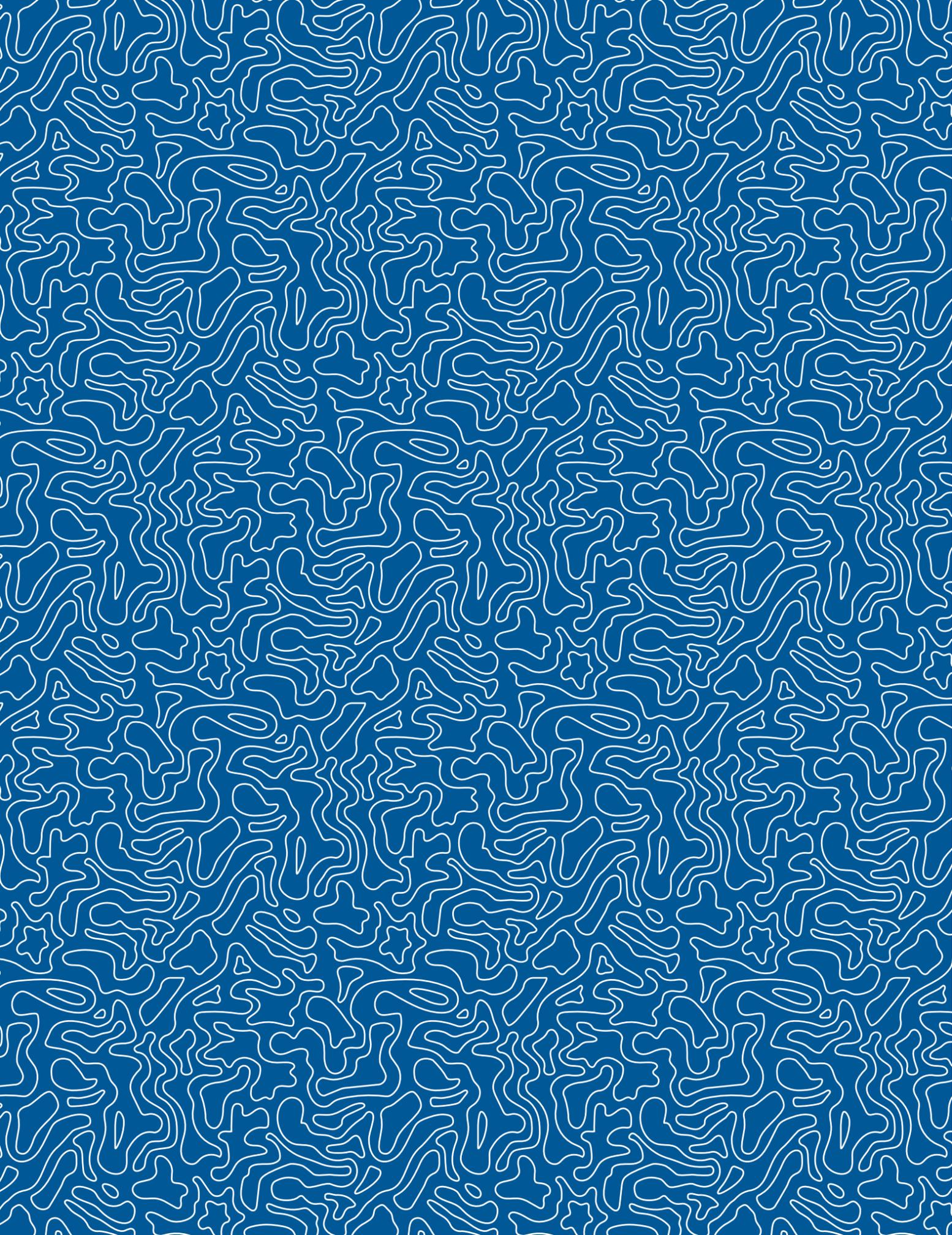


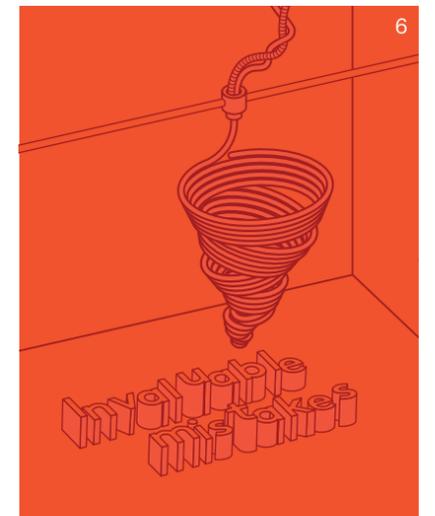
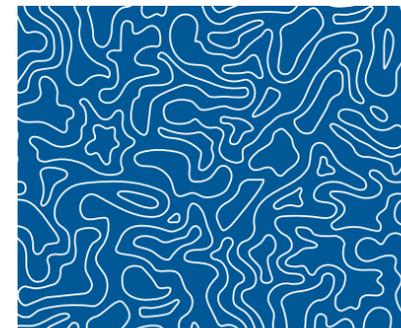


Marineterrein Amsterdam



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An unstoppable dynamism

Here at the Marineterrein Amsterdam, I meet with a variety of people, ranging from a secondary school drop-out, to someone looking for affordable housing, to a soldier with PTSD. Each of them has a unique life story to tell. What connects them is the way they deal with the social, economic, and technological challenges of a rapidly changing society. The figures don't lie: according to Statistics Netherlands (CBS), the number of inhabitants in cities like Utrecht and Amsterdam will increase by 20% from 2018 to 2035. CBS also found that 2018 was the year in which overall happiness sharply decreased among less-educated inhabitants compared with previous years.

In 2019, some people view the Marineterrein Amsterdam as an oasis of calm and a refreshing place to swim during the hot summer months. Others see it as the ideal location for innovative, sustainable, and inclusive experiments. This is the case for a community that recently began using the outdoor space to test solutions for various metropolitan problems related to water, traffic, health, and housing. In short: it is an extremely versatile area. According to those same figures, the Marineterrein is a unique location where 400 people go to work every day, all sharing the same desire: to solve the problems that currently face the city. The Marineterrein also attracts thousands of residents, course participants, students, researchers, and business clients every week. This area has an unstoppable dynamism.

In terms of what this year has in store, Bureau Marineterrein Amsterdam will open up the area as a living lab – a testing ground for experiments with an autonomous bus and an autonomous Roboat, for smart quays, and for building houses on the helicopter field. In this third edition of Marineterrein Magazine, we will share the latest developments with you and introduce you to interesting makers and thinkers. I hope this magazine offers inspiration for your own experiments.

Happy testing!



Liesbeth Jansen,
director of Bureau Marineterrein Amsterdam

From printing plastic to VR experience

Experimentation is key
at the MakerSpace

A staff member from the Ministry of Defence, several departments of which are still housed at the Marineterrein, recently stopped by the MakerSpace for a chat, explains Peter Schuitemaker (32). He manages the new space where students from different academies of the Amsterdam University of the Arts can meet and work. As a manager and an instructor, he knows everything about the equipment in the room, including the 3D printers, CNC milling machines, the VR studio and more. And that was precisely what the Defence officer came to discuss. 'The Ministry of Defence also works with the latest 3D printing and VR technologies. He just wanted to see what we're working with.'

The large warehouse has been open to students from the music, dance, theatre, film, and architecture academies for several months now. Here, it's all about experimenting. There is plenty of room for exploring, testing, and inventing. 'There isn't enough room at the academy to make a mess, let alone to house the huge machines they have here,' says Roos Rodenburg (30), a second-year student at the Academy of Architecture.

Efficiency Schuitemaker and Rodenburg discuss how a scale model for a new building is created. 'Until recently, I would cut my scale models by hand,' explains Rodenburg. 'I'd spend hours cutting through the thick cardboard with a Stanley knife. And let me tell you: your thumb really starts to hurt after a while!' Schuitemaker nods and laughs as he rests his hand on top of the laser cutter. 'Machines like these can do a lot of the manual labour.' This means Rodenburg can make sleeker models. 'You want to do so much as a student, but you're limited by time. Tools like these help you get more done in less time.'

New way of thinking According to Schuitemaker, efficiency isn't the only benefit. 'These machines let you add such great details, but they do require a different way of thinking. It's interesting to figure this out with the students. Once they realize what's possible, the final product is more unexpected, more efficient, and more sustainable.' Rodenburg adds: 'I have the drawing, but Peter has the software and knows everything about the machine. That makes it a real collaboration.' In the meantime, Schuitemaker has turned on the machine. 'We discuss things like how deep to cut the wood of the model,' Rodenburg continues. 'He also gives me useful tips on the best material to use, in this case poplar wood.'

'The entire academy is essentially a series of invaluable mistakes'

Learning from mistakes Students aren't expected to get everything right the first time, stresses Schuitemaker. To illustrate, he picks up a 3D printed hand, made up of tiny grids, and points out minor flaws: the connections aren't as smooth or as clean as they could be. He also prints things like this for the students. 'This shows them the limitations of a specific 3D printer.' These are invaluable mistakes. 'The entire academy is essentially a series of invaluable mistakes,' says Rodenburg with a laugh. Assignments don't always have to go according to plan. When they don't, they become a great learning opportunity. Last year, Rodenburg was working on a scale model of a villa. She wanted to make a cross-section to show the inside, but it turned out to be too much work. 'If only I'd had a laser cutter back then!'

text: Roos Menkhorst, Marieke Berkers
illustration: Daniël Maarleveld

Different disciplines At the table, Schuitemaker and Rodenburg discuss the latest developments over a cup of tea. Students from different disciplines can work together at the MakerSpace, which makes it so unique. At the moment, a student from the music academy is working with dance and film students in the VR studio, Schuitemaker explains. There is a massive drum set in the room. 'They want to film the dancers moving and link their movements to music and thereby create a melody through movement.' The possibilities are endless, and the developments are moving at break-neck speed. 'You can already print with aluminium or print an entire dish,' says Schuitemaker. 'You can even print concrete,' adds Rodenburg, 'it's revolutionary! Pretty soon we'll be able to print an entire building with zero waste.' ♦

Having the courage and the room to fail

Teaching yourself how to code

Students should be given the freedom to fail says David Giron, director of the Amsterdam coding school Codam at Marineterrein Amsterdam. Jorn Brinksma had no prior training when he enrolled at Codam. Now, he can't imagine being anywhere else.

'It's not up to me or my colleagues to tell our students exactly what they should learn,' Giron stresses. 'Our job is not to siphon knowledge into them.' The 240 students can access the building any time, day or night. A quarter of them never completed secondary school, and none of them have to pay tuition fees. It all sounds very unconventional, especially when you hear that there aren't even any lecturers.

Unconventional Twenty-year-old Jorn nods as Giron explains the learning method. He's been a student at Codam for more than a year now and hasn't needed a staff member to help him solve a technical problem in all that time. Admittedly, this took some getting used to. 'I remember thinking: the staff have all the answers, so why won't they tell me? That attitude is so embedded in your mentality at first,' he continues. 'But after a few weeks at Codam, it becomes clear: you can ask all you want, they won't tell you. So you look for different ways to solve your technical problem.' This includes asking a fellow student, researching the problem online, or taking a short break. 'The curriculum was designed so that each subsequent assignment is too difficult to understand in one go,' Jorn continues. 'But having been accepted to Codam means you can probably figure it out yourself.' Perseverance is the name of the game.

A critical mind The director agrees wholeheartedly. After completing his master's in computer science, the Frenchman spent five years working as a lecturer. In this role, he noticed that his students took everything he said as truth and didn't question anything. 'They passively accepted everything I told them, which made me uncomfortable. Students should have a critical mind and that attitude was not being stimulated.'

No classrooms Walking around the Codam building, it becomes clear that this school does things differently. Students come and go as they please. There are no traditional classrooms. Instead, there's an auditorium, and there's an area where you can make music or meditate. There are beanbags and a cosy 'Lego corner'. Two rooms with hundreds of computers, the place where students write code, make up the heart of the building.

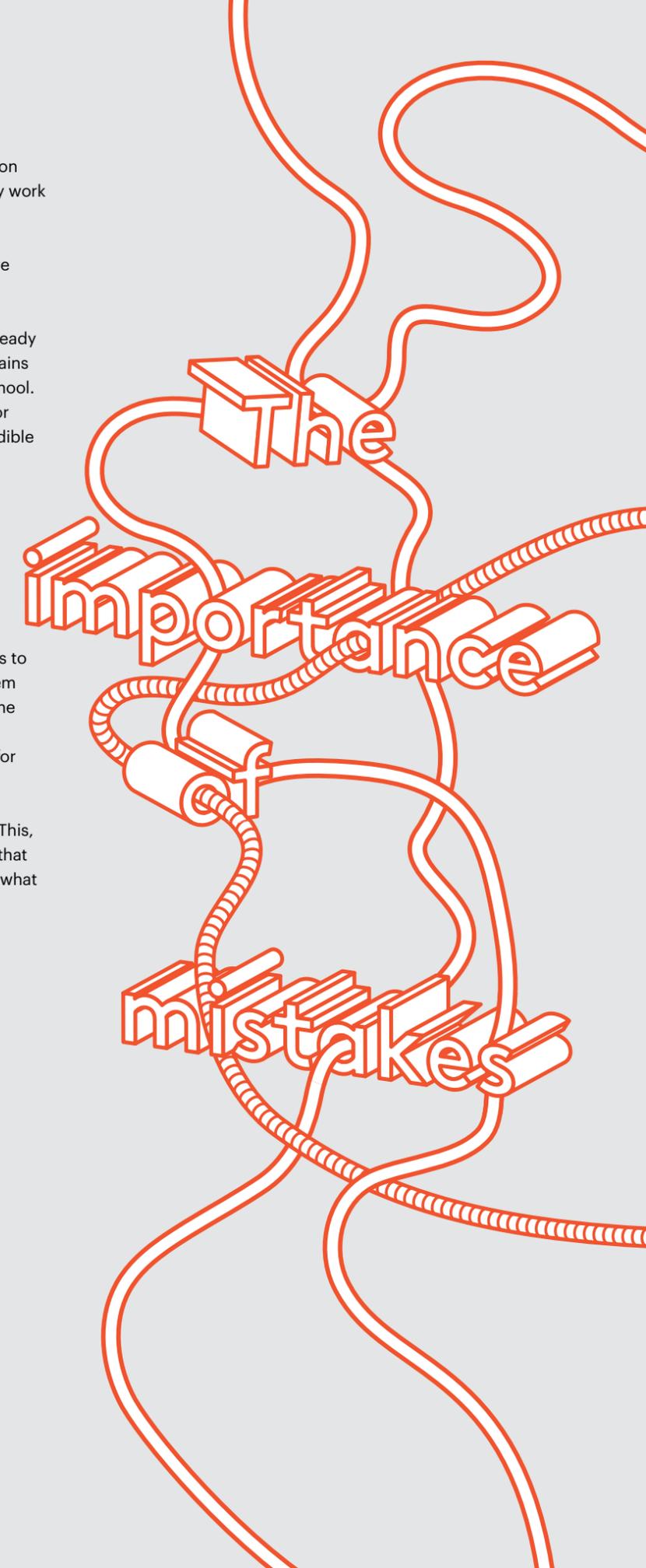
Perseverance Jorn can be found in the building day and night. 'Sometimes up to twelve hours a day,' he says with a slightly embarrassed laugh. This is quite the contrast with a few years ago, when he begrudgingly went to school every day, until he finally quit in the fourth year. He and his mother were at a complete loss, until he heard about Codam. Jorn

completed an online game and was invited to the selection month. 'That month I was shocked that I could voluntarily work on something with such dedication,' he remembers.

Own pace Jorn has been studying at Codam for more than a year now and is almost ready for his first work placement, which will round off the 'inner circle' of the curriculum. Some of the students he started with aren't ready for this step yet. 'Everyone works at their own pace,' explains Giron. 'Deadlines are pretty much meaningless at this school. Jorn is a fast learner. Some students may need a month or more to finish a project, but then go on to become incredible cyber hackers or programmers.'

'Everyone goes at their own pace'

Starting over This brings Giron to what he considers to be the most important point: the current education system is far too focused on success, despite experts extolling the virtues of failing at nearly every educational conference. 'Giving someone the freedom to fail lays the foundation for learning,' says Giron. 'But let's be honest: at the moment, failure still means bad news in our academic system.' At Codam, you can fail and start over as often as you want. This, according to Giron, builds confidence. 'Just get back on that horse. You learn just as much from what doesn't work as what does.' ♦



Peer-to-peer testing and learning

Short interview with Ilja Klink

What makes experimenting so important in education? Ilja Klink is best qualified to answer this question. 'I'm old-school with a new-school mentality,' she says. When it comes to learning, Klink sees two different worlds: the traditional classroom setting with a teacher and a teacherless, peer-to-peer environment. She's interested in connecting these two worlds.

Klink has worked as a teacher at various secondary schools and founded the Hyperion Lyceum in Amsterdam-Noord in 2011, where she served as headmaster. She then spearheaded the development of a teacher-training programme known as De Nederlandse School. After that, she decided to return to school herself. 'I can work for another twenty-five years, so it would be good to know what young people are interested in.'

Equality The programming school Codam offered her the opportunity to spend a week learning how to code. 'I was able to experience how the new programme – coding – was being taught in a new way. Codam offers a free training programme for people aged 18 and older. This means that 40-year-olds with no previous training can be offered a spot at Codam based on their experience and skills. Codam has a peer-to-peer programme with no lecturers. This means the students help each other with their work. I've really seen people flourish thanks to this kind of equality.'

Incomparable When asked whether she thinks this teaching method could be applied in traditional education, she sighs deeply. 'Why does everyone ask me that? Innovation is meaningful in all types of learning, but you can't compare Codam to traditional primary or secondary schools. Codam is something you choose to do; school is something you have to do. They're two different things.'

Working together 'Codam is not so different to other learning methods. You work together there and you succeed and fail there, just like any other school. I do see a lot of young people at meetings about new learning methods, such as blockchain or artificial intelligence. They seem to be interested in learning about new methods and algorithms. This is very eye-opening.'

Ethics 'I do ask questions about the ethics of using algorithms – a number of steps that result in a given output from a given input. Algorithms learn quickly and make sure users always get what they want. Take Spotify, for example, which always shows you your "favourite" music. But don't we want to be in control of our own decisions? When I ask young people this question, their response is always the same: "But it's so easy" or "That's just how it works." This taught me how important it is to discuss the ethical aspects of big tech.' ♦

text: JaapJan Berg, Marieke Berkers
photography: Sjoerd Ponstein

Special spots

The Marineterrein as a test area



Sharing knowledge at Sensemakers

Looking for smart solutions together

Sensemakers is a club comprised of people from different backgrounds who regularly meet to share their knowledge of the Internet of Things (IoT) for solutions to societal problems. The volunteer-run community unites enthusiastic members who are eager to learn more. And everyone is welcome to join. The ever-changing group is committed to finding new solutions to questions raised by, for example, the National Ombudsman, by Bureau Marineterrein Amsterdam (BMA), or by the community itself. Sensemakers was founded in 2011 and has convened at the Marineterrein (Codam) for lectures and to exchange knowledge since 2015. The community currently has more than 6,700 members.

In 2016, BMA asked Sensemakers to find a solution for determining the quality of the swimming water. This resulted in a test characterized by smart technology, a relatively low price, and concrete results. From that moment on, Sensemakers has helped solve various challenges, such as classifying noise in the city and researching how plants can survive (or thrive) on Mars. The water quality study is still ongoing, and a rainmeter has since been installed on the roof of building 002 (Smart Roof 2.0). ♦

Healthy conditions for athletes and the city

Natural cooling method

Why test artificial grass systems at the Marineterrein, where athletes can enjoy fresh, green, natural grass instead? Because this area offers plenty of room to carry out experiments that help make the city a healthier place. One such example is Project CitySports. In Amsterdam, countless people exercise on the more than 100 artificial grass fields every day. This has both advantages and disadvantages. Artificial grass is more durable and less vulnerable than natural grass fields, but artificial grass gets very hot on sunny days, in some cases reaching temperatures of 60 °C (a whole 50% hotter than natural grass). Researchers at CitySports therefore decided to develop a new artificial grass system with irrigation elements under the field. The water evaporates on hot days through tiny holes in the artificial grass, which cools the fields and the immediate area naturally. Rainwater is also collected and stored under the field for reuse. Smaller test sites were set up at the Marineterrein featuring natural grass and other systems, all of which were equipped with sensors. This allowed the researchers to compare the temperatures and the degree of evaporation on the different fields. ♦





Roboat spotted near the Marineterrein

Self-driving boats reduce traffic congestion

Quietly cruising around the Marineterrein without a captain? Meet Roboats. Researchers see these autonomous floating platforms as an ideal way to transport people, rubbish, construction materials, and construction waste. The boats will also help to reduce road traffic, which is important now that cities are becoming increasingly crowded. But before this can happen, researchers must answer some important questions. The trial, running on a life-size prototype on the quiet waters surrounding the Marineterrein, will be a great first step. After all, it's important to make sure a new technology is safe before

it's applied in a busy city centre. How do you ensure that an autonomous boat learns how to respond to the other traffic in the canals? How will a Roboat respond as the load increases on a trip (e.g. for garbage collection)? One particularly important test was designed to see how Roboats autonomously connect to floating bridges or temporary platforms. The researchers hope that the knowledge they gain at the Marineterrein will help them perfect the Roboat and transform it into a safe, sustainable, and ubiquitous form of urban transport. ♦



Boombrix gives trees a voice

Healthy trees for a healthy city

A lot is happening at the Marineterrein, some of it visible and some of it invisible. With respect to the latter, two researchers installed a Boombrix sensor under a tall tree to measure the influence of drought and precipitation on the tree's root system. The data, such as how long it takes for rainwater to reach the roots after a heavy shower, can be read on a remote computer. This is important information, given that many trees are suffering from the effects of drought. But not all trees. Does this have to do with the location of the tree, the species of tree, or the quality of the soil? Questions like these are being addressed as part of the research study. The researchers hope their tests will inspire a debate among policymakers and local residents about how healthy trees can benefit our cities. If they understand the importance of this (for example, by realizing that trees have a 'voice'), it could generate more support for initiatives that create a healthier city. The municipality is so confident in this experiment, it decided to install nine (secret) tree sensors in the city centre. They're secret to stop them being stolen! ♦



Driving without a driver

First Olli test route planned

The future may arrive sooner than we once thought... you need only look at developments in autonomous electric vehicles. Vehicles like these will be used on and immediately next to the Marineterrein as well in the foreseeable future, with spring 2020 seeing the launch of the Olli pilot, following the approval of the Netherlands Vehicle Authority (RDW). This promises to be a unique experience at the Marineterrein, and one that aligns nicely with the other tests carried out here. The autonomous electric van can transport eight passengers per ride. Olli will run from the bus stop near the main entrance of the Marineterrein on Kattenburgerstraat to the tram stop near the Bimhuis on Piet Heinkade.

The pilot will last three months and aims to test this new technology and its interaction with other traffic users. It will also inspire a debate about the social impact and effects of this type of self-driving car in the city. Will passengers enjoy the jokes this vehicle can tell thanks to the integrated artificial intelligence? Depending on the results of the pilot, similar autonomous vehicles may be introduced elsewhere in the city.

The Olli pilot is a collaboration between the Municipality of Amsterdam, Local Motors, Vervoerregio Amsterdam, AMS Institute, GVB, the Province of North Holland, and Bureau Marineterrein Amsterdam. ♦



Doing things differently



We provide a service and the necessary tools

Thinking ahead with Wilma Haan, director of the Open State Foundation

What's your relationship with Marineterrein Amsterdam?

The Open State Foundation has been committed to shedding light on the actions and performance of governments since 2012. This ranges from information about how public funds are spent to how political decisions are made. Our goal is to make government data transparent for users. I see a parallel with the way the once hermetically sealed Marineterrein slowly opened itself up to new users in the form of innovative companies and institutions.

Do you see the Marineterrein as a test location? If so, why?

It's an amazing location right in the heart of the city, imbued by a sense of the past as well as a thirst for the future. Being so fundamentally versatile is an ideal condition for a test location. The counter image of a deserted site on the outskirts of a city immediately reveals the added value. I can appreciate the possibility of creating direct connections with the city, especially as a journalist.

What does testing mean to you personally? We live in a world that has a lot to offer in terms of digital information and data. This is great and inspires lots of new connections, improvements, and changes. At least, it has the potential to, given that digital data processing is still in its infancy for many governments.

At Open State Foundation, testing often means encouraging the development or enforcement of new standards that the government can use to effectively publish its data. It also means 'freeing' data that is locked in government systems and building applications and making that data available to

everyone. We also test whether this data can actually be used by journalists, social organizations, citizens, and other potential reusers.

What is the added value for society of the tests in your field?

Open State aims to help create government transparency by pursuing the 'open unless' principle. Essentially, the government belongs to all of us, which means we all have a right to the information they possess. We also understand that some information is sensitive and should therefore remain classified. However, I want the government to tell me that certain parts of a data set will remain classified. This is something that has to be determined for each issue or layer of government. It also affects issues like privacy and other rights that we as a society uphold.

How does the Open State Foundation approach testing?

Our very existence is based on the results of government tests – and they're not always positive. Information isn't always transparent or easily available to journalists, for instance, which affects their ability to do their job. This has to change. Citizens also have a right to transparency, and governments have to learn how to cope with increasingly complex data and information. We set high standards for this or strengthen existing standards. We can also accept that certain things are simply not possible, assuming they supported by good arguments as to why. It's important to remember that we're not journalists; we don't do anything with the information we make available. We simply provide a service and the necessary tools.

What is the most recent test you remember? I'm a big fan of the shared space behind Amsterdam Centraal Station. This traffic concept, devised by traffic expert Hans Monderman, focuses on the multifunctionality of public space. What appeals to me is that all of the existing rules were cast aside for this test in order to explore new possibilities without fear and with faith in people.

Which test changed the world? Here, too, I'd like to draw on my own experience. With the advent of the internet came the abolition of newspaper deadlines. Most news is available immediately these days. This was a fraught test for newspapers, but it turned out to be extremely liberating. It completely redefined the concept of news. Instead of making journalism faster and less in-depth, we have even more choice and more depth.

How will testing change in the future? To paraphrase the question, I think the future should change because of testing.

Do we still have time and patience for testing? The recent nitrogen crisis revealed that testing should always be an unfinished, continuous part of society. Only then can imperfections, gaps, and improvements come to light.

Which test do you believe should be carried out immediately? It would be nice for a government, analogous with the 'shared space', to do away with some of the rules and give the 'open unless' concept a try. ♦

Defining and breaking boundaries

Thinking ahead with Melissa Bremmer,
Art Education lecturer

What's your relationship with Marineterrein Amsterdam?

Together with Emiel Heijnen, I teach art education at the Amsterdam University of the Arts (AHK). The plans are to relocate to the Marineterrein in the course of 2020. The research group is currently looking into questions posed by the various teacher training programmes at the AHK. Our research is generating information that helps to improve our innovative primary and secondary education. With research themes like interdisciplinarity and social engagement, the Marineterrein is the perfect location. For example, we want to think about how to improve interdisciplinary education at the interface of art, science, and technology and what the implications are for society. Several companies here are working on this. Take our neighbour, IJsfontein: they develop interactive games for primary school children and interactive experiences for museums. The MakerSpace and the AHK's VRAcademy are two other examples.

Do you see the Marineterrein as a test location? If so, why?

We once did an experiment in which we asked pupils to make a musical instrument using materials from a waste collection point. This prompted them to think about circularity through music, which would be the perfect test for the Marineterrein. This site is a sanctuary with a very different atmosphere from a classroom – it broadens your perspective.

What does testing mean to you personally? Success and failure are both successful research outcomes. They both help you understand the next steps to take.

What is the added value for society of the tests in your field?

This is the best job in the world. I not only get to improve or innovate art education together with lecturers, I also give primary and secondary school pupils new and exciting experiences. These days, art education is more than just self-express-



sion and aesthetics. We're at the heart of society and can offer new artistic perspectives on pressing social issues.

How do you approach testing as a lecturer? Our approach is similar to that of design education. We identify a problem, research existing perspectives, and then come up with new tools and methods to offer new perspectives. We then test and evaluate those perspectives with pupils and other educators.

What is the most recent test you remember? The Ocean Cleanup project by Boyan Slat really moved me. The inspiration for this project came while he was working on his secondary school profile paper. What a wonderful example of how original pupils can be! Since the foundation was established, he's raised millions to help clean up the plastic soup in our oceans. That wasn't always smooth sailing by any means. During his first attempt, his material broke. Instead of seeing this as a failure, he created a better version of the installation, which can now clean up microplastics as well. You see, perseverance leads to further development.

Which historic test changed the world? Hedy Lamarr (1914-2000) was the mastermind behind Wi-Fi and Bluetooth.

She invented a method that shielded radios from outside interference. I think it's important to stress the role women play in art and science. Their inventions are often overshadowed by those of their male colleagues.

How will testing change in the future? As far as we're concerned, experimentation should play a more central role in education, in addition to the subject matter. This will teach children and students how to think independently and that a problem can have more than one solution.

Do we still have time and patience for testing? I hope so! The Marineterrein can help, as it invites us to explore and push the boundaries of what we're working on and researching.

Which test do you believe should be carried out immediately? We're working on a test from the perspective of both our themes. We want to find out how to stimulate the imaginations of children with an autism spectrum disorder. This is difficult for this target group, so we're using technology as our jumping-off point. A lot of children on the autism spectrum are interested in technology. I can't wait to get started. ♦



Increasing societal value at Defensity College

Thinking ahead with Alfred van der Klis, programme manager and co-founder of Defensity College

What's your relationship with Marineterrein Amsterdam?

I run Defensity College from the Marine Etablissement Amsterdam (MEA) together with two colleagues. Defensity College is an academic institute founded in response to the conclusion that very few people understand what the Ministry of Defence does or what its social value is. The opportunity to do this here, among so many innovative companies, is a real motivator.

Defensity College aims to achieve this in two ways. First, by attracting motivated students to work for us part time and conduct research on behalf of the Ministry of Defence. Second, by helping people realize that guns, tanks, and planes aren't the only ways to keep our country safe and secure.

Do you see the Marineterrein as a test location? If so, why?

The Marineterrein has a rich history in terms of its links to Defence. Working on updating and innovating the Ministry of Defence from this location, against such a historic backdrop, is incredible. The Ministry of Defence has been looking for ways to accurately represent society since the end of conscription in 1997. It's about representing a new generation of highly educated young people who aren't motivated by fast money, but who are looking for more meaning and significance in their lives.

What does testing mean to you personally? Working here is the direct result of reflecting on my work as a reservist, combined with the experiences I gained during foreign missions. I critically examined those experiences and insights, tested them, and drew conclusions. This also influenced my everyday work. In addition to serving as a reservist and a first lieutenant in the Civil-Military Interaction Command (CMI), I own a media production and events company and produce feature films. The results of this 'testing' my experiences certainly play a role here, too.

What is the societal value of the tests in your field? The Defensy programme focuses on new and existing knowledge. There is a lot of specialized knowledge in the various layers of Defence, which need to be continually updated and revised. Developments in the field of national and international security also call for topical and innovative knowledge. The results benefit the Ministry of Defence and society as a whole. For example, mental health facilities use our military research results on the processing of stress disorders, and health care institutions benefit from our knowledge of tools and aids for people with a physical disability. Many of our students end up in commercial or social positions and apply the skills we taught them – such as leadership and teamwork – in practice.

How does your institute approach testing? We try to be open to other attitudes and to the sense of urgency experienced by young people. As a result, we have to constantly revise our profile. Defensy College wants to create real added value by focusing on knowledge and social relevance.

We try to connect and combine different types of knowledge. In doing so, we distinguish ourselves from other, foreign armed forces, which use similar recruitment processes.

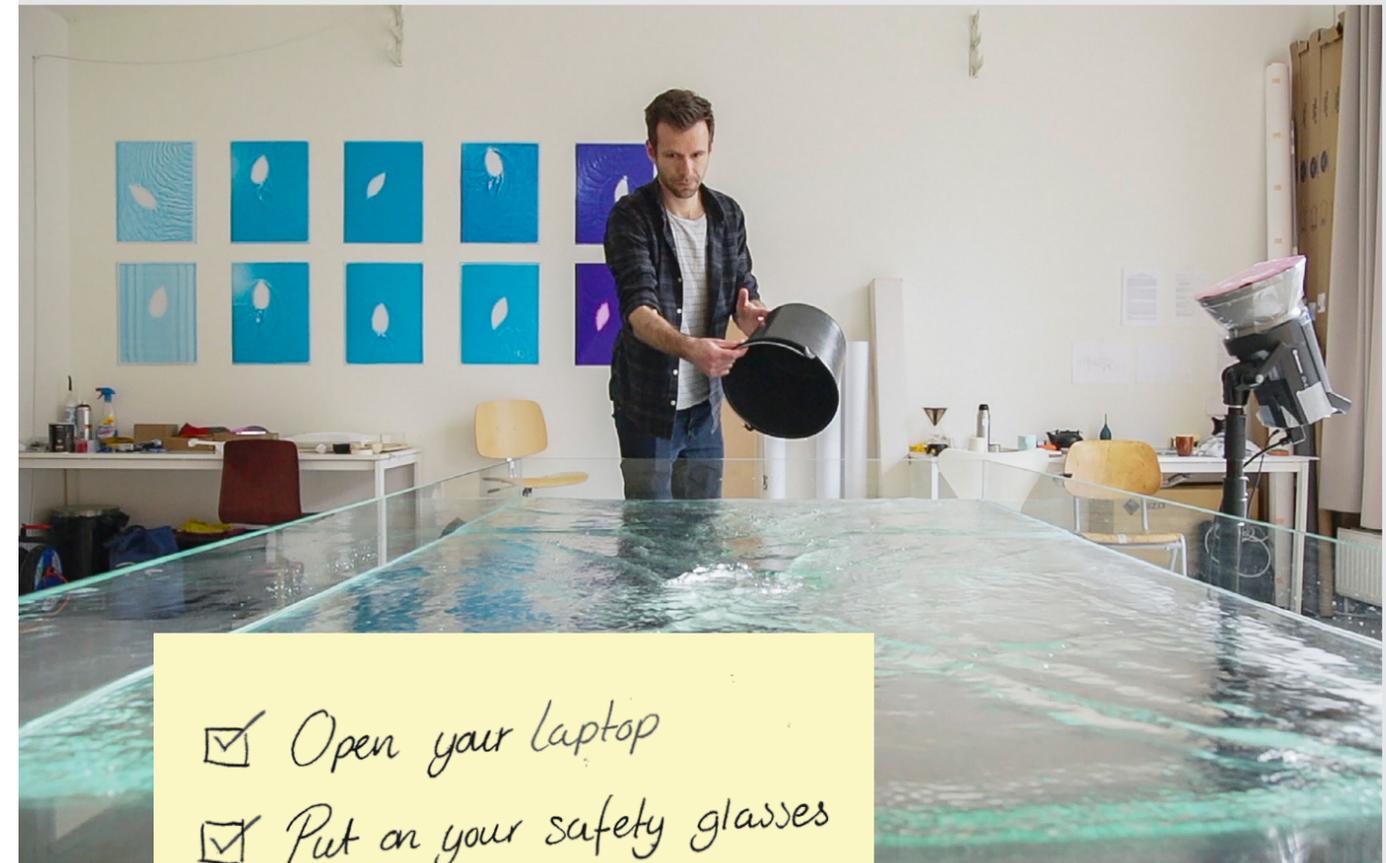
What is the most recent test you remember? I would have to say our origins, developing a bigger meaning for the Ministry of Defence, and the possibility of creating our own training programmes in the future, alongside our current workplaces at other units at the Ministry of Defence. It's all one big, exciting test.

Which test changed the world? The most radical tests happened long ago, such as the discovery of electricity or the invention of the telephone. However, plenty of innovative tests are being carried out under our very noses these days. A recent example is the World Human Powered Speed Challenge in the Nevada desert, during which a team of Dutch students broke the women's bicycle land speed record. This was also the result of endless testing, and the knowledge and experience gained will eventually make its way into other layers of society.

How will testing change in the future? Innovations and tests shouldn't just be a response to a crisis. This is easy to forget in light of the current climate developments and sustainability issues. It's also about taking a critical and analytical look at the systems that do function well.

Do we still have time and patience for testing? The fact that Defensy was given the opportunity and the freedom within the Ministry of Defence is a positive answer to that question. Enlarging the conceptual and operational framework within a rather tightly organized organization created a situation in which testing and analysis have become more natural.

Which test do you believe should be carried out immediately? I would choose to build on the current test of having the Ministry of Defence collaborate with other institutions and companies. Defining clear principles can help you achieve much more than blindly following ideologies. To illustrate: safety is a societal condition, and technology is the means by which to get there. ♦



Open your laptop
 Put on your safety glasses
 Start testing!

text: Marieke Berkers, JaapJan Berg
photography (this page): Sjoerd Knibbeler



Outdoor laboratory with toilet bowls

Peeing for a good cause

For biotechnologist Monica Conthe Calvo (Delft University of Technology and AMS Institute), flushing our urine down the toilet without a second thought seems like a waste. In addition to how expensive the purification process is, we're disposing of valuable waste products in our urine each time we flush. As part of the Cinderella project at the Marineterrein, Conthe Calvo is setting up an outdoor laboratory consisting of a greenhouse and a container with two toilet bowls. She hopes to discover the best way to extract the valuable substances from urine. She is also researching ways to have the public experience first-hand the importance of extracting valuable raw materials, right in the middle of the city.

In this case, it's phosphate – the most valuable substance in our urine. This substance is also mined naturally in countries like Morocco and China, but our natural phosphate supply is expected to be depleted within the next fifty years. This is a serious problem, as phosphate is an important food source for many plants and animals. Testing and researching ways to extract phosphate from waste products like urine is therefore an important step.

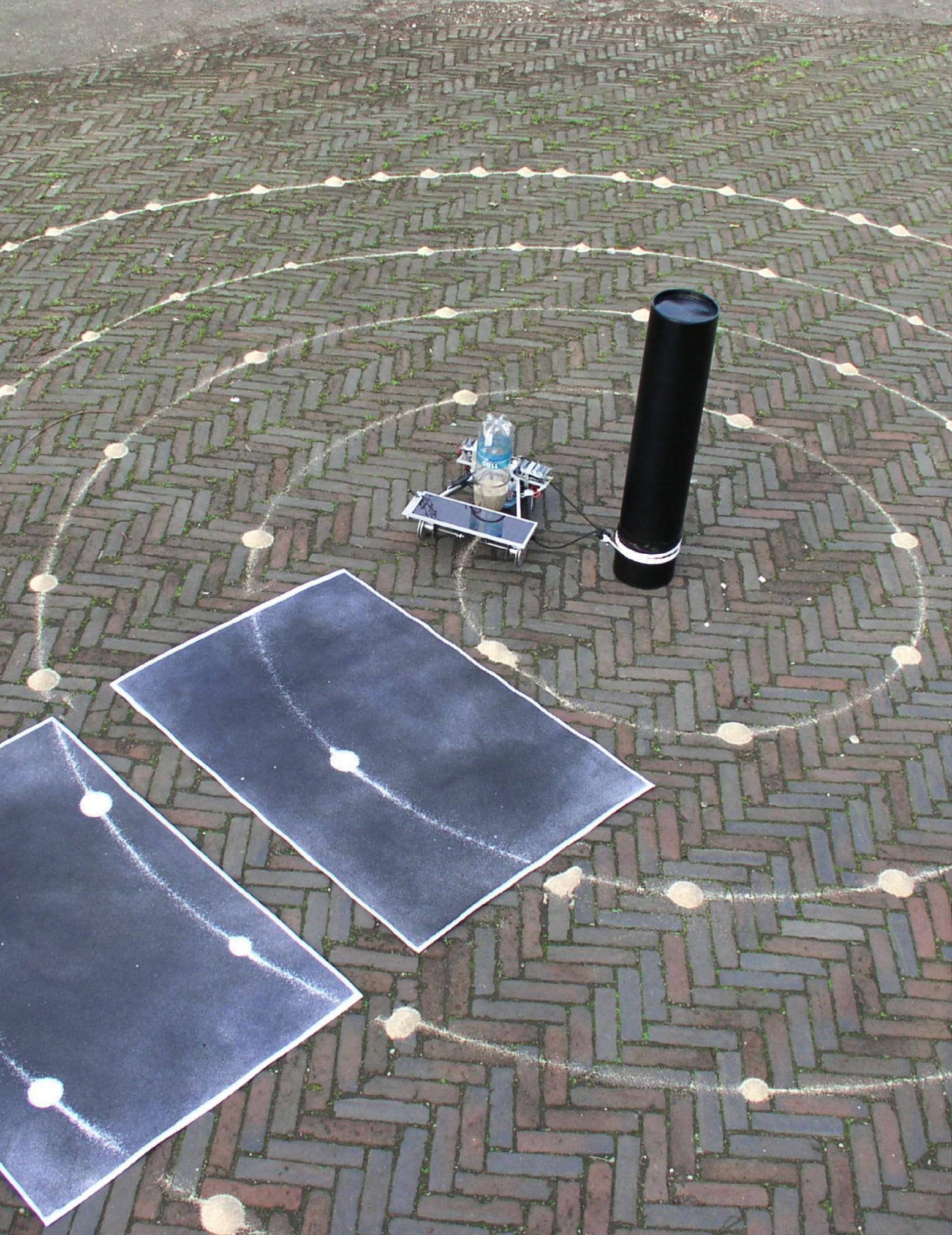
Salty super-fertilizer At the Marineterrein, you'll soon be able to participate in such a test by taking a seat on the toilet. Your urine will be collected in a test tube, where it's mixed with bacteria. These microorganisms consume components in the urine, such as ammonia, which removes all unpleasant smells. As urine often contains a lot of medicine residue as well, further treatment is required, so the urine is carefully filtered. The result: a huge quantity of pure liquid that is compacted by heating it until it evaporates or by pressing it through a filter using a high-pressure pump. What remains is an easily transportable liquid phosphate fertilizer. And this is where the greenhouse part of the experiment comes in. Plants really benefit from this high-quality manure, which has a high salt content, so researchers at the Marineterrein are also testing which crops thrive best.

Circular The outdoor laboratory closes the loop: waste is converted into raw materials, and the greenhouse will one day contain plants that thrive on it. Visitors and the Marineterrein community not only supply the waste (urine), but also the fertilizer for the vegetables consumed here. This makes people an important part of the circle, although admittedly it's strange to think of eating a carrot grown in your own urine.

New perspective It's important to help change people's perspective on urine. The researchers are doing everything they can to make their testing site as appealing as possible. The toilet bowls are beautifully designed, and the container looks attractive. They've also made the circular process of converting waste into a usable raw material perfectly visible. According to Conthe Calvo, now is the perfect time to change the way we think and act. People want to learn about food, about their body, and about the role of microorganisms such as bacteria. This is evidenced in the success of the Micropia exhibition at Artis and NEMO's Studio programme at the Marineterrein.

'Now is the perfect time to change the way we think and act'

Profitable urine Conthe Calvo is also pleased that the experiment is being conducted at the Marineterrein. While this technology has been tested elsewhere, the combination of toilets, test sites, and circularity in the city answers a range of questions, such as how this technology can be applied on a city-wide level. The test system is too expensive for an individual homeowner to buy and takes up a lot of space, but it becomes profitable when fifteen houses or an entire office building makes the investment. Circular toilets may one day become reality at the Marineterrein. ♦



Customization for a clean 'last mile'

The perseverance of
FOODLOGICA

The last mile is a popular expression used to describe many innovative developments in the field of mobility. From public transport, bicycle sharing, and electric cars to designing networks that become increasingly intricate and individualized as the goal draws nearer: these are just some of the issues that many companies and organizations focus on. The same is true of FOODLOGICA, a young company dedicated to cleaning the last mile of Amsterdam's food transport system.

For the record, the transport of food and other goods is generally well organized in most countries. However, the local food distribution systems used to deliver food to the individual threads of our urban fabric are often subpar. This applies equally to cities in a well-organized economic system and to less fortunate cities and countries. In other words, when it comes to the way goods such as food – usually produced outside a city – reach consumers quickly and effectively, there's certainly room for improvement. FOODLOGICA was founded in 2014 by Francesca Miazzo and Jessica Spadacini as a direct response to these inadequate systems and their sub-standard sustainability. Various studies have shown that the environmental burden is increasing proportionately the closer food (and other products) get to their goal, i.e. the end user or client. This calls for more specific actions and more

transport equipment to achieve this. While large lorries can be used for bulk transport in an earlier phase of the supply chain, this becomes far too taxing in the last mile. To add to the burden, the destinations are often in intricate, densely populated areas.

Cargo bicycles Miazzo and Spadacini discovered this 'weak link' while working on the CITIES Foundation project in 2008, which was launched to critically examine the city's sustainable functioning. Their analysis not only revealed a good business opportunity but also generated support from parties who recognized it as a promising revenue model. FOODLOGICA has since developed a service that sees suppliers deliver food to several hubs in the city, after which it's distributed by special cargo bicycles to customers ranging from private consumers to companies and shops.

After several years of trial and error, which included technical issues with the bicycles (but also a growing group of loyal customers), FOODLOGICA is operating smoothly. Amsterdam appears to have been the perfect choice for a pilot city. The infrastructure (lots of narrow streets and limited parking) creates the necessary spatial challenges for which FOODLOGICA provides an excellent alternative. Many clients and consumers are also open to this sustainable initiative.

'The 'last mile' continues to demand focus and attention to detail'

Expansion FOODLOGICA currently has two hubs, one in Amsterdam's Houthavens district and one at the Marineterrein. Both locations have nine cargo bicycles shared by a group of approximately twenty drivers. FOODLOGICA is currently searching for a suitable location in Amsterdam-Zuid and plans to open a total of eight hubs in Amsterdam in the long term. More importantly, there are also plans to roll out the FOODLOGICA concept in other parts of the Randstad area, as well as international cities such as Copenhagen, Paris, and Milan. Although the basic principle will remain the same, Miazzo expects the concept to be adjusted somewhat based on consumer demand and the delivery area (i.e. longer distances) in other cities. The principle and the successful implementation of the 'last mile' continues to demand focus and attention to detail.

Ideal testing ground That FOODLOGICA chose the Marineterrein as one of its locations comes as no surprise.

In addition to being a delivery hub for the city centre, it's a logistically ideal location to conduct further testing on a more defined concept with new vehicles. After all, this is a low-traffic (soon to be no-traffic) area, with plenty of potential customers who are active in innovative fields. This inherent curiosity and openness will benefit FOODLOGICA in a successful try out of a truly clean 'last mile' and in identifying and making improvements. There is also plenty of room to perfect the continued innovation of vehicles and systems, in anticipation of the expected changes to the legislation governing vehicles on public roads. In the meantime, FOODLOGICA will deliver food to the organizations located at the Marineterrein. From that point on, lorries will no longer be able to enter the site, and will instead deliver their goods to the FOODLOGICA hub at the entrance gate. In this way, the city and the Marineterrein are seconding what FOODLOGICA already knew: the Marineterrein is the ideal testing ground. ♦

Collecting data in the harbour

Test the opportunities and risks of the smart city

Tom van Arman made a career as an architect and urban planner, but shifted his focus to the domain of data, design tools, and state-of-the-art technology. For the past few years he has devoted all of his time, energy, and interest into Tapp, a start-up and smart city design cooperative.

Tapp aims to help companies and governments navigate the developments surrounding the registration, management, and digitization of data. This is necessary for several reasons. Companies and governments clearly see the possibilities and opportunities data offers for creating smart cities. However, they often lack the knowledge and insight to smoothly wind

their way through the growing mountain of data and information. In addition, many of the ethical and legal frameworks on how to process, collect, and use digital data are in their infancy. Developments are lagging behind at best, but the debate is also secondary to technological temptation and rapid growth.

Opportunities for a smart city On the flip side of the digital data coin are concerns about loss of privacy and uncertainties about how data is collected, managed, and monitored. These issues play a role in companies and organizations, but also cause the necessary concern among citizens. As a result, there are plenty of possibilities and opportunities for creating a smarter city. Identifying and analysing the behaviour and movement of people, for example, can help to improve the layout of public spaces. At the same time, a tension is created between possibilities and uncertainties. Taking the social debate into account is important for Tapp.

Test setups The new situation and new developments serve as a source of inspiration and a rich breeding ground for test setups. These vary from small-scale prototypes used to identify, build, and test innovations to advising governments on ways to deal with digital (smart) cities. Van Arman uses recent examples of global news events to show how many governments are failing to fully grasp the consequences of public data registration. This makes them suspicious of these developments, much like many citizens. However, governments often take steps without considering the consequences or the future applications. 'One thing's for sure: there's a somewhat risky mix of curiosity and naivety,' explains Van Arman. Video cameras in public areas that can be linked to other data are a good example of this. Van Arman is referring to the roughly 830 cameras installed by the police in Amsterdam – just a fraction of the 20 million cameras the Chinese government installed to keep an eye on its people. These cameras not only record images... they can also link data to the individuals being filmed through technology like facial recognition. Tapp addressed this issue by launching a test site at the Marineterrein during the 2018 festival WeMakeThe.City. He used smart cameras to collect data from people who entered a testing area. Once inside, they were also asked about the impact of this development.

'A somewhat risky mix of curiosity and naivety'



Harbour: an in-depth look For Van Arman and Tapp, being able to test installations at the Marineterrein is important and an excellent opportunity. Tapp will use its own cameras to monitor the way the harbour (next to Pension Homeland) is used by swimmers and other recreational users. The test will collect data as transparently as possible (without facial recognition), analyse that data, and then reveal the possibilities to interested parties. Van Arman stresses that data collection is not the primary purpose; it's about exploring the possibilities of sharing and implementing data for further urban development. In a sense, he is still striving to improve cities. Whereas he used to do this in brick and mortar, he now focuses on influencing the layout and use of public spaces through data. An important and reassuring fact is that Tapp wants to do this together with politicians and residents. After all, society must be aware of the risks associated with rapid developments in this area, as well as the possibilities they offer for improving people's everyday life. For Van Arman, it's about highlighting and implementing innovative technology in a positive way to create an even better city and society. ♦

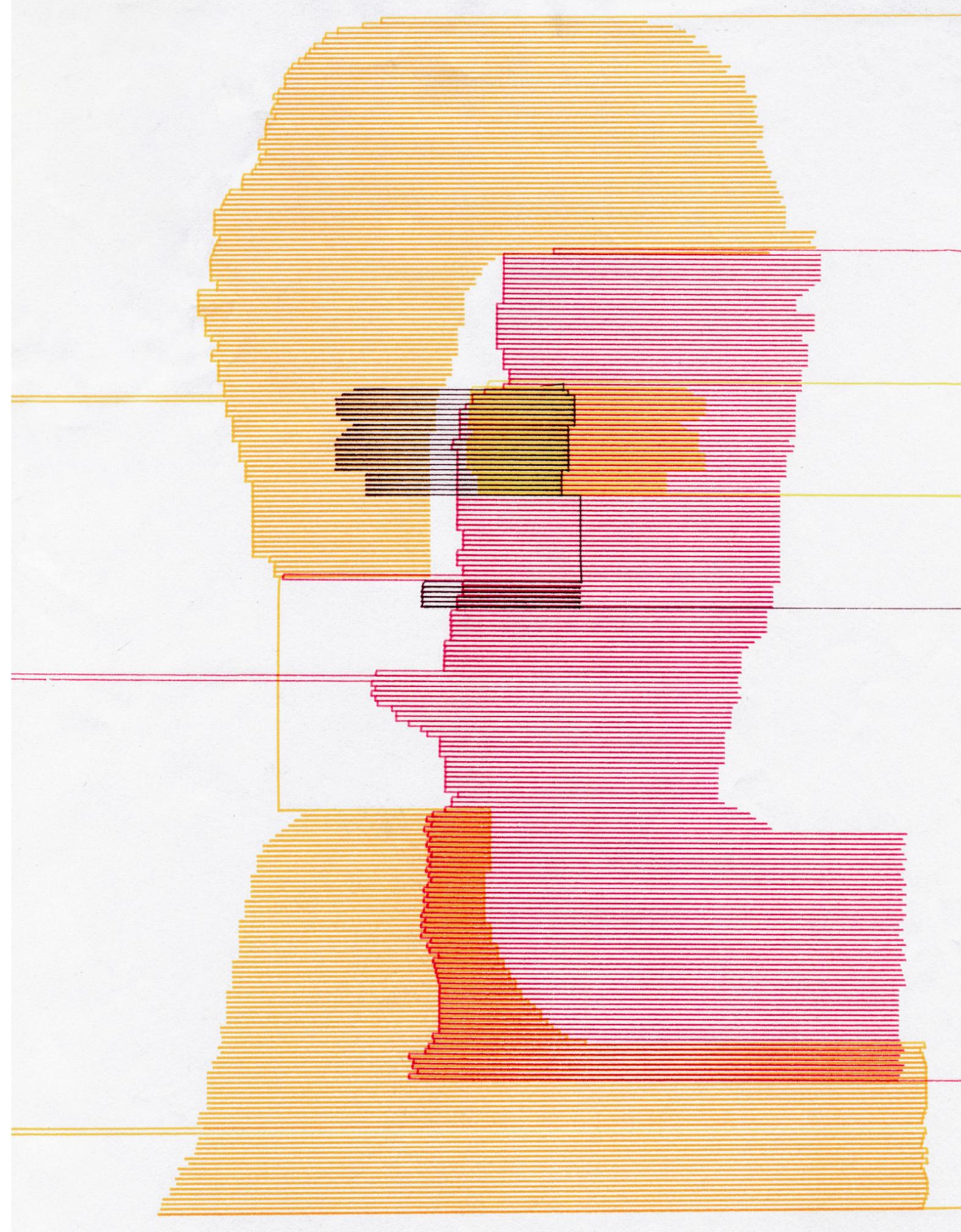
Bringing the far-away near

Evoking experiences with VR

'What happens to your body and mind when you experience something?' This is the question that has kept entrepreneur Fred Galstaun occupied for quite a while. As founder of Sensiks, he develops Sensiks pods – booths that are big enough to fit a person inside and which evoke experiences using sensory reality technology. A virtual world is created with the help of VR glasses, a headset, infrared lamps, fragrance atomizers, and fans. Relaxation is just one of the seemingly limitless possibilities this technology has to offer. It has sparked interest from all corners of the scientific community, with people looking for solutions to all kinds of problems.

Tests have been carried out in collaboration with Merel Kindt, professor of Experimental Clinical Psychology at the University of Amsterdam. She has spent years researching a new form of therapy to treat anxiety disorders. This therapy uses stimuli to trigger the anxiety combined with beta blockers, which lessen the intensity of these emotions. A person with a mouse phobia (musophobia), for example, is confronted with a mouse in a safe environment. Some fears, however, are impossible to recreate in a quiet room, such as war traumas.

Reliving the trauma of war With Galstaun's sensory reality technology, experiences can be recreated in a controlled setting, including bad experiences, such as a shooting in Kabul. As part of her therapy, Kindt uses this



technology on a soldier who was traumatized by his war experiences. The man relived his war trauma in an intense and multi-sensory total experience, after which he was given the beta blocker to prevent the trauma from being rewritten in his emotional memory. The session yielded promising results, even fourteen months after the test.

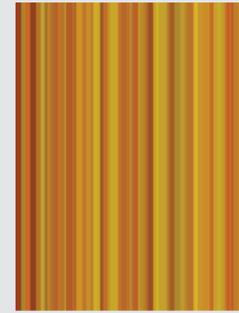
‘If it doesn’t inspire me,
I don’t do it’

Experience machine The way we experience things is strongly governed by our emotions. Galstaun experienced this first-hand when he found himself on a beach after a particularly busy period. Once there, he became totally relaxed. How? He felt the breeze against his skin, he heard a rope ticking against a flagpole to the rhythm of the wind, he breathed in the fresh sea air, and he listened to the rhythm of the crashing surf. This made him wonder: what if you could recreate these elements in a controlled setting? Would this artificial reality have the same relaxing effect? It was a tempting prospect; a machine like this could be extremely helpful. For example, it could be used to help bed-ridden elderly people who want to experience the healing effect of a walk in the forest.

Knowledge grant Galstaun decided to bring this idea to life and started building his experience cabin. This called for the necessary knowledge of technology and design. How do you write the software, build the hardware, and design a comfortable cabin? The challenge was to make the cabin as sustainable as possible. Recreating experiences brings far-away realities straight to you – a sustainable process in its own right. The cabin’s production method is also sustainable and consists of a kit made from waste-based sheet materials, assembled entirely by computer-controlled machines. Sensiks was awarded a knowledge grant from TNO. With this grant, experts in the field of neuroscience and biofeedback (which researches ways to manipulate consciousness) spent more than eighteen months on the development phase. Galstaun also worked with storytellers and programmers such as XRBASE, which experiments with augmented and virtual reality at the Marineterrein – the location of one of Sensiks’ cabins.

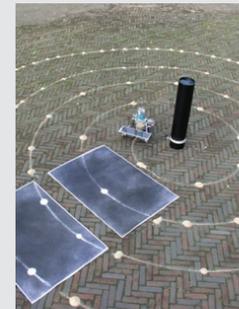


Intuition Galstaun’s experiences with sensory reality technology have given him a better understanding of what happens when you experience something. He believes we intuitively know what we like. This intuition has guided Galstaun in his preferred decision-making process: learning on the fly, which is also how he makes decisions about the future of Sensiks. ‘I get asked a lot to participate in projects with our technology,’ says Galstaun. ‘I make my decisions based on a gut feeling. If it doesn’t inspire me, I don’t do it.’ ♦



Pismuur IV — Willem Besselink

Artist Willem Besselink is fascinated by the structures, patterns, and systems behind trivial, everyday events. In his work he observes, visualizes, and combines the structures he encounters. Much of his work focuses on himself, his body, and his life. He uses the objective, measurable data to create extremely personal portraits. For the wall mural Pismuur IV, Besselink collected data about his own urine. Over the course of two weeks he documented the amount of urine and colour. The image is a graphic representation of those results. Viewers are challenged to recognize elements of the artist or a social context in the pattern.



Spiral Sunrise — PolakVanBekum

The projects by artist duo PolakVanBekum (Esther Polak and Ivar van Bekum) are about personal experiences with movement and space. Their work therefore reveals a kinship with traditional Dutch landscape imagery, peppered with contemporary, sometimes technological, and often experimental perspectives. In Spiral Drawing Sunrise, a tiny robot with solar cells and an hourglass play a leading role. The degree and duration of the sun’s rays determine the duration of the robot’s spiral movement. All the while, sand flows out of the hourglass, leaving behind trails of differing lengths and thicknesses.



Fixed Flow — Sjoerd Knibbeler

With Fixed Flow, commissioned by Het Scheepvaartmuseum (The National Maritime Museum), artist Sjoerd Knibbeler depicts the innovative nature of maritime technology. This artistic experiment was inspired by scientific shipbuilding studies, as part of which scale models were used to test the properties of new ships. In the late nineteenth century, similar tests were systematically carried for the first time in the Netherlands. Knibbeler was looking for a way to document these tests, using a technique from the pioneering days of photography: the photogram. His photograms show the smooth flow of the model through the water as a static movement, a fixed flow.



Penjet — Daniël Maarleveld

Daniël Maarleveld is a graphic designer who studied at the Gerrit Rietveld Academy. In his work he examines the unexplored possibilities of natural, mathematical, and mechanical principles. The result: designs that strike the perfect balance between machine-made and hand-made. Experimentation plays an important role in his designs. Penjet is a joint project between Jaan Evert and Julian Hagen. Replacing the ink cartridge with a pen meant that a printer could suddenly draw. It also made it possible to manipulate and control the printing process, which allowed for the combination of hand-made and machine-made elements.

The seagull that calls the Marineterrein home

There are seagulls that fly from Texel to England to visit a football stadium. Hovering on the sea breeze, they are lured by the bright lights and the sound of packed stands... and not by the football. The steaming snack carts next to the stadium are the reward for their journey. In particular, the fish and chips left behind by football fans after the final whistle blows. As the stands empty out and the streets surrounding the stadium come alive with cries of euphoria or defeat, the seagulls gather for a feast. Day in, day out.

Seagulls are creatures of habit, just like us. While some brave the North Sea in search of fried cod, one particular seagull

prefers to stay closer to home and has settled at the Marineterrein. This seagull is not lured by the promise of deep-fried fish, but by a tin of cat food lovingly offered by Codam's caretaker. What started as a single feeding has since turned into a ritual. As soon as the seagull appears near the staff entrance of the coding school, the caretaker appears with a serving of tinned affection. They see each other every day, driven by hunger and affection and habit.

No one knows where this particular seagull comes from or where he goes after his lunch. But he's there every day without fail, a constant in an ever-changing environment. Under his

wings, gates are moved, car parks disappear, and grey makes way for green. New ideas transform concrete into a liquid. The seagull flies above an area that seems to change as quickly as the wind beneath his wings. Every day, he breaks away from this wind and makes his way towards the building that rises like a beacon next to the heliport. Here, where everything can change in an instant, the seagull's arrival is a certainty, as is the tin of cat food from the hands of his friend. ♦



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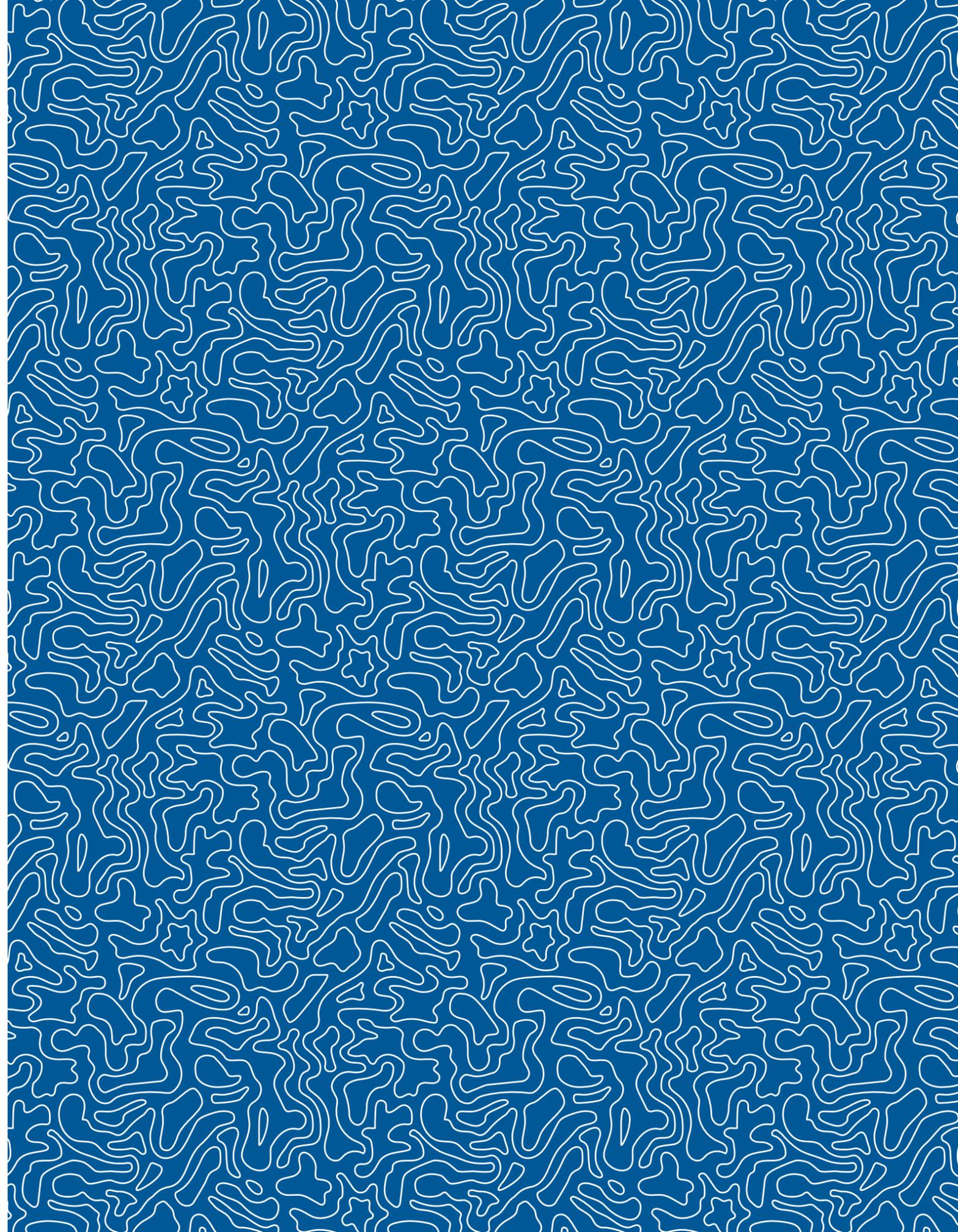
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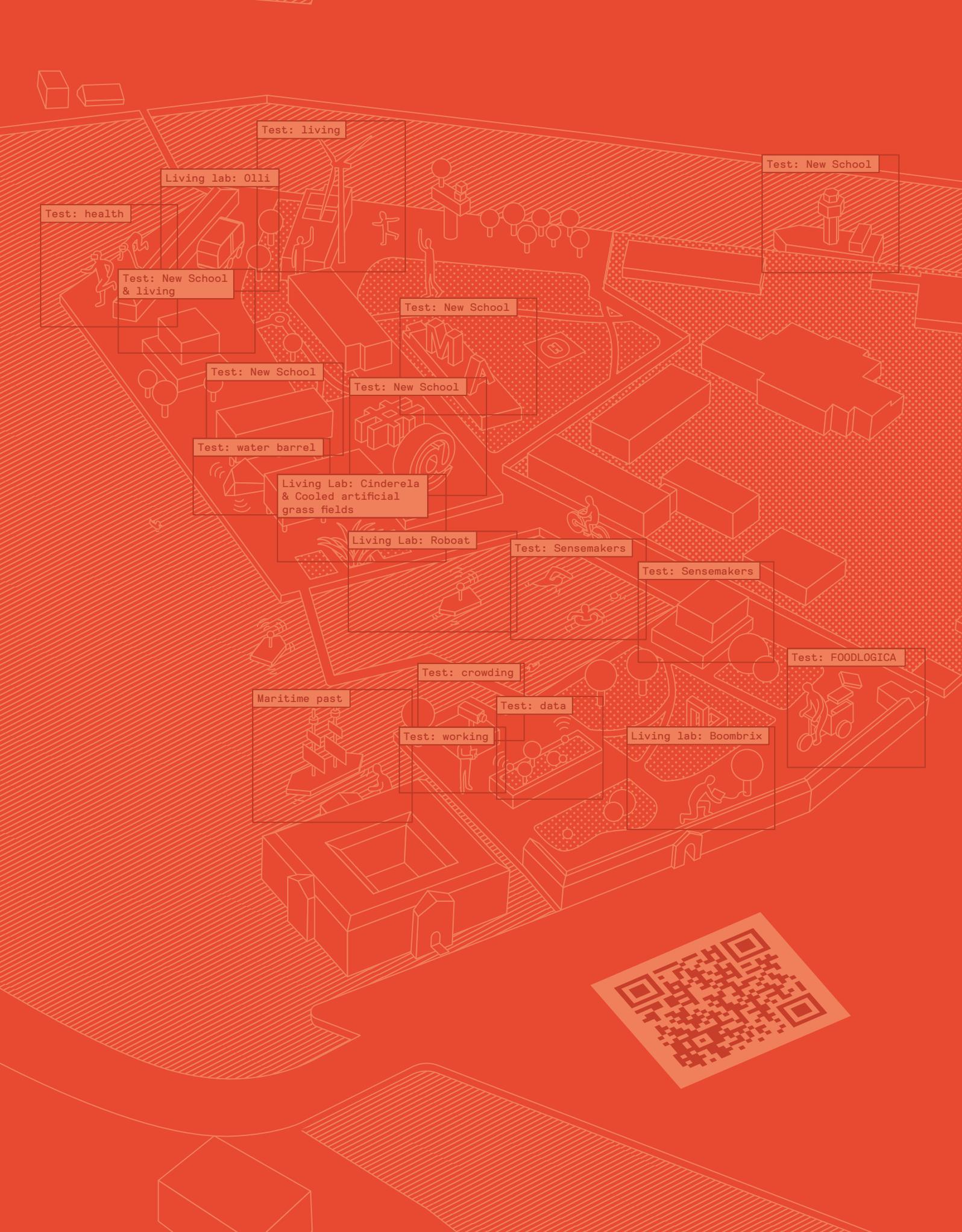
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Test: living

Living lab: Olli

Test: health

Test: New School & living

Test: New School

Test: New School

Test: New School

Test: New School

Test: water barrel

Living Lab: Cinderela & Cooled artificial grass fields

Living Lab: Roboat

Test: Sensemakers

Test: Sensemakers

Test: crowding

Maritime past

Test: data

Test: working

Living lab: Boombrix

Test: FOODLOGICA

