

Designing Research for Computational Design

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1. Workshop Organiser/s

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2. Context of Workshop

In “The Reappearing Computer: the past and future of computing in design research” [1], Simone Gristwood and Stephen Boyd Davis ended their fascinating discussion on the intertwining history of design and computation by asking future researchers: How best can thinking about computing be embedded in the philosophy of design, and design research? This workshop proposes some responses to this question, specifically considering the design of physical objects.

The future of design is becoming ever more digital: from the Computer Aided Design systems designers use to create 3D models of their inventions, to the digital fabrication machines that can build physical objects previously impossible to manufacture, to the online crowd-sourcing research tools that allow researchers to collect thousands of responses to their studies. Computing allows us to execute our research and designs at very large scale and with great speed, but its reductive nature potentially misses out on the unexpected idiosyncrasies that the human designer or researcher can uncover in their more limited and time-consuming yet richer qualitative processes [4]. How can we bring these two worlds together and use the power of computing to expand the research we collect to create broader and deeper knowledge of how we perceive and interact with objects? And how can we more directly employ this knowledge in computational systems to further empower designers of any expertise level to create more suitable, empathetic and meaningful designs?

Building on my research at the MIT Media Lab and previous workshops [3] that explore the design language of physical artefacts – how we perceive and embody meaning in objects through their physical design attributes such as form, material etc – this workshop will share my work on the design research methodologies and tools that can translate this very tacit knowledge into computationally-parsable syntaxes able to power more intuitive and accessible design tools (for example the EmotiveModeler [2]: emotivemodeler.media.mit.edu).

3. Planned Activities and Expected Outcomes

This workshop will be a brief introduction into how understanding the computational design of objects can help develop research methods and tools that can seamlessly feed into the development of more intuitive computational creativity support tools.

Through presentations and discussion, the workshop will cover: (1) Theory covering the connection of the product semantics to the computationally defined form parameters of an object, and the design tools that can use this knowledge; (2) Explorations in new methods of design research that can inform the development of such computational design tools.

Participants who join the workshop will leave with a better understanding of how considering the theory behind the computational design of objects can help us research design in a way that enables the results to more directly integrate into computationally-driven creativity support tools. A range of computational tools and methodologies available to researchers to create this digital knowledge will be shared and built on through discussions prompted in the workshop.

The pre-prepared materials describing the theory and tools discussed as well as notes from the group conversation will be posted to an online summary of the workshop available to the DRS community.

4. Intended Audience

The ideal group of participants (max 30) for this workshop would be a mixture of designers and design researchers in both academia and industry who are interested in considering and discussing how to integrate computation more effectively into their design and research processes from both theoretical and applied viewpoints.

5. Length of Workshop

The length of the workshop is 1.5hrs, as it is an introduction to the theory and tools available to allow designers and design researchers to develop and integrate their findings into the expanding number of computational design applications.

6. Space and Equipment Required

A small studio type space is preferred where we can arrange the tables into small groups for a discussion format. Some sort of projection AV equipment is required as a lot of the work to be shared is in a digital format.

7. Potential Outputs

Participants who join the workshop will leave with an understanding of how they can use computational design tools and methodologies to reframe how we collect design research and integrate that knowledge into computationally-driven creativity support tools. The pre-prepared materials describing the theory and tools discussed as well as notes from the group conversation will be posted to an online summary of the workshop available to the DRS community.

Prompting a discussion of the role that computation plays in the design research community can empower researchers to think more broadly about the knowledge they can collect in their studies and the direct applications it can have in the growing digital world.

1. Gristwood, S., & Davis, S. B. (2014) The Reappearing Computer: the past and future of computing in design research. In *Proceedings of DRS 2014: Design's Big Debates*. (618-632)
2. Mothersill, P., & Bove Jr, V. M. (2015). EmotiveModeler. *interactions*, 22(6), 14-15.
3. Mothersill, P. (2015) Communicating Through the Language of Design [workshop] O'Reilly Solid Conference, Retrieved from: <http://conferences.oreilly.com/solid/internet-of-things-2015/public/schedule/detail/40520>
4. Negroponte, N., & Groisser, L. (1970). The Semantics of Architecture Machines. *Architectural Design*, (9).

About the Organisers:

Philippa Mothersill is a PhD student in the Object-Based Media group at the MIT Media Lab, where she explores the language of design, particularly how objects can communicate information to us through their form. Through research that connects design theory, cognitive science, and linguistics, she investigates computational processes for the design of expressive objects and explores how the physical attributes of artefacts can become a more active medium for communication. Before the Media Lab, Philippa worked for three years as a product designer for Procter&Gamble, where she led the upstream industrial design of new products by bringing together design research, marketing narrative, and functional technology to create the first aesthetically designed functional prototype in a product's development cycle. She holds a MEng in Aeronautical Engineering, a joint MA/MSc degree in Industrial Design Engineering from the Royal College of Art and Imperial College, London, and a Masters in Media Arts and Sciences at MIT. Her work can be viewed at: www.pipmothersill.com