



Visualizing Design Ecologies:

Collecting, visualizing and interpreting data for design research

Keywords: data visualization; design studies; design ecologies; critical data studies

1. Workshop Organiser/s

Organiser Name	Email	Affiliation
Dr. Daniel Cardoso Llach	dcardoso@cmu.edu	Carnegie Mellon University
Dr. Yanni Loukissas	yanni.loukissas@lmc.gatech.edu	Georgia Institute of Technology

(Image credit: data visualization by Daniel Cardoso Llach)

2. Context of Workshop

Today's design processes are increasingly collective, geographically distributed, and digitally mediated by information networks and software. The data produced by these *design ecologies* —from e-mail and timestamps to digital files, simulation and sensor data and conflict logs— constitute important new sites that researchers might explore for new insights about the social and technical complexity of present and future creative practices.

The goal of this workshop is to provide participants with a basic conceptual and technical framework to engage with data as a site of design research. Presentations by the organisers will cover recent advances in critical studies of data, design, and the digital humanities, highlighting their relevance to design research. Discussions and hands-on experimentation with design datasets will invite participants to consider how data about design ecologies can be computationally collected, visualized and interpreted. Participants will develop a conceptual framework, get acquainted with the state of the art, and learn the fundamentals of data visualization.

Fundamentally, participants will acquire the critical and technical tools to creatively engage the question: What does the phenomenon of design look like from the perspective of data?

3. Planned Activities and Expected Outcomes

The morning session will begin with presentations by the workshop's leaders discussing the visual and epistemic history of data visualization, as well as contemporary examples. Alongside the state of the art, the organisers will introduce the concept of design ecologies and discuss recent theoretical developments in the digital humanities, information studies, and science and technology studies restoring data's ties to their social and material substrates —casting data as fundamentally heterogeneous and plural, rather than as inherently objective or truthful. A series of recent interactive data visualizations developed by the organisers will be demonstrated in order to illustrate different techniques and interpretive frameworks, as well as to discuss their potential as critical instruments for design research.

Then, the organisers will invite participants to share their experiences, discuss ways in which design ecologies may be visualized, and consider the question, what constitutes a design ecology? What kinds of data does it produce? How might these data be collected? What visual and computational frameworks might be used for its analysis? The conversation will focus on the differences across design disciplines and scales, and will seek to relate directly to the participants' diverse experiences.

During the afternoon session participants will be introduced to the fundamentals of programming for data visualization through a highly structured tutorial in the open source programming language Processing. Then they will be given access to actual design ecologies datasets. Working in pairs, participants will use these datasets as 'sandboxes' throughout the afternoon module. With the organisers' assistance, participants will sketch data

visualizations first through hand-drawn and digital mockups and then interactively using code. Participants are also encouraged to bring their own datasets.

To finalize the workshop, participants will discuss their prototypes in terms of their visual structure and interpretive intent. After the workshop, organisers and participants will continue to collaborate towards an online publication exhibiting the work.

4. Intended Audience

The organisers will seek to form a cohort of 8-12 workshop participants with diverse design and research backgrounds, and different levels of technical proficiency. Applicants are encouraged to bring a dataset they wish to explore visually; however, this is not a requirement. No programming experience is required.

5. Length of Workshop

Full Day.

6. Space and Equipment Required

A reconfigurable room with Internet access, a whiteboard and a projector. Workshop participants are expected to bring their own laptops.

7. Potential Outputs

An online exhibition documenting the workshop and the different data visualizations.

About the Organisers:

Daniel Cardoso-Llach is an Assistant Professor in the School of Architecture at Carnegie Mellon University and the author of *Builders of the Vision: Software and the Imagination of Design*. He holds an MS and a PhD in Design and Computation from MIT and a BArch from Universidad de los Andes, Bogotá.

Yanni Loukissas is an Assistant Professor of Digital Media in the School of Literature, Media and Communication at Georgia Tech and the author of *Co-Designers: Cultures of Computer Simulation in Architecture*. He holds an MS and a PhD in Design and Computation from MIT and a BArch from Cornell University.