Session S9 Show your code: task streamlining, reproducibility and replicability in archaeological computing

Once a fringe component of archaeology, digital data and methods are rapidly becoming commonplace, changing how we learn about and discuss the past (Bevan 2015). This presents many technical challenges, but also an opportunity to reshape archaeological science by automating many of the most tedious tasks while encouraging reproducibility and replicability of computer applications. This session will be part seminar and part live-coding demonstration to which we invite anyone with a working piece of code that automates or streamlines any task that may be undertaken by an archaeological practitioner. We ask participants to show their code, explaining what the code does and how it works to make it easier for others to use it (Eglen et al. 2017). In doing so the session will showcase the principles and benefits of open science (sensu Nosek et al. 2015).

We invite demonstrations from all points in the production of knowledge, from building and using archaeological databases, to statistical analyses and modelling (simulation, GIS, etc), to dissemination and public engagement. We also welcome more traditional papers that can bear on the following issues:

-Improving usability and discoverability of code;
-Communicating coding results with non-experts;
-Managing concerns regarding intellectual property and data ownership;
-Maintaining code and data in the long term;
-Using code examples for teaching archaeology.

Whether you are producing grand-scale syntheses of big data or those bits of programming that make life just a little easier, we want to see your code! All programming languages welcome.

Session S10 Expanding horizons: confronting issues of scale, resolution, and representation in the study of human expansions

Panelists of this roundtable session will discuss theoretical and methodological issues associated with the study of prehistoric human expansions and computational methods used to represent them. From the earliest hominin expansions in Africa and Eurasia, to the settlement of Australia and the New World, to explorations of the world's oceans: the historical record of humanity is structured by the movements of people over the earth. Human expansions have been facilitated by changing environmental conditions, technological innovations, and shifts in the social relationships between different human groups, all of which have consequences for patterning observed in the archaeological record. Many major human movements occurred at spatial and temporal scales that differ from that of both archaeological investigations and many conceptions of human culture, leaving room for a good deal of uncertainty and presenting challenges to the construction of prehistoric narratives. Computational modelling approaches like GIS, network analyses, and agent-based models, offer opportunities to place these narratives in a framework where different potential historical processes can be assessed and uncertainty can be quantified. How we represent our ideas about the past in computational form involves trade-offs between realism and generality, as well as negotiations between different areas of expertise. This roundtable will include panelists from a range of research specialisations in order to expose common issues in the field of modeling human expansions and generate ideas about how best to bring together these areas of expertise.

Paper 3161 Automating heritage reporting tasks with R

Heritage documentation often needs to fit particular formats based on legislative or corporate regulations. Having standardised formats is useful for comparison between reports, but creating them can sometimes be tedious and time-consuming. Large heritage organisations sometimes develop bespoke field recording solutions to streamline this process, but for independent heritage contractors or small university teams who may work for multiple organisations, these options may be either financially impractical or insufficiently flexible. In many cases, data is collected in multiple formats that need to be parsed and then recombined in a standardised way. In this presentation, I will demonstrate how different kinds of field data (GIS, spreadsheets, photographs, etc.) can be collated into pre-formatted documents using the free R statistical software platform. Making use of existing R libraries for creating rich text documents and manipulating different data formats, this workflow provides an inexpensive solution to standardised report generation that is flexible enough to be extended across many heritage settings.

Paper 3162 What's geography got to do with it? A networked, agent-based model of exchange in Polynesia

Ancestral Polynesians settled the widely-dispersed islands of the Pacific Ocean through a series of purposeful voyages of discovery. These discoveries were followed by periods of maritime interaction, demonstrated by the presence of exotic stone artefacts in archaeological assemblages. It is often assumed that the presence of these exotic materials is evidence of exchange relationships between islands or island groups. Here we present on work simulating exchange across a spatial network in the central Pacific Ocean, with the goal of understanding how patterns in the distribution of lithic material sources might be influenced by the geography of the oceanic environment. First, a network between islands is generated where connections are mediated by geographic criteria (e.g. distance, size). Agents then move between points in the network, obtaining raw material at rocky islands and relocating it according to a neutral model of distribution. Results from the simulation demonstrate how frequencies of sources represented in archaeological assemblages can be approximated using a minimal set of constraints on networks, providing a set of baselines which can be used to assess any preferential exchange relationships. Recommendations are made for future work incorporating temporal changes in assemblage composition and the sailing environment.