Chapter 1

DeSForM 2017: Sense and Sensitivity

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Additional information is available at the end of the chapter

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1. Introduction

This year we celebrate the 10th edition of the DeSForM conference series. In 2005, DeSForM was born in (Eindhoven) the Netherlands with the premise of creating meaning through objects, interactions and people. Over the years, the DeSForM community has explored and designed objects through a multi-sensorial approach always aiming at enriching users' experiences with them. Throughout previous editions, we have seen the development from digital and mechanical objects that had enriched sensorial presence to adaptive and intelligent objects that feel almost analogous to reality given their increased information processing power and sensory resolution. These are thanks to the recent developments in the material sciences, robotics, information and sensor technology, and improved production techniques. Consider, for example, developments in wearables and embedded or computational materials. Consequently, the arena that belongs to design researchers and practitioners has gotten more sophisticated by being more technical, but also raises new questions regarding the effect and the impact of the new technologically rich designs. In 2017, DeSForM is returning to its place of birth opening up to a broader audience with deeper insights to debate about the future of dynamic 'form' giving and its effects on people and their environment.

Three major themes were devised for the conference. Our ambition was to explore how we adapt to novel interactive technologies, for which we received submissions exploring the home context and situations of (health)care. Furthermore, we wanted to devise what happened in the interaction of different modalities through the perceptual and experiential gap. Authors contributed through research on auditory experiences and how the different senses can be engaged or transformed into others. Also, we intended to look into the development of sensitivity, addressing the co-creation of experiences and design explorations into dynamic esthetics. Not only did we want to explore this through the contributions of many design researchers, but also we aspired to look at it from alternative perspectives. Therefore, we invited three keynote speakers from diverse backgrounds offering their distinctive view on the state-of-the-art of dynamic form. A physicist—investigating and creating materials with

surprising dynamic properties, an artist—composing the sounds for an intensive care room and a design engineer—working in one of the major navigation companies giving form to route finding through the use of data.

2. Adaptation to interactive technologies

Not only interactive technologies such as actuators, sensors, chips, lights, smart materials but also social robots and virtual reality, offer a specific challenge that humanity has not faced before. The design of interactive, responsive and self-evolving artifacts and environments challenges the physical understanding of people's surroundings and their skills to adapt to it. More than ever before, technologies create a gap between the human senses and the understanding of what is (being) sensed. Therefore, the senses are not to be trusted as much as one was used to. Novel products, interactions and experiences naturally emerge and question the way users make sense of novelty and interpret its effect on them. Authors contributing to the 10th edition confirm that soon enough more and more novel objects with interactive features will be part of our daily lives encouraging us to adapt to technological advancement in the comfort of our domestic environments. This time technology is employed in a sensitive and sensible manner in order to care and support us.

2.1. Sensible care

Technological advancement has always been in favor of addressing the imminent needs of human beings. While, in the past, technological innovations have covered many of our psychological and safety needs, today people feel the need to be 'the best one can be'. Being the best as possible (i.e., self-actualization) refers to both physical and mental performance in environments that are sensitive to rendering people's actual capacity and what they can achieve. **Feijs and Delbressine** offer a calm technology for monitoring the vitals of people and providing them with biofeedback, which is a timely solution in the age of information fatigue. **She et al.** study prolonged grief disorder (PGD) and how early signs can be detected through an internet-based screening. **Xu et al.** extend their interest in monitoring individuals and their vitals to monitoring societies and their stress levels. The authors seek answer in the field of interaction design and in the form of a clock that visualizes how people collectively experience stress. With an interactive demo, **Boess et al.** investigate ways to calm (overstressed) children with autism through technology that is respectful and that can relate to social tensions sensitive children can experience. While all authors in this session address stress and mental well-being, **Ramirez** and colleagues explore ways to introduce healthcare technology in people's homes for physical rehabilitation purposes. **Ramirez, Duncan, Brebner, and Chan** aim to make stroke rehabilitation exercises more playful, and with an interactive demo, **Ramirez, Lemke, Mccarthy, and Andreae** demonstrate women's preferences for interactions with healthcare products when the product is meant for private use as in the case of pelvic floor exercises. All these papers reflect designers' sensitivity to embed technology in domestic and social contexts with care and sensibility.

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In a workshop, **Sen and Sen** show participants how listening to the world with the sensitivity of a musician can transform the way they experience the world. The workshop organizers further guide the participants to hear the future soundscape of hospitals and craft speculative narratives for 2027.

2.2. Domestic digitization

In domestic digitization projects, the developments of connected products in the home and their potential impact on our lives were investigated. Critical reflections are taken on the increasing number of such products. For example, **Frens** discusses critical design issues for upcoming Internet of Things systems and investigates how to design for embodied and rich interaction with systems in which functionality can grow to match user's preference through four design cases [FRENS]. Furthermore, **Pillan et al.** present a critical and ethical reflection on the self, privacy, personal identity and the design choices that need to be made when creating smart products for the connected world [PILLAN]. Other researchers explored how interactive products could support more sustainable practices. **Wessman et al.** present a design probe 'peacetime', which is a physical manifestation that encourages pleasant activities without the use of electricity during peak hours and compared it to a website. Their results can inspire future designs for energy saving by using more emotional approaches to engage users [WESSMAN]. Furthermore, **Bergamashi et al.** explore more sustainable behavior by means of two prototypes with which they investigated how sensory languages, that is, without explicit information exchange, can support users in decreasing their water consumption. Finally, **Liu et al.** investigate expressiveness in human-system communication using point-lights, their results show that light behaviors can convey specific state information to support intuitive communication [LIU].

In a workshop, **Hur et al.** imagine a better relationship with technologies, artifacts and design in the future. The workshop organizers intend to address and explore the pervasiveness of technology by breaking down the design of now obsolete technological artifacts and reconstructing/redesigning them in terms of current design contexts. The aim is to raise awareness to our sensual/perceptual abilities by using bodily movements in order to recall the nature of relationship users have with forgotten and future artifacts, data and networks.

Novel technologies are changing our environment and the way we interact with it. The data that is generated can help to improve our quality of life, but can also have its negative effects, for example, in terms of privacy. Designers will have to deal with these technologies and use them as new materials for creating the future. Our keynote, **Maarten Gribnau** illustrates how data about traffic is used as a material to improve the way in which we can navigate through the world.

3. The perceptual and experiential gap

The perceptual and experiential gap opens up new avenues for designers and researchers in the traditional domain of experience design. First, by exploring the new definition of satisfaction

in the realm of novelty. Next, and maybe more exciting, by exploring how the gap can be used to generate new ways of interacting with, interpreting and creating an intriguing new world rather than a mundane one. As a creative community, we have reached a crunch point where we are able to shape the future of product, interaction and experience design in an exciting way. Thus, it has become possible to envision a world where people are intrigued by design, have dialog with designed artifacts, or artifacts that have discussions with other objects. These encounters will move people in surprising ways. The natural design habitat enriches people's sensory repertoire and deepens the meanings attached to artifacts allowing for, for example, poetry, reciprocity and seduction in relation to designed objects.

3.1. Transcending acoustics

In our daily interactions in domestic and professional environments, we are often habituated to the norms offered by certain senses. In this session, the contributing authors investigate future design interventions that challenge the existing role of auditory experiences in sensitive and critical contexts. With HAPTIC, a wearable haptic device designed for ICUs and ORs, **Gay-Betton et al.** reassign information that usually triggers audible alarms to haptic display and investigate the position on body (e.g., wrist or ankle) that is the most appropriate in critical care contexts. Similarly, in the form of an interactive demo, **Reynolds et al.** present SLAAP as a sound attenuating device that can help overcome not only alarm fatigue in clinicians but also delirium and PTSD experienced in ICU patients. Thus, often lack of certain frequencies or even sound itself can be a desirable design feature. **Misdariis and Cera** address the issue of lack of conventional sound in electric vehicles and how such technological outcome helps rethink the politics of designing sounds for commercial entities and discuss its practice from the perspectives of arts and science. **McKenzie and Lennox** investigate the physiology of spatial hearing through a bone-and-tissue conductor apparatus and how the sensation of hearing is in its essence similar to tactile stimulation. The authors report that an tactilely induced spatial hearing may substitute a real auditory experience as this new technology is described by users as enjoyable, informative and spatial but also strange.

3.2. Sensory engagement

In sensory engagement, several designs are presented that extensively involve the senses to create more pleasant or rewarding experiences. To stimulate more active behavior, **Afonso** has developed urban art installations that afford playful, action-oriented and sensorimotor encounters. By analyzing these installations in context, they argue that active modalities are more effective at placemaking [AFONSO]. Another approach to behavior change was taken by **Andreae et al.** who explored how interactive tableware could manipulate sensory perception to control portion size, thereby preventing obesity [ANDREAE]. **Lim** developed an esthetically appealing felted textile that is inspired by a hilly green landscape. With its embedded soft electronics, this interactive textile creates a sensorial experience that combines the tactile and aural senses into an esthetic experience [LIM]. Finally, **Taverna et al.** presents their design of a set of products that aim to lead children toward autonomy in their personal hygiene practices [TAVERNA]. Igeni are three colorful monsters that support children in the bathroom and remind them to flush the toilet, brush their teeth and wash their hands.

In a workshop, **Frankel et al.** aim to increase multi-sensory and multi-modal design awareness of design practitioners. The workshop organizers offer participants activities with which they identify, share and play in order for them to learn novel ways for exploring multi-sensory and multi-modal qualities for physical and virtual interaction design.

Having technology embedded in our lives also comes at a cost. The more products that are there to support us the more they contribute to the noise pollution in our domestic as well as professional environments. Such negative consequence of sound is clearly prominent in hospitals in general and in critical care contexts in particular. Currently, this issue needs urgent attention as unwanted sound threatens not only patient safety but also their well-being. Our keynote speaker, **Yoko K. Sen**, with an artistic approach, rethinks the impact of hospital-specific sounds on the healing process of patients. Sen further imagines the future of hospital sound in which sound is a display of care, love and respect and that patient can recover in tranquility.

4. Developing sensitivity

Sensitivity is no longer about 'knowing the world' but about 'being in the world' and exploring it. This means that people need to continuously adapt to a changing world and give meaning to it in a creative way. The sensitivity of the mind is grounded in the sensitivity of the senses. The question becomes: how do people develop this new sensitivity and how do we design for it? Understanding the process of adaptation sheds light on the working of human body and mind. We are able to tackle sensory and cognitive capacity of users using the knowledge, tools and methods we have been acquiring and building over the years. Designing for sensitivity using these new approaches should result in the creation of unprecedented experiences as well as the envisioning and demonstration of interactive futures.

4.1. Co-creating experiences

In this session, authors consider all stakeholders in the design processes when technological solutions are prominent in interaction design targeted at individuals as well as societies. **Jaasma et al.** reflect on individual sensemaking of public technological applications and propose that collective experience of public technological applications could be based on scaffolding the individual interpretations of the system content in face-to-face interactions. **Wetzels et al.** propose a change in the roles of researchers and system developers in the design methodology that is applied for designing healthcare monitoring products. The authors argue that software developers need to have a deeper understanding of health-related data which can only be obtained through research. They demonstrate the benefits of this new methodology with the results of an app design that has been evaluated by users. **Peeters et al.** include a multi-disciplinary design team that consists of interaction designers, professional dancers, software developers, artists and 3D modeling experts in order to unravel, and design for, an embodied esthetic experience. Their study also sheds light into understanding the complexity of tacit experiences. Finally, **Karahanoglu and Bakirlioglu** reverse the design process to understand how designers can better understand the user and incorporate the product usage early in the design processes.

In a workshop, **Ventura and Shvo** reconsider the role of designer for societal and political impact and reframe designers as interpreters of socially and culturally complex issues rather than adopters of technology for resolving complex problems. The workshop organizers aim to depict a futuristic picture for healthcare design in which designers are powerful and influential in sensitive and emotional episodes in people's lives.

4.2. Dynamic esthetics

Biology can be of great inspiration for the design of dynamic movement, animals and plants that have developed these subtle movements over time and designers should use this knowledge to their benefit. Therefore, **Fayazi et al.** propose a three step biology-to-design approach to adapt biological movements into the design, observing and identifying natural movements, classifying the types of movements based on direction, volume and path and sketching and iterative prototyping [FAYAZI]. Other natural phenomena have inspired the work of **Petersen and Kristensen**, who have looked into the possibility of integrating of natural and artificial lighting to enable dynamic lighting design [PETERSEN]. Their observational instrument enhances the subtle integration of naturally reflected and artificially emitted light, to support experimentation with its nuances. Artificial behavior can lead to surprising effects, and this is explored in the context of light by **Ramirez et al.** The authors present a set of experimental light objects that support surprising experience through their visual-tactile incongruity [RAMIREZ]. A new craft for dynamic esthetics is to be developed, and why should this not be inspired in traditional crafts? **Lim et al.** explore how to embed interactivity in traditional materials through artisanal processes thereby creating interactive and reactive hybrid materials, that is, combinations of electronics, smart and traditional materials [LIM2]. These more dynamic materials, which in human-computer interaction are referred to as shape-changing interfaces, can be used to communicate system information. **Gallegos et al.** demonstrate how such dynamic forms can help people in understanding that the system is aware of their presence [GALLEGOS].

The possibility for the use of dynamic materials in design opens up new ways of material applications. Potential directions for interaction design, embedding new materials and the esthetics of dynamic form is addressed in the keynote of **Corentin Coulais.** Coulais presents machine materials, that is, materials that combine internal architecture and active processes to interact with their environment in a programmable fashion, for us to reconsider the distance between natural sciences and interaction design.

5. Speculating futures: student interactive demo (SID)

This year we had a chance to involve interaction design students who were rethinking the future of pervasive technology and privacy issues regarding data collection and use in the course of Interactive Technology Design (TU Delft) under the supervision of Aadjan van der Helm, Roy Bendor, Tomas Jaskiewicz and Wouter van der Hoog. Students' interactive demos are used as narratives to speculate the effects of technology on us. With **AI Mayor**, we step into

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a future where urban planning decisions are made by Artificial Intelligence. **The Republic of Tirania** demonstrates what one would be willing to do for safe refuge. **Interstellar emotion trainer** supposes that space travel is lonely and one better needs to be prepared! **The Datactor** questions what consumers can trust in an age of fake product data. **Data Graveyard** shows what happens to your data after you die. These interactive demos make the future concrete before our eyes and help us reconsider our options now with the pros and cons of data privacy and data usage.

6. Future of DeSForm

The 10th edition of DeSForm brings together not only interaction designers but also an array of technologists, artists, scientists, software developers, futurists, politicians, clinicians and makers and builders who are passionate about establishing a fertile and creative base for interactive experience design and the individual and social benefits it brings to people's daily lives. The multi-disciplinary scientific debate at DeSForm 2017 is exemplary and has to be openly shared by this widening interaction and experience design community. Therefore, for the first time in its history, DeSForM conference takes part in open access and indexed publication with InTechOpen to allow all contributors celebrate their work with their peers with open mind and sensitivity for scientific integrity. Our action is in line with the current movement in the academia toward Open Science Open Minds philosophy and we support delivery of science to society free of charge and accessible online. By doing this, we aim to propagate creation and application of new ideas in the field of interactive experience design as well as have impact in the corresponding fields such as material sciences, robotics, (bio)medical engineering, politics, social sciences and many more. The future of DeSForM is about co-creating this community with scientific and technological advancement and sharing unprecedented scientific experiences.

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