Geophysical Surveys in England: Using digital data to inform heritage management & promote collaboration

For more than 30 years, geophysical survey has played a major role in developer-funded archaeology in England, especially at the pre-determination stage of planning applications. This project will examine the current use of geophysical survey within archaeological investigation and how collaboration between archaeologists and geophysicists can benefit both disciplines. All work will be undertaken with close consideration of urgent priorities such as the recent White Paper *Planning for the Future* and the *Tailored Review of Historic England* 2020.

The research aims to:

- Assess the current effectiveness of terrestrial geophysical techniques in detecting archaeological remains within England with respect to specific available datasets
- Assess the effectiveness of the archaeological interpretation of geophysical data
- Assess whether geophysical data may be used more effectively within the Heritage sector
- Review current archiving practices and assess their benefit to the sector, and
- Enhance collaboration between archaeologists and archaeological geophysicists

The research will focus on the nature and suitability of the techniques used in relation to the quality and reliability of survey results when compared to excavation data. The work will also investigate a series of vital questions relating to how the datasets created by numerous separate studies may be combined on a digital platform to allow for landscape-scale coverage, the protocols needed to achieve this, how the results of large-scale surveys are published and made publicly accessible, and how applications could be used to automate the analysis and processing of these large datasets.

Importantly, the project will consider what kind of archaeological structures and deposits are being identified, the extent to which these are representative of archaeological assets as currently understood, and how collaboration across different fields of archaeological endeavour can improve interpretation of the geophysical data and contribute more widely to archaeological resource management.

The methodology is being developed to include:

- A desk-based study of existing practice
- Analysis of geophysical surveys in relation to subsequent excavation
- Experimental work looking at ways of combining large datasets, and
- A review of the current and potential applications of machine learning to process and interpret geophysical survey data.

To date, the bulk of planning evaluation has been subject to magnetometer survey, but a welcome increase in the use of a more diverse range of techniques, such as Ground Penetrating Radar and electromagnetic surveys will be considered within the research.

A comprehensive review of work will be undertaken, along with current research to include the effectiveness of geophysical survey when assessing variable factors such as geology, seasonality, equipment and expected remains will also be considered to inform limitations. Work undertaken in other countries that may influence the research will also be included. A survey of practitioners and their work will form part of the methodology, plus a review of work in related disciplines such as environmental science where large datasets relating to landscape assets are created, used, and curated routinely.

Outputs are anticipated to include:

- Accessible GIS of sites, subject to copyright
- Methodology for site analysis for future work
- Recommendations to empower non-geophysicists in the use of geophysical products
- Workshops to promote better understanding of geophysical investigation

This collaborative doctoral partnership is hosted by Bournemouth University, co-supervised with Historic England. The studentship is funded by AHRC and Historic England.

The project team consists of:

Researcher: Lucy Parker
BU Supervisors: Professor Tim Darvill & Dr Eileen Wilkes
HE Supervisors: Thomas Cromwell & Dr Neil Linford

How you can be involved:

- Data from throughout the sector will be needed, in the form of geophysical and excavation results plus information from both archaeological geophysicists and users, such as curators, field archaeologists & Heritage Consultants
- Be a collaborator. The research will need wide participation to understand Best Practice plus views on the current & future needs of the sector, and how collaborations can enhance the use of geophysical survey results in archaeological resource management
- Take part in non-technical seminars to better understand the benefits and limitations of geophysical survey within archaeological investigations

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