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## 1. Introduction

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Dear IQUA member,

Welcome to IQUA newsletter No. 62.

IQUA is very busy this year in the lead up to INQUA 2019. This edition has details of the upcoming annual Spring Meeting being held in the majestic National Botanic Gardens, Glasnevin, Dublin (details below).

However, this year is a little different in that we are also holding a public outreach event on the same day to encourage the public's interest in understanding the changes to the Irish landscape during the Quaternary period. This event titled, *Ireland and The Ice Age*, is sure to capture and engage the public. This occasion will also see the launch of the new IQUA book, *Giants of Irish Quaternary Science* and associated pull up banners. Note that if you intend coming to the Spring Meeting and would like to stay for the public outreach event you need to register. Please make your way to the Eventbrite link on the IQUA webpage.

This newsletter includes writes ups on the 2018 IQUA annual field trip and the IQUA 2018 Symposium. In September, IQUA members were treated to a fantastic weekend in the central Irish midlands centering around counties Offaly and Westmeath. Our thanks to Gayle McGlynn, Ingelise Stuijts and Bettina Stefanini for organising the great weekend.

In November, IQUA members attended a Symposium in GSI to get to grips with Ireland's offshore geomorphology. Our thanks to Mark Coughlan and Kieran Craven for organising the event. Both articles were printed in Earth Science Ireland, Issue 24. It is worth noting here that Issue 24 is the last issue of Earth Science magazine. Our thanks to editor Tony Bazley for printing IQUA articles over the years.

Make sure to look out for Sam Roberson of GSNI who is cycling from Mizen Head to Malin Head to celebrate the upcoming INQUA 2019 congress and to promote IQUA. His tour will cover 1000km in 13 days (details below).

Keep an eye on Twitter to keep you up to date with Ireland's current Quaternary related news. Check us out @Quaternary\_Irl or by using the hashtag #IQUA. Also, check out the website and Facebook on <https://www.facebook.com/IrishQuatAssociation>

Thanks to all who contributed to this edition of the newsletter.

*Kind regards,  
Martha Coleman, February 2019*

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## 2. IQUA Committee (2018/2019)

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**President:** Dr Catherine Dalton, MIC, University of Limerick (continuing)

**Secretary:** Dr Benjamin Thébaudeau, (continuing)

**Treasurer:** Dr Kieran Craven, Geological Survey of Ireland, Beggar's Bush, Haddington Rd, Dublin 4, (continuing)

**Postgraduate Rep:** Niamh Millward, UCD, Archaeology, (continuing)

**Website Manager:** Randall McGuckin (continuing)

**Publications Secretary:** Alwynne McGeever, Department of Geography, TCD (continuing)

**Newsletter Editor:** Martha Coleman, Maynooth University (continuing)

**Ordinary Members:** Dr Ellen O'Carroll, (continuing), Dr Steve Davis, UCD (continuing), Dr Rory Flood, QUB (continuing), Darren Barry, MIC, University of Limerick (continuing), Dr Sara Benetti, University of Coleraine (continuing), Dr Frank Ludlow, TCD (continuing), Dr Gayle McGlynn, Department of Geography, TCD, (continuing).

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### 3. IQUA Spring Meeting and AGM 2019

IQUA's range of new initiatives are in full swing. As well as our annual Spring Meeting we are holding a Public Outreach event on the same day titled *Ireland and The Ice Age*. Please note that IQUA members need to register on Eventbrite if they wish to attend the public event.

#### **Spring Meeting 2019 Saturday 13<sup>th</sup> April** **National Botanic Gardens, Dublin**

This year's Spring Meeting takes place on Saturday, 13<sup>th</sup> April and is being held in the National Botanic Gardens, Glasnevin, Dublin 9. It kicks off at 10.00 am with our annual AGM and will be followed by our annual set of postgraduate talks.

The call is out for postgraduate and early-career researchers to submit abstracts for the IQUA Spring Meeting on **Saturday 13<sup>th</sup> April** in the Botanic Gardens, Dublin. Deadline for abstract submission (poster or talk) is **Friday 15<sup>th</sup> March**. Abstracts should be emailed to [iqua.info@gmail.com](mailto:iqua.info@gmail.com).

This year we also have the launch of the IQUA book on Quaternary greats, *Giants of Irish Quaternary Science*, and look out for the new IQUA roll up banners documenting these people who've enhanced Quaternary science.

There will be the added bonus of a Quaternary themed tour of the Botanic Gardens by Dr Colin Kelleher. The tours will be on a first come first served basis. Check the IQUA website for further details. See the day's schedule below. Note, the schedule is subject to change.

- |               |                                                                                 |
|---------------|---------------------------------------------------------------------------------|
| 10.00 – 11.00 | IQUA AGM                                                                        |
| 11.00 – 11.30 | Tea/Coffee Break                                                                |
| 11.30 – 13.00 | Postgraduate and IQUA Award Winners Talks                                       |
| 13.00 – 14.30 | Lunch                                                                           |
| 14.30 – 15.30 | Quaternary Themed Tours of National Botanic Gardens                             |
| 15.45 – 18.00 | Public Outreach Talks<br>(Prof Pete Coxon, Prof John Sweeney, Dr Bethan Davies) |

### 4. IQUA Fieldtrip to the Midlands, 14<sup>th</sup> – 16<sup>th</sup> September 2018

#### **In the thick of it; an exploration of the Quaternary of the Irish Midlands.**

***Cathal Jordan and Benjamin Thébaudeau***

The weekend of the 14<sup>th</sup> to the 16<sup>th</sup> of September 2018 saw the well-attended annual field meeting of the Irish Quaternary Association ([www.iqua.ie](http://www.iqua.ie)) take place in the Midlands, more specifically in counties Offaly, Westmeath and Longford. The event kicked off on the Friday evening at the Greville Arms hotel in Mullingar where the audience were treated to a wonderfully comprehensive review of the Irish Bog Bodies undergoing research presented by Isabella Mulhall of the National Museum. This was followed by a presentation by David Fallon on the history of Bord na Móna and the plans the institution has for revitalising the wetlands under its jurisdiction for biodiversity. The evening ended with a presentation by Aine Mary McAdam from Maynooth University on her undergoing research on public perception of natural and cultural heritage places and landscape and their value.



**Lemanaghan Bog**

Day two began with a quick win when a visiting PhD student from Mexico conducting research on pollens in adobe bricks made contact with Irish researchers who had done similar work in the past. The first site was the Lemanaghan bog with Ellen O'Carroll describing an exposed trackway with a remarkable persistence of route usage over generations and across technologies. Paths were built from tracks, brushwood, planks, gravels and slabs. An interesting side discussion was had on how the landscape of a cut bog has a stillness similar to the post-industrial landscapes of Wales and England. The next stop

would have been the terminus of many of the paths through the bog leading to the monastic ruins of Lemanaghan. Caimin O'Brien talked us through the development of the Church and grounds. As with the routes through the bog, the persistence of use could be seen with geophysical resistivity surveys showing the Togher, or pilgrimage route, being refreshed at least once. This use has continued to the present day with votive offerings at St. Managhan's holy well. There was some discussion on the lithology of particularly ornate stones in the graveyard. However, the use of the geological hammer to settle the question was ruled out. The field meeting carried on to the next stop at a quarry called Hinch pit in Cartron, on a side of the Clara Esker. Cathy Delaney introduced how the removal of gravels revealed an ever-changing stratigraphy at this site while allowing a consistent overall interpretation of a two-stage deposition. The audience heard how models of esker formation have changed over time from deglacial channels to sutures between ice lobes and reinforced the need for assemblages of data rather than individual data points. Lunch followed suit in Tullamore.



Hinch Pit

At mid-afternoon, Paul Gibson introduced the formation of the Croghan Hill volcanics where a basalt intrusion spectacularly folded the surrounding sedimentary limestone layers. A large unconformity (i.e. a lack of geological information) of 335 million years exists between the Carboniferous limestone and the late Pleistocene glacial deposits above. Recently exposed intrusive and pyroclastic rocks were of great interest to the geologists in the attendance. A little further up Croghan Hill we stopped to look over the Cut Bog Landscape as Ellen O'Carroll and Gill Plunkett outlined the paleoenvironmental context and high profile finds

surrounding the Old Croghan Man excavation, one of the famous bog bodies on display in the National Museum. In discussion, a number of attendees were struck by the role of chance in the finding of remains of the man and the Pallasboy vessel (a surprisingly intact wooden vessel), with it the implication that as finds are revealed due to cutting, others must be missed. The final stop of the day was at Campbell's Gravel Pit in North West county Kildare where Michael Philcox explained the complexity of the depositional, erosional and deformational stratigraphy seen there. In discussion while standing above the exposures, connections could be made between the sedimentary units, while down at the section face, fine analysis could look for evidence of transport direction to test those connections. The day ended with the traditional dinner in Mullingar.



Intrusion at Croghan Hill

Sunday morning saw the convoy of cars head north to county Longford at the edges of Granard and the beautiful Lough Kinale. The first stop was Ballywillan heritage train station where Mary Reynolds and Jimmy Donoghue, a local historian, told the story of the station and its importance for the local countryside. A famous visitor to the station was Michael Collins visiting his fiancée and the Ford model T that he used was restored and on display as a delightful treat. Ingelise Stuijts accompanied by local councillor and landowner P.J. Reilly took the attendance to a viewpoint nearby overlooking the lake and presenting the Lough Derragh Mesolithic site in its context. The field meeting concluded on the actual site after a long drive around the south the lake where members of the Discovery Programme excavation and post-excavation team described their results to date. Andy McWilliams and James Perkins presented their pollen results in two different parts of the site. Meriel McClatchie then went on to describe the macrofossil plants from the excavation while Amy

Bunce talked about the specific clues left by the amount of hazel shells left behind. Finally Robert Power talked about the findings recently published on the fish parasites found in the Mesolithic levels as well the organisation of the site with regards to the location and use of hearths. Ingelise Stuijts finished the presentations by highlighting the great body of work collated in the field guide to present the excavation's results to date in the absence of a monograph. The Lough Derragh site, made accessible thanks to Bertram and Monica Lorraine, is a hidden treasure and the audience there could get a sense of life in the Mesolithic in Ireland. The weather was particularly clement and made this dense and varied field meeting a tremendous success.



View of Lough Kinale



Excavation team led by Ingelise Stuijts with local councillor P.J. Reilly

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## 5. IQUA 2018 Autumn Symposium

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### ***Irish Offshore Records***

#### ***Mark Coughlan and Kieran Craven***

The 2018 Irish Quaternary Association (IQUA) symposium was recently held at the Geological Survey Ireland, organised and convened by Dr. Stephen McCarron (Maynooth University), Dr. Kieran Craven (Geological Survey Ireland) and Dr. Mark Coughlan (Irish Centre for Research in Applied Geoscience). This year's theme was "Irish Offshore Quaternary Records", focusing on advances in our understanding of the Quaternary history of Irish shelves and comparing existing work to ongoing research in neighbouring regions.



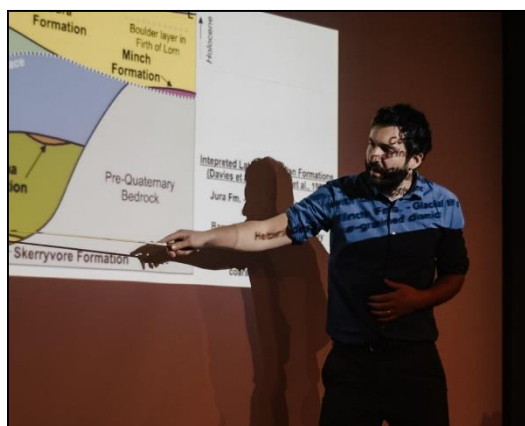
Dr. Stephen McCarron delivering the opening address

More than 60 researchers, consultants and interested parties gathered to hear nine presentations delivered by some of the foremost and up-and-coming researchers in the field at present. In his opening address, Dr. Stephen McCarron welcomed all the attendees and highlighted the pertinent and timely nature of the Symposium given recent and on-going research in the field and upcoming events such as the Quaternary Research Association Annual Discussion Meeting and the INQUA Congress in Dublin, 2019. He extended an especially warm welcome and thanks to those who travelled from the UK to present at the event or attend it, strengthening ties and collaborations between Irish and UK based researchers.

The morning session engaged the attendees by setting the context for broad Quaternary stratigraphic frameworks and how they are established. Mr. Dayton Dove of the British Geological Survey detailed the extensive work undertaken in the UK since the 70s to rationalise Quaternary stratigraphy and nomenclature based on extensive datasets, and how best to present and deliver updated information on Quaternary geology (e.g. engineering properties)

to ensure science advances are made useful and relevant to the many users of the UK offshore. Dr. Kara English of the Department of Communications, Climate Action and Environment (DCCA), followed this by presenting the latest efforts by DCCA and their consultants to establish a Quaternary stratigraphic framework for Irish offshore deposits. Both talks highlighted the difficulties in developing a catch-all framework and the need for constant iteration based on the latest research.

After the morning break, attention switched to the Atlantic margin. Dr. Audrey Morley of the National University of Ireland in Galway discussed recent findings of an investigation, using a multi-proxy approach, into an abrupt high magnitude climate event in the North Atlantic and the implications for our understanding of glacial/interglacial condition drivers. Dr. Kieran Craven of Geological Survey Ireland presented a seismic stratigraphy, constrained by borehole data, for sediments found on the outer Malin Shelf and how we can infer several phases of phases of cross-shelf grounded ice extension from Scottish sources from it. Dr. Louise Callard of Durham University developed on some of the concepts presented by Kieran in her following presentation discussing the glacial and deglacial history of the Malin Shelf, based on new data gathered as part of the BRITICE-CHRONO Project. Mr. Xavier Monteys of the Geological Survey of Ireland then brought us further offshore to the Porcupine Seabight where he discussed some of the previous work carried out on IODP and INFOMAR data to constrain palaeoenvironmental change over the last c. 340,000 years, and how that data is now being collated to offer new insights into, what is, a poorly understood region.



Dr. Kieran Craven (GSI) discussing the seismo-stratigraphy of the Malin Shelf

After lunch, the final session moved south and east geographically to the Irish Sea and its approaches.

Prof Andy. Wheeler of University College Cork discussed new ideas regarding ice dynamics and ice-sheet interactions off the south coast of Ireland, and how offshore data can be linked to onshore data for a more holistic approach. Andy was followed by his former PhD student, and current lecturer at Bangor University, Dr. Katrien Van Landeghem who presented some fascinating geophysical, sedimentological and geotechnical data used to define the spatial and temporal patterns of ice stream advance, retreat and reactivation in the Irish Sea. In a lovely continuum of research lineage, Katrien's own PhD student, Mr. Edward Lockhart of Bangor University, presented his latest work reconstructing icesheet dynamics in the Celtic Sea during the last glaciation.

All the speaker presentations were well received and generated a significant amount of informed discourse throughout the day, which was enthusiastically carried through to the post-Symposium reception kindly sponsored by Arup. Here, the results of the <sup>14</sup>C Chrono (Queen's University Belfast) sponsored awards were announced. Other sponsors on the day included the Institute of Geologists of Ireland, the Quaternary Research Association (QRA) and Geological Survey Ireland (GSI).



IQUA Symposium 2018 at GSI, Beggars Bush

The organisers would like to thank the sponsors for their support and the speakers for providing such stimulating and engaging presentations.

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### 6. Bill Watts 14CHRONO AWARDS & IQUA Research awards

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We are pleased to announce the winners of the **IQUA Research Awards** and the **Bill Watts**

**14CHRONO Awards 2018.** The awards are open to all paid-up IQUA members of at least one year's standing. They consist of four AMS radiocarbon dates sponsored by the 14CHRONO Centre of Queen's University Belfast and an additional IQUA grant designed to fund a further two radiocarbon dates, but which can alternatively cover other dating methods or laboratory fees (e.g. for DNA or isotope analyses). The **Bill Watts 14CHRONO Awards** pay for six AMS radiocarbon dates for current postgraduate members of IQUA. Winners of the Awards are asked to present their research and the use of their awarded AMS<sup>14</sup>C dates at the Spring Meeting and to include their abstract in the IQUA Newsletter.

**Winners of the 2018 Awards** (including the IQUA Research Awards) were Ros Ó Maoldúin, Anthony Beese, Ellen O'Carroll and Robin Lewando.

**7. Upcoming Events, Forthcoming Conferences**

**The Irish Quaternary Cycle**  
13<sup>th</sup> March – 27<sup>th</sup> March

Starting on 15th March, Sam Roberson, Quaternary geologist at the Geological Survey of Northern Ireland, will be cycling from one end of Ireland to the other to celebrate the INQUA 2019 Dublin congress in July and promote Quaternary geology and landscapes in Ireland. Scientists from the IQUA, GSI, the BGS and others will be joining in for part of or all of the route. Sam will also be giving a talk in NUIG at 8pm March 21<sup>st</sup> titled *The Irish Quaternary Cycle-Its Landscape Legacy*.

The tour will be promoted on Twitter through the GSNI (@GeoSurveyNI), GSI (@GeolSurvIE) and BGS (@BritGeoSurvey) feeds using the handle #irishquaternarycycle. The route will cover 1000 km over 13 days, much of it following the Wild Atlantic Way route. Take a look at Sam's route below and see if you can catch up with him.

DAY	DATE	START	FINISH	DISTANCE (km)	ASCENT (m)
F	15/03/2019	Schull	Schull	51	620
S	16/03/2019	Schull	Glengarriff	45	450
S	17/03/2019	Glengarriff	Killarney	69	830
M	18/03/2019	Killarney	Kilrush	87	580
T	19/03/2019	Kilrush	Doolin	60	440
W	20/03/2019	Doolin	Galway	70	430
T	21/03/2019	Galway	Galway		
F	22/03/2019	Galway	Letterfrack	82	450
S	23/03/2019	Letterfrack	Westport	70	430
S	24/03/2019	Westport	Westport via Achill	120	630
M	25/03/2019	Westport	Sligo	103	450
T	26/03/2019	Sligo	Sligo		
W	27/03/2019	Sligo	Enniskillen	78	350
T	28/03/2019	Enniskillen	Londonderry/Derry	100	900
F	29/03/2019	Londonderry/Derry	Malin Head	58	450



**GSNI's Sam Roberson getting ready for the Irish Quaternary Cycle and The Route**

**EUGEO 2019**  
15<sup>th</sup> – 18<sup>th</sup> May, Galway

This year the conference of Irish Geographers runs in conjunction with Association of Geographical Societies in Europe hold their conference Re-Imagining Europe's Future Society and Landscapes in NUIG.

**ENVIRON 2019**  
15<sup>th</sup> – 17<sup>th</sup> April, Carlow  
The 29<sup>th</sup> Irish Environmental Researchers Colloquium will be held at the Institute of Technology Carlow.

**8. Recent Publications & New Projects**

Chiverrell, R.C., Smedley, R.K., Small, D., Ballantyne, C.K., Burke, M.J., Callard, S.L., Clark, C.D., Duller, G.A.T., Evans, D.J.A., Fabel, D., van Landeghem, K., Livingstone, S., Ó Cofaigh, C., Thomas, G.S.P., Roberts, D.H., Saher, M., Scourse, J.D. & Wilson, P. 2018. Ice margin oscillations during deglaciation of the northern Irish Sea Basin. *Journal of Quaternary Science* 33, 739-762.

Esterhuysen, A., Knight, J. and Keartland, T. 2018. Mine waste: The unseen dead in a mining landscape. *Progress in Physical Geography*, 42 (5), 650-666.

Gallego-Sala, A. V., Charman, D. J., Brewer, S., Page, S. E., Prentice, I. C., Friedlingstein, P., Moreton, S., Amesbury, M. J., Beilman, D. W., Björck, S., Blyakharchuk, T., Bochicchio, C., Booth, R. K., Bunbury, J., Camill, P., Carless, D., Chimner, R. A., Clifford, M., Cressey, E., Courtney-Mustaphi,

C., De Vleeschouwer, F., de Jong, R., Fialkiewicz-Koziel, B., Finkelstein, S. A., Garneau, M., Githumbi, E., Hribljan, J., Holmquist, J., Hughes, P. D. M., Jones, C., Jones, M. C., Karofeld, E., Klein, E. S., Kokfelt, U., Korhola, A., Lacourse, T., Le Roux, G., Lamentowicz, M., Large, D., Lavoie, M., Loisel, J., Mackay, H., MacDonald, G. M., Makila, M., Magnan, G., Marchant, R., Marcisz, K., Martínez Cortizas, A., Massa, C., Mathijssen, P., Mauquoy, D., Mighall, T., Mitchell, F. J. G., Moss, P., Nichols, J., Oksanen, P. O., Orme, L., Packalen, M. S., Robinson, S., Roland, T. P., Sanderson, N. K., Sannel, A. B. K., Silva-Sánchez, N., Steinberg, N., Swindles, G. T., Turner, T. E., Uglow, J., Väliiranta, M., van Bellen, S., van der Linden, M., van Geel, B., Wang, G., Yu, Z., Zaragoza-Castells, J. & Zhao, Y. 2018 Latitudinal limits to the predicted increase of the peatland carbon sink with warming. *Nature Climate Change* **8**, 907–13.

Hawthorne, D. & Mitchell, F. J. G. 2018 Investigating patterns of wildfire in Ireland and their correlation with regional and global trends in fire history. *Quaternary International* **488**, 58-66.

Itrax operators: Menno Bloemsma, Ian Croudace, J. Stephen Daly, Robin J. Edwards, Pierre Francus, Jennifer M.Galloway, Braden R.B. Gregory, Jyh-Jaan Steven Huang, Anna F. Jones, Malin Kylander, Ludvig Löwemark, Yangbing Luo, Suzanne MacLachlan, Christian Ohlendorf, R. Timothy Patterson, Christof Pearce, Jörn Profe, Eduard G.Reinhardt, Christian Stranne, Rik Tjallingii, Jonathan N. Turner, Practical guidelines and recent advances in the Itrax XRF core-scanning procedure, *Quaternary International*, 2018

Jones, A., Turner, J., Stephen Daly, J., Francus, P., Edwards, R. Signal-to-noise ratios, instrument parameters and repeatability of Itrax XRF core scan measurements of floodplain sediments, *Quaternary International*, 2018

Kemp, A. C., Wright, A. J., Edwards, R. J., Barnett, R. L., Brain, M. J., Kopp, R. E., Cahill, N., Horton, B. P., Charman, D. J., Hawkes, A. D., Hill, T. D., Van de Plassche, O. 2018 Relative sea-level change in Newfoundland, Canada during the past ~3000 years, *Quaternary Science Reviews*, 201, (1 December 2018), p89 - 110

Knight, J. and Evans, M. 2018. Luminescence dating, sediment analyses, and flood dynamics on the Sabie River, South Africa. *Geomorphology*, 319, 1-14.

Knight, J. 2018. Decolonizing and transforming the Geography undergraduate curriculum in South Africa. *South African Geographical Journal*, 100 (3), 271-290.

Knight, J., Harrison, S. and Jones, D.B. 2019. Rock glaciers and the geomorphological evolution of deglaciating mountains. *Geomorphology*, 324, 14–24.

Knight, J. and Rogerson, C.M. (eds) 2019. *The Geography of South Africa: Contemporary Changes and New Directions*. Springer, Switzerland, 326pp. ISBN 978-3-319-94973-4.

Knight, J. 2019. Wind erosion. In: Livingstone, I. and Warren, A. (eds) *Aeolian Geomorphology: a new introduction*. Wiley-Blackwell, 61-80.

Lord, T.C., Palmer, A.P., Telfer, M.W., Murphy, P.J., Lewis, M. & Wilson, P. 2017. The Pleistocene laminated sediments of Victoria Cave, North Yorkshire, UK: characteristics, age and significance. *Cave and Karst Science* 44, 143-144.

Matthews, J.A., Winkler, S., Wilson, P., Tomkins, M.D., Dortch, J.M., Mourné, R.W., Hill, J.L., Owen, G. & Vater, A.E. 2018. Small rock-slope failures conditioned by Holocene permafrost degradation: a new approach and conceptual model based on Schmidt-hammer exposure-age dating, Jotunheimen, southern Norway. *Boreas* 47, 1144-1169.

Mitchell, F. J. G. & Maldonado-Ruiz, J. 2018 Vegetation development in the Glendalough Valley, eastern Ireland over the last 15,000 years. *Biology and Environment: Proceedings of the Royal Irish Academy* 118B, 55-68.

O’Connell, M. and Molloy, K. 2019. Aran Islands, western Ireland: farming history and environmental change reconstructed from field surveys, historical sources, and pollen analyses. *Journal of the North Atlantic* 38: 1–27 [and six supplementary files]

Putman, A.E., Bromley, G.R.M., Rademake, K. and Schaefer, J.M. 2019. In site <sup>10</sup>Be production-rate calibration from <sup>14</sup>C-dated late glacial moraine belt in Rannoch Moor, central Scottish Highlands. *Quaternary Geochronology* Vol 50: 109-125

Prat-Guitart, N., Nugent, C., Mullen, E., Mitchell, F. J. G., Hawthorne, D., Belcher, C. M. & Yearsley, J. M. 2019 Peat Fires in Ireland In: Stracher, G. B. (ed.) *Coal and Peat Fires: A Global Perspective*,

*Volume 5: Case studies - Advances in field and laboratory reserach.* Amsterdam: Elsevier, 451-82.

Shennan, I, Bradley, S, Edwards R., Relative sea-level changes and crustal movements in Britain and Ireland since the Last Glacial Maximum, *Quaternary Science Reviews*, 188, 2018, p143 – 159

Wilson, P. 2017. Rock-slope failures in southwest Donegal. In: O’Carroll, E. & McClure, M. (eds), *South-West Donegal*. Field Guide No. 34, Irish Quaternary Association, Dublin, 51-58.

Wilson, P., Rodés, Á. & Smith, A. 2018. Valley glaciers persisted in the Lake District, north-west England until ~16-15 ka as revealed by terrestrial cosmognic nuclide (<sup>10</sup>Be) dating: a response to Heinric event 1? *Journal of Quaternary Science* 33, 518-526.

Wilson, P. & Lord, T.C. 2018. Dry stone walls as sediment traps: example from Rydal. *Proceedings, Cumberland Geological Society* 8, 477-491.

Wilson, P. 2018. Thomas Hay and ploughing blocks. *Proceedings, Cumberland Geological Society* 8, 492-495.

Wilson, P. & Lord, T.C. 2018. The caves of Giggleswick Scar, North Yorkshire. *British Cave Research Association Annual Review for 2017*, 43-45.

Wilson, P., Ballantyne, C.K., Benetti, S., Small, D., Fabel, D. & Clark, C.D. 2019. Deglaciation chronology of the Donegal Ice Centre, northwest Ireland. *Journal of Quaternary Science* 34, in press.

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**Newly Funded Projects.**

A4: Aigéin, Aeráid, & athrú Atlantaigh (Ocean’s, Climate and Atlantic Change)

A4 is a new five-year project studying the changing Atlantic & Ireland. Looking at Atlantic change, sea level, and decadal climate prediction, led by Gerard McCarthy (Maynooth) and Robin Edwards (Trinity College Dublin), and funded by the Marine Institute. Follow on Twitter [https://twitter.com/a\\_ceathair](https://twitter.com/a_ceathair)

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**9. General Membership Items**

Please let your students/colleagues know about IQUA and encourage them to join. Join/Renew IQUA membership online via PayPal We encourage all our

members to update their annual subscription for 2019. The annual membership cost is: €20 waged; €10 students/ unwaged. IQUA offers a fast, safe, online payment system already familiar to many (PayPal) for joining IQUA or renewing your membership (!), and for purchasing past field guides (where available). PayPal allows you to pay securely with your credit/debit card via the IQUA website: <http://www.iqua.ie/membership.html> \*\*\* If you do not have access to our online PayPal system, which is our preferred method of dues collection, please cut out and complete the following form and send it with a cheque for the relevant annual subscription to the IQUA Treasurer at the address below. Cheques should be made payable to IQUA. IQUA membership form

Name: .....

Address: .....

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.....

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Telephone: .....

E-Mail: .....

Amount paid: .....

If you have any queries about your current IQUA membership status, or general IQUA membership queries, please contact the Treasurer. Dr Kieran Craven, IQUA Treasurer Geological Survey of Ireland, Beggar's Bush, Haddington Rd, Dublin 4. Email: [cravenk@tcd.ie](mailto:cravenk@tcd.ie)

**IQUA e-mail listserver:**  
<https://listserv.heanet.ie/iqua-l.html>

If you are not receiving IQUA listserv emails, please sign up to the list at the location above or contact Benjamin Thebaudeau ([thebaudb@tcd.ie](mailto:thebaudb@tcd.ie)). A request for subscription to the IQUA-L list goes initially to the list moderator first for cross-referencing with the current membership list. Benjamin Thebaudeau: IQUA-L Moderator

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**IQUA thanks its kind sponsors:**

- Ex Libris
- Geological Survey of Ireland
- 14Chrono LAB, Queens University, Belfast



14  
**CHRONO**



Queen's University Belfast  
**AMS Radiocarbon  
Dating**

*...over 45 years  
of experience...*

- ✓ *results: - typically less than 10 weeks  
- fast track available  
- accurate and precise\*  
-  $\delta^{13}\text{C}$  included (&  $\delta^{15}\text{N}$  for bones)*
- ✓ *small sample size*
- ✓ *full sample pretreatment (all types)*
- ✓ *expert sampling & calibration advice*
- ✓ *10% student discount*

*\* Check our website for VIRI results*

Contact us for current price and turnaround:  
[www.chrono.qub.ac.uk](http://www.chrono.qub.ac.uk) [chrono@qub.ac.uk](mailto:chrono@qub.ac.uk)

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