Environews Issue 28 Summer 2014

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Background photo, this page: Dawn over the Slieve Mish Mountains, May 2014. Photograph: Michael O’Clery
A green future for Aranmore Island

The potential for renewable wind and tidal energy generation on Aranmore Island, Co. Donegal (Arainn Mhor) is enormous, the island possessing for example wind speeds of up to 9m/sec.

In 2012, a 20 year plan to achieve energy independence was drawn up for Aranmore Island (Arainn Mhor). The island is a hidden treasure on Failte Ireland’s Wild Atlantic Way. Arainn Mhor is following in the footsteps of the Aran Islands in Galway who have received close to a million euro in funding for an energy conservation initiative. This was made available through SEAI BEC working with Energy Wise Consultants who have upgraded building specifications in schools, domestic dwellings and a community centre.

The initiative ReGen Arainn Mhor was a finalist in the Green Community Awards 2014 with its driver former ESAI chairman and Aranmore native Dr Shirley Gallagher being nominated for Green Leader. The awards were hosted in April with Minister for the Environment Mr Phil Hogan the guest of honour (www.greenawards.ie).

Dr Gallagher and fellow Aranmore islander Michael Kavanagh have been selected as climate change champions; Pioneers in Practise; PIP in the Climate KIC Project funded by the European Innovation Centre. This is the forefront European project tackling climate change. Both are currently using their expertise further afield in the UK developing an energy research strategy for Loughborough University. Seven other PIP have been selected from Ireland including 4 from UCD, 1 from TCD and 2 other entrepreneurs Rory Kelleher and Joey Gieluk from Cork. The managing agencies in Ireland include The Green Way and Energy Cork.

Currently a needs analysis is being drawn up for the island covering all sectors – social, economic and environmental – by a steering group chaired by Dr Gallagher, under the auspices of her consultancy Syspro: Systems for Progress Ltd., to act as a framework for future development on the island. A new island council will act as an umbrella body for all islanders and island organisations.

The possibility of alternative revenue creating and job creation initiatives to a declining fishing industry are endless for example in ecotourism (e.g. development of greenways, and island hopping heritage tours) and production of branded local organic produce such as honey, fruit and vegetables.

These initiatives demonstrate what a small group of committed and knowledgeable individuals can do in the sustainable development arena in a relatively short period of time with perseverance, dedication and time.

John Wann, Editor
As incoming Chair of the Environmental Sciences Association, I welcome all readers to the latest edition of Environews. At the most recent AGM of the ESAI, held during Environ 2014 at Trinity College Dublin, we had some changes in the membership of the Council. I would like to acknowledge the work of the outgoing members of Council, Dr John Gallagher, Damian Howard, Dr PJ Purcell and I extend my good wishes to new members Elizabeth O’Reilly and Rebecca Mooney. I welcome the incoming Honorary Secretary, Dr Kevin Ryan (congratulations on completing the PhD!) and Treasurer, Dr David Bourke, and wish them well in their roles. In addition, Mark Nolan will develop further the social media communications of the ESAI, so best of luck to him also.

I wish to pay tribute to outgoing Chair, Dr Paul Bolger and outgoing Honorary Secretary, Dr Alan Berry. Paul has done excellent work in developing the ESAI to another level, especially in building further links to like-minded organisations such as the Chartered Institution of Wastes Management (CIWM), the Chartered Institution of Water and Environmental Management (CIWEM) and Engineers Ireland. Examples of such collaboration include the co-hosting of relevant events, reciprocal discounts for members of the organisations attending such events, and gaining CPD approval of same. Our outgoing Honorary Secretary, Dr Alan Berry, has also given tremendous support to the ESAI over the past few years. His development of social media communications has given extra visibility to our organisation. His attention to detail has been second to none.

As mentioned previously, our annual flagship event, Environ 2014, was held at TCD in February. Delegates had an excellent opportunity to network and to hear the latest research findings. Our thanks go to Dr Laurence Gill, Ian Douglas and the team at Trinity College. The overview of the conference is provided elsewhere in this newsletter. We are delighted to announce that Environ 2015 will be held at IT Sligo from April 6-8, 2015, under the guidance of Dr Frances Lucy, Director of the newly established Centre for Environmental Research Innovation and Sustainability (CERIS).

The Career Expo was held for the second successive year in conjunction with Environ 2014. Well done to Dr Cara Augustenburg, Aoife Delaney and the team for a well organised event as we aim to support our members in yet another way. It is encouraging to see vacancies advertised in the environmental sector, not only by the organisations attending the Career Expo but also the recent positions made available in the Environmental Protection Agency. It is exciting to see that one of our exhibitors UCD spin-out company Oxymem was recently announced as overall winner at the 2014 Irish Times InterTradeIreland Innovation Awards. Congratulations to them and best wishes on the ambitious expansion plan ahead.

Overall, the past few months have been extremely active with many contributions from ESAI in various events such as the Dooge Nash Hydrogeology Conference, the Natural Capital Conference, ESAI Young Research of the Year Award, and YouTube Research Competition. Further details can be found elsewhere in this newsletter.

As always, many thanks to Sinead Macken for continuing as an excellent support in the administration of the ESAI. Well done to John Wann on his work editing yet another newsletter, in what we have learned is his penultimate one. I would like to acknowledge his excellent contribution and important role as editor and wish him well for the future.

We always welcome feedback on how the ESAI can support members, so please feel free to get in touch with any suggestions or comments. I look forward to working with the new Council and developing the organisation further for the benefit of all members.

Tom Curran is a lecturer in UCD School of Biosystems Engineering and has been on ESAI Council since 2008, served as vice-chair in 2013 and was conference convenor at the 2012 ENVIRON in University College Dublin.
The 24th Irish Environmental Researchers’ Colloquium, ENVIRON 2014, was held on 26th to 28th February in Trinity College Dublin, organised jointly by the Schools of Engineering and Natural Science. Trinity College last hosted the Colloquium in 1993 and as one of the original hosts of this event, we were very pleased to welcome the colloquium back in 2014.

The theme of this year’s colloquium was ‘Environmental Challenges and Solutions’ which provoked the delegates into considering how their research either investigates contemporary threats to the natural and human environment and/or contributes towards finding solutions. With the succession of winter storms fresh in everyone’s minds it is clear that multidisciplinary approaches from scientists and engineers are needed to address the challenges of environmental pollution, energy security and sustainability of natural resources.

The conference began on Wednesday, 26th February 2014 with two workshops during the afternoon on the following topics: How to Launch and Run a Smart Sustainable Campus delivered by Noel McCann, Joe Borza, Kieron McGovern, David Hackett and Michael Keigher from the TCD Buildings Office and Energy Elephant; and; Presentation and Technical Report Writing Skills delivered by Bruce Misstear from the Department of Civil, Structural and Environmental Engineering. Many thanks to all those involved in the organisation of both these events.
Wednesday evening then featured a debate in the Science Gallery held around the provocative topic, “Is green technology good for the environment?” which attracted a good crowd of around 100 people. The energetic debate chaired by Dr Paul Butler of Enterprise Ireland, featured some brief initial thoughts from the panel of Prof. Pete Smith (University of Aberdeen), Bob Ursem (Delft University of Technology), Eamon Ryan (leader of the Green Party) and Rory O’Donnell (National Economic and Social Council) before the motion was opened to the floor. The focus of the debate was very much dominated by the issue of Climate Change (and not other contemporary issues of environmental concerns) which in itself is an interesting reflection.

The Colloquium was formally opened on Thursday morning by the Provost Dr Patrick Prendergast followed by keynote lectures by three speakers: Profs. Balz Kamber, Pete Smith and Bob Ursem. Balz Kamber, the Chair of Geology and Mineralogy in Trinity College Dublin, gave a fascinating talk on the use of trace elements and isotopes to identify aspects of changing climates in the past and previous land uses from work carried out in New Zealand and Australia. Pete Smith is the Professor of Soils & Global Change in the Institute of Biological and Environmental Sciences, University of Aberdeen as well as Science Director of Scotland’s ClimateXChange, and a lead author on the recent IPCC report. His talk focussed on food security and climate mitigation, particularly in relation to the choices we make with respect to our diet and the resulting impact on land use and greenhouse gas emissions. Finally, Bob Ursem is Scientific Director of the Botanic Garden Delft University of Technology, specialising in the application of plants in the development of technology. His wide ranging, thought-provoking presentation covered many different ideas and examples on how we can learn from nature and develop new technologies, both by using the plants themselves as well as by mimicking and adapting their processes for the materials science and engineering disciplines.

The parallel technical sessions then started which featured a total of 99 papers as oral presentations in addition to 45 poster presentations. The range, diversity and quality of the papers showed how interest in issues of environmental concern and incisive research in Ireland are flourishing. There were 7 prizes on offer this year, including the Best Oral Presentation (€500) and Best Poster Presentation (€250) both in memory of Maximilian Von Sternburg who
was a PhD student in the Herbarium of the Botany Department, School of Natural Sciences, TCD until he was killed in a road accident in his native Germany last year. The prizes were presented during lunch amongst the impressive marble columns in the spacious Victorian lobby of the Museum Building. The winner of the Best Oral Presentation was Fergus McAuliffe (University College Cork) for his presentation, “The application of a commercial mycorrhizal inoculum in a willow wastewater treatment system” whilst the winners of the Best Poster Presentation were Siobhan Atkinson and Charlotte Dennehy (University College Dublin) for their poster entitled, “Rehabilitating aquatic macroinvertebrate and macrophyte communities after control of alien invasive plants using geotextile matting as a benthic barrier.”

Running in parallel to the technical sessions on Thursday afternoon was the Environ Career Expo and CV workshop which proved to be very popular. Attendees met with representatives from NGOs, environmental consultancies, research institutes and semi-state bodies to discuss job opportunities; internships; post doctorate and PhD programmes; and also receive career advice. Many thanks to Cara Augustenborg and Aoife Delaney for organising this year’s event again. Finally, the conference dinner held in the Alexander Hotel on Merrion Square, featured the North Strand Kontra Band who’s Romanian / Bulgarian influenced, high energy infectious tunes got everyone up and dancing late into the night.

In general the Colloquium went very well and provided an opportunity for cross fertilisation of ideas between almost 300 delegates over the three days across their different fields of environmental related research. A big thank you to Ian Douglas (TCD) and Sinead Macken (ESAI) as well as the local TCD organising committee for all their efforts in organising the colloquium and good luck to Dr Frances Lucy, Centre for Environmental Research Innovation and Sustainability (CERIS), Institute of Technology, Sligo who is next year’s convenor for ENVIRON 2015.

Laurence Gill, TCD ENVIRON 2014 Colloquium Convenor
Like many areas of the Irish economy, finding opportunities in the green sector has proven to be difficult in recent years. In recognition of this, the ESAI were delighted to run yet again the environmental career expo at this year’s Environ conference, at Trinity College Dublin.

Expanding on the success of last year’s expo in Galway, it welcomed some of Ireland’s leading environmental organisations from a range of sectors who were on hand to offer advice and opportunities to over 200 attendees. The expo was free to attend and open to the public.

Participating this year were RPS, Teagasc, Northern Ireland Environment Agency, Green Careers Ireland, OES Consulting, Agapé Adventures, Alupro Ireland, OxyMem, Evolution Environmental Services/Noonan, Intertrade Ireland, and Northern Ireland Environmental Link.

Positions on offer included environmental consultancy jobs, paid graduate programmes, fully funded international research placements, PhD studentships, postdocs, research contracts and positions within environmental inspection teams.

The Careers Advisory Service from Trinity College Dublin were also in attendance offering participants free careers advice while a panel of experienced environmental professionals assisted attendees with CV preparation.

Feedback from the expo was excellent from both attendees and participating organisations. According to Caitriona McCabe of Green Careers Ireland, “We were delighted both with the high calibre of organisations that got involved but also the well qualified and experienced candidates we met. Not only was it great to meet with other organisations but it was also a fantastic way to find excellent candidates to fill our vacancies.”

It is hoped that the career expo will expand on its success and return yet again next year.

Mark Nolan
Getting trees to do the dirty work

Fergus Mc Auliffe

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Across Ireland there are almost 500,000 onsite wastewater treatment systems (e.g. septic tanks), in operation. Some of these systems do not operate effectively due to poorly draining soil. The use of short rotation willow as part of an onsite wastewater treatment system in poorly draining soils has shown promising results. This is due to the high evapotranspiration rate of willow trees, which use up wastewater during the growing season. The advantage of this system is that there is complete isolation and removal of the wastewater.

To help with tree growth, the use of mycorrhizal fungi is being explored. Mycorrhizae (literally meaning fungus-root) work in a beneficial symbiotic relationship with plants. The presence of mycorrhizae are known to help plant establishment, growth and pathogen resistance.

This research looked at the effect of a commercial mycorrhizal inoculum (DIEHARD TransplatTM: Horticultural Alliance, Florida) on the establishment and growth of willow trees Salix viminalis. Results have shown promise so far, with inoculated trees outperforming control trees. Good first year establishment is vital to the long term success of willow coppice, and it is hoped that using mycorrhizal inoculum will have benefits for willow coppice systems throughout their life-cycle.

This research project is funded by the Irish Research Council. It is run under the supervision of Prof. Peter Jones and Dr Pádraig Whelan of the School of Biological, Earth and Environmental Sciences, UCC.

With thanks to our prize sponsors

The Family of Maximilian Von Sternburg
The high abundance of freshwater habitats in Ireland render it particularly vulnerable to invasion by aquatic species (Baars, 2011). Lough Corrib supports highly diverse, keystone macrophyte communities, which are currently under threat from the invasive weed *Lagarosiphon major* (Ridl.) Moss ex Wager. In addition, this weed has negative impacts on the macroinvertebrate and fish communities, some of which are internationally important (Caffrey et al., 2010).

Concerted efforts have been invested in the management of *L. major* in Lough Corrib. Biodegradable jute matting, a light exclusion method has been successful in controlling the weed, and charophyte regrowth is observed within seven months after its application (Caffrey et al., 2010). This study focused on the recovery of macroinvertebrate communities after jute application.

Jute treated areas and charophyte and *L. major* control areas were sampled periodically over a set timespan. The results showed that after two years, the macroinvertebrate communities resembled those on undisturbed areas. Recovery was influenced by native *Chara* regrowth, as species with differing architectural complexity supported different macroinvertebrate assemblages. As two years is a long recovery period, this study indicates that changes to current management techniques may be required to promote timely restoration of the native plant communities. The seeding of a complex set of native charophyte oospores on jute following application may encourage faster charophyte regrowth and thus a more diverse macroinvertebrate community. Further financial investment may be required should control practices be changed.

References:


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The Family of Maximilian Von Sternburg
Dose dependent effects of silver nanoparticles on soil microbial communities

Conor McGee, Evelyn Doyle and Nicholas Clipson
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Nanotechnology has become central to many industries e.g. cosmetics, paint, clothes etc. The variety of commercial products which contain nanoparticles such as silver, aluminium oxide and silicon dioxide to name a few, is increasing yearly. Consequently, anthropogenic nanoparticles are now being emitted into natural ecosystems such as soils and sediments.

Currently the fate of nanoparticles in soil systems is poorly understood. For example, although nanosilver is toxic to pure cultures of bacteria and fungi in the laboratory, little is known about its effects on microbial communities in natural systems. Microbial communities are central to the functioning of the soil ecosystem and integral to many ecosystem services, being involved in organic matter degradation and recycling of nutrients such as nitrogen.

Our work has shown that nanosilver alters fungal and bacterial community structures present in pastureland soil and reduces soil enzyme activity. Microbial community structures were assessed using molecular techniques, which showed that nanosilver concentrations as low as 10 ppm changed the species of bacteria and fungi present in soil and reduced soil functional processes.

This work highlights that there should be concern about the quantities of nanosilver that come into contact with soil environments.

With thanks to our prize sponsor
Amendment of peat–based and peat–reduced growing media with vermicompost: effects on plant growth, development, and fruit yields of tomato

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Waste management policy supports the conversion of biodegradable wastes into value-added products. Spent mushroom compost is a widely-available, low-value, by-product of the mushroom industry. It has little or no value as a soil enhancer, mainly due to expensive transport and land-spreading costs. Because the spent mushroom compost is still actively decomposing, it requires additional maturation before it can be used in agriculture and horticulture.

The main objectives of this study were to identify the plant growth effect of spent mushroom compost, when matured two different ways; by mechanical turning, and by feeding the spent mushroom compost to worms (vermicomposting). The mechanically turned spent mushroom compost was used as a major component of peat-reduced growing medium (50:50 v/v vermiculite to spent mushroom compost), and compared to a commercially available peat-based growing medium. The vermicomposted spent mushroom compost was used as a minor component (10% by volume) of both the peat-reduced growing medium, and peat-based growing medium, and compared to both growing media types when no vermicompost was added.

The peat-reduced growing medium, with 50% mechanically turned spent mushroom compost, reduced above- and below-ground growth, and reduced fruit yield when compared to commercially available peat-based compost. The addition of vermicomposted spent mushroom compost to both growing media, on the other hand, had no effect on early plant growth, but it did increase plant fresh weight, and fruit dry weight in mature plants ready to be harvested. The addition of vermicompost to the peat-based growing medium also increased the quality of the fruits, and reduced the number of fruits with blossom end rot (a calcium deficiency resulting in a large number of unmarketable fruits).

This study indicates that, whereas inclusion of mechanically turned spent mushroom compost reduced the quality and yield of plants when added to commercial peat-based compost, incorporation of vermicomposted spent mushroom compost showed biostimulant effects, resulting in larger plants, with heavier fruits with less physiological disorders.

With thanks to our prize sponsors

Best Waste & Resource Management Prize Winner
Tara Duggan, UCC, accepts her prize from sponsor
Conor McGovern of the Irish Branch of CIWM

Photograph: Grace Healy

With thanks to our prize sponsors

Tomato Trial set-up Photograph: Tara Duggan
Challenges of monitoring of suspended sediment fluxes

Anna Rymszewicz
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Elevated levels of suspended sediments can affect river ecology and contribute to pollutant and nutrient transport. When deposited, fine sediments affect sensitive ecosystems such as fish spawning grounds or freshwater pearl mussel beds. Monitoring of suspended sediment levels is therefore crucial for the protection of sensitive environments.

High temporal variations of suspended sediment fluxes require long-term, high-frequency sampling which is commonly supported by continuous monitoring of a readily measurable parameter such as turbidity. Light emitted by turbidity sensors is scattered by the presence of sediment particles in water and the magnitude of the light scatter can be related to sediment concentrations. These concentrations are determined from water samples collected over time (often automatically) (see Figure 1) and ideally reflect the increased sediment loadings to rivers that occur for wet weather conditions.

Based on experiences with the EPA funded Siltflux project being undertaken in UCD, monitoring with turbidity sensors is not without its challenges. System installation, fouling, bio-fouling (see Figure 2) and instrument type settings can affect the accuracy of results. Although all turbidity sensors are calibrated to the same standard, they can produce different results depending both on measured sediment properties, and the technical specifications of the instrument. These issues are currently being explored with a view to advising on measurement methods in Irish rivers.

This work is part of the EPA funded SILTFLUX project that is carrying out an assessment of the magnitude and dynamics of fine sediment transport and resultant sediment ecological impacts in selected Irish rivers www.siltflux.com.

With thanks to our prize sponsor
Ireland is unlikely to meet the 2020 EU greenhouse gas emissions target, partly due to predicted increases in emissions from transport. Transport represents the most volatile, and arguably the most challenging, sector of emissions – accounting for one-tenth of emissions in 1990, one-fifth today and predicted to increase to one-third by 2020.

The National Cycle Network is tasked with providing traffic-free routes for walking and cycling. Although intended to facilitate both leisure and utility travel, the major routes opened to date (Great Western Greenway, Co. Mayo; Great Southern Trail, Co. Limerick) are predominantly used for leisure travel and have proven to be very popular with locals and tourists alike.

Our research at NUI Galway has shown that such routes, due to poor ground conditions and rural location, have the potential for significant embodied carbon – as high as 68 tonnes of carbon dioxide equivalents per kilometre of greenway. To put this in context, 115 drivers would have to start walking or cycling their daily 5 km commute for 20 years to offset the embodied carbon of a 10 km greenway. Furthermore, as these greenways are located in rural areas with a lack of public transport services and little other walking/cycling infrastructure, the carbon footprint of travel to greenways can also be quite large – most visitors to the Great Western Greenway arrive by car.

To bring sustainability to the transport sector, there must be a major shift to walking, cycling and public transport. Although utility travel should be the priority, leisure travel has an important role to play and greenways are set to become part of the Irish landscape. We must ensure that these greenways have minimal effect on the environment: materials should be low-carbon and locally-sourced, routes should improve or maintain biodiversity and be connected to public transport and other walking/cycling infrastructure.

The Celtic Tiger obsession with road-building and urban sprawl has led to the domination of travel by the private car for all ‘walks’ of life and 90% of all distance travelled is by car. Leisure travel is a particular cause for concern: of the seven million domestic travel trips taken in Ireland in 2012, 87% were by car. Disturbingly, this year, Ireland launches the Wild Atlantic Way – a 2,500 km driving route along the west coast, the world’s longest driving tour.

Richard Manton

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When an alien plant species such as Rhododendron invades, it is easy to see how the consequences for native pollinators could be severe. For example, native floral resources that pollinators used as food may be outcompeted. If the invasive plant can act as a replacement food resource, some of its negative impacts may be ameliorated. But plants sometimes contain toxic compounds, usually associated with defense against herbivores, in their floral nectar. This is the case with invasive Rhododendron, which contains neurotoxins known as grayanotoxins in its floral nectar. We wanted to know how native bee populations would react to these neurotoxins. Through a series of non-choice laboratory bioassays, we found a surprising result; the three species of native bees used in our tests reacted completely differently to Rhododendron nectar toxins. Honeybees died within 6 hours of consuming nectar-realistic concentrations of grayanotoxins. Solitary bees exhibited malaise and neurological symptoms but they recovered from consumption. Finally, bumblebees had no measurable negative reaction to nectar grayanotoxins. This research highlights the fact that when studying or trying to conserve pollinators, more than just one species should be looked at. The needs of pollinators differ, as does their biology, life history and genetics, and remembering this will help us to better protect our native pollinators.

By Erin Jo Tiedeken
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With thanks to our prize sponsor

Biodiversity Prize Winner Erin Tiedeken accepts prize from sponsor Fionnuala O’ Neil of BEC Consultants

Biodiversity Prize Winner Erin Tiedeken accepts prize from sponsor Fionnuala O’ Neil of BEC Consultants

Photograph: Grace Healy

Invasive Rhododendron ponticum is visited by a variety of Irish Insects

Photograph: Paul Egan, TCD
Evening on climate change sparks national debate

By Paul Bolger

The Environmental Research Institute, UCC in association with the Environmental Protection Agency and the Environmental Sciences Association of Ireland, hosted an Evening on Climate Change on Thursday, January 16th to highlight recent scientific research on climate change coinciding with the release of the 5th Assessment report by the Intergovernmental Panel on Climate Change in December 2013. The event was open to the public and was exceptionally well attended with a full capacity audience of over 300 people. The possible links between climate change and the storms and floods which occurred in late December/early January led to widespread media coverage for the event on both national and local media including RTE 1 News, Newstalk FM, Today FM, RTE 1 Morning Edition, Irish Times, Irish Independent and Irish Examiner.

The main feature of the evening was the screening of the widely acclaimed film “Chasing Ice”. In the spring of 2005, the film director James Balog headed to the Arctic on a tricky assignment for National Geographic – to capture images to help tell the story of the Earth’s changing climate. Balog deploys revolutionary time-lapse cameras across the brutal Arctic to capture a multi-year record of the world’s changing glaciers. Through powerful images of melting glaciers, the film shows the impact which climate change is having on the Arctic supporting the latest finding of the Intergovernmental Panel of Climate Change which reports a rapid acceleration of ice melt in the Arctic. Balog calls the Arctic the “canary in the coal mine” for climate change for the rest of the Earth.

The film screening was accompanied by a series of seminars and a Q&A session on “The Science of Climate Change – What’s new?” chaired by Dr Brian O’Gallachoir, UCC. The keynote speaker, Professor Ray Bates, IPCC Report Contributor & Climate Modelling expert, UCD, provided an overview of the most recent IPCC report in which he noted that “it is now even more certain (> 95%) that human influence has been the dominant cause of the observed warming since the mid-20th century” and that “a much more rapid sea-level rise is now projected” although Professor Bates did note that not all areas on earth might be subject to more extreme weather events. Dr Brian O’Gallachoir and Dr John O’Halloran provided short overviews of climate change research and practice at UCC followed by Fergus McAuliffe who provided an excellent snapshot of 11 different climate change research projects at UCC. Prof. Robert Devoy joined the panel of speakers for the Q & A session who fielded a diverse range of questions from the audience on the most important actions that need to be taken to mitigate climate change, fracking, rapid population growth, consumption levels in the developed world and the role of nuclear power in combating climate change. The Evening was completed with a “Meet the Climate Change Researcher” event where the public had an opportunity to meet climate change researchers at a post-film reception.

This highly successful and well-attended event demonstrated that there is an appetite amongst the public for scientific outreach events on matters of environmental issues where they can directly meet and interact with scientists and engineers.

Dr. Paul Bolger, Environmental Research Institute, UCC, Lee Road, Cork
Congratulations to Richard Manton from the Ryan Institute at NUI Galway who was the inaugural winner of the ESAI Postgraduate Researcher of the Year Competition, 2014. Richard is in the write up stages of his PhD working on a multi-disciplinary project entitled ‘Route Selection and Design of Greenways: Guidance for the Irish National Cycle Network’ which combines Civil Engineering and Social Science. Richard is a student of Dr. Eoghan Clifford, Civil Engineering and the Ryan Institute at NUI Galway.

His application explained that in Ireland there is an over reliance on the private car and a shift to walking and cycling has the potential to dramatically improve the environmental, economic and health implications of Irish transport. The objectives of his research are the promotion of walking and cycling for commuting, leisure and tourism; the design of safe, accessible, environmentally-friendly, and cost-effective greenways; and encouraging community involvement in the design of greenways and other green public space. His work is investigating a design methodology for greenways to ensure that they are safe, accessible, environmentally-friendly and cost-effective. He explains that a robust route selection process is required and needs to consider: life-cycle analysis and carbon savings of modal shift; cost-benefit analysis and tourism potential; safe and attractive route design; connectivity and accessibility; and integration with policy and plans. The quantitative basis of the research is informed by an international greenway user survey (n=1,000) and international best-practice; it is tested against an Irish case-study (Dublin-Galway). Currently, there is an absence of route selection and design guidelines for greenways in Ireland.

A route selection matrix will rate route options and recommend preferred routes and connections, under the headings:

- Environment (carbon footprint (LCA), habitats and designated sites, modal shift potential)
- Economy (costing, tourism potential, potential health and other benefits)
- Safety/Attractiveness (distance from traffic, surfacing, junctions, facilities)
- Connectivity/Accessibility (connection to residences and employment, user-friendly)
- Integration (inclusion in policies and plans, public transport networks)

According to Richard, “The route selection methodology and greenway design guidance will be a major asset to anyone involved in greenway planning, design or operation. It will be particularly useful for community campaign groups in designing and lobbying for greenways and for local authorities in assessing greenway proposals. An interactive website, IrishGreenways.com, will promote this research and the use of greenways in Ireland.”
The Dooge Nash International Hydrology Symposium was held in Dublin Castle on 24th and 25th April 2014 to honour the memory of two leading Irish hydrologists, Professor James Dooge, UCD and Professor Eamon Nash, NUIG. They established internationally, the key role of hydrology in many critical global issues, relating to the environment, ethics, food, energy and the developing world, in addition to their seminal roles in the emergence and development of Systems Hydrology. In keeping with their philosophy of enquiry and dissemination, the themes of the symposium focussed on the Grand Challenges facing hydrology in the 21st century and, included from amongst a wide range of thoughtful contributions, an inspiring presentation from Professor Dara Entekhabi (MIT) on “Hydrology from Space”.

Led by selected keynote speakers, the symposium brought together a mix of national and international delegates from government, and research and educational institutions with interests in hydrological science across a broad range of disciplines. The symposium was preceded by a day-long session of Hydrology Master-classes mainly for Irish postgraduate students, delivered by world leading hydrologists in the School of Civil, Structural and Environmental Engineering, UCD. A meeting of the board of International Association for Hydrological Sciences (IAHS) preceded the symposium at Dublin Castle and the inaugural IAHS Dooge and Volker Gold Medals were presented on the first day of the Symposium to Professors Dimitris Koutsoyiannis and Jun Xia. The 2014 IAHS Tison Award was presented to Dr. David Lavers and Professor David Hannah.

The symposium dinner was held at the Royal College of Physicians, Kildare Street, Dublin and the symposium tour was to the ESB Turlough Hill pumped storage scheme and Glendalough Heritage site.
The theme of the 2013 ESAI Photography competition was “Future Environment” and was opened to all amateur photographers on the 9th July 2013.

The winning photograph was taken by Mr John O’Neil from Co. Waterford and entitled “Gentle Giants”. He will receive a framed copy of his photograph together with a €200 One4all voucher, kindly sponsored by the Environmental Research Institute at University College Cork.

The two runners up in the competition, “Urban Sprawl Never Sleeps” by Simon Bluett, Kilkenny, and “Pollinating our Future Energy for a Cleaner Environment” by Richard Lally, Kildare both received a €50 One4all
voucher and a one year membership to the ESAI. Photographs were judged on picture quality, composition, and appropriateness of caption.

1st Prize: “Gentle Giants”, Wexford - John O’Neil


3rd Prize: “Pollinating our Future Energy for a Cleaner Environment”, Oak Park, Carlow – Richard Lally

The winning photographs have been displayed in the Photo Competition Gallery section of the ESAI website at www.esaiweb.org/gallery/photo-competition and were also displayed at the ESAI annual conference, Environ 2014, 24th Irish Environmental Researchers Colloquium, 26th-28th February 2014.

Many thanks also for the assistance of the photography competition judge, Nutan. He has a long established reputation in photographic journalism. He is a member of Rapho, the Paris based photographer’s agency, representing Robert Doisneau, Willy Ronis, Hans Sylvester, and a handful of other creative photographers. Based in the West of Ireland for the last thirty five years, he is the author of many books: “Blooming Meadows, the world of Irish Traditional Musicians”, “L’Enfant et la sorcière”, “L’Eternel Irlandais”, “The Islands of Ireland”, etc.

He has photographed editorials for most of the world’s photo-orientated magazines, such as National Geographic, Times, Newsweek, Airone, Stern, Geo and The Observer Magazine, and has had many photographic exhibitions hosted here and abroad. Nowadays, he mainly photographs nature and spends most of his time painting from his studio in the Burren. See www.nutan.ie for examples of his work.
EPA Research

By Paddy Morris

EPA Research is built around three pillars – climate, water and sustainability – and aims to:

Identify pressures: Providing assessments of current environmental status and future trends to identify pressures on our environment

Inform policy: Generating evidence, reviewing practices and building models to inform policy development and implementation

Develop solutions: Using novel technologies and methods that address environmental challenges and provide green economic opportunities

Strategy 2014-2020

The EPA Research strategy for 2014-2020 is now available on our website at www.epa.ie/researchandeducation/research/

The EPA 2014–2020 Research Strategy is focused on the provision of knowledge to support effective actions on the environmental and sustainability challenges that face Ireland. It builds on the work done and experience gained from previous programmes. It is informed by consultation with a broad spectrum of stakeholders including: the various research communities, experts and practitioners in the EPA and those in other State Agencies and bodies, the Department of Environment, Community and Local Government and other Government Departments, non-governmental organisations, and members of the business and innovation community.

Climate research is about informing actions on, and improving engagement with the diverse challenges posed by climate change under four areas: (i) Management of Greenhouse Gas Emissions and Sinks, (ii) Ireland’s Future Climate, Its Impacts and Adaptation Options, (iii) Socio-economic and Technological Solutions, and (iv) Air Science. It also aims to identify and advance opportunities that arise from addressing these challenges.

Water research is about supporting relevant water policy and protecting our water environment, contributing to achieving excellent water quality in Ireland, and is organised under five areas: (i) Safe Water, (ii) Ecosystem Services and Sustainability, (iii) Innovative Water Technologies, (iv) Understanding, Managing and Conserving our Water Resources, and (v) Emerging and Cross-cutting Issues.

Sustainability research is about achieving a high quality of life in a resource-efficient Ireland, and is organised under four areas: (i) Resource Efficiency, (ii) Health and Wellbeing, (iii) Socio-economics, and (iv) Natural Capital and Ecosystems.

Searchable database

All current and most past EPA-funded research projects can be found using our searchable database at http://erc.epa.ie/smartsimple/

EPA Research News – quarterly email newsletter

You can sign up for this email newsletter and EPA call announcements using the form on our webpages or by mailing research@epa.ie with ‘Subscribe’ as your subject line.

Calendar of Irish environmental research events

We recently added a calendar of events to our webpages. If you would like your environmental research event added please email research@epa.ie with full details.

@EPAResearchNews on Twitter

Follow us for updates on environmental issues in Ireland, call announcements and links to interesting environmental stories across the world.

Paddy Morris, EPA Research

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EPA Research News – check out the EPAs newsletter highlighting Irish environmental research

Join my network on LinkedIn

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The Chartered Institute of Ecology and Environmental Management (CIEEM)

By Paddy Morris

The Chartered Institute of Ecology and Environmental Management (CIEEM) is the leading professional membership body representing and supporting ecologists and environmental managers in Ireland, the UK and abroad. Established in 1991 and receiving its Chartered Status in 2013, it has around 4800 members drawn from across the employment sectors including local authorities, government agencies, NGOs, environmental consultancy, academia and industry.

CIEEM’s mission is to advance the understanding and standards of practice of ecological and environmental management for the benefit of the natural environment and society.

In order to achieve its mission, CIEEM engages in a wide range of activities. These include:

- establishing and upholding standards of professional competence and conduct of those who practise ecological and environmental management as a profession
- promoting the sharing of best practice through publications, networking and awards
- supporting continuing professional development (CPD) through the provision of training and conferences
- being an influential voice for the sector by advising governments on policy and practice in relation to management of the natural environment
- promoting an integrated inter-disciplinary approach to sustainable management of the natural environment

CIEEM members work for a wide range of ecological/environmental employers. Job roles are extremely varied and range from surveying and analysing field data to providing high level input into environmental policy. Our membership varies greatly in terms of professional standing, with chief executives and directors of large organisations at one end of the scale, all the way down to student members who are studying relevant courses at university/college before entering the sector professionally.

CIEEM in Ireland

CIEEM has an active voluntary Committee in Ireland that works on behalf of members in the North and South of Ireland. It has a dedicated part time Support Officer. CIEEM in Ireland organised a successful All Ireland Conference for members last November and this was attended by Minister Deenihan, T.D. It liaises with Irish members and provides CPD training relevant to the Irish ecological sector, organises networking events and is a voice for policy submissions for the professional ecologist in Ireland.

To find out more about CIEEM (including information about membership), please visit our website www.cieem.net

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Is deforestation in Ireland on the increase?

By Dr John Devaney, School of BEES, UCC

At the beginning of the twentieth century, forest cover in Ireland was <1% following millennia of gradual deforestation. Over the last sixty years, extensive afforestation programmes have increased forest cover to 10.5%. Despite this, recent evidence suggests the rate of deforestation in Ireland is increasing. Deforestation is defined by the Food and Agriculture Organisation of the United Nations (FAO) as “the conversion of forest to another land-use”. Hence, deforestation does not include the many areas of forest in Ireland that are clear-felled and subsequently replanted. Still, the rate that forests are being converted to other land-uses such as agriculture and settlement is on the increase according to Ireland’s most recent National Forest Inventory. However, current methods used for estimating deforestation in Ireland are associated with large uncertainties. Based at the School of Biological, Earth and Environmental Sciences, UCC, and funded by the Environmental Protection Agency, the DEFORMAP project is assessing the accuracy of current and potential deforestation estimation methods. The project will report on trends in forest related land-use changes in Ireland for the period 2000 to 2012. Using a combination of GIS analysis, satellite remote sensing and ground surveys, the project aims to create a national deforestation map for Ireland 2000 – 2012. The findings of this project will inform future inventories of forest resources and assist sustainable forest management in Ireland.

For more information see www.deformap.wordpress.com.
Groundwater risk assessment in a karst watershed

By Ger Shortle and Per-Erik Mellander

A Teagasc study¹ at the Agricultural Catchments Programme watershed near Ballinrobe, shows that farming in karst areas could pose much less risk to groundwater than was thought. A fifth of Ireland’s land is on karst, often with shallow soils and most of this area is considered at high or extreme risk of pollution. The spring at the study site shows no strong evidence of pollution despite relatively intensive farming and previous vulnerability assessments classifying 97% of the contributing zone as high to extreme risk.

The study showed that most P was attenuated by the soil, despite its shallowness, even in dolines (collapse features) and also likely in bedrock fissures and possibly larger channels. A specific P vulnerability map was developed which classified 14% of the site as highly vulnerable for P transfer to groundwater with two thirds of low vulnerability and the remainder moderate. Overlaying areas of high source pressure (P index 4 soils) on high vulnerability areas to generate a Critical Source Area map identified only 2% of the site as high risk. Encouraging farmers to reduce soil P from Index 4 to Index 3 (optimum for farming), offers a simple way to reduce risk with no impact on production.

References:
OxyMem was named by The Irish Times & InterTradeIreland as the 2014 Innovation of the Year for the development of its breakthrough technology for wastewater aeration at the annual awards ceremony at the Royal Hospital, Kilmainham.

Companies were recognised for their achievements across a diverse group of categories and honoured for their contribution in leading innovation within their industry. Now in its fourth year, the Irish Times InterTradeIreland Innovation Awards aim to identify and promote a range of the most groundbreaking product and service innovations throughout the island.

OxyMem was chosen as one of eighteen of the most successful innovations on the Island of Ireland based on an evaluation of such criteria as originality, proven market and industry impact and potential for sustainability and development. OxyMem is a breakthrough technology for the wastewater aeration market tackling the industry's biggest challenge - energy costs. For more than 100 years wastewater treatment has relied upon energy intensive processes which compress large volumes of air to provide oxygen to the bacteria breaking down the pollutants. The OxyMem solution does not rely on these highly inefficient methods. Instead it uses gas permeable membranes capable of providing Oxygen directly to bacteria for aerobic biological processes, resulting in up to a fourfold energy saving with more compact, and lower cost infrastructure.

On receiving the award, Managing Director of OxyMem, Wayne Byrne said "We were delighted to have won the Energy and Environment category of this year's Innovation Awards amongst very deserving entries. To win the overall Innovation of the Year award and be acknowledged by this highly respected industry award is a real honour for OxyMem." Mr Byrne added “We have major plans to revolutionise the wastewater treatment market and are targeting a turnover of €50 million within the next five years. Receiving this award strengthens our position as pioneers in the water industry and in the attainment of an energy and carbon neutral wastewater treatment plant.”
Adam Shanley