

Data as a Material for Design: Alternative Narratives, Divergent Pathways, and Future Directions

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ABSTRACT

This one-day workshop will bring together a diverse group of practitioners and researchers within the CHI community to discuss and explore data's increasing use as a material for design. This workshop encourages the submission of design exemplars, i.e., physical or digital works (in progress), design processes, or provocative or controversial pieces on the topic of data as a design material. If we are to continue to explore what data means as a design material and how we will continue to co-exist with them in our everyday lives through new and exciting ways and means, we must develop new strategies, tactics, tools, and outcomes. By bringing together products, processes, and provocations, this workshop will nurture and extend the continuation of research inquiring into data as a design material in its many forms. Our workshop will be conducted through physical and digital activities before, during, and after the onsite event at CHI 2023.

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CCS CONCEPTS

• **Human-centered computing** → Human computer interaction (HCI); Interaction paradigms; Human computer interaction (HCI); HCI theory, concepts and models.

KEYWORDS

Material for Design, Human-Data Interaction, Research through Design, Data Narratives

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1 BACKGROUND

Data is braided into the fabric of our everyday lives. Our interactions, entanglements, and encounters with data run deep, occur with and without technology, and exist in physical and digital contexts. For some, data is seen as a vital component for the utilitarian improvement of said everyday lives. To garner, aggregate, analyze, and communicate metrics, insights, and knowledge underpins how we see data and the technology that interacts with it.

However, the data-interaction design space is expanding. Recent and ongoing research is challenging current conventions

and proposing alternative narratives. These alternative narratives explore a variety of concepts and values such as ephemerality [12, 13], decay [9], negotiation [3], diffraction and (re)interpretation [4, 6, 18, 19], subjectivity [7], locality [14], invisibility [5, 8], and the interaction with analog data. When these narratives are embodied in design “outcomes” they allow us to experience other possible worlds where data is not only a straightforward means to an end but a malleable material that can be shaped to create a diverse range of experiences. These worlds do not only question what we can do with data, but what we can expect of the technology that collects, handles, and expresses these data. What alternative possible worlds of human-data-technology already exist? What design strategies and tactics can enable diverse uses and expressions of data in our everyday lives? What are the potential design outcomes when data we create and express need not be immediately practically “useful”?

We will critically examine these questions in this workshop by mapping the expanding, critical, and alternative data design space. In this mapping, we invite workshop participants to contribute examples from areas that include (but are not limited to): data physicalization [10], data fiction and folklore [4], slow or temporal data interaction [15, 16], or somaesthetic data [1]. By doing so, we continue to contribute towards data to becoming a rich contribution to the material for design repertoire [2, 11, 17]. Through sharing design exemplars and cases of design processes and outputs, we will seek to establish locations for exploration and critique along the following themes: the nature of the data, the processes of data handling, the methods and experiences of data collection and expression, and the risks, tensions, and stumbling blocks of working with data.

- **The nature of data asks:** what data can we collect, notably once we expand our horizons beyond data that is considered “useful” and/or “personal”?
- **The process of data handling questions:** how do design artefacts, objects, or systems (mis)interpret, alter, or transform the data they interact with?
- **The methods and experiences of data collection and expression provoke reflection on:** how do we go about generating and displaying data, notably the tools we use to collect and the modalities we use to express these data?
- **The risks, tensions, and stumbling blocks of working with data considers:** where, when, and why practitioners go wrong, get lost, and how do they overcome these challenges?

With these locations as a framework, we will put the design exemplars in dialogue as case studies. An underlying goal of our workshop will be to describe the narratives and possible worlds the cases explore, and their specific approaches to the implementation of these narratives. In other words – the story they want to tell and how they describe it. The aim will be for these design cases to exemplify ways and means of challenging narratives within interactions with data and technology. Although data are often seen as ‘digital’ materials, this workshop wants to give an equal platform to the physical and digital as such participants will be encouraged to bring and show off the ‘things’ that interact with and express these data. Additionally, we want to pay credence to the analog facet of data, embracing ways data can be created and

expressed without the need for electronics or circuitry. However, we do not offer these examples as the new grand narrative. This is about diversity, not diktat.

Our workshop will conclude with a discussion aimed at mobilizing the design exemplars presented for future research in the fields of human-computer interaction, human-data interaction, and design, focusing specifically on the challenges and opportunities in the crafting of alternative narratives and objects with data.

2 ORGANIZERS

Matthew Lee-Smith is a PhD student and technical tutor in user experience at the School of Design and Creative Arts at Loughborough University. His research explores our understanding and expectations of technology and data through discursive and posthuman lenses. He is also the main point of contact for the workshop.

Jesse Josua Benjamin is a PhD candidate at the University of Twente, and a Research Associate at ImaginationLancaster. Combining philosophy of technology and design research, Jesse investigates how emerging technologies shape the relations of people and their world(s).

Audrey Desjardins is an Associate Professor of Interaction Design in the School of Art + Art History + Design at the University of Washington. Trained as an industrial designer and interaction design researcher, she uses design as a way to critically reflect on people’s creative tactics to make, adapt, and transform their homes and to investigate potential futures in domestic spaces.

Mathias Funk is an Associate Professor in the Future Everyday group in the Department of Industrial Design at the Eindhoven University of Technology (TU/e). He has a background in Computer Science and a PhD in Electrical Engineering (from Eindhoven University of Technology). His research interests include methods and tools for designing with data, designing systems of smart things, and interfaces for data sense-making.

William Odom is an Associate Professor in the School of Interactive Arts and Technology at Simon Fraser University. He focuses on developing a theory and practice of slow interaction design, exploring data alternatives in everyday life, and generating methods to collaboratively investigate potential technological futures.

Doenja Oogjes is an assistant professor at the Department of Industrial Design at Eindhoven University of Technology (TU/e). She is interested in indirect, accidental, surprising, and overlooked ways designed things mediate the everyday. In her current research, Doenja develops actions and positions the human designer can take to increase participation of more-than-humans.

Young-Woo Park is an Associate Professor of Design at Ulsan National Institute of Science of Technology (UNIST), South Korea. His research team explores new interactive product designs using data-driven technologies and everyday objects to provide tangible interaction with personal lifelog data for enriching everyday experiences.

James Pierce is an Assistant Professor of Interaction Design at the School of Art + Art History + Design at the University of Washington. He practices design as a mode of inquiry, critical engagement, and speculative exploration.

Pedro Sanchez is an Assistant Professor at the Department of Informatics, at Umeå University. His research aims at designing

biodata-driven technologies for health and wellbeing and performing arts, drawing on feminist epistemology. He applies speculative and somaesthetic design tactics to critically analyze aspects of our lived experience when interacting with data.

Vasiliki Tsaknaki is an Assistant Professor in the Digital Design Department at the IT University of Copenhagen. Her research combines materials experiences, computational crafts and somaesthetic design methods. Through practice-based studies she investigates and reflects on intersections of these areas, probing the space of designing for wellbeing and exploring (bio)data as a design material.

3 WEBSITE

The workshop website will be used to distribute submissions, and the authors will continue to maintain the website after the workshop. Participants are invited to submit work in a variety of digital formats: video, audio, image, text, website, and applications. The preliminary website URL is: <http://materialfordesign.net>

4 PRE-WORKSHOP PLAN

The CHI community will be given two broad means of submission to encourage a diverse range of participants. The first means of submission is a short, written description of the prospective participants' work. However, we will emphasize visual documentation of design exemplars and design processes of working with data as a design material, rather than reported research results. We will highlight in the CFP and website that the selection criteria are (1) the submission must involve design processes and exemplars related to data, (2) the submission must be created and used within a research framework or with research goals, and (3) the authors must speak to the uses, goals, and outcomes of the work and how their design approach supported these goals. The second means of submission involves the creation of a provocative piece around data as a material and the four questions, however, high-quality pieces that go beyond these will be considered. The participants' choice of submission must be a 2-4 page document formatted using the ACM CHI 2023 template.

We will create a website to advertise the workshop, communicate with accepted participants, and help disseminate the work pre- and post-workshop. Workshop papers will be submitted through the website and then reviewed by organizers. An Instagram account will be set up giving us a low-maintenance channel to build an audience before, during and after the workshop—both inside and outside the CHI community. We welcome diverse documentation and exhibition format including but most certainly not limited to image, text, website, application, video, audio, performance, code, and instructions. Once the submissions are reviewed, the accepted submission will be uploaded to the website for the participants to examine and engage with before the event itself.

5 IN-PERSON EVENT

This one-day workshop will be on-site at the conference. This is to encourage and facilitate the physical, and tactile side of using data as a material. This decision was made in full recognition that this will exclude members of the CHI community who are attending the conference virtually. As such, we will ensure there is a variety

of engaging and high-quality asynchronous events as well as multi-media documentation (text, images, audio, and video), of the event itself.

6 ASYNCHRONOUS ENGAGEMENT

To support research community members who cannot attend the physical event and expand the discussion of the workshop beyond the day (before and after), there will be a series of asynchronous events. The foundation of this will be built using the Figma platform which will be used as a repository for various links, media, and conversations. Figma will also be used to host asynchronous Q&A sessions, similar in structure to the examples found on Question Bridge (<http://questionbridge.com>) and Design Research Works QuBr (<https://qubr.designresearch.works>). This Q&A session will allow participants to ask and answer questions in video/written formats without needing to meet simultaneously. Where possible, video media that is created before, during, and after the workshop will be uploaded (with permission) to a Vimeo repository. All these links will be connected through the workshop website.

7 WORKSHOP STRUCTURE

This one-day workshop will be broken into two phases. The morning phase (Map and Compare) will consist of a broad summary of all of the accepted work and breakout discussions in studio-style critique in studio-style groups. Participants in each group will present their data-as-material case studies, discussing processes, inspirations, similarities, and differences. Participants are encouraged to share videos, interactive demos, functional prototypes, process documentation, and other artifacts.

The afternoon phase (Provoke and Debate) will bring in the 4 locations described above (nature, process, methods, and tensions of data as material) to provide an initial framework for discussion and critique. Participants will be asked to generate and respond to probing and unusual questions within these locations. For the organizers will prepare an initial set of questions, and participants will generate additional questions. For example, within the locations of the process of handling data or methods and experiences of data collection and expression, one might ask “how could we make a toolkit to work with data, what is the equivalent of chisels, bandsaws, planers, etc. for data? Alternatively, all four locations could be expanded with the broad question: what if we see using data in the way we study art history with surreal, abstract, or baroque styles of (using) data?

8 ACCESSIBILITY

In order to make the event as accessible as possible, the material generated before, during, and after the workshop will collect in a variety of formats and archived for later use and reference. This will include recording key moments of the physical workshop in audio or video formats and strongly encouraging participants to write alt-text descriptions on the images/figures they submit. Furthermore, accessibility design guidelines will be followed. This will include ensuring that the website design conforms to recommended visual requirements. Finally, although the workshop is in-person only, we contend that the variety of activities that occur before the workshop

Table 1: Breakdown of workshop activities and timings

Time	Activity
09:00 - 09:30	Welcome and introductions by organizers, an overview of the workshop, and a summary of submitted exemplars and provocations.
09:30 - 11:00	Group discussion in assigned interest groups of design exemplars
11:00 - 11:30	Representatives from each interest group summarize exemplars and discussions (audio/video recorded)
11:30 - 13:00	Lunch (off-site)
13:00 - 14:30	Group discussion in assigned interest groups of provocation pieces
14:30 - 15:00	Representatives from each interest group summarize provocations and discussions (audio/video recorded)
15:00 - 15:30	Coffee break
15:30 - 16:30	Breakout discussions outside of assigned groups to expand on ideas, and themes, and identify prospects. Begin documentation of additional material for the website/repository including voluntary insight collection (audio/video recordings).
16:30 - 17:30	Conclusion and debriefing by organizers, including encouraging post-workshop collaboration, and posting about the event on social media. Finish material documentation.

and the prospects for creating a reusable repository enable broader access beyond the event itself.

9 POST-WORKSHOP PLANS

Throughout the workshop, the organizers will thoroughly document the activities, exhibits, and materials generated. Following the workshop's close, these will be uploaded to the workshop website and Instagram account to create a gallery/repository of the event. This outcome will be communicated to the participants during and after the workshop as well as suggesting that this can serve as a resource for teachers and researchers when demonstrating the range data as a material for design. The participants will be encouraged to disseminate these outcomes and their experiences through various social media platforms. The organizers will also discuss the workshop and results with other conference attendees to spread the word, including working towards an informal exhibition of the galleries and outputs. Finally, the organizers will investigate the outputs beyond the conference, including special issues of journals, including ToCHI, based on the workshop goals and themes, as well as possible galleries or other forms of exhibitions including a permanent online repository of "data as a design material" examples attached to the workshop website.

10 CALL FOR PARTICIPATION

To say that data, and the technological "things" that interact with them, are quotidian to the lives of many humans is axiomatic. However, this ubiquity of presence, of availability as a resource, has yet to be met with diversity or plurality of use, craft, and experience. Much of how we see the use of data is still rooted and siloed in utilitarian and analytical perspectives of data. To labor the metaphor, if data were wood, we have only been using them to make simple tables and chairs, not buildings, sculptures, boats, and paper.

This one-day workshop offers diverse members of the CHI community the opportunity to present their unique perspectives on the concept of "data as a material for design". Through sharing design exemplars and cases of design processes and outputs, we will seek to establish locations for exploration and critique along the following themes: *the nature of the data, the processes of data handling, the*

methods and experiences of data collection and expression, and the risks, tensions, and stumbling blocks of working with data. We invite diverse submissions that respond to the topic of "data as a material for design." Topics/questions include but are not limited to:

- **The nature of data** asks: what data can we collect, notably once we expand our horizons beyond data that is considered "useful" and/or "personal"?
- **The process of data handling** questions: how do design artefacts, objects, or systems (mis)interpret, alter, or transform the data they interact with?
- **The methods and experiences of data collection and expression** provoke reflection on: how do we go about generating and displaying data, notably the tools we use to collect and the modalities we use to express these data?
- **The risks, tensions, and stumbling blocks of working with data** considers: where, when, and why practitioners go wrong, get lost, and how do they overcome these challenges?

Interested participants are invited to submit one or both of the following, using the ACM master template and in PDF format:

- A minimum 2-page Pictorial/image-heavy paper of a case study exemplifying "data as a material for design" will be discussed in the workshop's morning session.
- A minimum 2-page eyebrow-raising provocation about data, data as a material, or the artefacts that express data in some way for the afternoon session, this could include:
- A series of diary entries of a 3rd generation data crafter learning the family trade
- A manual for an artefact that displays private data publicly
- A manifesto for neo-data-Ludditeism where we must go back to paper-based data entry and/or non-electrical interaction with data

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