

Guest Editors' Introduction

DATA PHYSICALIZATION—PART 2

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This is a continuation of the CG&A November Special Issue on Data Physicalization [1]. As we noted in our previous introduction “*The practise of representing data in physical form has existed for thousands of years, yet it has only become an area of investigation and exploration for scientists, designers and artists much more recently* [2]. *Advances in areas such as digital fabrication, actuated tangible interfaces, and shape-changing displays have spurred an emerging area of research now called Data Physicalization.* [3]”

In the previous CG&A special issue on Data Physicalization (November 2020) we presented four articles that discussed the role of data as part of physical data-driven representations [4], the use of physicalizations to materialize qualitative data related to human experiences and knowledge domains [5], the design and construction of Data Badges -- customizable physical conference badges [6], and ‘Move&Find’ a multisensory data representation where people pedalled on a bicycle to exert the energy required to conduct a search [7].

IN THIS ISSUE

In this issue, we continue discussions through three further papers. First, describing a set of data physicalizations that represent aspects of the history of slavery in Brazil - “Slave Voyages: Reflections on Data Sculptures” illustrates how designerly and artistic concepts and material characteristics are deeply intertwined in the process of data physicalization. The article reflects on the

agency of materiality that influences pragmatic production and construction choices and discusses the interrelations between the maker and the material during the physicalization creation process.

Second, “Narrative Physicalization: Storytelling Through Bodily Engagements with Personal Data” introduces the concept of narrative physicalizations as everyday objects modified to support self-reflection through embodied engagement with personal data. The article reports on a two-part study which suggests people to develop meaningful narratives around data and personal experience and designers and developers can leverage on the affordances and familiarity of everyday objects to reveal insights with users/viewers that may not otherwise come to mind.

Finally, “Data Clothing and BigBarChart: designing physical data reports on indoor pollutants for individuals and communities” brought data physicalizations into the field by using physical data representations to communicate data about in-door pollutants to the participants in the Green Housing Study. Their article reports on how the physicalizations were received by diverse audiences.

Together these two special issues show the diversity of contributions that arise from the area of Data Physicalization. These include theoretical discussions and applied case studies that span the domains of art, design, humanities, and science. We therefore

encourage the community to further explore this style of data representation, analysis, and exploration to broaden the horizons of the emerging and growing field of data physicalization.

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ABOUT THE AUTHORS

Trevor Hogan is a Lecturer in Design at the Munster Technical University (formally known as CIT), Ireland, where he also leads the Human-Data Interaction Group. He received his Ph.D degree from the Bauhaus-Universität Weimar in 2016. His current research is concerned describing and better understanding how embodiment influences and augments people's experience of data representations. His work is strongly interdisciplinary and may be situated in the field of Interactive Design, at the intersection of Tangible Computing, Human-Computer Interaction, Data Physicalization and Psychology. He is the corresponding author of this special issue. Contact him at trevor.hogan@cit.ie

Uta Hinrichs is a lecturer at the University of St Andrews in Scotland. Uta's research is driven by the question of how to utilize and teach visualization and interface design to facilitate insightful, pleasurable and critical interactions with information. She has applied data physicalization especially in interdisciplinary contexts to teach data-driven thinking to audiences ranging from children to adult professionals. Uta's research draws heavily from fields outside of computer science and has been presented at a range of academic venues spanning the fields of visualization, HCI, literary studies, design and digital humanities, as well as museums, libraries, and art galleries. You can contact her at uh3@st-andrews.ac.uk

Samuel Huron is an associate professor in Design of Information Technologies inside the Social and Economical Science Department of Telecom Paris school at the Institut Polytechnique de Paris, and part of the CNRS Institut Interdisciplinaire of innovation. His research is focused on democratizing data visualization to every one. This focus led him to explore different

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Jason Alexander is a Professor in Human-Computer Interaction in the Department of Computer Science at the University of Bath. His primary research area is Human-Computer Interaction, with a particular interest in developing novel interactive systems to bridge the physical-digital divide. His recent work focuses on the development of shape-changing interfaces—surfaces that can dynamically change their geometry based on

digital content or user input. He has employed these in several examples of dynamic data physicalization. Alexander's other work has investigated novel interaction techniques using eye-gaze, haptic feedback, and gestural interaction. You can contact him at jma73@bath.ac.uk.

Yvonne Jansen is a permanent Research Scientist at the Centre National de Recherche Scientifique (CNRS) since 2016. She received her doctoral degree from Université Paris Sud in 2014. Her research interests include data physicalization, situated and embedded data visualization, and methods and techniques to facilitate the transparent reporting of research outcomes. Contact her at yvonne.jansen@sorbonne-universite.fr