

# “Makes Sense to Me!”: Participatory Sensing, Information Visualization, and 3D Representation

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## Abstract

With the proliferation of physical and digital “maker technologies” into initiatives for collective empiricism (e.g. citizen science), tactical media, and biometric evaluation (e.g. quantified self), there is a pressing need to understand how the communities supporting these programs adopt and develop technologies that assist in the public dissemination of their findings. This interactive session aims to raise awareness of a growing tendency for sensing devices, information visualization, and 3D representation to be cast as part of an assemblage of agential technologies for civic engagement. We invite participants to both explore and trouble this tendency by initiating collaboration and dialogue around three intertwined activities: participatory sensing; information visualization; and data sculpture. By, first, constructing and deploying small-scale sensors, then creating multiple visualizations and physical representations (both digital and material), participants will explore the technical, social, and semantic challenges involved with collecting, interpreting, and disseminating personal data.

**Keywords:** pervasive computing; information visualization; participatory sensing; data sculpture; representation

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## 1 Description

With the proliferation of physical and digital “maker technologies” into initiatives for collective empiricism (e.g. citizen science), tactical media, and biometric evaluation (e.g. quantified self), there is a pressing need to understand how the communities supporting these programs adopt and develop technologies that assist in the public dissemination of their findings. This interactive session aims to raise awareness of a growing tendency for sensing devices, information visualization, and 3D representation to be cast as constitutive of an assemblage of agential technologies for civic engagement. In raising awareness of this tendency, this session also aims to critically interrogate a number of contentious claims associated with it (e.g. that these technologies facilitate the ability of “non-experts” to both interrupt and productively intervene in flows of institutional data). We invite participants to explore these ideas by initiating collaboration and dialogue around three intertwined activities: participatory sensing; information visualization; and data sculpture. By, first, constructing and deploying small-scale sensors, then creating multiple visualizations and physical representations (both digital and material), participants will explore the technical, social, and semantic challenges involved with collecting, interpreting, and disseminating personal data.

## 2 Purpose and Intended Audience

This is not an instructional workshop, per se, but participants should still gain a basic applied understanding of low-cost sensing technologies and practices, free information visualization software, and methods for representing data as tangible 3D objects.

This session is intended for iConference attendees (specifically HCI, STS, and informal learning scholars) who are interested in critically examining challenges associated with bringing these technologies to bear on the arrangement of new forms of engaged publics (Disalvo, 2009). Our goal with this session is to move beyond academic discussions about fostering “digital literacy” and toward building a community guided by principles associated with critical information literacy (Elmborg, 2006).

## 3 Proposed Activities

### Participatory Sensing

Using portable, small-scale sensors that will be assembled in the opening phase of the session (based on circuits, code, and low-cost hardware we have deployed in similar sessions at related conferences), participants will capture data related to their experience at the conference. From this data, they will be

asked to speculate on possible interpretations of the collected data, and discuss how it reflects their phenomenological experience of the event. This activity will encourage participants to imagine ways in which they can tell stories with the data they have collected. For example, what might uniform temperature, proximity, or movement data tell us about conference environments? How might findings from this very local, specific setting be scalable to contexts outside the conference?

#### Information Visualization

Following this, participants will be asked to explore visualization techniques of the captured data using one of a number of easy-to-use free tools (Plotly; Raw; Tableau Public; Processing). How does representing the data graphically mediate or transform how they it is interpreted and described to a small group or audience?

#### Data Sculpture

Finally, participants will be asked to reinterpret their visualized data as a 3D sculpture. Does adopting a correspondence theory of representation (the closer it is to the real “authentic” object, the better) enhance one’s ability to make meaning from the data? Does the act of material production highlight the subjective, personal experience of telling stories with physical objects? Is it easier to tell a compelling story with an object that a “data narrator” has personal experience physically constructing?

### 4 Relevance to the Conference/Significance to the Field

We recognize the three related subjects of our session to be at the seam where information scholarship meets society. We increasingly rely on arrangements of digital tools for personal data collection and representation, to the point that identity construction becomes imbricated in these arrangements. However, the complexity of these artifacts create disruptions and disjunctures. A significant challenge faced by DIY initiatives has to do with gaining institutional legitimacy and authority. What can experts learn from non-expert sensing movements? Through this Critical Making workshop we want to encourage experts in information and its cognate disciplines to engage with discussions about data collection, interpretation, and dissemination that are happening outside their respective academic environments - discussions that are germinating in small-scale, grassroots communities.

### 5 Event Length

This event will be structured as a sort of low-stakes hackathon. It will take place over each of the three main days of the iConference, and will include voluntary introduction and check-in sessions. The first day will entail a 1 hour introduction to the materials we will provide and the content we’d like participants to engage with. Web-based instructional content will also be available for participants who cannot (or do not wish to) attend this session in person. Participants will spend the first day “getting to know” their sensing devices - gathering data as they walk around the conference and attend sessions. Participants will be asked to record notes about their day-to-day experiences in order to suitably parse the data on day two. The second day will entail a short session introducing easy-to-use information visualization tools that will enable participants to represent their collected data in myriad ways. On the third day, a morning “making” session will ask participants to construct three-dimensional sculptural representations of the data they would have previously represented graphically. Finally, we would ask that participants present their sculptures to the broader iSchool community in a public format, with an opportunity to engage in dialogue about what concepts or ideas their representations are intended to provoke, trigger, or evoke.

### 6 References

- DiSalvo, C. (2009). Design and the Construction of Publics. *Design issues*, 25(1), 48-63.
- Elmborg, J. (2006). Critical information literacy: Implications for instructional practice. *The Journal of Academic Librarianship*, 32(2), 192-199.
- Wylie, S. A., Jalbert, K., Dosemagen, S., & Ratto, M. (2014). Institutions for civic technoscience: How critical making is transforming environmental research. *The Information Society*, 30(2), 116-126.