

# Archaeology Research Grant 2022

## Katharina Becker

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1. Title: Dr

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2.

3. Grant programme Archaeology Research Grant

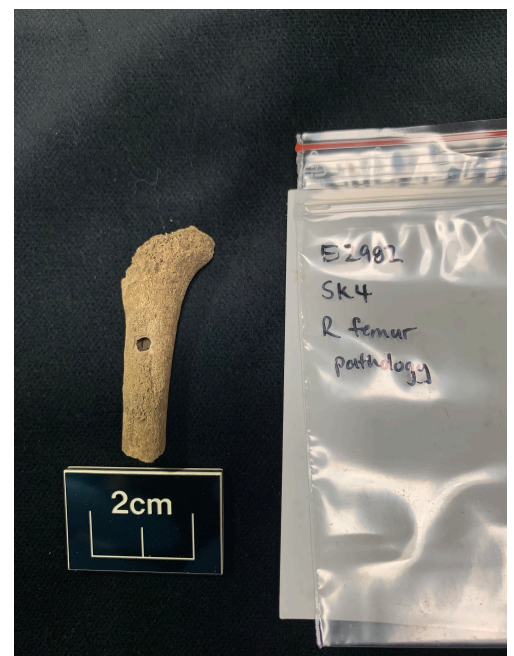
4. Year awarded 2022

5. Title of project Infant mortality and kinship in the Irish Iron Age

6. Summary of report  
(Minimum allowed 100 words)

The project 'infant mortality and kinship in the Iron Age' examines a newly identified group of infant burials of Iron Age date. Since award, a key assemblage from Moone 2, Co. Kildare was examined as a pilot study and sampled for human and pathogen aDNA as well as isotopic analysis on the 26th and 27th of September by Dr Kirsten Bos, Max Planck Institute, Leipzig, and Professor Derek Hamilton, University of Glasgow. All other individuals in the dataset (with the exception of the infant from Platin, Co. Meath, which could not be located) were examined and assessed for preservation by Dr O'Donnabhain and Dr Bos. The project team also gathered and assessed the detailed contextual and taphonomic information on the individuals from primary site reports where accessible. An article on the phenomenon and its interpretation in social terms is in preparation. We are awaiting results and pending approval by the NMI a second application for the funding of the full stage of the project would be submitted in 2023.

7. Please provide two appropriate images



8. Please outline the objectives of the project

This project will for the first time identify, analyse and present a group of Iron Age inhumation burials of young infants representing a previously not recognised burial tradition, specific to neonates and babies around the 12month age mark. These very young infants were formally buried in a crouched position in settlement and related contexts deviating fundamentally from the standard rite of cremation burial. A case study at Moone 2, Co. Kildare, consists of a small settlement cemetery of such infants, that offer unprecedented potential to investigate kinship in the Iron Age. The study brings together a range of cutting-edge methods in a research design that aims to utilise a newly identified dataset to its fullest extent, and has the potential to shed light on a wide range of crucial issues. A number of primary and secondary aims and objectives translate this range of questions into a programme of work that aims to elucidate causes for infant mortality, the social definition of the earliest life stages, the conceptualisation of the social identity of very young infants, kinship practices, and ancestral relations of these individuals across the country. The list of objectives as outlined in the project application had to be modified, as the National Museum of Ireland advised a pilot study to be conducted on the site of Moone 2, before extending the sampling and analysis strategy to the wider dataset. We examined all individuals with the exception of the infant from Platin, Co. Meath (Objective 1). We are in contact with Ed Bourke in the National Monuments Service to access the Ballydavis site archive (Objective 2). The archive is about to be inventorised and Ed Bourke will liaise with us as soon as access is possible. We have been in touch with John O’Keeffe of the Discovery Programme to access the original field drawings and photographs for the Rath na Ríogh and Dune Aengus individuals, which appear to have been submitted to the National Archives, rather than the National Monuments Service and are currently not accessible. We hope to be able to access both archives early in 2023. We are also in contact with Dr Kerri Cleary of ACSU to located original photos or drawings of the Platin, Co. Meath individual. We have started work on Objectives 5, 6 and 7 (aDNA and isotope analysis) for the infants from Moone 2, but not for the other sites. These will be revisited in a possible future funding application, which would also address Objective 3, the radiocarbon dating of undated burials at Ballydavis, Lough Gur and indeed also Dun Aengus, where a larger group infant remains than previously realized, were found.

9. Please describe the methodology used in conducting the research

Seven sites with articulated Iron Age infant and neonate burials have been identified in Ireland (table 1). The central case study of the project is Moone 2, Co. Kildare, where two groups of crouched infant burials are located beside a likely contemporary roundhouse respectively. Radiocarbon dates indicate the possible contemporaneity of the individuals within each group, making it possible that they relate to one kin group residing within the roundhouse. This group has been identified by the National Museum as the target of the pilot study and sampling has been conducted. The skeletons and their condition was assessed by Dr Barra Ó Donnabháin and Dr Becker in March and a strategy devised in consultation with all specialists and the NMI. Licenses for alteration and export were applied for and sampling was conducted by Dr Kirstin Bos, Max Planck Institute Leipzig, and Professor Derek Hamilton, University of Glasgow in the NMI on the 27th of September 2022. All individuals were reassessed to current scientific standard (e.g. AlQahtani 2010), with a particular view to identifying evidence for lesions and other indicators of disease or abnormal development. Such were identified in a number of individuals. In order to minimise impact, the number of samples has been kept small in a judicious selection process that adheres to international ethics standards

(Alpaslan-Roodenberg et al. 2021). Isotopic sampling, pathogen screening and aDNA will be conducted on one tooth for those individual where teeth were available. Otherwise unidentifiable bone was chosen and in three instances a small sample will be drilled out of the petrous portion of the temporal bone, with the remainder to be returned. (cf Parker et al. 2020). Lesions were sampled by drilling of 50mg of material out of the surface of the bones. The sample weight for stable isotope-only analysis will be c. 0.5g . Pathogen analysis will be performed on the DNA extracts manufactured for human analysis, so only one sampling effort will be required for completion of all intended molecular analyses. Full genomic profiles will be established for all individuals where preservation allows. The genome-wide analyses will allow the determination of the sex of the individual, biological kinship analyses up to second/third degree relationships and ancestry analyses within the wider West-Eurasian context. Extracted DNA will be converted into Illumina libraries for sequencing. This involves the addition of synthetic components to either side of the DNA molecule, which can be used as sites to initiate replication. In this way the extracted molecules have higher chemical stability and can be amplified for future applications without the need for additional drilling from the bone. The analysis of the  $\delta^{13}\text{C}$ ,  $\delta^{15}\text{N}$ , and  $\delta^{34}\text{S}$  (Carbon, Nitrogen and Sulfur) will be conducted in order to establish the dietary basis of the infant – and mother where infants still being breastfed.

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

1 We have accessed original site documentation for a number of the sites and are in touch with colleagues who will facilitate access to original documentation in due course.  
2 We have inspected all individuals with the exception of the individuals from Platin, Co. Meath  
3 We have identified additional infant remains from Dun Aengus  
4 We have found all assemblages to present in good state of preservation  
5 Dr Bos identified possible evidence for periostitis on a number of specimens, including some of those sampled from the site of Moone 2. We have found evidence for individuals from Moone 2 and the other skeletons in the assemblage to be well preserved, allowing in all likelihood for the preservation of human aDNA.  
6 We conducted sampling of the eight individuals from Moone 2, Co. Kildare. With the analysis of the Moone assemblage, some of the central aims of the project will be addressed. We are anticipating results of the aDNA analysis for March (ca 6 months after retrieval), but an exact date of return cannot be predicted. By this time we will also have received the results of the isotopic analysis.

11. a) Please provide details of the dissemination of the outcomes from this project (inc. publications, presentations, outreach, media etc.) including details of any social media/web platforms used to publicise this project

We have been drafting a paper that presents the corpus as it is known to date which will articulate some of the insights the group in itself provide into the issue of social age and funerary practice of the period and will be submitted to Antiquity.

We have been working on the compilation of the primary documentation for all infant burials in the dataset and the digitization and creation of reconstruction images for publication.

Becker will present the project to the Department of Archaeology in the University of Aberdeen in their lecture series on the 13th of December. The results of the analysis of the Moone assemblage will be subject of a further publication in a journal yet to be decided.

We would be pleased to also present on the project in the next Revealing the Past seminar.

15. How did the award enhance your professional development (e.g. in terms of specific opportunities, opportunities for enhancing skills, collaborations with others etc.)?

A great opportunity to do cutting edge research on an exciting assemblage. It allowed us to work for the first time with specialists from the Max Planck institute, who are internationally leading in the field of human ancient genomics (with a colleague in the institute recently having been awarded the Nobel price in 2022). Bringing not only scientific expertise, but also cutting edge methodologies to play in the project, we are especially excited about the potential of the screening for pathogens which Dr Bos specialises in. We are also delighted to be working with Dr Schiffels, who is leading an ERC project on Iron Age genomics across Europe, which will facilitate the contextualisation of the human aDNA more broadly. Professor Hamilton's work promises to reveal important information on the nutritional status of the individuals and we are excited to be collaborating with these international specialists to learn about their methods and lay the foundation for future collaborations.

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

We would like to reapply for funding for the full project scope set out in the application, if permission by the NMI is granted for the analysis of the remainder of the dataset. The permission will depend on the aDNA analysis producing results. While we are optimistic that the samples will return aDNA, as bone preservation appears good (as also indicated by the fact that individuals had previously been dated by  $^{14}\text{C}$ ), the return of the result in good time to allow for the application to the next round cannot be guaranteed. The results are expected for February or March 2023 but cannot be precisely predicted.