# Joe Roe

I am a computational archaeologist using data science to understand the economy and ecology of the first farmers in Southwest Asia. I also develop research software and open data resources that support reproducible quantitative analysis in archaeology.

View this CV online with links at https://joeroe.io/cv

## **Education** 2017 Postgraduate studies **♀** University College London UCL Institute of Archaeology 2013 • Computational modelling of prehistoric human ecology in the Southern Levant • Part of the Prehistoric Hunting Strategies in Jordan project • Supervisors: Prof. Louise Martin, Prof. Andrew Bevan, Dr. Andrew Garrard MA Archaeology (Distinction) 2013 • University College London UCL Institute of Archaeology 2012 • Dissertation: Cultural phylogeny of kurgan burial mounds in the west Eurasian steppe • Supervisor: Prof. Stephen Shennan BA Anthropology & Archaeology (1st class hons.) 2011 Durham University Departments of Anthropology & Archaeology 2008 • Dissertation: Spatial analysis of intra-site surface collection data from a Cucuteni-Tripolye mega-site • Supervisor: Prof. John Chapman Secondary education 2008 • Leeds Woodkirk High School 2001

#### Contact

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# **Programming**

| R          |
|------------|
| SQL        |
| HTML/CSS   |
| Javascript |
| Ruby       |
| Python     |

# Academic appointments

Current

2025

2024

2021

Research officer (Forskningsfuldmægtig)
 Department of Cross-Cultural and Regional Studies

**♥** University of Copenhagen

Research assistant (Projektmitarbeiter)

Institute of Archaeological Sciences

- **♥** University of Bern
- Lead developer of XRONOS, an open repository for chronometric data (PIs: Dr. Martin Hinz, Prof. Dr. Albert Hafner)
- Contributed to research project "Climate Change Resilience and Vulnerabilities of Bronze Age Waterfront Communities (2200-800 BC)" (PI: Dr. Caroline Heitz)

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2020 2017

#### Research assistant (Videnskabelig assistent)

Department of Cross-Cultural and Regional Studies

University of Copenhagen

- Responsibility for archaeological survey and spatial analysis components of major field projects in Iran and Jordan
- Developed databases and software interfaces for the projects' research data
- PIs: Dr. Tobias Richter, Prof. Peder Mortensen

## Publications

2025

Martin, L., Roe, J. & Yeomans, L., Late Pleistocene-Holocene mammalian body size change in Jordan's Azraq Basin: A case for climate driven species distribution shifts. Quaternary Science Reviews 350: 109-147. doi:10.1016/j.quascirev.2024.109147

2024

- Gaydarska, B., Roe, J., and Slavchev, V., Dietary Variability in the Varna Chalcolithic Cemeteries. European Journal of Archaeology NA. doi:10.1017/eaa.2024.33
- Batist, Z. & Roe, J., Open archaeology, open source? Collaborative practices in an emerging community of archaeological software engineers. Internet Archaeology 67. doi:10.11141/ia.67.13

2023

- Batist, Z. & Roe, J., open-archaeo: a resource for documenting archaeological software development practices. Journal of Open Archaeology Data 11: 9. doi:10.5334/joad.111
- Arranz-Otaegui, A. & Roe, J., Revisiting the concept of the 'Neolithic Founder Crops' in southwest Asia. Vegetation History and Archaeobotany 32: 475– 499. doi:10.1007/s00334-023-00917-1

2022

- Arranz-Otaegui, A., Pedersen, P. N., Schmidt, A. F., Jörgensen-Lindahl, A., Roe, J., Villemoes, J., Pantos, G. A., & Killackey, K., Identifying the chaîne opératoire of club-rush (Bolboschoenus glaucus [Lam.] S.G.Sm) tuber exploitation during the Early Natufian in the Black Desert (northeastern Jordan). Journal of Archaeological Science: Reports 47. doi:10.1016/j.jasrep.2022.103677
- Jones, M., Richter, T., Rollefson, G., Rowan, Y., Roe, J., Toms, P., Wasse, A., Ikram, H., Williams, M., AlShdaifat, A., Pedersen, P. N., & Esaid, W., The palaeoenvironmental potential of the eastern Jordanian desert basins (Qe'an). Quaternary International 635: 72-82. doi:10.1016/j.quaint.2021.06.023
- Hinz, M., Roe, J., Laabs, J., Heitz, C., & Kolář, J., Bayesian inference of prehistoric population dynamics from multiple proxies: a case study from the North of the Swiss Alps. In NA, NA. NA, pp. NA. doi:10.31235/osf.io/dbcag

2021

Richter, T., Darabi, H., Alibaigi, S., Arranz-Otaegui, A., Bangsgaard, P., Khosravi, S., Maher, L., Mortensen, P., Pedersen, P., Roe, J., & Yeomans, L., The formation of Early Neolithic Communities in the Central Zagros: an 11,500 year old communal structure at Asiab. Oxford Journal of Archaeology 40 (1): 2-22. doi:10.1111/ojoa.12213

My publications reflect a number of ongoing collaborations with domainspecialist colleagues, bringing a data science perspective to addressing multidisciplinary research questions in prehistory.

| 2020 |   | <ul> <li>Khosravi, S., Pedersen, P. N., Alibaigi, S., Roe, J., Heidary Dastenaei, M., Miladi, B., Darabi, H., Richter, T., &amp; Mortensen, P., Archaeological Landscape of Razavar Valley in the Neolithic Period: the survey of the 8th–6th millennium BC in the north of Kermanshah Province. Pazhoheshha-ye Bastan shenasi Iran 26. doi:10.22084/NBSH.2020.21133.2094</li> <li>Nebbia, M., &amp; Roe, J., Landscape Studies. In Gaydarska, B., Early Urbanism in Europe: The Trypillia Mega-Sites of the Ukrainian Forest-Steppe. De Gruyter, pp. 60–107. doi:10.1515/9783110664959-007</li> <li>Martin, L., &amp; Roe, J., The Kheshiya Cattle Skull Ring: Zooarchaeological Analyses. In McCorriston, J., &amp; Harrower, M. J., Landscape History of Hadramawt: The Roots of Agriculture in Southern Arabia (RASA) Project, 1998–2008. Cotsen Institute of Archaeology Press, pp. 275–348. doi:10.2307/j.ctvzgb8n3.20</li> </ul> |
|------|---|---|
| 2019 |   | Henton, E., Roe, J., Martin, L., Garrard, A., Boles, O., Lewis, J., Thirlwall, M., & Jourdon, A-L., Epipalaeolithic and Neolithic gazelle hunting in the Badia of north-east Jordan. Reconstruction of seasonal movements of herds by stable isotope and dental microwear analyses. <i>Levant</i> 50 (2): 127-172. doi:10.1080/00758914.2019.1598764  |
|      |   | Jones et al., 20,000 years of societal vulnerability and adaptation to climate change in southwest Asia. <i>WIREs Water</i> 6 (2): e1330. doi:10.1002/wat2.1330   |
| 2018 |   | Arranz-Otaegui, A., González Carretero, L., Roe, J., & Richter, T., "Founder crops" v. wild plants: Assessing the plant-based diet of the last huntergatherers in southwest Asia. <i>Quaternary Science Reviews</i> 186: 263–283. doi:10.1016/j.quascirev.2018.02.011   |
| 2016 |   | Martin, L., Edwards, Y., Roe, J., & Garrard, A., Faunal turnover in the Azraq Basin, eastern Jordan 28,000 to 9,000 cal BP, signalling climate change and human impact. <i>Quaternary Research</i> 86 (2): 200–219. doi:10.1016/j.yqres.2016.07.001   |
|      |   | Publications (non-peer-reviewed)  |
| 2023 | • | Roe, J., Peer Review Report For: Inglämnlagare: a tool for restructuring Swedish HER record site data for statistical analysis [version 2; peer review: 3 approved]. F1000Research 11 (1370). doi:10.5256/f1000research.157510.r222117  |
| 2016 | • | Roe, J., PIA at 25: A Retrospective. <i>Papers from the Institute of Archaeology</i> 25 (2): p.Art. 16. doi:10.5334/pia.517   |
| 2015 |   | Allentuck, A., Martin, L., & Roe, J., Refuse Disposal in the Early Epipalaeolithic? Preliminary Zooarchaeological Evidence from Kharaneh IV, Eastern Jordan. <i>Bulletin of the Council for British Research in the Levant</i> 10: 67–69. doi:10.1179/1752726015Z.00000000034   |
| 2014 |   | Roe, J., Review of <i>Green Arabia</i> : Human Prehistory at the Crossroads of Continents. <i>Papers from the Institute of Archaeology</i> 24 (1). doi:10.5334/pia.458  |

# **—** Conference presentations

2025

Heitz, C., Ismail-Meyer, K., Aellen, C., & Roe, J., *Leben am See in Zeiten des Klimawandels – Klimaarchäologische Perspektiven auf bronzezeitliche «Pfahlbauten» im zirkum-alpinen Raum.* Presented at the Berner Zirkel für Ur- und Frühgeschichte.

2024

- Heitz, C., Ismail-Meyer, K., Aellen, C., & Roe, J., *Coping with the Cold Climate Change Resilience and Vulnerabilities of Bronze Age Communities during the 3.7 ka 'Löbben' Glacier Advance (ca. 1900–1450 BCE)*. Presented at Climate of the Past and Societal Responses to Environmental Changes (Climpast), Bern, 5–8 June 2024.
- Roe, J. & Hinz, M., *XRONOS as a Resource for Archaeological Chronology in West Asia*. Presented at the Digital Ancient Near Eastern Studies (DANES) Conference, Virtual, 4–6 December 2024.
- Heitz, C., Ismail-Meyer, K., Aellen, C., & Roe, J., Climate Change Resilience and Vulnerabilities of Waterfront Communities – Mixed Methods Research on 'Pile Dwellings' around the Alps (4000-800 BCE). Presented at the 30th Annual Meeting of the European Association of Archaeologists (EAA), Rome, 28-31 August 2024.
- Hinz, M. & Roe, J., ESTER: Estimation of the prehistoric population of Eurasia based on a large number of records. Presented at the World Neolithic Congress, Şanlıurfa, 4–8th November 2024.
- Roe, J. & Hinz, M., *Estimating the prevalance of post-agricultural population declines through the global radiocarbon record.* Presented at the World Neolithic Congress, Şanlıurfa, 4–8th November 2024.

2023

- Roe, J. & Hinz, M., *XRONOS: open chronometric data from archive to infrastructure*. Presented at Digital Archaeology Bern 2023.
- Roe, J., Modelling the range of wild plants and crop progenitors in the Late Epipalaeolithic–Early Neolithic Levant. Presented at Digital Archaeology Bern – Ancient West Asia.
- Roe, J., *More than just porridge: old materialism and the macroarchaeology of the Neolithic Revolution.* Presented at the 13th International Congress on the Archaeology of the Ancient Near East, Copenhagen.

2022

- Hinz, M. & Roe, J., *Zoom and Enhance: high-resolution reconstruction of macroscale processes with Bayesian hierarchical models.* Presented at the European Association of Archaeologists (EAA) Annual Meeting, Budapest, 31 August 3 September.
- Roe, J., Are we what we eat? The Southwest Asian 'Neolithic Revolution' as macroarchaeological theory. Presented at the European Association of Archaeologists (EAA) Annual Meeting, Budapest, 31 August 3 September.
- Roe, J. & Hinz, M., XRONOS: challenges in building a global open repository for chronometric data. Presented at the European Association of Archaeologists (EAA) Annual Meeting, Budapest, 31 August – 3 September.

See my homepage for abstracts and posters.

- Roe, J., *Out with the new, in with the old: recent advances in palaeoecological modelling with open data.* Presented at the Association for Environmental Archaeology Spring Meeting 2021: Open Science Practices in Environmental Archaeology, Oxford.
- Roe, J., *A revised radiocarbon chronology of Ganj Dareh*. Presented at the 53rd Annual Meeting of the Canadian Archaeological Association, 'Ganj Dareh Then and Now: Integrating Past and Current Research'.
- Roe, J., *Nonequilibrium dynamics in models of human palaeoecology*. Presented at Computer Applications & Quantitative Methods in Archaeology (CAA), Limassol (Virtual).
- Batist, Z. & Roe, J., *Open archaeology: a survey of collaborative software engineering in archaeological research.* Presented at Computer Applications & Quantitative Methods in Archaeology (CAA), Limassol (Virtual).
- Roe, J., *Computational models of chronology and regional settlement in the Epipalaeolithic–Neolithic Zagros (20000–6000 BP)*. Presented at the 'Revisiting the Hilly Flanks: the Epipalaeolithic and Neolithic periods in the eastern Fertile Crescent' conference, Copenhagen.
- Pedersen, P. N., Roe, J., & Richter, T., *Free foragers? A case for transient social inequality at Epipalaeolithic Shubayqa, eastern Jordan.* Presented at the 12th International Congress on the Archaeology of the Ancient Near East, Bologna.
- Roe, J., *On uncertain ground: modelling human palaeoecology in the Azraq basin, eastern Jordan, 24,000–8,000 BP.* Presented at the 12th International Congress on the Archaeology of the Ancient Near East, Bologna.

2018

2017

2016

- Roe, J., \*\*Gorram shiny!\* An accessible interface for reproducible landscape archaeology with R and fieldwalkr\*. Presented at Computer Applications & Quantitative Methods in Archaeology (CAA), Kraków.
- Richter, T., Arranz Otaegui, A., Jones, M., Roe, J., & Yeomans, L., *Environmental Crisis and Societal Collapse: Was the Younger Dryas a significant factor in triggering the transition from the Palaeolithic to the Neolithic in the Levant?*. Presented at 'Culture in Crisis: Flows of Peoples, Artifacts and Ideas', the 14th International Conference on the History and Archaeology of Jordan (ICHAJ 14), Florence.
- Arranz-Otaegui, A., Roe, J., Pantos, G. A., Santana, J., Araus-Cabrera, J. L., Le Roux, P., & Richter, T., *Locally available or imported? Identifying the provenance of Natufian plant food and fuel resources at Shubayqa 1 (northeastern Jordan)*. Presented at the 18th conference of the International Workgroup for Palaeoethnobotany (IWGP), Lecce.
- Buffington, A., Olson, K., Roe, J., Al Kathiri, A. A., McCorriston, J., Over Mountains and Through Woods: survey results and preliminary spatial analysis of the 2018 field season of the Ancient Socio-Ecological Systems in Oman (ASOM) project. Presented at the 53rd Seminar for Arabian Studies, Leiden
- Roe, J., & Richter, T., *Mutable mobilities: 15,000 years of nomadic settlement in the Qa'Shubayqa*, *eastern Jordan*. Presented at the 53rd Seminar for Arabian Studies, Leiden.
- Pantos, G. A., & Roe, J., A halfway house: open source tools for tidy photographic and 3D data management between the field and the archive.

  Presented at Computer Applications & Quantitative Methods in Archaeology (CAA), Kraków.
- Roe, J., *The Q Continuum: open source GIS tools for paperless field survey.*Presented at Computer Applications & Quantitative Methods in Archaeology (CAA), Kraków.
- Roe, J., Pedersen, P. N., Khosravi, S., *A survey of early prehistoric sites in the Razavar Valley (Kermanshah, Iran)*. Presented at the British Association for Near Eastern Archaeology (BANEA) annual conference, Liverpool.
- Roe, J., *Is there anything R can't do?*. Presented at the Computer Applications and Quantitative Methods in Archaeology (CAA) conference, Tübingen.
- Roe, J., fieldwalkr: an R package for spatial sampling and field survey simulation. Presented at the Landscape Archaeology Conference (LAC), Newcastle & Durham.
- Richter, T., Arranz-Otaegui, A., Boaretto, E., Jones, M., Roe, J., & Yeomans, L., Reconstructing Environmental Impacts on Late Pleistocene and Early Holocene Societies in the Marginal Zone of the southern Levant: A Case Study from Shubayqa. Presented at the XVIII UISPP World Congress, Paris.
- Roe, J., *The Zagros in Prehistory: geography, chronology, demography.* Presented at the British Association for Near Eastern Archaeology (BANEA) annual conference, Liverpool, 2019, and the KU Archaeology Day.
- Martin, L. & Roe, J., *The Complexities of Mammalian Body Size Change in Late Pleistocene to Holocene Southern Levant*, 35 years on. Presented at 'From the Mediterranean to the Atlantic: themes in European zooarchaeology', Museum of Natural History and Science, Lisbon.
- Roe, J., A greener model of palaeoenvironments in the eastern Levant.

  Presented at Unravelling the Palaeolithic, Southhampton.

| 2015 | • | Allentuck, A., Martin, L., Roe, J., <i>Domestic maintenance practices in the Early Epipalaeolithic of the Jordanian steppe</i> . Presented at the 12th International Symposium of the ICAZ Archaeozoology of Southwest Asia and Adjacent Areas Working Group (ASWA), Groningen. |
|------|---|---|
|      |   | Roe, J. & Martin, L., <i>Open season: modelling prehistoric wildlife dynamics in Epipalaeolithic and Neolithic Jordan</i> . Presented at the British Association for Near Eastern Archaeology (BANEA) annual conference, London.  |

Allentuck, A., Roe, J., Martin, L., Macdonald, D., & Maher, L., Zooarchaeological evidence for domestic maintenance in the Early Epipalaeolithic. Presented at the British Association for Near Eastern Archaeology (BANEA) annual conference, London.

# Software & datasets rpaleoclim: R interface for paleoclimate data 2023 open-archaeo: a list of open source archaeological software and 2023 resources Zenodo era: R package for years with an era 2022 c14: R package for tidy radiocarbon data 2020 rintchron: R interface to IntChron 2020 stratigraphr: R package for archaeological stratigraphy and 2020 chronological sequences evoarchdata: datasets from studies of cultural evolution in 2020 archaeology Data from Uerpmann 1987, The Ancient Distribution of Ungulate 2019 Mammals in the Middle East, TAVO A27

Zenodo

2019

2018

Trypillia mega-sites of the Ukraine

fieldwalkr: R package for spatial sampling and survey simulation

Archaeology Data Service

I am also an active contributor to a number of other open source software and open data projects.

# Field projects

2019 Field director Jordan Shubayga Archaeological Project Field archaeologist 2018 Oman Ancient Socioecological Systems in Oman (ASOM) project **Supervisor** 2018 **♀** Iran Razavar Valley Survey Field archaeologist & supervisor 2018 Jordan Shubayqa Archaeological Project 2015 Field archaeologist 2015 Jordan Kharaneh IV Project Field archaeologist & supervisor 2014 • Ukraine Tripillia Mega-Sites Project 2012 **Supervisor** 2012 Bulgaria Mirkovo Project **Trainee** 2009 • Ukraine Tripillia Mega-Sites Project 2007 Trainee England York Archaeological Trust

In the field, I specialise in site prospection, intrasite survey, digital recording and GIS.

I was responsible for the survey component Shubayqa Archaeological Project (2018– 2019), including designing the research strategy, planning and obtaining permits, and directing teams on the ground.

# Grants & scholarships

**Young Researchers' Promotion Fund** 

And other internal funds

University of Bern

•

 $7300~\mathrm{CHF}$  for 'Digital Archaeology Bern 2023'

•

Small grants for conference and workshop participation

2019 • Project grant

Danmarks Frie Forskningsfond

- "Connecting the Dots: Reconfiguring the Indo-European family tree"
- Named applicant. PI: Dr. Thomas Olander

# Fieldwork grant 2018 Det Danske Institut i Damaskus • 115,000 DKK to support archaeological fieldwork in eastern Jordan (2019) • Co-applicant with Dr. Tobias Richter 2018 Fieldwork grant H. P. Hjerl Hansen Mindefondet for Dansk Palæstinaforskning • 50,000 DKK to support archaeological fieldwork in eastern Jordan (2019) · Co-applicant with Dr. Tobias Richter **Project grant** 2016 C. L. Davids Fond og Samling • "Tracking Cultural and Environmental Change: the Epipalaeolithic and Neolithic in the Seimarreh Valley, central Zagros" • Named applicant. PIs: Prof. Peder Mortensen, Dr. Tobias Richter, Dr. Hojjat Darabi **Institute of Archaeology Award** 2015 **♀** London UCL Institute of Archaeology • Individual grant (£1888) to participate in archaeological fieldwork in eastern **Research Students' Conference Grant** 2014 London Centre for the Ancient Near East (LCANE) **PhD Studentship** 2013 Leverhulme Trust • Part of Research Project Grant RPG-2013-223 **Research-preparation Masters Award** 2012 Arts and Humanities Research Council Teaching & public engagement **Guest lecturer** 2024 **♀** University of Copenhagen • "Theory and Method in Near Eastern Archaeology" (CCRS) • "Advanced Archaeological Methods" (Saxo Institute) Instructor 2024 University of Pisa "R for Archaeologists" winter school 2020 • For five years I have led an intensive two-day workshop on data visualisation in

R for archaeologists

Promoting computational tools, and especially R, in archaeology has been a particular focus; I have experience in teaching at a range of levels, as well as informally mentoring students and colleagues.

**Course lecturer** 2023 **♀** University of Bern Institute of Archaeological Sciences 2022 • Lead instructor on BA-/MA-level courses GIS in Archaeology and Statistical Methods for Archaeological Data Analysis (SMADA) • Recognised for "Excellence of Teaching" for SMADA 2023 (top 14% of courses in the Faculty of Humanities according to student satisfaction) Course lecturer 2021 Department of Cross-Cultural and Regional Studies 2018 • University of Copenhagen • BA: "Practical Archaeology 1" (Arkæologisk praksis 1, HNAB0100FU), "Practical Archaeology 2" (Arkæologisk praksis 2, HNAB0102EU), "Science and Theory of Science" (Videnskabsteori, HTOR0102FU) • KA: "Theory and Method in Near Eastern Archaeology" (HNAK0101EU), "Environments and landscapes in the archaeological record of southwest Asia" (HNAB0102FU), "Neolithic to Early Urban Periods in the Near East" (HNAK0102EU), "Project-based course" (HNAK0100FU) Workshop organiser 2020 Department of Cross-Cultural and Regional Studies **♀** University of Copenhagen • Led an intensive two-day workshop on mobile GIS for linguistic field research **Postgraduate Teaching Assistant** 2016 **♥** University College London UCL Institute of Archaeology 2015 • ARCL2028 Research & Presentation Skills Tutor 2016 Schools in London The Brilliant Club 2014 • Designed and delivered a university-style tutorial course for primary and high school students **Student Volunteer** 2015 Maths and Archaeology workshop 

◆ Petrie Museum of Egyptian Archaeology • Outreach event for high school students organised by Dr. Alice Stevenson (Petrie Museum) and Dr. Luciano Rila (UCL Mathematics) and supported by the London Mathematical Society



## Peer review Journals • Journal of Open Source Software: #4335, #5811 • Journal of Open Archaeology Data (2) • PCI Archaeology: #333 • Advances in Archaeological Practice (1); Open Archaeology (1); Open Quaternary (1); PLOS ONE (1) Member of Review College 2023 **CAA** International 2020 • Reviews completed: CAA2025 (4); CAA2024 (4); CAA2023 (3); CAA2022 (7); CAA2021 (8); CAA2020 (3) **Conference organiser** 2023 Bern Digital Archaeology Bern 2023 Session organiser 2021 **♀** Limassol CAA2021 • S17: Tools for the Revolution: developing packages for scientific programming in archaeology? Session organiser 2019 Kraków CAA2019 • S06: Recent advances in spatial statistics for archaeology **Senior Editor** 2016 **♥** University College London Papers from the Institute of Archaeology 2014 Postgraduate Student Representative 2016 **♥** University College London UCL Institute of Archaeology 2014 • Communications Committee • Publications Committee **Editorial Assistant** 2014 **♀** University College London Papers from the Institute of Archaeology 2013 **Conference organiser** 2014 **Q** London Postgraduate Zooarchaeology Forum (PZAF) **Professional memberships Managing Artificial Intelligence in Archaeology** current 2025 • European COST Action 23141

• Management Committee Representative for Denmark

I am especially active in CAA International and its special interest group for scientific scripting languages.



## Workshop & seminar participation 2024 **MOSAICchrono Summer School ♀** European Archaeological Centre, Bibracte International Summer School · Invited guest lecturer · Led workshop on "radiocarbon and aoristic modelling" "Scientific Scripting Languages in Archaeology" Roundtable 2019 Kraków CAA2019 "Connecting the Dots" 2018 • Christian-Albrecht University of Kiel International Summer School • Development of the R package moin: Modeling Interaction in Landscape Archaeology Shubayqa Project Workshop 2017 **♀** University of Copenhagen Workshop **Near East Climate Workshop** 2016 University of Nottingham Workshop



