Institution: University of Ulster

Unit of Assessment: 7 Earth Systems and Environmental Sciences

a. Overview

As part of the University of Ulster's Strategy for Research and Innovation 2009-15, research is concentrated in 15 Research Institutes, each led by a director who reports directly to a dean. RI directors meet regularly with the Pro Vice Chancellor (Research and Innovation) and they receive independent recurrent budgets to support the strategic development of research in their units.

Research in Earth systems and environmental sciences at Ulster is conducted within the Environmental Sciences Research Institute (ESRI). All staff in ESRI are also members of the School of Environmental Sciences and the Head of School and Research Institute Director are joint line mangers for academic staff who are in both the School and the Institute. Contract research staff and postgraduate research students are supervised by their project leaders, overseen by the Director; she also has responsibility for the technical staff in the Institute.

Membership in ESRI is selective and is reviewed bi-annually. The criteria are adjusted for career stage; they include an assessment of research outputs, external research funding, national / international collaborations, leadership in research and in the discipline, as well as a number of esteem elements such as invited presentations and prestigious reviews. At present, 21 of the 28 full time academic staff in the School of Environmental Sciences are members of ESRI.

The School of Environmental Sciences delivers undergraduate courses in environmental science, marine science, and geography. The breadth of this delivery naturally requires staff with a wide range of expertise and this is reflected in the diversity of our research activities, which range from geophysics to human interaction with the environment and also includes work in coastal systems, maritime archaeology, freshwater sciences, benthic and terrestrial ecology, and Quaternary environmental change. Research within ESRI is structured in a number of small research groups in these areas although there is substantial collaboration between the groups.

b. Research strategy

Our overarching aim is to conduct and disseminate excellent research in areas that are relevant to society. In the current REF period, our main strategic objectives have been to:

1. Increase our overall level of internationalisation in terms of staff, students, and collaborations with leading researchers worldwide.
2. Increase the number and quality of proposals to highly competitive funders, particularly Research Councils.

The main motivation for these goals is our recognition that international collaborations improve research quality and encourage the broad understanding of research problems which is required to conduct internationally excellent and world leading research. Clearly, external funding is required to support such collaborations and, additionally, the process of preparing a strong application to a highly competitive funder such as NERC encourages careful thought about the broad significance of the proposed work.

Implementation

Achievement of these aims involves three interlinked processes – prioritization of the ESRI recurrent budget, strong mentoring, and a staffing strategy designed to attract and retain strong researchers. Details of the latter two elements are described in section C below.

Professor Sandy Steacy became ESRI Director in January 2009. In the recognition that strong national / international collaborations underpin much internationally excellent research, as well as most successful Research Council (RC) applications, she immediately targeted a substantial portion of her budget on improving such links. In particular, she focuses on assisting early career researchers and provides funding for networking, conference attendance, and short trips; the latter either to visit well respected researchers or to bring them to Ulster. She also provides funding for more established researchers to take advantage of unexpected opportunities that were not costed into existing grants and require immediate action.

In addition to strong collaborations, engagement with Research Councils is extremely important to understanding how to develop strongly competitive applications. To improve our interaction with

RCs, the Director notifies individual researchers of relevant activities such as sandpits, town hall meetings, etc… and funds their attendance when required. She also strongly encourages membership of Peer Review Colleges and since 2009 three academics joined the NERC PRC (Jackson, Jordan, Nalbant). (Steacy was a member from 2007 – 2011.)

Key indicators

The data in the table below demonstrate the success of key elements of the research strategy.

Metric	RAE 2008	REF 2014
Staff returned	24	18.4
Research Council spend in period	£480k	£2,768k
Research Council spend per annum	£80k	£553.6k
Total spend per annum	£932k	£1,267k
Outputs with non-UK authors	39.6%	47.9%
International research students	15.4%	27.8%
International research staff	12.5%	36.4%
International staff in submission	16.7%	30%

Clearly, the Research Council numbers are slightly skewed by the move to full economic costs in 2004 which increased the value of awards by a factor of about 1.5. However, the main reasons for the increase are that ESRI is writing larger grants (the largest in the current period was £713k compared to £244k in RAE 2008) and that many more staff are acquiring RC funding. Since August 2007, 9 ESRI members have, for the first time, become principal or co-investigators on successful applications to NERC, ESRC, and/or AHRC.

Continuing and future strategic aims

Our strategy of increasing internationalisation and supporting staff in developing strong Research Council applications has been very successful and we intend to continue it. In future, however, we also plan to increase our engagement with global initiatives to solve global problems and our future recruitment strategy will reflect this.

Clearly, the main societal issues related to research in earth and environmental sciences are global environmental change and natural hazards; addressing these will require input from both natural and social scientists. This requirement is increasingly recognised internationally with, for example, the Future Earth initiative being pushed forward by both the International Council for Science and the International Council for Social Science. At present, social science is underrepresented in ESRI and we will be making appointments in this area. Additionally, natural scientists are often reluctant to engage with social scientists, in part because they don't 'speak the language'; to date we have convened 2 workshops to bring together the communities and we will be expanding this initiative in the future.

Another major issue going forward is the ability to handle 'big data' and the need for rigorous quantitative analysis of large data sets. As open data become more prevalent, the problem will increasingly be handling the large datasets that exist, not developing new data. At present, ESRI has only limited expertise in this (our current strategy involves external collaborations) but we plan to develop this very important area in future.

c. People, including:

i. Staffing strategy and staff development

Context

Since the 2008 RAE, ESRI has undergone a large number of staffing changes. We have had 6 retirements and another 4 staff have resigned to take up other posts (in Canada, Germany, Italy, and Northern Ireland). Further, 3 additional staff members, returned in 2008, do not meet the

eligibility criteria for REF inclusion. Balancing this, we have made 9 appointments of research active staff (Benetti, Clark (0.2 FTE), Fornara, Forsythe, Hope, McGonigle, McKenzie, O'Connor, Plets) and one retiree (McCabe) has returned on a 0.2 contract. Five academic staff have been promoted, 2 to Professor (Jackson, Jordan), 2 to Reader (Nalbant, Quinn), and 1 to Senior Lecturer (Dunlop).

Appointment strategy

As described above, our teaching spans environmental science, marine science, and geography and appointments must satisfy teaching as well as research requirements. Hence, our strategy in replacing posts has involved 3 elements: i) identification of teaching needs in the medium to long term, ii) assessment of current research strengths and areas in which complementary expertise is required, and iii) evaluation of future research trends. We have then developed posts that will benefit both our teaching and research, now but particularly in the future. For instance, we recently recruited to 2 posts in the broad area of global environmental change; one with a marine science emphasis, the other focused on climate change / human interaction.

All 8 of the full time appointments have been at lecturer level which is part of our deliberate strategy to bring in dynamic motivated individuals and help them develop their potential in the expectation that they will build long-lasting successful careers at the University. Exceptionally, we have also made two adjunct professorial appointments (Clark and McCabe) in the Quaternary environmental change group. The reason is that the group was recognized in RAE 2008 as one of our best performing areas (along with geophysics) but the retirement of McCabe left it without strong leadership. Hence, we brought back McCabe on a fractional contract but he plans to retire again at the end of 2013. We have therefore appointed Peter Clark to act as a mentor through May 2015; he has strong pre-existing links with the group through publications with McCabe and Dunlop and his involvement will help the less senior staff develop stronger international profiles.

All new appointees are automatically members of the Research Institute during their probation period and ESRI members have reduced teaching loads compared to non research active staff in the School of Environmental Sciences. Further, the Director and Head of School work closely together to allocate workloads and have pursued a strategy of assigning quite low teaching hours to new members of staff.

Staff development

Staff development is critical for us given our strategy of appointing at lecturer level and our concomitant goal of increasing Research Council income. One issue across the sector is that postgraduate students and postdoctoral researchers learn how to write papers during their training but very few learn how to write research proposals. They then become academics where this is required for the conduct of high quality research and for career advancement.

In recognition of this problem, the Director developed a unit on proposal writing which she piloted in ESRI in spring 2009. Over the course of a semester, staff are taken through the entire process of developing a Research Council proposal (with peer feedback midway through) and it culminates with their complete applications being reviewed by senior members of staff, their writing of responses to those reviews, and finally with them acting as introducers of fellow participants' applications at a mock panel chaired by someone with actual panel experience. This model has been adopted by the University and is now the basis of a module which is compulsory for academic staff enrolled in the Postgraduate Certificate of Higher Education Practice (PgCHEP). (Six of the nine ESRI members who have received their first RC grants in the assessment period completed this module, either in the initial pilot or subsequently.)

Mentoring on grant applications occurs at all levels within ESRI and all proposals to highly competitive funders are informally reviewed before submission. Initially the Director and a colleague in the geophysics group (McCloskey) provided most of the mentoring as they had the best track records with RC applications. However, recently staff in coastal systems (Cooper, Jackson) and in Maritime Archaeology (Breen) have developed significant expertise which they share with colleagues. Additionally, 3 staff (Jackson, Jordan, Nalbant) are currently members of the NERC peer review college and they share insights from this work with colleagues through ESRI meetings and individual discussions. These staff also help less experienced ones develop

strong but appropriate rebuttals to reviewers' comments before applications go to panel.

Developing strong international / national collaborations is fundamental to research success and the ESRI budget is prioritised to helping junior colleagues develop and maintain such links. For instance, ESRI funds have been used to support visits to the Geological Survey of Canada for work with Prof. David Piper on the Atlantic continental margin (Benetti), to Memorial University for research with Profs. Trevor Bell and Norm Catto on glacial geomorphology (Dunlop), and to the University of Minnesota for ecological research with Prof. David Tillman (Fornara). ESRI has also funded attendance at international conferences for academic staff at all levels.

The provision of information is also important to staff development as many early career staff are not aware of the opportunities available and even more experienced ones may miss some given the sheer volume of information. To compensate for this, the RI director compiles an update of funding opportunities and research news of interest to academics, contract research staff, and postgrads and circulates this on a fortnightly basis. Urgent opportunities are also sent directly to appropriate individuals.

Contract research staff and the Research Concordat

The importance of recruitment, selection, retention and career development paths for Contract Research Staff (CRS) is recognised through the Research Concordat, with annual formal opportunities for advancement, regular training and development provision for both CRS and supervisors, and opportunities to publish, develop grant proposals (CRS are encouraged to enrol on the proposal writing module of the PgCHEP), and participate in teaching activities. Conditions for CRS are championed by the University's Coordinator for CRS Concordat, and the University's Research Concordat Steering Group, chaired by the PVC (R&I), monitors and reviews the implementation of institutional policy related to CRS and reviews the University's progress in meeting the recommendations of the Research Careers Initiative; Steacy is a member of this group. In 2013 Ulster received the European Commission's "HR Excellence in Research" award, acknowledging our alignment with the principles of the European Charter for Researchers and Code of Conduct for their Recruitment.

Contract research staff are automatically members of ESRI and attend RI meetings and receive the fortnightly update. Research staff are encouraged to write and participate in proposals and the Director has led proposal writing workshops for CRS and postgrads. One recent success involves three linked grants from the Heritage Council, Society of Antiquaries of London, and the Royal Archaeological Institute for field work expenses (Westley). The Director also has an open door policy and is always willing to provide career advice to staff (research and academic) and postgraduate students.

Support for equality and diversity

ESRI operates within the University's policies and procedures for equality and diversity, which are developed and managed by the University's Equality and Diversity Services (EDS) department. EDS develops and promulgates policy and good practice in relation to both staff and students, and provides training and advice on interpretation and implementation of policies and codes of practice. EDS implements the University's Equality Scheme, which addresses equality issues in relation to gender, marital status, religious belief, political belief, race, age, disability, sexual orientation, and responsibility for dependants. Ulster is a member of the Athena Swan Charter to promote equality for women in STEM subjects; an application for bronze status will be made in November 2013. ESRI has a goal of increasing its international staff complement and 30% of staff returned are of non-UK/Ireland origin. (As are 36.4% of our CRS.)

ii. Research students

Research students are managed through the Faculty Research Graduate School (RGS), in association with the University's Research Office (RO). The RO is responsible for research student registration and maintaining records, including both those relating to periodic data returns, such as to HEFCE and REF, and to individual student progress. The RGS is responsible for quality assurance and maintenance of standards through procedures established by RO. In line with these, ESRI has a robust recruitment process to allocate research studentships through open

competition and interview. Almost all students recruited have a First Class Honours degree, and many also have a Masters qualification.

In its Institution Audit report, March 2010, QAA commended Ulster on its "framework for the management and development of research degree programmes". In particular, QAA considered "the balance between PhD students being associated with Research Institutes and the way that their administration is located in the Faculty RGSs but monitored centrally by RO was thoughtful and productive"; felt assured that induction process was "well-designed and effectively implemented"; and "found evidence that (PhD) student representation on (RGS and RO) committees was both valued and effective". Student progress is monitored through annual assessment procedures: in Year 1, a 100-day viva and report; after 9 months, a more substantial viva and report, to secure confirmation of PhD registration; and early in Year 3 students make oral presentations to academic staff and have the option of allowing other PhD students to attend. Additionally, the Head of the RGS annually reviews reports from students and supervisors and alerts the appropriate Research Institute director if there are any issues of concern.

Funded PhD students receive annual budgets of £1000 to support training and development. Although all spend has to be approved by the Director, students are expected to manage their own budgets on the basis of £3k total over the 3 years. Research students are automatically members of ESRI and are encouraged to attend its meetings and engage in discussions at them. They also receive the fortnightly funding update which includes grants and opportunities of interest to them. Students can avail of in-house training to develop skills needed to complete their research including laboratory and field-based activities. The research facilities and ESRI's suite of equipment are available for their use as are staff expertise and technical help. Students are encouraged to attend international conferences and seminars to establish contacts and present the results of their work, and can apply to ESRI for extra financial help to do so. In addition many take the opportunity to expand their skills and experience by becoming involved in demonstrating activities to undergraduates, delivering field exercises and practicals as their studies permit. A strong community ethos within ESRI is reinforced by annual cross-faculty social events as well as a vibrant student society.

d. Income, infrastructure and facilities

Infrastructure and facilities

ESRI is housed in a £1m research building constructed in 2004 and in an immediately adjoining block refurbished in 2005. The facility contains 2 conference/seminar rooms (one equipped for Skype meetings), 4 specialist (analytical chemistry, ecology, marine geophysics, and sediments) and 2 general laboratories, a coffee room, and office space for all staff and postgraduate students. Additionally, ESRI has an outdoor storage area for vehicles, boats, and trailers and 3 large garages housing marine and coastal survey equipment, freshwater and ecology survey equipment, and a dive store. There is also a dedicated cold store in a separate building.

The marine geophysics lab is equipped with in excess of £500k of high-resolution marine and terrestrial geophysical and dive equipment including chirp and boomer sub-bottom profilers, side-scan sonar, echo-sounders, magnetometers, multiple-antennae GPR, resistivity profiling and seismic refraction. The processing and spatial analysis suite comprises high-end computing facilities with esri ArcGIS, IVS Fledermaus, CARIS Hips&Sips and Kingdom Suite.

Freshwater and ecology research is supported by field equipment and 2 specialized laboratories – analytic chemistry and ecology. The terrestrial ecology lab is divided into a 'preparation lab' where plant and soil material are prepared for chemical analyses and a 'wet lab' where the initial processing of plant and soil samples usually start. The two areas are equipped with in excess of £60k of new equipment. Field work in these areas is supported by equipment to discreetly sample vegetation and animals, soil, sediment, and water. In addition, we have an instrumentation suite for high resolution freshwater monitoring which includes phosphorus and nitrate analyzers and multi-parameter water quality sondes.

Our coastal survey equipment is specifically designed to monitor wind blown sediment flux in beach and sand dune environments and represents one of the largest collections of its kind internationally. The field rig consists of 2 x 17m masts, 4 x 6 m masts, 18 load cell sediment traps (sampling at 25 Hz), 16 audio impact sensors (safires) listening to grain impacts (at 25 Hz), as well

as 24 ultrasonic anemometers which are interfaced simultaneously. The combined equipment in this setup, funded by a recent NERC grant, has an approximate value of £240k.

The scientific diving facility is equipped with a full suite of SCUBA equipment for up to four divers, serviced and maintained to ensure compliance with the relevant legislation. The facility operates a 6.5 m coded research vessel (£50k) which is licensed to operate in Category 4 waters. Diving equipment includes four full sets for drysuit diving in temperate waters. Underwater imagery can be collected using an inspection camera, topside display with digital recording facility. There is also a range of digital terrestrial cameras in underwater housings, and an amphibious NIKONOS camera.

ESRI maintains a fleet of vehicles and boats to support fieldwork. At present we have 4 vehicles (including three 4x4s) suitable for this as well as 2 cars for general transportation. We also have 3 boats for use on rivers, lakes, and offshore. Additionally, we are equipped with a 6*2.5m refrigerated container operating at 4°C which is used to store and preserve over 200 m of deep and shallow water marine sediment cores for paleoenvironmental research, as well as 100 m of lake sediment cores and thousands of water samples from Irish lakes.

In addition to the lab/field equipment, we have made significant investments in high performance computing in the past few years (> £100k from ESRI funds and external grants). As a result, we now have a dedicated high performance computing system which consists of 300 interconnected cores across the system.

Funding portfolio and plans

Our profile for funders whose grants totalled more than £10k since August 2007 is shown in the table below. The total amount is approximately £7.8m of which £2.5m is from Research Councils – primarily NERC, our largest funder – and £3.2m comes from government agencies in NI. We've also received £1.2m from European bodies, £81k from charities, and £750k from government agencies in the Republic of Ireland and Great Britain. Additionally, Clark has received NSF grants exceeding US$1.3m; Benetti, Dunlop, and Quinn have received more than €1.2m of in-kind funding (ship time) from the Marine Institute in the Republic of Ireland; and NERC has provided £290k of in-kind funding, primarily for radiocarbon and cosmogenic dates.

As described above, our strategy continues to be to focus on highly competitive funders such as Research Councils and we are encouraged by our success in this assessment period compared to RAE 2008.

Research Council	NERC	1,923,465
	AHRC	369,156
	ESRC	234,321
Europe	Interreg IVA - Env	485,045
	CEC - Framework 7	345,901
	Interreg IVB	279,863
	CEC - Northern Periphery Programme	123,149
Charity	Save the Children Fund	50,000
	LeverhulmeTrust	31,331
NI government	Dept. of Employment & Learning	1,403,981
	NI Environment Agency	1,089,837
	Environment & Heritage Service	525,833
	HSC, R&D, Public Health Agency	199,399
	Invest NI	10,031
Other government	EPA	337,156
	National Dev Plan - Dep of Agriculture	146,499
	The Heritage Council	141,347
	Teagasc	53,386
	Joint Nature Conservation Committee	33,300
	Forest Research	24,534
	WHSCT	14,000

Other	CARDI	13,655
	Universidade De Algarve	10,200

Consultancies and Professional Services

We provide consultancy research in our benthic and terrestrial ecology, coastal systems, freshwater science, maritime archaeology, and science and environment research groups. Almost all of this is funded by government agencies, in particular environmental agencies in Northern Ireland and the Republic of Ireland as well as local councils. Some recent examples include a service level agreement with the Irish Agriculture and Food Development Authority to provide expert services related to the Nitrates Directive Programme (Jordan), work with local agencies on 'soft' approaches to coastal protection (Cooper, Jackson), and GIS based research on fuel poverty for the NI Office of the First Minister and Deputy First Minister (McKenzie).

e. Collaboration and contribution to the discipline or research base

Research collaborations

Every research group in ESRI is returning co-authored papers with international collaborators and this is also true for 75% of staff included in the submission. Additionally, the majority of our grant applications to highly competitive funders have national/international investigators or partners. We are currently involved in several large collaborative projects including GLANAM on glaciated ice sheet margins (FP7: Benetti, Dunlop), Britice-Chrono on ice sheet forecasting (NERC: Benetti), one on climate change and landslide/tsunami risk in the UK (NERC: McCloskey, Dunlop, Nalbant), REAKT on earthquake risk reduction (FP7: Steacy), and we lead one on late glacial sea level minima (NERC: Cooper, Jackson, Quinn).

In addition to the large scale projects described above, significant collaborations involving both joint grants and publications include:

- British Antarctic Survey: Sedimentological processes in Antarctica and subglacial sediment processes (Benetti, Dunlop)
- Cambridge University: Sudan archaeology (Breen, Forsythe)
- Griffith University, Australia: Coastal adaptation (Cooper)
- GFZ Potsdam: Earthquake hazard (Steacy)
- GNS Science, New Zealand: Earthquake forecasting and hazard (Steacy)
- INGV Rome: Earthquake hazard (McCloskey, Nalbant, Steacy)
- Marine Institute Ireland: Archaeology applications of the JIBS data (Forsythe, Quinn)
- NUI Galway: Aeolian transport (Jackson)
- Universities of Aberdeen and Dundee: Barrier island geomorphology (Cooper)
- University of Edinburgh: Earthquake hazard and mitigation (McCloskey, Nalbant)
- University of KwaZulu-Natal: stratigraphic record of sea level rise (Cooper)
- University of Maine: Sea level research (Jackson)
- University of Minnesota: Agricultural, biodiversity, and CO_2 sequestration (Fornara)
- University of Sheffield: Subglacial bedform production (Dunlop)
- University of Wisconsin: Transient modeling of the last deglaciation (Clark)
- Woods Hole Oceanographic Institute: West Antarctic ice sheet deglaciation (Clark)

Interdisciplinary research

The majority of our research is interdisciplinary and this is indicated by the collaborative nature of our grants and publications both internally and externally. Some examples of note are:

- Linking earthquake science to community vulnerability to increase resilience to earthquake and tsunami hazard (McCloskey)
- Understanding past ice sheet behaviour through integrated geological, geomorphological, and sedimentological studies (Benetti, Dunlop)
- Combining archaeological studies with environmental anc community sustainability (Breen, Forsythe, Westley)
- Global climate modelling and model-data comparison through the last glacial cycle (Clark)
- Understanding terrestrial ecosystems through plant ecology, soil ecology, and soil microbiology (Fornara)

- Investigating aeolian transport of sand through observation and computation fluid dynamics modelling (Jackson)

Collaborations with research users

Interactions with research users have guided our research strategy in a number of areas. In coastal science, collaborations with the Canadian companies RWDI consulting engineering and Klimaat Consulting and Innovation have brought state-of-the-art computational fluid dynamic modelling to our NERC funded work on coastal dune processes. The techniques developed in that work are now being applied to research on Martian dune systems in collaboration with the Planetary Science Institute (Arizona) and the Carl Sagan Centre (California). In Quaternary science, data from national initiatives such as the Irish National Seabed Survey and the Joint Irish Bathymetric Survey are enabling us to undertake research on the glacial history and sediment transport of the entire Irish Shelf. Additionally, high resolution geochemistry data collected by the Geological Survey of NI as part of the Tellus project is enabling a new approach to Quaternary glaciation research in Ireland.

Collaborations with the humanitarian organisations Kogami (Sumatra) and Concern Worldwide have led to the development of a social science thread to our geophysical research. Specifically, one PhD student has completed work on understanding how community based initiatives can improve earthquake awareness in a developing country whereas another is working with Concern to understand and improve their approach to working in earthquake prone area. In archaeology, collaborations with industrial archaeologists through the Ecosal Atlantis initiative has led to new AHRC funded research on the salt producing areas of Ireland.

Leadership in the academic community

The research excellence of several ESRI members was recognized internationally during the assessment period. Professor Andrew Cooper was appointed a Fellow of the Geological Society of America in 2009 and a Fellow of the Royal Society of South Africa in 2013, Professor Peter Clark was appointed a Fellow of the American Geophysical Union in 2010, and Professor John McCloskey was made a Member (equivalent to 'Fellow') of the Royal Irish Academy in 2012. (Professor Marshall McCabe was appointed to the RIA in 2005.) Additionally, Dr. Colin Breen and Dr. Wes Forsythe jointly received an award of merit from the US Society for Historical Archaeology.

Three ESRI academics (Jackson, Jordan, Nalbant) are currently members of the NERC peer review college and Steacy was a member from 2007-2011 (deputy chair on 4 of the 7 panels in which she participated). Additionally, McCloskey chaired the Geophysical Equipment Pool funding committee from 2006 – 2010, Benetti was an expert evaluator on a Marie Curie Panel in 2011 and was vice chair of a subsequent one in 2013 and she is also an expert evaluator for the FP7 programme on renewable energy, and Steacy was a member of an FP7 funding panel for tsunami hazard (2012). Clark was joint coordinating lead author of Chapter 13 (Sea Level Change) of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (2013) and Steacy was a member of an expert elicitation panel on future seismic hazard in the Christchurch NZ region (2011).

Seven ESRI members are or have been editors or associate editors of international journals during the assessment period – Breen (Journal of the North Atlantic, Underwater Archaeology Proceedings), Clark (Journal of Climate, Atmosphere-Ocean), Forsythe (Underwater Archaeology Proceedings), Jackson (Journal of Coastal Research, Journal of Engineering Technology), Jordan (Environmental Science and Policy), Quinn (Journal of the North Atlantic), Steacy (Journal of Geophysical Research).

Additionally, five academics have convened academic conferences or acted as program chairs – Breen (Society for Historical Archaeology, Leicester, 2013), Cooper (International Coastal Symposium, Durban, 2014), Jackson (Adapting to Coastal Change, the Hague, 2011), Jordan (Catchment Science, Dublin, 2011), Steacy (ESF conferences on challenges in earthquake dynamics, Obergurgl, 2008, 2011).