

PHYSICS IN SCOTLAND

The newsletter of the Institute of Physics in Scotland

May 2003

Doppler demo wins Paperclip final

The Scottish final of the Paperclip Physics Competition 2003 was held on 24 February in the Reid Concert Hall at the University of Edinburgh.

The Paperclip Physics competition is open to teams of three to five S4/S5 pupils in schools throughout Scotland. Teams have to demonstrate an application or principle of physics to a non-scientist using only items that can be found in a typical home. Presentations are limited to five minutes.

Any demonstration apparatus must be able to fit into the boot of a car and be assembled and in working order within 30 minutes. A tabletop (1.5×1.0 m) is supplied to each team and can be used for the demonstration, but the use of mains water, mains electricity and mains gas is not permitted.

Teams must complete and submit a hazard assessment prior to their demonstrations. Text and diagrams may be used to assist the presentation but these are limited to four sheets of A3 paper or card.



The winning team from the Douglas Academy (left) lines up alongside competition judges, organizers and runner-up, Stewart's Melville College.

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, and audiovisual demonstration aids.

Following a testing final, Douglas Academy, Glasgow, was

judged the winner for its presentation on the Doppler effect. Team members Iain McLarty, Sarah Munn and Mark Thompson were awarded their prizes by Heather Reid, senior meteorologist with BBC Scotland and past chair of the Institute of Physics in Scotland.

Stewart's Melville College was a close runner-up with a

presentation on the centripetal force by Nathan Smeaton, Colin Tinniswood, Douglas Dunlop and Ross Campbell.

Subsequently, as the national winner, the Douglas Academy team was flown to London to compete in the UK grand final held on 2 April at Portland Place. It lost out narrowly to the UK overall winner, Hull High School, and the runner-up, Urmston Grammar School.

The Scottish final was judged by Suzanne Dyer from Cademuir Consultancy; David Dempster, principal teacher of physics, Boroughmuir High School; and Prof. Tom Rossing, Leverhulme visiting professor, University of Edinburgh.

An outstanding teacher and researcher in musical acoustics, Rossing is a past president of the American Association of Physics Teachers and a fellow of the American Association for the Advancement of Science. He has written and co-written several textbooks, including *The Science of Sound*, *The Physics of Musical Instruments* and *Light Science*.

Teachers' Award goes to a 'model professional'

Martin Robertson, principal teacher of physics at Elgin Academy, is one of the winners of this year's Institute of Physics Teachers' Awards.

Each year the Institute honours a small number of practising teachers in the primary and secondary sectors. Nominations come from a variety of sources, including

students, head teachers, colleagues, governors, advisors, Institute branches and parents. The selection is made by a panel of teachers and former teachers. There is one basic criterion for the award: that the nominee is an exceptional teacher.

In his citation it was stated that Robertson, who has taught at Elgin for 31 years, "is a remarkable teacher whose desire to impart knowledge enthuses his students and his colleagues. Throughout his career he has been a model teaching professional,



Martin Robertson, a worthy winner of the this year's Teachers' Award.

developing physics education in the local authority and passing on his knowledge of teaching. His pupils speak of him with a genuine fondness because not only is he one of their favourite teachers, but also they appreciate the efforts that he puts into engaging them in physics and relating the subject to their experience."

Another of the four awards made this year went to Peter Sammut, a physics teacher at St Paul's School, London, but who previously taught for many years at the Dollar Academy.

Institute rolls out the Teacher Network nationwide

For the past eight months the Institute has been running a pilot project with a group of six remarkable volunteers. The majority of the six are physics teachers from schools and further education colleges who are undertaking work – equivalent to half a day per week – to provide enhanced support for other teachers of physics in their locality. They are the first “local coordinators” of the Institute’s developing Teacher Network.

The amazing thing is that the volunteers are taking the half-day from their own free time. Their efforts are being recognized financially by the Institute through the payment of an annual honorarium of £2500, with an additional £2500 to cover the costs of setting up activities and services, and to cover out-of-pocket expenses. Central management and administrative support is also available to the coordinators.

The project was the idea of recently retired Institute chief executive Alun Jones. His optimism that some teachers would be prepared to take on extra work for the wider benefit of physics education in schools

has been justified. The volunteers – five based in England and one in Wales – have devoted their time and a considerable amount of energy, and they are all enthusiastic about the tasks that they are undertaking in their new role.

The Institute is recruiting a further nine coordinators to start work in September, and it plans to have a total of 30 in place by 2004. The initiation of the network has cost £500 000 and the ongoing annual costs of the scheme will be about £200 000 at today’s rates. Even with this level of expenditure, coordinators will be thinly spread, but the Institute is hoping to raise funds from other organizations to improve the coverage of the UK.

Three of the 30 coordinators to be appointed will be based in Scotland, and it is planned to appoint the first two in the next cohort. Vacancies are currently being advertised (see p6). Applicants should be practising teachers or have recently been so, although in exceptional circumstances a non-teacher might be appointed. One of the six pilot coordinators is a postdoctoral researcher with

excellent connections in education who intends to train to teach in the near future. In the meantime she is fulfilling her role very effectively.

Local coordinators negotiate their own job description with the overall coordinator for Great Britain and Ireland, Catherine Wilson – formerly education manager at the Institute and now living in Scotland. The agreed specification will be a compilation of tasks and responsibilities drawn from a centrally devised list, although coordinators are encouraged to contribute their own ideas.

The Institute recognizes the importance of coordinators being able to respond to local priorities. It is partly for this reason and also because it does not wish to deplete further the stock of specialist physics teachers in the classroom that the Institute has decided to increase its investment in school physics teaching in this manner, rather than by adding to the staff of the education department at the Institute.

In England and Wales, where the shortage of specialist physics teachers is currently acute, providing in-service

education and training for non-specialists teaching physics at lower-secondary level is a priority for existing coordinators. An emphasis is also being placed on making contact with and supporting PGCE students and newly qualified teachers, with a view to providing additional support to these teachers in their formative teaching years.

Improving the links between primary and secondary schools is a focus in at least one region.

All coordinators that have already taken up their posts have recognized the need to work collaboratively with other organizations. In Scotland the challenges may be different but collaborative working will be equally important.

Do you know a teacher who might be prepared to rise to the challenge of being a coordinator? Are you such a teacher yourself? If so, you can obtain more information about the work of a local coordinator from Theresa Blythin, Human Resources, Institute of Physics, 76 Portland Place, London W1B 1NT (e-mail: theresa.blythin@iop.org), or from Catherine Wilson (e-mail: catherine.wilson@iop.org).

Pupils receive prizes for physics exam excellence



Top scorers (left to right): at a public event at Meldrum Academy recently, Sarah Zakeri of Speyside High School receives her prize from Hamish Vernal; as does George Molyneaux of Robert Gordon’s College; and Edward Snedden of Harlaw Academy, with Vernal assisted by Alistair Flett.

In recognition of Scottish excellence in physics, the Institute of Physics in Scotland awards annual prizes to those candidates who achieve the highest marks in the SQA physics examinations.

Wherever possible, the prizewinners are invited to be presented with their awards at

high-profile public events.

Three of this year’s physics higher prizewinners were George Molyneaux of Robert Gordon’s College, Aberdeen (joint first); plus Sarah Zakeri of Speyside High School, Aberlour, and Edward Snedden of Harlaw Academy, Aberdeen (joint third). The three pupils were

recently presented with their awards by Hamish Vernal, director of education for Aberdeenshire, during a public evening at Meldrum Academy.

The event, which was organized by the British Association for the Advancement of Science as part of National Science Week, featured

workshops, interactive exhibits, games and shows on the theme of energy. It was supported by a number of local organizations.

Four prizewinners will receive their awards at the Stirling Physics Meeting in June (see p4). Arrangements have yet to be finalized for a further three prizewinners.

Scotland stages successful C

After several years of lobbying for Congress to be held in Scotland, both by members of the former Scottish branch and by officers of the branch committee, the idea became reality with the 11th and final Congress in its current format being held at Heriot-Watt University on 23–27 March.

With more than 500 delegates attending nine conferences, the Institute of Physics specialist and professional groups continued a tradition of staging scientific events that attract not only physicists but also scientists and engineers in other disciplines. These events involved leading speakers from both the UK and abroad.

Prof. David Wallace, president of the Institute of Physics, stressed in his plenary lecture that the Institute must engage both with the wider issues of physics education and with the concerns of society. He asserted that the future of physics is heavily dependant on education in schools and universities, and he made the point that the traditional one-way view of the Public Understanding of Science had evolved into a two-way dialogue of Science in Society and the place of physics in this arena.

It was therefore fitting that Congress included a Physics in Action programme, extending over three days and attended by more than 500 upper-primary- and lower-secondary-school pupils, and a Continuing Professional Development programme, also over three days and attended by 40 primary- and secondary-school teachers, plus probationary and PGCE student teachers.

Undergraduate and postgraduate students, together with postdoctoral researchers, were well catered for with a Students Career Workshop, an EPSRC Student/Research Assistant Workshop and a Faraday Partnerships Workshop. On the social side there was a young physicists dinner and a young physicists social evening.

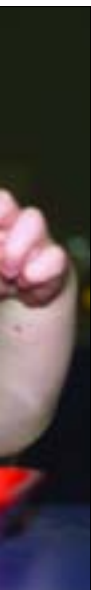
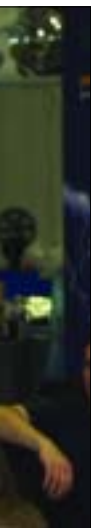
Members in industry had a day devoted to the contributions



Clockwise from above: a pupil from Tanshall Primary School, Glenrothes, is encapsulated in a soap bubble by her colleagues; Ken "Arcs & Sparks" Skeldon, Public Understanding of Science fellow, is put through his paces by primary-school pupils; an alternative weather forecaster warms to her young audience; a budding young physicist hard at work; the Lothian and Borders Fire Brigade joins in the physics fun.



Congress



of physics and physicists to the wider modern economy and the role played by physics-based industries in contributing to wealth creation, business processes, quality of life and society in general. Speakers were able to draw on case-studies from *The Importance of Physics in the UK Economy*, a report published by the Institute and launched on 10 March 2003.

An associated exhibition, designed to complement the main conference programmes, was well attended and involved some 33 exhibitors.

Echoing the president's theme of a two-way dialogue, Tam Dalyell, in his plenary lecture, gave his thoughts on the general public's perception of science and what more can be done to improve its understanding of scientific issues. He also suggested how to raise the profile and awareness of physics research in government and its agencies, and to influence government policy on science.

Prof. Wilson Sibbett – the Scottish executive's chief advisor on science and chairman of the Scottish Science Advisory Committee (SSAC) – together with Roger McClure – chief executive of the Scottish Funding Councils for Further and Higher Education – discussed the SSAC's work and the role of the Scottish Executive and the Scottish Higher Education Funding Council in supporting physics higher education and research, together with other general policy issues affecting physics in Scotland.

Congress was also well supported by members of the general public, with 400–500 people attending the Sunday Family Science Funday. Later in the week it was also visited by the Lothian and Borders Fire Brigade, which had to attend a false alarm that resulted in an emergency evacuation of the Edinburgh Conference Centre.

In conclusion it was most heartening to see a Scotland-based Congress finally become a reality, and one that proved to be a successful and fitting conclusion to the current series.

Glasgow Science Centre to host AGM

The AGM of the Institute of Physics in Scotland will be held in the Multi-Media Theatre at Glasgow Science Centre at 5.30 p.m. on Friday 30 May 2003. Members received the calling notice and agenda with the April issue of *Physics World*.

Volunteers, particularly from industry, who are willing to serve on local teams and/or the committee, either as co-opted or as elected members, are especially welcome.

Nominations for elected members, proposed by at least two members of the Institute of Physics in Scotland, should be sent, with the nominee's consent, to the honorary secretary.

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

The minutes of the 2002 AGM will be made available at

COMMITTEE NOMINATIONS

Chairman Prof. David Saxon, University of Glasgow

Past chairman Eur Ing Alan Harper, Avecia

Honorary secretary Duncan Hand, Heriot-Watt University

Honorary treasurer Alistair Flett

Ordinary members Glenn Davanna, Heriot-Watt University; Norman Fancey, University of Edinburgh; Gillian Lang, Glasgow Science Centre; Dorothy McMurrich, University of Edinburgh; Gemmill Miller, Stewart's Melville College; Derryck Reid, Heriot-Watt University; Heather Reid, BBC Scotland; Iain Ross; Catherine Wilson. Hillary Sillitto is standing down from the committee.

scotland.iop.org by the middle of May. Copies will also be available at the AGM.

Directions to Glasgow Science Centre are at www.gsc.org.uk/visiting/location.htm.

Members are urged to attend the AGM and make sure that their voice is heard on the future of the Institute in Scotland.

Members and their partners wishing to visit the Glasgow Science Centre Science Mall can do so at a group-discounted rate

of £3.75 per person. Please note: the mall will close at 6.00 p.m.

You can also visit the Glasgow Science Centre IMAX Theatre, where films will be showing at 5.00–5.45 p.m. and 6.15–7.00 p.m., at the same discounted rate. A discounted rate of £6.95 is available for admission to both attractions.

For further details of these offers and programme details for the IMAX theatre, see the website at www.gsc.org.uk.

Stirling Physics Meeting offers varied programme

The 29th Stirling Physics Meeting will be held at the University of Stirling on Wednesday 4 June 2003.

This popular annual event is regularly attended by in excess of 200 physics teachers, plus others with an interest in physics education, to learn about the latest developments in physics and physics education. It provides a valuable forum for discussion that will influence and shape the Institute of Physics in Scotland's strategies and policies relating to the development and improvement of science and physics education in Scotland.

Speakers and topics to be covered include Prof. Wilson Sibbett, Wardlaw professor of

physics, University of St Andrews, chief advisor of science and chairman of the Scottish Science Advisory Committee: "Science policy in Scotland"; Neil Taylor, Learning and Teaching Scotland: "Improving science education 5–14, S1/S2 content and assessment"; Tom Balanowski, principal teacher physics, Linlithgow Academy: "Intermediate 1 physics"; Adrian Watt, principal teacher physics, Kirkcaldy High School: "Teaching physics with digital content"; Prof. Wilson Poon, University of Edinburgh: "More is different: why there is plenty of physics after the theory of everything"; Daniel Sandford-Smith, recently appointed education manager (schools and colleges) for the

Institute, will provide an update on the work of the Institute's education department; and Catherine Wilson, Teacher Network overall coordinator for Great Britain and Ireland, will provide details about the planned roll-out of the network in Scotland (see p2).

Institute of Physics in Scotland prizes, awarded in recognition of Scottish excellence in physics, will be presented to four pupils who were among those who achieved the highest marks in the 2002 SQA physics exams (see p3).

Martin Robertson, principal physics teacher at Elgin Academy, will be presented with his 2003 Institute of Physics Teachers' Award (see p1).

Registration and programme details were sent to schools in April. Copies are available from Leila Solomon at the Institute (e-mail: leila.solomon@iop.org; tel: (0)20 7470 4821).

Scottish Executive considers the future of renewables

The Scottish Executive's response to the consultation on a higher target for renewable energy in Scotland by 2020 has been published as *Securing a Renewable Future*. The press

release on the response by the Minister for the Environment and Rural Development can be found at www.scotland.gov.uk/pages/news/2003/03/SEEN408.aspx.

An analysis of the

submissions to the executive with the full text of the submissions and the executive's response are at www.scotland.gov.uk/about/ELLD/EN-CS/00016749/consultation.aspx.

Summer school will tackle LHC phenomenology

The 57th Scottish Universities Summer School in Physics (SUSSP) is to be held at the University of St Andrews on 17–29 August 2003.

The SUSSP was established in 1960 by Aberdeen, Edinburgh, Glasgow and St Andrews universities “to contribute to the dissemination of advanced knowledge [in physics] and the formation of contacts among scientists from different countries” through setting up a series of annual summer schools of the highest international standard. The subject area of each school reflects the research interests of these universities.

In the early years a school was held annually, but with the increase in the number of Scottish universities it has been possible in some years to hold two or three schools. The number of Scottish universities supporting SUSSP increased to 10 with the addition of Dundee, Glasgow Caledonian, Heriot-Watt, Paisley, Stirling and Strathclyde universities.

Each school is organized by its own committee, which is responsible for inviting lecturers

of international standing to contribute an in-depth lecture series on one aspect of the area being studied.

Participants come from all over the world and mostly comprise postgraduates and postdocs. Schools typically last two or three weeks and are held in one of the many historical beauty spots in Scotland.

In addition to the formal programme of lectures and seminars, an extensive social programme is included to contribute to the informal atmosphere that has become the tradition of the SUSSP.

A governing committee, comprising the professors of physics of the participating Scottish universities and appointed office bearers, is responsible for overseeing and supporting the ongoing series. (see www.sussp.ac.uk.)

In addition to the support of the participating Scottish universities, the SUSSP has, from the beginning, been indebted to the Scientific Affairs Division of NATO for its generous support through its Advanced Study Institute

programme. More recently the European Commission has made support available through its Training and Mobility of Researchers programme.

An important aspect of each of the schools is the wider dissemination of knowledge through the publication of the proceedings jointly with the Institute’s publishing division, Institute of Physics Publishing (bookmark.iop.org/browse.htm).

The 57th summer school in the series, entitled Large Hadron Collider (LHC) Phenomenology, is being organized jointly with the Institute for Particle Physics Phenomenology.

With the LHC under construction and due to come online in 2007, and at a time when most of the experimental effort is directed towards detector construction and software development, it is vitally important to focus young members of the experimental community on the physics that the LHC will deliver. At the same time there is a continuing need to bring more young theorists into phenomenology, and in particular to inform them about

the basic properties and capabilities of the machine, detectors and software required for physics analyses.

The range of physics covered by the LHC is broad: from the search for the Higgs boson and physics beyond the Standard Model, to detailed studies of quantum chromodynamics, the B-physics sectors and the properties of hadronic matter at high-energy density as realized in heavy-ion collisions. The school will aim to cover all of these at a pedagogical level, starting with a basic introduction to the Standard Model and its most likely extensions. Theoretical training will be supplemented by courses on the detector capabilities and search strategies.

The school will equip young particle physicists with the basic tools to extract the maximum benefit from LHC experiments.

The fee for the school is £700, which includes meals and accommodation in university residences. Further details and application forms are available from the school website (<http://ipp.dur.ac.uk/sussp57/>).

COME TO THE ANNUAL DINNER

All members and their partners are invited to the Institute of Physics in Scotland annual dinner, which is to be held at Glasgow Science Centre on Friday 30 May at 7.00 p.m.

Attendees should gather in the Multi-Media Theatre for an address by Julia King, chief executive of the Institute of Physics. King spent 16 years as an academic researcher and university lecturer before joining

Rolls-Royce Aerospace Group as head of materials in 1994. Progressing through several senior engineering and business positions, she became director, engineering and technology for the marine business before taking up her post at the Institute last year.

As last year, the dinner will be an informal buffet, giving ample opportunity for mingling and renewing acquaintances.

Reservations for the dinner, together with payment of £20 per person, which is inclusive of wine, should be sent to Peter Ball, 1 The Glebe, Saline, Dunfermline, Fife KY12 9UT. Cheques should be made payable to the Institute of Physics in Scotland.

Directions to Glasgow Science Centre can be found at www.gsc.org.uk/visiting/location.htm.

Is this newsletter unwanted mail?

You are sent this newsletter because your membership record shows you as a member of the Institute of Physics in Scotland. To amend your details you must currently contact the membership department at Portland Place.

At the end of May, members. iop.org will be relaunched with enhanced facilities, which will allow you to access and amend your membership record online.

Take your hat off to some inventive young milliners

As part of National Science Week – an extravaganza of science events that is coordinated by the British Association for the Advancement of Science – the Grampian Local Area Group of the Institute of Physics in Scotland sponsored a



competition to design and make a hat from materials the materials provided.

All of the entries had to include a simple working part, for which the specification was given. The competition was open to teams of up to four people.

It's a hat trick: the winning entries, modelled by their designers, who also bear their "SMART" awards. Jim McColl of BBC Scotland's Beechgrove Garden looks on.

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The Institute of Physics, 76 Portland Place, London W1B 1NT, UK.
Tel. +44 20 7470 4800.
Fax +44 20 7470 4848.

CALENDAR OF EVENTS MAY–SEP

Details of all Institute of Physics in Scotland meetings and other events are available at whatson.iop.org. Shortened notices will normally be published in *Physics World* a few weeks before each meeting. Non-physicist guests are most welcome at all meetings. Please send suggestions of topics and venues for future events to your local organizer. Details of other events in particular areas will be circulated locally and made available at whatson.iop.org.

Friday 30 May 2003
Institute of Physics in Scotland AGM (see p4) Glasgow Science Centre, 5.30–6.30 p.m.

Friday 30 May 2003
Institute of Physics in Scotland annual dinner (see p5) Glasgow Science Centre, 7.00 p.m.

Wednesday 4 June 2003
Stirling Physics Meeting: the changing face of physics teaching University of Stirling, 9.15 a.m. – 4.00 p.m.

23–27 June 2003
Summer School for Physics Teachers University of Edinburgh

17–29 August 2003
Scottish Universities Summer School in Physics: LHC phenomenology (see p5) University of St Andrews www.ippp.dur.ac.uk

9–11 September 2003
Modern practices in stress and vibration analysis University of Glasgow www.mech.gla.ac.uk/Research/Dynamics/MPSVA2003.htm.

Friday 12 September 2003
Visit for physics teachers to medical physics department Ninewells Hospital and Medical School, Dundee, 9.00 a.m. – 4.25 p.m.

LOCAL COORDINATORS NEEDED

The Institute is seeking to appoint nine local coordinators to support its developing Teacher Network. Once established, the network, covering Great Britain and Ireland, will comprise a number of local coordinators linked to one overall coordinator. It will offer support to teachers in a variety of forms. The nature of this support will depend on the priorities of the area.

Following a successful pilot phase involving coordinators spread through England and Wales, nine additional coordinators are to be appointed in London and the South East, the East Midlands, the South West, the North East, Merseyside, Northern Ireland, the Republic of Ireland and Scotland (two coordinators). The appointments will run from September 2003.

Coordinators, who will be expected to undertake the work in their own time, will be paid an honorarium of £2500 per annum and will have an annual budget of £2500 to operate the network.

Candidates should have recent experience of physics teaching in schools or colleges. They will be selected for their dedication to physics (and its teaching) and for their interpersonal skills.

The closing date for applications is 31 May 2003.

Further details are available from the Human Resources Department, Institute of Physics, 76 Portland Place, London W1B 1NT; tel: (0)20 7470 4800.

More information about the Institute of Physics in Scotland can be found at scotland.iop.org or obtained from Peter Ball, the representative of the Institute of Physics in Scotland (tel: (0)1383 853207; fax: (0)1383 852856); e-mail: peter.ball@iop.org.

INSTITUTE OF PHYSICS IN SCOTLAND COMMITTEE MEMBERS 2002/3

Chair

Eur Ing **Alan J Harper** FlnstP
Avecia, Earls Road, Grangemouth
FK3 8XG
Tel: (0)1324 494 072
Fax: (0)1324 494747
E-mail: alan.harper@physics.org

Vice-chair

Prof. D H Saxon FlnstP
Faculty of Physical Sciences,
Kelvin Building, University of
Glasgow, Glasgow G12 8QQ
Tel: (0)141 330 4673
Fax: (0)141 330 4371
E-mail: Dean@physics.gla.ac.uk

Past chair

Heather M Reid FlnstP
Broadcast meteorologist, BBC
Scotland, Broadcasting House,
Queen Margaret Drive, Glasgow
G12 8DG

Honorary treasurer/Aberdeen local organizer

Dr Alistair Flett FlnstP
Easter Crichtie Cottage,
St Katherines, Inverurie,
Aberdeenshire AB51 8SR
Tel: (0)1651 891620
E-mail: amflett@hotmail.com

Honorary secretary

Dr Duncan P Hand FlnstP
School of Engineering and
Physical Sciences, Heriot-Watt
University, Riccarton, Edinburgh
EH14 4AS

Tel: (0)131 451 3020
Fax: (0)131 451 3088
E-mail: D.P.Hand@hw.ac.uk

Media representative

Dr Gillian Lang MlnstP
Glasgow Science Centre, Pacific
Quay, Glasgow G51 1EA
Tel: (0)141 420 5000
Fax: (0)141 420 5001
E-mail: gillian.lang@gsc.org.uk

Education representative/

ordinary member
Mr Michael McVey
Lourdes Secondary School,
47 Kirriemuir Avenue, Cardonald,
Glasgow G52 3DF
Tel: (0)141 883 4711
Fax: (0)141 810 5441
E-mail: mpjmcvey@hotmail.com

Industry representative

Mr Hillary G Sillitto FlnstP
Chief engineer, Thales Optronics,
1 Linthouse Road, Glasgow
G51 4BZ
Tel: (0)141 440 4951
Fax: (0)141 440 4051
E-mail: hillary.sillitto@uk.thalesgroup.com

Public understanding of science coordinator

Mrs Dorothy McMurrich MlnstP
Department of Physics and
Astronomy, University of
Edinburgh, James Clerk Maxwell
Building, The King's Buildings,

Edinburgh EH9 3JZ
Tel: (0)131 650 5292
E-mail: d.mcmurrich@ed.ac.uk

Student representative

Mr J Glenn Davanna AMlnstP
School of Engineering and
Physical Sciences, Heriot-Watt
University, Riccarton, Edinburgh
EH14 4AS
E-mail: j.g.davanna@hw.ac.uk

Ordinary member

Dr Norman E Fancey FlnstP
Department of Physics and
Astronomy, University of
Edinburgh, James Clerk Maxwell
Building, Edinburgh EH9 3JZ
Tel: (0)131 650 5275
Fax: (0)131 650 5902
E-mail: n.e.fancey@ed.ac.uk

Ordinary member

Mr Gemmill Millar FlnstP
Stewart's-Melville College,
Queensferry Road, Edinburgh
EH4 3EZ
Tel: (0)131 332 7925
Fax: (0)131 343 2432
E-mail: gemmell@2millar.freereserve.co.uk

Ordinary member

Mr Iain Ross
Tel: (0)7710 195691
E-mail: iain_ross@compuserve.com

Ordinary member

Dr Jo Beswick
Glasgow Science Centre

Pacific Quay, Glasgow G51 1 EA
Tel: (0)141 420 5010 x303
Fax: (0)141 420 5011
E-mail: Joanna.beswick@gsc.org.uk

Dundee area local organizer (co-opted)

Dr David J Keeble MlnstP
Department of Electronic
Engineering and Physics,
University of Dundee, Dundee
DD1 4HN
Tel: (0)1382 344561 (office)
Fax: (0)1382 348313
E-mail: d.j.keeble@dundee.ac.uk

Edinburgh area local organizer (co-opted)

Dr Derryck Reid
School of Engineering and
Physical Sciences, Heriot-Watt
University, Riccarton, Edinburgh
EH14 4AS
Tel: (0)131 451 3652
Fax: (0)131 451 3136
E-mail: D.T.Reid@hw.ac.uk

St Andrews area local organizer (co-opted)

Dr Bruce Sinclair MlnstP
School of Physics and Astronomy,
University of St Andrews,
St Andrews, Fife KY16 9SS
Tel: (0)1334 463118
Fax (0)1334 463104
E-mail: b.d.sinclair@st-andrews.ac.uk