**Proposed Conversation Title: Beyond black boxes: tackling artificial intelligence as a design material**

**Keywords**: artificial intelligence, machine learning, design, system, materials

## 1. Convenors Information

| Convenors Name | Email | Affiliation |
|---|---|---|
| Aisling Kelliher | aislingk@vt.edu | Virginia Tech, USA |
| Barbara Barry | Barry.Barbara@mayo.edu | Mayo Clinic, USA |
| Joanna Berzowska | joanna.berzowska@concordia.ca | Concordia, CA |
| Nora O'Murchú | nora.omurchu@ul.ie | University Limerick, IE |
| Alan Smeaton | alan.smeaton@dcu.ie | Dublin City University, IE |

## 2. Context of Conversation Topic

The growth and development of artificial intelligence is fast becoming a powerful influence in the global economy and society overall. While advancements in AI are successfully reshaping many transactional contexts such as image search and purchase recommendations, the progression of this technology is somewhat slower in contexts that involve multidimensional experiences aimed at advancing human intelligence and the overall human condition. In this conversation, the convenors aim to present their evolving experiences engaging AI and machine learning as a vital design component in their research and practice in health, fashion, and expressive domains. The conversation will examine both the philosophical "whatness" of AI as a material, and the practical "howness" of going about working with it. There is a growing body of literature examining the relationship between design, AI, and user experience [3, 4, 7] and this conversation aims to build and expand upon this emerging area of interest.

The five panelists tackle the issue of AI and design from a variety of perspectives, disciplines, and praxis cultures. In this conversation, they will foreground the metaphors, strategies, and methods that best support their design process in conceptualizing, implementing, and understanding the power (and threat) of AI as a key material in creating and presenting systems for diverse contexts including home-based stroke rehabilitation [5, 6], digital mental health [1, 5, 9, 10], interactive textiles [2], reminiscence therapy [10, 11], and curatorial practice [8].

**3. Conversation research question**

The primary research question for this proposed conversation will ask: **How can we enhance and evolve the intelligence, abilities, and experience of all human actors in AI supported systems?** From this initial prompt, we propose addressing four other inter-related questions:

1. How can we move beyond a model of AIs replacing humans, or humans simply serving to enhance AI algorithms and performance (e.g. crowdsourcing of image labeling)?
2. How can we design for experiences where humans and machines symbiotically learn and develop together?
3. When do we feel understood or misunderstood by AI, and how can we design for mutual understanding?
4. What are the optimal conditions and approaches for creating a more nuanced form of cyber-human intelligence that takes into account algorithmic bias and the normalizing aspects of machine learning?

**4. Set-up of your session**

The five convenors will briefly present their experiences in both research and practice in designing with AI. Dr. Barbara Barry and Prof. Joanna Berzoswka will speak from the realm of professional practice and research (Dr. Barry leads the Mayo Clinic Center for Innovation), while Prof. Berzowska blends entrepreneurial success (XS Labs, OmSignal) with a lengthy academic career at Concordia University. Dr Alan Smeaton and Dr. Aisling Kelliher will describe their respective research experiences developing AI technologies and systems for healthcare contexts, while Prof. O' Murchu will present her academic and curatorial work engaging AI through design practice. These short presentations will probe and critique the main conversation research questions, examining the highs and lows, and the successes and failures of AI as experienced in the past and present ,and as predicted in the future. In beginning the conversation with these thoughts, the convenors aim to put AI on a metaphorical plinth so the remainder of the discussion can use a common definition and context of usage, for what we call AI.  The convenors will then:

1. Invite participants to describe what exhilarates, concerns and frightens them about engaging with, and designing for, machines.
2. Call on participants to describe the metaphors and strategies that they use or have encountered in conceptualizing and working with AI
3. Invite participants to brainstorm about what aspects of AI they want make visible, and where do they see AI working or indeed, not working?
4. Pinpoint and discuss the present dangers around ethics, responsibility, data ownership and privacy and how the brand name of "AI" can sometimes steamroll over these.
5. Lead discussion on the responsibilities of designers in learning about AI/machine learning and their role in future system developments.

The conversation will be video-recorded and Dr. Kelliher will take on the role of observer and note-taker during the breakout discussion sessions. This documentation will be used in the creation of a summary mediated Medium article describing the conversation events.

## 5. Type of space and equipment required

We will need access to an audiovisual projection system, some microphones, 1 – 2 flip charts, writing materials, post its, and some tables. We will use the audiovisual equipment for the brief introductory presentation and will make use of flip charts to document issues raised and points make by audience participants during the open discussion section (1-4 above) We will make all presentation materials available to conference attendees prior to the conference event itself and will ensure that all posted documents are accessible and follow general guidelines for presentation (e.g. SigACCESS).

## 6. Dissemination strategy

We will produce a richly mediated and annotated Medium article that documents our preparation for the conversation, the activities during the conference, and our reflections after the fact.

## 7. References

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[2] J. Berzowska (2016). Wearables: The future of everything. TEDxYouth@Montreal, retrieved from https://www.youtube.com/watch?v=NiBMgpUAHt4

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[4] L Holmquist. (2017). Intelligence on tap: artificial intelligence as a new design material. *interactions* 24, 4 (June 2017), 28-33.

[5] A. Kelliher and B. Barry. (2018). Designing Therapeutic Experiences with AI in Mind, forthcoming at the *AAAI 2018 Symposium, Designing the User Experience of Artificial Intelligence,* March 2018

[6] A. Kelliher, J. Choi, JB. Huang, K. Kitani, T. Rikakis. (2017). HOMER: an interactive system for home based stroke rehabilitation, *ACM ASSETS 2017*, Oct 30 - Nov 1, Baltimore, Maryland, USA.

*[7]* M. Kuniavsky, E. Churchill, MW. Steenson. (2017). Designing the User Experience of Machine Learning System. *Part of the AAAI Spring Symposium Series, March 27–29, 2017*

[8] N. O. Murchú. (2015). "Collaborative Modes of Curating Software," in *IEEE MultiMedia*, vol. 22, no. 1, pp. 88-92, Jan.-Mar. 2015.

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[10] A. Smeaton. (2017) Applications of data analytics: three data-driven reminiscence therapy deployments. In: *Technology and Dementia Preconference at the Alzheimer's Associated International Conference,* 15 July, 2017, London, UK. Ireland

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[12] http://centerforinnovation.mayo.edu/student-health-wellbeing/

**About the Convenors:**

**Aisling Kelliher** is an Associate Professor of Computer Science with a joint appointment in the Institute for Creativity, Arts, and Technology at Virginia Tech. She co-leads the Interactive Neurorehabilitation Lab where she designs and develops interactive systems for stroke rehabilitation.

**Barbara Barry** is the Design Strategist for Mayo Clinic Center for Innovation and an Assistant professor in the Mayo Clinic School of Medicine. She leads a design team and develops applications of AI to drive health care transformation.

**Joanna Berzowska** is Associate Dean Research of the Faculty of Fine Arts at Concordia University and a member of the Hexagram Research Institute in Montreal. She is also the founder and research director of innovative electronic textiles company, XS Labs.

**Nora O'Murchú** is a curator and designer based in Ireland. Her practice engages with fictions and narratives to explore how complex sociotechnical systems are imagined, built, and used. She is currently a lecturer in Interaction Design at the University of Limerick.

**Alan Smeaton** is Professor of Computing at Dublin City University and Founding Director of the Insight Centre for Data Analytics. He is a winner of the Royal Irish Academy Gold Medal in Engineering Science and a Fellow of the IEEE.