Applied Design Research as Catalys of Change

Joore, Peter; Van den Eijnde, Jeroen; van 't Veer, Job T.B.; Van Beurden, Karin; Hadzhivalcheva, Iman; Brinks, Ger; Troxler, Peter; de Lille, C.S.H.; Hassels, Cathy; Böttger, Willem

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Applied Design Research as Catalyst of Change

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Applied Design Research as Catalyst of Change

Peter Joore

The Network of Applied Design Research (NADR) was founded at the end of 2016 and has been in operation for almost two years now. Design Research in an academic context, however, is a relatively new field of study. And Applied Design Research, which is given particular attention at universities of applied sciences (*UAS*), is an even more recent development. By linking design research to professional practice, several research groups have actively contributed to this field of expertise over the previous ten to fifteen years. An important reason for founding NADR was the need for reflection: what exactly do we mean when we are discussing the various facets of Applied Design Research? Which methodologies help us to translate scientific knowledge into professional design practice? And, vice versa, when are we talking about high-quality applied research? What sort of generically applicable knowledge does it provide? The list continues. To some extent, these questions overlap with the discussion about the difference between scientific research at universities and applied research at universities of applied sciences in the form of *lectoraten*[1]. In this case, it concerns each nuance of the specific discipline of the designer.

We often gain the best insight into a specific issue by simply engaging with it, as a form of *learning by doing*. That was the rationale that led to the first exhibition organised by NADR during the Dutch Design Week in 2016. By displaying the design and research projects we were working on, we were able to provide an initial answer to the question of what we mean by *Applied Design Research*. The title of the exhibition – *Work in Progress* – reflected our position. With the second exhibition in 2017, we tried to gain a greater understanding in the form of a review by design expert Gert Staal. This resulted in a critical reflection regarding the raison d'être of our projects. We have now reached the third edition of the *Work in Progress* exhibition, which consists of eleven

1 The concept of 'lectoraat' appears to be hard to translate, as it has a specific link to the Dutch educational system and the separation between research universities and universities of applied sciences. Translations that are being used include 'professorship', 'lectorate', 'lectorship', 'readership' and 'research group'. So far, no consensus has been established regarding the proper English translation of the term. With regards to the term 'lector', the word 'professor' is now mostly used as translation. However, in the Dutch educational system, the title professor is strictly reserved for professors at research universities.

projects that will be on display from 20 to 28 October 2018. This time, we are addressing the question of what Applied Design Research is by asking four questions about each of the projects that have been submitted for the exhibition:

What has been designed in the project?
What has been investigated in the project?
What was the realised or intended change?
What was the role of the Applied Design Researcher during this process?

At first glance, these four questions appear to be relatively simple and clearly demarcated. *Designing* is aimed at devising and simulating a concrete solution for a specific situation. *Research* is aimed at finding new generic knowledge that is not restricted to a particular situation. *Change* concerns the actual realisation and implementation of an intended, new situation. However, answering the first three questions has brought us to our goal of reflection. The question is, after all, whether these three processes can really be so strictly distinguished from each other. This implies a sort of linear process in which research, design and implementation would take place separately and one after the other. When it comes to Applied Design Research, the various processes are inextricably linked, so it would actually mean taking a *step back* when we start to separate the various processes again. The same can be said about the fourth question, which focuses on the role of the Applied Design Researcher. After all, by defining the different roles or tasks separately, we are separating the various activities from each other, whereas we are actually looking for a new integrated perspective.

For the benefit of our intended learning process, we have nevertheless chosen to deal with the four questions separately, with all the nuances we can apply to them. We subsequently combined the separate answers to these four questions to arrive at the theme and title of this year's exhibition: *Applied Design Research as a Catalyst of Change*.

Question one: What has been designed?
The projects presented cover many different areas: new, physical products for healthcare and the construction industry, new services for the retail sector, new materials based on recycled denim and wool, new ways of manufacturing, including concrete printing and dyeing of textiles, new games and apps for children with autism, and new tools, methods, roadmaps and innovation labs to promote behavioural change among young people – all in just eleven different projects. You could say that no topic is excluded, as long as it is aimed at solving and resolving the many challenges that people may encounter.

For example, the XoSoft project (*Saxion UAS, see page 47*) developed a modular exoskeleton based on 'soft' robotic technology. This can provide walking support for people with reduced mobility. Moreover, the exoskeleton is more comfortable because it is shaped like a regular pair of trousers made of a soft material. Similar to the latter project, the Proud Breast project (*also by Saxion UAS, see page 51*) developed a lightweight breast prosthesis in combination with a specially designed bra for women who have undergone a breast-removal procedure. The garment is intended to offer these women a comfortable alternative that helps them and their entourage to come to terms with their new body. Robo-stairs (*HAN UAS, see page 33*), a smart staircase that combines the advantages of a staircase and lift, has been specially developed for use in the homes of people with reduced mobility. The staircase increases these people's habitable living area and enhances their freedom of movement, as part of an interaction between building and healthcare. The project is part of the Empathic House project, which aims to create the living environment of the future. Alongside other results, this produces in a house that *sympathises* with its ageing resident and thus supports their informal caregiver. Other examples of design solutions that have been developed in this context include an intuitive floor system and an *edible wall* that has been exhibited in an earlier *Work in Progress* exhibition. Other products designed for use in the built environment include facade panels based on fungal threads and biocomposite in the Biobased Building project (*Avans UAS, see page 59*), as well as wall panels made of recycled wool and denim in the RECURF-UP! project (*Amsterdam UAS, see page 55*). The same project also designed tables made of recycled jute for cafés.

Some solutions initially appear to be a product but are actually more of a service. This includes the likes of the *Donner doosje* box, which has been developed in the Retailution project (*Rotterdam UAS, see page 69*). This is a gift box that can be ordered online containing all kinds of products from Rotterdam-based retailers. In addition to the development of new products and services, some solutions involved new materials. This includes The Future of Living Materials project (*ArtEZ University of the Arts, see page 39*), in which new fabrics based on fruit waste were used to create new, leather-like materials. The project used living organisms such as plants, algae and bacteria to dye textiles and design clothes that can grow on the body. In reality, this is about the design of new production methods.

Just like in the Konkreet project (*Saxion UAS, see page 69*), which developed, designed and built a new 3D concrete printer from scratch, including the recipe of the concrete. Projects of a completely different nature are aimed at young people and their behaviour, such as the SoVaTass project (*NHL Stenden UAS, see page 25*), which has developed all kinds of interactive exercises and digital working methods for children with autism, including

an escape room that trains children to be able to work more effectively with each other. The Touchpoints project (*HU UAS, see page 29*) developed a *behavioural change toolbox* that included a behavioural design model and a design tool with guiding principles for behavioural change. This process also created a *touchpoints lab* that enabled designers and researchers to work together. The project was aimed at creating products that would bring about behavioural change in young people, such as to alter their smoking and alcohol consumption. In practice, the latter projects are designed at two levels simultaneously: at the product level and at the level of the design methodology.

At first glance, behavioural change seems to be the focus of the Silent Ticker project (*The Hague UAS, see page 65*), which redesigned the lower part of a pedestrian traffic light to give visually impaired people a better feeling of the traffic around them using their white cane. When we look more closely at the objects designed for this project, they are actually a means of encouraging discussion between the residents and social entrepreneurs in the cities of The Hague and Liverpool. The objects that have been developed function as boundary objects to encourage discussion between different actors with different interests and backgrounds. With this approach, which originates from sociology, the object is considered to be a reference point that is the same for everyone on the one hand, but on the other may have a completely different meaning for different people. Thus, the creation of the different products is in fact a means of investigating the role that boundary objects may play during the design process.

Question two: What has been investigated?
This brings us to the second question: what exactly has been investigated in the eleven projects that have been presented? Similar to the question of what has been designed, the question of what has been investigated reveals a wide range of different results. The research into the role of boundary objects revolves around the question of how design processes take place, how actors can enter into dialogue with each other, and how they can work together during the design process. Other projects include ergonomic research, technical research, research into human behaviour, materials research, research into new ways of producing, research into the use of design methods and research at the interface between these subjects.

The research in the Proud Breast project focuses on the question of how the developed products can improve the self-confidence and the feeling of *wholeness* and normality in women who have had one or both breasts removed. Meanwhile, the XoSoft project performed ergonomic research that focused on the question of exactly what physical support is needed to support which parts of the body. This ergonomic research is combined with production

and material research into 3D-printed textile structures, which should possess lightweight characteristics and be soft to the touch. The RECURF-UP! research also concentrates on textiles, more specifically on the question of how to reuse end-of-life textile fibres in biocomposites in combination with bio-based plastics. The study focuses on the material properties of bio-based materials, both in terms of physical characteristics such as sound absorption and elasticity, as well as in terms of the *look and feel* of the new biocomposite products. In addition to this, investigations are being conducted into how the entire production chain – from residual fibre to end product – can be made truly circular, and to what extent digital production techniques might contribute to this.

The Biobased Building project focuses on research into new materials, looking – amongst other things – at the question of how mycelium (*a material based on fungal threads*) can function as a building material. This includes its durability, compressive strength and insulation value. Another project from the same research group is aimed at a new facade material that was inspired by polar-bear skin. Biomimicry principles were used to investigate how a layered product (*Plyskin*) might serve as durable facade insulation, and how the material could in addition be integrated into a circular production process. Circularity and sustainability are also the inspiration behind the research questions of The Future of Living Material project. These projects do not use the fungus product mycelium as a material for construction, but as a possible alternative for the use of leather or textile in the fashion industry. Some other alternative materials that have been used were made from fruit waste, such as Piñatex, which was made from cellulose fibres extracted from pineapple leaves. One part of the project concentrates on the question of how textiles can be dyed in a sustainable way by using living organisms such as bacteria or using residual inks from the textile industry.

Of a rather different order is the research into users' behaviour and the way in which you can use the design to influence that behaviour. For example, the question raised within the SoVaTass project (*NHL Stenden*) is how the developed apps and games can make the current social-skills training for children with autism more fun, varied and therefore more effective. In doing so, the research team supported the choices made on the basis of a scientific *Intervention Theory*, which also formed the foundation for the effect study required to ensure an effectively proven intervention. The Touchpoints project also developed a scientifically based *Behavioural Model* that functioned as a backbone, as it were, to structure the research findings. The research was based on the *Persuasive by Design* model that examines the behaviour of the user by means of various *Behavioural Lenses*. The project specifically focuses on the identification of *Touchpoints*: critical moments and places where

designers who work on behavioural change can focus their interventions on. The Rotterdam Retailution project also aims at influencing behaviour, more specifically at influencing consumers' buying and shopping behaviour. It is part of a larger study that is investigating societal transformations that result from the digitisation of society and also researching the effect on the urban environment, particularly in the retail sector. Such a societal transformation relates to the third question in the search for the role of the Applied Design Researcher: what change has been set in motion by the design or research project, or what change has been intended?

Question three: What is the intended change?
The aim of the Retailution project was to increase the innovativeness and competitiveness of retailers in the inner city of Rotterdam. The underlying motivation for this was the societal change that is inevitably awaiting entrepreneurs, as a result of today's host of digital developments. The project addressed the question as to how new store concepts can look, what digital means can contribute to this, and how Rotterdam city centre can offer its residents and visitors a *distinctive shoppable experience*. On the one hand, this has resulted in concrete ideas such as the *Doosje Donner* gift box and, at the same time, in more abstract insights into the consequences of the digitisation of society for the retail sector.

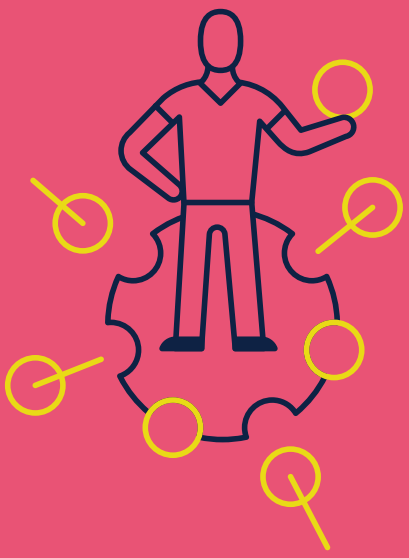
A number of projects are aimed at ***social change***. For example, both the XoSoft project and the Proud Breast project have the underlying goal of enhancing the quality of life of its users. The Robo-stairs project also has a social change in mind, aimed at enabling elderly people to continue to live independently for a longer period of time, and the vision that the home can function as a healing environment that contributes to well-being, recovery and healing. The envisaged change is prompted by an identified problem, which is the growing need for care for an ageing population and the resulting shortage of housing for senior citizens. The problem identified and the change intended invariably appear to go hand in hand. Moreover, the Touchpoints project is the result of an observed difficulty, being the problem behaviour of specific groups of consumers. The aim is then to bring about a change in behaviour in these people: young people must drink less; drivers must drive more carefully; office workers must adopt less stressful working practices. To achieve this, the Platform for Behavioural Design was established, giving designers a place to collaborate with the aim of developing products that will persuade people to engage in healthy, safe and sustainable behaviour. The intended change pursued in the SoVaTass project is to improve the situation of young people with autism. In addition to the development of new digital working methods (*the design in the small*), the project explicitly focuses on the effective implementation of these tools in professional practice. At an early stage in the project, thought was given to the question of how the new digital

working methods can be integrated into existing care processes. Among other things, it appeared to be necessary to adapt certain care processes and to develop special training for the professionals involved. This required a change both for the individual professionals as well as for the healthcare organisation as a whole. The aggregate of the changes at micro and macro level has been documented in an implementation roadmap that shows the steps needed to actually achieve the intended new situation.

In addition to a change in the healthcare sector, a number of projects are aimed at a change towards ***a more sustainable and circular economy***. ArtEZ Future Makers states that all its research and innovation projects should contribute to a resilient, sustainable future and a fair, inclusive and diverse society. This also applies to their Living Materials project, which is aimed at the efficient use of raw materials, water and energy, a reduction in the use of harmful substances and the reuse of waste, specifically in the fashion industry. The development of new, sustainable materials and ways of dyeing can therefore be seen as one of the steps towards this overarching sustainability vision. It is expected that the initiatives will have a bottom-up effect on the companies involved and can serve as inspiration and an example for the fashion industry to organise itself in a completely different manner. The Konkreet concrete-printing project (*Saxion*) also has an ecological objective: to reduce the use of materials by only applying concrete where it is really needed. In order to work on this, it was first necessary to investigate exactly how such a concrete printer works, in order to gain insight into the possibilities and limitations of this new production method. During the course of the project, the parties involved gradually became aware that this new concrete printing technique has the potential to revolutionise the way in which buildings are designed. The research group Circular Design and Business (*Amsterdam UAS*) also has the objective of contributing to the creation of a circular economy. The development of wall panels based on recycled wool and denim (*RECURF-UP!*) and the development of new tables made from recycled jute show that it is possible to develop attractive products based on recycled and bio-based materials. The same applies to the facade panels based on fungal threads and biocomposite, developed by Avans. In addition, these bottom-up activities are being supported by the Green Deal Biobased Buildings partnership, in which 30 organisations cooperate in order to achieve the collective goal of applying more bio-based materials in the building sector.

Question four: What is the role of the Applied Design Researcher?
Finally, we raised the question of what exactly were the tasks, roles and activities of the Applied Design Researchers in the projects in question. We have been able to define seven different roles: the ***developer***, aimed at developing new solutions; the ***discoverer***, aimed at discovering facts and developing new knowledge; the ***initiator***, aimed at exploring new possibilities

Applied Design Research as Catalyst of Change



1 Developer
Devises and creates new solutions

2 Discoverer
Researches facts and new knowledge

3 Initiator
Hunts for new possibilities and opportunities

4 Change manager
Achieves concrete results and organizational transformation

5 Interpreter
Develops a common vocabulary between different approaches

6 Networker
Connects people and organisations

7 Reframer
Gives meaning and interpretation to the achieved results

The Seven Roles of the Applied Design Researcher

and opportunities; the ***change manager***, aimed at achieving concrete results and organisational transformation; the ***networker***, aimed at connecting people and organisations; the ***interpreter***, aimed at the interaction and interface between different concepts and approaches, and the ***reframer***, the one who interprets the results achieved and demonstrates their significance.

The same question that arose at the beginning of the reflection plays a role in this classification. Is it not the case separating the different tasks and functions is the opposite of the integrated approach of the Applied Design Researcher? And does this not mean that we are actually taking a step backwards by decoupling the various tasks? In a number of cases, the various tasks were explicitly assigned to different people or even different organisations, such as in a project where material researchers from the university were linked to students in fashion design from universities of applied sciences. The *research* task then clearly lay with the university and the *design* task with the fashion students. In this analysis, we particularly explored the specific role of the Applied Design Researcher, which, as discussed in the first paragraph, is characterised by a great deal of overlap with the more generic role of the '*lector*' and the execution of applied research. In formulating the roles, we have based them as much as possible on the actual experiences in the cases described. A possible next step could be to link these roles and tasks back to the different steps in the *applied design research* process, and then perhaps render these more descriptive profiles into a potentially prescriptive *applied design research methodology*. But first, we will have a look at the seven different roles.

The first role concerns the ***developer***. This role is aimed at devising and developing new solutions. Examples of these new products, services, materials, games, apps and production methods have been described when answering our first question. In some projects, the developers involved were mainly focused on creating products, preferring to work quickly and purposefully, but perhaps being a little less focused on the problem behind the problem. Christine De Lille (*The Hague UAS*), for example, contrasts this way of working with her ambition to transform the traditional developer-designer into an Applied Design Researcher by utilising the boundary objects previously discussed. From our perspective, however, the core role of the developer is mainly to create something new that did not exist before.

The second role we have identified is that of the ***discoverer***. As described above, their research activities range from ergonomic and usage research, research into human behaviour, technical research, materials research, research into new production methods and research into design methods to research at the interface of these subjects. The core function of the discoverer is to understand the world, looking for objective facts and new insights and

knowledge that – ideally –result in a scientific publication. Having said that, it is obvious that the Applied Design Researcher has a broader perspective than the purely knowledge-driven approach. As Job Van 't Veer (NHL Stenden) describes it: *The role of the researcher is to monitor the scientific integrity of the entire project, and to provide a conceptual and methodological foundation that can serve as a guiding framework for all the activities of the project*. Sander Hermsen (*HU*) indicates that the role of the researchers was, on the one hand, to make the existing theory understandable and easily accessible while protecting the fundamental aspects of this knowledge. Our definition of the role of the *discoverer* is thus narrower than the broader perspective of the Applied Design Researcher.

The third role we could identify was that of the ***initiator***. One of the involved partners defined this role as an *Open-Minded Opportunity Hunter*. This involves collecting and combining different ideas and possibilities and rendering these as new initiatives and projects. The initiator sees opportunities everywhere and operates as a driver and motor of innovation, creating new initiatives seemingly from scratch. Of course, the various roles have many overlapping aspects, and part of the initiator role results from the role of the *reframer* who knows how to show the significance of results that for others appear to be totally independent of each other. There is also an overlap with the role of the *developer*, which – in this case – often develops and *thinks up* a new project. The specificity of the role of the initiator is that they are able to convert their ideas into specific new projects and initiatives. Incidentally, the role of initiator is not only relevant at the beginning, but also at the end of a project. After all, there is always a need for follow-up projects to keep the train of design and research moving.

The fourth role is that of the ***change manager***, which consists of two elements. On the one hand, this role is aimed at achieving anticipated results within the agreed time and within the available budget. This more practical role of coordinator and organiser is mainly aimed at *getting things done*. The role is not emphasised by most of the respondents but seems to be an aspect that they more or less take for granted. The second part of this role is that of the organisational change agent, who is not only interested in creating a new project or new solution, but rather in implementing the new situation in the organisations involved. Job van 't Veer describes this emphasis on organisational change as *design in the large*, aimed at the necessary transformation by involving the required stakeholders in all phases of the project. This then contrasts with the *design in the small*, by which he refers to the specific digital working methods developed in the SoVaTass project. Both processes should not be considered as separate processes, but as parallel processes that take place simultaneously and are closely linked.

The fifth role, that of ***networker***, is about connecting people and organisations, as well as about connecting different ideas. The *networker* functions as a connector and gatekeeper between different professional networks. For example, Karin van Beurden (*Saxion*) emphasises her role as a unifying and guiding factor within the entire project. The networker's activities include being on the road, making visits, getting to know new people, bringing people into contact with each other by facilitating visits and meetings, and bringing people with different opinions on board so that they can ask critical questions and contribute their innovative insights. An important point of attention for the networker is the development of support among the stakeholders involved and the management of mutual expectations between these stakeholders.

The development of a common vocabulary can help to manage these mutual expectations, as a dictionary to bridge the gap between different conceptual frameworks. This brings us to the sixth role we identified, that of ***interpreter***. The emphasis here is not on connecting people and organisations (*as with the networker*) but on connecting different concepts and contextual frameworks. A key aspect relates to the linking of theoretical models from science with the practical experience from professional design practice. Such a dictionary can take the form of a written text, but it can also have the character of a joint product in the form of a boundary object mentioned earlier. However, it may also be a collective experience in the form of a joint design session. The SoVaTass project, for example, has organised several sessions that enable people from the healthcare and technology sectors to work together and think about problems in the practice of healthcare. Jeroen van der Eijnde (*ArtEZ*) explains that the initial assumption in The Future of Living Material project was that the designers in particular needed the scientific knowledge of the academic researchers. During the project, it became clear that university researchers just as much needed practical design applications for their knowledge. As an interpreter, on the one hand, the Applied Design Researcher was able to convert the complex scientific concepts of chemical science into understandable language for the fashion designers. On the other hand, still as an interpreter, they helped to render the designers' practical questions as scientific questions for the researchers.

The seventh and last role we have identified is that of the ***reframer***. The emphasis here is on showing the significance of the results achieved, adopting a different perspective on things that others may perceive as irrelevant or self-evident. This role is probably the most important and unique role of the Applied Design Researcher, as it is essential in fulfilling the roles described above. In fact, the interpretation of the results achieved plays an important role in all projects. It appears that Applied Design Research is not so much about establishing objective facts as about knowing how to interpret these

facts in order to show their significance. Shahab Zehtabchi (*The Hague UAS*) explains that the concept of boundary objects had existed in sociology for a long time. The step the reframer is making is to give new significance to the concept – in this case, applying the concept in a new manner in the field of design. Sometimes, however, this calls for a reframing of the problem. One of the results of the SoVaTass project was that, in addition to training young people with autism, the project placed much more emphasis on the acceptance of the fact that young people are allowed to be 'different'. Meanwhile, in the Living Colours project, the discolouration of textiles that have been dyed in a new way was regarded not so much as a problem to be solved, but rather as a unique characteristic of the new paint that allowed each fabric to acquire its own character. Peter Troxler (*Rotterdam UAS*) explains that the Applied Design Researchers were looking for a model that would *encompass, summarise, conceptualise, explain and model the buzz*, taking the single-loop learning of the individual retailers to double-loop learning for the retail sector in Rotterdam and at large. Mark Lepelaar (*Amsterdam UAS*) emphasises that reframing is often only possible when the results of several projects are combined. At first glance, the results of individual projects tend to lead to fragmented and separate results. Actors who are directly involved will often only know the results of their own project, but it is precisely the combination of different results that can result in truly new insights.

Conclusion: Being a catalyst of change

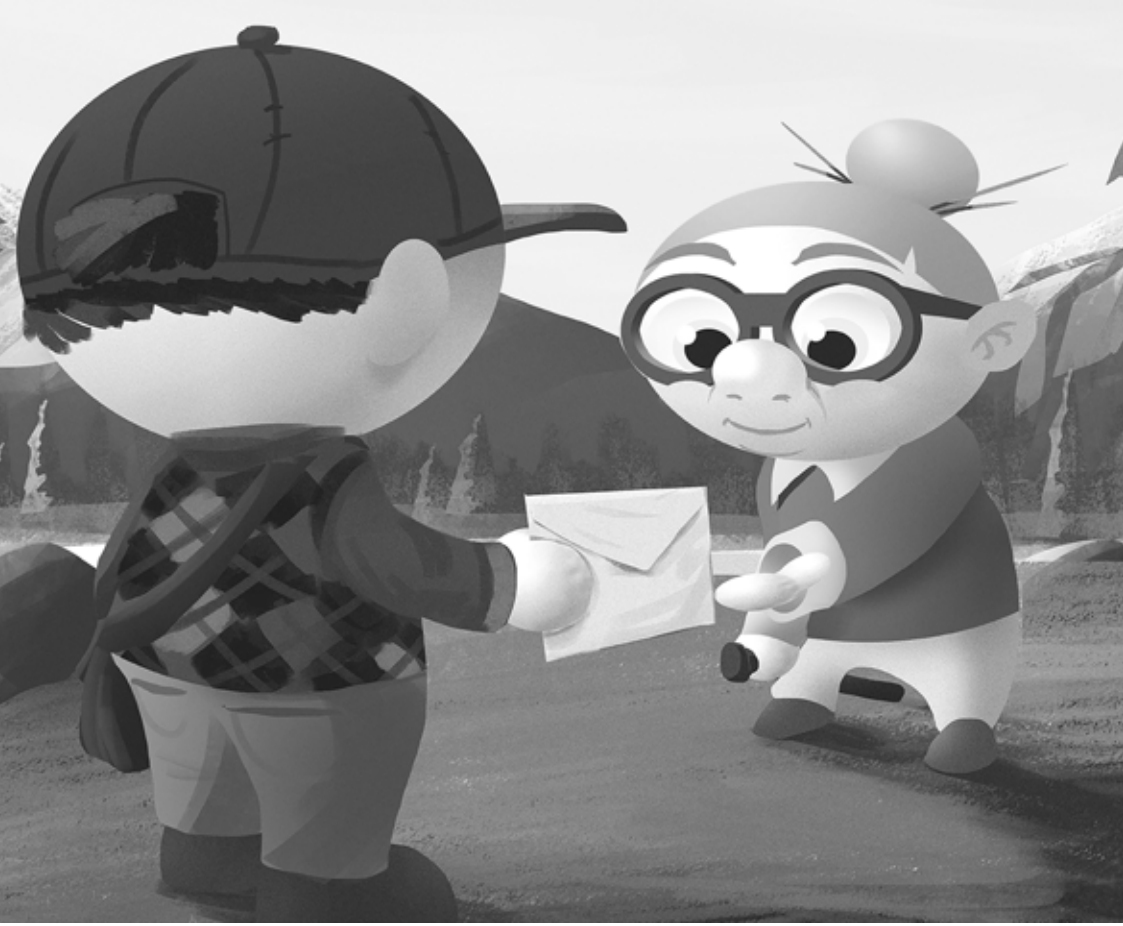
In our search for the meaning of *Applied Design Research* and the role of the *Applied Design Researcher*, we have asked what has been designed, what has been researched, what was the intended change, and what was the role of the Applied Design Researcher. With regard to the first question, our conclusion was that many different things are being designed, ranging from physical products, new materials, new ways of producing, new games and apps and new tools and methods to roadmaps and innovation labs. This brings us to a follow-up question: what are the boundaries of the area of expertise of the Applied Design Researcher? If *everyone designs who devises courses of action aimed at changing existing situations into preferred ones*, as Herbert Simon already concluded 50 years ago, what is the boundary of the professional designer's field of expertise? With regard to the second question, our conclusion was again that a great many different things are being investigated, varying from the way in which design processes take place, ergonomic research, technical research, materials research, research into people's behaviour, research into new production methods and research that is at the interface of these subjects. All research, however, has a strong link with the design process, being the connecting factor of all investigation. With regard to the third question, our conclusion was that the intended change can be defined at different levels of abstraction. The most concrete change relates to the successful implementation of the specific solution created. The more

abstract change is about long-term societal transformations, aimed at social aspects such as health and inclusiveness, as well as ecological aspects such as the use of bio-based materials in construction. In between, there is the level of what we can call *organisational change*. This is where actors are triggered to implement a new solution that resulted from a bottom-up development, thus contributing to the broader societal goals from a top-down perspective.

With regard to the activities of the Applied Design Researcher, seven roles were identified: the developer, the discoverer, the initiator, the change manager, the networker, the interpreter and the reframer. The last two aspects mostly reflect the distinctive aspect of Applied Design Research and the Applied Design Researcher, which consists of connecting, translating and reframing. In this sense, the comparison with the function of a catalyst in chemistry is indeed very accurate. Such a catalyst has the purpose of improving certain chemical processes. It brings together substances, fulfils an interconnecting function and ensures that the process produces a new substance. The catalyst itself remains unchanged after the process. For the non-chemists among us, it may appear that this chemical process could have taken place independently of the catalyst, but nothing could be further from the truth. A similar role is fulfilled by the Applied Design Researcher, bringing people together, ensuring that they understand each other's language, that they have a common goal and that they achieve meaningful results together. In this sense, the objects that are visible in the exhibition are only a very small – though often the most visible – part of the entire Applied Design Research process. The only way to gain a real insight into the role of the Applied Design Researcher as a Catalyst of Change would probably be to experience it yourself once, according to the learning-by-doing principle outlined in the first paragraph. Anyone who wants to experience what such a catalyst of change can mean for a particular situation is warmly invited to get in touch with one of the partners of the Network of Applied Design Research!

Peter Joore is a professor (lector) in Open Innovation at NHL Stenden University of Applied Sciences in Leeuwarden and one of the partners of the Network of Applied Design Research.

Applied design research as Catalyst of Social Change



Still from the Island game

Using games to train social skills of children with autism

NHL STENDEN
university of applied sciences

NHL Stenden University of Applied Sciences
Research Group in iHuman Care|Well-Being |Digital
We focus on digital innovation in healthcare and social work. Through design and research, we facilitate new and inventive solutions and focus on the organisational and social changes these innovations imply.

SoVaTass – An empowering design approach for children with autism

Changing your life by empowering social-skills interventions

Background
For children (10 to 12 years old) with autism spectrum disorder (ASD), functioning in social situations can be a huge challenge due to their limited social and communication skills. Current interventions often seem ineffective. However, digital interventions such as games and apps with interactive exercises may offer more variety and customisation, making exercises not only more fun but also more effective.

Purpose and deliverables of the project
In the SoVaTAss project (SIA RAAK public), we aim to develop a toolbox with several digital interventions (games, apps) in co-creation with children, parents and professionals.

Design-oriented work on digital working methods
In the design process, a children's panel was deliberately included as a co-designer (*see illustration of the co-designer toolbox*). It was precisely this human-centred design approach that produced new insights and possible solutions. The approach is not only aimed at making children with ASD more socially competent, but at creating a greater understanding required in the social environment, especially in the school context.

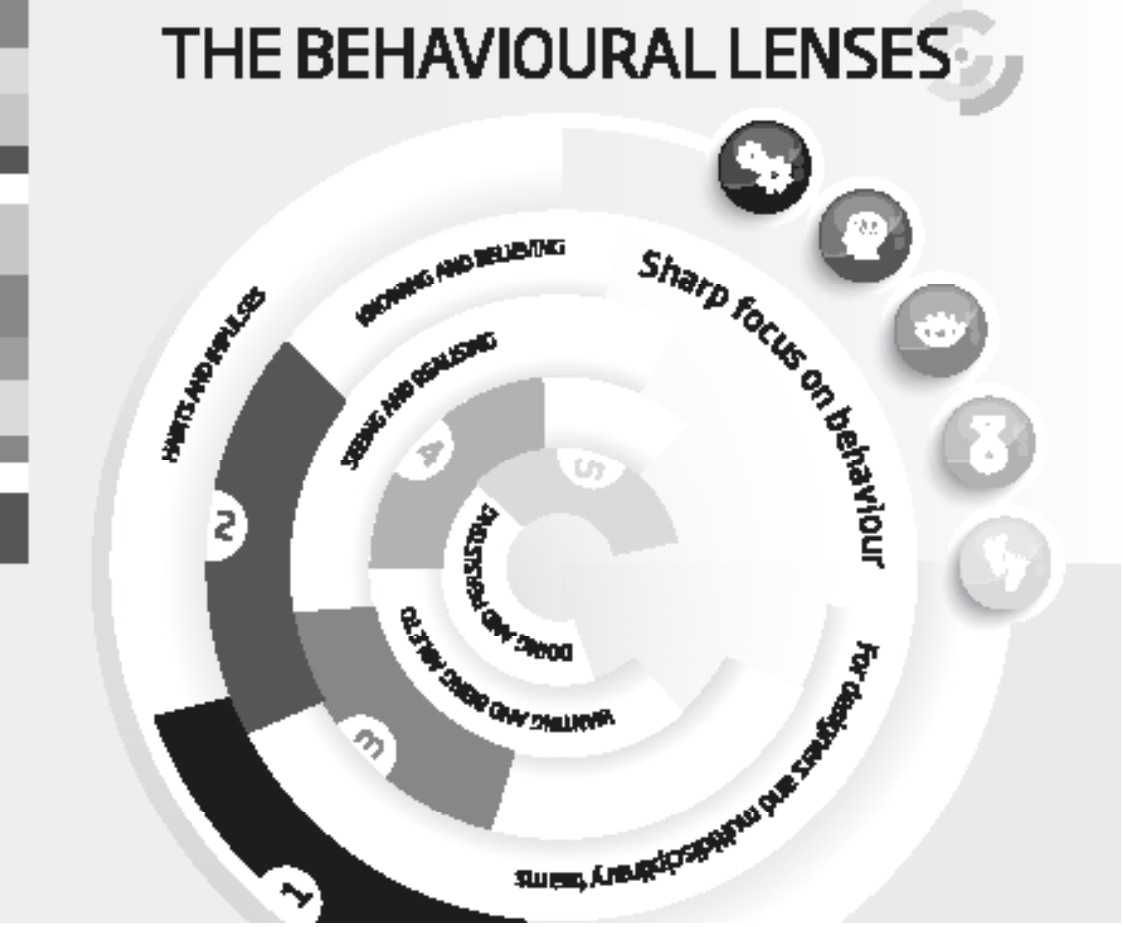
Design-oriented working on implementation in the work context
When designing the digital working methods, we also take into account the organisational context in which the working methods must operate. In the process, care and education professionals contribute to the design of the toolbox and suggest necessary adjustments to existing work processes. The working approach with this panel of professionals includes methods such as desktop walkthroughs, customer journey maps and service blueprints. In short, this design-oriented approach facilitates the social aspects of this innovation in care.

The designer as a catalyst of change
The SoVaTAss project and other similar projects imply the need for a new kind of professional: someone who responds to the rapid developments in their field of work, analyses problems and finds solutions in a design-oriented way (*user-centred, co-creation, iterative*). To train such professionals, NHL Stenden University of Applied Sciences has developed two Master degree programmes: the Master in Digital Innovation in Care & Welfare (MaDIZW) and the Master in Design Driven Innovation in formation (MaDDI).

The Master degree programme in Care & Welfare aims to educate change agents for a profession in healthcare and social work. However, designing digital interventions is not necessarily the first priority, as the curriculum focuses heavily on creativity, social innovation and the use of the student's own professional expertise. This Master is open to recent graduates and working professionals (*at Bachelor degree level*) or for those who do not have a background in care or social work.

TOP: Still from the Island Game

BOTTOM: Professionals working with Desktop Walk Through



Designing healthy, safe and sustainable behaviour

UNIVERSITY OF APPLIED SCIENCES UTRECHT
U CREATE WE CONNECT

Utrecht University of Applied Sciences
Cross-media communication in the public domain
Communication in the Public Domain (PubLab) contributes to the development of effective and innovative communications and communication strategies. It examines how cross-media and other communication can be used strategically to promote a sustainable society with a good quality of life.

Platform for behavioural design

New platform for healthier, safer and more sustainable behaviour

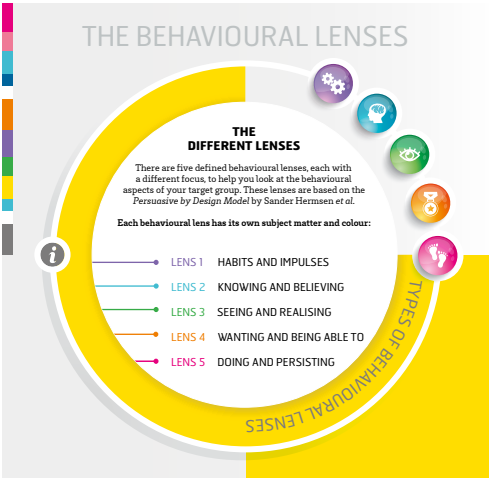
What is the best way to create effective designs that encourage healthy, safe and sustainable behaviour? Many professionals are grappling with this question, including the Touchpoints research project, which studied how to use theoretical knowledge as part of the creative design process. In this project, the research groups Crossmedia Communications in the Public Domain (*PubLab*) and Co-design (*Utrecht University of Applied Sciences*) joined forces with creative agencies, knowledge institutions and researchers in behavioural sciences to find answers to these and other questions. The partnership resulted in the '*Behavioural Lenses*' toolbox, a method for '*designing behavioural change*', as well as the foundation of the Dutch Platform for Behavioural Design. The platform was an initiative by U CREATE, the Centre of Expertise Future Health Design.

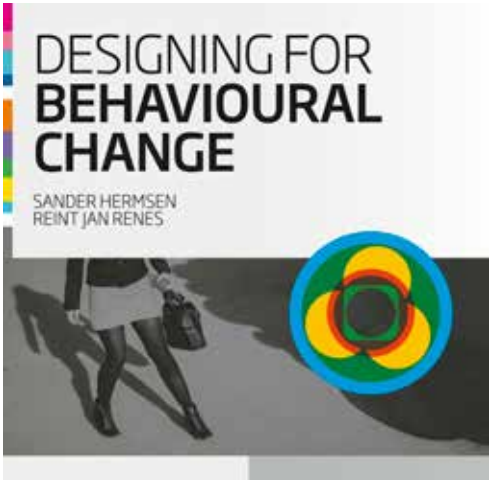
The Behavioural Lenses toolbox has already been frequently used in projects by the partner agencies. The project has also led to several presentations, workshops, academic papers, an '*explanimation*', a workbook, and a more intensive collaboration between design professionals, research, and education.

The researchers and entrepreneurs involved in the new Dutch Platform for Behavioural Design will continue to work closely together in similar projects in the future. Their collaboration will ensure a constant link between the latest scientific insights and new experiences in day-to-day practice. In turn, this will offer organisations the opportunity to design new interventions that will enable end users to improve their own health and safety and contribute to a sustainable society.

THE BEHAVIOURAL LENSES

The Behavioural Lenses: a method for 'designing behavioural change





Publication part of 'Behavioural Lenses' toolbox

DUTCH PLATFORM FOR **BEHAVIOURAL DESIGN**

DESIGN INNOVATION GROUP ideate service | design | innovation PUBLAB panton ontwerpers voor de zorg

Visual representation of the Robo-stairs concept

Empathic homes will change the face of health architecture

Hogeschool van Arnhem en Nijmegen

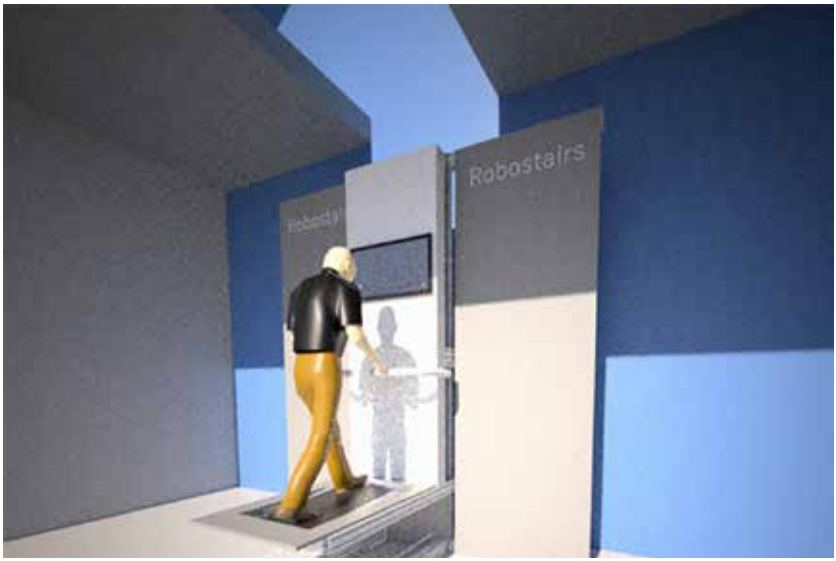
Han University of Applied Sciences
Architecture in Health Research Group
This multidisciplinary research group focuses on innovations in healthy buildings and smart environments.

Robo-stairs

Traditional stairs reinvented

Elderly people or those with a disability face many difficulties in their daily activities as far as the accessibility of their living environment is concerned. Staircases are the most critical elements in impeding accessibility, as proven by many studies and surveys on healthy living environments. While current building practice regards staircases as utilitarian objects that enable people to reach different floors of a building, this is often not the case for people with reduced mobility. This research project therefore aims to take the first step in investigating smart staircases in homes for older adults with reduced mobility. To achieve this, the researchers are developing a prototype for the Smart Robo-stairs: a unique combination of the benefits of stairs and lifts that is able to increase the amount of liveable space and improve users' mental and physical well-being.

Mock-up
Brainstorming sessions with experts, colleagues, students and stakeholders participating in the 'Empathic Home' project have resulted in an innovative product that powers vertical movement by means of horizontal transmission. This way, the Robo-stairs can stimulate physical activity and contribute to a healthy living environment. The design has been developed by the research group Architecture in Health, who collaborated with students from mechanical engineering and product design in autumn 2017 and spring 2018. These concepts have been further developed and realised in the prototype.



RIGHT PAGE: Design concept Robostair before prototyping

LEFT PAGE: Visual representation of the Robo-stairs concept

Applied design research as Catalyst of Environmental Change

Connecting art, design and science to explore living materials for a sustainable fashion industry

ArtEZ University of the Arts

Artez University of the Arts
Centre of Expertise Future Makers (professorships Fashion and Product Design & Interior Architecture)
Future Makers initiates and realises research and innovation projects in the field of textile, fashion and interior and other design that contribute to the development of a resilience, sustainable future and a fair, inclusive and diverse society. Future Makers connects creative thinkers and makers to scientific and practical research and collaborates with universities, research centres, companies and public institutions.

The Future of Living Materials

More and more designers are exploring the possibilities of biobased materials that will contribute to a sustainable, circular future. For instance, the fashion industry can benefit from a more efficient use of resources, water, land and energy or by using fewer toxic chemicals and reusing waste. Nature provides the perfect source of inspiration to aid us in meeting these criteria. Its resources, living and other materials and various functional principles may help the transition to a sustainable fashion industry. In various subprojects, designers join forces with Wageningen University & Research to research the possibilities of living materials.

1. *Living Leather*: Although natural leather is a high-quality material, the tanning process to create it has a negative environmental impact. Large amounts of water, energy and chemicals are used to turn animal skin into leather for the fashion industry. However, the earth offers renewable biobased materials and extensive fruit waste that could be used as a resource for new materials like Mylium, Fruitleather and Piñatex. Could these materials offer an alternative to leather?

2. *Living Skin*: Living Skin focuses on skin-like materials, such as mycelium. Clothing is often seen as a second skin and a means of visually expressing one's identity. Shaping one's second skin and allowing new materials to grow and move on the physical body could be viewed as the ultimate form of personalisation.

PREVIOUS PAGE: Aniela Hoitink (NEFFA), experiment with MycoTEX, a material made from mycelium that can be shaped directly on the body.

LEFT: Lara Luchtman & Ilfa Siebenhaar, experiment with living bacteria to dye textiles.

TOP RIGHT: Aniela Hoitink (NEFFA), experiment with MycoTEX, a material made from mycelium that can be shaped directly on the body using mold by Karin Vlug.

BOTTOM RIGHT: Emma van der Leest, clutch bag made from a leather-like material using a symbiotic mix of yeast and bacteria's. The mix grows bacterial leather in a fermentation process, the same way beer and cheese is being produced..

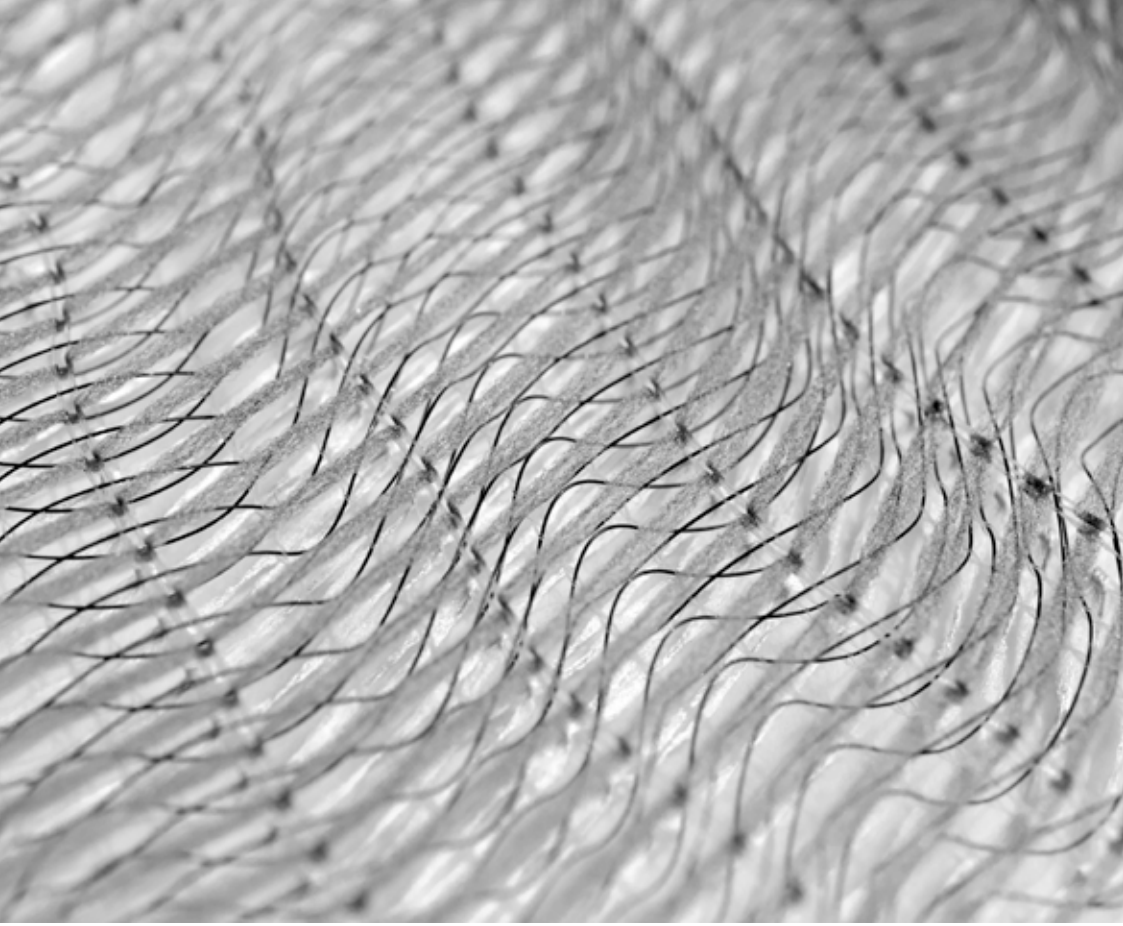
Photo's: Jeroen Dietz

BankGiro Loterij FONDS
WAGENINGEN UR
Future Makers

3. *Living Colours*: Living Colours focuses on the possibilities to create a new and alternative colour palette by using living organisms such as plants, algae and bacteria and by upcycling colours from residual ink from the textile industry.

4. *Living Waste*: People produce large quantities of waste that can be used to produce new raw materials. For example, cellulose can be extracted from agricultural and industrial waste in order to produce naturally degradable yarns or filaments for 3D printing. Bone waste from the meat industry has also been used for centuries to produce high-quality ceramics, but this material's quality depends on the living conditions of the animals.

Designers: Luc Aarts, Lilian van Daal, Aniela Hoitink, Iris Houthoff, Nienke Hoogvliet, Aliki van der Kruijs, Emma van der Leest, Laura Luchtman, Ilfa Siebenhaar, Karin Vlug



Smart Wearables will change our daily experience of who we are and will be

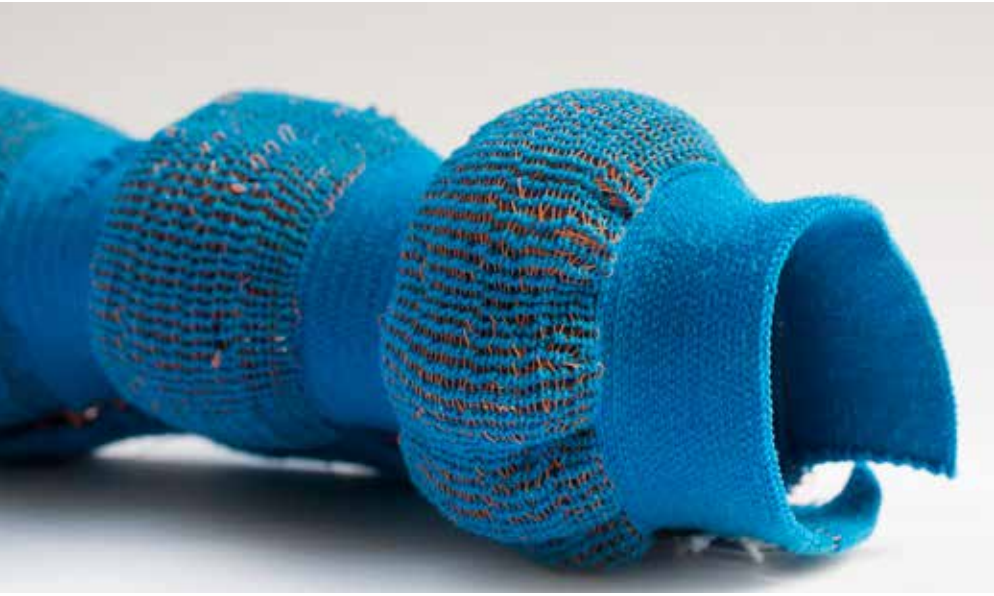
ArtEZ University of the Arts

Artez University of the Arts
Centre of Expertise Future Makers (professorships Fashion and Product Design & Interior Architecture)
Future Makers initiates and realises research and innovation projects in the field of textile, fashion and interior and other design that contribute to the development of a resilience, sustainable future and a fair, inclusive and diverse society. Future Makers connects creative thinkers and makers to scientific and practical research and collaborates with universities, research centres, companies and public institutions.

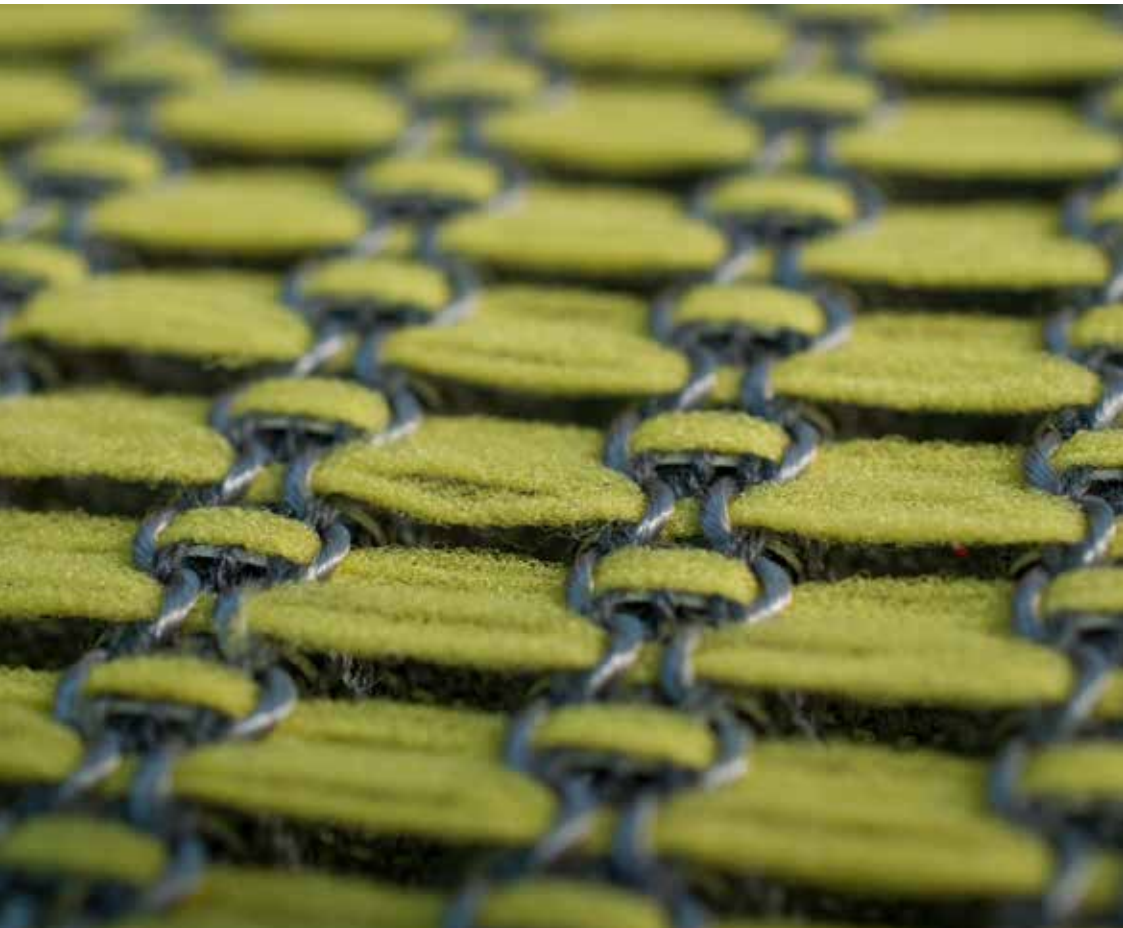
Smart Wearables, Soft Skin

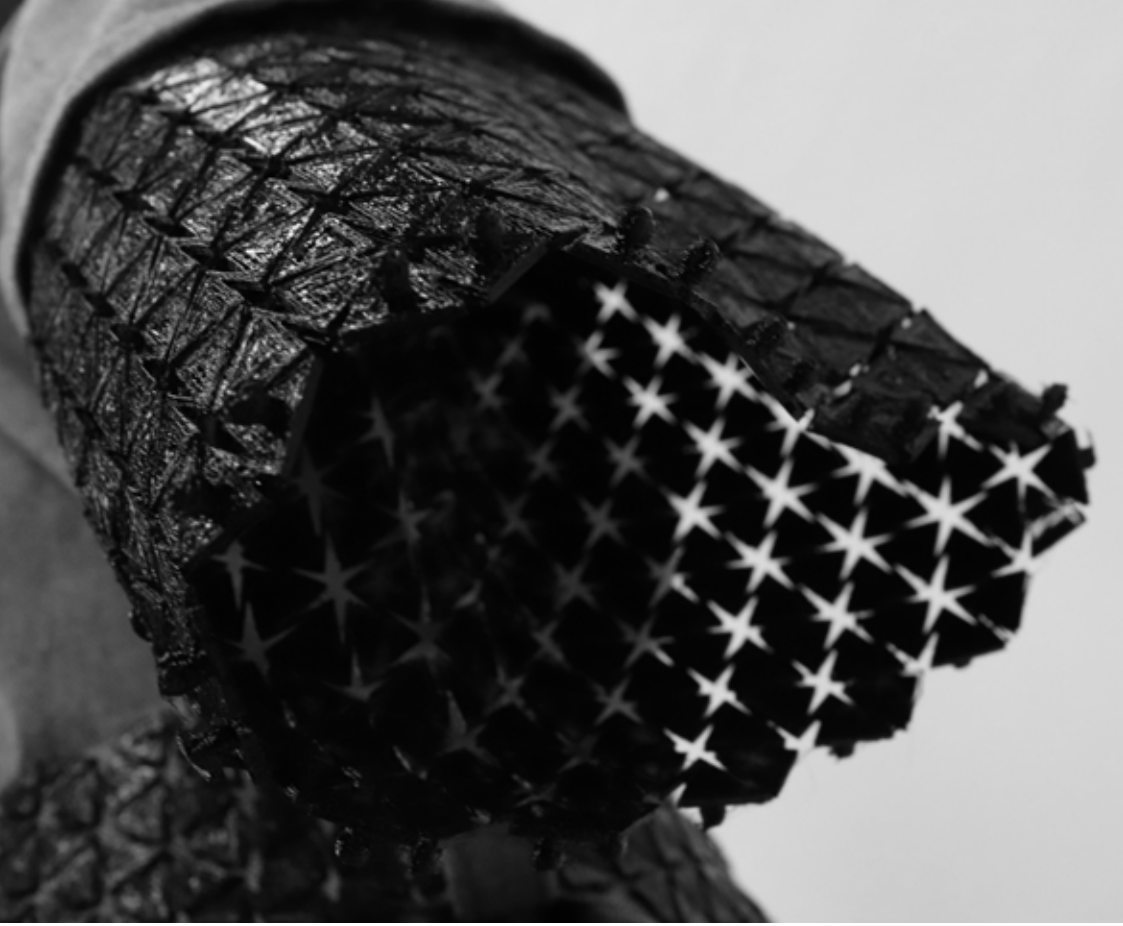
The Smart Wearables, Soft Skin project focuses on the interaction between wearable technology and the physical body. It aims to realign fashion's human dimension with technological innovation, with a selection of product designers exploring the intimate and affective relationship between smart textiles and the human body. Instead of hard functional materials, this project explores how 'soft technology' designed on the skin affects the actual physical, sensorial experience of the wearer.

Designers: Suzanne Oude Hengel & Milou Voorwinden



Suzanne Oude Hengel & Milou Voorwinden, ‘Smart Wearables Soft Skin’, weaving and knitting experiments in ‘smart textiles’ (technology integrated in textiles) to explore how small adjustments of the technique affect the qualities of the textile and the sensorial experiences on the body.





Sleeve made from 3D-printed textile structure.

Material research will impact the future of textiles for health

SAXION

Saxion University of Applied Sciences
Research Group Smart Functional Materials
The 'Smart Functional Materials' Research Group focuses in particular on research into the development of high-quality textiles and the conditions for innovations in functional and sustainable materials.

Design and development of smart and functional textile materials

Developing 'soft' garment applications

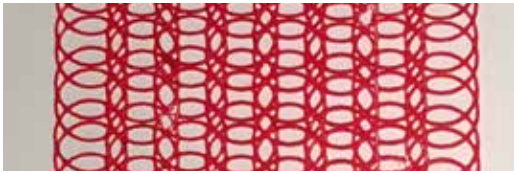
Textile materials are everywhere and are becoming increasingly sustainable and durable, smarter and more functional. Meanwhile, society faces complex issues and demands new technologies, smart materials and sustainable, durable processes to solve them. Thankfully, applied research conducted in cooperation with companies, researchers and students is producing innovative concepts and products that can provide an answer.

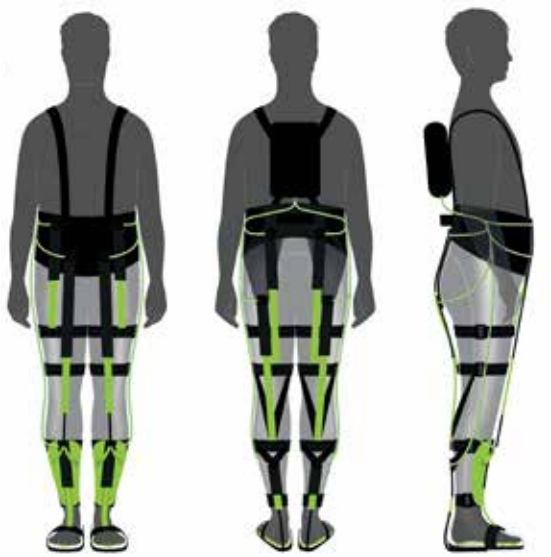
One example is the European XoSoft project, as part of which we are designing and developing a soft exoskeleton that is capable of assisting older people or patients with reduced mobility. The exoskeleton has been developed so that patients can still use their own muscles and increase their mobility, thereby improving their health and quality of life.

The exoskeleton was designed using the '*user-centred design*' method. This approach focuses on users' requirements, such as what kind of support is needed at which locations, how this can be made as user-friendly as possible, and how items of clothing can be put on and removed. These criteria are rendered as technical requirements and design specifications that would be used to develop the technology behind the concept. The project made and tested various prototypes, which were brought in line with the requirements and tested by potential users.

Another example is the design and development of 3D-printed textile structures. 3D printing opens up a whole new range of possibilities in prototyping, recycling,

customisation and local production. This applies in particular to the fast fashion and textile industries, where 3D printing of textile structures could reduce the environmental impact. As part of this project, participants melted, mixed, granulated and 3D printed plastic waste, researching several designs for their softness, flexibility and drapability in order to achieve a textile-like structure. The project also took into account the material's weight, strength and possible applications, developing geometrical structures that would guarantee sufficient strength and flexibility. Filaflex filament was eventually used for its softness and lightweight properties, and several parts of a garment were produced by 3D printing.





TOP: Three 3D-printed structure

LEFT: Sketch of the soft exoskeleton prototype

RIGHT: Garment with 3D-printed textile structures

XoSoft

User test of a modular bra with lightweight prosthesis and concrete 3D printed frame

Applied design research accelerates new material- and product solutions and increases wellbeing

SAXION

Saxion University of Applied Sciences
Industrial Design Research group
Saxion's Industrial Design research group offers companies knowledge and practice-oriented research for the development of innovative products and services. Through our work, technological possibilities are integrated in a creative way to serve people's needs.

New ways of thinking lead to groundbreaking solutions

A fresh perspective on challenging topics

Our changing world constantly raises new questions about ourselves and society at large. However, these constant changes can equally produce novel and exciting technologies. How do we design meaningful and socially relevant products in such a dynamic setting?

In cooperation with companies, researchers and students, the Research Group in Industrial Design at Saxion University of Applied Sciences is able to develop new products and knowledge. We are harnessing our creativity to ensure the possibilities presented by technology are aligned with people's real needs.

One example is the Konkreet project, which focuses on 3D printing of concrete. This promising technology could transform the construction sector. Konkreet started with the development of a 3D concrete printer. To fully explore the new technology's potential, however, we also had to find solutions to specific challenges, such as providing a concrete recipe, undercuts and reinforcement. We have analysed specifics cases in order to explore different applications. During the project, we learned that it is possible to build unique elements without extra costs and longer turnaround time, giving designers a new kind of freedom and options. As the printer makes it easy to tailor construction design to the customers' demands and required functions while also optimising structure and functionality, we need a new dynamic way of 3D modelling.

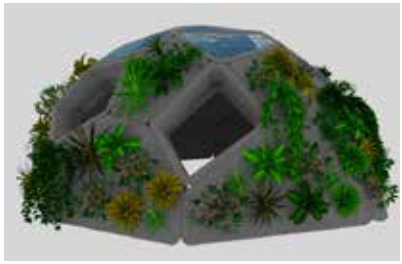
Parametric design is a way of generating 3D geometry using variable parameters and calculations and is revolutionising the way we think. It ranges

from designing a single solution to generating multiple solutions in one design by determining the relations between the building factors.

Another example of how to rethink design process is the project Proud Breast, which aims to research and develop alternative and empowering products for women who have had one or both breasts removed as part of their cancer treatment.

The products that are now available all focus on the idea of '*replacement*'. Together with over ten women, we explored different aspects of the taboo surrounding breast prostheses and whether the market provides authentic solutions. We found that a lot of women embrace their bodies after the operation, while others need the prostheses in order to feel '*whole*'.

In collaboration with students of Textile and Industrial Product design, we created a new type of post-mastectomy lingerie that enables women to accept, at their own pace, the reality of having an asymmetric body. Thanks to its modular structure, the bra can be used with or without a prosthesis while maintaining a natural look and guaranteeing comfort. Unlike current mastectomy bras, which lose their shape if the prosthesis is removed, the new concept sends the message that a woman is complete – whether or not she chooses to wear a prosthesis.



TOP LEFT: Concept for a tiny house to combine concrete 3D printing and textile.

TOP RIGHT: Test 3D print.

BOTTOM LEFT: Parametric self-sustaining modular dome with a stable shape.

Modular asymmetric body with detachable cup

Integrating design and digital production creates inspiring use of waste materials

Amsterdam University of Applied Sciences

Amsterdam University of Applied Sciences
Research Group Circular Design & Business
HvA's Circular Design & Business Research Group is dedicated to advancing the knowledge we possess about circular design and business-model strategies, making use of advanced digital production processes such as industrial robotics) to encourage the local reuse of discarded urban material. Together with entrepreneurs, designers, researchers and students, we work on a range of applied-research projects, studying how valuable applications of materials such as plastics, textiles and wood can be achieved using a research-through-design approach.

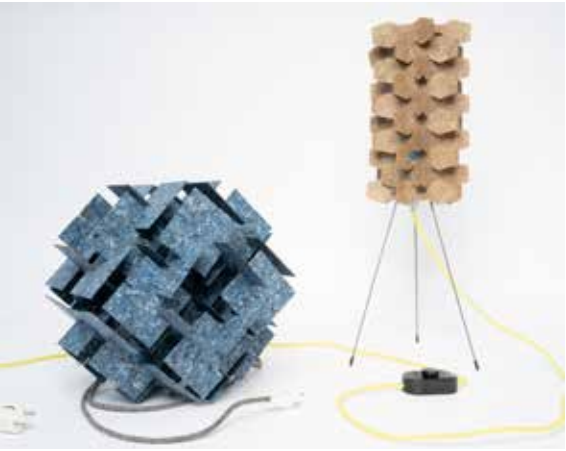
RECURF-UP!

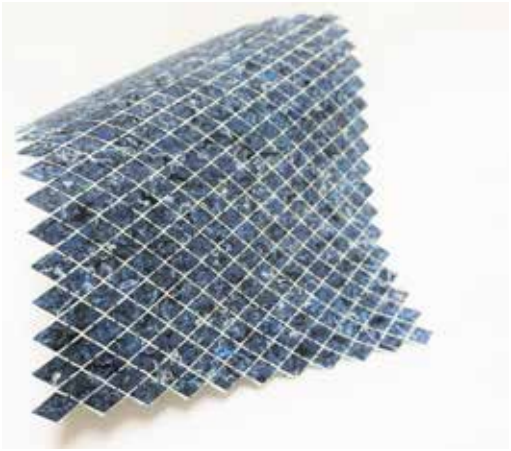
A new destination for textile waste: from biocomposite to design product

RECURF-UP! is a research project conducted by Amsterdam University of Applied Sciences (HvA) in cooperation with local SMEs from the textile-recycling and biobased plastics sector, as well as with designers, architects and Dutch knowledge institutes. The entire value chain is involved in the research, which aims to upcycle local residual textiles into circular, economically justified, industrial, non-textile products. The project develops new materials by mixing residual burlap, wool and denim with biobased plastics. It focuses on sheet-based and shell-based interior products such as desktops, table tops and acoustic wall and ceiling panels. We elaborate and explore these applications in order to develop and deepen our knowledge about circular biocomposites and the use of flexible digital production techniques to create customised products, shapes and appearances with a viable, circular business model.

The newly developed composites have improved technical and mechanical properties and showcase a wide range of different perceptive values. You could see this as a new and unique 'look and feel': from smooth to rough, from glossy to dull, from flexible to rigid. These distinctive characteristics form the basis for designing products as well as developing and testing prototypes. We also focus on developing applications, quantifying physical and mechanical properties (such as fire resistance, sound dampening, tensile strength and rigidity increase) and optimising circularity and commercial feasibility (from raw material to the marketing of the final product).

We are gradually discovering the value of using digital production techniques, and designers play a key role in using these techniques effectively. After all, successful designers increase the technical quality and perceived value of products made using waste materials, which in turn adds value to these upcycled materials and brings us closer to achieving a circular economy. We are demonstrating this in our BiOrigami project, which is the product of an intensive collaboration between Samira Boon and Next Architects.



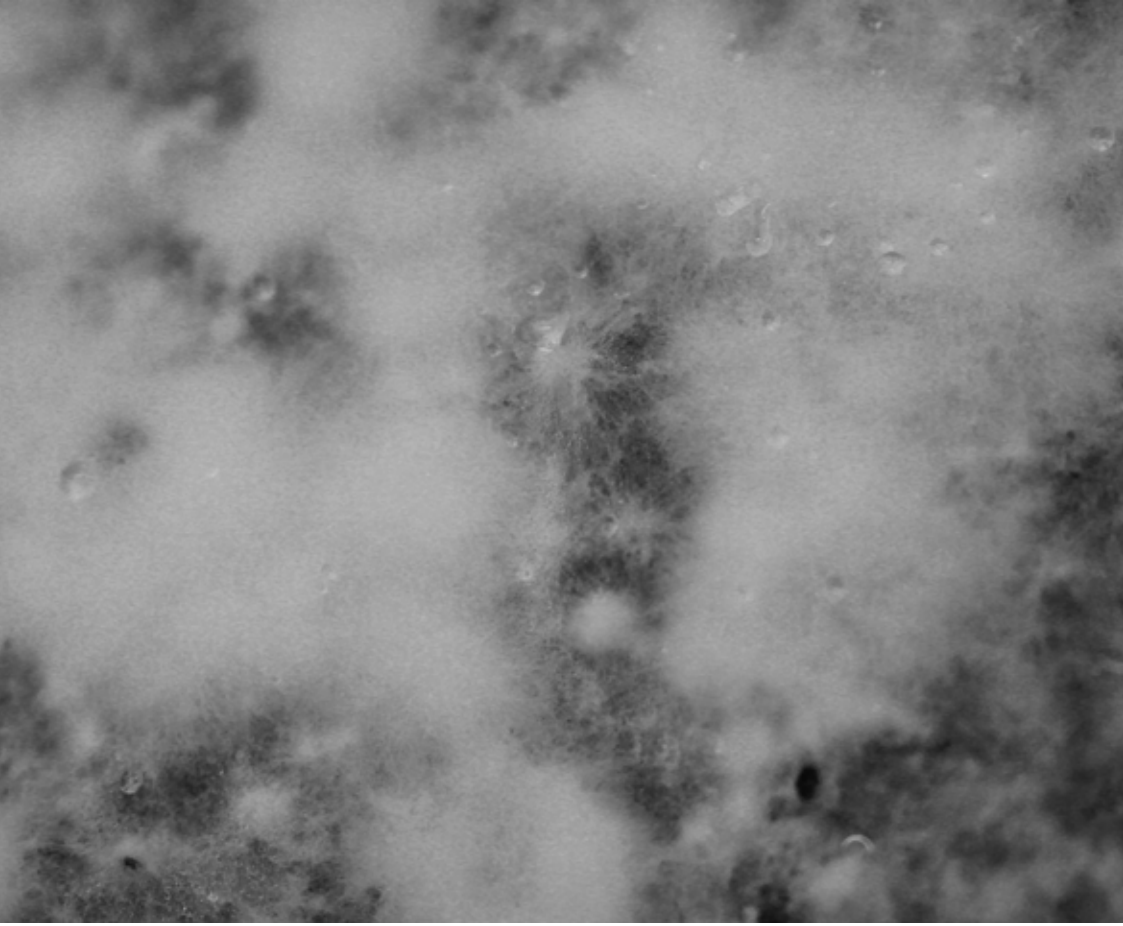


TOP LEFT: Exploring the possibilities of our materials with students, for example these lamps. Denim lamp: Ties Westerhuis, intern RECURF-UP! 2018. Burlap lamp: Romano Sperling, 1st year Product Design student 2017

TOP RIGHT: New materials were developed by mixing residual textile (including denim) with biobased plastics (PLA) into a non-woven, our base material for sheet based interior products.

RIGHT: Samples with a new and unique 'look & feel': from smooth to rough, from glossy to dull, from flexible to rigid. Integrating digital production techniques, such as laser cutting, contributes even more to this variety to customize products, shapes, patterns and appearances. It has also been used to create 3-D shapes and incorporate origami techniques.

From denim to product. New materials were developed by mixing residual textile (including denim) with biobased plastics (PLA) into a non-woven, our base material for sheet based interior products.



Designing with biobased materials leads to warm, beautiful and healthy, buildings with low CO_2 footprint

avans hogeschool

Avans University of Applied Sciences
Research Group Biobased Building
The aim of the research group in Biobased Building is to conduct research into the added value of biobased materials for construction, focusing on their mechanical, thermal, acoustic, hygro-thermal, aesthetic and sustainability properties.

Biobased facade products inspired by biomimicry

Fibre-reinforced biocomposites, mycelium pavilion and polar-bear facade

This research project investigates the possibilities of biobased facades. We look at insulation material based on fungi, wall cladding based on residual materials from agriculture and a new facade concept inspired by polar-bear skin.

1. **Mycelium insulation material**
   Mycelium, the network of all the thread-like roots of a fungus, is a material that grows on residual materials from agriculture and creates a foam-like insulating material once dried. This material is turned into mycelium panels to construct the mycelium pavilion. We are also demonstrating the properties of polystyrene sheet in terms of its durability, compressive strength and insulation value and investigating the technical and economic feasibility of mycelium insulation products

2. **Plyskin facade**
   This project conducted research on a new kind of sustainable, insulating facade product that also had to become part of a circular process. The research focused on structural-physical properties, the production process and the design. The difference with normal insulating products, however, is that the panel is not located in the cavity of the building but on the outside and doubles up as wall cladding. As part of this research, biobased and recyclable materials were used as raw materials. Their appearance and functionality were inspired by biomimicry of polar-bear skin, resulting in a product known as 'PLYSKIN' (skin consisting of several

layers). The project showcases a different approach to insulating our buildings, with logical consequences for architecture, sustainability and the environment.

3. VIRTUe facade

As part of the VIRTUe project, a study was conducted into a facade system comprising biobased and circular biocomposites. This biocomposite material consisted of the waste fibres of mown roadside grass, toilet paper, recycled textiles and reed, as well as of CaCO3, residual material from softening of drinking water and a biobased resin based on residual materials from the biofuel industry. The result is a high-quality and durable product that is strong, dimensionally stable and has a long lifespan.

The shape of the facade is specially designed for use in countries with a hot climate. Thanks to its shape, the façade can cool the building behind it. The air behind the panels is heated by solar energy, causing the air behind it to rise. This rising air ensures that that cool air is drawn into the building.

TOP: Plyskin facade project

BOTTOM LEFT: Hypha

BOTTOM MIDDLE: Mycelium Insulation material project

BOTTOM RIGHT: Mycelium composite

Applied design research as Catalyst of Process Change

Design of ‘Boundary Objects’ facilitates discussion and goal alignment within collaborative design networks

THE HAGUE
UNIVERSITY OF
APPLIED SCIENCES

The Hague University of Applied Sciences
Research Group Innovation Networks
The research group in Innovation Networks develops and offers expertise and tools to help organisations create innovations within their current and future networked context. We address complex challenges and work in networks to design solutions that ensure our society is better able to adapt to future challenges.

Design projects as a catalyst for collaboration

Activating dialogues through boundary experiences

The presented projects are part of a larger research project on the role of design outcomes, activities and experiences in designing international innovation networks. We aim to explore how the process of designing plays a catalysing role in initiating and extending collaboration. We extend this by investigating how the events that facilitate communication among current and potential stakeholders could act as 'boundary experiences' in research. Our objective is to better understand the characteristics and principles that could enable designers to form international and impact-oriented co-design networks.

In the realm of research through design, we consider the artifacts that are made during the design process, the people and project proposals as boundary objects (Star & Griesemer, 1989). Based on the lessons learnt from analysing the presented projects and other projects, we aim to consciously apply this in the use of provocative prototypes – '*provotypes*' (*Boer, Donovan and Buur; 2013*) – in future projects.

The projects that are showcased have brought together a multitude of partners from different expertise areas and backgrounds. The design of artifacts for the visually impaired connects residents of The Hague and Liverpool and creates a network of social entrepreneurs and universities. The Noomi and 3D printable drone projects have also formed an innovation network that joins NGOs and universities. The Hilume project acts as a bounding element that amplifies creation of new connections across these networks.

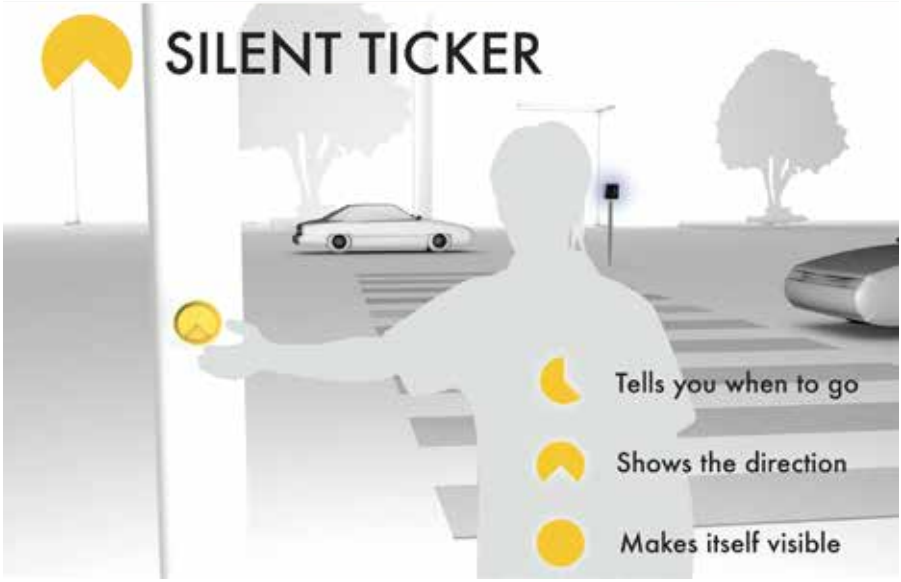
While establishing the innovation networks, the projects were structured and developed to engage their stakeholders in the design process, human-centred research and prototype testing. The network grows organically through continuous development. Meanwhile, the projects themselves are a vehicle for collaboration, as their inherent value and technical intricacy motivate stakeholders to make a contribution.

We learned that the projects, prototypes and other means of communication facilitate the creation of innovation networks. Our realization that boundary experiences amplify people's eagerness to participate in and the effectiveness of our co-design practice was the driving force behind the research on activating dialogues using these experiences. We have seen the unique effects of these projects in creating spin-offs and supporting dialogues. Consequently, we tend to apply what we have learnt in future design proposals in order to increase the potential impact of projects.

LEFT: Hilume uses AR to enhance our experience with informative and communication technologies

RIGHT: Silent Ticker and Ecce aim to increase the safety and mobility of visually impaired


ECCE
"HERE I AM"


SILENT TICKER
Tells you when to go
Shows the direction
Makes itself visible

Design Research Spurs Retail Innovation

Rotterdam University of Applied Sciences
The Research Centre Creating 010
Research Centre Creating 010 studies how society is transforming as a result of digitisation and related developments in information and communication technology. The principal constituents of the research at Creating 010 are people in their socio-economic contexts.

Retailution

Retail innovation in Rotterdam

The Research Centre Creating 010 at Rotterdam University of Applied Sciences presents Retailution, an exhibition about the future of retail. As part of this exhibition, students from different disciplines developed several proposals that could have a use in the future or produced speculative solutions based on emerging trends. The project was based on the underlying themes of storytelling, sustainability, social influence, smart design and personalisation of brands, products and services.

The purpose of the project was to make small and medium retailers in inner-city Rotterdam more innovative and more competitive, taking into account that the strain on these businesses is rising due to the dwindling offer of retail spaces and, as a result, higher rents on 'triple A' locations such as the city's high streets.

Students developed practical, innovative solutions along five lines of investigation: trends, new retail formats, online communication and positioning, conversion, and the city as an incubator of innovation. Using a mix of methods and techniques, the students' work was supervised by Creating 010 and its researchers.

The project delivered a large number of designs that were co-developed with retailers or devised to solve problems that retailers are currently confronted with. These solutions and designs were developed as part of several university courses: the undergraduate courses in commercial practices at Willem de Kooning Academy, the graduate course in interior architecture: research and design at the Piet Zwart Institute, the undergraduate communication course at the School of Communication, Media and Information Technology, and the undergraduate course in small business and retail management at the Rotterdam Business School.

The project's ambition was to increase the innovation capacity and the competitive position of small retailers. The project results and the feedback from retailers show that there is a shift in attitude towards innovation readiness. The retailers discovered that inspiration is an important step that precedes innovation. For business associations and the municipality, the project led to a greater realisation and understanding of the possibilities and contributions of research-through-design approaches.

In total, more than 600 students and 40 lecturer-researchers worked together with 20 retailers. The project really engaged and inspired retailers, leading to the creation of several proposals that are now being realised as services or products, as well as proposals that form a framework for alumni of Rotterdam University of Applied Sciences to start their own business.

Multichannel navigatie for Chinese millennials, Stephanie Helmer, Small Business and Retail Management, 2017

RIGHT PAGE TOP Biometric Couture, maddyekkelkamp.nl, Willem de Kooning Academy, 2017

RIGHT PAGE MIDDLE & BOTTOM RIGHT Personalisation in knitwear, Maartje Boer, strikks.nl, Willem de Kooning Academy, 2018

RIGHT PAGE BOTTOM LEFT Retailution, exhibition, WTC Rotterdam, 2018

HU University of Applied Sciences Utrecht

The research group for Cross-Media Communication in the Public Domain (PubLab) contributes to the development of effective and innovative communications and communication strategies to stimulate people's health and wellbeing.

The Co-Design research group develops and validates tools and methods for involving people throughout the process of designing people-product-service systems, with a focus on systemic innovations that empower people to care for themselves, for each other and for the environment.

U CREATE (Centre of Future Health Design)
Supports health- and creative professionals to work on new or renewed health products, services and experiences through: innovation acceleration- knowledge development- talent promoting.
Powered by HU, HKU, Rabobank, Ordina

Amsterdam University of Applied Sciences (HvA)

The *Technical Innovation & Enterprise research group* does design-based research on circular materials, products, systems and business models that could help lead to the realisation of a circular city.

NHL Stenden University of Applied Sciences

The research group *Open Innovation* investigates how companies, government and civil society can jointly solve complex issues through a design-oriented approach, based on the premise that the development of new products, services and solutions can contribute to the realisation of a sustainable and inclusive society.

The Research Group *iHuman Care|Well-Being |Digital* focuses on digital innovation in healthcare and social work. Through design-research, we facilitate new and inventive solutions, but also focus on the organisational and social changes these innovations imply

The Hague University of Applied Science

The research group *Innovation Networks* develops and offers expertise and tools to help organisations devise innovations within their current and future networked context. We address complex challenges and work in networks to design solutions that make our society more futureproof.

Rotterdam University of Applied Sciences

Creating 010 studies how society transforms in view of digitization and other developments in information and communication technology. Creating 010 puts people in their social contexts at the centre of its research.

Avans University of Applied Sciences and the Centre of Expertise Biobased Economy

The Biobased Construction research group aims to conduct research into the added value of biobased materials for construction: mechanical, thermal, acoustic, hygro-thermal, aesthetic and sustainability properties.

The Research group *Innovation of the Building Process & Technology* focuses on integrated building- and design processes and the required collaboration. It collaborates with the Centre of Expertise Sustainable Innovation of Avans.

Hanze University of Applied Sciences

The research group *Art & Sustainability* researches the role of the sustainable designer. An important focus is the continuing development of creative practices and relevant knowledge of materials, language, technical skills and new possibilities for making a living.

Saxion University of Applied Sciences

The *Industrial Design research group* offers companies knowledge and practice-oriented research for the development of innovative products and services. Through our work, technological possibilities are integrated in a creative way to serve people's needs.

The research group *Smart Functional Materials* focusses in particular on research into the development of high-quality textiles and research into the conditions for innovations in functional and sustainable materials.

HAN University of Applied Sciences

The multidisciplinary research group Architecture in Health focuses on innovations in the area of healthy buildings and smart environments.

ArtEZ University of the Arts

ArtEZ Centre of Expertise Future Makers (*research groups Fashion and Product Design & Interior Architecture*) initiates and realizes research and innovation projects in the field of textile, fashion and (interior) design that contribute to a resilience, sustainable future and a just, inclusive and diverse society. Future Makers connects creative thinkers and makers to scientific and practical research and collaborates with universities, research centres, companies and public institutions.

Fontys University of Applied Sciences

The Health Innovations & Technology (HIT) research group are experts in designing technology and care concepts and in acceptance and implementation issues, always with a key role for the user.

Colophon

TEXT: Peter Joore, Jeroen van de Einde, Job van 't Veer, Karin van Beurden/Iman Hadzhivalcheva, Ger Brinks, Peter Troxler, Christine de Lille, Cathy Hassels, Willem Bottger, Masi Mohammadi/Toine van Lieshout

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