



## Archaeology Research Grant Report

Recipient name:	Karen O'Toole
Discipline and subject area:	Archaeology Radiocarbon Dates Scheme
Year awarded:	2022
Title of project:	Investigating the chronology of the bog butter assemblage in Northern Ireland

### Introduction:

A total of five bog butters from the collections of the National Museum of Northern Ireland – Ulster Museum were sampled for radiocarbon dating, to address a core research gap identified as part of my PhD research and to establish a chronology of bog butter deposition in Northern Ireland. The bog butters selected were provenanced to four of the six counties of Northern Ireland and were associated with a variety of container types, including a churn, a mether and an animal membrane. Most of these finds were discovered prior to World War II - only one was recovered in the 1990s. As a result, it was anticipated that these bog butters would be of relatively late date. The samples were submitted to the I4Chrono Centre at Queen's University Belfast and radiocarbon measurements were returned within four weeks. Two were dated to the early medieval period, one to the late medieval period and two to the post-medieval/early modern period. These results were consistent with our previous expectations, given their date of discovery.



Figure 1 BELUM.A418.1920; bog butter in wooden keg

### Please outline the objectives of the project

The primary objective of this project was to address a core knowledge gap in our understanding of bog butter in Ireland by establishing a chronology of bog butter deposition in Northern Ireland. The extant assemblage from Northern Ireland is significantly smaller (c. 20 examples) than that of the Republic of Ireland (500+ examples), but their chronology had not previously been well understood and no Northern Irish example had been radiocarbon dated prior to this project. Establishing a chronology for Northern Irish bog butter was necessary in order to 1) better characterise the Northern Irish assemblage; 2) enhance our understanding of bog butter and its deposition on the island of Ireland and 3) to shed light on the relationship between bog butter deposition in Ireland and in Scotland.

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### Please describe the methodology used in conducting the research

The bog butters submitted for radiocarbon dating as part of this project were selected on the basis of a number of criteria, the most significant of which was the presence of a museum research file. This was in order to maximise the potential of the radiocarbon dates to contribute to our understanding of the phenomenon. Ensuring the samples were representative of the assemblage as a whole was also a key consideration, and so bog butters associated with a variety of different types of container and a number of different counties were selected. Communication with the I4Chrono Centre confirmed that a 1g sample from each bog butter would be sufficient to obtain a radiocarbon date. Sampling from the individual bog butter masses followed the procedure outlined by Casanova et al. (2021). In short, a 1g sample was taken from under the external surface of the bog butter mass. Samples were taken from below the external surface in to avoid surface contaminants. The site from which samples were taken differed between bog butters as the sampling procedure considered the state of preservation of each butter and aimed to preserve its integrity as an archaeological object. Sampling occurred under sterile conditions. Nitrile gloves and solvent-washed scalpels and tweezers were used at all times to prevent modern contamination. Sampling also took place with permission from and under the supervision of the National Museum of Northern Ireland (NMNI). The mass of each sample was weighed using a KERN Pocket Balance with a resolution of 0.1g. The samples were wrapped in tin foil and placed inside plastic sample bags. The samples were then submitted to the I4Chrono Centre at QUB in person. Once the analysis was completed, any excess material was returned in accordance with the policy of the Ulster Museum.



Figure 2 Karen O'Toole sampling BELUM.A414.1935; bog butter in a wooden mether

### References:

Casanova, E.; Knowles, T.; Mulhall, I.; Sikora, M.; Smyth, J. and Evershed, R. 2021 "Generation of two new radiocarbon standards for compound-specific radiocarbon analyses of fatty acids from bog butter finds", *Radiocarbon* 2021, 1-13.

### Please outline the findings of your research and/or milestones achieved.

The bog butters were sampled at the Ulster Museum Stores and submitted to the I4Chrono Centre on 1 March 2022. Radiocarbon measurements were returned on 4 April 2022. BELUM.A215.1940 (Garvagh, Co. Fermanagh; in a wooden container) was dated  $950 \pm 19$ BP (Early Medieval); BELUM.A414.1935 (Bunshanacloney, Co. Antrim; in a wooden mether) was dated  $314 \pm 22$ BP (Post-Medieval/Early Modern); BELUM.A418.1920 (Tyane, Co. Derry; in a wooden keg) was dated  $331 \pm 20$ BP (Post-Medieval/Early Modern); BELUM.A554.1930 (Drumkeeran, Co. Antrim; in a bark container) was dated  $1055 \pm 22$ BP (Early Medieval); and BELUM.A14643 (Garvaghullion, Co. Tyrone; in an animal membrane) was dated  $829 \pm 20$ BP (Late Medieval).

The dates obtained were consistent with our prior expectations, given the date of discovery and the find place of each of the bog butters sampled. As a result of this project, a secure chronology has now been established for Northern Ireland extending from the early medieval period, through the late medieval period, and into the early



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modern period. This is a significant finding of the research conducted as part of this project, and also represents a significant milestone in my PhD research on bog butter more generally.

Establishing this chronology has also made a considerable contribution to our broader understanding of bog butter on the island of Ireland. It has closed the obvious research gap that existed due to the lack of dates from Northern Ireland. Additionally, patterns in the chronology of bog butter deposition can now be discussed more confidently as a result. Indeed, the early medieval dates of BELUM.A215.1940 and BELUM.A554.1930 coincide with a peak in bog butter deposition elsewhere on the island at this time (Smyth et al. 2019). The results of this project are also consistent with the later (Early-Late Medieval) dates established in the chronology of Scottish bog butter deposition (Hunter 1997). This suggests that the practice of bog butter deposition in Northern Ireland is well integrated into the wider practice of bog butter deposition during this period. This is a significant finding of this research and has markedly improved our understanding of the phenomenon.

### References:

Hunter, F. 1997 "Iron Age hoarding in Scotland and Northern England" in A. Gwilt and C. Haselgrove (eds) *Reconstructing Iron Age Societies*, 108-133. Oxford: Oxbow Books.

Smyth, J., Berstan, R., Casanova, E., McCormick, F., Mulhall, I., Sikora, M., Synott, C. and Evershed, R. 2019 "Four millennia of dairy surplus and deposition revealed through compound-specific stable isotope analysis and radiocarbon dating of Irish bog butters", *Scientific Reports* 9(1), 1-10.

### **Please provide details of the dissemination of the outcomes from this project.**

The outcomes of this project have been disseminated in a number of ways, including social media posts and presentations. The project was publicised on Twitter (@UlsterMuseum, 04/03/2022) by the Ulster Museum after the samples had been taken, and shared on my own account (@KarenOT101, 04/03/2022) tagging the Royal Irish Academy. The results of the project were also disseminated as part of a number of conference presentations. The project was presented at the Institute of Archaeologists of Ireland (IAI) Conference in Belfast (01/04/2022-02/04/2022) as a core aspect of my PhD research. Once the results had been obtained, they were presented as part of a presentation on my research for the School of Chemistry at the University of Bristol (12/07/2022) and in my conference presentation at the European Association of Archaeologists 27th Annual Meeting at Budapest, Hungary (02/09/2022).

No. of Lectures given/outreach events involved in: 3

There are clear plans for the continued communication of the results of my project. The core dissemination strategy is the inclusion of these results as part of my PhD research and thesis. The radiocarbon dates awarded are key deliverables of this wider project and are a major output of my research to date. This will allow the award's results to be contextualised in the wider practice of bog butter deposition and will maximise their potential to enhance our understanding of the phenomenon. Additionally, the results of this project will continue to be presented and discussed at conference proceedings and presentations, such as at the EAA and other relevant conference proceedings. Finally, the results will be published in scholarly articles in appropriate journals, such as the Proceedings of the Royal Irish Academy and the Journal of Irish Archaeology and in any publications that arise from my wider PhD research.



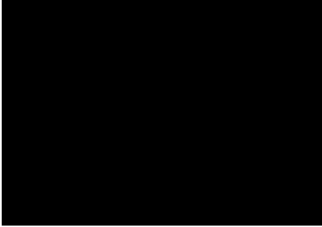
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### **How did the award enhance your professional development?**

This award significantly enhanced my professional development, in addition to progressing my research. The award allowed me to develop a strong, positive and collaborative working relationship with the National Museum of Northern Ireland (Ulster Museum). This relationship has been mutually beneficial and generated new interest in bog butter research by creating new knowledge and sharing the results with a wide audience. Additionally, a major opportunity that arose as a result of this project was the chance to submit samples from the same bog butters for organic residue analysis. As these bog butters had been radiocarbon dated and excess material survived from this analysis, it was possible to submit them to the Organic Geochemistry Unit at the School of Chemistry in the University of Bristol. This was a significant opportunity as I was able to travel to Bristol on a research trip and learn how to prepare and analyse the samples. I was fortunate to work under Lily Olet, a fellow Irish Research Council PhD scholar, and Professor Richard Evershed, a pioneer of the organic residue analysis techniques. As a result, I developed invaluable new skills in archaeological scientific techniques and gained experience working in an organic chemistry laboratory. Thus, this award has also played a key role in creating opportunities to further my research and enhance my skills and professional development, as well as facilitating further collaboration with existing cultural institutions and research facilities.

### **What plans (if any) do you have to further your proposal/project?**

This project has already been significantly furthered to date as the excess material from samples of these bog butters have since been submitted for organic residue (lipid) analysis. These analyses have allowed this project to also establish an understanding of the chemical composition of these bog butters from Northern Ireland. In addition to these, this project will continue to be furthered through my PhD research. These results have been integrated into the wider project data and will feature in the PhD thesis I am producing as part of my degree. More specifically, these results will form part of the data for a comprehensive geospatial analysis as part of my research. The results of this project will be compiled with other published and unpublished radiocarbon dates from the island of Ireland in order to understand the changes that occur through time and space. This will allow patterns in chronology and distribution to be identified across the island as a whole, as well as local and regional patterns.



<sup>14</sup>CHRONO Centre  
Queens University  
Belfast  
42 Fitzwilliam Street  
Belfast BT9 6AX  
Northern Ireland

## Radiocarbon Date Certificate

Laboratory Identification: UBA-47459  
Date of Measurement: 2022-03-21  
Site: Garvaghy, Fermanagh  
Sample ID: BELUM.A215.1940  
Material Dated: other  
Pretreatment: None  
mg Graphite: 0.978  
Submitted by: Karen OToole

Conventional <sup>14</sup> C	
Age:	950±19 BP
Fraction	using AMS
corrected	δ <sup>13</sup> C



<sup>14</sup>CHRONO Centre  
Queens University  
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## Radiocarbon Date Certificate

Laboratory Identification: UBA-47460  
Date of Measurement: 2022-04-04  
Site: Bunshanacloney, Antrim  
Sample ID: BELUM.A414.1935  
Material Dated: other  
Pretreatment: None  
mg Graphite: 0.984  
Submitted by: Karen OToole

Conventional <sup>14</sup> C	
Age:	314±22 BP
Fraction	using AMS
corrected	δ <sup>13</sup> C



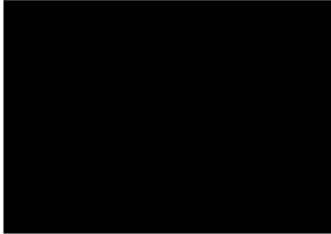


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Belfast  
42 Fitzwilliam Street  
Belfast BT9 6AX  
Northern Ireland

## Radiocarbon Date Certificate

Laboratory Identification: UBA-47461  
Date of Measurement: 2022-04-04  
Site: Tyanee, Derry  
Sample ID: BELUM.A481.1920  
Material Dated: other  
Pretreatment: None  
mg Graphite: 0.991  
Submitted by: Karen OToole

Conventional <sup>14</sup> C	
Age:	331±20 BP
Fraction	using AMS
corrected	δ <sup>13</sup> C



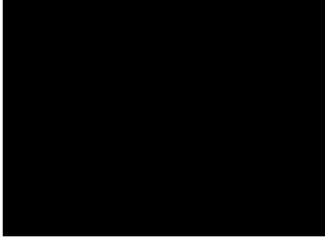
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Queens University  
Belfast  
42 Fitzwilliam Street  
Belfast BT9 6AX  
Northern Ireland

## Radiocarbon Date Certificate

Laboratory Identification: UBA-47462  
Date of Measurement: 2022-04-04  
Site: Drumkeeran, Antrim  
Sample ID: BELUM.A554.1930  
Material Dated: other  
Pretreatment: None  
mg Graphite: 0.987  
Submitted by: Karen OToole

Conventional <sup>14</sup> C	
Age:	1055±22 BP
Fraction	using AMS
corrected	δ <sup>13</sup> C





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Queens University  
Belfast  
42 Fitzwilliam Street  
Belfast BT9 6AX  
Northern Ireland

## Radiocarbon Date Certificate

Laboratory Identification: UBA-47463  
Date of Measurement: 2022-03-30  
Site: Garvaghullian, Tyrone  
Sample ID: BELUM.A14643  
Material Dated: other  
Pretreatment: None  
mg Graphite: 0.995  
Submitted by: Karen OToole

Conventional <sup>14</sup> C	
Age:	829±20 BP
Fraction	using AMS
corrected	δ <sup>13</sup> C