

# Digital Humanities and Laboratories

Perspectives on Knowledge, Infrastructure  
and Culture

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## **The Promise of Laboratories**

An Introduction to Digital Humanities  
Laboratories in the 21st Century

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# The Promise of Laboratories

## An Introduction to Digital Humanities

### Laboratories in the 21st Century

*Urszula Pawlicka-Deger and Christopher Thomson*

This book is about laboratories in digital humanities, new and intriguing spaces that have emerged within many fields from literature to science and technology studies to architecture. A common image of a laboratory is that of a group of people in white coats gathering in a sterile and controlled room equipped with pipettes, flasks, and other chemical instruments to conduct experiments and perform measurements. But this book is about laboratories of quite another kind. They are rooms where cockroaches are replaced with digital texts and microscopes with multi-core processor computers. They house experimental and exploratory digital research projects, involving collaborations between people with sometimes radically different epistemological backgrounds, research methodologies, and skills. They are, often, sites of intervention and collective imagination engaged in tackling pressing social problems. Re-envisioning and re-conceptualising laboratories for the 21st century has led to “ordinary places” becoming, or being designated as, labs of one kind or another.

In the last decade, we have observed a rapid spread of laboratories into public spaces, cultural institutions, and academic departments, expanding our concept of “laboratory” from a privileged and private site belonging to the sciences to a common space that may span many disciplines in the humanities, social sciences, software engineering, and cultural heritage, among others. The diversity of social labs, galleries, libraries, archives, and museums (GLAM) labs, feminist labs, research software engineering labs, and digital humanities labs is evidence of “permeable or non-existent” boundaries between laboratories and other spaces (Gooday 2008, 783). This popularisation of labs on an unprecedented scale has begun a new chapter in the history of what Robert E. Kohler has called the “systematic, macrosocial history of the lab” (2008, 761). Laboratories have drastically changed their position in the world, along with associated shifts in power between sectors—universities, non-profit organisations, tech industries—public spaces, and academic disciplines. In light of these changes, Graeme Gooday suggested an inclusive approach to laboratory studies. He claimed that theorists now must seek to understand what constitutes a laboratory, “especially in relation to the difficulty of demarcating this scientific space from other less formal sites of the empirical making of new knowledge or new artefacts” (2008, 784).

This book is about laboratories where the humanities meet technology to explore research in a new digital and computational way. These are digital humanities (DH) laboratories, which have been prominent in adapting the precursor science-based models to new purposes. Over the last decade, we have seen a significant increase in the number of DH labs established in the academy and beyond, indicating that there is no single model for a DH lab and that they can have many different forms (e.g. physical, virtual, and distributed), functions (e.g. research, teaching, services, archiving, and collection management), and practices (e.g. building digital resources, conducting text analysis, and producing software). We have also seen growing interest in the concept of a laboratory in the digital humanities, as exemplified by an increasing number of conference panels, seminars and workshops devoted entirely to this new infrastructure (Pawlicka-Deger 2020a). In particular, the panel session “Building the Humanities Lab: Scholarly Practices in Virtual Research Environments” at the Alliance of Digital Humanities Organizations’ conference at King’s College London in 2010 gave rise to many discussions about adapting the science laboratory model for the humanities.

The field of digital humanities has embraced the laboratory as an institutional form that targets a wide range of objectives, from supporting computational or multimedia research methods and teaching to interdisciplinary collaboration, public engagement, and bids for funding. Laboratories in the humanities can alter the nature of humanities research and teaching on multiple levels, holding out the promise of collective discovery and productive disagreement beyond an entrenched model of “disciplinary contempt” (Davidson 1999) that has long been perceived to hamper the humanities collectively. Yet disciplinary divisions persist, and—more importantly—the socio-economic, racial, and gender disparities of the academy continue to shape what can be achieved inside laboratories just as they do elsewhere in the field (Losh and Wernimont 2018; Bordalejo and Risam 2019). Also, during this period, the conceptual resources of software and platform studies, new materialist philosophies and critical media studies have focused our attention upon the materiality and non-human agency of digital systems (Kirschenbaum 2008; Casemajor 2015), showing that these are not merely tools but objects and material practices that situate or “co-constitute” (Malazita, Teboul, and Rafeh 2020) the relation between researchers and the laboratory environment.

When Stanford University invited Jeffrey Schnapp, then Professor of Comparative Literature at Stanford, to develop an initiative that would build bridges between the arts and humanities and the technological revolution unfolding both on the Stanford campus and in the surrounding Silicon Valley in 1999, he proposed a vision for what would later become the Stanford Humanities Lab (SHL) (1999–2009), a laboratory for the digital humanities inspired by the artistic and pedagogical experimentalism of the Bauhaus and Black Mountain College (Birkle and Däwes 2019). The lab combined creative experimentalism from the second half of the 19th century, the counterculture of the 1960s, and the contemporary techno-science innovations of Silicon Valley. The SHL became a forerunner of humanities labs dedicated to merging the approaches of traditional humanities with hands-on experimental practices using digital technologies. The “laboratory

philosophy” developed by SHL constituted a significant reference point for future humanities labs and included the principles of collaboration, co-creation, and team-based experimentation, thereby merging transdisciplinary practice-based research with pedagogy and linking research with public engagement (Hartwig 2011).

Laboratories have for a long time been associated with experimentation and the making of instrumentation and prototypes that become tools for thinking. In digital humanities, reorienting enquiry towards the process of making or “building things” has opened up a long-lasting conversation about integrating critical thinking with making. While the infamous juxtaposition of yacking—a critical thinking process—and hacking—making things—has been challenged by many scholars, such debates have contributed to reshaping digital humanities as a practice of “thinking through building” (Arthur and Bode 2014, 5). In recent years, we have observed the emergence of “critical making” that has given rise to new approaches, such as revealing the operation and manufacture of digital objects through the method of reverse engineering (Jones 2018), critical analysis of data underpinning the research (Mandell 2019), and a systems analysis of humanities infrastructure (Smithies 2017).

The growing calls for infrastructural criticism (Liu 2018), transparency (Noble 2018), data decolonisation (Ricaurte 2019), data feminism (D’Ignazio and Klein 2020), critical modelling (Bode 2020), ethical production (Smithies 2017), and explainability (Berry 2023) demonstrate how digital humanities have become a focal point for critical interrogation of information and knowledge production systems and for the design of alternative socio-technical configurations that can promote social justice and data transparency. The study of laboratories—places where such digital design and creation occurs—can provide important insights into how data-driven knowledge is modelled and produced by researchers. The observation of social, research, and organisational practices within laboratories enables critical forensic perspectives where an artefact is tracked and deconstructed in a way that reveals its innermost details, such as its operation and architecture. The interrogation of DH labs has, therefore, the potential to disclose insights into their production of knowledge, social and organisational functions, and relations to power.

Indeed, questions about the role of laboratories in the digital humanities invoke the tradition of laboratory studies, defined by sociologist Karin Knorr Cetina (1995) as the study of science and technology through direct observation and discourse analysis at the root where knowledge is produced in the scientific laboratory. The ethnographic investigations of laboratories in the 1970s and 1980s by a group of sociologists including Bruno Latour, Steve Woolgar, Karin Knorr Cetina, Michael Lynch, and Harry Collins revealed the complexity of the production of scientific facts within places, instruments, and communities. Laboratory ethnography in science was a seminal movement which opened up new research questions addressed later by historians of science and geographers of scientific knowledge. These extensive studies showed that a lab can become a gateway for understanding how knowledge is constructed and how it gains the power to transform nature and society.

While scientific laboratories have been much discussed, humanists have just begun to explore their own infrastructures and spaces, which have their own specific requirements, management, processes, and types of use. Matthew Kirschenbaum has described digital humanities as “tactical”, both aiming to obtain agency within a highly competitive and constrained academic sphere, yet at the same time genuine in its efforts to expand the theories and methodologies of digital research. Thus far, only a few researchers have discussed labs as institutional structures (Foka et al. 2018; Smithies and Ciula 2020; Pawlicka-Deger 2020a, 2021), situated knowledge practices (Oiva and Pawlicka-Deger 2020), and as “lab discourse” with its wider relevance to popular culture as well as academic knowledge (Wershler, Emerson, and Parikka 2021). Given that laboratories are highly charged in all these ways—epistemologically, culturally, and tactically—it becomes imperative to reflect critically on the institutional, material, and socio-cultural organisation of DH spaces.

This book aims to explore the terms “laboratories”, “digital”, and “humanities” at a deeper level and investigate how their different configurations can provide valuable insight into many critical issues, such as power, labour, and decolonisation. DH laboratories also have more specific identities and specialise in particular perspectives, methods, or issues, including as research software engineering (RSE) labs, computational labs, digital heritage labs, feminist labs, and social labs. By documenting a registry of contemporary DH labs, we aim to interrogate their fluid nature, dynamic variations, and critical imaginaries where power is shifted towards designing a better future based on justice, equality, and sustainability. Facing grand challenges—the Covid-19 pandemic, climate change, disinformation, and racial and gender injustice—there is a sense that laboratories are critical for tackling these issues and navigating the field of DH in the Anthropocene (Nowviskie 2015). As Esteban Romero-Frías and Lidia Bocanegra Barbecho claim in their chapter, “DH laboratories play a fundamental role to connect scientific-humanistic procedure with public commitment”. Yet the chapter by Rachel Fensham, Natalia Grincheva, and Tyne Daile Sumner reminds us that we must be prepared to constantly revise this commitment, for

in the humanities today, this institutional, epistemological, and ideological activation announces the lab’s immediacy as a place of critique, critical analysis, and resistance. In this sense, a lab is always in flux; it “does not emerge out of an epistemically neutral position”.

Through these and other voices, the book argues that greater theorisation of the laboratory and reflection on its implication for humanities, culture, and society remain crucial for understanding its role in informal and public spaces. The global challenges we face are complex and interrelated; therefore, they require active engagement and collaboration from actors representing different perspectives, disciplines, and sectors. Under these conditions, DH laboratories are being re-imagined as an infrastructure of engagement (Pawlicka-Deger 2020b) and as sites for interventions in pressing social challenges. Laboratories have the power to reposition the

humanities in society as they can provide space for the application of humanities knowledge in epistemological and practical experiments and for the transformation of ideas into actions.

Laboratories aspire to bring together digital media with ethics, the humanities with engineering, and institutional structures with culture, and seek a capacity to “raise the world” (Latour 1983). If this is so, what do they promise in the 21st century? How can science and technology studies (STS), infrastructure studies, and feminist and cultural studies inform processes of knowledge creation and become central contributors to the practices and systems within DH labs? How might labs help us to reconfigure research infrastructure alongside, or embedded within, understandings of research as a social practice? How does a DH lab become a site of collaboration between the university, industry, and citizens and a site of critical interrogation of urgent global issues? How can labs be configured to work towards greater racial and gender equity and diversity? In short, how can we design a better DH lab, more attuned to the challenges of today’s world?

### **The Goal and Scope of the Collection**

To address these questions, we propose to discuss the concept of a laboratory in digital humanities from a broad range of perspectives: epistemological, infrastructural, technological, socio-cultural, and critical. The purpose is to make the established discourse of laboratory studies a starting point for reflections on how to interrogate the organisational structures of DH, how to re-imagine a “critical laboratory” with sensitivity towards racial, gender, and indigenous issues, and also to examine what can be offered to STS and other fields interested in laboratories (e.g. media studies, cultural heritage studies, and research software engineering) by analysing labs from new, critical perspectives. We also position this discussion in relation to the ongoing debates in DH, including such directions as critical infrastructure studies, critical digital pedagogy, and the critical university. We argue that laboratory studies, discussed in the next section, is in an excellent position to build on both the theories and knowledge developed in DH and open up new research enquiries.

One of the great strengths of an edited volume is that it can offer a wide breadth of scholarship and we, as editors of this book, wanted to ensure that the range of themes and concerns is determined by the authors, not us. Writing about DH laboratories means different things to different people, and in this plurality and variety of voices, we hope, lies the strength of this collection. The heterogeneity of perspectives has been ensured by gathering contributions from scholars and practitioners from across disciplines and institutions around the world. The book includes voices from Australia, Germany, India, Israel, Italy, Nigeria, Spain, the United Kingdom, and the United States. The authors include established scholars in the DH, heads of DH labs, and researchers working at the intersection of DH, media studies, cultural heritage studies, computer science, research software engineering, and architecture. We hope that those diverse perspectives will prove valuable to scholars engaging with digital, infrastructural, and critical topics within, across, and beyond DH.

The international range of the volume stems from our conviction that investigating DH laboratories must go beyond epistemological and disciplinary debates. Domenico Fiormonte (2014) was among the first to set the research agenda on the “global scene” of digital humanities, arguing that DH is a critical part of “global changes in the production and diffusion of knowledge” (3) where there is “a unique opportunity for DH to overturn traditional scientific practices” (4). It has become increasingly clear that the laboratory is a key site for theoretical and political analyses of digital humanities, as shown in the chapters by Dibyadyuti Roy and Maya Dodd, who are among the scholars to have developed Fiormonte’s claims and emphasised the need for DH to approach global changes to conditions of knowledge through fully theorised and specifically local perspectives. In *Navigating the Global Digital Humanities*, Roopika Risam argued there is “a critical need for sustained theorization of the relationship between local and global scholarship and practice” (2016, 359). Risam further showed how essential it is that such theory is not overdetermined through the global assertion of issues, norms, or values arising from local contexts—particularly the dominant voices of DH from the United States and Europe, where funding for DH infrastructures and projects has been available to a far greater extent than in other regions. Following this advance, Amy E. Earhart suggested that “we need to imagine a global digital humanities that lives in the borderlands, a place of connection and contradiction and, most importantly, a place that does not try to centralize itself” (2018, 358). All this suggests the importance of scrutinising the laboratory through a regionally specific lens while keeping an eye on global issues.

The goals of the volume are therefore manifold, calling for critical reflections on how best to theorise, design, and imagine a laboratory in digital humanities. The list of themes that follows is not exhaustive but is intended to demonstrate that the DH laboratory is a broad and complex topic that needs careful unpacking. The collection, therefore, aims to develop a greater understanding of DH labs by

- Discussing epistemological, organisational, and infrastructural implications of laboratories for scholarly knowledge creation;
- Revealing the ways labs contribute to digital research and pedagogy as they emerge globally, amid varied cultural, epistemic, and scientific traditions;
- Considering how labs lead to the specification of digital humanities, a process that is still ongoing, as well as how they can re-embed digital humanities within a social field;
- Reflecting on how DH labs can be configured to work towards greater racial and gender equity and diversity and how they can mitigate or overcome the hierarchies that may appear there, such as those of technical expertise (“technical” vs “non-technical” roles) and labour practices (precarious employment, gender bias);
- Re-envisioning and imagining a feminist, decolonised, domestic, and critical laboratory that is more attuned to the challenges of the present and future.

The book regards a laboratory as an epistemic infrastructure (Malazita, Teboul, and Rafeh 2020) that draws together and tracks an assemblage of people, technologies, institutions, and cultures. Laboratories are relational, as John Law (2010)

argued, stressing that knowledge is theoretical but is also embodied in the relations between people, machines, and experimental objects. Examining these relations can also bring to the surface issues that are often silenced or marginalised. The authors are therefore not afraid of disclosing cumbersome and difficult knowledge about laboratories that emerged from ideologies of subjugation in colonial India (Roy and Dodd) or were established at an institution shaped by a history of slavery, segregation, and white supremacy (Woodbury, Losh, and Beltrán-Rubio). It is imperative that we trace the historical roots of laboratories as they in turn determine how we constitute, perceive, and imagine places of knowledge creation.

For years, digital humanities have attracted criticism for their claimed connections with Silicon Valley's brand of technological determinism and neoliberalism (Allington, Brouillette, and Golumbia 2016). Laboratories, which may be influenced by tech industry models as well as university research cultures, bring those debates into focus again and call for scholars to reconsider the role of digital humanities in the contemporary world. The authors of the present volume discuss how DH labs can contribute to supporting diversity and inclusion in STEM (Thoni Howard), how they can lead towards changing the structural inequalities that plague universities (Brenner et al.), and how in corporate institutions they can re-appropriate resources for the activation of spaces and ideas with open and novel capabilities (Fensham, Grincheva, and Daile Sumner). DH laboratories are complex socio-technical entities, as James Smithies, Patrick ffrench, and Arianna Ciula argue in their chapter, which can benefit from and support humanistic analysis. It is, therefore, time to bring humanities thinking to laboratory studies and, conversely, to bring laboratory studies to the humanities and introduce the lab as an object and subject of critical enquiry—one that has the potential to reveal much about the complex relationships between knowledge, infrastructure, and culture.

### **Emergent Lab Studies in Digital Humanities**

The main contribution of this collection is to pave the way towards laboratory studies as a new research direction in digital humanities. We aim to show that the laboratory has become an important lens for investigating the development of DH and its connections with science, technology, industry, and society, drawing on interdisciplinary approaches from STS, infrastructure studies, philosophy of technology, feminism, postcolonial studies, and critical digital pedagogy. Laboratory studies can substantially contribute to, and capitalise upon, ongoing debates in DH, including, the interrogation of DH infrastructure and workplaces (Marienberg-Milikowsky, Brenner et al.; Fensham, Grincheva, and Daile Sumner; Ope-Davies, Akinola, and Anowu), the discussion of labour in/visibility and recognition (Smithies, ffrench, and Ciula; Damerow and Laubichler; Woodbury, Losh, and Beltrán-Rubio), the reinforcement of intersectionality and gender equality (Thoni Howard; Sichani et al.), the material production of knowledge (Kleymann; Tolfo et al.), the relationships between the university and citizens (Romero-Frías and Bocanegra Barbecho), the university and industry (Clini et al.; Toscano, Ros Muñoz, and González-Blanco García), and the inclusion of non-Western epistemologies (Roy



and Dodd; Marienberg-Milikowsky; and Ope-Davies, Akinola, and Anowu). It is our hope that these contributions can open up new directions in research within the field of DH, including methodological questions about studying DH knowledge production, the entanglement of human and non-human actors in DH work, the development of lab models transcending geographical, national, and cultural borders, and the design of labs as collaborative, inclusive, and feminist infrastructures.

We argue that laboratory studies can significantly contribute to the social exploration of the field (Borgman 2009; Liu 2013). Digital humanities are increasingly interested in the socio-technical conditions for digital knowledge production and discussions grounded in STS (Nyhan and Flinn 2016; Witmore 2016; Smithies 2017; Noble 2018; D'Ignazio and Klein 2020). Such approaches make digital humanists think more about how they do digital work rather than only what they do. This shift in intellectual concerns is significant because it represents a disciplinary maturity: the move from the endless discussions about the definition and boundaries of the field towards conversations about infrastructural, technological, and social aspects of the co-production of knowledge and meaning in digital humanities. Laboratories have, therefore, become the object of study that can help to disclose and better understand the field's identity, organisation, scholarly practice, and forms of knowledge.

"Lab stories" have appeared as an interesting genre with a focus on exploring the establishment, development, and management of DH labs from the perspective of those who built them (Oiva and Pawlicka-Deger 2020). In a candid way, scholars share stories of successes and failures and opportunities and obstacles related to creating and sustaining a DH laboratory (Cummings, Roh, and Callaway 2020; DeRose and Leonard 2020). These stories about laboratories have the potential to reveal aspects that have been marginalised in the DH debates, including socio-political situatedness (Shah 2019), labour relations (Griffin and Hayler 2018; Graban et al. 2019; Lischer-Katz 2019), and workplace culture (Losh 2018). With this collection, we aim to consolidate the various emerging discussions about laboratories in DH, encourage scholars to engage in the development of their own infrastructures, and bring digital humanists into the interdisciplinary debate concerning the notion of a laboratory as a critical site in the generation of experimental knowledge.

Lab studies in DH can clearly capitalise on the legacy of laboratory studies in STS, but their main aspiration should be to expand this well-established research programme by pushing a laboratory's boundaries to include places and actions that have never been considered previously. The STS approach to laboratory studies may be enriched by the many emerging configurations of labs: research software engineering labs, feminist labs, digital heritage labs, home-based labs, studio-driven labs, and social labs. The authors here are interested in both investigating the multifacetedness of DH laboratories and critically interrogating their institutionalisation, socialisation, politics, and cultures. As James Smithies, Patrick French, and Arianna Ciula argue in their chapter, "[r]ather than being conceived as service units for the delivery and maintenance of corporatised knowledge, DH laboratories should be positioned as radical interventions into the spaces that lie between the

humanities, technology, science, and society”. The promise of the laboratory to interrogate such spaces means also to perceive a laboratory as something more than a lab. As Rachel Fensham, Natalia Grincheva, and Tyne Daile Sumner explain, “to become ‘more than a lab’ is to argue that infrastructure serves the laboratory as an outcome of the interactions between humans, computational agents and physical architecture, and, as importantly, to further the potentiality of dialogue, critique and experimentation”.

### **Overview of the Collection**

This volume is organised into four parts. Part One touches on the following questions: why do we set up DH labs? How does knowledge come to be embedded in digital tools? What are the implications of using software development methodologies for DH knowledge production? How is the emerging role of research software engineers embedded in digital humanities? How does the concept of a laboratory embody the movement from traditional humanities to digital humanities and, going further, how is a laboratory transformed from a room serving experiments in the natural sciences to a place for the humanities enquiry? In this part, the authors present epistemological reflections to explore the connections between science labs and DH labs, reveal human–machine relations in digital work, and study new objects of knowledge resulting from lab-based practices. To this end, they enter into dialogue with the philosophy of technology, techno-feminism, and research software engineering.

Questions of epistemology in the digital humanities have long been framed as a debate about praxis, “building”, or “things” (Ramsay and Rockwell 2012; Endres 2017). Defining the field to a large degree through its practices or methods, this framing has also been an important motivator for defining the boundaries of digital humanities, its relation to critical theory, and its politics (Liu 2012; Nowvskie 2016; Risam 2019). A specific body of work on digital production, particularly within text-based research, has developed theoretical accounts of DH knowledge ranging from anti-realist, “serendipitous” tools for reading (Ramsay 2008) to the substantial examination of issues involved in modelling and annotating humanities texts (Flanders and Jannidis 2015; Ciula and Eide 2017) to debates about knowing through explanatory versus predictive models in literary studies (Da 2019; Underwood 2020). Meanwhile, work on virtual reality and 3D production has extended epistemological questions in DH to include topics such as prototyping (Galey and Ruecker 2010), embodied knowledges through 3D printing (Staley 2017), feminist knowledges in hackerspaces (Burek, Foster, and Fox 2017), or making as “humanistic fabrication” (Boeva et al. 2017).

While key epistemological questions have come into sharper focus, it is only recently that attention has turned to DH laboratories or centres, primarily through related topics such as infrastructure and collaboration. One of the key motivations for this collection is to examine concepts and processes of knowledge production in the context of DH laboratories. Examining a range of approaches from different cultural, theoretical, and geopolitical perspectives can draw out the relations and

tensions between epistemic positions within laboratories and significantly enriches this area of scholarship. In general, these are tensions between what, drawing on Deleuze and Guattari, we could call a *molar* technoculture—those ways in which the DH lab is a tactical endeavour aiming to increase productivity, impact, and profile for the humanities, as opposed to embodying minor knowledges that seek to destabilise, critique, and alter the dominant technoculture. We find this tension being explored when DH labs are conceived as spaces of becoming rather than as merely a physical container of separate people, objects, and computing systems or when postcolonial critique reveals how epistemological claims have been shaped by colonial power relations. Equally, epistemological approaches are important as ways to contest the boundaries of what constitutes humanities research. The chapters in Part One see these different approaches to this tension as being ultimately complementary ways to examine the possibilities of DH labs as “hybridised” labs (Wershler, Emerson, and Parikka 2021) that borrow their typologies from other architectures and infrastructures.

Itay Marienberg-Milikowsky begins this part with a fundamental question “What is the goal of starting a lab?”. In answering this question, he draws on different methods and intellectual traditions of natural science labs. By referring to the Israeli biologist Uri Alon’s thoughts on a laboratory, he presents a nurturing lab model for digital humanities that entails a new perspective on the research process where computational and humanities techniques are integrated. The natural sciences lab is also the starting point for the next chapter by Julia Damerow and Manfred D. Laubichler who describe the transformation of a biology wet lab to a lab with a DH “touch”. This extraordinary case study shows how their lab has moved into a new research area focused on computational studies with big data approaches. The development of a computationally intensive environment has not, however, been easy, and the authors discuss the obstacles in a candid way and share recommendations for overcoming them. They call for more attention to developing new career opportunities in digital humanities, including research software engineering (RSE), which can maximise architecture and code quality and improve the sustainability of careers in the field.

The discussion about institutional support for RSE is further extended by James Smithies, Patrick French, and Arianna Ciula, who propose an epistemological experiment and consider the RSE position within the university through the lens of the philosophy of technology. They ask, provocatively, “what if the space and ethos of the digital lab were thought of as a flat sociality, [that] implies a communitarian relationship between human and technical existence and a corresponding sense of non-hierarchical collective agency?” They propose a socialised model of the DH lab with an eye on the deep conceptual integration of humans with non-human materiality, as well as issues of sustainability and career opportunities. The discussion of epistemological perspectives is carried through the last chapter in this part, which is devoted to the Sussex Humanities Lab, a space framed as an “extended lab” (Wershler, Emerson, and Parikka 2021) with a commitment to interdisciplinarity and intersectionality. Anna-Maria Sichani et al. relate how the Sussex Humanities Lab is resistant to being called a “digital humanities” lab since

this felt too narrow for its range of disciplines and interests. This chapter presents the fascinating story of a lab grounded in its space within the university's distinctive history of radical interdisciplinarity as well as a story about the digital humanities themselves, whose plurality and density of conceptions are difficult to capture in one definition.

In recent years, digital humanities have increasingly drawn on infrastructure studies to grasp more fully the materiality of computational work. The range of topics upon which infrastructure bears—such as social organisation, information flows, inequality, and environmentalism—is enormous and enables us, paraphrasing Shannon Mattern, to “appreciate media as potentially embodied on an urban or even global scale, as a force whose modes, ideologies and aesthetics of operation can be spatialized, and materialized” (2017, xxv–xxvi). More specifically, critical infrastructure studies ([cistudies.org](http://cistudies.org); Liu, Pawlicka-Deger, and Smithies forthcoming) have emerged as a key focus for DH, alongside more established research areas, such as platform studies and media archaeology. Seeking to theorise and contextualise the role of the laboratory as a technical and social space for research and teaching, each chapter in Part Two picks up distinctive threads within the frame of DH infrastructure.

Opening this part, Rachel Fensham, Natalia Grincheva, and Tyne Daile Sumner explore alternatives to the dominant conceptualisation that defines research infrastructures as technical systems and computing hardware. They argue that while computing resources are necessary for DH research, they are not sufficient to enable the humanities to serve its purpose in the 21st century. Drawing on their experience in the Digital Studio at the University of Melbourne, they examine architecture as infrastructure, particularly the ways a physical lab space is also an epistemic and cultural space whose parameters can be reinforced or decentred through an awareness of the values and assumptions about the built environment and the socio-technical interfaces where knowledge is produced, transformed, and disseminated. Their analysis highlights the need to avoid the foreclosure of intellectual horizons as research infrastructure, university strategies, and funding policies increasingly shape the nature of humanities enquiry. The following chapter by Aaron Brenner et al. brings together experiences from six DH labs in the United States to examine how lab infrastructures—spaces, technologies, and funding models—can be sustainable and contribute to diversity and equity in DH. As they show, the laboratory is a site where these aspects of infrastructure and the staff and students who use them are being rapidly re-negotiated. They extend recent work focused on diversity and inclusion in DH (Risam 2019; Kim and Stommel 2018; Liu 2020) by outlining a variety of strategies for improving equity outcomes across the six labs. Their comparative approach enables the authors not only to highlight key issues and approaches but also to take a step further by identifying ways to make DH labs and their wider institutions more accountable to their own equity and diversity policies.

Tunde Ope-Davies (Opeibi), Ayodele James Akinola, and Anthony Elisha Anowu provide an overview of the Centre for Digital Humanities at the University of Lagos, Nigeria, including the establishment of digital research environments through a collaboration with the African Multiple Cluster research initiative at

the University of Bayreuth, as well as local capacity-building DH workshops for students and academics. Africa, like other regions of the Global South, has been severely under-represented in digital humanities; yet this chapter indicates that the development of laboratory spaces is underway and this is an important step for developing digital humanities more broadly. Indeed, the authors note that the “transdisciplinary and collaborative dimensions” of DH labs are especially important in developing economies where resources are scarce.

In the last chapter of Part Two, Rabea Kleymann explores how software prototypes, and the processes of prototyping, are significant for our understanding of knowledge production and relations between researchers and research infrastructure. Extending the discourse on “DH as building” (Ramsay 2013; Endres 2017) in a new theoretical direction, Kleymann investigates the role of prototyping within the epistemic culture of DH and the potential to recast our understanding of the prototype less as a knowledge object and more as a network of relations within a local research project and infrastructural setting. This chapter engages with some similar issues to the chapter by Giorgia Tolfo et al. in Part Three, notably in the way that re-conceiving research through prototyping practices can have positive impacts on the iterative development of research ideas.

Collaboration is a central goal, perhaps the *raison d’être*, for a DH laboratory. Jonathan Arac’s diagnosis that collaboration in the humanities has typically involved “too much shop window, too little laboratory” (1997, 122) may have given encouragement to those setting up DH labs over the past decade, but we should take care not to assume that digital research is inherently more collaborative than any other field of study. There is a risk that digital outputs might be added to Arac’s “shop window” so that it can now be stocked with reflections of the dominant technoculture rather than creating genuine and original collaborative work. Like Arac, Willard McCarty (2012) argues that in digital humanities “collaboration is a problematic, and should be a contested, term” (2). This is especially urgent because digital humanities are concerned with the co-constitution of human and machine, as well as with the work that happens between technical and non-technical members of a research team. Part Three (re)turns to questions of collaboration in DH labs and research groups, exploring various forms of collaboration within and between institutions, communities, and industry in ways that grasp this problem actively and seek to conceptualise it as part of the research process itself.

The first chapter, by Maurizio Toscano, Salvador Ros Muñoz, and Elena González-Blanco García, addresses the concept of knowledge transfer within universities and to and from other sectors and communities. Their lab, LINHD, the Laboratory of Innovation in Digital Humanities at the National Spanish Distance University, makes this focus on external consulting and training effective through a “hybrid” lab model that brings external advisors and industry partners into active roles within their projects. They present case studies that highlight how their focus on “bidirectional” knowledge transfer processes in the areas of natural language processing, cultural heritage, and research policy has produced research with greater impact and applications.

Paolo Clini et al. provide an account of the DHeKalos digital heritage laboratory, an initiative at the Università Politecnica delle Marche that draws on digital humanities, among other specialisations, within the field of digital heritage conservation. Based in a civil engineering and architecture department, and working primarily with heritage institutions and local governments, DHeKalos specialises in digitisation, building educational digital experiences, user behaviour and impact assessment, and education and is perhaps unique in the way it brings together perspectives from DH with other technically oriented heritage conservation disciplines. A notable feature of the case studies presented in this chapter is the use of AI and machine learning. Just as in digital humanities at large, DHeKalos faces some undeniably advantageous applications for machine learning, such as identifying architectural features within spatial point clouds, as well as others that prompt ethical and cultural questions, such as the design of predictive systems for museum visitor experiences.

Giorgia Tolfo et al., in turn, address collaboration in quite a different way to the previous two chapters, offering a conceptual approach to questions of how DH researchers should develop work and define outcomes. As collaborators on a major five-year project rather than a permanent laboratory—the Living with Machines project undertaken by the Alan Turing Institute, the British Library, and partner universities—the authors examine how the research process is shaped by their concept, the “Minimum Research Outcome” (MRO). The MRO takes its name from the minimum viable product of software development and represents a practical proposal for facilitating an experimental mindset and more iterative work cycle. This very focused perspective demonstrates how a single conceptual tool for collaborative work can be applied in a DH lab setting to manage work and develop multiple connected research projects.

The final part of the volume looks at the role of DH labs in addressing challenges confronting today’s societies, including gender inequality, decolonisation, and decentralisation of global knowledge. Key questions here include the following: how does a lab take part in social and cultural transformation? How can critical DH practices and pedagogy be applied in non-DH spaces, such as STEM labs, citizen labs, and domestic spaces? How can approaches from intersectional feminism, critical pedagogy, and public humanities be used to deconstruct a lab culture? In this part, the authors conceptualise DH labs as sites for social and cultural interventions that aim to address issues of social justice work, gender minorities in STEM fields, academic labour, decolonising archival practices, and the creation of knowledge as a commons. The chapters here address the sense that digital humanities, as Matthew K. Gold and Lauren F. Klein rightly state, “has always seen itself as a field that engages the world beyond the academy” (2019, x). In this light, laboratories are less a manifestation of a desire to mimic scientific practices, and more an effort to rearrange the humanities to respond to social needs. As Esteban Romero-Frías and Lidia Bocanegra Barbecho astutely observe in their chapter, “laboratories do not aspire to be revolutionary, but rather to be transformative with due respect for the democratic institutionality from which they emerge”. The authors here, therefore, explore the articulation and significance of DH labs and other fluid spaces built upon the values of equality, inclusion, openness, and community engagement.

The socio-cultural approach to investigating DH laboratories draws upon feminism, postcolonial studies, and public humanities. The “cultural turn” in DH (Liu 2012) gave rise to new research areas with critical interventions focused on the global dynamics of DH (Fiormonte 2014; Risam 2017; Fiormonte, Chaudhuri, and Ricaurte 2022) and the under-representation of minority groups in mainstream DH and academic discourse (Losh and Wernimont 2018). The move towards exploring the global dimension of DH is a manifestation of resistance to the Western imagination of globalism and the dominance of Western epistemologies (Pawlicka-Deger 2022). In recent years, scholars have explicitly called for building an inclusive and heterogeneous DH community and critically interrogating DH workplaces, labour, and resources. Conferences and panel discussions, such as “Creating Feminist Infrastructure in the Digital Humanities” (2016), “Reimagining the Humanities Lab” (2018), and “What Is a Feminist Lab?” (2019) proposed to interrogate these issues, including the types of projects taken up by a lab, its labour, ethos and culture, its epistemic models, and the accessibility of its methods and outputs. Such approaches can provide rich analytical tools for investigating and reimagining labs as feminist spaces (Ricaurte Quijano 2018) with the capacity to disrupt the geopolitical and postcolonial system of knowledge production (Ricaurte 2019) and transform the DH community and its practices. The authors here embrace intersectional feminist practices as institutional frameworks for designing labs, interdisciplinary teamwork, community-building, citizen engagement, and equitable pay.

Part Four begins with a chapter presenting a unique model for DH labs, using feminist principles to promote interdisciplinary collaboration, demystify technology for non-technical majors, and support diversity and inclusion in STEM. Jacquelyne Thoni Howard presents a lab that educates students about gender equity by providing undergraduates with paid and community-based opportunities to gain a diverse technical portfolio and feminist leadership experience. This work is a significant contribution towards building a generation of students and leaders who reject exclusionary hierarchical systems of knowledge production, and instead build equitable learning spaces with a focus on feminist technologies.

The need for using intersectional feminist practices in the organisational structures of DH labs is also a focal point of the next chapter by Sara Woodbury, Elizabeth Losh, and Laura Beltrán-Rubio. These authors propose to consider labs through a hospitality lens, touching on issues such as compensation and recognition of labour, as well as collaborative practices characterised by affect, emotional well-being, and listening. By exploring the intersections between labs, the domestic privacy of the home and the public curation of the museum, they propose to think about both digital humanities and hybridised labs through a lens of domestic, feminised labour. This can direct attention towards a more conversation-oriented perspective on the potential roles of labs which invites discussions without necessarily providing definitive solutions.

The next chapter also offers an alternative, decolonial view of DH labs built upon the principles of gift economics, connectivity, and digital inclusivity. Dibyadyuti Roy and Maya Dodd examine the collective challenges for DH labs in India, where colonial legacies and the scarcity of humanities centres in higher education

institutions hinder the development of digital scholarly practices. The authors juxtapose the normative legacies, imaginaries, and infrastructures of DH labs alongside postcolonial discontents with laboratories and propose strategies through which DH labs can become decolonised locations for resisting techno-positivist ideologies by focusing on collaboration and practicality in humanistic enquiry.

The last chapter in Part Four also explores ways DH labs can be re-envisioned to tackle contemporary challenges and contribute to social transformation. Esteban Romero-Frías and Lidia Bocanegra Barbecho argue that DH labs have deep humanistic roots, therefore, “the humanities must act as a bridge that integrates and connects citizens and stakeholders in these laboratories, using digital tools and understanding technology as a means to express, integrate, coexist and connect”. Drawing upon Spanish sociologist Antonio Lafuente’s theory of citizen laboratories, and other theories of social labs and social innovation, they explicitly propose to rebuild DH labs into experimental spaces for the production of knowledge based on the values of commons, co-creation, and openness.

This chapter, deliberately placed as the last contribution in the volume, calls for stepping out of DH labs to connect them with society and citizens. As the editors, we have sought to offer readers a journey from epistemological and infrastructural approaches to critical and social perspectives on DH labs. Now, we hope that this volume will find its way to go beyond its material form and be used as an inspiration for designing, building, and imagining DH labs that can renew and extend humanities research, pedagogy, and social engagement now and into the future.

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