

Simulating Climate Change in Ireland



The first conference jointly hosted by The Institute of Physics (IOP) and the Irish Met Society (IMS) was held in Botanical Gardens, Dublin.

Contents

EPG News	4
<i>A message from Pat Goodman, chair of the EPG</i>	4
Reports from previous EPG events	6
<i>Weather and Sports Performance</i>	6
<i>Weather and Health; An Irish perspective</i>	8
Forthcoming Environmental Physics Group Events	12
<i>Environmental Physics Group Members' Day</i>	12
<i>Should weather and climate prediction models be deterministic or stochastic?</i>	13
<i>Quantitative measurements of atmospheric composition using laser-induced fluorescence spectroscopy.</i>	13
<i>Environmental Electrostatics 4</i>	14
Forthcoming IOP Events	15
<i>International Conference on Neutron Scattering</i>	15
Other Activities	16
<i>Institute of Physics Awards</i>	16
<i>Research Student Conference Fund</i>	16
<i>from Student Conference Fund Recipients</i>	16
Environmental Research Letters News	17
Careers and Jobs in Physics	18
<i>Getting chartered workshops</i>	18
<i>IoP Careers Website and Bursaries</i>	

Welcome to the Environmental Physics Group Spring 2013 newsletter...

Welcome to the spring edition of the Environmental Physics Groups newsletter. We are sorry to announce that our chairperson, Pat Goodman, will be standing down from leading the EPG at the next AGM. First of all, on behalf of all of us in the Environment Physics Group, we would like to thank Pat Goodman for all of his hard work and leadership over the past 9 years. His wise word of introduction to the newsletters, (page 4), will be sorely missed.

In this edition we have reports from the “Weather and Sports Performance” event, page 6, that was held to celebrate the success of the London 2012 Olympics, and the first conference jointly hosted by The Institute of Physics (IOP) and the Irish Met Society (IMS) event, “Weather and Health: an Irish Perspective”, page 8. We also have the first notice of the next Environmental Physics Group Members’ Day (page 12). We hope that you enjoy the newsletter.



Hugh Mortimer

Hugh.mortimer@stfc.ac.uk

EPG News: A message from Pat Goodman, Chair of the EPG

Dear members of the Environmental Physics group,

It's been my privilege to have been chairperson of this group, I am due to step down at the AGM. I have worked with some great and enthusiastic members on the committee over the past number of years and I thank them all. I am delighted that the EPG is such a vibrant group, which is held up as an example of best practice by the IOP. The qualities of our newsletters are something we can be proud of, and I want to thank all those who have contributed, particularly our editors, well done.



One thing which we have tried to achieve as a group, is better cooperation with other groups and branches in the holding of joint events with an environmental theme, this seems to be progressing well. A battle we had with the IOP and where we had some success is the changing of regulations regarding membership of IOP group committees, previously once one served for 9 years you could not serve again at all, this has now been changed and one can re-join a committee (if elected) after a gap of 3 years. I think the IOP will benefit from this.

In relation to the EPG we a number of young members on our committee and they bring a great vibrancy to the group, with our more experienced members bringing their experience to the table, this has provided the group with a great balance.

Environmental Physics covers a great many aspects of Physics, and that in itself has been a major challenge to the group in trying to cater and accommodate the interests of all of our members, if you

feel we are letting you down, or that your interest area is not getting the attention it deserves, then please tell us, and please consider serving on the committee. We have a number of vacancies on the committee, so please consider putting your name forward for election.

We have our members day and AGM scheduled for the 22nd May, I would encourage as many as possible to attend, there is no cost to members, and lunch and refreshments are provided. You will also see an invitation for members to submit potential talks for presentation at the meeting, you may have some of your research that would be of interest to the members of the group.

We also have an evening lecture with the London and South East Branch, where Prof. Micheal Rycroft, I wish to thank Michael, and I very am very much looking forward to his lecture, again I hope you can attend.

I want to wish the group every success going forward, I know we have an excellent team in the committee looking after the interest of our members.

Sincerely



Pat Goodman - Chair EPG

Reports from EPG Previous Events

Weather and Sports Performance

Old Town Hall, 29 Broadway, Stratford, London E15 4BQ

To celebrate the success of the London 2012 Olympics, the Royal Meteorological Society along with the Environmental Physics Group of the IOP, held a one day meeting on “Weather and Sports Performance” on 20th October 2012 in Stratford, London. The event was attended by around 40 people and featured five speakers covering a variety of topics from sailing to tennis, along with a tour around the outside of the Olympic Park to end the day.



Two excellent presentations on Olympic sailing were given by Mike Molyneux and Jim Trice, both from the UK Met Office. Mike’s talk provided an introduction to Olympic sailing and also discussed the importance of understanding the effects of the orography on local winds around the race course, and the advantages that accurate meteorological observations can provide to a sailing team. Jim Trice, who was part of the forecasting team for the 2012 Olympic sailing event held at Weymouth Bay, provided an excellent summary of the weather conditions required for racing to take place safely, as well as discussing the forecast modelling tools implemented at Weymouth and the effects of increasing the resolution of the models to improve forecast accuracy.

The next talk, by Matt Woodhouse from the University of Leeds, took us from the ocean to the air, discussing weather from a glider pilot’s point of view. Matt’s talk gave an introduction to the sport of gliding and discussed the importance of a pilot’s ability to find regions of air which provide lift, in order to keep the aircraft at altitude. Also discussed was the use of gliders as an airborne platform for atmospheric measurements. From the air back down to ground level, David James, a sports engineer from Sheffield

Hallam University, gave a fascinating talk on the effects of weather on sports performance, particularly in regard to cricket. David discussed the perplexing theory that humid weather is widely regarded by the cricketing community to influence the ability of a bowler to put spin on the cricket ball. The various explanations that have been suggested were discussed, as was a new, although yet untested theory, that the swing is more influenced by the presence of cloud than humidity, and related to the lack of turbulence in cloudy conditions.

The last talk of the day was provided by Tim Hewson from the UK Met Office and ECMWF, discussing the challenges of forecasting during the Wimbledon tennis tournament. Tim discussed the setup of the forecasting team at Wimbledon as well as the importance of accurate rain prediction during the tournament, and the variety of observational as well as forecasting tools which are used. To finish off the day, participants were treated to a two hour walking tour around the perimeter of the Olympic Park in Stratford (unfortunately there was no access to the site due to construction work). A history of the area around the Stratford site was discussed as well as the details of the buildings in the Olympic Park, their design and plans for the future. Luckily, as the tour was entirely outside, it even managed to stay dry!



Meeting participants during the walking tour around the perimeter of the Olympic Park in London. Photo courtesy of Stephen Burt.

Weather and Health; An Irish perspective***Botanical Gardens, Dublin******Conference on 17th November 2012***

Reflections on the “Weather and Health – An Irish Perspective” conference



The first conference jointly hosted by The Institute of Physics (IOP) and the Irish Met Society (IMS), and which was sponsored by the IOP (UK and Ireland) and the Environmental Protection Agency (EPA), took place on Saturday the 17th November. It was held in the visitor centre of the National Botanic Gardens, on what was a beautiful, cool, sunny and (mostly!) dry, late autumn’s day. As the early morning sunshine streamed into the bright centre, so did the enthusiastic organisers, speakers and numerous attendees of the conference themed “Weather and Health – An Irish Perspective”. With such an interesting line up of speakers, there was an air of anticipation at the busy registration and cafe areas, where all gathered for an event that very successfully lived up to all expectations.

Proceedings got underway in the lecture hall with a warm welcome and appreciation to all involved from both Paul Halton, President of the Irish Met Society, and Professor Pat Goodman, of the Environment Group of the Institute of Physics. The morning session was chaired by Declan Murphy, former director of Met Éireann and current member of the IMS committee. The first presentation entitled “Heat Waves and Mortality in Ireland” was given by Dr Mathilde Pascal, an epidemiologist at the Environmental Health Department of the French Institute on Health Surveillance. Dr Pascal presented findings of her study into mortality impacts of heat wave episodes in Ireland between 1981 and 2006 and also looked at the temperature-mortality relationship during Irish summers. She found that 294 deaths were attributable to heat waves in Ireland in that time frame and that a linear relationship exists between mean temperatures and mortality. She concluded that heat is a moderate but real risk in

Ireland, and in the context of climate change, it could well be that future heat waves may have a larger impact.

Professor John Crown, consultant medical oncologist at St Vincent's University Hospital, Dublin, gave a very informative presentation on the topic of skin cancer. He stressed the importance of not getting sunburnt and advocated the Australian campaign of Slip-Slop-Slap, as he cited sun burnings as the main root cause of skin cancer. He highlighted the importance of including details of the sunburn index in weather forecasts. He described skin cancer types and their treatments, concentrating mainly on melanoma, as it has lethal potential, because it can metastasize/spread to other parts of the body and because the current treatments for metastatic melanoma are generally unsatisfactory. However, he emphasised the fact that most melanomas are curable, with early detection the key to ensuring this. Furthermore he discussed, how occasionally, metastatic melanoma can be completely cured, through an immunotherapy treatment which uses the drug ipilimumab, also known as "ipi". Thankfully, this treatment is now available in Ireland. Other treatments have also shown some positive results and research is ongoing.

After some coffee (and delicious scones!), the morning session resumed with a talk by Dr Helen McEvoy of the Institute of Public Health in Ireland (IPH), on "Coping with Cold Weather and Fuel Poverty". Dr McEvoy presented a number of findings from a collaborative all-island research project in this area, and highlighted that old people are the most vulnerable group in society when it comes to fuel poverty and that their homes are generally the least energy efficient. Health outcomes associated with cold homes include increased risk of cardiovascular and respiratory disease. Dr McEvoy advocated "penguin principles", in that there needs to be a collective social responsibility in tackling the issue. The last talk of the morning session was given by Sean Moynihan from ALONE, who gave details of the crucial services and support offered to vulnerable older people by the charity. Currently, ten percent of older people in Ireland are considered vulnerable and Sean pointed

out that in our aging society, the number in this category is likely to increase.

As well as enjoying their lunch at either the Botanic Gardens restaurant or the Addison lodge, some conference attendees also enjoyed a tour of the glasshouses of the Botanic Gardens, during the break.

The afternoon session was chaired by Frank McGovern of the EPA and included another four presentations and got underway with a discussion by Dr Paul Nolan of UCD on “Simulating Climate Change in Ireland using a Multi-Model Ensemble Approach”. Paul described how he has used a regional climate model (RCM) to predict the future climate of Ireland for the period 2021 to 2060. There was a huge level of interest among the attendees on the figures presented, with the chair, Frank McGovern, stressing to all, that the figures were to be taken as rough predictions and that this important research is still ongoing. Paul informed us that he expects mean temperatures to rise; precipitation amounts and mean wind power to decrease during summer; precipitation amounts and mean wind power to increase during winter; and he also predicts an increase in the incidence of extreme precipitation events.

The next presentation was entitled “Once a Spring” in which Dr Chris Morris of the University of Ulster discussed the link between suicide and weather. He discussed how a recent study of this topic in Northern Ireland proved a statistical link between changes in the weather and suicide. He highlighted two categories, weather improvements and deteriorating weather, which were linked to suicide. However, he said that the weather is not necessarily a direct causal link in suicide and that there are also seasonal variations in many other factors e.g., lack of access to personnel in the social services during staff holidays.

Gavin Maguire of the HSE spoke on the subject of “Health Service Executive Major Emergency Planning for Extreme Weather Events”. He described how severe weather is the most frequently occurring major emergency type in Ireland. The severe weather events of recent years required the activation of major emergency plans in the HSE and in other principal response agencies. Gavin discussed the

case of prolonged widespread flooding during November and December 2009 and detailed the specific response required in the case of flooding at the Mercy Hospital, Cork. He concluded that many important lessons have been learnt from these events. He highlighted a specific guidebook “Be Winter–Ready”, which has been produced by the Office of Emergency Planning, Department of Defence, and which is accessible at <http://www.winterready.ie/>

The final presentation of the day was given by Gerald Fleming, Head of Forecasting at Met Éireann, and was titled “Weather and Climate services for Health applications”. Gerald reviewed some recent international developments in the area of climate and health, and in particular discussed details of the “Atlas of Health and Climate” which was recently published by the World Health Organisation (WHO) and the World Meteorological Organisation

(WMO). The atlas gives practical examples on how the use of weather and climate information can protect public health. He then described the current range of Met Éireann health related warnings, and pointed out that Ireland is well behind most other European countries in the area of biometeorology. Biometeorology



The session chairs: Frank McGovern and Declan Murphy.

is an interdisciplinary science, involving the study of the interactions between atmospheric processes and living organisms. He observed that we need to increase our involvement in biometeorology and noted that this is what the conference was all about!

Podcasts of the various lectures will soon be available to IMS members on the IMS website at <http://www.irishmetsociety.org/>. The committee would like to thank all who contributed to making this very successful day possible and are glad to have played a part in raising a greater awareness of the field of biometeorology.

Abstracts accepted for presentation will be published in the conference brochure.

Forthcoming Environmental Physics Group Events

Environmental Physics Group Members' Day: Call for Presentations

Institute of Physics, London

Wednesday 22nd May 2013



The Environmental Physics Group is pleased to announce that Members' Day will take place on the afternoon and evening of 22nd May 2013 at the Institute's HQ in Portland Place, London. Our Members' Day happens each year, together with the AGM and it is a chance to hear fascinating scientific presentations and have the chance to hear about cutting edge research from early career scientists to those more experienced scientists. We invite group members to present their work at the meeting.

If you would like to present, please contact Dr Simon Buckle (simon.buckle@imperial.ac.uk) by the end of March. If you would like attend Members' Day, you can register here: <http://members-day-13.speedsurvey.com>, or if you have not got internet, by contacting Dr Sally Brown (address at the back of the newsletter). We will circulate an updated announcement by email after Easter.

Should weather and climate prediction models be deterministic or stochastic?

Blackett Laboratory Lecture Theatre 1, Imperial College, South Kensington Campus, London SW7 2BW

Wednesday, 17 April 2013, 2pm



It is becoming increasingly common to represent subgrid-scale features in weather and climate models by including random noise. But is this really the best approach to the parameterisation problem? This meeting will examine the pros and cons of these stochastic

approaches, compared to the traditional deterministic approach.

This meeting is part of the Royal Meteorological Society National Meetings programme, open to all, from expert to enthusiast, for topical discussions on the latest advances in weather and climate.

Non members are welcome to attend these meetings. Where seating capacity is limited, priority will be given to members.

Maps and information concerning all meetings and memberships is also available from The Royal Meteorological Society, 104 Oxford Road, Reading RG1 7LL / www.rmets.org or +44(0)118 9568500

Spectroscopy of the Earth's Atmosphere

Cavendish Colloquium Room, Faraday Building, Lancaster University
Wednesday 17th April 2013, 6pm-8pm.

Prof Dwayne Heard, University of Leeds

Organised with the IOP Lancashire and Cumbria Branch

Free-radicals are intimately involved in the chemistry of the atmosphere. For example, the hydroxyl radical, OH, removes the

majority of trace gases emitted into the atmosphere either naturally or via human activities. These include greenhouse gases and substances harmful to health, and OH initiates the formation of a wide range of secondary products, many of which are implicated in poor air quality, for example ozone and aerosols. Laser-induced fluorescence spectroscopy is a very sensitive method that has enjoyed considerable success in the quantitative detection of radicals in the atmosphere. In this talk, I will focus on the LIF detection of radicals at low-pressure using a supersonic free-jet expansion, how the method is made to be absolute, and the modifications that are necessary for field deployment of the instrumentation on ground and airborne platforms. The Leeds instruments have been operated in a number of locations worldwide, ranging from the Poles to the Tropics, and from rainforests to cities. Field measurements of the concentrations of radicals and comparison with calculations using a numerical model provides a stringent test of our understanding of the underlying chemistry, and I will give a flavour of the results in a variety of locations worldwide. For further details, please contact John Bradshaw john.bradshaw@physics.org or look at the website: http://www.iop.org/activity/branches/north_west/lancashire/calendar/index.html

Environmental Electrostatics 4: Using environmental electric fields to monitor natural hazards

Institute of Physics, London

24 April 2013, 1pm – 5pm.

This half-day event is organised jointly by the Institute of Physics' Electrostatics and Environmental Physics specialist groups and continues the successful series of triennial meetings investigating the importance and applications of electric fields present in the natural environment. The presentations in this meeting will have an emphasis on monitoring of electric fields for research into natural hazards including Earthquakes, volcanoes and severe thunderstorms, as well as fundamental aspects of charge in the

atmosphere through the spectrum of particle sizes from ions to water drops. Novel instrumentation used to monitor environmental electric fields will be discussed together with their implications for the physical environment from the lithosphere to the ionosphere.

For further information about this meeting and to register please contact the Environmental Physics Group secretary Sally Brown (sb20@soton.ac.uk). There remain some opportunities for poster presentations, which can still be considered. When emailing Sally, please provide your name, institution, contact details, and whether you would like to present a poster. Registration deadline 22 March 2013. This is a half-day meeting, with a series of presentations between 1300 and 1700. Please note that lunch will NOT be provided but that tea and coffee will be available from 1230. This meeting will be held in the Lovelace Room which is not fully accessible to disabled visitors owing to a small staircase.

Forthcoming IOP Events

International Conference on Neutron Scattering

Edinburgh International Conference Centre

Monday 8th – Friday 12th July 2013

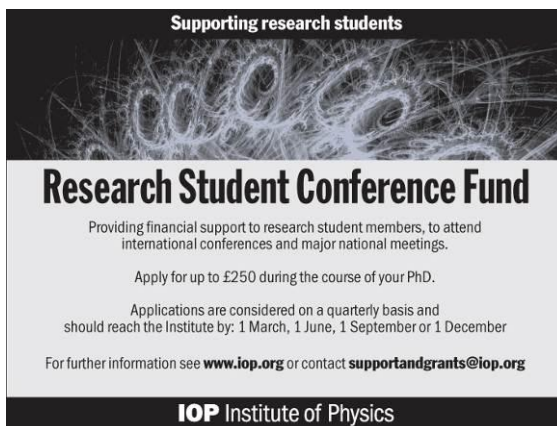
ICNS 2013 will bring together scientists from a wide range of disciplines including biology, chemistry, earth science, engineering, materials science and physics. This international conference is held every four years.



Other Activities

Research Student Conference Fund

Each year the group is allocated funds for students to apply for financial assistance to attend environmental-physics related international conferences and major national meetings. We are pleased to sponsor students at events such as these, and students are welcome to apply for up to £250 during the course of their studies. Please see the advert below for further details.



Supporting research students

Research Student Conference Fund

Providing financial support to research student members, to attend international conferences and major national meetings.

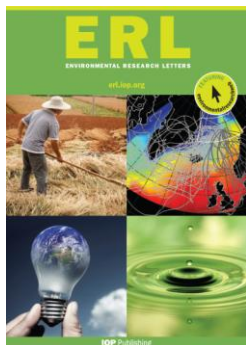
Apply for up to £250 during the course of your PhD.

Applications are considered on a quarterly basis and should reach the Institute by: 1 March, 1 June, 1 September or 1 December

For further information see www.iop.org or contact supportandgrants@iop.org

IOP Institute of Physics

Environmental Research Letters News



Environmental Research Letters, ERL, covers all of environmental science, providing a coherent and integrated approach including research articles, perspectives and editorials. ERL is a broad scope, open access journal covering all areas of environmental science. We publish both high-quality research letters and commissioned Perspective articles that highlight the impact and wider environmental implications of studies in the

journal. With a current Impact Factor of 3.631, ERL receives over 60,000 article downloads each month and aims to publish accepted articles within 90 days of submission.

Research in the journal regularly appears in high-profile media outlets such as the New York Times, The Guardian and BBC. ERL is Free to readers, since it is funded by an article publication charge. The current open issue is now available: Number 1, January-March 2013 (011001-019601).

Careers in Physics

Getting chartered workshops

Have you ever thought about applying for Chartered status but are not sure how to go about it? Are you unsure of the requirements or put off by the forms? Workshops are being held in Belfast, London, Cardiff, Sheffield, Oxford, Cumbria, Cambridge, Manchester, Newcastle, Derby, Edinburgh and Inverness between now and November. The workshops will cover:

- *The benefits of getting chartered*
- *The two designations (CPhys and CEng) offered by the Institute and the differences between them*
- *The requirements and application process*
- *Making an effective application*

For further information, please go to http://www.iop.org/membership/prof-des/chartership/page_51450.html. If you are interested in attending one of these workshops, please email CPD@iop.org along with your membership number.

IOP Careers Website and Bursaries

The IOP offers an up-to-date careers resource that is aimed at providing students and career scientists alike a place to explore new opportunities. The IOP would like to promote this service which can be found at

<http://www.iop.org/careers/index.html>

and advertise that they will be shortly

announcing the return of their successful Institute internship scheme which was run last year.



Last year's scheme saw forty bursaries of £2000 being offered to undergraduate student members of IOP who have secured work placements of up to eight weeks in length, in an area related to physics-based business and innovation, to take place during the summer holidays. Next year's scheme will open will open within the next month or two, so watch this space!











Further information about last year's application process and news for the this coming years scheme please keep an eye on:

<http://www.iop.org/careers/top40/index.html>

EPG Committee

<p>Chair: Prof. Pat Goodman</p>		<p>Physics Department, Dublin Institute of Technology, Kevin Street, Dublin 8 Tel: + 353 1 4024782, Fax: + 353 1 4024988 e-mail: pat.goodman@dit.ie</p>
<p>Treasurer: Dr Mhairi Coyle</p>		<p>CEH Edinburgh, Bush Estate, Penicuik, Midlothian, EH26 0QB. Tel: +44(0) 131 445 8574. Fax: +44(0) 131 445 3943 e-mail: mcoy@ceh.ac.uk</p>

<p>Secretary: Dr Sally Brown</p>		<p>Faculty of Engineering & the Environment, University of Southampton, Highfield, Southampton, SO17 1BJ. Tel: 02380 594796, Fax: 02380 677519 e-mail: sb20@soton.ac.uk</p>
<p>Communications: Dr A. Hugh Mortimer</p>		<p>Space Science and Technology Department, Rutherford Appleton Laboratory, Chilton, Didcot, Oxon, OX11 0QX. Tel: 01235 446746, Fax: 01235 446434 e-mail: hugh.mortimer@stfc.ac.uk</p>
<p>Dr Chris Lavers</p>		<p>University of Plymouth at Britannia Royal Naval College, College Way, Dartmouth, Devon, TQ6 OHJ. Tel: 01803 677218 Fax: 01803 677015 e-mail: brnc- radarcomms1@nrta.mod.uk</p>
<p>Dr Alec Bennett</p>		<p>Biral, PO Box 2, Portishead, Bristol. BS20 7JB Tel: 01275 847787, Fax: 01275 847303 e- mail: alec.bennett@biral.com</p>
<p>Dr Simon Buckle</p>		<p>Grantham Institute for Climate Change, Imperial College London, South Kensington Campus, London SW7 2AZ Tel: 0207 594 9665 email: simon.buckle@imperial.ac.uk</p>
<p>Dr Jarlath Molloy</p>		<p>Environmental Consultant at ICAO. e-mail: jarlathmolloy@gmail.com</p>
<p>Dr Paul Green</p>		<p>Research Scientist, National Physical Laboratory. e-mail: paul.green@npl.co.uk</p>
<p>Dr Claire Ryder</p>		<p>Research Scientist, Reading University e-mail: c.l.ryder@reading.ac.uk</p>

This newsletter is also available on the web and in larger print sizes

The contents of this newsletter do not necessarily represent the views or policies of the Institute of Physics, except where explicitly stated.

The Institute of Physics, 76 Portland Place, W1B 1NT, UK.

Tel: 020 7470 4800

Fax: 020 7470 4848