

## Research Article



# The future of archaeology, interdisciplinarity and global challenges

Sarah Kerr\* 

\* Department of Archaeology, University of Sheffield, UK (✉ [sarah.kerr@sheffield.ac.uk](mailto:sarah.kerr@sheffield.ac.uk))

Understanding of the past can inform our approach to tackling a range of global challenges. Yet the inclusion of archaeologists and, more generally, those scholars engaged in studies of the past, is highly limited in most large, problem-oriented, interdisciplinary research projects, such as those supported by funding under Horizon 2020—the European Commission’s major research and innovation programme. This article examines the interdisciplinary context of archaeological research and funding, and proposes potential ways forward to ensure that such work is fully integrated into projects supported under the next programme, Horizon Europe (2021–2027). In this way, archaeologists can contribute to and influence societal change.

Keywords: Horizon 2020, interdisciplinarity, funding environment, arts and humanities research

## Introduction

Archaeological research has an intrinsic value in the creation of new knowledge and the development of innovative research methods. As well as enriching scholarship of the past, archaeological research—and the closely related disciplines of anthropology, history and heritage studies (referred to as ‘archaeology’ henceforth for brevity)—provides scope for informing our understanding of current problems and societal approaches to future solutions. Through archaeological research we can therefore address global-scale issues, develop problem-oriented research agendas and help to tackle a range of challenges confronting contemporary society. This important historical perspective has been encouraged by major funding bodies, particularly within an interdisciplinary context. An analysis of the grants awarded by funding bodies, however, reveals two clear limitations: disciplines offering a historical perspective are persistently under-represented; and when such disciplines are included, they are poorly integrated into wider interdisciplinary research. This article discusses the future potential of archaeology in tackling current societal issues. It does so with particular reference to the European Commission’s (EC) Societal Challenges, which form a central pillar in the current research and innovation framework, Horizon 2020 (H2020), although reference is also made to funding in other contexts where similar problems can be discerned. It then goes on to suggest possible ways of enhancing the role of archaeology in approaching future Global Challenges, as framed within the forthcoming EC research and innovation programme, Horizon Europe (2021–2027).

---

Received: 6 June 2019; Revised: 10 October 2019; Accepted: 17 October 2019

© Antiquity Publications Ltd, 2020

## Funding global challenges

As practitioners of archaeological research, we recognise the benefits of understanding the long-term trajectories of past societies when addressing contemporary global problems, be they formulated as EC Societal Challenges, United Nations' (2018) Sustainable Development Goals, or Grand Challenges in the United States (Grand Challenges 2003–2016). An in-depth understanding of the past can provide unique insights into contemporary problems and, more crucially, this can inform their potential solutions (Kintigh *et al.* 2014: 6).

Archaeologists have become increasingly aware of how our discipline can be used to approach present-day problems, a recognition that is reflected in a shift of focus. From the long-established disciplinary concentration on reconstructing the past—a focus that, of course, persists—a broader exploration of the processes underlying cultural transformation and change has emerged (Kintigh *et al.* 2014: 6). This shift, or development, in emphasis is demonstrated in Kintigh *et al.*'s (2014) identification of a series of 'Grand Challenges' for archaeology. The 25 challenges, or areas of contemporary concern to which archaeologists might usefully contribute, were collated through crowd-sourcing, as inspired by the National Science Foundation's SBE 2020 initiative (2011). They are not concerned with reconstructing specific historical events. Rather, they focus on the dynamics of long-term cultural processes and the operation of human-natural systems (Kintigh *et al.* 2014: 7). This shift does not represent a sudden disregard for understanding the past through material culture, but rather is representative of a new recognition of the essential role of archaeological research, or what Kintigh *et al.* call "the facts of the past" (2014: 7), in approaching the problems of today.

Archaeological research has informed our understanding of contemporary society, both the many general developments around the globe, as well as social and cultural problems found in specific contexts. This includes climate change, geological developments and the implications of the Anthropocene not only since the industrial revolution (often cited as the beginning of the Anthropocene), but from the Pleistocene onwards (e.g. Van der Noort 2011; Braje 2016; Scarre 2016; Zalasiewicz & Waters 2016). This is a particular strength of archaeology: the long-lens perspective. This perspective derives from the knowledge of societies over time that sets contemporary global challenges in context and is used to gain a better understanding of today's world (Scarre 2016: 286).

The EC recognises the importance of including archaeological research when tackling societal challenges. In Regulation (EU) No. 1291/2013 of 11.12.2013 of the European Parliament and of the Council, which established the Horizon 2020 (H2020) funding programme, the EC (2013: 163) states that disciplines that explore changes over time and space must have a "leading role" in H2020 to enable "exploration of imagined futures". The description of Societal Challenge 6, *Europe in a changing world: inclusive, innovative and reflective societies*, requests specifically an understanding of Europe's "history and the many European and non-European influences [to] enable a look to the future through the archive of the past" (European Commission 2013: 164). Likewise, the European Research Council (funded by the European Commission) recognises that both archaeological and anthropological exploration endeavours to show how the "evolutionary path of *Homo sapiens* has influenced the human past and present, and how it could potentially influence human

culture and future social organisation” (European Research Council 2012: 2). By framing present-day problems within the perspective of past events, we are faced with a “golden opportunity [...] to demonstrate the relevance of our discipline” (Scarre 2016: 285).

## **Inter-discipline and interdisciplinarity**

Each of the global or Europe-wide issues, whether EC Societal Challenges, United Nations’ Sustainable Development Goals, or Grand Challenges in the United States, are multi-dimensional, with social, economic and often physical components. It is widely recognised, therefore, that their mitigation requires an integrated approach drawing on the expertise of a variety of disciplines. Indeed, problem-oriented funding calls seeking interdisciplinary solutions rarely request specific disciplinary involvement. The inclusion of social sciences and humanities (SSH), however, is stressed at various points in H2020 literature. This is of particular interest to archaeologists, who often straddle humanities and the social and natural sciences. Regulation No 1291/2013 states that, in H2020, “social sciences and humanities will be mainstreamed as an essential element of the activities needed to tackle each of the societal challenges to enhance their impact” (European Commission 2013: 121). The EC reinforced its agenda in 2017, stating that future research programmes will, “by design, fully integrate social sciences and humanities (SSH). Where missions concern the big social questions of our time [...] SSH researchers will initiate and lead them” (European Commission 2017a: 16).

This emphasis on an interdisciplinary approach is stressed across national and international funding calls. The British Academy (2016a: 9), for example, notes that interdisciplinarity has an “essential role in addressing complex problems and research questions posed by global social challenges”. The Global Research Council (a federation of national funders, including the U.S. National Science Foundation and the Chinese Academy of Sciences) have included “[a] stronger focus on interdisciplinary research” in their Statement of Principles (Global Research Council 2017: 2). The apparent value of an interdisciplinary approach can be discerned relatively consistently across the research sector, with EC Research Commissioner Carlos Moedas stating in a 2017 speech that “the most exciting and groundbreaking innovations are happening at the intersection of disciplines” (see also: Bruce *et al.* 2004; Hetel *et al.* 2015; Wernli & Darbellay 2016; British Academy 2016a; Birnbaum *et al.* 2017), with the key supposed benefit of providing “increased rigour [...] to one’s understanding of one’s own discipline” (British Academy 2016a: 3).

For archaeology, interdisciplinarity is “not just valued, but necessary” (British Academy 2016b: 10) for the enhanced understanding of archaeological sites and materials. A further incentive—and one of equal importance—is that interdisciplinarity is “now much more in favour with research funders” (Richards 2009: 2), even an “omnipresent requirement in most grants/fellowships” (Ion 2017: 178). The response to both of these motivations can be observed in the proliferation of interdisciplinary discussions taking place at international conferences. ‘Interdisciplinary’ was mentioned 220 times in the European Association of Archaeologists (EAA) conference abstracts in 2018—more than double its occurrence in the 2016 conference abstracts (European Association of Archaeologists 2016, 2018).

The praise for interdisciplinarity should come as no surprise to those conducting archaeological research. With roots in antiquarianism, archaeology has continually adapted to incorporate discussions and approaches from a variety of disciplines. From its origins and by its nature, archaeology is interdisciplinary. During the mid twentieth century, archaeology further expanded its boundaries, gaining an “extreme multidisciplinary nature” (Sinclair 2016). This has not been without challenges, as demonstrated by discussions around the very definition of ‘archaeology’ and its future viability (e.g. Kristiansen 2009, 2014; Bintliff & Pearce 2012; Sinclair 2016). Does interdisciplinarity, for example, complicate the definition of archaeology as a homogeneous discipline (Kristiansen 2009: 3)? Has it morphed into a group of specialist but separate ‘archaeologies’ (Sinclair 2016)? The different traditions of archaeological research entrenches this ambiguity. In the USA, archaeology grew from anthropology (Kristiansen 2009: 22), but is arguably transforming into an independent social science with epistemic ties to numerous other disciplines, including the natural sciences (Kintigh *et al.* 2014: 6). Conversely, in Europe, archaeology has traditionally been linked more strongly to both history and natural sciences, particularly geology (Kristiansen 2009: 23). Despite this, archaeology is more frequently considered as part of the STEM subjects in the USA than in Europe. Furthermore, archaeological theory has developed to bridge the divide between the dualities of positivism-hermeneutics, explanation-interpretation and objectivism-subjectivism. Archaeology strives for balance between science-oriented and narrative-oriented research, quantitative and qualitative research and positive and speculative knowledge (Criado-Boado 2016), as ambitious to achieve though this balance may be.

This situation risks a crisis of identity for archaeologists. The translucent nature of the discipline’s boundary, however, can be considered its inherent strength. Research by Sinclair (2016) quantifies this interdisciplinarity, emphasising the “extraordinary range of academic disciplines from which archaeology constructs its intellectual base”. Indeed, a UK higher education qualification in archaeology may be gained as either Bachelor of Arts or of Science. Archaeology in higher education sits within the broad fields of the humanities, and the social and natural sciences, utilising theories and practices from all, and allowing degree courses with different slants and emphases. Whether this placement in or ‘between’ SSH is one of comfort or advantage is a matter of ongoing discussion (see for example, Wylie & Chapman 2016; Ion 2017).

Sinclair (2016) has quantified the *components* of archaeology’s interdisciplinary value. Firstly, the broad range of disciplines from which it draws, and secondly, the time depth of the secondary sources that are used. This interdisciplinary nature has resulted in, or is sustained by, ambiguity concerning the boundaries of the discipline. This reflects the *open-endedness* of archaeological exploration and the subsequent dynamic narratives created, as well as reflecting the range of theoretical and methodological approaches.

## Archaeology and global challenges

Archaeology has inherent interdisciplinarity, and funders deem this quality as crucial to tackling global challenges. Closer inspection of the specific calls within H2020, however, shows that an archaeological approach is almost absent, as indeed are archaeologists in the calls funded thus far. The H2020 programme is divided into: 1) Excellent Science; 2) Industrial

Leadership; and 3) Societal Challenges, and within the latter two pillars, there are 83 topics ‘flagged’ by the funding body as SSH themes (Birnbbaum *et al.* 2017: 10). Of these 83 topics, only 27 per cent of consortia partners who secured grants were from SSH disciplines (Figure 1), securing 22 per cent of the estimated total budget flagged for the SSH (Birnbbaum *et al.* 2017: 10).

The low representation of SSH in the projects tackling societal challenges is worrisome, and only more so when that total is disaggregated to consider those disciplines with a historical perspective. Archaeology is not listed as a discipline in its own right, but, rather, is included in humanities and arts, which in total comprise just four per cent of the total SSH participants (or 1.08 per cent of total participants) (Birnbbaum *et al.* 2017: 15). Considering archaeology’s broader scope beyond arts and humanities, the total number of experts from related disciplines comprise 11 per cent of the total SSH participants (or 2.97 per cent of total participants). This includes experts from history (four per cent); anthropology and ethnology (two per cent); and human geography and demography (one per cent). While these data are far from absolute (physical geography, for example, is classified as a natural science, and is thus not included in the analysis), they reveal the degree to which the ‘long lens’ required in approaching societal challenges has not been applied (Figure 1).

The low rate of SSH inclusion in H2020 is unlikely to surprise anyone active in archaeological or other SSH research. The culture, traditions and values in SSH and arts disciplines often privilege basic blue-sky research over applied, and individual approaches over collaborative. This may make it difficult to find appropriate common ground between the aims and methods of SSH and those of other disciplines, such as STEM, in which the basis of evidence and argument may be more grounded in the empirical or experimental, rather than the theoretical or other source-led approaches. This epistemic mismatch often leads to superficial engagement of SSH within large-scale, collaborative research projects. This is the second limitation of interdisciplinarity in funding schemes that address societal challenges: poor-quality *integration* when collaboration does occur (Birnbbaum *et al.* 2017: 12–13). Research evaluating interdisciplinarity indicates that SSH practitioners are more likely to be in auxiliary roles of supporting developments in STEM, described as “subordination-service mode” by Barry *et al.* (2008: 28). This inequality derives from what Marginson (2017) describes as “an imbalance between on one hand STEM, on the other hand the core social sciences and humanities, in social esteem, policy, funding and often in the extent of provision”.

This is the paradox of interdisciplinarity (Woelert & Millar 2013). While it is encouraged and considered vital in tackling present and future global issues, it continues to be both poorly supported and poorly rewarded. The Australian Research Council, for example, has discovered that proposals with a higher degree of interdisciplinarity have a lower probability of receiving funding (Bromham *et al.* 2016). Interdisciplinarity is in a structurally and terminologically weakened position. The very term positions it as supplementary to disciplinary power structures, existing only between the established spaces, with no place of its own. This terminological idiosyncrasy is furthered by a lack of understanding of the different approaches to researching beyond individual disciplines. While inter-, multi- and transdisciplinarity each provide different benefits and limitations, ‘interdisciplinarity’ is often used as a catch-all term. This occurs particularly in Western Europe, at times in an unreflective and interchangeable

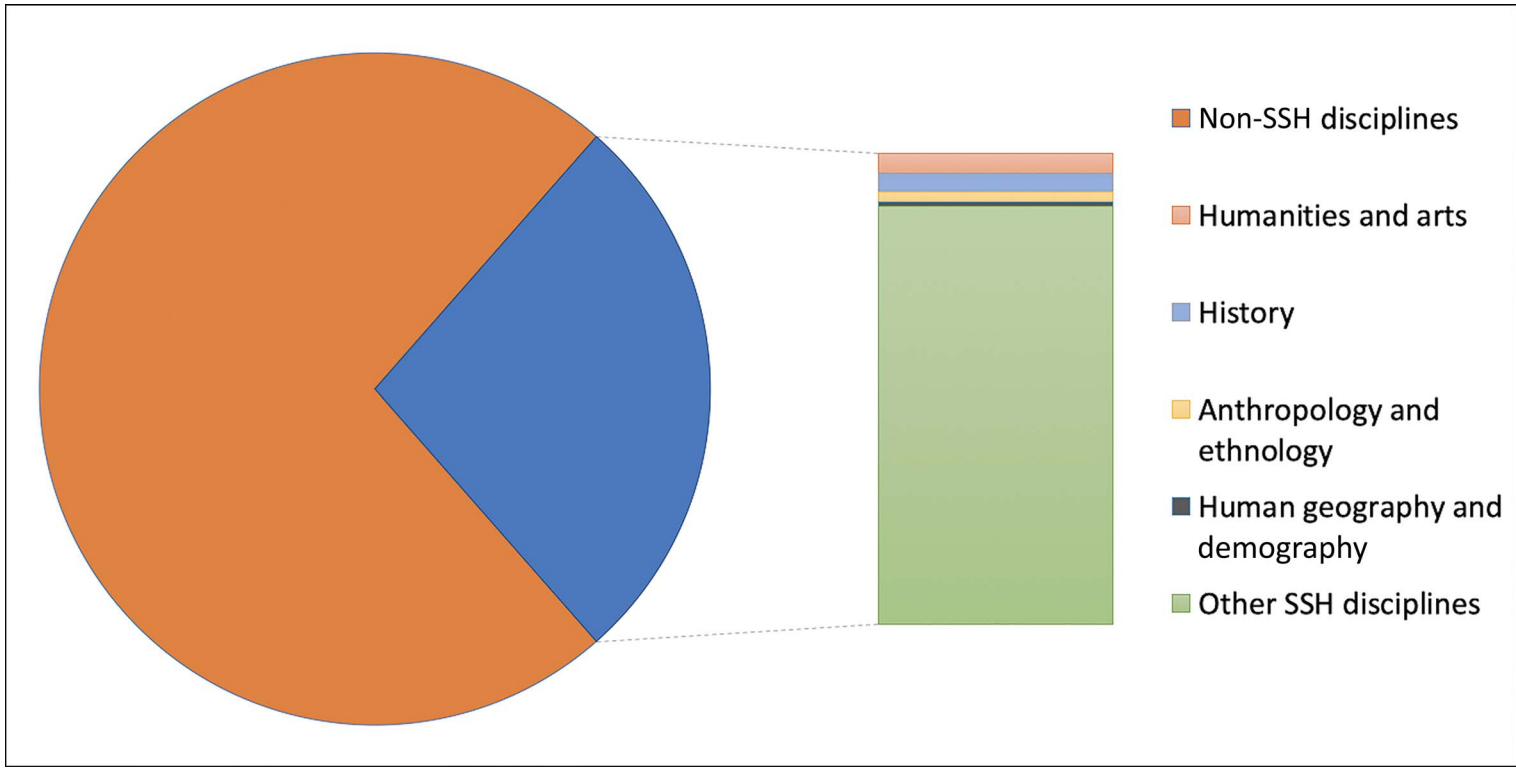


Figure 1. Involvement of social sciences and humanities (SSH) partners in SSH projects and the representation of disciplines within that which have a historical perspective (data source: Birnbaum et al. 2017: 10 & 24).

fashion, as transdisciplinarity, in name at least, is not yet mainstream in the research environment as is evident in its absence in funding calls (Lyll *et al.* 2015: 151).

An interdisciplinary approach involves a problem defined within a disciplinary context, and then the integration of knowledge, theories or methods from different disciplines into the research approach. This is precisely the type of research approach exemplified by archaeology. Transdisciplinarity, however, stems from a research question defined and situated *between* disciplines, with relevant scholars approaching it together and as equal partners. The use of interdisciplinarity as an all-encompassing term to describe a broad spectrum of activities beyond one discipline can refer to a number of situations. It may, for example, describe one researcher using publications from a different area of research; or a group of humanists, scientists and policy-makers addressing together a major societal issue; or multi-discipline projects in an emerging area, such as the digital humanities. Describing as interdisciplinary all research methods beyond mono-disciplinarity, however, creates obvious problems, and the use of multi-, cross-, trans- and post- as prefixes is not necessarily useful. Indeed, some scholars have remarked that “arcane debates” surrounding terminology are “unhelpful” (Rylance 2015: 314).

It is over 50 years since C.P. Snow (1959) lamented the cultural schism between the disciplinary groups of sciences and humanities—coining their “Two Cultures” in the process. Archaeology could provide the required bridge, its strength lying in its utilisation of theories, methods, practices and interpretations from both cultures; this is the foundation of archaeological reasoning. Archaeology is interdisciplinary in nature, and when the transdisciplinary approach is required (arguably of emerging importance and a type of well-integrated interdisciplinarity), the tools for integration between disciplines exist already within archaeology. This strength is almost unique in a higher education system characterised by disciplinary ‘silos’ (geography also rests between disciplinary spaces, arguably more comfortably than archaeology).

## **Discussion: the future of archaeology**

The inherent interdisciplinary nature of archaeology is coupled with a long-lens perspective on a diverse range of subjects, including human health, climate change, economic risk and resilience, violence *vs* cooperation, ecological sustainability, urbanisation and globalisation, inequality and identity (Kintigh *et al.* 2014: 6; British Academy 2016b: 9). The relevance of archaeological evidence to these major topics, however, often still has to be argued for (Scarre 2016: 286). Archaeology, for example, featured only twice in a 1150-page report on climate change, impact, adaption and vulnerability published by the Intergovernmental Panel on Climate Change report (Field & Barros 2014). The subsequent 562-page report on global warming contains no reference to archaeology or archaeological research at all (Masson-Delmotte *et al.* 2018). In our modern world of social media, shrinking space and greater globalisation, some groups are less inclined to consider present and future issues in terms of long-term historical processes (Mizoguchi 2015: 17). By including archaeological research in tackling societal challenges, we introduce an interdisciplinary *and* long-lens perspective, thus allowing better-informed decisions about and actions on present-day society, while informing predictions of social and cultural responses to change (Kintigh *et al.*

2014: 6). It is this crucial combination that gives archaeology “a unique perspective to tackling global challenges” (British Academy 2016b: 9).

While the degree of interdisciplinarity within funding schemes for global challenges remains poor, the EC continues to encourage and build upon collaborative efforts established in previous framework programmes. A key feature of problem-oriented research in the future is not only interdisciplinarity, but better integration that is balanced and high quality in a deliberate departure from tokenism and superior-inferior relationships. The EC has stated that “the integration of several disciplines, especially in the humanities, remains a serious challenge in H2020” (Birnbaum *et al.* 2017: 23), reiterating its earlier commitment stating that interdisciplinarity is a “consistent priority” (European Commission 2017a: 14). There has, however, been opposition to the EC’s commitment to interdisciplinarity, with a partner stating in the H2020 interim evaluation that there is already sufficient interdisciplinarity, and that the approach risks research losing its focus (European Commission 2017b: 43). Likewise, archaeologists, along with some researchers across all disciplines, see limitations—even “epistemic anxiety”—in forcing greater interdisciplinarity (Wylie & Chapman 2016: 15). The perceived “difficulties and frustrations” (Richards 2009: 2) concerning interdisciplinarity from archaeologists include the “gamble” (Holas-Clark 2009: 1) and “compromise” (Capper 2009: 10) of investing time to acquire the skills necessary to understand specialist reports from other disciplines. This, in turn, can reduce the time and scope of research. A competent understanding of the results, methodologies and analyses from other disciplines is crucial, otherwise we risk entrenching poor integration in interdisciplinary spaces. Ion (2017: 179) warns of the dangers of poorly integrated interdisciplinarity, such as the incorporation of data from ‘hard’ sciences without a comprehensive historical and cultural context. Indeed, this warning may be warranted based on the integration report by Birnbaum *et al.* (2017). The experience of practising, developing and shaping interdisciplinarity, a comprehension of its benefits and limitations and an understanding of the need for balance between historical contexts and new scientific datasets, however, is exactly the strength of archaeology. The EC and future global-challenge-focused funding schemes can learn from the interdisciplinary balance achieved in much archaeological research (and the mistakes made along the way), and the commitment to occupying the space between and within SSH. To have our voices heard in shaping society and to increase our contribution to tackling global problems, archaeological practitioners must be more accepting of the interdisciplinary nature of archaeological research, and actively enhance, promote and support this particular strength. Archaeology requires a strong commitment to the “amalgamation of Humanities and Science, of narrative and scientific knowledge” (Criado-Boado 2016: 152).

The need for interdisciplinarity will not disappear. Contributions from across SSH “are indispensable to address the most pressing global challenges in today’s world” and well-balanced integration between disciplines “is the only way to make sure that the [EC funding] delivers the economic and societal impact that Europe needs” (Birnbaum *et al.* 2017: 9). The World Economic Forum (2016: 20) reports that the top 10 skills that employers will seek in 2020 will include competencies such as critical thinking, emotional intelligence and creativity—skills that are enhanced through interdisciplinary teaching and development. Interdisciplinary practitioners therefore have a vital role in equipping the next generation of researchers with the combination of skills required to address future complex problems.



The potential for archaeology is clear: it can play a central role in forming the aptitudes that are required to address global issues, even those beyond the current scope of the discipline.

While many archaeologists may agree with the arguments made here, this article calls for action to ensure that the strengths of archaeological research can be recognised by potential funders and collaborators, and for its inclusion in the major funding schemes such as Horizon Europe. There are two approaches to securing the role of archaeological research: in more actively influencing the nature of the EC's framework programme, and in stressing the importance of archaeology's almost unique nature as both interdisciplinary and long-lens. Regarding the first approach, it has been demonstrated here that although the EC desires a long-lens perspective to be incorporated into research, the record of funding is yet to follow this aim. This is due to a multifaceted system of barriers to well-integrated interdisciplinarity, including the very wording of the H2020 funding programme, and is, in part, historical. In its current form, the EC framework evolved from the previous technical funding body, and the STEM-specific wording persists. The EC, however, can be lobbied. If we want more opportunities for archaeology within the framework, we must argue for its inclusion. The EC encourages involvement from experts in wording calls and selecting topics. We should not expect them to change without input from the archaeology community across Europe. The EC is publicly funded, so must be responsive to pressure for change. Although private funding groups are naturally different, the bodies within the funding system—regardless of their sources of income—respond to and influence each other. The EC takes inspiration from national funding bodies and their strands, and influences them in turn. Encouraging both top-down and bottom-up change is therefore essential in terms of envisioning places for archaeological research within major funding calls.

Secondly, archaeologists need to be more active in stressing why this input is essential in approaching societal challenges. After all, every societal challenge has at least one dimension that can be informed by an historical perspective. This approach may seem unsatisfactory. Why, for example, does this effort fall to archaeologists? Archaeologists are best placed to achieve this as, by the very nature of their training, they are experts in interdisciplinarity. If better integrated interdisciplinarity, or rather true transdisciplinarity, is what is needed to be considered relevant to funding bodies, then the experience of excelling in this space should pave the way, demonstrating to other disciplines and to funding bodies how to overcome the challenges facing inter- and transdisciplinarity.

## **Conclusion**

Archaeology's inherent interdisciplinarity creates challenges and opportunities for our discipline, and the supposed limitless benefits of even greater interdisciplinarity should continue to be questioned. The knowledge of past human creativity, values and activities generated by archaeologists through interdisciplinary research, however, has resulted in an exceptional evidence base that should be more fully harnessed. In combination with the long-lens perspective that is core to the discipline, archaeology offers a powerful prism through which global challenges can be viewed.

For archaeology to become influential in societal change, this unique perspective must be fully and coherently integrated within interdisciplinary projects. This requires the proactive

development of its interdisciplinary properties and competencies by practitioners, as well as better integration methods supported by funding bodies. Achieving a balance between scientific datasets and the historical and cultural narratives must become central in engaging with other disciplinary approaches and methods. We should avoid attempts to delimit archaeology, but instead promote the benefits of a translucent disciplinary boundary, and occupy fully the (un)comfortable space in and between the humanities and social and natural sciences.

The role of archaeology in tackling societal challenges should not be underestimated. At a time when local, national, European and global identities—all of which are tied to the past in complex ways—are being negotiated in a shifting European Union, the natural interdisciplinarity and long lens of archaeology are more crucial than ever.

## References

- BARRY, A., G. BORN & G. WESZKALNYS. 2008. Logics of interdisciplinarity. *Economy and Society* 37(1): 20–49. <https://doi.org/10.1080/03085140701760841>
- BINTLIFF, J. & M. PEARCE (ed.). 2012. *The death of archaeological theory?* Oxford: Oxbow. <https://doi.org/10.2307/j.ctvh1dk87>
- BIRNBAUM, B., P. KERAUDREN, T. STROM & T. VAVIKIS. 2017. *Integration of social sciences and humanities in Horizon 2020: participants, budget and disciplines: 2<sup>nd</sup> monitoring report on SSH-flagged projects funded in 2015 under the societal challenges and industrial leadership*. Brussels: European Union. <https://doi.org/10.2777/097678>
- BRAJE, T.J. 2016. Evaluating the Anthropocene: is there something useful about a geological epoch of humans? *Antiquity* 90: 504–12. <https://doi.org/10.15184/aqy.2016.32>
- British Academy. 2016a. *Crossing paths: interdisciplinary institutions, careers, education and applications*. London: British Academy. Available at: <https://www.britac.ac.uk/interdisciplinarity> (accessed 30 June 2020).
- 2016b. *Reflections on archaeology*. London: British Academy. Available at: <https://www.britac.ac.uk/reflections-on-archaeology> (accessed 30 June 2020).
- BROMHAM, L., D. RUSSELL & X. HUA. 2016. Interdisciplinary research has consistently lower funding success. *Nature* 534: 684–87. <https://doi.org/10.1038/nature18315>
- BRUCE, A., C. LYALL & R. WILLIAMS. 2004. Interdisciplinary integration in the Fifth Framework Programme. *Futures* 36: 457–70. <https://doi.org/10.1016/j.futures.2003.10.003>
- CAPPER, M. 2009. The practical implications of interdisciplinary approaches: research in Anglo-Saxon East Anglia, in Z.L. Devlin & C.N.J. Holas-Clark (ed.) *Approaching interdisciplinarity: archaeology, history and the study of early medieval Britain, c. 400–1100* (British Archaeological Reports British series 486). Oxford: Archaeopress.
- CRiado-Boado, F. 2016. Tangled between paradigms in the neo-baroque era. *Archaeological Dialogues* 23: 152–58. <https://doi.org/10.1017/S1380203816000192>
- European Association of Archaeologists. 2016. *Programme volumes 1 and 2*. Available at: [https://www.nearch.eu/IMG/pdf/ea\\_-\\_vilnius\\_-\\_full\\_programme\\_-\\_2016.pdf](https://www.nearch.eu/IMG/pdf/ea_-_vilnius_-_full_programme_-_2016.pdf) (accessed 30 June 2020).
- 2018. *Programme volumes 1 and 2*. Available at: [https://www.e-a-a.org/EAA2018/Programme.aspx?WebsiteKey=35414e88-a032-42d3-9e9b-d34ff524c79a&hkey=9ba73740-1809-47c0-bd96-13055196e087&Program\\_ContentCollectionOrganizerCommon=3#Program\\_ContentCollectionOrganizerCommon](https://www.e-a-a.org/EAA2018/Programme.aspx?WebsiteKey=35414e88-a032-42d3-9e9b-d34ff524c79a&hkey=9ba73740-1809-47c0-bd96-13055196e087&Program_ContentCollectionOrganizerCommon=3#Program_ContentCollectionOrganizerCommon) (accessed 30 June 2020).
- European Commission. 2013. *Regulation (EU) no. 1291/2013 of 11.12.2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020: the Framework Programme for Research and Innovation (2014–2020) and repealing decision No 1982/2006/EC*. Brussels: Official Journal of the European Union. Available at:

- [http://ec.europa.eu/research/participants/data/ref/h2020/legal\\_basis/fp/h2020-eu-establact\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/legal_basis/fp/h2020-eu-establact_en.pdf) (accessed 30 June 2020).
- 2017a. *LAB—FAB—APP: investing in the European future we want*. Brussels: European Commission. Available at: [http://ec.europa.eu/research/evaluations/pdf/archive/other\\_reports\\_studies\\_and\\_documents/hlg\\_2017\\_report.pdf](http://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/hlg_2017_report.pdf) (accessed 30 June 2020).
- 2017b. *Commission staff working document in-depth interim evaluation of Horizon 2020*. Brussels: European Commission. Available at: [https://ec.europa.eu/research/evaluations/pdf/archive/h2020\\_evaluations/swd\(2017\)220-in-depth-interim\\_evaluation-h2020.pdf#view=fit&pagemode=none](https://ec.europa.eu/research/evaluations/pdf/archive/h2020_evaluations/swd(2017)220-in-depth-interim_evaluation-h2020.pdf#view=fit&pagemode=none) (accessed 30 June 2020).
- European Research Council. 2012. *Anthropology and archaeology ERC projects*. Brussels: European Research Council. Available at: [http://www.gppq.fct.pt/h2020/\\_docs/brochuras/erc/erc\\_special\\_edition\\_archeology.pdf](http://www.gppq.fct.pt/h2020/_docs/brochuras/erc/erc_special_edition_archeology.pdf) (accessed 30 June 2020).
- Global Research Council. 2017. *Statement of principles: the dynamic interplay between fundamental research and innovation*. Bonn: Global Research Council. Available at: [https://www.globalresearchcouncil.org/fileadmin//documents/GRC\\_Publications/Statement\\_of\\_Principles\\_for\\_The\\_Dynamic\\_Interplay\\_Between\\_Fundamental\\_Research\\_and\\_Innovation.pdf](https://www.globalresearchcouncil.org/fileadmin//documents/GRC_Publications/Statement_of_Principles_for_The_Dynamic_Interplay_Between_Fundamental_Research_and_Innovation.pdf) (accessed 30 June 2020).
- FIELD, C.B. & V.R. BARROS. 2014. *Climate change 2014: impacts, adaptation, and vulnerability*. New York: Intergovernmental Panel on Climate Change. Available at: <https://www.ipcc.ch/report/ar5/wg2/> (accessed 30 June 2020).
- Grand Challenges. 2003–2016. Available at: <https://grandchallenges.org> (accessed 30 June 2020).
- HETEL, L., T. MØLLER & J. STAMM. 2015. *Integration of social sciences and humanities in Horizon 2020: participants, budget and disciplines. Monitoring report on SSH-flagged projects funded in 2014 under the societal challenges and industrial leadership*. Brussels: European Union. <https://doi.org/10.2777/382488>
- HOLAS-CLARK, C.N.J. 2009. The end of Anglo-Saxon furnished burial: an interdisciplinary perspective, in Z.L. Devlin & C.N.J. Holas-Clark (ed.) *Approaching interdisciplinarity: archaeology, history and the study of early medieval Britain, c. 400–1100* (British Archaeological Reports British series 486). Oxford: Archaeopress.
- ION, A. 2017. How interdisciplinary is interdisciplinarity? *Current Swedish Archaeology* 25: 177–98.
- KINTIGH, K.W. *et al.* 2014. Grand challenges for archaeology. *American Antiquity* 79: 5–24. <https://doi.org/10.1073/pnas.1324000111>
- KRISTIANSEN, K. 2009. The name and nature of archaeology, in C. Gosden, B. Cunliffe & R.A. Joyce (ed.). *The Oxford handbook of archaeology*. Oxford: Oxford University Press
- 2014. Towards a new paradigm? *Current Swedish Archaeology* 22: 11–71.
- LYALL, C., L. MEAGHER & A. BRUCE. 2015. A rose by any other name? Transdisciplinarity in the context of UK research policy. *Futures* 65: 150–62. <https://doi.org/10.1016/j.futures.2014.08.009>
- MARGINSON, S. 2017. The case for more liberal arts and science degrees. *University World News* 484. Available at: <http://www.universityworldnews.com/article.php?story=20171123075843679> (accessed 30 June 2020).
- MASSON-DELMOTTE, V. *et al.* (ed.). 2018. *Global warming of 1.5°C: an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Geneva: IPCC, World Meteorological Organization and UNEP
- MIZOGUCHI, K. 2015. A future of archaeology. *Antiquity* 89: 12–22. <https://doi.org/10.15184/aqy.2014.39>
- MOEDAS, C. 2017. *The European Open Science Cloud: the new republic of letters*. Available at: [https://ec.europa.eu/commission/commissioners/2014-2019/moedas/announcements/eosc-summit-european-open-science-cloud-new-republic-letters\\_en](https://ec.europa.eu/commission/commissioners/2014-2019/moedas/announcements/eosc-summit-european-open-science-cloud-new-republic-letters_en) (accessed 30 June 2020).
- National Science Foundation. 2011. *Rebuilding the mosaic: fostering research in the social, behavioral, and economic sciences at the National Science Foundation in the next decade* (National Science

- Foundation NSF 11-086). Arlington (VA): National Science Foundation. Available at: <https://www.nsf.gov/pubs/2011/nsf11086/nsf11086.pdf> (accessed 30 June 2020).
- VAN DER NOORT, R. 2011. Conceptualising climate change. *Antiquity* 85: 1039–48. <http://dx.doi.org/10.1017/S0003598X00068472>
- RICHARDS, J. 2009. Preface, in Z.L. Devlin & C.N.J. Holas-Clark (ed.) *Approaching interdisciplinarity: archaeology, history and the study of early medieval Britain, c. 400–1100* (British Archaeological Reports 486). Oxford: Archaeopress.
- RYLANCE, R. 2015. Grant giving: global funders to focus on interdisciplinarity. *Nature* 525: 313–15. <https://doi.org/10.1038/525313a>
- SCARRE, C. 2016. Editorial. *Antiquity* 90: 283–89. <https://doi.org/10.15184/aqy.2016.61>
- SINCLAIR, A. 2016. The intellectual base of archaeological research 2004–2013: a visualisation and analysis of its disciplinary links, networks of authors and conceptual language. *Internet Archaeology* 42. <https://doi.org/10.11141/ia.42.8>
- SNOW, C.P. 1959. *The two cultures*. London: Cambridge University Press. <https://doi.org/10.1126/science.130.3373.419>
- United Nations. 2018. *Sustainable development goals*. Available at: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/> (accessed 30 June 2020)
- WERNLI, D. & F. DARBELLAY. 2016. *Interdisciplinarity and the 21<sup>st</sup> century research-intensive university*. Leuven: The League of European Research Universities. Available at: <https://www.leru.org/files/Interdisciplinarity-and-the-21st-Century-Research-Intensive-University-Full-paper.pdf> (accessed 30 June 2020).
- WOELERT, P. & V. MILLAR. 2013. The ‘paradox of interdisciplinarity’ in Australian research governance. *Higher Education* 66: 6. <https://doi.org/10.1007/s10734-013-9634-8>
- World Economic Forum. 2016. *The future of jobs: employment, skills and workforce strategy for the fourth industrial revolution*. Cologne & Geneva: International Organization for Public-Private Cooperation. Available at: <http://reports.weforum.org/future-of-jobs-2016> (accessed 30 June 2020).
- WYLIE, A. & R. CHAPMAN. 2016. *Evidential reasoning in archaeology*. London & New York: Bloomsbury.
- ZALASIEWICZ, J. & C.N. WATERS. 2016. Geology and the Anthropocene. *Antiquity* 90: 512–14. <https://doi.org/10.15184/aqy.2016.42>