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Royal Irish Academy

Archaeological Research for World Heritage Sites Grant Report

Recipient name:	Dr Daniel Curley
Discipline and subject area:	Archaeological Research for World Heritage Sites scheme
Year awarded:	2023
Title of project:	Decoding the ogham stones of early historic Machaire Connacht

Summary of findings:

Six ogham-inscribed stones are known today from the mid-Roscommon area, broadly contiguous with the early medieval territory known as Magh nAí or Machaire Connacht. Rathcroghan is the multi-period archaeological landscape at the core of this territory, a location which has been demonstrated to have reached its zenith in the late Iron Age and early medieval period. The objective of this project is to seek to better understand the earliest surviving written words from this internationally significant UNESCO World Heritage Status Tentative Listed archaeological and cultural landscape, by systematically digitally recording the six ogham stones as a collection for the first time. In so doing, this project provides new opportunities in public dissemination, interpretation and interaction with these important monuments both within the facility at Rathcroghan Visitor Centre and online, allow for detailed research into the stones, their inscriptions, and generate theories as to their placement and significance in the mid-Roscommon landscape.

Photo 2 : Drummin I Ogham Stone. 3D model illustrating enhancement of carved marks using a selection ofshaders
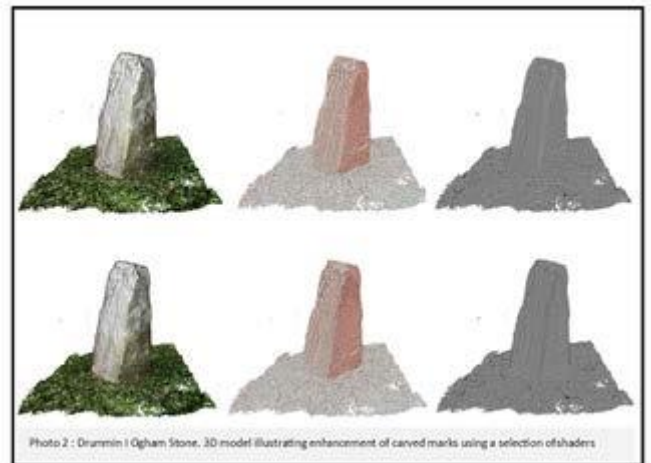
Please outline the objectives of the project.

Six ogham-inscribed stones are known today from the mid-Roscommon area, broadly contiguous with the early medieval territory known as Magh nAí or Machaire Connacht. Rathcroghan – Cruachan Aí – is the multi-period archaeological landscape at the core of this territory, a location which has been demonstrated to have reached its zenith in the late Iron Age and early medieval period. The objective of this project is to seek to better understand the earliest surviving written words from this internationally-significant UNESCO World Heritage Status Tentative Listed archaeological and cultural landscape, by systematically digitally recording the six ogham stones as a collection for the first time. In so doing, the project will provide new opportunities in public dissemination, interpretation and interaction with these important monuments both within the facility at Rathcroghan Visitor Centre and online, allow

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for detailed research into the stones, their inscriptions, and generate theories as to their placement and significance in the mid-Roscommon landscape.

This project, separate to the RIA grant award, will also display the Carns ogham stone, to be housed in the Rathcroghan Visitor Centre, whereby the six stones will be presented to the visitor for the first time as a collection, with the significance of their inscriptions, and their original settings, considered and brought to greater recognition, prominence and celebrated in new ways.

Please describe the methodology used in conducting the research.

The objective was to produce high resolution jpeg images of the Ogham Stones to meet the requirements for 3D photogrammetric imagery. Photographs were needed from multiple positions and angles. Direct sunlight leading to shadows across the stones was avoided.

The schedule was: Drummin, two stones, outdoors, one upright, one recumbent; Baslick, one stone, outdoors, embedded in wall; Glenballythomas, in Oweynagat souterrain and cave, one stone in souterrain, one embedded in corner wall of cave. Cameras used were Nikon Z6ii (Image 6048x4024 pixels) and Samsung Galaxy S22 (image 4000x3000 pixels). Lens used was a Nikkor Z 20mm, f1.8.

The Nikon camera was mounted on a K&F Concept gimbal seated on a Vanguard Alta Pro 263AT tripod. A Joby 24cm Gorilla pod was used for low-level shots. The gimbal has a graduated scale for altitude and azimuth. Underground lighting at Oweynagat used a 25cm LED Ring-light mounted on a telescopic pole. Indoors at the NMI archive 20cm x 70cm Softboxes with LED lighting were used. Each stone was photographed multiple times from a number of stations around its perimeter. The tripod was moved to each station, and the process repeated. At Drummin each stone had a 1m graduated perimeter line pegged around its base at a fixed distance.

Photo 1: Drummin II Ogham Stone showing photographic setup. Inset left is Baslick Ogham Stone and right is the entrance to Oweynagat souterrain and cave

Distance to stone was c. 0.5m (Photo 1). Where it was impossible to mount the camera on a tripod, or Gorilla pod, the stone was photographed hand-held from a number of stations in the same fashion as at Drummin.

For each station, where the camera was tripod and gimbal-mounted, photographs were taken in a grid pattern. For Drummin II, photographs were taken at three heights, with multiple photographs taken in a grid of altitude and azimuth readings. The methodology was repeated for hand-held photography. A further set of low-level photographs were also taken, at each station, with the camera mounted on the Gorilla pod.

Photographs for each stone were processed to create 2D images and 3D models. The software used was Agisoft Metashape.
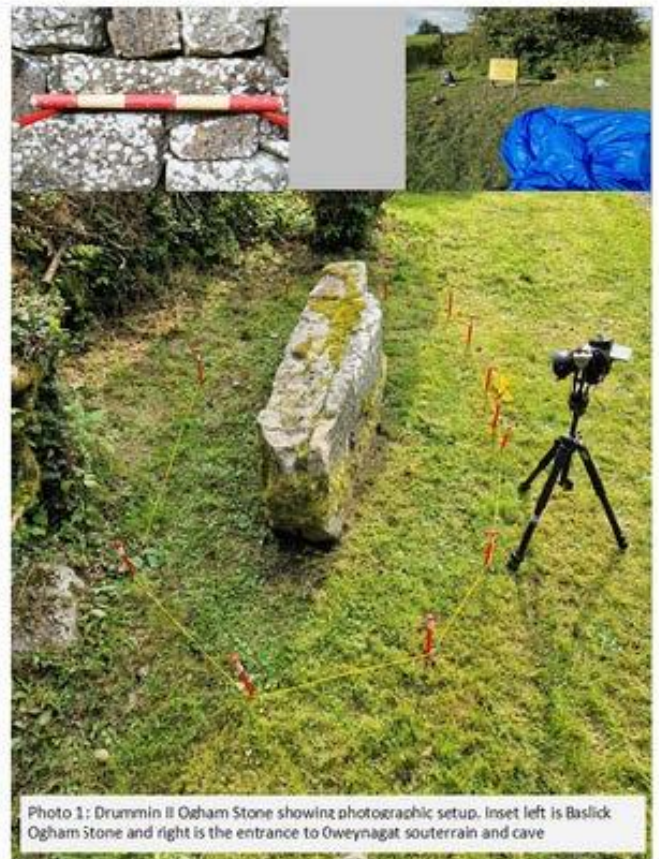
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The processing workflow was:

- Add photographs – For Drummin 1 273 photographs were processed.
- Quality control – 273 photographs passed inspection.
- Align photographs – up to 40,000 recognisable points were picked on each photograph. Matching pairs in adjacent photographs were identified. The pairs were located in 3D space and a sparse point cloud of tie points created.
- Build dense point cloud – using the tie points to define the surface of the stone enabled a dense point cloud to be built which enable a 3D model of the surface of the stone to be created.
- Build mesh – to create a realistic 3D model of the surface of the stone, a mesh was created by joining each point in the dense cloud to each of its immediate neighbours by a series of vertices.
- Build texture – Using the mesh the detailed 3D surface of the model was re-created by selecting relevant photographs to add the texture.

At this stage digital 2D still images (Photo 2) and animated 3D models were created.

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

The principal milestone achieved thusfar has been the successful data collection and processing of the six stones in a uniform and consistent form for the first time. The stones were located in a variety of contexts, as outlined in the methodology, and as such, the complete survey of each stone required innovations and problem-solving in how to deliver the project. The survey and processing having been completed, the next step will be to display the collection on the Rathcroghan Visitor Centre Sketchfab profile, newly established for the purposes of the project, and this will be linked to the centre's website and Facebook page.

While it goes beyond the life cycle of the grant award, this data capture will now also form the basis for public visitor and online dissemination, detailed epigraphical study of the inscriptions, and preserve recordof these important artefacts for future study, enjoyment and understanding.

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

The current dissemination of the project has come in the form of social media posts via the Rathcroghan Visitor Centre Facebook page during the fieldwork, in order to successfully complete that part of the work, and which formed the basis of the RIA grant award.

The project will presently be introduced at the forthcoming Rathcroghan Conference 2023 – Archaeology Above & Below, 11th and 12th November, to both an in-house and online audience for the first time. Further plans for dissemination will fall into categories as broad as museum information panels, Archaeology Ireland submissions, proposals to peer-reviewed journals, and, through collaboration with the AHRC/IRC-funded project OG(H)AM: Harnessing digital technologies to transform understanding of ogham writing, from the 4th century to the 21st, which sees the University of Glasgow and Maynooth University collaborate on ogham in all its forms. Our hope will be to disseminate our results alongside the newly installed Carns ogham stone in time for International Ogham Day, 8th July 2024, with the RIA-funded decoding project a central part of the new exhibition to be housed in the Rathcroghan Visitor Centre museum.

No. of Lectures given/outreach events: 1

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How will you continue to communicate the results of your project and what are your publication plans?

The results will be communicated via the upcoming Rathcroghan Conference 2023, and once uploaded to Sketchfab in the immediate future, Rathcroghan Visitor Centre will publicise the presence of the collection via our social media platforms, website and mailing list. The results will in the near future form part of an interactive information panel, connected with a series of QR codes linked to the Sketchfab profile, to be installed in the museum at Rathcroghan Visitor Centre, coupled with the Carns ogham stone, which will be provided on loan from NMI, and will be mounted for display in 2024.

The project team aims to submit a proposal for an article to a forthcoming issue of Archaeology Ireland magazine, and in the medium-term, and in association with the Og(h)am project, and the skill-sets present in their team, peer-reviewed publications such as Peritia can be explored, to publish the updated versions of the inscriptions, and should any new insights emerge, study them further.

How did the award enhance your professional development?

It enabled the delivery of a research avenue which hasn't previously been available to the project team, and has allowed for the museum at Rathcroghan Visitor Centre to significantly add to their exhibition to the general public, maintaining and enhancing the relevance of that facility into the future.

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

The successful installation of the Carns ogham-inscribed stone as part of the RIA-digital recording project, which we aim to have completed by mid-2024.