Editorial

Material-Enabled Changes in Design Research and Practice

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Editorial: Material-Enabled Changes in Design Research and Practice

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Over the last decade, we observe an ever-increasing interest of designers in tinkering and designing (with) new materials (Karana et al., 2015, Rognoli et al., 2015). Designers grow materials from living organisms (Myers, 2012; Collet, 2017), create active composites by embedding electronics into materials (Vallgårda et al, 2016). These emerging materials do not only radically change the role of the designer from a 'passive recipient' to an 'active maker' of materials (Myers, 2012; Karana et al., 2015; Rognoli et al., 2015), but also the ways we experience materials in daily artifacts, as *alive, active and adaptive* more than ever (Karana et al. 2017). We argue that practices with and through these emerging materials both in-design and use-time (Giaccardi and Karana, 2015) offer opportunity for achieving positive social (Drazin & Küchler 2015), environmental, economic and even political change.

- How do/will emerging materials advances affect practices around products from the designer and the end-user perspective?
- How is environmental, social, economic or political change activated through these new and emerging materials and "*material-driven design*" practices?

Within this Theme Track we asked authors to prepare articles that collectively address these questions through material and product design cases, examples of methods and frameworks, and theory building, which focus on the following axis points:

- Emerging materials: growing, recycled, bio-based, smart materials and material systems, alternative material resources, self-produced materials...
- Material-enabled cultures around design and production: open science, co-design, customization, democratization of fabrication practices, repair, craft practices, closed-loop systems, DIY approaches, bio-hacking, collaborative cross-disciplinary working practices, resilience strategies, …
- Emerging material experiences: sensory, embodied and affective experience, new material-driven practices, our relationships with nature and technology mediated by materials, new material identities and languages, new material contexts, virtual materials...

We have nine unique contributions accepted for the theme track which provide a wide panorama of topics in relation to emerging materials and design. Common to all, materials are considered as a powerful catalyst for change in design research and practice, as well as design practice as a catalyst for change in materials design. For example, borrowing concepts from social sciences that explore materiality within its multiple environments, ***Damla Tonuk*** and ***Tom Fisher*** draw on

conceptualisations of materials as active and as having the capacity to bring about change by proliferating relations and responding to new developments of "biotic materials". Sharing a similar view and a socio-material theoretical lens, ***Marium Durrani*** takes the mending activities of non-professional menders in communal repair workshops in the city of Helsinki, Finland, as a point of departure, identifying these menders as vernacular menders and exploring their dynamic practices to reveal the situated, embodied, routinized yet creative process of mending. She argues that

professional designers are not the only ones experiencing proximate relations with materials and the created outputs by the vernacular menders point towards extending mainstream conceptualizations of design and creativity towards positive environmental change.

More specifically about textile materials, ***Elaine Igoe*** identifies the deepening relationship between textiles and material design practice in the post-digital era by using key examples of contemporary designers. With a quote from the designer Lucy Hardcastle, she draws attention to the diverse techniques used by designers to tailor materials and create sensual aesthetics in design: "Hardcastle uses glass blowing techniques, 3D printing, flocking, hand dyed fabrics, 3D rendering, digital animation, photography and sound effortlessly to create *"real and imagined touch, visual illusions and sensual aesthetics"* (Hardcastle, 2017).

Stefano Parisi and his co-authors accentuate the connected, augmented, computational, interactive, active, responsive, and dynamic features of emerging materials and provide a number of examples to illustrate the potential of these materials for unique experiences. They urge designers to understand these materials in relation to other non-human entities, i.e. the environment or other materials, artefacts and organisms, which they introduce as the 'connected level' of materials experience. Delving into the making of a specific active, dynamic, responsive material, ***Jane Scott*** explores the design space in relation to humidity and moisture levels, using textile fibres with the ability to swell; changing in dimensions when exposed to high levels of moisture. Drawing on her personal experience, she explores how the complex hierarchies that exist within textiles can be used to engineer a unique class of programmable systems. She argues that this challenges conventional smart interfaces that rely on mediated responses via electronic control and demonstrates how an alternative approach informed by biomimicry can generate a new class of smart-natural materials.

Hellen van Rees and her co-authors describe the development of a robotic textile to be implemented in a health & wellbeing context and emphasize the role of a multidisciplinary approach to advance in new material development. The role of collaborative materials development for positive social and environmental change has also been emphasized by others contributing to the theme track. ***Rosie Hornbuckle*** shared her own experience from an EU H2020 funded project for the collaborative development of materials, involving designers, scientists and manufacturers. She argues that for such projects to move forward, at the very least, designers need to understand the material's potential and scientists need to understand what designers want the material to 'be like'. She offers one approach – appointing '*materials liaison officers*' to overcome language barriers between involved parties. To that end, ***Serena Camere and Elvin Karana*** offer a Toolkit to enrich designers' materials experience vocabulary to open up the design space for unique functions and expressions in material (driven) design. They emphasize that when the experiential qualities of a material are probed and mapped alongside the material's technical properties and performances, a thorough understanding of the material is achieved to guide the design process in (collaborative) materials design. ***Maria Engberg*** and her co-authors offer a new perspective to emergent materiality by giving prominence to the visual experience, next to the haptic and performative. The authors illustrate how engaging with phenomenological and computational visuality using mobile AR/MR technologies provides a deeper understanding of how the visual can be designed as part of a complex and re-configurable materiality.

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