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# Combining agent-based modelling and geographical information systems to create a new tool for modelling movement dynamics: A case-study of Mesolithic Orkney

Leo Sucharyna Thomas\*<sup>1</sup>, Alison Heppenstall<sup>2,3</sup>, and Caroline Wickham-Jones<sup>4,5</sup>

<sup>1</sup>University of Edinburgh, School of History, Classics and Archaeology (UoE) – William Robertson Wing Old Medical School, 4 Teviot Pl, Edinburgh EH8 9AG, United Kingdom

<sup>2</sup>School of Geography – University of Leeds, LS2 9TJ, United Kingdom

<sup>3</sup>The Alan Turing Institute – British Library, 96 Euston Road, London NW1 2DB, United Kingdom

<sup>4</sup>Institute of Northern Studies, University of the Highlands and Islands (UHI) – 12b Ness Walk, Inverness IV3 5SQ, Royaume-Uni, United Kingdom

<sup>5</sup>Department of Archaeology – Kings College, Aberdeen, AB24 3FX, Scotland, United Kingdom

## Abstract

*The earliest Holocene occupation of Orkney is still poorly understood. A lack of obvious sites means that it has, to date, undergone inadequate representation in the wider research agenda. This proof-of-concept study explored the development of a ground-up environment-based site-prediction model; a realistic mobility-resistive prehistoric landscape; and a dynamic human exploratory approach, using advanced computational techniques to place Mesolithic activity within a realistic landscape setting. Constrained variables pertaining to the base physical character produce initial insights into site placement and exploratory movement. This lifts topography and terrain from a passive backdrop to play an active role within Mesolithic studies, moving away from the static frameworks of previous analyses. The promotion of a complex physical environment can be used to test hypotheses and allows the development and layering of more complex input factors, and progresses research by addressing further questions. The approach promotes understanding of post-glacial Orkney and is widely applicable to other situations around the globe. This reasearch is the first step of a scalar investigation into the utility of regression-based predictive modelling for the early Holocene.*

**Keywords:** Modelling the Mesolithic, Agent, Based Model, Geographic Information Systems, Landscape Reconstruction

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\*Speaker