Institute for his services to physics education in Scotland and has been heavily involved with the Institute of Physics in Scotland, having served both as a committee member, which he continues to do, and for five years as honorary secretary. He also serves on the organizing committee for the annual Stirling Physics Meeting.

Millar is an exceptional teacher who has been the inspiration for countless generations of pupils to



*Thought-provoking: Bob Neill of George Heriot's School receiving his award from Prof. David Wallace at the Institute's Awards Dinner.*

continue studying physics.

Bob Neil has taught at George Heriot's School for nearly 40 years and has made major contributions to the teaching of physics in Scotland. He worked with the former Scottish Examinations Board, introducing the multiple-choice Higher physics papers, and has co-produced two books of physics questions, for both Standard Grade and Higher Grade.

Under his guidance his department has had great academic success, both in

physics examination results and in the Physics Olympiad, with several pupils receiving gold medals. His knowledge and understanding of physics, his professionalism, his sense of humour and his ability to captivate pupils all make him a truly outstanding teacher.

Neil received his award from Prof. David Wallace, president of the Institute, at the annual Awards Dinner at the Savoy Hotel, London, earlier this year. Gemmell will receive his award at the Stirling Physics Meeting.

## Debate on education addresses Scottish science

These extracts come from the debate on education reform held in the Scottish Parliament on 22 January 2004, courtesy of Willie Rennie, Scottish Parliamentary Affairs, Royal Society of Chemistry.

**Robert Brown MSP** "Science teaching is vital. If Scotland is anything, it is a country of scientists, engineers, medical pioneers and inventors. To say that the modern world has been shaped by that is no exaggeration. Why therefore do so few Scottish students – fewer than the number in England and Wales – hold basic qualifications in science subjects? Why do 65% of Scots have no formal qualifications in a science subject? Why is the number of Scottish children who are attracted into science at school decreasing? Why is science often considered a difficult and dull subject in which to become involved? Against that background, how can modern Scotland match the

achievements of its forebears?

"I do not downgrade science achievements, but we have a long way to go. A challenge is developing. The minister will know of the Institute for Science Education in Scotland, which is a network of scientists who work with science teachers to support excellent science teaching. He will know of that institute's proposal for four regional hubs in universities and science centres to provide a focus for good practice and the basis of a dynamic network throughout Scotland. He will also know that England is developing that and similar ideas.

"Will the minister agree urgently to meet the institute and similar bodies to discuss those issues and, if possible, to provide the necessary ministerial push to action? Some cross-cutting issues that concern the Enterprise, Transport and Lifelong Learning Department and other departments are involved in ensuring that science

is a major driver of the nation's future and that science teaching can stimulate minds and imaginations."

**Elaine Murray MSP** "I echo Robert Brown's concerns about science education and the uptake of science in schools and further and higher education. We know that science is tremendously popular on television. People will watch endlessly programmes about black holes, string theory and so on. However, people are frightened about doing science as a subject. There is a job to be done, and we must consider why science is no longer attractive to people. The subject cannot be that difficult – I did it. It is important for Scotland's future and for our knowledge economy that we encourage more people to study science at school and in further and higher education."

**Rhona Brankin MSP** "I agree about the importance of science education, which many colleagues mentioned. In my constituency of Midlothian, one

of our ways of developing the local economy is by encouraging the important bioscience cluster. However, many of the youngsters in Midlothian leave school and go into low-skill, low-wage jobs. Science education is important in getting youngsters into university so that they can create the ideas that can be commercialised and contribute to the economy, but we also need to raise science skills at technician level."

**Euan Robson MSP, Deputy Minister for Education** "Robert Brown made some important points on the teaching of science, as did Elaine Murray. We will consider these points to see how we can take those agendas forward. I am not sure about meetings and so on, but I will look into that for him. It is important that Scotland's scientific tradition continues, and the Executive is firm in that resolve."

For the full debate, see <http://www.scottish.parliament.uk/plenary/or-04/sor0122-02.htm> (Col 5136).

# Scotland gains local coordinators

Six local-area coordinators for the Physics Teacher Network have now been appointed for Scotland. One vacancy (Stirling/Perth and Kinross/Fife/Dundee/Angus) remains. When complete, the network will comprise 30 coordinators across Great Britain and Ireland. The enhanced coverage in Scotland has been made possible by a £98 000 grant from the Scottish Executive (see October 2003 newsletter).

The following six coordinators were appointed late last year:

## **East Lothian, West Lothian, Mid Lothian, Edinburgh City and Falkirk** **Tom Balanowski (tombalanowski@hotmail.com)**

Tom Balanowski is principal teacher (PT) of physics at Linlithgow Academy. He has been a member of the curriculum support team in West Lothian, with special responsibility for physics, for eight years. He headed the West Lothian team that developed national support materials for Intermediate 2 and Higher, and led a local-authority working group producing 5–14 materials for levels E and F.

He is the SQA principal assessor for Advanced Higher physics, has been involved in a range of national initiatives, and is an experienced speaker.

## **Inverclyde, North, East and South Ayrshire, Renfrewshire and East Renfrewshire**

### **Tom Clark (tomwc\_41@hotmail.com)**

Tom Clark is PT of physics at Greenock Academy. Until



Four of our local coordinators (left to right): Tom Balanowski, Tom Clark, Nick Forward and Brian Redman.

recently he was the coordinator for Inverclyde. His role was to organize meetings for PTs of physics throughout the authority, set up INSET days for primary and secondary teachers and technicians, and liaise with industry and local colleges. His earlier career experience as an engineer and manager in the steel industry has helped in this.

Tom is keen to make science and physics more enjoyable by organizing trips for pupils and arranging for visiting speakers/demonstrators. He has a special interest in the physics of projectile motion as applied to the flight of the golf ball. Unfortunately, his practical application of the theory is alarmingly deficient!

## **Grampian and Northern Isles** **Stuart Farmer (stuart.farmer@btinternet.com)**

Stuart Farmer has been head of physics at Robert Gordon's College, Aberdeen, for nearly eight years. Previously he was PT of physics at Alford Academy. He is convenor of the SQA Physics Assessment Panel and

has extensive experience of vetting and marking Higher and Advanced Higher physics papers.

Stuart has been an active member of the Association for Science Education (ASE) throughout his teaching career and has been chair of ASE Scotland, as well as serving on the ASE National Council. He has a keen interest in curriculum issues and has campaigned for better lab accommodation and equipment in schools, recently completing research in this area for an MBA dissertation.

## **Highlands and, in due time, the Western Isles**

### **Nick Forwood (forwood@macunlimited.net)**

Nick Forwood is PT of physics at Fortrose Academy in the Highlands. He has also been the principal distance-learning tutor for physics for the Highland Council and has taught evening classes in computer studies (Scotvec).

## **East and West Dunbartonshire, Glasgow City and North Lanarkshire** **Ronna Montgomery**

### **(rcmontgomery@fsmail.net)**

Ronna Montgomery is PT of physics at Bearsden Academy. She teaches from S1/S2, Standard Grade physics and science through to Higher and Advanced Higher physics, attracting large numbers to the latter course each year. Ronna works on a variety of committees in and outside the school, including a 5–14 committee for primary and secondary teachers in the local authority.

## **Scottish Borders and Dumfries and Galloway**

### **Brian Redman (bjred10@aol.com)**

Brian Redman is PT of physics at Selkirk High School. He has considerable experience of advising and training other PTs in the area, and nationwide in the context of new exam systems in physics and CASE. He has been an SQA examiner for S-Grade physics and a moderator for short courses in electronics. He has also been actively involved in primary/secondary liaison in the Borders area, running INSET and acting as an informal specialist adviser.

# Physics teachers return to school

The University of Edinburgh will host the fourth summer school for physics teachers on 28 June – 2 July. The purpose is to bring together teachers from across Scotland to give them the chance to discuss contemporary issues in physics, physics education and applied physics.

The five-day programme, led by recognized experts in the field, is designed to shed insight on key areas of physics, and to offer an opportunity to handle

new apparatus and try new experiments. Time is also allowed for discussion. This gives delegates scope to reflect on teaching methodologies and on the skills shortage affecting physics-based industry. It draws physics teachers into the wider group of professional physicists, helping them to feel that they are part of the physics community. This in turn enriches their work as school-based scientific educators.

Organized visits are planned to show various applications of physics, including the option of a morning at either BAE SYSTEMS' new state-of-the-art laboratories and manufacturing plant at Crewe Toll, Edinburgh, or at Photoemissive Displays, an Edinburgh-based optoelectronics start-up company. There will also be a day spent in Glasgow to see cutting-edge research in a large university physics

department and to visit Glasgow Science Centre.

The school is co-supported by The Institute of Physics in Scotland, the University of Edinburgh, the University of Glasgow, the Engineering and Physical Science Research Council and the Scottish Schools Equipment Research Centre.

The cost is £180. For further details, contact Jim Jamieson, Scottish Schools Equipment Research Centre, St Mary's Land, 23 Holyrood Road, Edinburgh EH8 8AE (tel: 0131 558 8180; e-mail: psa@sserc.org.uk).

## Seniors Group holds first events

The newly formed Seniors Group has firmly established itself as a forum for members of the Institute of Physics in Scotland who have ceased full-time employment and are more than 55 years old. The principle objective of the group is to encourage members to contribute to the professional activities of the Institute in ways that are different from those associated with full-time employment. In particular, the Seniors Group provides a means of exchanging information between members about relevant professional activities.

Two social events have already been held. A Lunchtime Rendezvous took place in late January at the University of Glasgow, and a second Lunchtime Rendezvous was held in mid-February at the James Clerk Maxwell Foundation (JCMF) in Edinburgh.

The first of these included a lecture, entitled "Financial education" and given by Stewart Crockett of Nelson Money Managers. This took place in the Melville Room of the Gilbert Scott Building and was followed by a buffet lunch with wine in the Gallery Restaurant.

The second event, attended by 24 members and guests, included a talk entitled "bfriends – making a difference" and given by Miss Rachel



*Colourful conversation: Peter Dryburgh tries out a model of James Clerk Maxwell's colour top. He is watched by (left to right) Elisabeth Law, John Law and Prof. David Ritchie, director of development for the James Clerk Maxwell Foundation. The original colour top was used in Maxwell's early quantitative work on colour analysis and synthesis.*

Bennett. There was also a presentation about the JCMF given by Prof. David Ritchie and Dick Dougal, ably assisted by David Forfar – all trustees of the JCMF. This was followed by a buffet lunch with wine.

Two further Lunchtime Rendezvous are planned for 2005. The first is in the Melville Room, Gilbert Scott Building, University of Glasgow, on Wednesday 26 January. The second will be held at the James Clerk Maxwell Foundation,

14 India Street, Edinburgh, on Wednesday 30 March. Both dates are provisional and further details, together with the names of invited speakers, will be included in the autumn edition of this newsletter.

Information about both events can also be found by selecting Events on the Institute of Physics in Scotland website at [scotland.iop.org](http://scotland.iop.org).

Several members of the group have been co-opted or are being considered for co-option onto

school boards. This can be an interesting, fulfilling and rewarding experience, according to an Edinburgh-based member, who has been co-opted onto the Sciennes Primary School Board and has already attended an in-service day for the teachers as well as two training courses for board members. If you are interested in having your name put forward for election as a co-opted community member of a school board near you, please contact the Seniors Group coordinator.

Several members have also expressed an interest in giving free physics tutorials to children from deprived backgrounds. Members wishing to give such assistance need Criminal Records Bureau clearance and the Institute is investigating the mechanisms to facilitate this. If you are interested in helping potential budding physicists in this way, please inform the Seniors Group coordinator.

Members may also be interested in the following general opportunities: **Retired and Senior Volunteer Programme (RSVP) in Scotland** [www.csv-rsvpscotland.org.uk/](http://www.csv-rsvpscotland.org.uk/); **HOST (Welcoming International Students)** [www.hostuk.org](http://www.hostuk.org).

For further information, please contact Dr John Higinbotham, the Seniors Group coordinator, (see p8 for contact details).

## Scientists and politicians consider 'green' issues

The Science and Parliament event organized by the Royal Society of Chemistry, in association with the Institute of Physics in Scotland, was held in the Signet Library, Edinburgh, in November 2003.

Key speakers included deputy first minister Jim Wallace; Nobel prizewinner and president of the Royal Society of Chemistry, Prof. Sir Harry Kroto; convener of the Scottish Parliament Environment and Rural Affairs Committee, Sarah Boyack MSP; and Green Party spokesperson on the environment, Eleanor Scott MSP.

About 200 scientists, MSPs and other interested parties attended the meeting, which

took "Science – protecting the environment" as its theme and was followed by a reception.

Deputy first minister and science minister Jim Wallace took the opportunity to announce a £270 000 science grant scheme aimed at supporting the transition of young people from primary- to secondary-school science. Wallace also highlighted the importance of the event in helping to ensure a better dialogue between the science community and politicians.

He also said: "We need to harness the benefits of science and technology wisely so that we increase our wealth and our

welfare without putting at risk ourselves, our children and future generations." He added: "We need to improve public debate on the issue of risk so that policy can be developed in a balanced, informed and objective way."

An associated motion was tabled in the parliament by Brian Adam MSP: "The parliament welcomes the Science and the Parliament 2003 event held on 12 November 2003, organized by the Royal Society of Chemistry in association with Scotland's leading science organizations.

"It notes the contribution of Scotland's 40 000 scientists to

our economic, environmental and social development, including those working in the public sector. It further notes the contribution of science to the development of new technologies in renewable energy and waste management, and in supporting a sustainable environment.

"The parliament also notes the importance of a well resourced science research sector to allow Scotland to be a world leader in the 'green' technologies. It considers that the Scottish Executive should increase investment in science research and support greater industrial research."

## Come to the AGM and Annual Dinner

### AGM

The Annual General Meeting of the Institute of Physics in Scotland will be held at the National e-Science Centre, 13–15 South College Street, Edinburgh EH8 9AA, at 5.30 p.m. on Friday 11 June. Light refreshments will be available from 5.00 p.m.

Formal notice of the AGM, including the agenda, will be enclosed with the May issue of *Physics World*.

The 2003 minutes are posted at <http://scotland.iop.org> and will be available at the meeting.

Nominations for the 2004/5 committee are as follows:

**Chairman** Prof. David Saxon, University of Glasgow

**Vice-chairman** Prof. Robert Chapman, University of Paisley

**Honorary secretary** Prof. Duncan Hand, Heriot-Watt University

**Honorary treasurer** Alistair Flett

**Past chairman** Eur Ing Alan Harper, Avecia

**Ordinary members** Norman Fancey, University of Edinburgh; Iain Glennie, Biggar High School; John Higinbotham; Julie MacDonald, Stewart's Melville College; Gemmell Miller; Derryck Reid, Heriot-Watt University; Heather Reid, BBC Scotland; Iain Ross; Bruce Sinclair, University of St Andrews; Catherine Wilson.

Volunteers, particularly from industry, who are willing to serve on local teams and/or the committee (as co-opted or elected members) are welcome. Nominations for elected members – proposed two or more members of the Institute of Physics in Scotland – should be forwarded, along with the consent of the nominee, to the honorary secretary.

Members are also reminded that if they wish to raise any competent business at the AGM they should advise the honorary secretary, in writing, at least seven days before the meeting.

Directions to the National e-Science Centre are at [www.nesc.ac.uk/esi/esi\\_map.pdf](http://www.nesc.ac.uk/esi/esi_map.pdf).

Members are urged to attend the AGM and thereby ensure that their voice is heard regarding the future of the Institute of Physics in Scotland.

### Annual Dinner

All members of the Institute of Physics in Scotland, together with their partners and guests, are invited to the Institute of Physics in Scotland Annual Dinner. This will be held at the Novotel Edinburgh Centre, 80 Lauriston Place, Edinburgh EH3 9DE, on Friday 11 June 2004

at 7.45 for 8.00 p.m.

The dinner will be an informal buffet-style meal, providing ample opportunity to mingle and renew acquaintances.

Reservations, together with a payment of £20 per person (which includes wine) should be forwarded to Peter Ball, 1 The Glebe, Saline, Dunfermline, Fife KY12 9UT. Cheques should be made payable to the Institute of Physics in Scotland.

The Novotel is situated close to the College of Art and is just a 10 minute walk along Teviot Place and Lauriston Place from the National e-Science Centre. Waverly station and Haymarket station are also both about a 10 minute walk from the hotel.

The hotel has a limited number of parking spaces, but is able to offer discounted parking at the public car park in Castle Terrace.

## Inertia triumphs in Paperclip finale

The Paperclip Physics Competition is open to teams of three to five S4/S5 pupils – or their English, Welsh or Irish equivalent – at schools or further-education colleges.

The teams have to give a demonstration that will explain to a non-scientist an application or principle of physics using only household items. Presentations are limited to five minutes.

The apparatus must fit into a car boot, and be assembled and in working order in 30 minutes. A 1.5×1.0 m tabletop is provided but the use of mains water, gas or electricity is not permitted. Teams must complete and submit a hazard assessment prior to their demonstration. Text and diagrams are limited to four sheets of A3 paper or card.

A panel of judges, comprising, a non-scientist, a physicist and a physics teacher, awards marks for ingenuity, scientific validity, content, safety, understanding by the non-scientist judge, oral presentation, plus audiovisual and demonstration aids.

Following heats held in the University of Edinburgh's Reid Concert Hall and the University



Scotland's 2004 Paperclip champions: The High School of Glasgow team with Heather Reid and principal teacher of physics, Arthur Baillie.

of Glasgow in December and February, the Scottish national final was held on 2 March at Glasgow Science Centre.

The judges were Mark Hughes, development manager, Glasgow Science Centre; Drew McCormick, principal teacher of physics, Braidfield High School; and Dr Ken Skeldon from the University of Glasgow.

Following a tough final, The High School of Glasgow were judged the winners for their presentation on inertia. Team members Rajan Jandoo, Kenneth Murray, Jake Lever and Nathan Owens received their prizes from Heather Reid, broadcast meteorologist at BBC Scotland.

The joint runners-up were Bathgate Academy, with a presentation called "The secrets of Polaroid sunglasses" by Laura Alexander, Alice McNamara, Darren Philip and Calum Steele; and Douglas Academy, with "Xplaining Xrays" by Tony Smith, Colin Fraser, Peter Davison and Alasdair Parkes.

As Scottish national winners, The High School of Glasgow team was flown to London to compete in the Great Britain and Ireland grand final on 31 March at Portland Place. They narrowly lost to the overall winners, King's School, Macclesfield, and the runners-up, Ermysted's Grammar School, Skipton.

## Scottish students rack up the prizes

In recognition of Scottish excellence in physics, the Institute of Physics in Scotland annually awards prizes to candidates who attain top marks in the SQA physics examinations.

The prizewinners for the 2003 exams were:

**Kenneth Deeley** of Marr College – Advanced Higher Physics, first place; **Paul Paterson** of Hamilton Grammar School – Advanced Higher Physics, joint second place; **Jenny Sillitto** of The Mary Erskine School – Advanced Higher Physics, joint second place; **Richard Bowman** of Douglas Academy – Higher Physics, first place; **Alexander Smillie** of Dollar Academy – Higher Physics, second place.

There were 1420 presentations at Advanced Higher and 9711 presentations at Higher Physics.

Paul Paterson, Richard Bowman and Alexander Smillie will be presented with their prizes at the annual Stirling Physics Meeting in June (p7). Arrangements for the presentations to Kenneth Deeley and Jenny Sillitto have not yet been confirmed.

## Witches and pigs attract crowds

More than 8000 people have taken part in two initiatives at Glasgow Science Centre, supported by the Institute of Physics in Scotland.

A Witches Test was an astronomy show held at Halloween last year. What turned out to be the largest Halloween party in Scotland was attended by 1400 guisers. A lucky 600 of these revellers packed into the ScottishPower Space Theatre to participate in a show supported by the Institute of Physics in Scotland.

The audience at each of the performances helped witches Gremlina and Grizelda to pass their final witchcraft and wizardry exam in astronomy to become fully fledged witches. Gasps were heard from the many witches and wizards in the audience as the lights were lowered to reveal the night sky without light pollution.

During each of the performances the audience were invited to shout out the answers and point to the constellations



*Flying tonight: witches get the audience to help them to pass their exam.*

and stars to help the two witches navigate the night sky and pass their exam. The theatrical performance was the first of its kind at the ScottishPower Space Theatre and, judging by its success, it is unlikely to be the last.

Pigs Might Fly is a fun-filled, interactive science show that marks the centenary of the Wright brothers' first powered flight. The performance, which

was the flagship event of Glasgow Science Centre's Soaring Science – Festival of Flight programme, has been watched by almost 8000 people since its December 2003 launch.

Through the use of exciting interactive demonstrations, visitors explore the history of flight from the hot-air balloon and the blimp to the glider and the jet engine. The huge smoke rings that the enthusiastic



*And if the Wright brothers did it...*

presenters use to explain how the air can act like a fluid have mesmerized audiences.

Pigs Might Fly encourages the audience to participate by shouting out answers, and also invites volunteers to attempt to fly to the back of the theatre using home-made wings and a lot of flapping. You can catch this event when it returns to Glasgow Science Centre as part of its summer programme.

## Meeting suggests optoelectronics–biotechnology collaboration could put Scotland on world stage

As the optoelectronic and life-science sectors continue to expand, the area of overlap between these two technologies continues to increase. At the same time, recent research demonstrates the potential commercial opportunities in each of these areas.

The current downturn in communications technology applications for optoelectronics demands and necessitates an element of diversification for Scottish companies active in this sector. Potential commercial applications in the life-science sector are therefore of interest. Growth in the market for medical imaging and similar technologies may also present opportunities.

A pilot event last August, organized by Scottish Enterprise in partnership with the Scottish Optoelectronics Association, attracted an interested audience and demonstrated a demand for

the optoelectronics and biotechnology communities to interact more to maximize these opportunities.

A follow-up one-day conference held in October at the Royal College of Surgeons, Symposium Hall, Edinburgh, supported by the Institute of Physics in Scotland, attracted more than 80 delegates.

The purpose of the meeting was to bring together key players from business and academia, present a broad range of potential opportunities, engage the communities and enable Scotland to maximize any potential competitive advantage that our relative excellence in these areas might present.

According to Prof. Wilson Sibbett, who opened the meeting: "Scotland's place on the world stage depends on finding opportunities in the overlap, or white space, of

physical sciences, mathematics, electronics and engineering, photonics and biosciences. Entrepreneurs and researchers, often based in just one discipline, must now turn their attention to this largely untapped area."

He continued: "Research centres within Scottish universities are moving in this direction, but many local companies remain based on one science discipline. We have the National E-science Centre run by the University of Edinburgh and the University of Glasgow, but we see opportunities there for company involvement in the same way that IBM is doing a lot of exploration work in this sector.

"We would see economic benefit in e-science by directing it towards healthcare. The three intermediary technology institutes (ITIs), which have been created to increase the

number of high-growth companies in Scotland, could also play a key role once they are up and running."

"There is an opportunity that the ITIs that are set up in life sciences and Tech-Media [communications technology and digital media] could work together on a project like information-based medicine. Some of our ideas are good, but to be competitive with Europe and North America, we have to get these ideas into practice quickly."

Keynote speakers from IBM Life Sciences, PhotonicNet of Hamburg and Opticsvalley from Paris then presented an international perspective on what is sometimes termed "innovation crossover". This was then followed by four Scottish case-studies that highlighted the opportunities that could be developed in this exciting area.

# Sixth-year pupils attend TUSLIP Day of Physics

The School of Physics and Astronomy at the University of St Andrews played host to about 150 sixth-year pupils from Perth, Ellon, Dundee, Fife and Angus last October.

These young scientists came to St Andrews to take part in the annual Tayside Universities and Schools Liaison in Physics (TUSLIP) group's Day of Physics. The aim of the day, which was sponsored by the Institute of Physics in Scotland, was to show to these Advanced Higher pupils some of the opportunities that exist for careers and further study using physics.

The pupils spent the morning session in the laboratories, working in pairs on experiments ranging from classifying galaxies to studying the motion of electrons in semiconductors.

After lunch the visitors had the chance to attend a full 50 minute undergraduate lecture, one of 14 that form the first-year waves and optics course at St Andrews. This was delivered by Dr Bruce Sinclair. The undergraduate lecture is a regular feature of the TUSLIP



*Undergraduate experience: two students explore centripetal forces.*

day at the request of pupils' teachers. It is intended to give pupils a feel for what they can expect at university. Pupils are encouraged to try to take notes from the lecture, just as they would as undergraduates.

Following a short session of physics demonstrations, Dr Moira Jardine gave a presentation on the science and exploration of young stars and planets. This was followed by an informal session where the visitors had the chance to meet and talk with

undergraduate students of physics and astronomy.

The afternoon continued with a presentation on the range of careers available to graduates of physics and astronomy, and it was rounded off with a presentation by Prof. Malcolm Dunn on "What's the use of physics research?". Dunn discussed how the correct understanding of concepts can lead to advances in scientific knowledge and also to the development of new products.

## Stirling promises to update teachers

The 30th Stirling Physics Meeting will be held at the University of Stirling on Wednesday 2 June.

This popular annual event is regularly attended by in excess of 200 physics teachers and others who have an interest in physics education. They come from throughout Scotland to learn about the latest developments in physics and in physics education.

The meeting provides a forum for discussions that will influence the formulation and shape of the Institute of Physics in Scotland's strategies and policies regarding science and physics education in Scotland.

Speakers and topics to be covered at the meeting include: **Life after Primary Science** Billy Higgins, quality improvement officer, Edinburgh

**Science 5-14: the Glasgow Perspective** Roseleen Kennedy, curriculum development officer, Glasgow  
**Implementing the Cognitive Acceleration through Science Education (CASE) Scheme: a Physics Teacher's Experience** Rhona Goss, principal teacher of physics, Monifieth High School  
**Maxwell's Contributions to the Understanding of Colour** Dr Richard Dougal, University of Edinburgh  
**Extraterrestrial Life: Is there Anybody Out there?** Dr Martin Hendry, Department of Physics and Astronomy, University of Glasgow.

Prof. Peter Main, the Institute's director of education and science, will also provide an update on the work of the Institute in secondary education. Institute of Physics in

Scotland prizes, which are awarded in recognition of Scottish excellence in physics, will be presented to three pupils who were among those achieving the highest marks in the 2003 SQA physics examinations (p5).

Gemmell Millar, head of physics at Stewart's-Melville College, will be presented with his 2004 Institute of Physics Teachers' award at the meeting (p2). Malcolm Littlejohn of Banchory Academy will be given his Institute of Physics Technicians' award (p1).

Registration and programme details were sent to schools in late March. Copies are available from [leila.solomon@iop.org](mailto:leila.solomon@iop.org) at the Institute in London (e-mail: [leila.solomon@iop.org](mailto:leila.solomon@iop.org); tel: 020 7470 4821; fax: 020 7470 4848.)

## Students do battle in paintball final

Aberdeen and Edinburgh universities met in the Scottish final of the Nexus National Paintballing Competition held near Glasgow in February.

Suitably kitted out, the combatants were advised that the paintballs would leave the gun barrel at 100 mph. This guaranteed a lot of pain for most contestants at some point.

Three different scenarios were each played out twice with teams exchanging roles. For example, Pyramid required the teams to race and grab a canister from the centre of a pyramid and then attempt to deposit it at their opponent's base.

By lunch, Edinburgh led the field, but due to bad weather in the north, Aberdeen had to leave. Edinburgh then achieved the day's highest team score.

Edinburgh now plays in the Great Britain and Ireland final.

For details of student events, contact our student representative, Laura Jackson (e-mail: [s0092758@sms.ed.ac.uk](mailto:s0092758@sms.ed.ac.uk)).

## Institute adds new fellows to its ranks

The following members of the Institute of Physics in Scotland have been elected fellows of the Institute of Physics:

**Prof. Carlo Barenghi**, Department of Mathematics, University of Newcastle-Upon-Tyne.

**Dr Andrew Harvey**, School of Engineering and Physical Sciences, Heriot-Watt University.

**Dr Carol Trager-Cowan**, Department of Physics and Applied Physics, University of Strathclyde.

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## CALENDAR OF EVENTS MAY 2004 – MARCH 2005

**Wednesday 19 May 2004**  
**Institute of Physics Annual Schools Lecture: Sport vs. Physics – which wins, the Rules of Physics or the Rules of Sport?**  
School of Physics and Astronomy, University of St Andrews

**Wednesday 2 June 2004**  
**Stirling Physics Meeting**  
10.00 a.m. – 4.00 p.m.  
University of Stirling

**Friday 11 June**  
**Institute of Physics in Scotland AGM**  
5.00 for 5.30 p.m.  
National e-Science Centre  
13–15 South College Street,  
Edinburgh EH8 9AA

**Friday 11 June 2004**  
**Institute of Physics in Scotland Annual Dinner**

7.45 for 8.00 p.m.  
Novotel Edinburgh  
Centre, 80 Lauriston Place,  
Edinburgh EH3 9DE

**28 June – 2 July 2004**  
**Summer School for Physics Teachers**  
University of Edinburgh

**2–11 September 2004**  
**Orkney International Science Festival**

**Early September 2004**  
Date to be confirmed  
**Sixty Experiments in Sixty Minutes**  
Talk by Prof. Moellmann from  
the University of Brandenburg,  
Germany  
University of Paisley

**Thursday 21 October 2004**  
**The Physics of Motorbikes: Are**

**We Reaching the Limits?**  
Talk by Prof. Jan Evans-Freeman,  
Sheffield Hallam University  
5.15 p.m. Tower Extension,  
Lecture Theatre, University of  
Dundee

**October 2004**  
Date to be confirmed  
**TUSLIP Day of Physics**  
University of St Andrews

**Thursday 24 March 2005**  
**Institute of Physics in Scotland/ IMechE Joint Seminar: Thin Films – the 100 Billion Dollar Industry No One Knows About**  
Talk by Prof. Frank Placido,  
director of the Thin Film Centre,  
University of Paisley  
6.00 for 6.30 p.m.  
University of Paisley  
This talk will be followed by a  
guided tour of the university's  
Thin Film Centre

## Physics in Person thanks speakers

The latest Physics in Person booklet includes 21 Scotland-based speakers who are willing to volunteer their time to speak to schools, colleges and physical societies, or who are prepared to take part in careers events.

This is a significant increase in speakers from the last edition and the Institute of Physics in Scotland would like to thank all those members who have indicated their willingness to take part in this worthwhile way.

If the decline in pupils opting to study physics at S3 and S5/S6 is to be reversed, it is important for the Institute to continue to offer high-quality and topical speakers for such events.

To offer your support for this vital work contact Leila Solomon (leila.solomon@iop.org).

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