

**Exceed! '17**



Cover image: **Design - | +**  
**Negative emotions for positive experiences**  
Steven Fokkinga (Project 21)

#### COLOPHON

**Exceed!**'17  
IDE Exhibition of Excellence in Design,  
Research & Engineering

June 7th until June 22nd 2017  
Faculty of Industrial Design Engineering, TU Delft,  
Landbergstraat 15, 2628CE Delft, The Netherlands

#### OPENING

Jeroen Tas (Chief Innovation & Strategy Officer  
and Member Executive Committee of Royal Philips)

#### EXHIBITION

Project manager: Hans Suijkerbuijk  
Organization: Carlita Kooman  
Student Assistant: Jord de Kat Angelino

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# Exceed! '17

IDE EXHIBITION OF EXCELLENCE IN  
DESIGN, RESEARCH AND ENGINEERING

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The Tovertafel	p.50-51	23	HESTER ANDERIESEN/LE RICHE

"KOOKID initiates a daily moment to connect for parents and their infants (1,5 up to 3 years old) by involving the child in the process of cooking in a safe, explorative and playful way. The child's natural movements are utilized in a beneficial way by the various elements. This facilitates simple cooking actions like cutting, mashing and cracking. In this way, infants can proudly contribute to the dinner preparation. Furthermore, integrating KOOKID in the kitchen and on the dinner table helps the child to understand the transition from cooking to eating dinner, while given the opportunity to positively relate to healthy food at an early age.

In this exceptional graduation project (DfI) Lotte did not stop with a concept and experiential prototype, but with a refined, final (3D printed) product that has been improved in three iterations with fully functional prototypes and corresponding testing in context (dinner preparation with children 1.5-3 years old). The company involved, 10XBeta, a product development company based in New York, is currently seeking opportunities of crowdfunding for this project in order to bring it to market. Furthermore, in addition to the high level of product refinement, Lotte had an extensive research phase in the beginning, including multiple observations in context, expert interviews, literature review and a collection of daily anecdotes by parents. Her design is the first design project that is fully grounded on the positive design framework, developed by Pieter Desmet and Anna Pohlmeier, and thereby an exceptionally nice example that bridges research, education and design. In this line, we also published a conference paper on the research outcomes of this project: a novel approach to design for co-wellbeing of different user groups."

Paper presented at International Conference on Design and Emotion; received Best Presentation Award Jacobse, L., Pohlmeier, A.E., Boess, S. (2016). Still in its infancy: Design for co-wellbeing among different user groups. International Conference of Design and Emotion 2016 (pp. 211-221).



Anna Pohlmeier (Chair)  
Stella Boess (Mentor)  
Marcel Botha (Company Mentor)



WOUTER KOOMEN

Graduation Project

Margreet Beets (Mentor)  
Rudolf van Heur (Chair)

02



## The Sync-a downdraft solution



### An innovative solution to extract cooking vapours

"The assignment was to design and validate a new domino downdraft extractor for the domino product lines of ATAG and ASKO that is able to extract the cooking vapours better than the BORA Professional in all home-cooking scenarios.

Conclusion: The assignment was to design a new domino downdraft extractor that would better extract the cooking vapours of large pots. However, by deviating from more obvious solutions that rise from the cook-top to extract the cooking vapours, a completely new concept was created that brings solutions for: extracting from high pots; reducing noise; and increasing efficiency.

This student project is relevant because of its research into new possibilities for extraction of cooking vapours that has led to a small technological advancement. The project also embodies the integration of this technique into an innovative product design. The new design stands out compared to the competition on the market."



03





"No matter whether we see the artifact as a manifestation or a provocation, whether we use them as a vehicle for critique or for developing theories - artifacts certainly have an important influence on people. Whether they are props or fully functional products, their tangible qualities draw attention and spur the imagination of many. At the same time to gain insight from an artifact, we need to have a framing. And it's on this idea of whether artifacts speak by themselves, that [we need to] consider how the agency of artifacts is transformed by data technologies"

"To avoid thinking of data-enabled artifacts as measurement devices aimed to produce data for analysis, I will use the term 'things' rather than artifacts. With the use of the term things, besides the obvious link to data technologies, Internet of Things infrastructures etc. I aim to go beyond the idea of the 'single object' (the device) and frame data-enabled artifacts as sociomaterial assemblies, where data, connections and interactions (humans and humans, humans and nonhumans) converge."

**"As objects around us begin to collect data and make suggestions about what might be desirable, it is possible that they may even be able to design things that we could never think of. Thing-Centered Design is a new way of researching and designing 'with' things that looks into these possibilities."**

"One of the broader definitions of design as an activity is 'transforming a current state into a preferred state' (Simon, 1996). By this definition, it is very clear that design is inherently ethical. For what is defined as 'preferred' and who decides this?

Within this research ethical design practice is defined as being aware of and taking responsibility for the ethical implications of a design in development.

To this end, the central aim of this research has been to explore ways for designers to incorporate ethics into their design process. A practice-based research methodology has been employed. Various techniques based on current ethical decision making tools and design methods have been experimented with. The insights gained throughout the project are boiled down into an accessible framework of how designers can cope with ethical issues within design.

The argument put forth in this research is that the development of skills allows for incorporation of ethics because skills are not limited to specific content. The proposed ethical skills for designers are moral sensitivity, moral creativity and moral advocacy. Building on the theoretical framework, a toolkit for designers to acquire and develop these ethical skills has been developed. The tools are grouped in relation to the three ethical skills.

This cum laude graduation project opens (creative) possibilities for ethics in the design process, something that has not been done before. The toolkit Jet developed is a first step to develop one's skills in this field (moral sensitivity, moral creativity, and moral advocacy). Jet integrates the skills of an academic industrial designer; the cognitive, the empathic, and the intuitive."

Marco Rozendaal (Chair)  
Wim Schermer (Mentor)

1. Describe the current situation of your design context.

04

### ETHICAL DISCLAIMER.

THIS TOOL HELPS YOU SET THE ETHICAL TERMS AT THE START OF YOUR PROJECT. USE YOUR IMAGINATION TO THINK OF UNETHICAL SITUATIONS AND DISCUSS WHAT YOU'LL TAKE RESPONSIBILITY FOR AS DESIGNERS.

2. List all the people/companies/ institutions that have an interest in, or are affected by your design. Both direct stakeholders such as users and your client and indirect such as maintenance.

**Note:** the ethical disclaimer is a living document. As the design develops and becomes more concrete, so will the potential unethical situations. Therefore it is important to update the disclaimer at project milestones and discuss changes with all stakeholders.

"What dark, wrong  
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'wrong' people?  
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What happens if

3. Write down your intentions. Be specific in terms of users, context and purpose. The more explicit, the easier you can discuss them with stakeholders throughout the project.

4. Imagine the context with your design in it. (If you don't know yet what you're designing, think of ways to change the current situation.) Think of situations with your design which might be unethical. Think from the perspective of the different stakeholders. How will they use/contribute to/gain from/be harmed by your design? Use post-its to speed things up.

5. Discuss for which of the unethical situations you will take responsibility by moving them down to the left or right section of the template. Substantiate your choices.



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Or shared by differ-  
at if it is used in  
ntext? Or for a dif-  
? Or combined with  
gy? Who can access it?  
E people hack it?"

Marco Rozendaal  
(Daily Supervisor)  
Pieter Jan Stappers (Promotor)  
Marry M. van den Heuvel-Eibrink  
(Promotor, Princess Máxima  
Center for pediatric oncology)  
Janjaap van der Net  
(External Advisor, Wilhelmina  
Children's Hospital)

05a



## 1. Fizzy

### A pro-active ball



"In this PhD project we are interested in what stimulates young children to engage in physical play in hospital settings. The research, in its current stage, focuses on young children with cancer. When hospitalised, children often show low levels of physical activity. Increasing these levels can positively affect the child and family both experientially and developmentally.

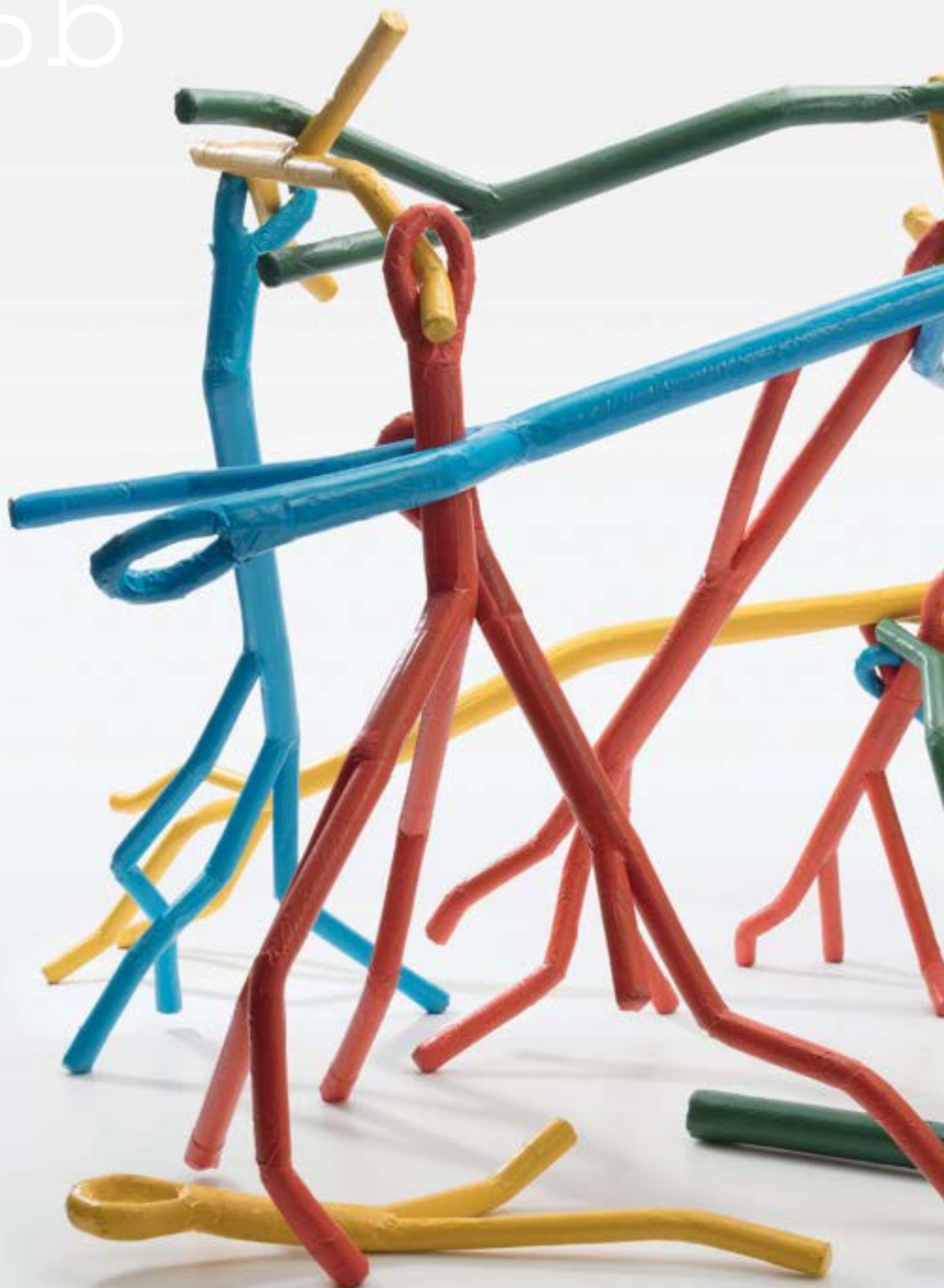
As part of the project we are developing a design perspective called 'Playscapes', hinting at children's perception of their direct environment as potential 'landscape for play'. Playscapes is inspired by young children's outdoor play, which typically involves a high amount of physical activity. The design perspective accounts for three main qualities: free play (play that is spontaneous, self-directed, unstructured), bodily play (play that involves a diversity of gross motor movements) and dispersed play (play that is dispersed and beyond the boundaries of a predefined play area). We are gaining and sharing concrete insights on how to design for these qualities in hospital settings.

Two design examples that have resulted from Playscapes are 'Fizzy' and 'Stickz'. Fizzy ([this page](#)) is a pro-active ball that wiggles to get your attention, rolls away when being approached, shakes when it is picked up, and purrs when being caressed. With this behavioural repertoire, Fizzy invites children to follow and play, while allowing the child to attach their own meaning to it (e.g. Fizzy as ball or creature). Stickz ([next page](#)) are soft branch-shaped objects which can be used to build various structures. As loose and connectable parts, Stickz invite dragging, carrying and building. The ambiguous shapes of Stickz and the creations children make with them, stimulate children's imagination (e.g. a single Stick as a sword or a construction as a 'tent for nurse Amy')."



Research 1.7 THE EXISTENCE OF RESISTANCE IN DESIGN, RESEARCH & ENGINEERING

05b



## 2. Stickz

### Ambiguous soft branch-shaped objects

"This PhD project uses a 'Research through Design' approach in which design actions and resulting prototypes play a central role in exploring a social phenomenon in real life settings. For example, the Fizzy prototype ([previous page](#)) was used to explore physical play in patient rooms, while Stickz ([this page](#)) were introduced to a semi-public waiting area in the hospital. With these efforts we are gaining rich insight into how the designs, children, parents, siblings and hospital staff play various roles in stimulating physical play.

The research is part of a project called 'Meedoen=Groeien!', in which we collaborate with the Princess Máxima Center for paediatric oncology and the Dutch Rehabilitation Fund. The project is unique in that it does not only aim to generate knowledge output, but also commercial design output. For example, a variant on Stickz is currently being developed further by an interior design agency for implementation in the Princess Máxima Center. Furthermore, the project has served as a design context for several graduation projects and courses such as Interactive Technology Design, Advanced Concept Design and the minor Interactive Environments."





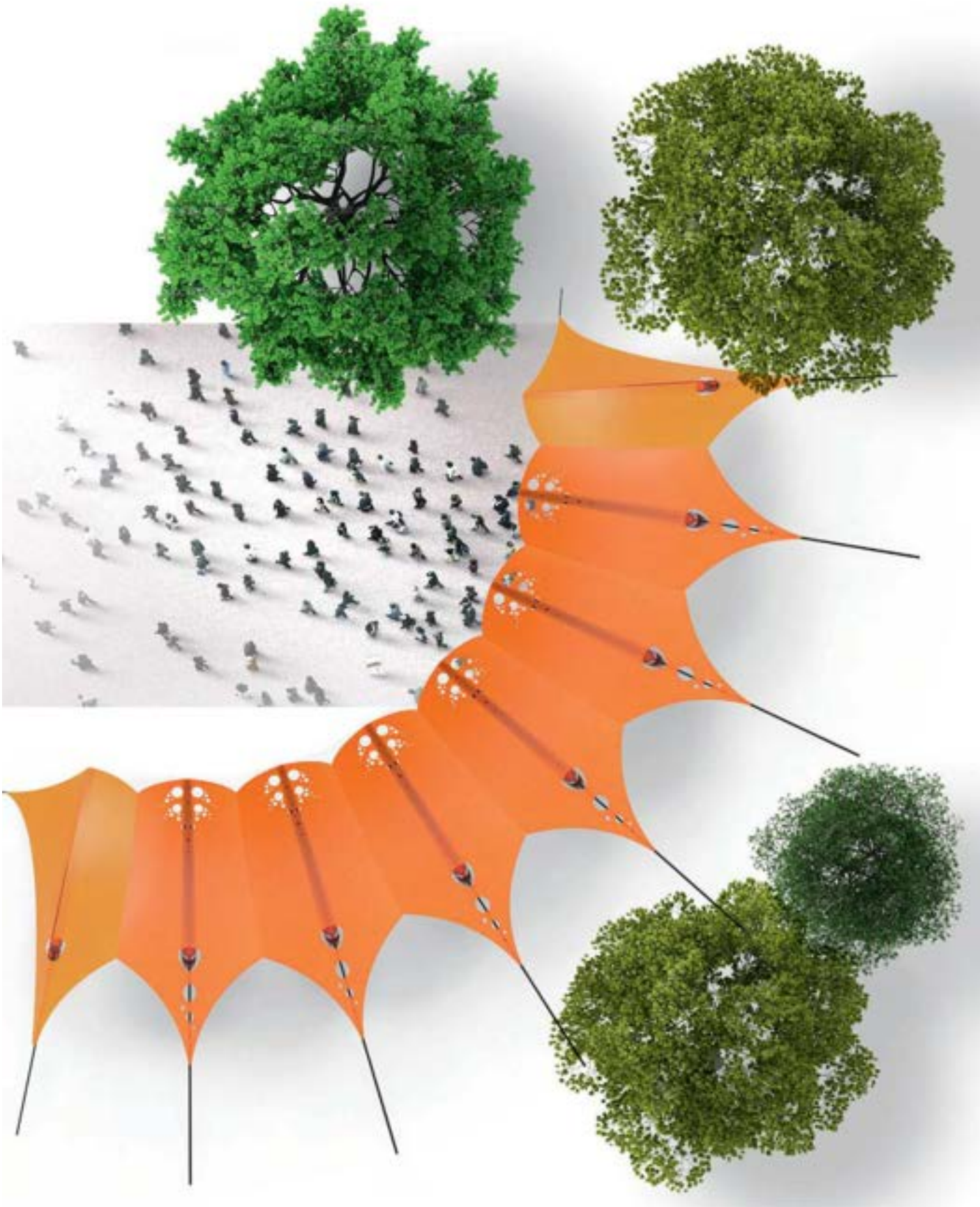
Vliegerop (Company)

"The Industrial Design bachelor final thesis is a comprehensive project covering the production, sales, esthetics and product characteristics of the design process. In this report several analysis-, extensive research- and conceptualization methods are used to cover a complete design process. 'ElRogga: not an ordinary tent' describes the development of a new inflatable tent. This tent is the result of the challenge of Vliegerop BV to develop an innovative tent design using their specialized techniques.

Vliegerop is a Dutch company that has a lot of knowledge concerning inflatable objects. The holding specializes in beach sports. Their brand Peter Lynn Kites is one of the leading kite surf brands in the world. This brand is uses inflatable air tubes to create a stiff skeleton optimized for kitesurf kites. The air tubes are made of a polymer inner- and a stiff textile outer tube (Dacron) and can withstand great loads when inflated. These tubes can function as the structural backbone of inflatable tents.

The project is unique in its kind. The techniques used, have seldom been applied to tents on such a scale. The project comprises design, strategy a bit of ingenuity. The project is a nice example of what the intensive Bachelor Final thesis project can lead to. 'elRogga' is currently still in development. After this project I started helping developing a new product line for Vliegerop bv. At the moment prototyping is done."





Jos Oberdorf (Mentor)  
 Valentijn Visch (Mentor)  
 Broadbent, S. (Mentor)  
 TomTom A'dam (Company)

## TomTom Orbit

"TomTom Orbit is a digital sports toy that can be thrown with. This shuttle measures several throw statistics like distance, height, speed, spin and amount of catches. With these, multiple games can be played. Each appealing to a different type of self-enforcing challenge. In its most basic form Orbit can be thrown away and children can see how far and high they have thrown. More sophisticated games include game mechanics like time pressure and catch detection. Each game requires a clear game goal structure. Goal attainment directs players towards one game goal, nurturing the group spirit.

Children between the ages 8-12 want to discover what they are capable of through challenge affording toys. At the same time millennial parents would like to stay active, thoughtful participants in their children's lives. They fear children will isolate themselves by playing video games. The increasing demand for digital entertainment shows that tech becomes a fundamental part of play, rather than just a gimmick. Many parents, therefore, embrace digital educational toys, which emphasise

## Facilitating collective playtime

the cognitive development of children. However, the physical challenge-need of children stays underexposed within digital play. TomTom Orbit is a throwable shuttle that inspires movement by challenging children physically through digital means. Orbit measures various throw statistics, e.g. throw distance, that open up ways for children and parents to engage in goal-oriented games. But just numbers and stats are not impactful for play. Orbit makes sensational sound effects while throwing and catching it. These sounds alter based on the player's performance. By morphing between play and performance children get engaged in a self-enforcing challenge that facilitates other people's involvement.

This very well executed and allround IPD project started with a search for new applications of TomTom technology in the field of toys. This resulted in interesting research into game playing in combination with technology involving a new application, effective concept development and exemplary embodiment."

1. TPU outer skin body
2. PU foam
3. Electronic module (IP67)
4. TPU tail frame
5. TPU outer skin tail





07



## A new Unaccompanied Minors Service

MARGA UNA BORRAS

"What started off as a project to design a new service for the most vulnerable passenger of all: children travelling alone, became one of the most illustrative projects of what design can bring to a corporate environment. The 'Unaccompanied Minor' project from the Horizon 2020 PASSME project, in collaboration with KLM (Royal Dutch Airlines) became a carrier for multiple research projects. The design itself was an exploration of how designers can act on a system design level, showcasing the strengths of the designers skills, as well as working in iterations on results and testing them in real operations. For KLM, the project became the showcase of how the operations could be digitized, and is being used to understand what digital transformation implies for the organization. It makes at the same time the digital strategy

so concrete, it can be tackled in various parts of the company. After the end of the project, we continued with the team, to investigate how we can make sure the concepts of designers can be implemented within a corporate environment, moving from abstract dreams to an actual experiential reality. During Marga's graduation, the project was developed up to a tested MVP and is now in the planning to roll out. Being one of several projects where we undertook measure to design from a system perspective, with a focus on making it reality.

This project has been presented at the Passenger Terminal Conference in Cologne, february 2016, as well as at the Design Management Conference 2016 in Boston, August 2016. The project was an example project in the 'Design Practice for Business' MOOC."

Christine De Lille (Chair)  
Suzanne Hiemstra-van Mastrigt (Mentor)  
Robin Bronkhorst (Co-Mentor)  
Tiddo Veldhuis (KLM Supervisor)  
Marco van Heerde (KLM Buddy & Follow-up)

"This project will be reality, moving from a report and a design towards being offered to children travelling alone. It is a showcase of what the contribution of design is: holistic, designing for a system, user perspective central, taking into account all stakeholders, result driven, with an amazing affinity for technology and using all skills of a designer. The project is a combination of research and education, an example to showcase how the two can reinforce each other. It is frequently used for both research and industry purposes, as part of one of the Horizon2020 projects of the faculty: PASSME and showcases what these projects can bring for both education and research."

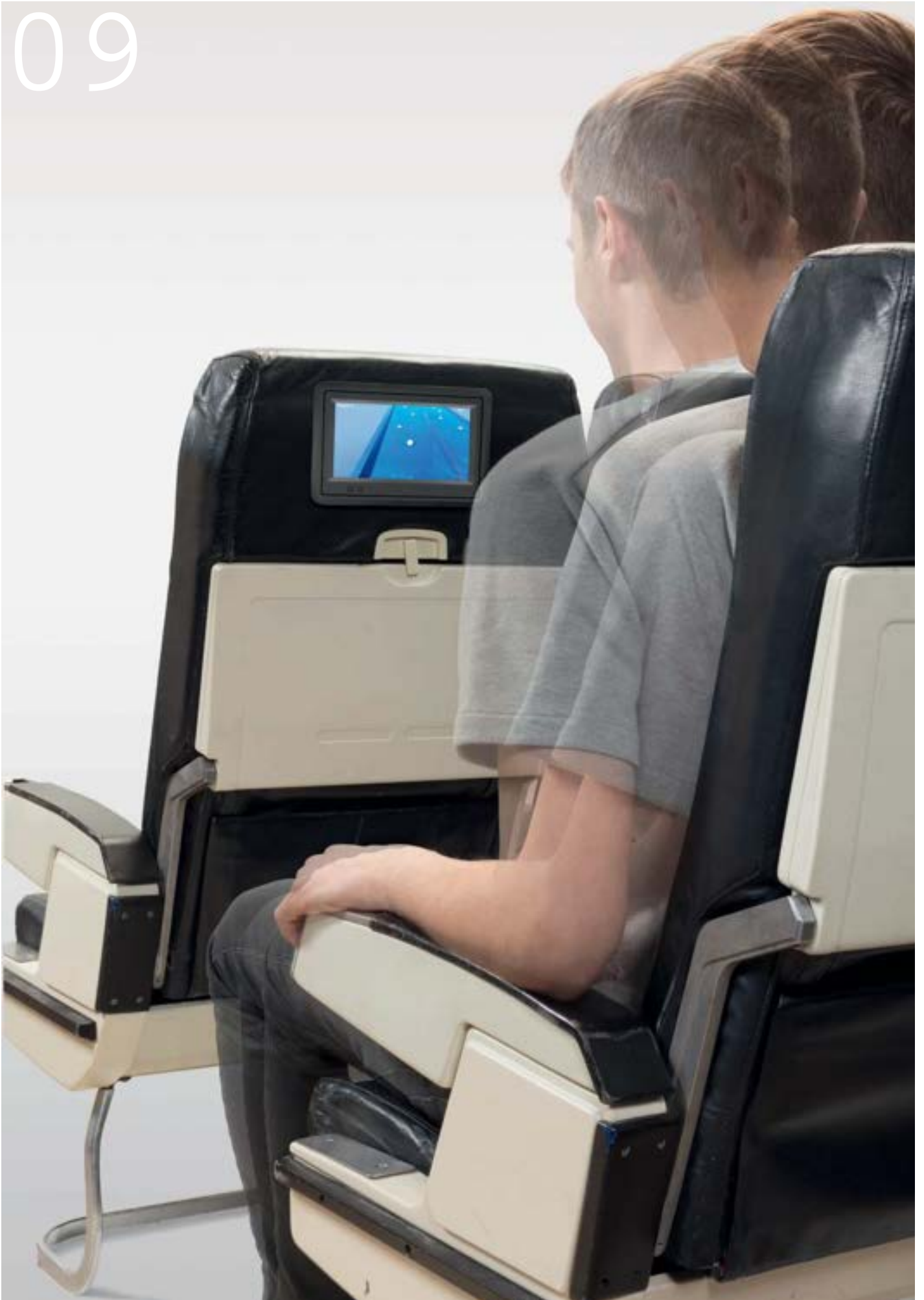


08



# 09

Research 1.7 THE EXISTENCE OF EXPERIENCE IN DESIGN, RESEARCH & ENGINEERING





## The aircraft seat as a game controller

"The Revitalisation System solves the problem of discomfort in aircrafts in an innovative way. Instead of reducing discomfort by changing physical attributes of the seats, this solution changes the way we interact with the seats. The idea is to engage passengers in unobtrusive exercises in their aircraft seats by playing a game. Exercise based gaming is not currently available on-board commercial aircrafts, making this product the first of its kind. The most comparable product could be found in the automotive industry, where BMW integrated an exercise system in their 7 series. This system allows a passenger to do a number of exercises while seated in the backseat and get feedback via a screen in front of them, which is far more rudimentary than the feedback a game gives. The aircrafts setting sets specific demands on the type of exercise. Fellow passengers seated close by should not be disturbed and exercise based movements may also feel embarrassing for the person doing them. This might inhibit passengers from performing the exercises, which is why extra care was taken for the user during concept development. The specific movements in the seat were designed in an aircraft setting through iterative testing. The tests included experiences from passengers and comfort and discomfort ratings based on ergonomics testing. These tests showed that an exercise combining lifting the legs and extending them was the most suitable while it also provides a sufficient rise in heart rate to reduce discomfort.

The physical shape of the product was developed with focus on the designed exercises and the installation process. The product is a thin nylon band, with force sensors attached to a stiff textile section in the middle. The ideal location for the sensors was found by analyzing the pressure points that arise during the exercises. This location is under each

EMMA ERKELENS, DOMENICO IACOVIELLO, MAX KERSTEN,  
DAVID RANGLES, LUKAS RIEDEL, EMMA WISSE

leg, 125 millimeters from the seat pan edge and 190 millimeters apart. It can be installed in both new seats and current seats of all different sizes. This is made possible by elastic ends on the band, which also assures an optimal centered position of the sensors. The present velcro fastening that attaches the cover to the foam of the bottom cushion is used for attaching our product. It sits just under the cover of the seat pan, unnoticeable to the passenger. This placement and attachment allows for a quick and easy installation: open the cover of the seat pan, attach the velcro and our product aligns itself. Put the cover back on and the product is ready to use.

Peter Vink (Coach)  
Joyce Bouwens (Coach)

A new game was developed to make the controller perform to its best. Requirements for the game include making movements in the seat precision based, rather than reaction based. Reaction based games create quick movements, which is unwanted in the aircraft setting. Therefore a balance game was developed to showcase the strengths of the Revitalisation System. The game required users to roll a ball through a virtual 3D maze while avoiding obstacles. In order to succeed players had to tense their muscles and carefully adjust themselves to control the ball.

The Revitalisation System has been scientifically tested for its proof-of-concept. The tests were conducted with a working prototype. The test concluded that the heart rate had a significant rise between playing state and rest state, with an average rise of 21%. The study also showed higher ratings for excitement from people using the Revitalisation System and lower ratings for stress. These factors contribute to the conclusion that the innovation is performing well and reduces discomfort for passengers.

This project was one of the finalists of the Crystal Cabin Awards 2017."

# 10



## A future vision on console gaming

TELMEN DZJIND

Conny Bakker (Mentor)  
Marieke Sonneveld (Mentor)

"WAVES is a product-service combination that completely rethinks the console gaming experience. In the near future, gamers don't have to buy an expensive game console. They simply choose a subscription that provides a game console tailored to their needs. The three subscriptions are PLAY (casual gamer), CORE (core gamer) and FRONTIER (heavy core gamer). Due to its modularity, the gamer can receive upgrades based on their desired gaming experience and performance need. Because the performance need of gamers cascades gradually, the manufacturer can efficiently reuse and remanufacture parts throughout different gamer-segments. One wave of parts that serves multiple users throughout its lifecycle. Finally, at the end of each lifecycle, the manufacturer can recycle the parts and close the ecological loop. WAVES is based on user research on the desired user experience of gamers. The insights of the research acted as a guide for existing (circular) product design and business strategies. The outcome is a powerful case study of how the Circular Economy can enhance the user experience when driven by a user-centered approach.

The modular WAVES game console is a great example of a circular product design - we think it showcases the future of product development. Designers like Telmen take responsibility for a product's "afterlife", and develop business models and associated product concepts that have a useful and economically profitable second and third life. Telmen's contribution is that he didn't only focus on material flows and business models, but he gave the user centre stage; developing an attractive concept and value proposition for the future gamer."

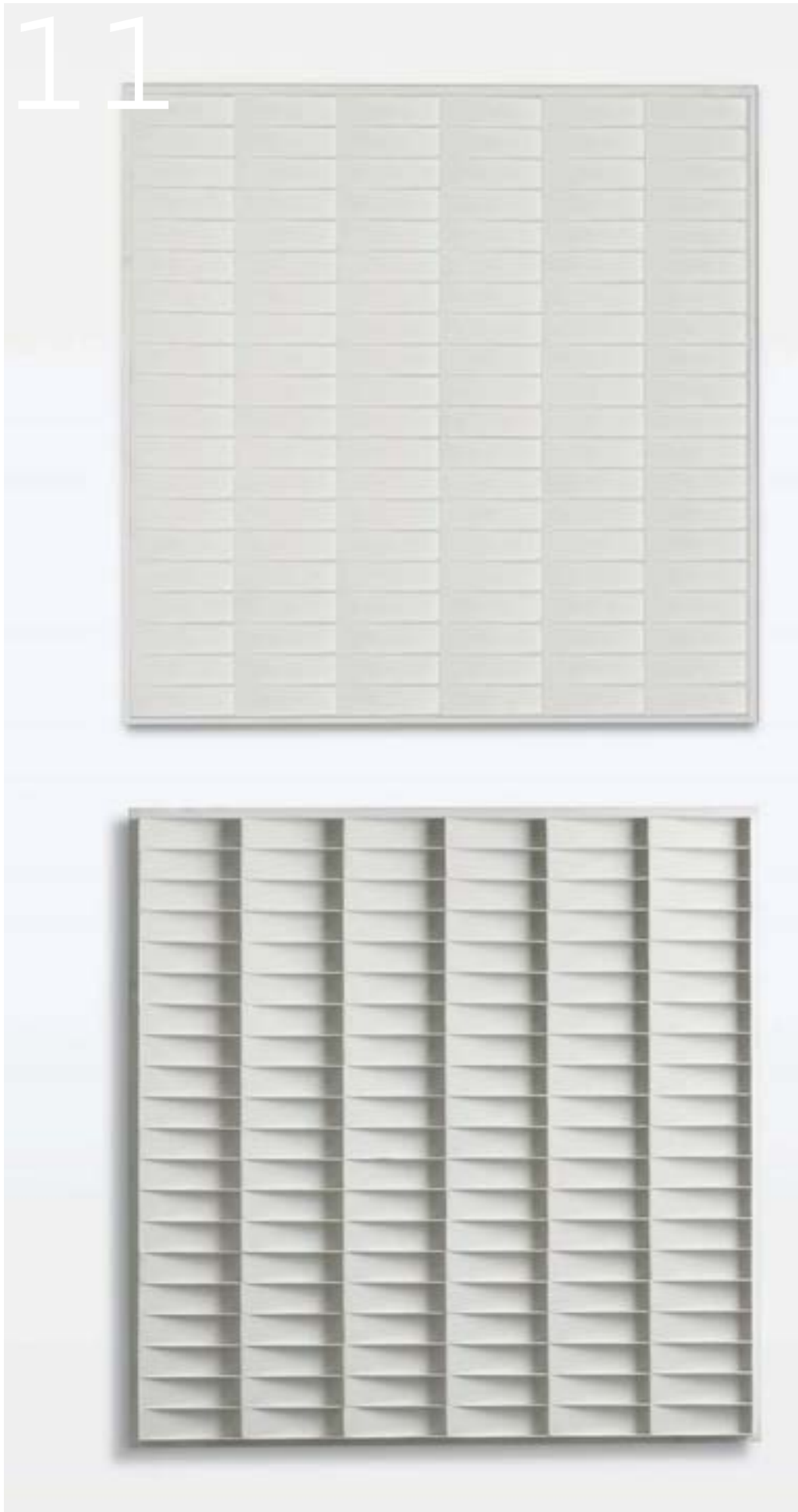


## Lichtvorm

"Several years ago, Professor Sylvia Pont worked on the light design for an exhibition on Delft-based artist Jan Schoonhoven, who specialised in wall reliefs. "I gave a lecture at Museum Prinsenhof once on light and perception and all the factors that play a role in what and how you see." Following that lecture, Pont was invited to make a design for the Schoonhoven exhibition. (Delft, October 2015-February 2016) "If you Google his work, the way it's presented in different exhibitions, you often can't even see that it's the same piece. The museum wanted to show that phenomenon." Cris van Hoogdalem, whose Master's project was supervised by Pont, did a number of preliminary studies using copies of his work. "We tried all sorts of things in collaboration with the Beers-nielsen bureau. We eventually designed a light set-up for the exhibition. The works of art were lighted interactively, changing before your very eyes from cones to vertical lines to all sorts of shapes. That exhibition was widely acclaimed. People were amazed by it and couldn't believe it was real."



Light, shape and shadows. Designing an exhibition for dynamic experience of Jan Schoonhoven's reliefs.



Sylvia Pont (Chair)  
Valentijn Visch (Mentor)  
Beersnielsen (Advising Company)  
Marga Schoemaker (Curator  
Museum Prinsenhof, Delft)



"The graduation project by Chris was well-worked out, realized in a public setting and well received by the media. Moreover, it also resulted in publications such as a book and a conference poster. The project was a multidisciplinary collaboration in which people (perception & user experience), technology (advanced dynamic LED lighting) and business (public exhibition) were connected, and from a scientific perspective optics, psychology, design and humanities."



Kaspar Jansen (Chair)  
Bram de Smit (Mentor)

## Materials that Move

"A novel material is developed consisting of 3d-printed flexible material combined with Fields metal (a metal with extreme low melting point). By adding memory metal wires the material is able to morph in a controlled manner, thus making a new type of products possible which can morph into different geometrical shapes. In the project extensive experiments were specified and conducted, thus iterating to an applicable technology. The technology was then used in creativity sessions to generate new directions for product development. A working demonstrator was built which shows ground breaking potential.

In her project Liselotte perfectly combined scientific methods and academic approach with the skills of a an IO product designer. In her report and presentation she has shown extraordinary skills in explaining and demonstrating all working principles and clarifying the great potential as well as the remaining problems to be solved. Liselotte's project is a perfect example of what IDE engineers can do and add to the world."

## Creation of a shape morphing composite

# 12







# 13



## An intelligent denim wearable

"This project started as a collaboration between Pauline van Dongen and ItalDenim. ItalDenim is an innovative, Italian denim manufacture making every meter denim without environmental impact. This collaboration provided the opportunity to weave conductive yarns into denim fabric to obtain 'intelligent denim'.

Much research has been conducted to the meaning of denim. Denim is transcending all layers in society, worn by young and old, poor and rich is therefore the ultimate fabric to showcase the potential of wearable technology. Denim is characterised by its graceful aging, it fades and becomes softer, like a friendship it becomes more personal and intimate throughout the years. This friendship metaphor has been used as design input for Issho. Not only in shape of the jacket, the cocoon-like shape, high collar enable to conceal and a zipper on the back for extra space, but also as a form of interaction. Like a friendship there is a mutual relation between the wearer and the jacket.

ISSHO contains three touch sensors and four vibration motors on the upper back, controlled by a microcontroller with rechargeable battery. The denim fabric obtains its touch capacity by conductive yarns woven into the denim fabric. The yarns are selected on functionality; price, conductivity and conductivity maintenance after several washing cycles, and aesthetics. The touch capacitive denim enables the jacket to identify touches but also to indicate whether its worn or not. The jacket relies completely on itself, able to turn itself autonomously on and off when worn or not. Issho functions without a smartphone which was done deliberately to move away from utilising gadgets as interface. The jacket is washable due to a detachable microcontroller and battery. The vibration motors are providing haptic feedback and are programmed in such a way that they simulate a gentle stroke on the upper back."

ISABEL BERENTZEN

Pauline van Dongen (Company)  
Realised in collaboration with: ItalDenim & Stimuleringsfonds (Support)  
Kaspar Jansen (Chair)  
Paul Hekkert (Mentor)

"ISSHO is a denim jacket that likes to share its enthusiasm for the world with its wearer. Through mutual interaction, Issho makes its wearer more aware of the moments they experience together. Issho is a revolution in the world of smart wearables that is dominated by functionalism. Instead, Issho is an example of positive design, that fosters mindfulness and a peaceful mind. Issho is the perfect balance of technology, fashion and experience design. It integrates touch sensitive technology and vibration motors for feedback. Issho was launched by Pauline van Dongen at the SxSW festival in Austin, Texas, in March 2017.

ISSHO is a revolutionary denim jacket, the result of a unique collaboration between fashion designer Pauline van Dongen, ItalDenim and our DE and ID departments. This concept wearable shows us how technology can shape our experience, make our lives more mindful, and teaches future designers how we can apply technology for 'a better world'."



"The project 'Designing the New Normal' is part of the overarching project named Meedoen= Groeien!; result of the collaboration between the Revalidatiefonds, the Prinses Máxima Centrum and TU Delft. The research project explores how interactive objects can be designed in order to become a tactful support for children with cancer and their families during the treatment phase.

Dealing with cancer, can generate emotional burden and tension in the relationships inside the family. AscoltaMe, ('Listen to Me' in Italian), a design developed within this project, is meant to stimulate communication among family members and talk about emotions and difficult things. It works like the 'broken phone game' that children can use to leave quick messages to the parents and trigger conversations in a new and playful way.

This project represents an example of how design and research used in sensitive settings can be combined to generate potential solutions that go beyond traditional intervention in the health-care sector and that promote innovative research approaches. Designing the New Normal is an -in progress- project that investigates the role of objects and technologies in the everyday context of families struggling with disruptive life events and it tries to create knowledge towards the definition of a broader concept of 'Tactful Design'. A new concept of design that brings together methodologies, approaches and hands-on work to reflect on how is possible to design with empathy and tactfulness when we are dealing with sensitive contexts and complex systems of users."

Marco Rozendaal  
(Daily Supervisor)  
Elisa Giaccardi (Promotor)  
Martha Grootenhuys (Promotor)  
Jaap Huisman (External Advisor)

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Recorded 1:17 THE EXISTENCE OF RESISTANCE IN DESIGN, RESEARCH & ENGINEERING





## Crescent Alpha



"The rapid rise of our smart devices has enabled modern society to reach amazing levels of productivity in our lives. While the Graphical User Interface utilised by these devices has played a substantial role, it has nevertheless caused the economy to be dependant on our attention, given rise to the multitasking paradox and has shown substantial decrease in our ability to empathize and converse. Fortunately, there are multiple drivers indicating that it is now time to integrate our physical and digital lives in a more mutually beneficial way.

The Crescent Alpha, is introducing an alternative, screenless, interface for a camera. With this camera you can capture your moment without putting a screen in between you and the moment. While this interface brings a great amount of technical possibilities for the individual, it also poses a challenge for society. Will we choose user friendliness over our privacy like we're already doing with Social Media?

## A Future Vision for Mobile Communication

This research and development project was meant to explore these technological and societal drivers and formulate a 2025 future vision where borders between digital and physical become virtually invisible. The report proposes how a simple product, the Crescent Alpha, could mark the first step towards a healthier future. One where we have a healthier relationship with our digital devices and solve the need for connection in our fast paced and asynchronous world. The vision behind Crescent is to develop an omnipresent personal interface that enables us to interact with our digital space in a natural way. This vision is then embodied through rapid prototyping and several interactions with users. This iterative process made it possible to go from a solution on paper to a physical well founded basic concept.

Currently, Crescent Alpha (the company) is focusing on the medical market, developing cameras for teaching surgeons to capture and share their surgeries with students."

Maaïke Kleinsmann (Chair)  
Ianus Keller (Mentor)  
Nick Sturkenbaum  
(Assistant-Chair)  
Wit Dot Media Inc. (Company)  
Tom Kluyver (Photographer)

Natalia Romero Herrera (Chair)  
 Quiel Beekman (Project Mentor)  
 Philips Design (Company)

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Scenario 1.7 THE EXISTENCE OF RESISTANCE IN DESIGN, RESEARCH & REGENERATING



## Emergency rescue workflow

What happens on  
and behind the scenes  
of ambulance rides



PRE-ARRIVAL



ARRIVAL ON SITE



PATIENT TRANSPORTATION



## Effortless Interactions for Emergency Care



## Designing the LiveSync

"The core challenge of this DFI (/medisign) master graduation thesis project was to improve the workflow of ambulance staff. The project was conducted for and within Philips Design in Eindhoven, where I currently work as a Service Designer. The design process was characterized by a strong focus on analysis, and in particular on user research, which included intense inquiry activities such as direct observation of ambulance shifts. The project resulted in the conceptualization of the LiveSync, a product aimed at facilitating the daily workflow of ambulance staff by enabling hands-free interactions. The final prototype was tested (and very much liked!) by real ambulance paramedics and drivers. After the graduation presentation, interest came from quite a few ambulance centers to develop the project further. The project was graded a 9.5 and awarded a cum laude. Currently, a proposal to transform the LiveSync into a real product is being taken into consideration at Philips.

This project is a sort of concentrated version of IDE's design philosophy, especially in terms of process, focus on the end users, research methods, and importance given to reflection. To me, it constituted a way to demonstrate once for all the great value of IDE's teachings and to prove they can lead to extremely useful, innovative results.

For the diversity of research methods, the quality of the deliverables, and the completeness of the report structure, the thesis is often used for inspiration and cited by current Joint Master Projects (JMP) and Graduation Projects."



## Reframing Emergency Care

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**A patient centric information system that facilitates a seamless dialog between teams of care givers & their patients**

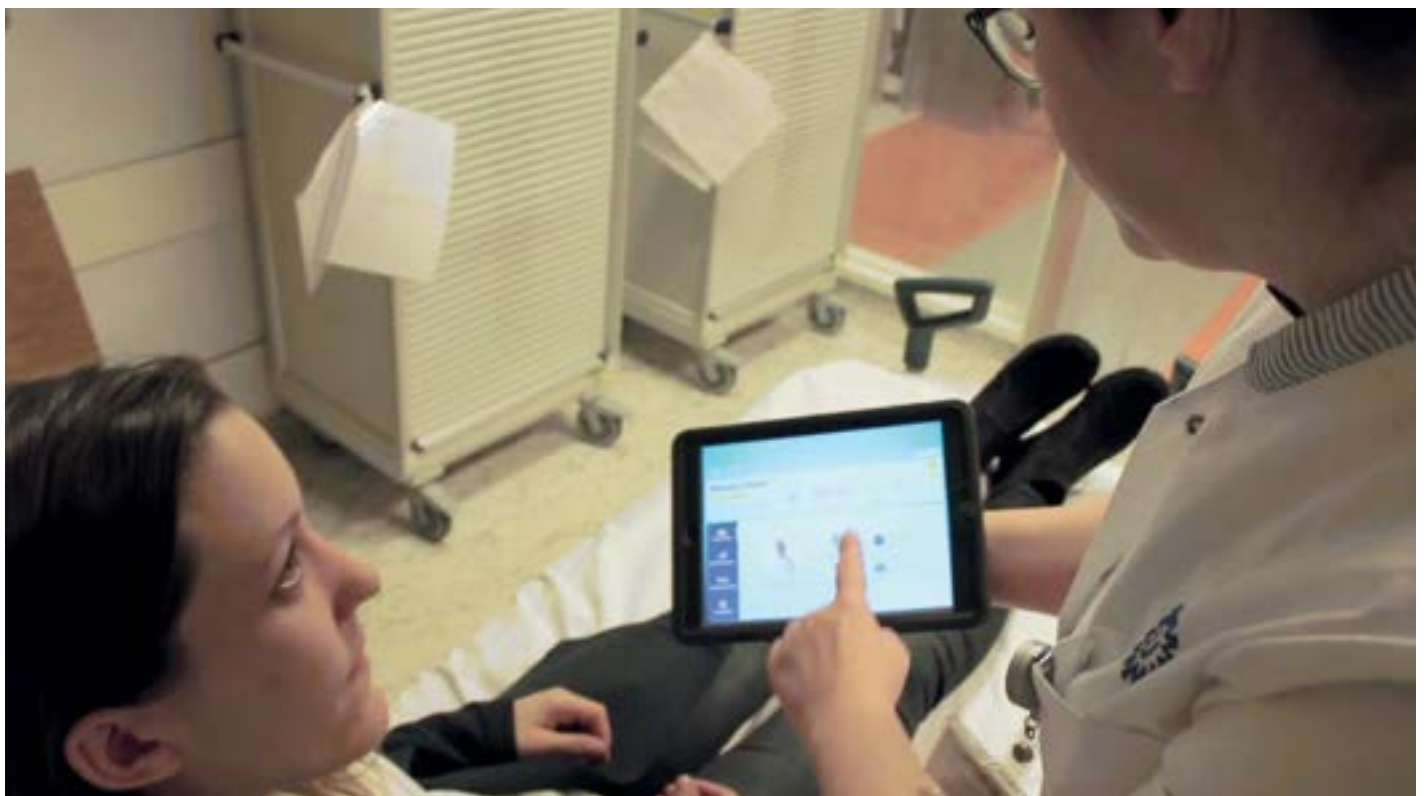
"With emerging e-health technologies, and changing patient's behaviors, healthcare services need to transform accordingly towards a more connected and patient centric care system. By applying the Vision in Product Design Method, four types of future emergency patients were revealed and led to a proposition for an aligned workflow for ambulances and hospitals: This reframed emergency process should be: - tailored to each individual patient, with all health data being owned by the patient - transparent, in order to increase situational awareness, trust and reassurance - embedded into a continuous healthcare continuum, to make history and recovery phase more relevant - socially connected, to improve communication with other caregivers and involve private contacts of a patient. Based on these characteristics, "MED Dialog" was designed: A front-end for a platform, which links paramedics, emergency nurses and doctors to unify their communication around - and with their patients. The communication system consists of three elements: - A tablet app to send pre-announcements of new patients from the ambulance to the hospital. - A smart board app for accurate

team briefings inside the trauma room. - A tablet app for nurses and doctors to access a summary of a patient's health data, to either collaborate with experts or have better dialogs with their patients. Throughout user research, co-creative methods and iterative prototyping, the project was carried out in close collaboration with the emergency department UMC Utrecht and Pontes Medical. It motivates stakeholders and triggers the next steps in developing a patient centric emergency care.

First of all, the project's approach is a good example of human centered design, since it focusses on analyzing and designing for people's interactions within an emergency care process. This was done by applying the theoretical Vision in Product Design framework in combination with co-design. Secondly, the project goes in depth with it's user research insights, but also the design outcome has a high level of detail. And thirdly, the product proposal is both - a solution for immediate problems of medical professionals, as well as it is a vision towards a desirable future care process."

Matthijs van Dijk (Chair)  
Quiel Beekman (Mentor)  
Frank Goethals (Company mentor)  
Pontes Medical, University  
Medical Center Utrecht (Company)





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"The majority of trucks is equipped with an external sun visor. The design of this product has not changed significantly since its first introduction around 1950. Despite the availability of alternative products such as tinted windows, users often make the decision to purchase this optional part. The truck industry is focusing increasingly on aspects such as comfort, safety and efficiency and the question arises if, and how improvements can be made to the sun visor.

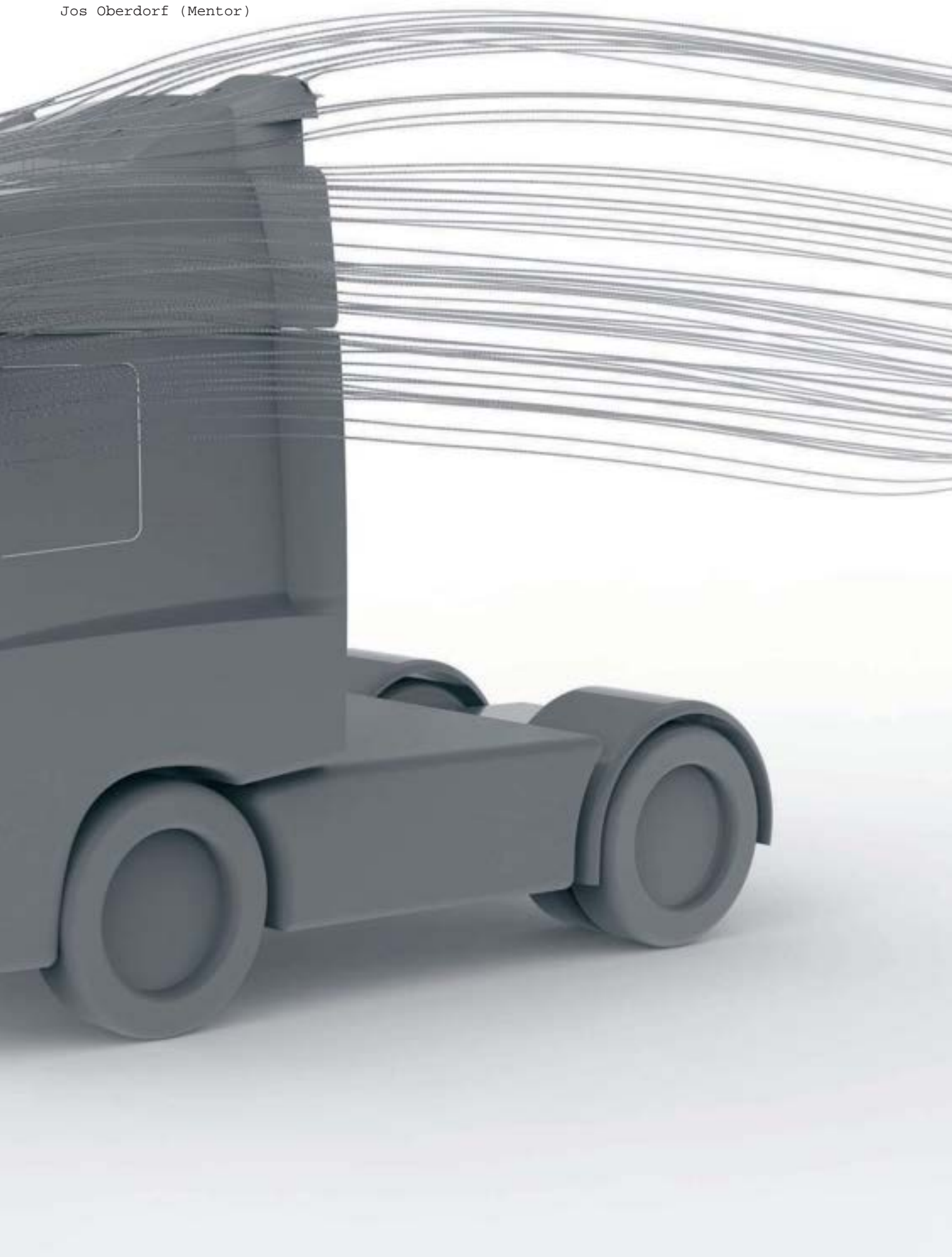
The result of this project is a new sun visor combination for a DAF CF truck. A broad analysis that was performed was based on four pillars: Influence on Efficiency, Aesthetics, Materialization and Visibility & Sun Protection. This analysis resulted in various criteria, opportunities and insight in the deficiencies of the current DAF CF sun visor. An opportunity was found to satisfy the criteria of the four pillars with a combination of an external and interior part. Sun protection & Visibility is improved by an interior sun protection while the exterior sun visor improves Efficiency, Materialization and Aesthetics."





VINCENT AUS DEM KAMEN

Stefan van de Geer (Mentor)  
Jos Oberdorf (Mentor)





Discussed: 1.7 THE EXISTENCE OF RESISTANCE IN DESIGN, RESEARCH & ENGINEERING

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### A discus that captures throwing performance

"Discus throwing outdoors provides the coach and athlete with direct feedback on the performance in the form of a final distance. Even by eye this can intuitively be judged. When switching to indoor training come winter, this intuitive measure is taken away as the athletes throw into a net suspended 5-8 meters in front of them. The coach believes this lack of feedback is the reason for the drop in performance over the winter. This project's aim was to develop a training solution that can measure the relevant variables of a discus throw and compute the final distance using a theoretical model. A functional prototype was built that can track the position of the discus in 3D with an accuracy of 2,5 mm. Concurrently, an Android app was developed to receive and process the data coming from the discus and calculate a predicted final distance of an indoor throw.

This is an example of a project that clearly stems from a user need (the desire for an indoor throwing performance figure) and successfully translates that, through many iterations and technologies, into a working prototype, theoretical model and app, showcasing how real-world products can be augmented by combining them with the digital realm. It also presents a mix of embodiment design, research, physics models, digital design and prototyping. This means it is a prime example of how research and technology in both the physical and digital domain can come together to create products that are more than the sum of their parts."

Arjen Jansen, Wolf Song,  
G. Damkat (Project Guidance)  
Atletiekunie, NOC\*NSF  
(Financial Support)

## Nike Fitroom

"Recent researches show that digital transformation is top priority in the retail sector. But retailers face difficulties to make successful use of digital technologies in the store. Digital innovations instore are frequently seen as unnecessary, unintuitive and uncomfortable by the consumers. Furthermore, the personalization strategies initiated with digital technologies are not using personal data in a humanized way. The aim of project was to develop a design framework which can be used as guidance for designing a new brand touch point instore using personal data. The framework is used for designing a new in-store experience for Nike, namely the Nike Fitroom. The Nike Fitroom is a digital immersive fitting room to encourage the non-customers to try Nike products too. The Fitting room delivers an engaging customer experience by combining a deep understanding of user needs with different (digital) technologies. The Fitroom experience is customized and optimized by using personal attitudinal data. Personal consumer goals are uncovered with a light-hearted and encouraging dialogue on the smart mirror. The visitor can try the product in a truly personalized Fitroom, stimulating the user to achieve their personal goals by triggering personal intrinsic motivations.

The Fitroom can be the first step into a complete personalized Nike journey, making use of the same attitudinal data. As a result Nike will strengthen its brand values and move towards a coherent omni-channel brand experience. This project is a great example of combining the three IDE pillars (business, human and technology) in a strategic way. It delivered a very creative concept that is the outcome of both a well-done design process and a careful business reflection. Furthermore, the project has used and combined different theoretical perspectives, and extended one of the main theoretical frameworks developed by our faculty (design for emotion). The student is now working on thinking about a working prototype to be used for further test."

## Data Driven Design for Emotional Engagement: Designing a Digital Interaction for the Nike Store



# HOW

# WILL

Giulia Calabretta (Chair)  
Jeroen van Erp (Mentor)  
Franklin Heijnen  
(Company Mentor - Deloitte)

# A

# NIKE

**STARTING  
WITH A  
DIALOGUE**

**STARTING  
WITH A  
DIALOGUE**

**DIGITAL  
IMMERSIVE**



**DIGITAL  
IMMERSIVE**



**COMMUNICATING  
WITH YOU  
AS A PERSON**



**COMMUNICATING  
WITH YOU  
AS A PERSON**



**NIKE  
FITTING**



**NIKE  
FIT ROOM**





"Since the late 1990s, designers and design researchers have begun to investigate how products elicit emotions in users and how they could use emotions to improve the user experience of products. It seems evident that designers should aim to maximize positive user emotions and minimize negative user emotions. However, if we look at some examples of enjoyable human experiences, we quickly realize that this assumption is not always true. People who ride rollercoasters, play challenging video games, or listen to downbeat music are experiencing fear, frustration, and sadness, respectively, but are also enjoying themselves. In my PhD-project I have focused on such experiences - named 'rich experiences' - and investigated how these can be systematically designed into consumer products and services.

The project resulted in several deliverables. It produced a theoretical framework that explains the phenomenon of rich experience, the contribution of negative emotion in this experience and the conditions under which negative emotions can be enjoyed. To support this framework, I created a negative emotion database of in-depth information, videos, and illustrations for 36 distinct emotions. The framework and the database are resources for a design approach that guides designers in creating rich experiences for any user product or service. This approach was followed in several design case studies with in total sixty design students and a professional designer, who used the approach to design dozens of products and services. Lastly, I applied the approach in a research-through-design approach and created a wearable prototype that motivate runners."

Pieter Desmet (Promotor)  
Paul Hekkert (Promotor)



"The designed product was 'Run for your life', a device intended to be worn by runners, which tracks their progress and evokes fear emotions to motivate them to run longer and faster. Through visual, auditory and tactile feedback, it gives the runner the impression that she is being chased by something. A versatile prototype was built that could run a number of different scenarios and feedback modes. With this prototype, eleven amateur runners were recruited to use the prototype in a total of 26 runs and were afterwards interviewed about their experiences. The prototype was optimized between sessions based on the





results. This process yielded insights on the design process of this particular product, as well as on the development of rich experience products in general. One main insight was that there were roughly three ways to elicit (fear) emotions in the user-product interaction: through hard-wired stimuli (e.g., loud bangs), by association (e.g., viciously barking dogs), and through so-called 'appraisal components' (e.g., the predictability of the pursuer). Secondly, the study showed that the effects of different aspects of the design on the user experience (e.g., the effects of the sound, images, and behavior of the

pursuer) can only be described and predicted in relation to one another. The chapter describes a way to make these relations explicit. The third main insight was that the effectiveness of the product depended a great deal on the running styles and preferences of the participants. Three participants found that the prototype did not fit their running style. Three other participants mainly wanted to increase their running performance, and liked how the prototype helped them do that. Lastly, four participants mainly wanted to have a better running experience and found that the prototype made running more exciting."

"This innovative project broke new ground in our assumptions of what constitutes a good user experience. I employed both design and research methods to explore how this principle applied to the interactions between users and technology. Because the project had an exploratory nature, I was able to use a lot of different methods: phenomenological research, theoretical frameworking, case studies with designers, stimulus validation, research-through-design, and prototype testing. Thus, the activities in this project gives a broad overview of the different types of research that can be employed in the design engineering domain."

Annemiek van Boeijen (Coach)  
Henk Kuipers (Critic)  
YesDelft/aQysta (Company)





## Get Involved!



"The start-up company aQysta, located in YesDelft! And Nepal, developed a principle for a hydro-powered irrigation pump, that operates using solely the power it obtains from the river or stream it is placed in. Following this principle, they designed an irrigation pump which is currently on the market. We were asked to use their principle to design a pump for small-holder farmers located in the mid- and highlands of Nepal, as their current design is too expensive and unsuitable for the context of these small farmers.

This is an example of a project in which the designers are unfamiliar with the culture they design for. There is a cultural chasm that they need to cross, but in advance it is uncertain how big this gap is. Therefore, the designers choose a holistic approach, which means that they tried to understand the context, and in particular the socio-cultural context, as well as possible (in the limited time they had), looking at their target context from different angles and with an open mind to avoid biases and limit their blind spots.

Social aspects, such as the roles of women and men, division of tasks and power, responsibilities and ownership, forms of cooperation with neighbours and other people in their neighbourhoods, were examined. This was needed, not only to determine what kind of product solution would be most acceptable and sustainable, but also to develop a business model that tunes with local values. In the end cultural understanding stimulated their creativity too."



1. EXPLORING



2. CREATING



3. DEFINING

## The Tovertafel

A magic table creating moments of happiness for people living with dementia and all those around them.

"The (Active Cues') Tovertafel is a game for the elderly with moderate to severe dementia, encouraging them to instinctively participate in order to stimulate both physical and social activity in them. Numerous games, consisting of interactive light animations which are projected on a table, stimulate their mind and inspire them to be active. Tovertafel was developed during the PhD research of Hester (Anderiesen) Le Riche in close collaboration with the elderly and therefore closely matches their needs and capabilities.

The brain's deterioration, a consequence of dementia, influences how older people experience the world around them, and so influences how they play games. To determine which games are suitable for older people at the different stages of Alzheimer's, Hester Le Riche, together with amongst others Prof. Dr. Erik Scherder, looked at the literature on neuropsychology.

The Tovertafel is a fun care innovation that connects older people in the late stage of their dementia journey with each other and with their surroundings, all the while stimulating movement. The beautiful games were developed specifically for the target group and can be played both independently and under supervision.

The Tovertafel is a little box that can be mounted on the ceiling, for instance, above the dining room table of a care institute. Inside the box is a high-quality projector, infrared sensors, speaker, and processor that work together to project the games onto the table. Because the colourful objects respond to hand and arm movements, residents get to play with the light itself."





Richard Goossens (Promotor)  
Marieke Sonneveld (Co-Promotor)  
Valentijn Visch (Mentor)



"90% Of nursing home residents with dementia suffer from apathy, which negatively influences their physical, cognitive, and emotional well-being. The goal of this project-grounded research is to develop a product-service system that stimulates nursing homes residents, living with moderate to severe dementia, to reduce their apathy."



**Exceed! '17** is the first exhibition in a series of reflective events that are part of the run-up to the 50th anniversary of IDE in 2019.

The Faculty of Industrial Design Engineering at TU Delft has great graduates, appealing student work and ground-breaking research in the area of industrial design engineering, assets we proudly present to all who are interested, from our partners and stakeholders outside of the faculty, to those who shape our community from within.

**Exceed! '17** showcases a curated selection of student work, graduation projects, PhD explorations and other research that excelled, amazed and/or confronted and form a conscious accelerator and foundation for an open debate about the role of the complementary and (often) overlapping fields of design, research and technology in both physical and virtual contexts on a local, as well as a global scale.

