

What makes you tick and making your mark on the world



Caspar Chorus

The pursuit of a PhD degree is a significant milestone in one's academic career and requires a great deal of dedication and hard work. It is a rigorous process that involves conducting original research, analyzing data, and communicating findings through scholarly publications.

At our faculty of Industrial Design Engineering, we strive to educate PhD graduates who are not only experts in their respective fields but also well-rounded individuals equipped with competences in critical thinking, problem-solving, and innovation. Our doctoral candidates work on cutting-edge research projects that aim to solve real-world problems and make a positive impact on society.

We are proud of our PhD candidates and the contributions they make to our faculty and the wider community. We are committed to supporting them in their academic and personal growth and look forward to seeing the impact of their research in the years to come.

I wish our PhD candidates every success and I look forward to meeting them during their journey. Also, I hope this booklet inspires and guides future PhD candidates in Industrial Design Engineering.

Sincerely,
Caspar Chorus
Dean

PhD research in design and the Graduate School: This is who we are and what makes us tick

Matching the evolution of people with the revolution of technology. Our PhD candidates work on bridging between advancements in technology and the needs of people, organisations, and society. Their research covers a very wide range of topics, and methods of research, with research approaches from science, engineering, humanities, and design used in many variations.



Sylvia Pont





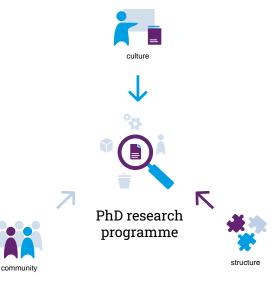
Compared with other leading design schools in the world the number of PhD candidates at Industrial Design Engineering (IDE) in Delft is large, signalling the significant role of our faculty in the development of our profession. Since the start of the PhD at TU Delft in the beginning of the 20th century our community steadily grew to approximately 120 PhD candidates currently being enrolled in the Faculty Graduate School. This growth was accompanied by the acknowledgement of design research as scientific field. The key goal of the Graduate School is to provide PhD candidates a PhD trajectory that enables them to become independent researchers, able to contribute new knowledge at the frontiers of science, engineering, humanities, and design to meet society's needs. Doctoral education and training should provide PhD candidates the hard and soft skills that are needed for diverse career paths in- and outside academia.

Supervision

PhD candidates at IDE are supervised by at least two academic staff members: a full professor or associate professor with ius promovendi (promotor) and a daily supervisor / copromotor. The relationships between PhD candidates and their supervisory team are one of the most important factors that define the candidate's experience at the university. Supervision quality is key for recognizing, steering, and improving pedagogical excellence and improving timely completion of the doctoral trajectory.

The Graduate School

The Graduate School at the faculty of Industrial Design Engineering (GS-IDE) was set up in 2011, and at TU Delft in 2012. Via process support and doctoral education they aim to support the structure, research culture and community of PhD candidates and researchers. In 2022, with the 10 years anniversary of the University Graduate School, we formulated our mission and strategic plan that will guide our work through 2027.



Our Mission

The Graduate School aims to promote and facilitate an inclusive and excellent environment for candidates to achieve a PhD degree that forms a valuable foundation to science and society. To achieve this aim, the Graduate School:



Supports the recruitment, education, and supervision of PhD candidates towards a successful dissertation.



Facilitates a positive environment that safeguards the well-being of PhD candidates.



Provides a doctoral education program that develops research and transferable skills of PhD candidates.



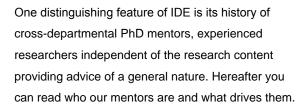
Monitors the quality of the PhD process.

The GS-IDE is headed by the director Graduate School (Sylvia Pont) and supported by a doctoral education programme coordinator (Wilfred van der Vegte) and a Graduate School coordinator (Kim Scheffelaar). What makes them tick?



Dr. ir. Wilfred van der Vegte

"Stimulating innovations in the doctoral education programme and helping candidates to a meaningful individual plan"



A very important element of this is the annual PhD Day. We are very happy that this year we can celebrate PhD Day again in its full glory, with a fantastic speaker from TU Eindhoven, an exhibition by our PhD candidates, workshops for our PhD candidates, lunch and drinks with supervisors. All this was organised by our PhD Council; Caiseal, Vera



Kim Scheffelaar

"Getting to know people from different nationalities and backgrounds and supporting them in their PhD journey"

and Wo, with support of Kim, expressing what makes them tick and enabling our PhD community to show who they are.

And to conclude, what motivates me:

"The honour, and pleasure in working with all these energetic, intelligent and creative people finding things out."

Prof. dr. Sylvia Pont

Director Graduate School IDE

Internationalisation of PhD research

The EU policy regarding PhD education promotes interdisciplinary and international connections and exchange. Three initiatives support this policy. Firstly, we participate in, or lead, Marie Curie Doctoral Networks such as D-Code, ODECO, DyViTo. Secondly, we host PhD candidates from other universities like Politecnico di Milano as visiting researchers. Thirdly, we collaborate with five other leading design schools with an established PhD programme.

Involved in this collaboration are Aalto University,
Politecnico di Milano, Imperial College, Carnegie
Mellon University, and Illinois Institute of Technology.
The collaboration started in 2018 with a series of
meetings where we shared our experiences in guiding
PhD candidates in design. In 2020 the collaboration
became formalized in an Erasmus+ project called
DoCS4Design, to collect and disseminate best
practices for a PhD in design curriculum. The
outcomes of this project include a report 'PhD in
Design – a Map and Glossary', an online platform, the
'WunderLibrary'', and a series of on-site and online
workshops. During these workshops, PhD candidates
and staff from all six universities collaborate and

discuss topics such as research methods, knowledge formation, and societal impact.

What makes Pieter Jan Stappers as leader of this initiative tick:

"Discovering IDE through collaborating with passionate developers who do things differently."

PhD mentors

At the start of the PhD project each PhD candidate gets assigned a mentor from a different department who will support them in their process during the first two years.

A distinguishing feature of IDE is its history of cross-departmental PhD mentors. These are experienced researchers who act as a sounding board, provide PhD candidates and their supervisory teams with support in the process and alert them on potential bottlenecks and difficulties. PhD mentors are appointed for 3 years and typically deal with up to 10 candidates per year each, totaling to a maximum of 30 PhD candidates. The PhD mentor will be present

during all mandatory progress meetings within the PhD trajectory up until the 24 months meeting. They ensure all topics are discussed and monitor the progress, but are not involved in the scientific content of the project.

Our mentors are enthusiastic, committed to our PhD candidates and take their role seriously. Please read below what makes them tick as a PhD mentor.

Dr. Jun Wu:

"I support the progress of PhD projects, with a focus on the welfare and interests of PhD candidates. Being exposed to various research topics within our faculty is a fulfilling experience for me."

Dr. Jeremy Faludi:

"I like mentoring because education isn't just about ideas, it's about people, and people need support to navigate this sometimes crazy world."

Dr. Lise Magnier:

"I believe the fact that a mentor is present during the yearly meetings really improves the quality of the communication between PhD candidates and supervisors. It gives candidates a safe space to bring about suggestions for improvements in supervision."

Dr. Rebecca Price:

"Completing a PhD is a huge undertaking and life changing journey for the candidate. To mentor someone closely through the early and perhaps most difficult phases of this journey brings enormous professional fulfilment. It's yet another reason why I love my job here at IDE!"

Dr. Maarten Wijntjes:

"To be able to improve the interaction between candidate and supervisory team by learning from my own mentorship and fellow mentors. Also, it is awesome to see PhD candidates grow in a period of four years."

Dr. Himanshu Verma:

"Although I have only been a PhD mentor for a very short time, I really appreciate talking to PhD candidates about their personal and professional development and relating it to my own time as a PhD candidate, which I really enjoyed."

Dr.ir. Froukje Sleeswijk Visser:

"Being so close to so many inspiring and courageous people wanting to investigate and change something in the world."





PhD Day fosters new connections

Even before we ate the first bitterball at the borrel it was clear that PhD day was a success in many ways. Besides the exciting talks, the fun workshops, and tasty lunch, our wonderful PhD candidates connected with each other; shared their work, challenges, triumphs, and lives, a true achievement.

The day started with three very engaging introductions from the Dean, the IDE Graduate School, and the PhD council. The PhD candidates jumped at the opportunity to open the dialogue during the talks, dialogues we hope to continue so that we can strengthen the PhD community and how the faculty of IDE supports and encourages it.

Following, the amazing Kristina Andersen, associate professor at TU Eindhoven, gave a keynote talk. Unfortunately, Kristina had to join remotely, and the ghost of the pandemic reared its ugly head with some technical challenges. Kristina inspired both thought and discussion on what design research is and can be in the future.

With lunch came the mini symposium of the PhD candidates showing posters and prototypes to further inspire and engage their colleagues. Then, filled with inspiration and nice sandwiches, the PhD candidates had a set of workshops; art therapy, improvisational theater, or chair yoga.

At last, there was a brief wrap up from the PhD council and the wonderful Sylvia (director) and Kim (coordinator) of the Faculty Graduate School. At the end of the day, a "borrel" allowed those who remained to continue their connections and reflections.

4 insights



The mini-exhibition gave PhD candidates from different departments and research areas the chance to connect and learn about each other's work, helping us feel like part of a broader community.



Giving the PhD candidates a break from their computers and meetings helped foster new social connections; something that can be supported more proactively in the future for the well-being of our PhD community.



The creative workshops were particularly well-received, providing a welcome break from research activities whilst giving PhD candidates the space to explore skills they might not usually engage with in their daily lives.



Bringing in researchers that focus on other methods, techniques, contexts, etc. Is both inspirational and engaging; we should connect not just with other PhD candidates in IDE but also look to build connections with those outside of it.

After party

For some of us, one PhD day just wasn't enough—so we organised an afterparty the next afternoon!

Professor Phil Cash from Northumbria University gave an amazing lecture and workshop, where he challenged us to revisit our research ambitions and focus on theory building in design research.

Caiseal Beardow, Vera van der Burg and Wo Meijer

IDE PhD Council





















Agenda

09.30	Welcome	11.00	Presentation by Kristina Andersen, Associate professor, dept. Industrial Design, TU/e
10.00	Kick off by Prof.dr.ir. Caspar Chorus, Dean IDE	12.00	Exhibition & demos and lunch
10.15	Introduction by Prof.dr. Sylvia Pont Director IDE Faculty Graduate School	14.15	Workshop carousel, 2 rounds Arts & Crafts, Yoga, Improvisational theatre
10.30	Introduction by Vera van der Burg, Caiseal	16.50	Closing remarks PhD Council
	Beardow & Wo Meijer, IDE PhD Council	17.00	Closing Drinks







Kars Alfrink MA



"I used to work as
a designer. Now I
am learning to be a
researcher. It is amazing
to be in a place where
it is encouraged to do
design as part of doing
research."

Supervisory team:
Dr.ir. Ianus Keller
Prof.dr. Gerd Kortuem
Prof.dr.mr.ir. Neelke Doorn

Artificial Intelligence

Cities

Contestability

Interaction Design

Public Administration

Contestable AI by Design

To ensure artificial intelligence (AI) systems respect human rights to autonomy and dignity, they must allow human intervention throughout their lifecycle.

This PhD research project aims to develop new knowledge for the design of mechanisms that (1) enable people to contest individual



algorithmic decisions made by AI systems; and (2) enable people to collectively contest the design and development of AI systems, particularly as it pertains to datasets and models.

Al system fairness, accountability, and transparency are not problems that can be solved by technical means alone. Effective solutions require careful consideration of technological and social factors together and should take local contexts into account. These are

challenges that design research is uniquely equipped to meet.

The project takes a practice-based, action-oriented approach. The main research activity is prototyping mechanisms for contestation in new and existing AI systems in the lab and the field, focusing on local governments using AI for algorithmic decision-making in urban public administration.

We aim to present a portfolio of examples of contestable AI in context and generative, intermediate-level design knowledge that aids others in researching and designing AI systems that respect human rights. We aim to present a portfolio of examples of contestable AI in context and generative, intermediate-level design knowledge that aids others in researching and designing AI systems that respect human rights.

















Studying and developing Critical Participatory Futuring through Design

My PhD research started with three words: Critical, Futures, Design. And it's driven by three simple questions: What does it mean to engage critically with future? How can such engagement be enabled? What role can design play in this?

To answer these questions I have gone back to first principles to develop a working understanding of what criticality entails in the fields of Critical Pedagogy and Critical Futures Studies. My first paper interrogates definitions of criticality I have observed in the context of Design and Futures Education, but in short my answer is that criticality should

be about being attentive to issues and relationships of power, which in itself requires a social orientation and great deal of reflexivity. My second study is a systematic literature study that considers questions of criticality and inclusivity in the context of participatory futuring.

Parallel to this more theoretical line of inquiry, I am also following a anthropologically-informed Case Study and Research through Design approach, to consider the potentials and challenges of critical participatory futuring in the contexts of natural disaster, flood risk management and climate adaptation in the Netherlands.



Laura Barendregt MSc



"It was never my intention to do my PhD in a design department or at a technical university, but I have really appreciated the very active and handson approach I have been forced to take here."

Supervisory team:
Dr. Roy Bendor
Prof. dr. Bregje van Eekelen

Critical Futures

Critical Design

Critical Pedagogy

Participatory Futuring

Natural disaster

Caiseal Beardow MSc



"For me, practices of making artefacts and knowledge are inextricable. Doing a PhD at IDE enables me to explore both aspects of this relationship, grounding my theoretical work in the act and experience of designing."

Supervisory team:

Prof.dr. Pieter Jan Stappers

Dr. Derek Lomas

Technology

Accessibility

Play

Building Intuition for Quantum Computing through Play

My project explores the design and efficacy of play experiences as a mechanism for learning to use and building intuition for quantum computing.

Quantum computing is an emerging technology that uses quantum mechanics to solve specific types of complex mathematical problems. It is highly theoretical, both functionally and physically: interactions with a quantum computer are often represented as equations, and the hardware is under development in specialised laboratories. This raises issues regarding accessibility and, by extension, aligning this technology's impact with societal values. To address such issues, new ways of interacting with quantum computers—and of conceptualising these interactions—are needed.



I work with societal stakeholders to identify user needs.







Prototyping with quantum technology is central to my work.

My work investigates how playful, experiential interactions might aid novice users of quantum computers. Learning through play is well-established in the educational sciences, and is connected to constructivism: the viewpoint that knowledge is actively constructed by a learner through experiencing and interacting with their environment, resulting in mental models that enable future action. I therefore aim to not only design playful learning experiences, but to identify mental models that aid novice users—and examine how the former might support the development of the latter.

<mark>Evert</mark> van Beek MSc



"For me, a PhD is an opportunity to figure out my own path, through many disciplinary fields, merging the creative and experimental activity of design, with the equally creative, but more analytical pursuit of knowledge."

Supervisory team:
Dr. Dipl. -Des. Stella Boess
Prof.dr. Elisa Giaccardi
Prof. dr. ir. Alessandro Bozzon

Smart Home

More-Than-Human Design

Sustainability

Thermal Comfort

Energy

Crises in everyday co-performances of residents and sustainable smart housing





We need to reduce the energy consumption of our homes. One promising avenue is the implementation of sustainable and smart technologies such as heat pumps to heat Dutch homes.

In my project, I use ethnographic methods to develop a perspective on how residents live together with these technologies.



Heat pumps and pets

I found that conflicts occur between what residents find appropriate and what technologies do (such as making noise at night, or heating unoccupied rooms). These conflicts seem undesirable, but often they become opportunities for a dialogue between humans and technologies. Residents respond by engaging in experiments with technologies and attending to surprising observations such as where the dog lies down (not on the warmest place on the floor).

I use a speculative design approach to explore how to design for this more-than-human dialogue, and how designers and building professionals can shape a sustainable 'living together' of residents and technologies. Cats, and other non-human household members, are frequent visitors in my research.

Sustainable consumer behaviour: How design can stimulate product lifetime extension

It is common to discard electronic products while still functioning or only in need of (minor) repair.

This results in a growing amount of e-waste. For my PhD, I study sustainable consumer behavior within the Circular Economy. Specifically, I look at how to lengthen the (initial) use phase of products. Stimulating



consumers to extend the lifetime of products, such as smartphones or washing machines, is challenging. Consumers face barriers to repair (e.g., lack of skills, inconvenient services), but also feelings of satiation and new developments can lead to replacement.





My aim is to investigate how sustainable behavior can be stimulated through design. I investigated the psychological process of product replacement, and explored the reasons why people replace well-functioning products and their attitudes toward repair via in-depth interviews. Furthermore, I showed that a design intervention, such as a fault indication, can increase the user's repair "can-do" mentality. Also, a modular design can encourage repair activities, but explicit cues ("affordances") guiding the user through the repair steps are required to pursue self-repair. As a final study, I aim to investigate the influence of expected lifetime (label) information and an upgradeable design on product lifetimes.



Renske van den Berge



"Conduct research on the design of products and services that people use daily, and for which behavior change and breaking current consumption patterns is crucial in our transition to a more sustainable society."

Supervisory team:

Prof. dr. ir. Ruth Mugge

Dr. Lise Magnier

Behavior Change

Sustainability

Circular Economy

Long-lasting Design

Riel Bessai



"Having a job where I can read and learn and think about things that I am interested in is amazing. Also I love that academia gives you the freedom to be critical and sit somewhat outside of the system."

Supervisory team:
Prof.dr. Ruud Balkenende
Dr. Roy Bendor

Regenerative design

Design for sustainability

Bio materials

Politics of technology

Designing regeneratively with carbon

Regenerative design moves one step beyond sustainability, from minimizing the negative impacts of human activities to actively restoring and regenerating ecological and social systems. All design activities have a material component to them, and materials connect design to wider socio-technical systems of production. What materials then can act as a foundation for regenerative design? How do these materials ask us to design differently? Can they play a role in addressing climate change, now and deep into the future? In my PhD I am exploring

material design practices with the goal of creating lasting morethan-human value and supporting convivial communities. So far, I have been exploring how the production of different materials promote certain ideologies, politics, or power structures across their supply chains. My current work aims to show how convivial, independent, localized production can act as an antidote to large scale industrial extraction. In my work I combine a critical analytic approach with exploratory researchthrough-design projects. I love making chairs.



Developing a design framework for care infrastructures in AI-driven digital psychiatry



In my project, I look into a technology called digital phenotyping (DP), whose proponents promise to innovate the way we diagnose and monitor mental health conditions. It works on so-called passive monitoring of individual's digital footprint that include such mobile phone data as gait, speech patterns, emotional expressivity, and social media use. Developers argue that this method solves issues of accessibility, timeliness, and objectivity of mental healthcare, as well as opens a window into the lived experience of (potential) patients. Apart from expected ethical concerns about privacy and medical surveillance, there are other challenges to consider. In particular, I'm looking into plurality of cultures and ecologies that digital mental health interventions operate within. That is, cultures of experience and expressions of mental health, of technology implementation, as well as of psychiatric categorisaton and treatment. I intend to develop a framework grounded in care ethics that would position digital tools use within larger care ecologies and care infrastructures.



Karin Bogdanova MSc



"Openness and transdisciplinarity of design research and practice at IDE, where everyone can find their niche where their experience will be valuable and generative." Supervisory team:
Dr. Nazli Cila
Dr. Olya Kudina

Mental health

azli Cila <u>Digital phenotyping</u>

Inclusion

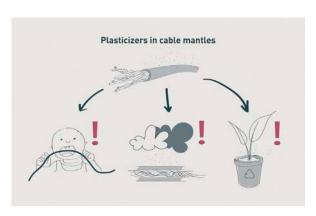
Care infrastructure

Health Al

Safe and Circular Design

Products that pose a threat to the environment or human health at any stage of their lifecycle do not comply with the principles of a circular economy. My research focuses on two key aspects, relevant to product design, to ensure products, components, and materials can safely cycle in a circular economy: 1) managing or eliminating risks associated with hazardous substances in products and 2) ensuring safety during non-professional repairs. To avoid the harmful impacts, safety needs to be addressed in early stages of the development process of products. However, awareness, information, and methods for designers to deal with substances of concern in products and consider safety in repairs are currently





Hazards of plasticizers in PVC cable mantles

very limited. During this PhD we will be developing, testing, and validating methods and guidelines for designers to deal with these two aspects of safe circular design. We have created a first version of a method for addressing hazardous substances in products, which is based on the research of five case studies. We will continue developing this method through collaboration with professional designers and by studying additional cases. Additionally, we are consolidating the knowledge acquired from previous projects that produced guidelines for designing for safe repairs.





"The diversity of research topics, backgrounds, and disciplines available is a constant source of inspiration and opportunities for valuable collaborations."

Supervisory team:

Prof. dr. ir. Conny Bakker

Prof. dr. Ruud Balkenende

Safety
Circular Design
Substances of Concern
Safe Repairs
Design Methods

Puck Bos MSc



"With a background as product designer and an interest in sustainability, I want to bridge the gap between research and design practice and make a meaningful contribution to the field of sustainable design."

Supervisory team:
Prof. dr. ir. Conny Bakker
Prof. dr. Ruud Balkenende
Dr. ir. Sonia van Dam

Bio-based plastic

Sustainable design

Circular economy

Designing with bio-based plastics in a circular economy

The aim of the project is to gain insight into the use of bio-based plastics for durable applications and provide guidance to designers for their sustainable usage. Initially, we evaluated the current use of bio-based plastics in commercially available durable consumer products and interviewed product designers of these products to identify opportunities and barriers. The results revealed that the bio-based plastic market is still immature, and a lack of important information has created confusion

and misconceptions. Furthermore, the value chain is underdeveloped, resulting in barriers such as high prices and insufficient end-of-life infrastructure. Current bio-based plastic use is often a one-to-one replacement of fossil-based plastics, and this may leave unique properties of bio-based plastics unused. The next step in my research project involves exploring the unique properties of bio-based plastics for product design to enhance value for both the product and the circular economy.







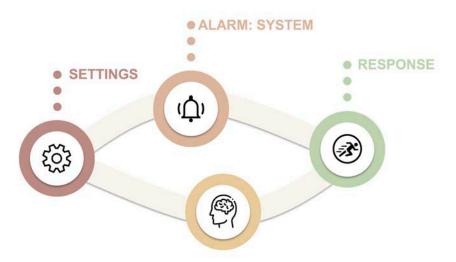
Examples of durable products made of bio-based plastic

VitalAlarms: Envisioning the Future Alarm Sounds for Better Nurse Workflow Erasmus MC



Intensive Care Unit (ICU) nurses rely on patient monitoring systems to stay informed about their patients. These systems communicate medical events to nurses through audiovisual alarms. Alarms are designed to attract attention and trigger action. However, excessive number of alarms desensitize nurses, resulting in inappropriate or even a lack of response to alarms. This points to a mismatch between the capabilities of nurses and interaction possibilities offered by the patient monitoring systems. Current systems can be improved considerably in such a

way that new technological tools are designed to allow for relieving workload, stress, and fatigue. In this project, we consider nurses as users of patient monitoring systems and aim to understand the cognitive space they are in, with regards to information processing and emotional affect. By doing so, we identify needs and preferences of nurses as they interact with patient monitoring systems. By optimizing the system to match the users' capabilities, we aim to take a step towards a seamless symbiosis between systems and users, allowing for more efficient collaboration.



Researching cognitive space as interacting with the system

Idil Bostan MSc



"It allows me to combine my interests for cognitive sciences and creative arts to explore the intersection of user-centered design. It's an opportunity to contribute to our shared future."

Supervisory team:

Dr. Elif Özcan

Dr. René van Egmond

Prof. dr. Diederik Gommers (Erasmus MC)

User-centered design

Human-system interaction

Cognition

Healthcare

Beyza Bozali



"Reaching the opinions of researchers from different disciplines is very valuable, as it offers the opportunity to integrate design-oriented approaches into my education as well as engineering approaches."

Supervisory team:
Prof. dr. ir. Kaspar Jansen
Dr. Sepideh Ghodrat

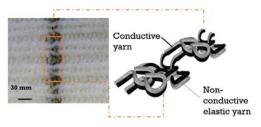
Smart textile

Textile-based sensors

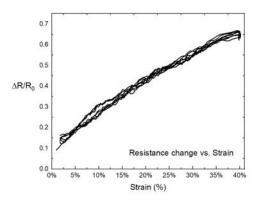
Wearable technology

Development of textile-based sensors and their performance and applications

Smart textiles have attracted attention in recent years to be used in applications such as health monitoring, sports and rehabilitation. Textiles are ideal as a platform to host sensors for monitoring body signals such as heart rate, respiratory rate and sweating, as well as body posture and limb movements. However, current sensors are often still rigid and bulky, which hinders their application in everyday life situations and home care. Textile-based sensors consist of conductive yarns and fabrics woven or knitted in specific structures and can be used to create pressure, humidity and strain sensors as well as simple electrodes. They have the advantage that they are washable and comfortable since they are soft, stretchable and conform to the body shape.



Textile-based sensor and schematic view of the structure



A linear textile-based strain sensor with low hysteresis

In my study, I focused on the development of textile-based sensors specifically strain sensors and pressure sensors and explore their integration into applications. An interesting result is that we can produce strain sensors that are linear up to 40% strain, have extremely low hysteresis levels and can be completely integrated into clothing using standard textile manufacturing equipment. The sensors can be used to monitor breathing rate when integrated into a t-shirt, breast band or bra, body posture, limb movement or rehabilitation purposes.

Noa van den Brink MSc



I am passionate about design for health, well-being and equity in complex societal challenges through participatory approaches. I love how design enables reflection on practices and understanding values towards change."

Supervisory team:
Dr. Valentijn Visch
Dr. ir. Marina Bos-de Vos

Participatory design

Health & wellbeing

Family-based intervention

Values

Personalized eHealth

Co-creating a smart family-based lifestyle buddy through a design for values approach







In my PhD I am exploring how we can design digital technology to support the healthy lifestyle of young families in vulnerable situations. Families with low socioeconomic status (SES) living in deprived neighbourhoods experience health inequalities like lower life expectancy that in turn aggravate social disadvantages. Supporting healthy lifestyles in early life can play an important role in addressing these inequalities as here the foundation for future life chances and health are laid. In the project I use participatory research through design methods to investigate how values of young families with children aged 0-4 and stakeholders in the social and medical care system around them can play a role in the development of personalized Al-based technologies. Designing for values is promising as values are a driver of behaviour and can also support the collaboration between stakeholders who may experience the potential worth of the design differently.



Illustration of a 'digital lifestyle buddy'

Finding AI-designer Dialogues: Exploring the Potential of AI as a Tool for Self-Reflection

The use of artificial intelligence (AI) in design practice is an exciting and emerging field of study, and one that holds promise for revolutionizing the way we approach design. One area of particular interest and the focus of my PhD is the potential of AI to become a tool for selfreflection during a design process. The desired result of the project is a framework for incorporating Al into the design process for facilitating self-reflection, in order to enable insight into personal design processes. To that end, my work develops practice-based and qualitative methods to investigate how designers can incorporate AI technologies into practice, to reflect



on their own fascinations, practice, and inclinations. So far, I've trained and utilized AI tools, such as neural networks for object detection, to explore concepts such as framing and self-reflection by training them on personal values. This project will also contribute to the ongoing discussion of AI in design, highlighting the possibilities for collaboration between AI and designers to create novel ways of designing.



Vera van der Burg



"Doing research at a design faculty is an incredible experience as it constantly pushes me to explore the interconnection between design and research, and to merge a making spirit with a thinking mind!"

Supervisory team:
Dr. Almila Akdag (Utrecht University)
Dr. Senthil Chandrasegaran
Prof.dr. Peter Lloyd

Artificial Intelligence

Collaboration

Reflection

Alice Buso MSc



"Doing a PhD at IDE allows me to collaborate with engineering, crafts, and social sciences experts. We all share the same interest in understanding how designers can shape people's experiences with animated materials."

Supervisory team:
Prof. dr. Elvin Karana
Prof. dr. ir. Kaspar Jansen
Dr. Holly McQuillan

Animated Textiles

Performativity

Material-Driven Design

Materials Experience

Tangible interaction

"Oops, I've ripped it!": On the Performativity of Animated Textiles

Over the past few decades, researchers and designers have contributed to the field of Animated Textiles by developing textiles with active and responsive capabilities by means of textiles' inherent properties or by embedding digital, physical and biological components. Alice is intrigued by potential rich experiences elicited by animated



textiles, in particular, their action potential in the use time, i.e., their performativity. She explores the ways in which these performative experiences are designed by tuning the qualities of animated textiles at matter, form, composition, and computation levels toward meaningful and prolonged relationships with textile artefacts.

She follows a hands-on materialdriven approach which combines intimate making and systematic exploration of textiles' performativity in (longitudinal) user studies. Her work contributes to design and



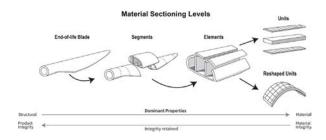
Human-Computer Interaction (HCI) communities by providing a vocabulary, techniques, and unique research artefacts to inspire and help explore this exciting and complex design space of animated textiles.

Designing Composites for Multiple Use Cycles Through Structural Reuse



Wind turbines are crucial for the energy transition, but their end-of-life treatment presents a challenge. Most wind turbine blades, made from composites, are currently sent for disposal or recycled through methods that degrade the value of this hybrid material. Structural re-use through blade segmentation was introduced as a recovery method that maintains high material value throughout subsequent life cycles. Most recovery attempts focus on thermoset composites, the dominant material used in blades, but thermoplastics are becoming more common. Unlike thermosets, thermoplastics can be

reshaped through thermoforming processes. Reshaping offers the opportunity of adapting the geometry of a blade segment for a new reuse application. As a part of the LICHEN-BLADES consortium, this project aims to design and develop "next-generation" wind turbine blades that can be used for multiple use cycles. A combination of material characterization techniques and research through design methods will be implemented to demonstrate the potential of wind turbine blades in secondary applications.



Process for harvesting materials from a wind turbine blade.

Israel Carrete MSc



"The opportunity to dive into a topic with more detail, while also making sure it is applicable at a larger scale. It gives me the sense that I am becoming an expert of something that in a way that is not completely niche."

Supervisory team:

Prof. dr. Ruud Balkenende

Dr. ir. Jelle Joustra

Design for Sustainability

Circular Products

Design for Reuse

Designing new ventures

How do entrepreneurs design new ventures? In entrepreneurship research, more scholars recognise that a startup is actually a designed object. Therefore, much interest is created around what the design process of a startup looks like.

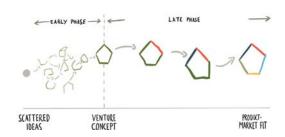
In my project, I try to uncover that design process. I use existing design theories on entrepreneurial data to explain how the founders are making decisions on their product, value proposition and business model.

My dataset is from the course Build Your Startup. I'm doing qualitative, longitudinal research of 18 weeks of 9

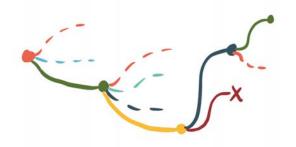
startups. I recorded all mentoring conversations and am coding the topics and relations they are discussing.

I'm finding that the process is chaotic (duh), but am trying to make sense of that chaos. I subscribe to the essense of design being an activity of making something that fits its intended context well with certain purposes/intentions.

In the data I see how these purposes and intentions arise via an interplay with the interpretations of the entrepreneurs. In the end, I hope to synthesize certain design processes or design moves by the founders that help them to design a new venture.



The early stage designs the first business model.



What options are ignored and what paths are chosen?



Mariska van Cronenberg MSc



"Sometimes your path in life leads you back to a cherished moment. If you have the chance to revive this moment again all you have to do is accept challenges along the way, keep moving forward and enjoy the journey."

Supervisory team:

Prof. dr. ir. Jan-Carel Diehl
Prof. dr. ir. Jo van Engelen
Prof. dr. Rudy Folkersma
(NHL Stenden UAS)
Assoc Prof. dr. Marcel Crul
(NHL Stenden UAS)

Sustainable Development Goals

Health care environment

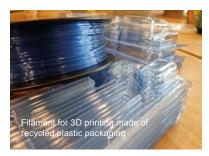
Material closed loop

3D printing

Life cycle evaluation

Local circularity in a health care environment

"Are a range of single-use plastics also banned in health care?", "How do we tackle the rising tide of pandemic-driven plastic waste?" and "Is 3D printing helping to drive personalisation in health care?" Do these headlines sounds familiar? In the Netherlands the healthcare sector is responsible for 7% of CO2



emissions, 4% of waste and 13% of raw material consumption. To reduce emissions and waste and to increase responsibility towards consumption and production, clear goals have been set by the Dutch government and stakeholders in the health care sector. These goals are published in the new national Green Deal 3.0

(2022) titled 'Working Together on Sustainable Care'. In line with this deal Medical Centre Leeuwarden (MCL) is focusing on separation and reduction of hospital waste. Together with MCL, HartPlastic and the Lectorship Circular Plastics we want to reduce the use of raw materials and plastic waste. Therefore, the intention is to create a local circular material closed loop in MCL itself. By using 3D printing technique the most promising plastic waste streams are being processed into new products so the material closed loop will be as short, as local and as efficient as possible. The 3D printed products (bed hook) are being used in the same environment as where the waste is coming from.









Advancing Reparability in Electronics: Design Guidelines and Evaluation Methods

Products that are discarded sooner than expected not only have a significant impact on the environment but also negatively affect consumers' budgets. One effective way to improve the longevity of products is by making them more repairable. This can be achieved by providing design recommendations to designers and manufacturers, as well as policy recommendations to policymakers, to promote the reparability of products. To accomplish this, we require design guidelines and a testing program to assess the reparability of products. In my research, I focus on developing both of these tools.

My research question seeks to understand how design influences the reparability of electronic products and how we can test and score it.

My findings indicate that the design of a product has a more significant influence on its reparability than the repair experience. Therefore, it is essential to prioritize the creation of better reparable designs rather than investing in training people. Furthermore, even minor design modifications, such as using screws instead of glue, can have a significant impact on a product's reparability.

We dismantled and studied many electronic products





Sagar Dangal MSc



"Tlove being able to combine design and scientific methodology to produce outcomes that have a tangible impact at both the design and policy levels."

Supervisory team:
Prof. Dr. Ruud Balkenende
Dr. Jeremy Faludi

Circular economy

Repairability

Repairability Assessment

Davide Di Staso MSc



"I love the variety of the projects that fellow researchers are working on. My work is about describing social issues through prototyping, which I find very empowering." Supervisory team:
Dr. Ingrid Mulder
Prof.dr.ir. Marijn Janssen
Prof.dr. Birger Larsen
(Aalborg University)

Issue articulation

Social innovation

Game-making

Prototyping

Research through design

Strategies for building data capacity

Open datasets contain large amounts of information about local and global issues, such as pollution, gender inequality, and mobility. One of the promises of open data is that it can be helpful in addressing these societal issues better. In my work, I refer to data capacity as citizen's ability to use data to articulate societal issues that affect them. Issue articulation is about understanding how different actors and factors are connected to a certain societal issue. By using data to articulate social issues, citizens can build narratives that are useful when interacting with the institutions and organisations around them, thus building data capacity.

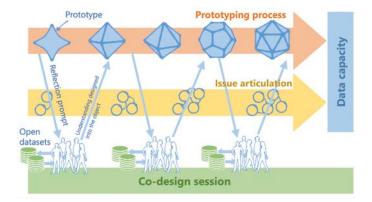
I am investigating how citizens (problem owners) can articulate issues through game co-design sessions. I take a research through design approach to uncover the mechanisms for issue articulation, and develop a new workshop process to articulate societal issues using open data. More specifically, I am looking at the

affordances for issue articulation offered by gamemaking. Prototyping a game requires the creation of a setting, a narrative, rules and game mechanics. In my research, I plan to engage citizens in game development workshops (such as game jams), and uncover whether and how they articulate societal issues through gamemaking.









Sofie-Amalie Dideriksen MSc



"I love the openness to combining seemingly distant theoretical frameworks with design practices – that you can explore strange connections based on your designerly intuition and see what emerges!." Supervisory team:
Prof. dr. Elisa Giaccardi
Dr. Dave Murray-Rust

People
AI
Justice
Feminism
Justice system

Exploring AI in the justice system from afeminist perspective

Al technology is developing at a rapid pace and is now entering areas of society we did not imagine could be automated just a few years ago. One of those contexts is the criminal justice system – from algorithms to aid the police in investigating cases and suspects, to Al lawyers fighting cases in courts and talk of Al judges, the institution around justice in our democratic societies is evolving. This has led to widespread critique and highlighting problems such as automation with hidden biases, invasive surveillance and the challenge to the individual justice. Simultaneously, there is an urgent need for new ways to optimize the current system. In

Workshop exploring the experience of AI through textile

many countries, the justice system in buckling under the pressure of limited budgets and too many cases, which is already harming the individual justice as well as societies collective feeling of justice.

In this PhD, I hope to explore how we can design Al for the justice system, that is able to support all actors in the system – from the police, lawyers and judges to victims and suspects. To ensure these concepts will create justice for all, a feminist standpoint will be taken to view the context from a power perspective where no one is left out when considering benefits and burdens of implementing Al.



This PhD is part of the newly started AI Futures lab

Toolkit with co-creation methods to develop digital innovations for health

Digital technology has the potential to make healthcare more effective and efficient. However, the scalable implementation of digital technology proves difficult due to the complex context of health. The CeHRes Roadmap is a robust innovation model that facilitates the development, implementation and evaluation of multidisciplinary

meaningful care technology with a structured holistic approach. The aim of this research is to make the CeHRes Roadmap applicable to the specific context of rehabilitation. A toolkit with co-creation methods will be developed to facilitate the innovation process in a field lab setting to develop digital innovations more effectively and efficiently.



Co-creation with stakeholders in a healthcare context.





Martijn van der Ent MSc



"My experience of 15 years as a health innovator taught me that the interplay of theory and practice make or break innovations. My research aim is to collect and unlock these insights to help others succeed."

Supervisory team:

Prof. dr. ir. Maaike Kleinsmann
Prof. dr. MD Niels Chavannes (LUMC)
Dr. Jorit Meesters (Haagse Hogeschool)

Dr. Sander van de Hoef (LUMC) Dr. Jeremy Faludi

Health

User-Centered Design

Co-Creation

Digital Technology

Toolkit

Pelin Esnaf-Uslu MSc



"Freedom to explore a wide range of topics, contributing to positive change in important areas such as well-being, using problemsolving skills and design thinking, working in an inspiring environment with creative minds!"

Supervisory team:

Prof. dr. ir. Pieter Desmet

Dr. ir. Rick Schifferstein

Mood

Interpersonal mood regulation

Service encounters

Wellbeing

Designing with/for Interpersonal Mood Regulation

During a conversation, we deliberately change the way we communicate to adapt to other people's moods: We talk differently to a person when they are cheerful than when they are grumpy or gloomy. In our attempts to influence other people's moods, we use "interpersonal mood regulation strategies". These are particularly important for service providers as the interactions customers have with frontline service providers are a significant determinant of customer experience. In our first study, we found at least nine interpersonal mood regulation strategies service providers use as a response to

their client's moods. However, these strategies are interwoven into our daily interactions, making it challenging to identify and isolate them. In this PhD project, we employ the research through design approach to create three different materials (cards, videos and non-figurative interactive digital characters) that enable an understanding of these strategies and make them more tangible. We also investigate the possibility of using these materials as training tools. Ultimately, they can serve as a starting point for designers and researchers who wish to facilitate interpersonal mood regulation in service encounters.







Overview of developed materials: cards, videos & characters



Designing for complexity: Supporting behavioural designers with a social-systemic approach

panton (ink).

This PhD research focuses on mapping the ways in which behavioral insights: 1) can be integrated in the design process, 2) can be aligned with the sociosystemic nature of complex behavioral issues, and 3) can contribute to the development of design ability of designers. The ultimate goal of this is to further professionalize design practice aimed at behavioral change in complex social issues. To this end, five design agencies are connected to this research project and committed to engage in (co)research and (co)design activities throughout this trajectory.



Socionas: analyzing behaviour in a social system

Anita van Essen MSc



"Working with 5 agencies in my research really motivates me to see what my research can contribute to design practice."

Supervisory team:
Prof. dr. Paul Hekkert
Dr. ir. Nynke Tromp

Behaviour Change
Systemic Design
Social Design
Design Methods

Circular economy through the metaphor of a forest



In my research, I explore how we can think in a radically different way about a circular economy and follow the pattern of a more natural ecosystem such as a forest. I see the forest as a metaphor for how a future circular economy could possibly work.

Metaphors are seen in literature as individual linguistic expressions, the decoration of language, and can also reveal the conceptualisation of abstract ideas. Around 98% of an individual's reasoning is unconscious, requires emotion and uses the "logic" of conceptual metaphors. Most individuals are unaware of the conceptual metaphors that govern their thoughts and the extent to which those metaphors can influence the product of those thoughts.

The planetary and social pressures - such as energy, climate, inequality, and resource use - have many academics arguing the need to radically transform the economy. It is, therefore, necessary to reflect on whether the metaphors used to inform the understanding of a circular economy are fit for purpose and explore new ones.





Supervisory team:
Prof.dr.ir. Conny Bakker
Dr. David Peck

Circular economy

Metaphor

Non-linearity

Complexity

Alejandra Gomez Ortega MSc



"Doing a PhD at a design faculty is very exciting and rewarding. The atmosphere and my colleagues are caring and creative. Besides, the multiple laboratories, equipment, materials, and tools allow you to explore."

Supervisory team:
Prof. dr. Gerd Kortuem
Dr.ir. Jacky Bourgeois

People

Technology

Personal Data

Data Donation

Towards Meaningfully Informed Personal Data Donation

My research focuses on fostering collaborations between people, designers, and researchers through personal data. I develop tools and guidelines to support the transactions of personal data, which are at the center of these collaborations. In doing so, my core focus is to help people, i.e., research participants, explore and understand their data. Because data collection practices are often blurry, most research participants aren't sure what their data looks and feels like. Hence, exploring and understanding

personal data is a process of being surprised and finding unexpected information. It can be confronting, but it is important. It allows participants to know what information they would be giving away if they decide to transfer, share, or donate their personal data; and supports them to make better-informed decisions.

As part of my research, I also designed dataslip; an installation aimed at raising awareness of the personal data collected about us as we navigate the world and interact with digital products and services.



Investigating The Adoption of Autonomous Processes in the Context of Organizations

The technological enablers for process automation have experienced fast development in the past decades. In organizations, the adoption of autonomous technologies could bring many benefits, as they offer the potential to increase the efficiency of operations, compensate human workers' limitations in uncomfortable tasks, or reduce labor costs. Nevertheless, new challenges emerge when implementing autonomous technologies in organizational processes (e.g., human element issues, weaknesses within the system, or liability and security concerns), which make adoption hard to achieve. The RSG is working towards the implementation

of autonomous operations in the airside of Amsterdam Airport Schiphol. Schiphol's airside (i.e., the side of an airport terminal dedicated to supporting airplanes and their inherent baggage, passenger, and resource flows) is a multi-stakeholder ecosystem, characterized by high degrees of uncertainty and unpredictability, which makes it an especially complex and worth studying context for automation. As a first study, we will be inquiring about the organizational tensions that hinder the adoption of autonomous processes, after which intervention studies will be proposed to design strategies that facilitate a sustainable implementation of the technology.





Garoa Gomez-Beldarrain



"Passion for design!
I like to be able to better
understand how the
design discipline can
serve to address current
issues from humancentered approaches,
as well as to help sense
making around future
technology."

Supervisory team:

Dr. Himanshu Verma

Dr. Euiyoung Kim

Prof. dr. ir. Alessandro Bozzon

Automation

Mobility

Organizations

Hannah Goss MSc



"I'm passionate about design's role in driving societal change. It's a big responsibility requiring transdisciplinary knowledge, collaboration, and deep consideration of what is desirable. IDE unites for such change."

Supervisory team:
Dr. ir. Rick Schifferstein
Dr. ir. Nynke Tromp

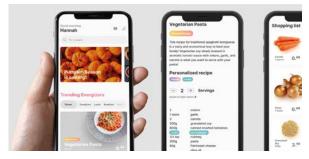
Transition Design
Design Expertise
Systemic Design
Envisioning
Food Waste

Fostering Transitions by Design: Transitioning the Dutch food system to cater for enough

I investigate how a designers' ability to imagine alternatives futures, frame system dynamics for innovation, and design new practices is valuable for fostering transitions. I explore these phenomena in the transition of the Dutch food system to cater to enough.

To understand the value of design-led visioning for transitions, we took a case study approach and followed a design agency in developing a vision of a new food system. Our findings show that designers engage in five visioning activities in a transition context which present tensions as they demand different qualities from the visioning process.

To support innovating for transitions, we propose designers frame system dynamics as Organizational Relationships, Citizen Behaviour, and Time. These concepts provide a way of looking at the systemic context and offer insights into how and where to intervene to foster transitions. To explore this framing, we apply a research-through-design approach to develop the Transition Readiness Profiles.



Retail concept that repositions retailers as care companies.

My final study, yet to begin, explores co-designing new practices to foster a transition path. By examining the role and value of expert designers in fostering transitions, my work informs future research and methodological development in designing for transitions in various domains beyond food waste.



Eduard (Ward) Groutars



"Enjoying the freedom and flexibility to explore different fields such as biology and ecology, fascinated by the elegance with which living systems adapt and evolve, qualities that I hope to combine with design."

Supervisory team:
Dr. Joana Martins
Prof. dr. Elvin Karana

Biodesign

Regenerative Design

Sustainability

Material Innovation

Multispecies Living Artefacts for Regenerative Design

Biodesign is an emerging field in which designers collaborate with living organisms to create either grown artefacts with a decreased environmental impact or living artefacts with unique, alive functionalities. Multiple examples of grown and living artefacts exist within the fields of design, art and HCI which I evaluate through an ecological lens; looking at the different species involved and the interactions between them.

Here we often see the organisms involved living their lives as a single-species community in sterile conditions, devoid of contact with their original habitat and other

In my research I aim to explore the potential of living artefacts that harness such qualities by facilitating interactions between living artefacts and their surrounding ecosystems. This to see if biodesigners collaborating with living organisms can actively

regenerate ecosystems by improving nutrient cycles and

species. Whilst such methods of growing organisms in

isolated monocultures favour control and predictability.

self-regulation, versatility and emergence.

biodiversity.

they deny the qualities inherent to living systems such as





Synthetic Stakeholders for the Design Process

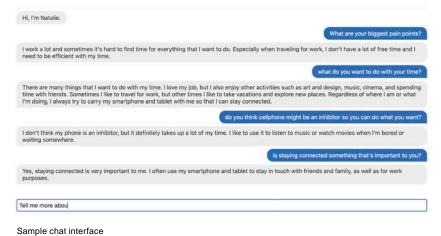
I seek to explore the feasibility of using Synthetic Stakeholders, embodied as conversational AI systems, in human-centered design. These bots embody the knowledge. experience, and personality of realworld user groups and offer a layer of privacy between corporations and end-users. They do not experience negative emotions such as embarrassment, annovance, fatigue, or boredom, making them endlessly available for insight gathering. Through our research, we aim to evaluate the impact of co-designing with these non-human representatives of stakeholders on creativity and performance of



Fabricated synthetic stakeholder headshot

designers. Our initial findings suggest that designers can iteratively improve ideas with feedback from the bots, but there may also be an impact on fixation.

Al Natalie



Heng (Eric) Gu MSc/MA



"I love the opportunity to collaborate with researchers across diverse disciplines, from consumer products to cultural heritage, and the dissection of design processes, to develop AI tools that augment creativity."

Supervisory team:

Prof.dr. Peter Lloyd

Dr. Senthil Chandrasegaran

Human-centered design

Conversational Al

Synthetic Stakeholders

Digital Twins

Data-enabled Design

Meike Hardt



"To engage critically and philosophically with like-minded people about inequality and discrimination in, through, and with design, but also to question one's own beliefs and research findings."

Supervisory team:
Prof.dr.ir. Pieter Desmet
Dr. Nazli Cila
Dr. Olya Kudina

Artificial Intelligence

Democracy

Critical Design

Care Ethics

Collective Infrastructures

Care and love as political and ethical (design) framework for contesting ADMS

This practice-based research investigates care and love as relational and political (design) framework in the context of democracy and artificial decision making systems (ADMS) in public spheres. Current cases such as the Dutch childcare benefits scandal have shown us how ADMS does repeat human biases and discrimination and that there is a demand for a broader societal integration for countering such systems. Current research on the contestability of ADMS in public spheres have pointed to a problem with existing unequal power distributions and value practices limiting the implementation of contestability of ADMS used in

public spheres. Starting with the hypothesis that there is a need of a reorientation of what it means to build civic infrastructures in a sociotechnical context, this research uses care and love as a political and ethical framework for imagining alternative infrastructures- and collective practices to counter its embedded power and hegemonial knowledge mechanisms. Care and love in this research will be understood as a radical and relational approach invested in daily (design) practices and their potentials and limitations for designing features and mechanism for contestation, negotiation and understanding ADMS in public spheres will be explored.





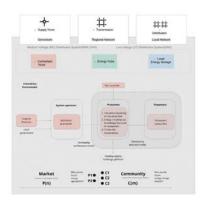


Design Challenges in Emerging Distributed Hydrogen Energy Storages





Distributed energy storage systems are emerging as a complementary element in the quest for sustainable energy solutions, with potential applications in regions featuring high industrial demands and spatially resolved negative residual loads. These systems can contribute to the decarbonization of electricity, heating, and transport sectors while enhancing local renewable energy consumption and supporting energy storage and demand-side management. However, the development of



Output of the social network analysis



these systems presents unique design challenges, calling for a comprehensive understanding of obstacles and opportunities in the evolving energy landscape. Drawing on case studies from distributed hydrogen system applications in the form of regional energy hubs in the Netherlands, our research in an exploratory process reveals these design challenges.

Mahshid Hasankhani MSc



"My PhD focuses on shaping decentralized storage systems for community-led energy solutions by collaborative design across disciplines and industries. I address coordination problems to engineer secure energy systems."

Supervisory team:

Prof. dr. ir. Jo van Engelen

Prof. dr. ir. Jan-Carel Diehl

Dr. Sine Celik

Smart Cities

Sustainable Design

Complex Networks

Social Networks

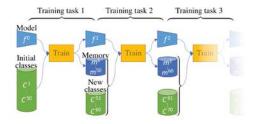
Participatory Design

AI-powered Information Analysis Tool for Sense-making in Design



As a first-year PhD candidate, my research explores designers and AI roles in video-based design research sense-making. In this rapidly evolving domain, AI applications make strides in academic and commercial spheres. I aim to understand the collaborative dynamics, integrating empirical and statistical analysis.

My approach involves AI tools for better design-AI collaboration in video-based research. Drawing from AI models like motion tracking, pose gesture configurations, and information distillation techniques, these models offer insights into AI's capabilities and limitations, enabling effective harnessing of its potential.



Designers mold AI for continuous learning



My project highlights how AI can augment sensemaking, problem-finding, and exploration processes in design research. Bridging the gap between AI and human designers, I strive for a seamless, productive collaborative environment, leveraging both parties' strengths. Enhanced collaboration could lead to novel design solutions and research methodologies, driving innovation.

Ultimately, my research aspires to advance design's academic and professional realms by deepening understanding of designers and AI interplay. This knowledge unlocks innovative possibilities in human-AI collaboration.





"From a background in Computer Science and Human-Computer Interaction, I am driven to explore innovative avenues where Artificial Intelligence can further enhance and empower human explorations in the realm of design."

Supervisory team:
Prof. dr. Gerd Kortuem
Dr. Evangelos Niforatos

Artificial Intelligence

Design Method

Human-Computer Interaction

Human-Machine Interface

JanWillem Hoftijzer



"The PhD helps and allows me to observe the field of IDE from a different angle than I usually do. The research provides depth and inspiration."

Supervisory team:
Prof. dr. David Keysor

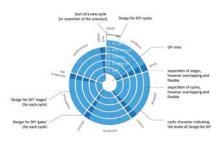
Do It Yourself
Sustainability
Facilitation
Self-sufficiency

Democratizing design, by designing for DIY

Design being an integrated element of industrialized society has merely focused on satisfying the increasing 'need' of consumption. In fact, this has resulted in an increasing 'distance' between people and the items they buy and use: an unhealthy human-product relationship.

According to Manzini (2006), designers have been 'active agents of an un-sustainable idea of wellbeing'.

This permits the search for an alternative interpretation of wellbeing: for 'a new partnership', as advocated by e.g. Ehn (2008). Anticipating (a) today's distant human-product relationship, (b) people's desire to create (J. R. Ehrenfeld, 2008), (c) the designers responsibility, (d) anticipating



A 'Design-for-DIY' framework



'Design-for-DIY' study regarding of a set of headphones

the potential of making tools and information (e.g. Bonvoisin et al. 2017), this study introduces a 'Design for DIY' scenario and framework to help bridge the knowledge gap between the product designer and the layperson. A series of 'Design for Do-It-Yourself' studies were conducted in which lay participants were facilitated in the DIY process by a designer. These studies and an exploration of existing design frameworks and design models, resulted in the design of a 'Design-for-DIY' framework, to serve as a working method. The study concludes with a range of design experiments that helped testing the framework.

Designing medical devices for a circular economy

My PhD is part of a large EU-funded consortium: DiCE. This project was initiated by Johnson & Johnson, and it includes many partners from both industry and academia. DiCE aims to develop circular solutions for healthcare devices that contain electronics, to reduce healthcare pollution and waste.

As part of this consortium, the TU Delft team aims to work towards a fully validated circular design guide for digital health devices. To do this, we are developing a best practices report. This means that we analyze



existing circular practices in the field to uncover opportunities for the circular transition of healthcare. Simultaneously, we define different circular strategies (such as recycling, remanufacturing, reuse, etc.), their exact steps, and their challenges. By

now, we found that some important barriers to circularity exist in the safety and infection risks, financial constraints, linear norms, unclarity in responsibility, logistic difficulties, and difficulties in the collection and separation of devices.



Also part of this work package is to create a circular redesign of four devices (electronic label, smart pill box, single-use endo-cutter, and wearable sensor). These design cycles will serve as 'case studies' to gather additional data for the development of the design guide.







Tamara Hoveling MSc



"It is my true passion to design future healthcare innovations that make an actual change. This PhD at the TU Delft serves as a springboard to allow me to do just that, while also being kind to the environment."

Supervisory team:
Prof. dr. ir. Conny Bakker
Dr. Jeremy Faludi

Sustainable Healthcare

Circular Economy

Circular Design

Sustainable design

Medical Devices

Jiwon Jung MSc ir.



"Very well-established and strong history in design theory and methodology. Various design domain spectrum covered by diverse colleagues." Supervisory team:
Prof. dr. Dirk Snelders
Prof. dr. ir. Maaike Kleinsmann

Digital Twins

User Research

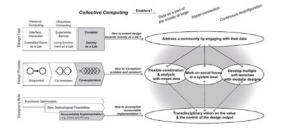
Virtual Reality

Internet of Things

Developing Data-enabled Design in the Field of Digital Health

My PhD starts with the design methodological concerns of how design activities evolve towards societal challenges along with technological advancement.

As design tasks expand to complex societal challenges such as developing digital healthcare, design tools to tackle them also need to be advanced by integrating the benefits of both humans and advanced technologies. Digital healthcare is a complex societal challenge that cannot be tackled by one-sided efforts. As a result, my research asserts the need of developing complementary efforts of doing design, using both designers' creative skills and advanced data collection and analysis technologies in the digital healthcare development process.

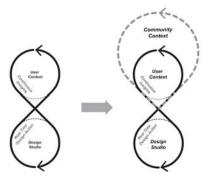


A design vision published in Journal of Engineering Design









Data-enabled Design in the field of Digital Health

Further, my research is rooted in the need to advance design methods and tools to recognise the collective wisdom of society as a whole to tackle societal challenges. Societal challenges are often beyond the individual context, that is, the expertise of conventional design tools. Furthermore, data and digital technology advancement are opening up such opportunities to explore society as a whole and delve into collective wisdom. As a result, my research explores the use of tens of thousands of online patient stories and machine learning to include collective patients' perspectives in a digital health design process.

Fredrik Karlsson MSc



'I find it interesting to understand how design research can merge with different fields, and in my case the field of healthcare, to solve complex problems by learning from each other." Supervisory team:
Prof.dr. Dirk Snelders
Prof.dr.ir. Maaike Kleinsmann
Valeria Pannunzio

Digital health

Data

Implementation

Design methods

Data-enabled design as a methodology for implementing digital health





There is a growing need for more resources and staff in the healthcare field due to an aging population. Developing digital health solutions is a way to improve care and efficiency but implementing them in practice is difficult. My research focuses on creating a good fit between digital health solutions and the context they are implemented into by monitoring, evaluation and adapting the digital health solution and the context it



Digital data collection can identify issues to adress.

is implemented in. By merging design research and research from implementation science, I will develop and test guidelines for how to implement digital health solutions. Implementation science will contribute with how to evaluate the implementation while design research will contribute with how to go from problem to solution.

My starting point is to use the data-enabled design methodology. When using this methodology, designers collect digital data to help to evaluate the implementation and to use as creative material in ideation and to inform criteria for the designs. Adjustments are then made iteratively to improve the implementation until a desired fit is reached. This iterative approach makes data-enabled design suitable for monitoring, evaluating, and adapting digital health solutions when they are used in clinical practice.

The Human Factors of AI-empowered Knowledge Sharing

Our project aims to design a cognitive assistant for knowledge sharing between operators in complex systems like agile manufacturing. Current training methods are resource-intensive and slow, so we want to improve human-Al collaboration in professional contexts. We carried out a context analysis, implementing a cognitive assistant to address challenges in maintaining and sharing operator knowledge.

Preliminary results show that using a voice user interface for maintenance reports saves time and improves quality without affecting tasks. Reports can be fed into the knowledge graph for reuse. The potential integration of Large Language Models (LLMs)

could improve the assistant's NLU, delivering relevant advice while reducing the development and maintenance burden. However, risks include hallucinated answers and intellectual property theft. Partial mitigation can be achieved through local LLMs and domain-specific knowledge bases.

Next steps include studying prompting techniques for tacit knowledge elicitation via conversation and conducting usability studies in real-world settings, considering user acceptance, production performance, safety, and ethical concerns. Our goal is to create design guidelines for cognitive assistants that effectively share knowledge in professional environments.





Samuel Kernan Freire MSc



"Doing a PhD at a design faculty encourages me to place humans at the center of my research, ensuring that my work remains focused on addressing real-world problems and improving the lives of people."

Supervisory team:
Dr. Evangelos Niforatos
Prof. dr. ir. Alessandro Bozzon

Cognitive assistants

Knowledge management

Manufacturing

Interaction design

Jiho Kim MRes



"The atmosphere that evokes creativity, aesthetics, and positive dynamics."

Supervisory team:
Prof. dr. Elvin Karana
Dr. Joana Martins

Biodesign

Digital Tool

Microbial Sensibility

Microorganism

Regenerative

The Role of Immersive Digital Tools in Cultivating Microbial Sensibility in Biodesign

Biodesign is an emerging field at the intersection of biology and design, incorporating living organisms as essential components in artefacts, and it has the potential not only to enrich human empathy and interest in non-human entities but also to support regenerative futures.



To surface the potential link, we coined the term "microbial sensibility" to refer to the biodesign processes and outcomes that connote sensorial interaction, inclusive understanding, and situational awareness toward the non-human world by centring on microbes. One way of cultivating microbial sensibility in biodesign is to be sensitive and empathic to non-humans, to sense, think and/or feel like them (e.g., Thomas Thwaites' GoatMan, albeit not microbial).

Microorganisms are challenging to perform this sensitisation due to their microscopic scale, invisibility, and transient nature. In response, I see the potential role that immersive digital tools might play in tackling the aforementioned microbial challenges by extended sensory experiences on imperceptible subjects (e.g., Marshmallow Laser Feast's project). In my PhD, I aim to contribute to the biodesign and regenerative design research agendas by offering such immersive tools and a set of guidelines for cultivating microbial sensibility in biodesign.



Designing public services that are good for people



As a user researcher in Dutch government organizations, I learned how difficult it is to design and deliver human centered services. Public service organisations designed themselves as a relay race from law to (digital) counter. In doing so, they easily forget the social purposes and find it difficult to take into account the context and experience of citizens. The organisational dynamics become a world in itself, a highly politicalised system world that becomes leading for how the relationship between the government and citizens is. Civil servants working in this context find it hard to keep the end-user in mind, as my photo series The compassionate civil servant of colleagues at the Executive Agency of Education shows.

In recent years, there has been an increasing call for public policy and services that take into account the perspective of citizens, how legislation works out for them and whether this will lead to the society we envisioned. But how can a public service organisation rise up to this challenge? With an open action research approach in close collaboration with Dutch public service

organizations, my PhD-program will focus on finding ways to design and deliver public services that are good for people. On my blog klipklaar.nl I will take you along on this journey.



From the photo series The compassionate civil servant.

Maike Klip - Veltman MA



"I have a practitioner's background and it's a great experience for me to work with super smart people in the design field and bring this inspiration to the Dutch government."

Supervisory team:

Prof. dr. ir. Maaike Kleinsmann Dr. ir. Jasper van Kuijk **Open Action Research**

Public Service-Organisations

Service Design

Policy Design

Design for comfort: an investigation of factors affecting seating discomfort



My project focuses on seating comfort. The first stage of my research is to understand the factors that contribute to discomfort and the strategies that humans use to mitigate discomfort.

Discomfort has been linked to musculoskeletal disorders which have far-reaching consequences for people's daily lives. With sedentary lifestyles becoming more and more prominent, understanding discomfort as phenomena is important for prevention and development of coping strategies.

A key component of my research involves examining various types of in-seat movements that individuals make while seated. My first literature search gave a very mixed result, which highlights the complexity of research on seating comfort. For instance, there seem to be many different patterns of in-seat movements, and they have different relations to human- and contextual factors.

Based on the literature review, we have planned a series of empirical studies for follow-up research. The outcomes of these studies are expected to provide a better understanding of different factors that contribute to discomfort during seating. This knowledge will also be the basis in developing design interventions that can effectively mitigate discomfort and promote seating comfort.



Aernout Kruithof MSc



"This PhD enables me to gain further understanding in my topic and get experience in managing research projects. Also, it allows me to contribute to the design field with new insights and applications of ergonomic tools."

Supervisory team:
Prof. dr. Peter Vink
Dr. Yu (Wolf) Song

Seating comfort

Discomfort factors

In-seat movements (ISM)

Ergonomics

Jason LaRoche MSc



"Janssen
Pharmaceuticals is
sponsoring my research,
but working within
the four walls of a big
company can restrict
your perspectives. The
diversity of thought and
ideas at TU Delft really
compliments my work."

Supervisory team:
Prof. dr.ir. Conny Bakker
Dr. Jeremy Faludi

Sustainability

Clinical Research

Pharmaceuticals

Sustainable Design

Healthcare

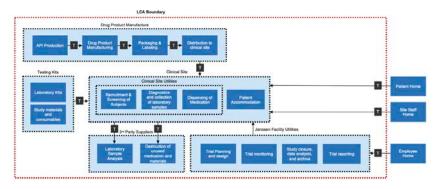
Reducing the climate footprint of Janssen's global clinical operations

This project is concerned with the greenhouse gas (GHG) emissions of clinical research at Janssen Pharmaceuticals, one of the industry's largest pharmaceutical companies. The execution of clinical research requires a complex web of actors, each providing unique functional capabilities critical to trial execution. The environmental footprint of these operations is yet unknown, but this project seeks to quantify the greenhouse gas emissions of Janssen's clinical operations via life-cycle assessments (LCAs) and use this to develop a streamlined decision-making tool that will allow scenario modeling

		Climate Change (kg COueq.)	Percentage Contribution
Travel-Related	Patient travel	5,419	31%
	Trial site staff commuting	909	5%
	Jansen staff commuting	2,560	15%
Total		8,888	51%
Drug-Related	Drug product	820	5%
Total		820	5%
Study -Related	Trial site utilities	2,725	10%
	Patient Accomodation	2,068	12%
	Janssen facility utilities	1,319	8%
	Testing kits & consumables	925	5%
	Laboratory Sample Transport and Processing	807	5%
	External meetings	26	0%
Total		7,870	45%
Study Total		17,578	100%

Results of the LCA of Phase I Study TMC114FD1HTX1002

to estimate the greenhouse gas emissions for different clinical trial designs. The goal is to elevate LCA data into actionable information that can be used to guide the strategy, design, and execution of clinical trials.



Visual Representation of System Boundaries

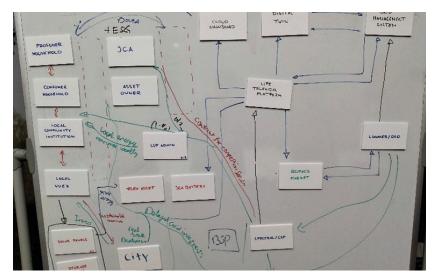


Transforming Power in Smart Local Energy Systems: A Design Anthropology Approach

In my PhD research I am taking a transdisciplinary approach towards the design of new, renewable energy systems that involve solar panels, battery storage, and various types of smart technologies. The new energy services and products that the energy transition enables can lead to novel business models, actor roles and social relationships, which also have political and cultural dimensions. In my research I am studying such aspects using the social theory concept of power.



Speaking with local residents in Amsterdam South-East



Conceptualizing the future energy system through co-creation





Gijs van Leeuwen MSc



"Being inspired by the incredibly diverse field that is design research. Learning about novel, creative ways of doing things that are practically applicable as well as grounded in rigorous research."

Supervisory team:

Prof. dr. David Keyson

Prof. dr. Bregje van Eekelen

Dr. Abhigyan Singh

Energy

Design Anthropology

Power

Sociotechnical

Co-creation

Qiang Liu MFA



"I am interested in the intersection field of emerging materials and interaction design. Design faculty of TU Delft can provide me a good platform to explore, engage in the field I like."

Supervisory team:

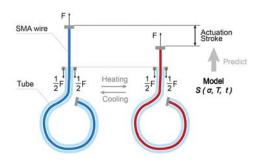
Prof. dr. ir. Kaspar Jansen

Dr. Sepideh Ghodrat

Smart materials
Interaction design
Design tools

Shape Memory Alloy Systems for Interaction Design

My research is to bridge the gap between SMA system and interaction design by developing phenomenological models and toolkits for the HCI community. With these models and toolkits, I expect designers can make their shape-changing objects easier and more efficient.



Modelling of A Flexible Tube-guided SMA Actuator



Mimosa: Modular Constructive Kit for Shape-changing Objects

Gijs Louwers MSc



"I love the complexity and ambiguity found when working on the fringes between arts and sciences by designing with light and sound, and supporting the needs and wants of vulnerable people who need it most."

Supervisory team:
Prof. dr. Sylvia Pont
Dr. Elif Özcan
Prof. dr. Diederik Gommers
(Erasmus MC)

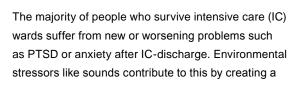
Intensive care

Soundscape design

Sonic ambiance

Fundamental needs

VitalSounds: Sounds for Clinical Well-being



negative experience with the IC-environment, exposing



Interview with an IC-survivor in Erasmus Medical Center.





patients to avoidable stress. In the VitalSounds: Sound for Clinical Well-being project, we work with the Erasmus Medical Center, Philips and the Critical Alarms Lab in Delft towards creating a more restorative, people-centred ICU by thinking of how personalized, contextualized soundscapes can support the basic, psychological needs of the listener. We found in an online study that the soundscapes people associate with the fulfilment of these needs set a corresponding sonic ambiance, and are mostly dominated by human sounds, followed by natural, technological and musical ones. In interviews with IC patients about their sound experiences, we found that being isolated in single-patient rooms, overexposed to alarms, having a lack of variety of sounds to listen to, and waking up from sedation could be opportunities for designers to improve the experience of the sounds of the ICU. Designing for these themes could then lead to a more positive patient experience with IC-admission with a human-centered critical care environment at its core.

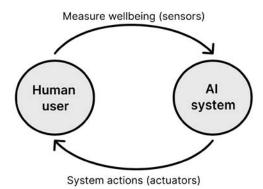
Designing Positive Artificial Intelligence

My project revolves around designing Al systems that foster wellbeing, known as "Positive Al." Utilizing a cybernetic perspective, I emphasize developing sensors and actuators. In this context, sensors function as instruments capturing the contextual aspects of wellbeing in a granular and actionable manner. Actuators, conversely, represent the components that enable the system to adjust based on sensor measurements, ultimately aiming to support human flourishing.

From this standpoint, I have pinpointed a set of key challenges to address in Positive AI design.

These challenges include the contextualization, operationalization, optimization, and implementation of wellbeing (actions). To overcome these challenges, I have developed a method that centralizes the measurement of wellbeing within the design process, integrating wellbeing assessment—action loops to guide Al system development.

I am now exploring opportunities to apply these insights within the industry, with a particular focus on the increasing integration of generative AI in ubiquitous systems and its societal implications.



A simple schematic of an assessment-action feedback loop

Willem van der Maden MSc



"Human-centered design can translate the complexity and serendipity of human experience to artificial systems and help face the problems of "Today's AI"."

Supervisory team:

Prof. dr. Paul Hekkert

Dr. Derek Lomas

Artificial intelligence

Positive design

Wellbeing

Cybernetics

Emile Mazerant MSc



"Being trained in business management and with over twenty years of experience in innovation, the design discipline adds interesting additional ways of doing and thinking to my repertoire in managing innovation."

Supervisory team:

Prof. dr. ir. Frido Smulders

Prof. dr. ir. Kees Dorst (UT Sydney)

Dr.ir. Mieke van der Bijl-Brouwer

Organizational Behavior

Design in Context

Innovation by Design

Social dynamics in traction finding between concept generation and implementation

For innovation in organizational settings to be successful, novel ideas will need to be absorbed by an existing context. Innovation practitioners experience challenges trying to gain traction between concept generation and implementation, negatively impacting efficiency and effectivity of the innovation process.



 $\label{eq:concepts} \mbox{How people shape concepts} - \mbox{shape boxes} - \mbox{shape concepts}$

My research focuses on the observation that in multi-stakeholder innovation processes in organizational settings, social dynamic factors within the process over time impact the moment, the speed, and the extent with which traction is obtained.

Reframing is considered a core design activity, innovating the way we make sense of a situation, oftentimes challenging underlying beliefs and assumptions. I expect to improve my understanding of the workings of social dynamics in gaining traction for novel ideas by learning in such settings. I am using qualitative mixed research methods, with semi-structured interviews (expert designers, innovation professionals) and case studies.

I aim to build new theory to be applied in developing new design- and innovation methods. For design- and innovation practice, these should lead to improved implementation in innovation processes, saving time, money, and frustration, thereby avoiding ideas to end up in the so-called Valley of Death.



Digital twins for collaborative bike-service co-design

Electric bikes enable more people to bike more often. These bikes are also mobile computers that have the potential to add new "smart connected bike" features. My research focuses on how the data generated by these bikes can be used to create digital twins that benefit bike designers making the next generation of innovative bikes and services. I am exploring interactions between designers and biking data to develop innovative new design tools that not only provide designers with information but also help them develop an empathic



An annotation of a 360 video being used in a design process

understanding of the cyclist's experiences.





A sphere of 360 video of an e-bike ride.

In my first project, I studied how a designer's empathic understanding of video footage of a bike ride changed by adding heart rate information. My findings revealed that while adding heart rate as a graph did not impact empathy, adding audible heartbeats led to a shift in the type of empathy from "understanding" to "feeling" the user.

My exploration of video is ongoing, and I am developing a tool to integrate 360 video into the design process. 360 video is immersive and contextually rich but also complex. To address this, I have developed a VR headset-based tool that allows designers to view and annotate video immersively and I will explore how this changes the insights and empathy of designers.

Wo Meijer MSc



"I love the fact that I get to blend research with innovative technology all while focusing on people."

Supervisory team:

Prof. dr. Gerd Kortuem

Dr. ir. Wilfred van der Vegte

Digital Twins

User Research

Virtual Reality

Internet of Things

A people-centered approach to integrating emerging technologies in cancer care



Shared decision making in cancer care is a process in which treatment decisions are made jointly between patients and professionals, based on evidence and people's preferences, opinions and values. In this context, emerging technologies - such as decision support tools - have the potential to transform care journeys. However, their integration is not free of complexities, posing challenges for patients, medical teams and organisations as a whole, and although several initiatives are underway to assess the impact of emerging technologies, health interventions are not always successful because they do not holistically consider the wide range of factors that might influence their design and implementation processes. Furthermore, the absence of people-centred approaches can result in developments that don't align with those of end-users; trust and privacy issues; or practitioners not perceiving technology as contributing to their workflows.

To address these complexities, this research focuses on creating a design-based framework for the adoption and acceptance of technology-supported innovations. By combining technology assessment approaches with design methods, technologies take on a people-centred perspective, allowing new possibilities for addressing care challenges to be explored.



Paula Melo Signerez MA



"A willingness to contribute to the creation of new knowledge and to constantly challenge myself."

Supervisory team:

Prof. dr. Dirk Snelders

Prof. dr. Judith Rietjens

Dr. Fernando Secomandi

Service Design

Design for complexity

People-Centred

Emerging technologies

Technology-supported care

Xueqing Miao



"I have a background in design with an interest in sustainability. Doing a PhD enabled me to satisfy my scientific curiosity and expand my understanding in this field by exploring how design drives a sustainable life."

Supervisory team:
Prof. dr. ir. Ruth Mugge
Dr. Lise Magnier

Consumer behaviour

Circular economy

Packaging

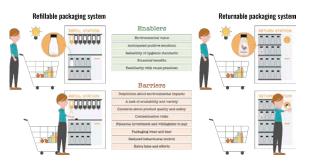
Reuse

Sustainability

The value of design for fostering consumers' engagement with reusable packaging systems

The global packaging waste crisis demands innovative solutions. Reusable packaging systems (RPSs) hold great promise in addressing this challenge by replacing single-use packages with reusable packages. My research focuses on consumer behaviour in the adoption of RPSs. Through both qualitative and quantitative approaches. I find that while consumers are generally willing to adopt RPSs, various barriers can complicate the process of adoption. For example, reduced behavioural control due to the complexity of this new shopping pattern, contamination concerns, a reluctance in investing extra effort and paying a premium, as well as scepticism about environmental performance

and behaviour effectiveness can all hinder consumers' acceptance. I will also develop and test whether design interventions can enhance acceptance and increase the number of packaging reuse cycles through experimental studies. This will provide more understanding of how RPSs stimulate more sustainable decisions and trigger behaviour change from single-use to reuse. My PhD research has scientific contributions to packaging innovation, consumer behaviour, and environmental psychology, as well as practical implications for packaging manufacturers and policymakers to promote sustainability and reduce waste.



Enablers and barriers of two main RPSs in this project



Revisiting computational methods to assess accessibility to urban places

There is new awareness coming from various fields on how cities affect the well-being of their residents. Driven by this new awareness, urban planners and designers shift away from the car-centric cities and embrace new models such as Paris' "15-minute-city", Barcelona's "superblocks", or Hamburg's "car-free zone". These models aim to promote physical activity through active travel and lead to living environments that foster social interaction and cohesion. However, the application of these models is mostly focused on proximity-based metrics. There is still a lack of nuanced methods and metrics to capture and assess what should one consider when assessing accessibility.

In my project I study the concept of accessibility and I am puzzled by what "easy access" to a place could or should reflect. This "easiness" is often translated to travelling time or distance. But could it also be translated to characteristics of the urban environment that motivate people to walk more, encounter each other, and, therefore affect their wellbeing? Arguably, a 10-minute walk through a dark, scary alley is not the same as a 10-minute walk through a vibrant street with many trees and flowers. My objective is to revisit existing methods that assess accessibility and enrich them while accounting for factors that influence people's wellbeing.



Vasileios Milias MSc



"The gentle push to
"mix" and "bridge".

Design constantly
pushes you to mix
quantitative with
qualitative methods
and bridge the research
and industry worlds.

I find this mentality
extremely valuable
and educational."

Supervisory team:

Prof. dr. ir. Alessandro Bozzon

Prof. dr. Gerd Kortuem

Dr. Achilleas Psyllidis

Accessibility

Urban Environment

Wellbeing

Computational Methods

Hosana Morales MSc



'I think it is very inspiring to see all the diverse design projects at IDE, especially to talk with the people working on them. For me, nothing is more inspiring than passionate people talking about what they are doing."

Supervisory team: Prof. dr. Gerd Kortuem Prof. dr. ir. Maai<mark>ke Kle</mark>insmann

Evidence-Based

eHealth

Health outcomes

Patient journey map

Design method

Evidence-Based Design in eHealth

How can healthcare designers effectively design for health outcomes?

Designers play a vital role in shaping future healthcare interventions and improving health outcomes. Yet methods and practices of healthcare professionals differ from how designers approach design challenges. In my PhD, I investigate how designers can systematically consider evidence about health outcomes in their design process to drive positive health outcomes.

As the first step, I have explored evidence practices of healthcare and design professionals and identified challenges and strategies with respect to evidence needs, processes, and desired effects. Now, my research focuses on methods and instruments for better-aligning evidence practices of designers and healthcare professionals. Specifically, I am investigating (1) how designers and healthcare professionals can collaboratively define hypotheses based on the relation between the eHealth system and health outcomes and



Mapping evidence needs and hypotheses into eHealth journey.

(2) how patient journey maps can support designers in engaging healthcare professionals in discussions about evidence and hypotheses to inform the healthcare design process.



"Doing my PhD at a design faculty makes me happy because I can use my interdisciplinary skills whilst working with people and fungi from a materials perspective!"

Supervisory team:
Prof. dr. Elvin Karana
Prof. dr. Han Wosten
(Utrecht University)
Dr. Joana Martins

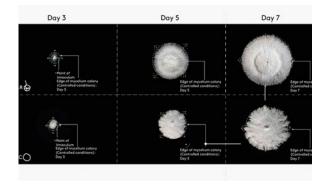
Materials Experience
Bio design
Regenerative Design
Design methods
Interaction design

From Healing to Care: On the Potentials of Living Fungal Artefacts for Regenerative Design



This PhD thesis contributes to the field of biodesign, with a particular interest in understanding the potentials of Living Fungal Artefacts (LFAs) for regenerative design. I am particularly interested in everyday encounters between humans and living fungal artefacts and how this is shaped by the shared habitat qualities (e.g., sound and light) in the context of use. Putting forward livingness as an ecological and social phenomenon, I emphasize a reciprocal relationship between humans and living materials, where such shared habitat qualities help surface the ways of living and everyday practices





and can ultimately help build regenerative practices that are beneficial for humans and non-humans alike. In my research, I adopt a material-driven approach, which suggests a hands-on and technical understanding of a material - in our case, fungi- from a bottom-up approach with design explorations and ideations on the social implications of the material in use (top-down) as part of the same holistic practice.

Conversations with Agents

My project takes a more-than-human approach to research human-Al interactions in everyday life. The pressing challenges we face today, from climate crisis to algorithmic discrimination, make it apparent that humans and technologies are deeply entangled. To design responsible artificial agents, it is urgent to find methods that can go beyond interactions, and instead focus on ecosystems, i.e., situating agents as part of larger processes of

data modeling, materials extraction, and human labor. Scholars in the posthuman turn in HCI have argued that in order to understand the socio-technical entanglements of AI systems it is necessary to shift from a user-centered paradigm to a more-than-human orientation.

In my PhD research, I have developed a more-than-human practice, including methods and concepts to notice and attune to more-than-human agencies.



Conversation starters explores (mis)understandings of Al

Johanna Nicemboim



"The freedom and autonomy I have in my research. The excellent supervisors and colleagues."

Supervisory team:

Prof.dr. Elisa Giaccardi

Prof. Johan Redstrom (Umea University)

Posthuman hci

More-than-human design

Conversational agents

ΔΙ

RTD

Speculative design

Alexander Nieuwborg MSc



"Unravelling complex system challenges and turning them into meaningful and tangible solutions fascinates me. On a philosophical level, I am intrigued by understanding the "why". And the "why's" underneath."

Supervisory team:

Prof. mr. dr. ir. Sicco Santema

Dr. ir. Marijke Melles

Dr. ir. Suzanne Hiemstra-van Mastrigt

Jan Zekveld, MSc (Royal Schiphol

Group)

Resilience

Antifragility

Black Swans

Aviation

Designing Towards Pandemic Antifragility in Multimodal Transport Hubs

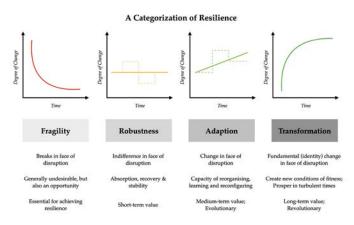


The COVID-19 pandemic exposed existential public health and economic fragilities of the civil aviation industry. To prepare for future Black Swans, high impact and surprising events which are only predictable in hindsight, an interest emerged in becoming "resilient". But what does resilience mean? As multiple interpretations exist, the first study aimed to create concept clarity by conducting a scoping review. This resulted in a categorization of resilience into four reoccurring aspects: fragility, robustness, adaptation and transformation.

The second study delved deeper into the lessons learned from

the Dutch airport system during COVID-19. The goal was to gain insight into how a complex system reacted upon a Black Swan. Some key takeaways emphasize the need for a more systemic approach across stakeholders, increased sensemaking and informal relation-building.

My current study aims to operationalize learnings from the first and second studies using serious gaming. The underlying goal is to explore how a systemic approach, increased sensemaking and the use of the categorization of resilience can help complex organizations in preparing for looming Black Swans.



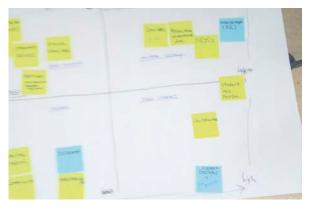
The result of study 1.

Co-creating product specifications and adoption plan through social network analysis

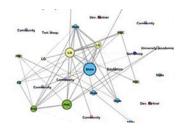


The project is situated within the INSPIRED (Inclusive diagnostics for poverty related parasitic diseases in Nigeria and Gabon) project which aims to design new digital optical diagnostic tools for malaria, schistosomiasis and soil transmitted helminth diseases. My part in the project focuses on co-creating the devices with different stakeholders both in the Netherlands and in Nigeria using various methods.

My approach includes using a variety of methods: context mapping, stakeholder identification and analysis, social network analysis, co-creation sessions to understand stakeholder needs, power and interest.



Power interest matrix by stakeholders



Output of the social network analysis

Adeola Onasanya MSc



"Working with designers to create devices that can be used to support healthcare in low-income countries."

Supervisory team:

Prof.dr.ir. Jan Carel Diehl

Prof.dr.ir. Jo Van Engelen

<u>Health</u>

Human-centered design

Co-creation

Neglected Diseases

Diagnostics

3D printing for repair



My PhD project focuses on how we can use 3D printing to produce spare parts for repair in a sustainable manner. Spare parts availability is crucial for repairing and thus extending the life of consumer products. Initially, I wanted to focus on self-repair of consumer products, for example in repair café's. However, I found that creating 3D printed spare parts is a long and cumbersome process. It is not as simple as just 3D-scanning or copy-pasting the original part, but it requires many design iterations before coming to a printable part. This limits the scope considerably, as it depends on consumers who are willing to put in the time and effort to redesign parts for printing. It would be much easier if original equipment manufacturers (OEMs) provide the part print files, or provide printed parts through service providers. This benefits OEMs as well, as new and upcoming eco-design legislation requires producers to provide spare parts for



3D-printed spare parts (left: Faludi, mid & right: Buijserd)

a longer time. To increase spare part availability while preventing obsolete stocks, storing spare parts online and printing them on-demand is a promising alternative. For the next part of my research, I want to see how you can balance traditional manufacturing and 3D-printed spare parts in the design phase of a product.

Alma van Oudheusden MSc

"A PhD at a design faculty gives me the opportunity to combine research with real-life impact. It gives tangible and practical results that help to build a more sustainable future across the entire product lifecycle." Supervisory team:
Prof. dr. Ruud Balkenende
Dr. Jeremy Faludi

3D printing

Additive manufacturing

Repair

Spare parts

Sustainable design

Mugdha Patil



"As a researcher with an industrial design background, I am fascinated by how technology shapes the behaviour of peoples and systems and how these influences manifest in the design of digital systems that we occupy."

Supervisory team:

Prof. dr. Elisa Giaccardi

Prof. dr. Somaya Ben Allouch
(University of Amsterdam)

Dr. Nazli Cila

n: Speculative design

accardi Decolonisation

Ben Allouch
msterdam) Digital futures

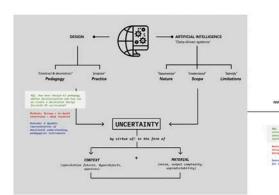
Design Methods

Design Thinking

Hauntological Explorations of and Speculations on Design-AI Futures



As AI amplifies and renders more oppressive the effects of Euro/Anglo-centric roots of design theory and practice, I intend to discard the idea that it is only AI that needs fixing. Through my research, I offer an epistemological critique of how we speculate and contend with uncertain outcomes and how these limitations contribute to coloniality in designed futures. I articulate this critique by deconstructing



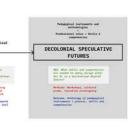






how the designerly understanding and visualization of historic time in relation to speculation – such as the future cone and its contemporary iterations— impair our ability to adequately address temporality in design as the confluence of historic pasts, contending present realities, and future imaginaries.

In this project, I introduce the concept of hauntology as a framework to understand issues of epistemic coloniality in speculative design and to develop an alternative, decolonial, designerly understanding of temporality and apply this alternative methodology to propose an initial catalog of design skills, competencies, and roles for building and sustaining decolonial digital societies.



Anna-Louisa Peeters



"I live for food, the human-animal relationship and a just and resilient future for my children. This all comes together in my PhD, super grateful for that!"

Supervisory team:

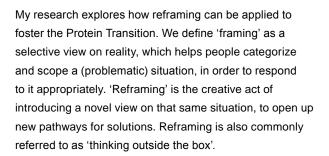
Prof. dr. Paul Hekkert

Dr.ir. Nynke Tromp

Transitions
Framing
Behaviour Change

Systemic Design

Designing the Protein Shift



Transitions are relatively new for designers to engage with. To foster these desired systemic shifts in society, we require the adjustment of traditional design approaches, including their core component of reframing.







oedingscentrum





Through this PhD we seek to develop a new methodology within the discipline of 'Transition Design', so that designers can play an even more fruitful role in fostering societal transitions.

Our research approach is primarily characterized by qualitative methods. We collect the majority of our data via 'research through design', by (co)creating design interventions and methods together, and testing them in the field. To support the findings, we complement these interventional activities with expert interviews and quantitative methods when appropriate.



Zhuochao Peng MSc



"Being a sensitive person enables me to realize various subtle human experiences and how they shape my life; being a design researcher empowers me to demystify them and how they can drive design and benefit other people."

Supervisory team:
Prof. dr.ir. Pieter Desmet
Dr. Hajan Xue

Mood

Experience design

Positive design

Human well-being

Design methods

Design for Mood Experience

The field of mood research has taken on a new sense of urgency in design research. This is due, in part, to the fact that our moods (as a type of affective experience) directly affect our well-being, which has become increasingly apparent since the pandemic. As a result, there has been a growing interest in the development of (positive) design interventions to diminish negative moods and enhance positive ones, and many innovations have been available that can express, adapt to, or influence people's moods. However, the topic of moodfocused design currently remains an ill-defined and elusive topic, and conducting systematic design research on mood is extremely challenging.

The current research gaps highlight the need for my PhD project to (1) advance our understanding of mood in the design field and (2) facilitate a mood-focused (experience) design process. This project follows a Design Research Methodology, including three phases: understanding, discovery & development, and evaluation. The anticipated contributions include: (1) a synthesis of design-relevant mood knowledge, providing clarity to the research area of mood-focused design; and (2) a design preparationoriented toolkit that support designers in understanding and considering user mood, ultimately enhancing the experience design process and design education.

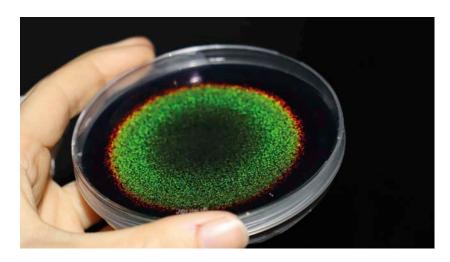




Exploring iridescent Flavobacteria as responsive medium for interaction design

In the growing field of biodesign, artists, designers and scientists are collaborating with microorganisms to produce new materiality with ecological benefits, novel forms of expression and unique responsive behaviour. This PhD project focuses on iridescent Flavobacteria, marine bacteria producing vivid structural colourations that change over time and in relation to the environment. We explore Flavobacteria's potential for the design of living artefacts, with a particular interest in their responsive

behaviour and temporality. Following a research-through-design approach, I will conduct hands-on studies with Flavobacteria in the bio lab and translate these insights into research artefacts which will form the foundation for the studies on humans' experience. Doing so, we intend to identify how we can emphasize and tune Flavobacteria's unique qualities to evoke reflection and engagement in the everyday, towards new care practices and alternative ways of living and doing.



Regieorgaan



HOEKMINE BV

Clarice Risseeuw MSc



"Doing a PhD in bio design makes me feel excited as it's the perfect way to combine my passions for design and nature. I'm still amazed by Flavobacteria's colour and often surprising behaviour, even after 2.5 years."

Supervisory team:
Prof. dr. Elvin Karana
Dr. Holly McQuillan
Dr. Joana Martins

Interaction design

Biodesign

Sustainability

Living artefacts

Designing feedstock strategies of passenger car tyres for devulcanisation

A representative of tyre manufacturers said during a stakeholder meeting about moving to a circular economy: "Rubber is always mentioned as part of the problem, but is hardly ever considered in solutions".

There is not yet high quality recycling of passenger car tyres on a large scale. One of the promising recycling techniques is devulcanisation; researchers have shown that 'devulcanized' rubber can maintain its original properties to a large extent. However, when this approach is applied to passenger car tyres, many other factors come into play. One of the key issues is the feedstock of recycled tyres; there are over 160.000 types of tyres on the market, and each tyre consists of various rubber compounds. If these rubber compounds are unsorted, all the rubber compounds are blended after devulcanisation, leading to a mix with a low quality. This implies that comprehensive solutions are needed to achieve high value recycling of passenger car tyres.

In my research I am investigating what the obstacles and opportunities are for the devulcanisation of passenger car tyres when making the shift to a circular economy. I investigate this topic by researching industrial devulcanisation processes from various angles; economic, environmental and legal perspectives. I started my research by interviewing the early adopters.



Two Windesheim colleagues are devulcanizing car tyre rubber

Eric Roetman MSc



"Instead of coming up with generalized solutions, I am seeking for the details that matter; the specific details that may contribute to new solutions for complicated problems."

Supervisory team:

Prof. dr. Ruud Balkenende

Multi-disciplinairy

Circular Economy

Devulcanisation

Tyre Recycling



Karlheinz Samenjo MSc



"Engaging in a PhD program at a design faculty is a vibrant and intellectually stimulating experience, where the atmosphere is always filled with dynamic and exciting activities and discussions."

Supervisory team:
Prof. dr. ir. Conny Bakker
Prof. dr. ir. Jan Carel Diehl
Dr. Rebecca Price

Medical device design

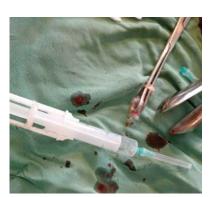
Circular economy

Low-resource setting

Healthcare systems

Circular economy approach to medical device design for low-resource settings in Africa

Low-resource settings in Sub-Saharan Africa suffer from most of the world's diseases. In addition to access to medicine and medical workforce, medical devices are needed to tackle this burden. However, 30-40% of medical devices in healthcare facilities in this region are non-functional, obsolete, and often prematurely disposed of as waste. With increasing healthcare demands, stopping this wasteful disposal is crucial. One way to achieve this is to leverage circular economy principles to ensure medical devices are designed for long use, recovery and, in the worst event, recycled to their material form.



Chloe SED® designed from a circularity approach





Chloe SED® demonstrator on a female pelvic model

This is the focus of PhD research. Our attempt to apply circularity principles to design Chloe SED® -Syringe Extension medical device for providing pain medication during miscarriage and abortion treatment in low-resource healthcare settings in Kisumu Kenya, required us to navigate various trade-offs. These included selecting the appropriate materials for manufacturing the device, balancing its initial cost, durability, and reuse cycle, as well as considering reprocessing methods, costs, and environmental impact. These tradeoffs must continually be assessed to deliver a medical device that provides healthcare for all with limited environmental impact.

Beyond Good and Bad Vibes: Developing group mood granularity for professional teamwork



Teamwork is crucial for achieving professional goals, yet the vibe in a group can impact the group performance and outcome. Group mood, the shared emotional atmosphere within a group, can be difficult to acknowledge, to describe, and therefore to manage.

What if groups could manage their group moods?

Designed products, services or interventions may potentially support groups in managing their moods.

A key hindrance when designing for group mood management is that a clear understanding of what group mood is, and what different kind of group moods occur, is currently not available. To address this challenge, this project examined group mood beyond the basic 'good versus bad' distinction and developed a descriptive overview of eight group moods.



Using an embodiment approach, we created two sets of artistic representations of group moods and explored their potential in facilitating group mood management in group work context. Our research aims to contribute to group mood management in two ways. First, by supporting workgroups in their attempts to communicate and manage their group moods. Second, by informing designers who aim to design products, environments that influence group mood or enable teams to manager their group mood effectively.

Alev Sönmez MSc



"It is fascinating to uncover the experiences that matter to humans by combining scientific rigour and design creativity."

Supervisory team:

Prof. dr. ir. Pieter Desmet

Dr. ir. Natalia Romero Herrera

Wellbeing
Work groups

Mood regulation

Embodiment

Group experience

Measuring children's access to urban greenspace



My research is all about the relationships between the physical urban environment and the health and well-being of people. Specifically, I focus on how children and adolescents have opportunities to access and perform activities in urban greenspace, and how we can measure such opportunities at scale.

How are greenspaces accessible from various routine settings, such as homes, schools and commuting routes? How can we adapt existing metrics to an age group at hand, for example unsupervised children? And how well are people's perceptions of well-usable greenspace even represented in large-scale data sets?

With answering these questions, I aim to provide novel methods, maps, and guidelines for measuring and planning greenspaces in cities for use by their youngest citizens, as well as to understand the usability and limitations of these methods, maps, and guidelines by planners in practice. I use both quantitative and qualitative approaches to collect data and analyse it, including spatial data analysis, co-design workshops, and crowd-sourcing surveys, and enjoy working with open-source data and tools wherever possible.



Children's access to green- and play-space in Utrecht, NL



Ir. Aniek Toet



"Because we generate and apply new knowledge in practice!"

Supervisory team:
Prof. mr. dr. ir. Sicco Santema
Dr. ir. Jasper van Kuijk

Airports

Multimodal Transport Hub

Mobility

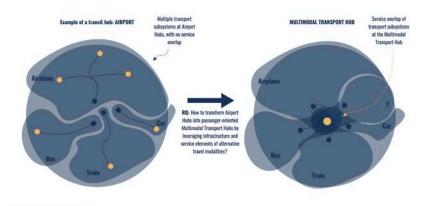
Transition

Action Research

Transforming Airport Hubs into Multimodal Transport Hubs

Future mobility systems will likely incorporate more multimodal journeys. These multimodal journeys integrate multiple modes of transport, and their higher future prevalence highlights the importance of paying attention to the modality transfers within journeys. To carefully facilitate these transfers, I advocate the creation of passenger-oriented Multimodal Transport Hubs (MTHs), which integrate both infrastructure and services of multiple travel modalities to ensure high-quality transfers between the different modes of transport. During my PhD, I approach the transformation of an Airport Hub into an MTH, as these bring together the infrastructure of

multiple travel modalities and already provide high-end integration for air travel. By performing this research I aim to answer the following research question: How to transform Airport Hubs into passenger-oriented Multimodal Transport Hubs by leveraging infrastructure and service elements of alternative travel modalities? Through a qualitative action research approach, I actively participate in practice, with the underlying notion being that "the best way to understand something is to try to change it" (Greenwood & Levin, 2007, p.18). Interesting insights so far point to themes that stimulate or thwart the transition of an Airport Hub into an MTH.



se serratracture and serves

The transition of an Airport Hub into an MTH



A systemic design approach for sustainable business interventions

The goal of my PhD is to develop systemic design methods within a business setting to develop sustainable interventions. In this way, systemic theory can be made more usable for designers by applying, testing and validating the current, more abstract theory.

My approach explores the combination of system methodology to frame and map a complex system with a design perspective. Followed by the application of participatory methods to explore leverage points & gather insights on how to impact the system. And engaging relevant actors to ensure acceptance of interventions.

I have applied this in a business case before and currently diving deeper within the EU horizon 2050 project TULIPS. TULIPS aims to accelerate the adoption of innovative and sustainable technologies aimed at reducing (or even eliminating) emissions at airports. Demonstrations showcasing green innovations are implemented at the lighthouse airport (Schiphol) and fellow airports to proof generalizability and scalability up on a European scale. TULIPS has arranged seven demonstration WPs (Work Packages) to take place at Schiphol and other airports. WP6 (Circular Airports) in collaboration with EME, is the focus of my PhD. The WP goal is a 20% waste reduction per passenger, i.e. prevent it from incineration/landfill by reducing/ reusing/recycling.



Exploration of waste management in the aviation industry

Elisabeth Tschavgova MSc



"Thave been passionate for sustainable impact for years and I believe that systemic approaches are needed to do so. To me the PhD is my personal quest to find answers and learn more about sustainable systemic impact."

Supervisory team:
Prof. dr. ir. Conny Bakker
Prof. dr. ir. Jo van Engelen
Dr. ir. Sonja van Dam

Systemic design

Sustainability

Behavior change

System change











Verindi Vekemans MSc



"Combining curiosity and creativity is what appeals to me and helps me to do research. In my research I can combine theory and hands-on explorations and it is a unique opportunity to explore working with living materials."

Supervisory team: Prof. dr. Elvin Karana Dr. Jun Wu Biodesign
Living Materials
Materials Experience
Generative Design
Design tools

Designing with and for Self-Healing Bio Mineralized Bacterial Cellulose (BMBC)

This research project is part of the European NEXTSKINS project, researching Engineered Living Materials and its potential for future everyday products. More specifically in this case, Living Regenerative Material made from Bio Mineralized Bacterial Cellulose (BMBC) which has a unique property of local self-healing.

The main goal of this research is to design with living BMBC material for future everyday products and to develop computational tools to optimize the process of designing with this material in order to save costs, time and resources.

During this research, the Material Driven Design Method is used to explore the potential of the material for applications.

In addition, form studies will be carried out to study and map the properties and possibilities of the material. By understanding and developing the process of making the living BMBC material and exploring the material itself and the livingness, the opportunities for computational tools become visible and their potential will be explored later in this research.

With these biodesign tools for predictive design space exploration with living BMBC material, new steps will be taken towards designs and applications with living materials for the future.



Bio Mineralized Bacterial Cellulose Material



<mark>Gerbe</mark>ra Vledder MSc



"I find the environment of our IDE faculty very stimulating. Within my research I enjoy spending time with many different interesting people. Students, fellow researchers, and companies from which I can learn many things."

Supervisory team:
Prof. dr. Peter Vink
Dr. Yu (Wolf) Song

Mobility

Comfort

Ergonomics

Sustainability

User testing

Interior comfort elements for enabling a transitioning to more sustainable transport

Within the context of comfort and mobility, I am challenging the current travel option of jet engine aircraft by looking into more sustainable transport alternatives. I study how the interior can contribute to attracting passengers to sustainable forms of transport. This involves analyzing the impact on passenger (dis)comfort of environmental factors such as noise and vibration in turboprop aircrafts and trains, and the sleeping environment in transport such as night trains or automated vehicles is explored. My studies are mainly qualitative, involving participant observation and questionnaires, which I am combining with objective

measurements of the environment or e.g. micro movements indicating discomfort. One outcome of a study is the confirmation that noise is the largest factor influencing passenger discomfort in turboprop airplanes. Additionally, we found that using noise-canceling headphones can help improve auditory comfort. Another example is an experiment defining sleep (dis)comfort levels for several backrest recline angles as a design guideline for sleeping (napping) in transit. Especially on longer trips the ability to comfortably sleep during travels can greatly improve the perceived value of travel time and willingness to travel more sustainably, e.g. by train.





Defining, evaluating, and improving the digital patient experience from a HCD perspective

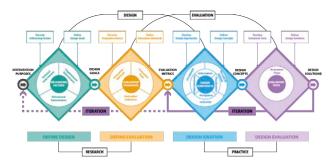
My PhD research is focused on defining, evaluating, and enhancing the digital patient experience through a human-centered design approach. Ultimately, my goal is to enhance the quality of care in digital health, which includes ensuring healthy lives and promoting well-being at all ages.

During my PhD study, I performed a systematic umbrella review to understand the state-of-the-art in the literature of patient experience and digital health. Through my research, I identified influencing factors and design considerations for the digital patient experience and formulated an evaluation framework for the digital patient experience. I also conducted an interview study with designers working in industry, which helped me identify a typical design workflow as



Patient-to-physician teleconsultation

well as a set of design challenges and strategies for designing digital health. Furthermore, I am currently collaborating with Erasmus MC on two projects that involve evaluating the digital patient experience in both high- and low-tech healthcare services. These include assessing a patient education website for individuals at a high risk of colorectal cancer and evaluating a virtual reality distraction tool for wound care.







Tingting Wang MA



"I have three reasons for choosing this. First, my educational background is in design. Second, I am passionate about continuing to work in this area. Third, I was an exchange student in the IDE faculty."

Supervisory team:

Prof. dr. ir. Richard Goossens Dr. ir. Marijke Melles

Patient experience

Digital health

Healthcare design

Human-centered design

Information and communication-

technology

Jun Xu MSc



"I was immediately drawn to the PhD research topic of '3D Printed Electronics'. With my background in biomedical engineering & wearable design expertise, I see potential for innovation in my previous work."

Supervisory team:
Em. Prof. dr. ir. Jo Geraedts
Dr. Yu (Wolf) Song

Dr. ir. Zjenja Doubrovski

Wireless power

Printed electronics

Structural sensor

3D Printed Electronics

With 3D printed electronics, we hope to give designers more freedom in their designs and minimize them, by making them as small as possible, while accelerating the manufacturing process, bringing it closer to personalized design.

By integrating structural with functional electronic materials, we want to introduce a new modality in 3D printed designs, that can transmit signals, power different devices and generate electromagnetic fields.

In the wireless power transmission system, we introduce a new method to generate a coil on a 3D arbitrary surface which can get maximum power transfer efficiency with just enough power. Geometric and electromagnetic constraints are embedded in designing a pair of assmall-as-possible coils.



Printed structural sensor for sensing system

In the structural sensor section, we introduce a new approach for designing the geometry and the system of structure sensors array for sensing pressure. By incorporating functional sensors in the structure we reduce the cost of materials and the limitation for the designer.



3D printed coils for Wireless Power Transmission system



Collaborative data reflection

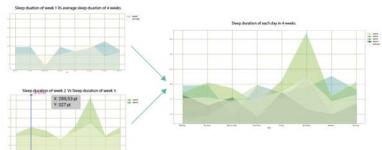


Personal data provides a detailed description of human behavior, such as how and when people sleep. Reflecting on this data can help individuals understand their past behaviors and the underlying factors that impact their health. However, many current personal informatics tools take an ego-centric perspective, isolating individuals from their social context and overlooking the fundamental mechanism of social comparison that constructs self-identity. This approach can lead to incomplete self-knowledge and abnormal self-expectations.

While some studies, such as family informatics, have shown the effectiveness of collaboration on reflection

on personal data, the complex and iterative process is still not well understood. The collaborative self-reflection process involves individuals assisting each other in cycles of visual data exploration, searching for and analyzing related information.

To further explore and better understand this process, my research will utilize a research-through-design approach. We will apply constructive informatics tools in the process to facilitate collaboration among individuals in sharing, crafting, and communicating their personal data. We will analyze how users apply different strategies and techniques with the tool during the process and draw implications for personal informatics design.



Constructive informatics to facilitate reflection

Di Yan MSc



"As an individual passion about understanding people and user-centric design, the interdisciplinary perspective in design faculty offers me a unique perspective to understand the gap between user needs and product design."

Supervisory team:

Dr.ir. Jacky Bourgeois

Prof.dr. Gerd Kortuem

Personal data

Reflection technologies

User research

Light and spectra in the wild



My project investigates the factors influencing the appearance of light-filled spaces and their impact on human perception, with a focus on the concept of the light field. By combining computational modelling and physical measurements, I aim to develop lighting design tools based on light field parameters.

A spectral rendering of white room with 3D checkers.

A spectral rendering of orange room with 3D checkers.

Key insights include the systematic variations in the spectral properties of indirect illumination, affecting colour rendering of objects and people. There are significant differences between lamp-specified correlated colour temperature (CCT) and colour rendition compared to the actual light-based effective CCT and colour rendition.

We developed the spectral cubic illumination method, capturing the 7-dimensional structure of light environments and translating it into perceptually-relevant information. This method helps understand how light and interior design influence scene and object appearance, such as colour gradients over 3D objects and spaces. In addition I developed visual tools for lighting designers and architects to explore the effects of light and material interactions.

I also investigated depictions of natural illumination in paintings and found that artists' depictions reflect daylight regularity and observers might use these cues to estimate the time of day.



Mireia Yurrita Semperena MSc



"I really enjoy the future-oriented way of thinking that we advocate for within the faculty and the way in which my colleagues challenge many of my assumptions by wondering the 'why' behind my ideas."

Supervisory team:
Prof.dr.ir. Alessandro Bozzon
Dr. Dave Murray-Rust

Procedural Justice
Algorithmic Decision-Making
Contestability
Process-Centric Explanations

Reflexivity

Understanding Procedural Justice in Algorithmic Decision Making

I am investigating the practical implications of designing for procedural justice in algorithmic decision-making processes. To this end, I started by looking into current discourses around the principles that guide the design of just algorithmic systems and highlighted the need to go beyond

harmful algorithmic bias. Check our paper "Towards a multi-stakeholder value-based assessment framework for algorithmic systems" published at FAccT 2022. In a second study, I looked into the effect that the principle of contestability and related system attributes (i.e., explanations and human oversight) have on decision



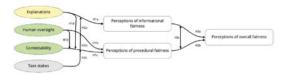




Multi-stakeholder assessment of algorithmic systems.

subjects' perceptions of fairness. In this work, I found that we need to go beyond outcome explanations (i.e., process-centric explanations) to be able to enact contestability that is not limited to appeal processes (i.e., contestability by design). Check our paper "Disentangling Fairness Perceptions in Algorithmic Decision-Making: the Effects of Explanations, Human Oversight and Contestability" that got the Best Paper Award at

CHI 2023. I am currently exploring providers' and developers' practices to foster reflection. I aim at distilling the rationales behind their subjective discretionary choices for generating process-centric explanations.



Hypotheses around decision subjects' fairness perceptions.



Designing Habitabilities: Materiality in Noticing and Caring for Microbes in Biodesign

Throughout history, humans have shared our living spaces with a variety of nonhuman organisms, from the planetary to domestic scale. My research in biodesign focuses on designing habitabilities for microbes, with a particular emphasis on the role of materiality in facilitating human-microbe cohabitation. In this context, I investigate how the choice of materials and their properties can affect the ways in which we notice and care for microorganisms.

As a case study, I worked with cyanobacteria, also known as "blue-green algae," which have been present on Earth for over 3.2 billion years. These photosynthetic organisms are crucial to the global carbon cycle, as they absorb carbon dioxide and release oxygen into the atmosphere.

Several recent design projects have explored the potential of using cyanobacteria for carbon fixation, fuel, and food in urban and domestic settings.

In my first experiment, I focused on developing a tangible interface that makes the normally imperceptible metabolism of cyanobacteria more noticeable to humans. I achieved this through a monochromatic material display, which helps to raise awareness of the reciprocal relationship between humans and microbes.

By encouraging human noticing and care, my design aims to promote a more harmonious cohabitation between humans and microorganisms.



Daylight Log: Designing Mutualistic Care with Cyanobacteria

Jiwei Zhou MSc



"Read and get inspired, and do design experiments which might ultimately bring planetary good and betterment of humannonhuman relationality; while getting paid and being able to feed myself and my rabbits:p"

Supervisory team:

Prof. dr. Elvin Karana

Prof. dr. Elisa Giaccar<mark>di</mark>

Dr. ir. Zjenja Doubrovski

Biodesign

Human-microbe Relations

Noticing

Care

Cyanobacteria

Marieke Zielhuis MSc



"Doing a PhD is a perfect opportunity to really dive into a topic. Doing it at a design faculty adds that you can bring design experience into the research." Supervisory team:
Prof. dr. Pieter Jan Stappers
Dr. ir. Froukje Sleeswijk Visser
Dr. Daan Andriessen
(Hogeschool Utrecht)

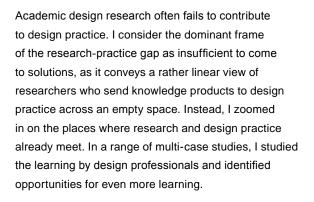
Research impact

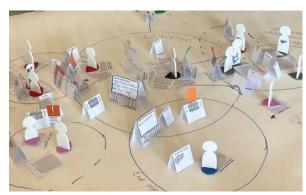
Design practice

Collaboration

Research-practice gap

Considering design practice





The tool to map research - design practice interactions



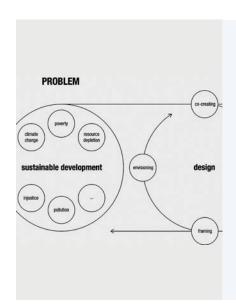
The main conclusions are:

- Design professionals can learn about more than designing, but also about application domains or project organization.
- Design professionals are misunderstood as learners. They learn by
 - 1. actively taking part,
 - interacting with project actors, and
 - 3. interacting with knowledge products.
- Learning goes easily unnoticed, especially when design professionals take active part in research projects.
- Learning without participating requires in-person exchanges.
- Design professionals are under-prioritized amidst the goals and agendas of the different involved communities beyond design practice (e.g., funding).

Based on these insights, I developed a mapping tool for researchers to identify how they can improve the contribution of their project to design practice.



Delft Design Stories



Sustainable design is not just about the material stuff

Sure, sustainable design can result in a trendy reusable bottle. But it's not just about the product, it's also about the process. Through his PhD research, Brian Baldassarre set out to understand how design expertise can be applied by business organisations in the transition towards sustainable development.

Read more about this story by scanning the QR code.



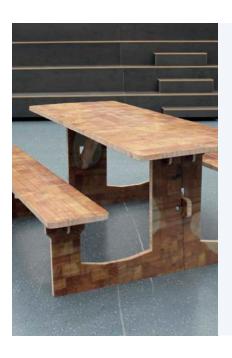
The Spaceman has a job for you

A cancer diagnosis is an awful and upsetting event for anyone. For the parents of young children, it is nearly unthinkable. Yet, every year, for some 35,000 families around Europe, it is a reality. PhD researcher Patrizia D'Olivo wanted to help them with her research.

Read more about this story by scanning the QR code.







Circular composites - design is the missing link

Composite materials have a lot to offer in terms of fine-tuning material properties, optimising functionality, and ensuring a long-life span. Despite those advantages, they still leave a lot to be desired when it comes to reuse and recycling. For his PhD, Jelle Joustra explored strategies for making composite materials that support a circular economy, proposing that design is the missing link.

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Index Keywords

3D printing 36, 77

Accessibility 22, 71, 85 Action Research 86 Additive manufacturing 77 Airports 86 Algorithmic Decision-Making 94 Animated Textiles 33 Antifragility 75 Artificial Intelligence (AI) 20, 32, 39, 49, 53, 66, 74 Automation 45 Aviation 75

Behaviour Change 24, 42. 79, 87 Bio-based plastic 28 Bio design 47, 59, 73, 81, 88, 95 Bio materials 25 Black Swans 75

Care 95 Care Ethics 49 Care infrastructure 26 Children 85 Circular Design 27, 55 Circular Economy 24, 28, 37, 43, 55, 70, 82, 83 Circular Products 34 Cities 20 Clinical Research 62 Co-creation 40, 63, 76

Cognition 29 Cognitive assistants 58 Collaboration 32, 96 Collective Infrastructures 49 Comfort 89 Complexity 43 Design for Complexity 69 Complex Networks 52 Computational Methods 71 Consumer behaviour 70 Contestability 20, 94 Conversational agents 74 Conversational Al 48 Critical Design 21, 49 Critical Pedagogy 21 Cyanobacteria 95 Cybernetics 66

Data 57 Data Donation 44 Data-enabled Design 48 Decolonisation 78 Democracy 49 Design Anthropology 63 Design Expertise 46 Design in Context 67 Design Methods 27, 42, 53, 57, 72, 73, 78, 80 Design Practice 96 Design Theory 35 Design Thinking 78 Design Tools 64, 88 Devulcanisation 82

Diagnostics 76

Digital futures 78 Digital health 57, 90 Digital phenotyping 26 Digital Technology 40 Digital Tool 59 Digital Twins 48, 56, 68 Discomfort factors 61 Do It Yourself (DIY) 54

EHealth 72 Embodiment 84 Emerging technologies 69 Energy 23, 63 Entrepreneurship 35 Envisioning 46 Ergonomics 61, 89 Evidence-Based 72 Experience design 80

Facilitation 54 Family-based intervention 31 Feminism 39 Food Waste 46 Framing 79 Fundamental needs 65

Game-making 38 Generative Design 88 Group experience 84

Health Al 26 Health and well-being 31, 40, 76. Living artefacts 81 85, 93 Healthcare 29, 62 Healthcare design 90

Health care environment 36 Healthcare systems 83 Health outcomes 72 Human-centered design 48, 76, 90 **Human-Computer Interaction** Human-Machine Interface 53 Human-microbe Relations 95 Human-system interaction 29 Human well-being 80

Inclusion 26 Information and communicationtechnology 90 Innovation by Design 67 In-seat movements (ISM) 61 Intensive care 65 Interaction Design 20, 58, 64, 73.81 Internet of Things (IoT) 56, 68 Interpersonal mood regulation 41 Issue articulation 38

Implementation 57

Justice 39

Knowledge management 58

Life cycle evaluation 36 Living Materials 88 Long-lasting Design 24 Low-resource setting 83 Manufacturing 58 Material closed loop 36 Material-Driven Design 33 Material Innovation 47 Materials Experience 33, 73, Medical Devices 55, 83 Mental health 26 Metaphor 43 Microbial Sensibility 59 Micro-organism 59 Mobility 45, 86, 89 Mood 41, 80 Mood regulation 84 More-Than-Human Design 23, 74 Multi-disciplinairy 82 Multimodal Transport Hub 86

Natural disaster 21
Neglected Diseases 76
Non-linearity 43
Noticing 95

Open Action Research 60
Optics 93
Organizational Behavior 67
Organizations 45

Packaging 70
Participatory Design 21, 31, 52
Patient experience 90
Patient journey map 72
People 39, 44, 69
Perception 93
Performativity 33

Personal data 92

Personal Data 44 Personalized eHealth 31 Pharmaceuticals 62 Philosophy Of Design 35 Play 22 Policy Design 60 Politics of Technology 25 Positive design 66, 80 Posthuman hci 74 Power 63 Printed electronics 91 Procedural Justice 94 Process-Centric Explanations 94 Prototyping 38 Public Administration 20 Public Service-Organisations 60

Reflection 32 Reflection technologies 92 Reflexivity 94 Regenerative Design 25, 47, 59, 73 Repair 77 Repairability 37 Repairability Assessment 37 Research impact 96 Research-practice gap Research through design 38 Resilience 75 Design for Reuse 34, 70

RTD 74

Safe Repairs 27 Safety 27 Seating comfort 61 Self-sufficiency 54 Service Design 60, 69 Service encounters 41 Smart Cities 52 Smart Home 23 Smart materials 64 Smart textile 30 Social Design 42 Social innovation 38 Social Networks 52 Sociotechnical 63 Sonic ambiance 65 Soundscape design 65 Spare parts 77 Spatial data 85 Speculative design 74, 78 Startups 35 Structural sensor 91 Substances of Concern 27

Design for Sustainability 25, 34
Sustainability 23, 24, 28, 47, 52, 54, 55, 62, 70, 77, 81, 87, 89

Sustainable
Development Goals
36

55 Synthetic Stakeholders 48

Sustainable Healthcare

System change 87 Systemic Design 42, 46, 79, 87 Tangible interaction 33
Technology 22, 44
Technology-supported care 69
Textile-based sensors 30
Thermal Comfort 23
Toolkit 40
Transition Design 46, 79, 86
Tyre Recycling 82

Urban Environment 71
Urban greenspace 85
User-Centered Design 29, 40, 93
User Research 56, 68, 89, 92

Values 31
Virtual Reality 56, 68
Visual ergonomics 93

Wearable technology 30
Wellbeing 41, 66, 71, 84
Wireless power 91
Work groups 84

Index PhD candidates

Design, Organisation and Strategy (DOS)

Renske	24
Noa	31
Vera	32
Jeroen	35
Martijn	40
Alejandra	45
Heng (Eric)	48
Jiwon	54
Fredrik	55
Maike	60
Emile	67
Paula	69
Xueqing	70
Alexander	<i>7</i> 5
Aniek	86
	Noa Vera Jeroen Martijn Alejandra Heng (Eric) Jiwon Fredrik Maike Emile Paula Xueqing Alexander

Essen Anita 44 Goss Hannah 48 Hardt Meike 53 Hoftijzer JanWillem 56 Leeuwen, van Gijs 65 Gijs Louwers 67 Maden, van der Willem 68 Nicenboim Iohanna 76 Patil Mugdha 80 Peeters Anna-Louisa Peng Zhuochao 82 Sönmez Alev 86 Wang **Tingting** 92 Yu Cehao 95 Yurrita Semperena Mireia 96 Zielhuis Marieke 98

Sustainable Design Engineering (SDE)

• .	-	
Barendregt	Laura	23
Beardow	Caiseal	24
Beek, van	Evert	25
Bogdanova	Karin	28
Bostan	Idil	31
Di Staso	Davide	40
Dideriksen	Sofie-Amalie	41
Esnaf-Uslu	Pelin	43

Human-Centered

Design (HCD)

Alfrink	Kars	20
	raio	
Bessai	Riel	25
Bolaños Arriola	Julieta	27
Bos	Puck	28
Bozali	Beyza	30
Buso	Alice	33
Carrete	Israel	34
Cronenberg, van	Mariska	36
Dangal	Sagar	37
Fromberg	Emma	43

Gomez Ortega	Alejandra	44
Groutars	Eduard (Ward)47
Hasankhani	Mahshid	52
He	Tianhao	53
Hoveling	Tamara	55
Kernan Freire	Samuel	58
Kim	Jiho	59
Kruithof	Aernout	61
LaRoche	Jason	62
Liu	Qiang	64
Meijer	Wo	68
Milias	Vasileios	71
Morales	Hosana	72
Ng	Wasabii	73
Onasanya	Adeola	76
Oudheusden, van	Alma	77
Risseeuw	Clarice	81
Roetman	Eric	82
Samenjo	Karlheinz	83
Teeuwen	Roos	85
Tschavgova	Elisabeth	87
Vekemans	Verindi	88
Vledder	Gerbera	90
Xu	Jun	91
Yan	Di	92
Zhou	Cehao	95



