



## ERI in the USA

Effective marine management is underpinned by accurate measurements of ocean circulation, to inform issues ranging from shipping routes to the spread of pollutants and larval dispersion. At the same time, the coastal zone is under increasing pressure from development e.g. from aquaculture and marine energy. Through a collaboration between the ERI and Marine Scotland Science, researchers are demonstrating high frequency (HF) radar as a tool to measure ocean circulation.

The Fair Isle Gap, between the Orkney and Shetland archipelagos, has a key role in the North Atlantic Current circulation. The narrow channel generates a huge source of storms entering the northern North Sea, and due to the high usage from tidal/wave energy, shipping, fisheries, oil and gas, etc., there is a risk of impacts on the environment and ecology of the area. ERI PhD student Matteo Marasco has been using the outputs of this technology to monitor

tidal variability and water transport through the Fair Isle Gap as part of the Brahan Project (2013-2014). Matteo's aim is to demonstrate that HF radar can be used to monitor extreme environmental conditions without the challenges of in-situ underwater instruments. The benefits are diverse – outputs can help coordinate monitoring activities, increase our understanding of climate change in the North Sea and Arctic Ocean, or inform ship route planning for fuel savings.

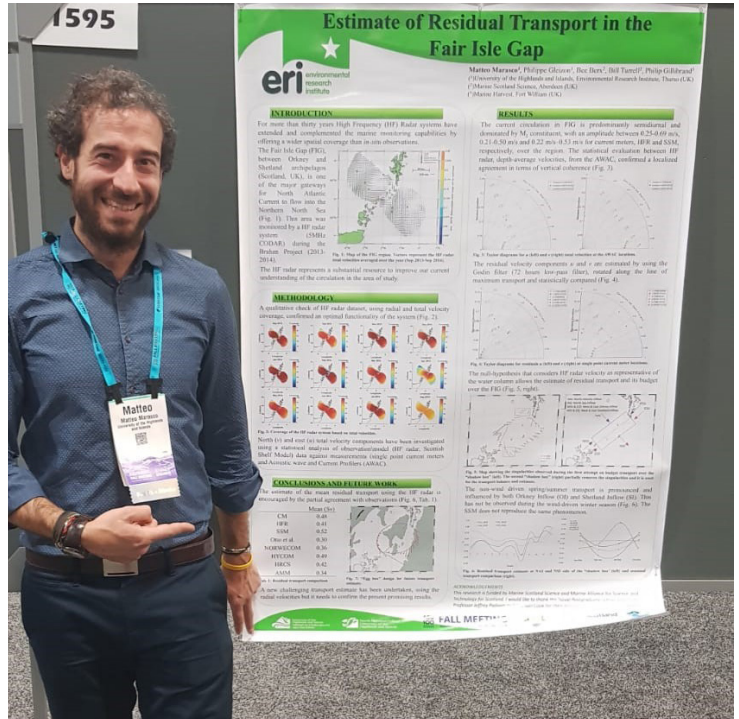
To further his knowledge, Matteo visited researchers at the Naval Postgraduate School, Monterey Bay, California (USA) – one of the first and most-monitored areas by HF radar technology in the world. With more than 20 years of experience using HF radar, Professor Jeffrey Paduan (Dean of Research) and Mike Cook (Chief of NPS Oceanography Lab) shared their expertise in oceanography and HF radar. Matteo developed his analysis of data collected by



the HF radar system, and began a comparison of the two oceanographic regions, establishing a strong link with the common objective of improving marine ecology monitoring in the coastal ocean.

Matteo's visit to the USA culminated in a presentation of a poster titled 'Residual transport estimate in the Fair Isle Gap' at the American Geophysical Union (AGU) Fall Meeting in Washington DC in a dedicated specific session on HF radar technology (Land-Based Remote Sensing of the Coastal Ocean).

Matteo's time at the Naval Postgraduate School was supported by a Marine Alliance for Science and Technology for Scotland (MASTS) Postdoctoral and Early Career Researcher Exchange (PECRE) award.



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## ERI Seminar Series

Part of our commitment as scientists is to communicate our research to the wider world, providing both validation of our research and opportunity to discuss our findings.

How do we do this? Papers published in academic journals target other researchers, and for the local community we host a series of monthly seminars which are open to all and free of charge.

Talks are provided by members of our research teams, or by colleagues visiting from different organisations. Highlights from last year include Vulture and Spoon-billed Sandpiper conservation in Bangladesh; invertebrate recovery on different restoration treatments at Forsinard; and an opportunity to meet researchers at the Flow Country conference to discuss ongoing work to protect this internationally important habitat.



This year, talks on marine plastics and wildlife; the impact of terrestrial renewables on bird behaviour; and the use of tracking devices to assess how marine species react to offshore developments will highlight our ongoing research.

We aim to schedule these events on a monthly basis starting at 17.30 at ERI Castle Street.

Details are posted on our website, and can be emailed on request.  
<http://eri.ac.uk/category/seminars>

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## Award Winning Presentation

Magdalena Blanz, PhD Student at UHI's Archaeology Institute and the ERI is undertaking research into 'Seaweed as fodder, food and fertiliser in the North Atlantic Islands: Past, present and future opportunities'.

Magdalena attended the 2018 Association for Environmental Archaeology Conference at Moesgaard Museum, Denmark in November. Her presentation was entitled "Recreating past effects of seaweed-fertilisation on the isotopic and chemical composition of barley to further palaeodietary reconstructions" for which Magdalena was awarded the best student presentation prize (pictured).

This research concerns how fertilisation with seaweed changes the chemical and isotopic composition of barley, and what implications this may have for reconstructing past diets. Barley fertilised with seaweed had elevated  $\delta^{15}\text{N}$  (nitrogen isotope) values. This indicated that when we study  $\delta^{15}\text{N}$  values in animal and human remains, the position of consumers of these crops in the food chain (i.e.

trophic level) might be overestimated if seaweed-fertilisation is not taken into account. This research is published in full in the Journal of Archaeological Science (DOI: 10.1016/j.jas.2019.02.003).

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## 2018 Annual Science Meeting- MASTS

The ERI was widely represented at the eighth Annual Science Meeting (ASM) of the Marine Alliance for Science and Technology for Scotland (MASTS). During this meeting, members of the marine science community promote their research and establish new scientific collaborations. The cross-disciplinary nature of the event as well as the high calibre of the selected talks means that scientists can broaden their knowledge in marine science as well as benefit from expertise in a range of fields other than their own. The 2018 ASM examined the modern challenges that face our marine waters with the aim to identify ways to conserve and sustainably use the oceans, seas and marine resources

Dr Benjamin Williamson, who leads the ERI's "Renewable Energy and the Environment" research theme, explained how his team is using unmanned aerial vehicles (drones) to measure animal distributions and hydrodynamic surface features at the MeyGen tidal energy site. Research fellow Dr Lonneke Goddijn-Murphy presented her research on spectral remote sensing of marine plastic litter in the session on "Marine Microplastics & Marine Litter". PhD students also had an opportunity to present and disseminate their research - Matteo Marasco talked

about how to estimate residual transport of ocean currents in the Fair Isle Gap using high frequency radar, and Daniel Johnston discussed the foraging ecology of black guillemots in relation to marine renewable energy devices.

Dr Jason McIlvenny and Benjamin were invited to present their experiences and techniques in the workshop 'Conducting fieldwork in tidal stream sites' which aimed to share best practice and lessons learned for successful data collection in challenging sites. Lonneke also attended the workshop "Marine Plastics - A Scottish Evidence Plan" of the Scottish Government Marine Plastics Evidence and Analytical Group to discuss ways forward for marine plastics research in Scotland.

Video interviews taken at the 2018 ASM with Lonneke Goddijn-Murphy and Daniel Johnston can be found at <https://www.masts.ac.uk/annual-science-meeting/2018-vidcasts/>

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## Arctic Engagement

Political and commercial interest in resources in the Arctic has increased whilst ice cover (and thickness) continue to decrease as global annual surface temperatures rise in response to climate change. Extended melting of sea-ice has allowed more opportunities for marine access, opening up new shipping trade routes and access to unexploited resources. However, this also brings an increased risk of negative impacts on local communities and the natural environment within the region. The consequences of climate change in the Arctic are likely to have a global impact.

The Scottish Government is currently developing an Arctic Policy, building upon existing involvement at the Arctic Circle Assemblies and a strong connection with the Arctic States. In conjunction with Highlands and Islands Enterprise, the Scottish Government is organizing Scotland's first 'Arctic Day' at Eden Court, Inverness on Monday 25<sup>th</sup> March to explore opportunities to increase links with the region.

Linked to Scotland's Arctic Policy, Magnus Davidson and Barbara Bremner, together with Glasgow Caledonian University's Centre for Climate Justice, recently completed an Arctic Policy Mapping Report. Commissioned by the Scottish Government to identify existing connections, this report mapped academic, environmental, social and economic links, with the aim of identifying gaps and informing future activity.

The ERI has been closely involved in Northern Periphery and Arctic (NPA) funded projects that focus on potential opportunities, and the risks faced by the region (e.g. APP4SEA, Circular Ocean, GREBE



and REGINA). In recent months, ERI staff have also participated in other activities related to the Arctic.

Stuart Gibb, who sits on the Arctic Policy Steering Group, took part in the University of the Arctic (UArctic) Congress 2018, Finland, attended by over 600 participants from 30 countries. Together with Linda Stewart (UHI's Director of European and International Development), Stuart was invited to present at a joint UK-Finland-Russia workshop on 'Sharing best practice in Arctic education'. A networking breakfast at the UK Embassy in Helsinki provided insight on the innovative delivery model and specialisms used by UArctic to help with the challenge of retaining young people in Arctic regions.

Nina O'Hanlon participated in a UK-Russia joint session for early career researchers at the Marine Research and Education (MARESEDU) Conference in Moscow, supported by the UK Science and Innovation Network in Russia. This workshop brought together a diverse group of marine scientists to explore joint interdisciplinary project ideas.

ERI's participation in these activities provides an excellent baseline for further research involvement and collaboration in the Arctic region.

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# New faces @ ERI

## Marta Herrero Villar Visiting Student



Hi, I am Marta, from the University of Castilla La Mancha (Spain), where my master's degree (2018) focussed on detection and quantification of veterinary NSAIDs in vultures in Spain, and carrion available to them. I am participating in a Short Term Scientific Mission funded through EU-COST action programme to review published information regarding pharmaceutical drugs and risks in avian scavengers.

I am applying for a scholarship to extend my study into a joint PhD. I would like to

continue to assess pharmaceutical risks to scavengers; undertake experiments to assess metabolic pathways and explore physiological aspects of avian scavengers that can potentially determine vulnerability. I think this project would provide novel data that would help mitigate risks to avian scavengers – especially vultures – and, create better estimates of the potential risks posed by pharmaceuticals.

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## Megan Grant Visiting Research Fellow



Hello! I am a visiting research fellow from the University of Tasmania, Australia. I was awarded an ACU Blue Charter Fellowship designed to support research and innovation into marine plastic pollution. I will be at the ERI for three months collaborating with Elizabeth Masden and Nina O'Hanlon and together we will be developing a standardized methodology for quantifying the amount of plastic debris in Northern Gannet nests.

During 2017, I undertook my honours research project where I studied the incorporation of debris in Brown Booby nests at 18 sites around the world. I then took a year off from studying and worked as a lecturer and demonstrator for a few classes. In December 2018, I began my PhD studying the nutrients and pollutants brought to islands by seabirds via their guano.

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## Melissa Costagliola-Ray PhD Student



I joined ERI in December to work on 'Quantification of seabird use of tidal environments: Novel methods to address potential biases in vantage point survey data'. The main aim is to investigate methods to address the limitations of vantage point surveys by developing data collection protocols, data analyses techniques, and model simulations. This PhD is funded through the Bryden Centre (Cross Border- INTERREG VA).

Before moving to Thurso, I completed

an MSc in Marine Biology at Bangor University studying the diet/foraging activities of common guillemots and razorbills at South Stack - the largest seabird breeding colony in North Anglesey. This project led to my fascination in seabirds and prompted me to apply for this PhD. I look forward to contributing to research within a multi-disciplinary team and I am extremely excited to explore the Highlands.

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## Julia Averkamp Visiting Student



My name is Julia and I completed my studies in Geography at the University of Bonn, Germany. I am taking a break before my Master's to do an internship at the ERI. My aim is to learn about peatlands, how they are affected by global change, and their importance for water quality and climate. This internship is an invaluable opportunity to develop my research skills and improve my English. Since my arrival, I have been working

on the characterisation of peatland condition in two contrasting blanket bog sites in the Flow Country, as part of a larger research project (InSAR). My internship involves a mix of field, lab and desk-based work, and a comparison of a low-level bog in good condition and an eroded upland bog, through assessing peat depth, bulk density, moisture content and loss of ignition.

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# ERASMUS + International Collaboration



Co-funded by the  
Erasmus+ Programme  
of the European Union



Barbara Bremner (middle) and Szabolcs Papp (4th from right-back) with MSc students and their tutors at University of Novi Sad

With the support of ERASMUS + International Credit Mobility, ERI, North Highland College and the Faculty of Technical Sciences, University of Novi Sad (UNS) in the Republic of Serbia have embarked on a project to build collaboration and provide new and exciting opportunities for staff and students.

The University of Novi Sad, with more than 50,000 students and 5,000 employees, is one of the largest educational and research centres in Central Europe. The planned program includes provision for student traineeships and staff mobility in Thurso and Novi Sad. By hosting incoming students and staff, the ERI hopes to gain culturally as well as benefiting from the academic experience and work practices of a very large University.

Whilst individual links between the Department of Environmental Engineering and Occupational Safety and Health (UNS) and the ERI have existed for some time, this project will help to build a new and effective partnership and bring benefit to teaching and research activity at both locations.

Initiating the mobility program, Barbara Bremner travelled to Novi Sad to meet with Professors Maja Turk Sekulić and Jelena Radonić - both will visit the ERI at the end of March. Olivera Đuričić from UNS International Office happily shared her experiences of arranging mobility for visiting students and provided

useful insight to their international strategy.

Having completed his PhD at UNS, Dr Szabolcs Papp provided valuable introductions to his former colleagues and department, as well as contributing to the proposed mobility schedule. To conclude the visit, Barbara gave a well-received presentation to MSc students on the potential student opportunities at the ERI and the delights of visiting Scotland – who knew that haggis and St Andrew's day celebrations could generate so much interest!

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