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Virtual Neanderthals : a study in agent-based modelling Late Pleistocene hominins in western Europe

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I alone remain responsible for any and all errors.

CURRICULUM VITAE

I, Fulco Scherjon, was born on the second of January 1969 in Amsterdam, The Netherlands. I was originally trained as a computer scientist and information analyst at Delft University (MSc). During an extensive career in software design and development I worked in many diverse projects for different employers that included river flow simulation software, database for planning of promotional activities, and eye care screening software.



I obtained a research master (MA Archaeology, Human Origins) in 2013. With this background I am working together with other researchers in a wide range of projects where computing knowledge is useful. Examples include a database constructed for lithic analysis, principal component analysis performed on experimental data sets, and research in which genetic data from extinct hominins has been analyzed for specific base patterns. My main research subject is modelling and simulation in an archaeological context.

My teaching experience started at Delft University, where I taught as a student assistant different programming languages include C++, Scheme and Pascal. At Leiden University I participated in many courses including “Data Analysis and Interpretation”, “Palaeolithic Europe”, and “Advanced Themes in Archaeology”. I obtained a 15k€ grant from Leiden University to develop, record and teach a Small Private Online Course (SPOC) titled “Modelling and Simulation for Archaeologists”, with Iza Romanowska and Karsten Lambers. I followed the Honours Class Archaeology in 2008, was admitted to the Honours College Linguistics in 2010, and obtained the Basis Kwalificatie Onderwijs (BKO, university teaching licence) in 2017.

Selected publications

- 2017 Sorensen, A.C. and F. **Scherjon**, 2017. fiReproxies: A computational model providing insight into heat-affected archaeological lithic assemblages, *PLoS ONE* 13(5):e0196777.
- 2016 Aarts, J.M.M.J.G., Alink, G.M., **Scherjon**, F., MacDonald, K., Smith, A.C., Nijveen, H. and W. Roebroeks, 2016. Fire Usage and Ancient Hominin Detoxification Genes: Protective Ancestral Variants Dominate While Additional Derived Risk Variants Appear in Modern Humans, *PLoS ONE* 11: e0161102.
- 2015 **Scherjon** F., Bakels C.C., MacDonald K. and W. Roebroeks, 2015. Burning the Land. An Ethnographic Study of Off-Site Fire Use by Current and Historically Documented Foragers and Implications for the Interpretation of Past Fire Practices in the Landscape, *Current Anthropology* 56(3): 299-326.

Education

- 2014 **Research Master of Arts in Archaeology**. Thesis: *HomininSpace – Modelling and Simulating Hominins moving through Time and real geographical Space*. Supervisors: Prof. Dr. J.W.M. Roebroeks and Dr. K. MacDonald. Grade: 9. Leiden University, the Netherlands. Simulation system developed in Repast and written in Java.
- 1995 **Master of Science in Applied Mathematics and Informatics**. Thesis: *Timing Analysis – A Case Study*. Supervisors: Prof. Dr. Ir. J. van Katwijk, Dr. Ir. W.J. Toetnel and Drs. Ing. K. Brink. Grade: 8. Delft University of Technology, the Netherlands. Research includes an explicit model of the i86 processor and an automated source code analysis

Virtual Neanderthals

This study presents an agent-based simulation model exploring the patterns of presence and absence of Late Pleistocene Neanderthals in western Europe. HomininSpace implements a parameterized generic demographic and social model of hominin dispersal while avoiding parameter value biases and explicitly modelled handicaps. Models are simulated through time within a high-resolution environment where reconstructed temperatures and precipitation levels influence the carrying capacity of the landscape, in the number of edible ungulates that can be hunted. Model parameter values are assigned and varied automatically while optimizing the match with Neanderthal archaeology using a Genetic Algorithm inspired by the processes of natural selection.

