



Newsletter 13 December 2018

Welcome to the thirteenth newsletter of the Sêr Cymru National Research Network for Low Carbon, Energy and Environment (NRN-LCEE).

As we near the end of 2018 when NRN-LCEE research activities will come to a close, we can begin to reflect upon just how successful the Network has been. This has not only been in acquiring competitively won research funding, but also in the strength of the research and ensuing outputs delivered by our research Clusters, the many collaborations made by NRN-LCEE researchers nationally and internationally, the impressive effort put into delivering novel engaging outreach tools and facilitating the return of talented researchers back to research after career breaks. We have recently published an overview document of the work of the NRN-LCEE to date which reports on these achievements - please see the online version [here](#).

To sum up nearly five productive years of the NRN-LCEE, by November 2018:

- NRN-LCEE researchers have won Competitive funding for 93 projects to Welsh institutions, combined to lever £19.2 million from RCUK, EU and other sources.
- The contribution of our Partner Organisations is currently an additional £11.5 million.
- Therefore the £7 million investment in the NRN-LCEE by WG/HEFCW has leveraged at least £30.7 million for Welsh research institutions.
- This results from researchers bidding for 205 projects. The success rate of 45% is well above the current sector norm which ranges from <5 to 20% depending on funding source.
- At the same time the Network has presented at least 260 conference abstracts and 140 publications (104 of which are in peer-reviewed high quality journals).
- Additional to these are of course the large number of events, public lectures and training the Network has provided.

In this newsletter you can read about the NRN-LCEE's partnership with STEM Cymru that enabled 120 Girls to experience STEM research at Bangor University, an NRN-LCEE hosted event on the problems and solutions for single-use plastics, a workshop on 'The Secrets of Science Communication' and the recently held NRN-LCEE Closing Event.

Prof. David Thomas (d.thomas@bangor.ac.uk)

Director of the Sêr Cymru National Research Network for Low Carbon, Energy and Environment

News: NRN-LCEE Closing Event

The Sêr Cymru NRN-LCEE Closing Event took place in Cardiff on 28 November 2018 with attendees from universities across the UK, Welsh Government, Natural Resources Wales, British Geological Society, UK Met Office, Wales Green Party, Farmer's Union of Wales and industry. Prof. David Thomas, NRN-LCEE Director, opened the event by celebrating the achievements of the Network. The day included three stimulating keynote talks:

[Prof. Janet Dwyer](#), Professor of Rural Policy & Director of the Countryside and Community Research Institute, University of Gloucestershire.

'Towards sustainability and resilience: the value of social processes'

Janet examined ways in which thinking sustainably becomes embedded in agricultural, economic and social values and practices. She addressed the critical importance of people and social processes in achieving rural resource use sustainability, and concluded her presentation with an agenda for future action that emphasises people, community and culture as vital ingredients in the mix.

[Prof. Camilla Toulmin](#), Senior Associate & former Director of the International Institute for Environment and Development.

'How can we accelerate the transition to a low carbon economy – locally and globally?'

In context of the Paris Climate Agreement, 2015 having set a clear target for all nations to shift to a low carbon economy, Camilla examined the options for different countries and how to accelerate the transformation of economic systems to meet the Paris targets. Camilla highlighted the recent Energy Transitions Commission report addressing zero-carbon transition: [Mission Possible: Reaching net-zero carbon emissions from harder-to-abate sectors by mid-century](#).

[Prof. Patricia Thornley](#), Director of the European Bioenergy Research Institute, Aston University & the Supergen Bioenergy Hub.

'What next for (bio)energy?'

Patricia outlined the diversity of bioenergy systems and challenges associated with sustainable production and conversion. She then critically examined the frameworks in place to promote their sustainability and effectiveness at delivering policy objectives including the governance of bioenergy systems and mechanisms to improve transparency and efficiency in certification and approval. Patricia highlighted the recent Climate Change Commission report: [Biomass in a low-carbon economy](#).

Alongside the keynote speakers, eight of the NRN-LCEE PhD students gave effective succinct presentations; each deftly summarising multiple years of their research into just five minutes.



NRN-LCEE Final Event Keynote speakers Janet Dwyer, Camilla Toulmin and Patricia Thornley.



NRN-LCEE PhD students. Front: Bid Webb, Rebecca Hindaugh, Rebekah Weatherhead & Maram Almollyeh; back: Annum Rafique, Rob Turner, Diana Waldron & Andre Soares.

News: NRN-LCEE Closing Event cont...

In conjunction with the event's talks, the NRN-LCEE research Clusters held a vibrant exhibition communicating the aims and key findings of their research - including incorporation of outreach materials ranging from model sheep, tidal turbines and landscapes to living plants, aquatic animals, rock samples and 3D geological visualisation technology.



Multi-Land's simulation in action to demonstrate the hydrological dynamics of trees in the landscape



Quotient's model turbine in action to explain the science behind marine renewable energy generation.

News: NRN-LCEE and STEM Cymru enable 120 Girls to experience STEM research at Bangor University's School of Ocean Sciences

The NRN-LCEE partnered up with STEM Cymru for four Girls into STEM events at Bangor University's School of Ocean Sciences (SOS), the last of which took place in December 2018. During each event, 30 Students aged 13-15 from schools across North Wales were welcomed to SOS to experience practical activities at SOS labs & research vessel and discuss career options with a panel of scientists. [Read more...](#)



Secondary school students experiencing university laboratory practicals

News: Single-Use Plastics – What about it?

On 18 October the NRN-LCEE hosted an event to explore some of the problems and solutions around the topic of single-use plastics. 4 speakers each covered a different area of the plastics problem and shared their insights, findings and ideas with an enthusiastic audience. [Read more...](#)



Julia Barton exhibited works from her Littoral Art Project investigating & visualising plastic pollution on Scotland's beaches.

News: The Secrets of Science Communication revealed at NRN-LCEE workshop

On Wednesday 22 August, the NRN-LCEE team was pleased to welcome Dr Helen Scales and Zoe Trinder-Widdess to the Royal Welsh College of Music and Drama in Cardiff, where they delivered an excellent workshop on science communication. [Read more....](#)

News: Antimicrobial Resistance multidisciplinary event

Jointly organised by the 3 Sêr Cymru National Research Networks, this event held in Cardiff on 14th November 2018 addressed challenges & advances in antimicrobial resistance (AMR) research across the disciplines of environmental sciences, life sciences & engineering. The event was free and open to all, and included the following keynote talks:

- The role of the environment in antibiotic resistant infections in humans.
Dr William Gaze, University of Exeter
- Using physical sciences & engineering approaches to meet the challenge of AMR.
Professor Jamie Hobbs, University of Sheffield
- Survival of pathogenic bacteria in the environment.
Dr Robin Howe, Public Health Wales.
- Developing a rapid label-free viability test and its application to antimicrobial resistance.
Dr Massimo Antognozzi, University of Bristol.

Public Lecture Series

On Thursday 27 September Dr Rebecca Ford, Programme Manager, The Oxford Martin Programme on Integrating Renewable Energy, University of Oxford, gave a well-attended public lecture at Swansea University, Bay Campus. [Read more....](#)

The NRN has sponsored a series of seven lectures from September to December 2018 forming the Year of the Sea Lecture Series at the Mostyn Gallery in Llandudno. Over 200 people have attended the six lectures to date. Professor David Thomas will be giving the final lecture in the series on 13th December entitled 'Art, Aesthetics, Architecture and Algae'. [Read more...](#)

Research Highlights – Publications

NRN-LCEE research has been published in the following selected recent publications:

Ellison, A. R., Uren Webster, T.M., Rey, O., de Leaniz C.G., Consuegra, S., Orozco-terWengel, P., Cable, J. (2018). Transcriptomic response to parasite infection in Nile tilapia (*Oreochromis niloticus*) depends on rearing density. *BMC Genomics* **19**: 723 <https://doi.org/10.1186/s12864-018-5098-7>

Rosadoa, D., Pérez-Losada, M., Severino, R., **Cable, J., Xavier, R.** (2019) Characterization of the skin and gill microbiomes of the farmed seabass (*Dicentrarchus labrax*) and seabream (*Sparus aurata*). *Aquaculture* **500**: 57-64 <https://doi.org/10.1016/j.aquaculture.2018.09.063>

Research Highlights – Publications Cont..

Foskolos, A., Moorby, J. M. (2018). Evaluating lifetime nitrogen use efficiency of dairy cattle: A modelling approach. *PLoS one* **13**(8):e0201638 <https://doi.org/10.1371/journal.pone.0201638>

Soteriades, A.D., Gonzalez-Mejia, A.M., Styles, D., **Foskolos, A., Moorby, J.M., Gibbons, J.M.** (2018). Effects of high-sugar grasses and improved manure management on the environmental footprint of milk production at the farm level. *Journal of Cleaner Production* **202**: 1241–1252. <https://doi.org/10.1016/j.jclepro.2018.08.206>

Pynegar, E.L., Jones, J.P.G., **Gibbons, J.M.,** Asquith, N.M. (2018) The effectiveness of Payments for Ecosystem Services at delivering improvements in water quality: lessons for experiments at the landscape scale. *PeerJ* **6**: e5753. <https://doi.org/10.7717/peerj.5753>

Humphreys, M.W., **Doonan, J.H.,** Boyle R., Rodriguez, A.C., Marley, C.L, Williams, K., Farrel, M.S., Brook, J., Gasior, D., Loka, D., Collins, R.P, Marshall, A.H., Allen , D.K., Yadav R.S., Dungait, J.A.J., Murray, P., Harper, J.A. (2018) Root imaging showing comparisons in root distribution and ontogeny in novel *Festulolium* populations and closely related perennial ryegrass varieties. *Food and Energy Security* **7**: e00145. <https://doi.org/10.1002/fes3.145>

Loka, D., Harper, J., Humphreys, M., Gasior, D., **Gwynn-Jones, D., Scullion, J., Doonan, J.H., Kingston-Smith, A.,** Dodd, R., **Wang, J., Chadwick, D., Hill, P., Jones, D.,** Mills, G., **Hayes, H., Robinson, D.** (2018) Impacts of abiotic stresses on the physiology and metabolism of cool-season grasses: A review. *Food and Energy Security* **8**: e00152. <https://doi.org/10.1002/fes3.152>

Sand, K. K., Jelavic, S. (2018.) Mineral Facilitated Horizontal Gene Transfer: A New Principle for Evolution of Life? *Frontiers in Microbiology* **9**: 2217. <https://doi.org/10.3389/fmicb.2018.02217>

Jelavic, S., Tobler, D.T., Hassenkam, T., De Yoreo, J. J., Stipp, S. L. S., **Sand, K. K.** (2017) Prebiotic RNA polymerisation: energetics of nucleotide adsorption and polymerisation on clay mineral surfaces. *Chemical Communications* **53**: 12700-12703 <https://dx.doi.org/10.1039/c7cc04276k>

Zhang, Z., **Masum, S.A., Thomas, H.R.,** Han, L. (2018) Modelling fully coupled hydraulic-mechanical-chemical processes in a natural clay liner under mechanical and chemico-osmotic consolidation. *Environmental science and Pollution Research*. [Epub ahead of print] <https://doi.org/10.1007/s11356-018-3532-7>

Prabhakaran, R.T.D, Gupta, M., Mahajan, P., **Ormondroyd, G.A.** (2018) Modelling and Simulation of Natural Fibre/Epoxy Composites – Prediction of Stress State and Deformations. *International Journal of Materials Engineering Innovation* In Press.

Prabhakaran, R.T.D, Curling, S.F., Spear, M., Ormondroyd, G.A. (2018). Simulation Model To Evaluate Human Comfort Factors For An Office In A Building. *Proceedings* **2**(15): 1126 <https://doi.org/10.3390/proceedings2151126>

Boada, J., **Pagès, J.F.,** Gera, A., Macpherson, E., Santana, Y., Romero, J., Alcoverro, T. (2018). The richness of small pockets: decapod species peak in small seagrass patches where fish predators are absent. *Marine Environmental Research* In press. <https://doi.org/10.1016/j.marenvres.2018.09.012>

Wang, J., Akiyama, H., Yagi, K., Yan, X. (2018). Controlling variables and emission factors of methane from global rice fields. *Atmospheric Chemistry and Physics* **18**: 10419 - 10431. <https://doi.org/10.5194/acp-18-10419-2018>

Find all publications resulting from NRN-LCEE research at: <http://www.nrn-lcee.ac.uk/publications>