



Instructor: Ben Davies (b.davies@auckland.ac.nz ext. 88570)

Meeting times: Mondays 4PM – 6PM in Arts 1, Room 209

Thursdays 3PM – 4PM in HSB East, Room 259

Office hours: Mondays 3PM – 4PM and Thursdays 2PM – 3PM in HSB East, Room 717

COURSE OBJECTIVES

The business of doing archaeology is changing in the wake of the digital revolution. The exponential growth of datasets accumulated, stored and transmitted using digital technology presents new opportunities and challenges for studying the past. Digital technology offers new ways to preserve and protect archaeological objects and build richer historical narratives, requiring investments in new skills and infrastructure. And as people spend more and more time online or in virtual worlds, the question of how our heritage in the digital realm is to be studied and curated becomes more and more relevant.

The aim of this course is to explore the transformative role of digital technology in archaeology and heritage. Along the way, this course will introduce you to a range of techniques used in archaeology and heritage. Most of the practical work will take place during the Thursday lab sessions. Assignments will help to reinforce and build on these skills. Throughout the course, readings will be assigned which will provide context for the methods we will be examining, and classes will typically include some discussion of the readings. These will be used to critically assess different methods and approaches to digital archaeology and heritage.

ASSESSMENT

You will be assessed in this course on four components: an original research project in digital archaeology (40%), a short proposal for that project (10%), a set of lab exercises (40%), and discussion participation marks (10%). Please submit assignments via Canvas. Multiple files should be zipped together before submission.

Research Project (40%) and Proposal (10%)

For the primary course assessment, you will be contributing a unique project in digital archaeology or heritage. Your project will address a problem, answer a question, or make an argument. Your project

should exhibit your ability to find or create data, manipulate and explore it, critically consider the tools you are using, and communicate about your work. Your final project should engage with **at least one open source dataset and/or open source software platform**, either one identified in the course or through your own discovery, and your work should be at least nominally publishable on the web.

Final projects will be accepted in many forms as long as they adhere to the guidelines above. Some projects may be more case-oriented, demonstrating how a particular method works using a given case study. Such a project should be treated as a 'proof-of-concept', emphasising the interaction between data and method. Others might be aimed more at methodological and theoretical considerations. Such projects would emphasise the communication and display of ideas concerning digital archaeology. Examples of these different kinds of projects can be found on Canvas.

Discussions of ideas for final projects should commence by Week 4 and be well sorted out by Week 6 or 7. By the end of the holiday break (DUE 29 APRIL), you will need to have developed a short proposal (worth 10%) indicating your research topic, identifying the methods and datasets you intend to use, and identifying expected outcomes. **It is very important that you discuss your project with the course convener before completing your proposal.** Word counts will vary substantially from project to project depending on the topic and method. The documentation itself should be a minimum of 2000 words.

FINAL PROJECT DUE 20 JUNE

Lab assignments (40%)

Four lab assignments, each worth 10% of your final grade, will be used to develop skills introduced in the weekly lab sessions. Lab writeups are meant to be less than 1000 words excluding any references you may use. More detailed information about assignment expectations can be found on Canvas.

Lab Assignment 1: Visualising open archaeological data

Large scale databases of radiocarbon data, often at the scale of countries or continents, are becoming more and more commonplace. Summed radiocarbon data are used increasingly to argue for long-term patterns in human palaeodemography, and are becoming points of departure for large scale regional prehistories. In this first lab assignment, you will locate open regional radiocarbon datasets on the web, clean and organize the data, calibrate and sum the radiocarbon dates, and compare histograms of raw data and plots of summed radiocarbon data curves. DUE 18 APRIL

Lab Assignment 2: Networking the past

Networks are everywhere: from the roads and public transit systems we use to get around every day to the chains of academic thought that connect your work back through history's greatest minds. Networks have influenced human lives for as long as we have been on the planet, and archaeological evidence for past networks can be found in material objects that connected and continue to connect different people, places, events or things in time and space. In this second lab assignment, you will be using material evidence in the form of Roman coins to assess connectivity between counties in Wales during the Roman period. DUE 6 MAY

Lab Assignment 3: Augmented Reality in Heritage

We use oral traditions, historical documents, and archaeological inferences to weave narratives about the past, and all of these are couched within and contorted by our own worldviews. Oftentimes, as particular stories become dominant in heritage discourse, the contextual information about those worldviews gets lost to time. This is especially true when it comes to stories about doing the archaeology itself: the voices of the actors involved an archaeological excavation often do not make it into site reports, and are rarely considered when building grander narratives. In this assignment, you will be using mobile phone geolocation to build a low-friction augmented reality, drawing on accounts from excavation blogs to create a multi-temporal user experience. DUE 3 JUNE

Lab Assignment 4: Minecrafting the Past

In a recent publication, Brackin (2014) argued that video games occupy a space between purely authentic experiences, which are “realistic or believable”, and purely valid experiences, which are imbued with “epic meaning”. He contends that the open gameplay environment of *Minecraft* operates in such a way that the authenticity of the experience actually lends itself to invite user-driven validation. Rather than the players operating as resistant agents within a highly constrained validation device (the story), players are invited to make their own by virtue of the nearly endless opportunities to express agency and manipulate the game environment. In this assignment, you will making and documenting changes to a historical replica in *Minecraft*, drawing on information from historical and contemporary documents, with the aim of increasing its validity through further engagement with archaeological authenticity. DUE 10 JUNE

Discussion Participation (10%)

Many of the topics being discussed in class are relatively new, but they are built on a long history of theoretical and methodological research in archaeology To obtain full marks for this assessment, you will need to identify two published case studies exemplifying the topic under discussion and share them during class discussions. You will be marked based on the quality of the research identified, the relevance of the case study to our discussion, and your ability to summarise the main points and integrate them in discussion about the assigned readings. A word of warning: as the course progresses, the approaches under study become more and more recent, and the number of high-quality case studies diminishes. **It is advisable not to wait until the end of the course to choose your case studies.**

Please note that plagiarism or the submission of assignments that are not the original work of the student **will not be tolerated under any circumstances**. The University policy on academic honesty and plagiarism can be found here: <https://www.auckland.ac.nz/en/about/teaching-learning/policies-procedures.html#fc0a5d466bf7da39d05596915c1d2ec0>

SOFTWARE

This course is committed to introducing skills that you can continue to build beyond the class room; as such, much of the software we will use is open source and freely available. For the first half of the course we will be using the free software package R (<http://www.r-project.org>), which is a flexible software package used for statistical computing. At other times, we will make use of other free platforms such as Blender (<https://www.blender.org>) for 3D manipulation and Twine (<http://twinery.org>) for creating non-linear online narratives. At the end the course, we will be making use of Minecraft (<http://minecraft.net>) to examine the concept of archaeogaming, along with the free platform World Painter (<http://www.worldpainter.net>) to integrate geospatial data. The University will supply Minecraft accounts to students, so please do not purchase it for use in class. Further platforms will be discussed in lectures, and final project may make use software not covered, please consult with the convenor for more information.

COURSE OUTLINE

| Week | Week of | Lecture topic | Lab topic |
|-----------------|---------|--|--------------------------------------|
| 1 | 29-Feb | Introduction: What is Digital Archaeology? | Introduction to R |
| <i>Readings</i> | | Bevan 2015, Huggett 2015, Allerhand 2011 | |
| 2 | 7-Mar | Surveying the Data Deluge | Data Visualisation in R |
| <i>Readings</i> | | Arbuckle et al. 2015, Bonacchi et al. 2014, Kansa in prep. , Kintigh et al. 2015. | |
| 3 | 14-Mar | Spatial Data and Digital Reconstructions | Cleaning Data with R |
| <i>Readings</i> | | McCoy and Ladefoged 2009, Opitz and Limp 2015, Llobera 2015, Ladefoged et al. 2011, Bevan et al. 2013 | |
| 4 | 21-Mar | Approaches to 3D Modelling | 3D Models in Blender |
| <i>Readings</i> | | Green et al. 2014, De Reu et al. 2014 | |
| 5 | 28-Mar | NO LECTURE: EASTER BREAK | Open Lab: Work on projects |
| <i>Readings</i> | | Esptein 2008 | |
| 6 | 4-Apr | Systems, Complex Systems, and Models | Network Analysis Basics in R |
| <i>Readings</i> | | Kohler 2012, Lake 2014, Premo 2007, Doran 1970, Brantingham 2003 | |
| 7 | 11-Apr | The Connected Past: Archaeological Networks | Constructing Networks from Data in R |
| <i>Readings</i> | | Brughmans 2013, Weingart 2011, Mills et al. 2013 | |
| | 18-Apr | NO LECTURE: MID-SEMESTER BREAK | NO LAB: MID-SEMESTER BREAK |
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| 8 | 25-Apr | NO LECTURE: ANZAC DAY | Open Lab: Work on projects |
| <i>Readings</i> | | Marwick 2016 | |
| 9 | 2-May | Digital Heritage and Digital Humanities | Introduction to Twine |
| <i>Readings</i> | | Richardson 2013, Brown and Nichols 2012, Heppler 2012, Limp et al. 2011 | |
| 10 | 9-May | Augmented and Virtual Reality | Augmented Reality with Twine |
| <i>Readings</i> | | Pujol-Tost 2015, Morgan 2009, Eve 2012 | |
| 10 | 16-May | Playing the Past: Archaeogaming | Minecrafting the Past |

| <i>Readings</i> | | Chapman 2013, Reynolds 2013, Brackin 2014, New Scientist 'Digital Trash' | |
|-----------------|--------|---|---------------------------------------|
| 11 | 23-May | Toward a Digital Past: Recording and Preservation of the Digital Record | Building Past Landscapes in Minecraft |
| <i>Readings</i> | | Rozenweig 2012, Ngata et al. 2012, UNESCO Digital Heritage Charter | |
| 12 | 30-May | Archaeology and Heritage in the Information Age: Questions and Maybe Some Answers | Open Lab: Work on projects |

COURSE READINGS

Weekly readings listed in **bold** in the course outline are required readings, others are optional. Readings can be accessed from the reading list on Canvas.

Allerhand M. (2011) A tiny handbook of R. Heidelberg: Springer.

Arbuckle B. S., Kansa S. W., Kansa E., Orton D., Çakırlar C., Gourichon L., Atici L., Galik A., Marciniak A., Mulville J., Buitenhuis H., Carruthers D., De Cupere B., Demirergi A., Frame S., Helmer D., Martin L., Peters J., Pöllath N., Pawłowska K., Russell N., Twiss K. and Würtenberger D. (2014) 'Data Sharing Reveals Complexity in the Westward Spread of Domestic Animals across Neolithic Turkey', PLoS ONE, 9(6). doi: 10.1371/journal.pone.0099845.

Bevan A. (2015) 'The data deluge', *Antiquity*, 89(348), pp. 1473–1484. doi: 10.15184/aqy.2015.102.

Bevan A., Crema E., Li X. and Palmisano A. (2013) 'Intensities, interactions and uncertainties: some new approaches to archaeological distributions', in Bevan A. and Lake M. (eds) *Computational approaches to archaeological spaces*. Walnut Creek, California: Left Coast Press, pp. 27–53. Available at: <http://site.ebrary.com/lib/auckland/Doc?id=10774989>.

Bonacchi C., Bevan A., Pett D., Keinan-Schoonbaert A., Sparks R., Wexler J. and Wilkin N. (2014) 'Crowd-sourced Archaeological Research: The MicroPasts Project', *Archaeology International*, 17, pp. 61–68. doi: 10.5334/ai.1705.

Brackin, A. 2014. Building the case for the authenticity vs. validity model of videogame design. In *Understanding Minecraft: Essays on Play, Communities, and Possibilities*, N. Garrelts, Ed. Jefferson, NC: McFarland & Co., pp. 191-20.

Brantingham P. J. (2003) 'A Neutral Model of Stone Raw Material Procurement', *American Antiquity*, 68(3). doi: 10.2307/3557105.

Brown D. and Nicholas G. (2012) 'Protecting indigenous cultural property in the age of digital democracy: Institutional and communal responses to Canadian First Nations and Maori heritage concerns', *Journal of Material Culture*, 17(3), pp. 307–324. doi: 10.1177/1359183512454065.

Brughmans T. (2013) 'Thinking Through Networks: A Review of Formal Network Methods in Archaeology', *Journal of Archaeological Method and Theory*, 20(4), pp. 623–662. doi: 10.1007/s10816-012-9133-8.

Chapman A. (2013) 'Is Sid Meier's Civilization history?', *Rethinking History*, 17(3), pp. 312–332. doi: 10.1080/13642529.2013.774719.

De Reu J., De Smedt P., Herremans D., Van Meirvenne M., Laloo P. and De Clercq W. (2014) 'On introducing an image-based 3D reconstruction method in archaeological excavation practice', *Journal of Archaeological Science*, 41, pp. 251–262. doi: 10.1016/j.jas.2013.08.020.

Doran J. (1970) 'Systems theory, computer simulations and archaeology', *World Archaeology*, 1(3), pp. 289–298. doi: 10.1080/00438243.1970.9979448.

Epstein J. (2008) 'Why Model?', *Journal of Artificial Societies and Social Simulation*, 11(4). Available at: <http://jasss.soc.surrey.ac.uk/11/4/12.html>.

Eve S. (2012) 'Augmenting Phenomenology: Using Augmented Reality to Aid Archaeological Phenomenology in the Landscape', *Journal of Archaeological Method and Theory*, 19(4), pp. 582–600. doi: 10.1007/s10816-012-9142-7.

Green S., Bevan A. and Shapland M. (2014) 'A comparative assessment of structure from motion methods for archaeological research', *Journal of Archaeological Science*, 46, pp. 173–181. doi: 10.1016/j.jas.2014.02.030.

Heppler J. (no date) 'What Is Digital Humanities?' Available at: <http://whatisdigitalhumanities.com/>.

Huggett J. (2015) 'A Manifesto for an Introspective Digital Archaeology', *Open Archaeology*, 1(1). doi: 10.1515/opar-2015-0002.

Kansa E. (no date) 'Click Here to Save Archaeology.' Available at: <https://ekansa-pubs.github.io/click-here-to-save-archaeology/>.

Kintigh K. W., Altschul J. H., Kinzig A. P., Limp W. F., Michener W. K., Sabloff J. A., Hackett E. J., Kohler T. A., Ludäscher B. and Lynch C. A. (2015) 'Cultural Dynamics, Deep Time, and Data Planning Cyberinfrastructure Investments for Archaeology', *Advances in Archaeological Practice*, 3(1), pp. 1–15. doi: 10.7183/2326-3768.3.1.1.

Kohler T. A. (2012) 'Complex systems and archaeology', in Hodder I. (ed.) *Archaeological Theory Today*. Polity Press. Available at: <http://auckland.ebib.com.ezproxy.auckland.ac.nz/patron/Read.aspx?p=1643805&pg=218>.

Ladefoged T. N., McCoy M. D., Asner G. P., Kirch P. V., Puleston C. O., Chadwick O. A. and Vitousek P. M. (2011) 'Agricultural potential and actualized development in Hawai'i: an airborne LiDAR survey of the leeward Kohala field system (Hawai'i Island)', *Journal of Archaeological Science*, 38(12), pp. 3605–3619. doi: 10.1016/j.jas.2011.08.031.

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Llobera M. (2012) 'Life on a Pixel: Challenges in the Development of Digital Methods Within an "Interpretive" Landscape Archaeology Framework', *Journal of Archaeological Method and Theory*, 19(4), pp. 495–509. doi: 10.1007/s10816-012-9139-2.

Marwick B. (2016) 'Computational Reproducibility in Archaeological Research: Basic Principles and a Case Study of Their Implementation', *Journal of Archaeological Method and Theory*. doi: 10.1007/s10816-015-9272-9.

McCoy M. D. and Ladefoged T. N. (2009) 'New Developments in the Use of Spatial Technology in Archaeology', *Journal of Archaeological Research*, 17(3), pp. 263–295. doi: 10.1007/s10814-009-9030-1.

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Morgan C. L. (2009) '(Re)Building Çatalhöyük: Changing Virtual Reality in Archaeology', *Archaeologies*, 5(3), pp. 468–487. doi: 10.1007/s11759-009-9113-0.

Ngata W., Ngata-Gibson H. and Salmond A. (2012) 'Te Ataakura: Digital taonga and cultural innovation', *Journal of Material Culture*, 17(3), pp. 229–244. doi: 10.1177/1359183512453807.

Opitz R. and Limp W. F. (2015) 'Recent Developments in High-Density Survey and Measurement (HDSM) for Archaeology: Implications for Practice and Theory*', *Annual Review of Anthropology*, 44(1), pp. 347–364. doi: 10.1146/annurev-anthro-102214-013845.

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Pujol-Tost L. (no date) 'Pixel vs Pigment. The goal of Virtual Reality in Archaeology | Savage Minds.' Available at: <http://savageminds.org/2016/01/11/pixel-vs-pigment-the-goal-of-virtual-reality-in-archaeology/>.

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Rosenzweig R. (no date) 'Scarcity or Abundance? Preserving the Past in a Digital Era.' Available at: <http://chnm.gmu.edu/essays-on-history-new-media/essays/?essayid=6>.

'The Archaeology of Digital Abandonment: Online Sustainability and Archaeological Sites' (2014) *Present Pasts*, 6(1). doi: 10.5334/pp.58.

'The changing shape of sharing: digital materiality and moral economies | Discover Society' (no date). Available at: http://discoversociety.org/2015/03/01/the-changing-shape-of-sharing-digital-materiality-and-moral-economies/?utm_content=buffer2fe&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer.

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Weingart S. (2011) 'Demystifying Networks.' Available at: <http://www.scottbot.net/HIAL/?p=6279>.

'What digital trash dumped in games tells us about the players | New Scientist' (no date). Available at: <https://www.newscientist.com/article/dn28505-what-digital-trash-dumped-in-games-tells-us-about-the-players/>.