

Public Research agenda



2019

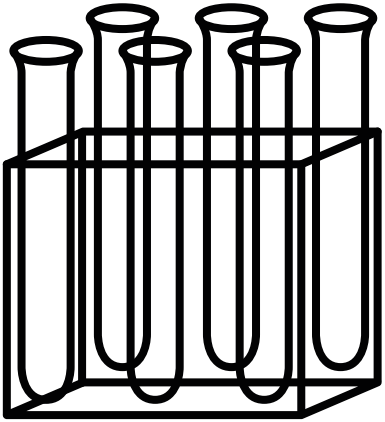
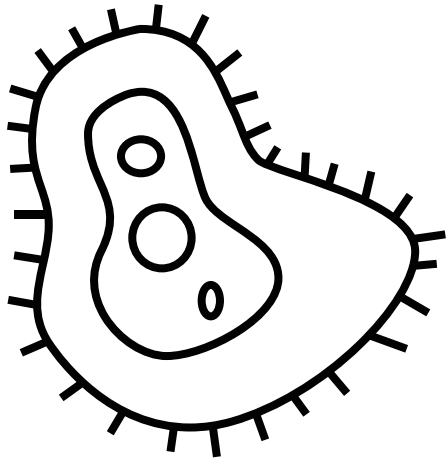


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Introduction

'Technology is not neutral. We're inside of what we make, and it's inside of us. We're living in a world of connections — and it matters which ones get made and unmade.'

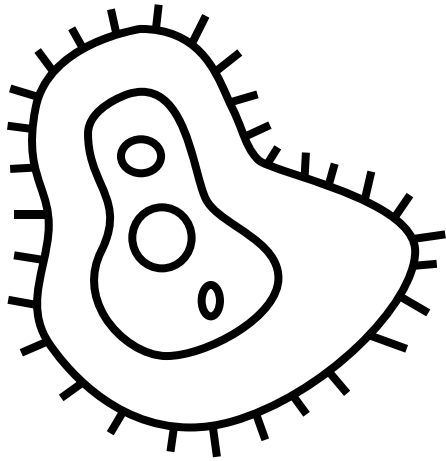
— Donna Haraway, Cyborg Manifesto (1984)

In 2019, it is 25 years since the launch of 'The Digital City' (DDS) in Amsterdam, closely followed by the founding of Waag. In that time, Waag has weathered storms that engulfed many media labs founded on the wave of emerging internet technologies in the mid 90s. Not only did Waag survive; it has grown into a leading European research institution for technology and society, championing the agency of citizens in a world ever-more determined by its technologies.

Twenty-five years since the rise of the internet, we find ourselves again at a crossroads. As ICT technologies have matured, they have become entangled with almost every aspect of our lives, causing major corporations and states to seek their capture as platforms of influence and control. Beyond the world wide web, a new ecological horizon has appeared, confronting us with strange and urgent questions at a planetary scale. As a species, we're facing levels of systemic complexity unimaginable a century ago, extending our influence to the genetic and quantum levels while we peer into the mirror of artificial intelligence.

Today, Waag's mission to contribute to a more open, fair and inclusive society is more relevant than ever, with high public and policy interest for ethical and cultural perspectives on technology. No longer is the question if technology has a political dimension, but rather how to influence the power-dynamics of technology. Over the years, Waag has developed an internationally recognised body of work in civic tech, open innovation and art-science that addresses this question. Since 2018, we refer to this work as Public Research.

Waag believes the public interest should be at the heart of innovation, and therefore society is the optimal research community. Public Research finds particular resonance with the policy goals of the municipality of Amsterdam, the Digital Society Agenda of the Netherlands and with the mission-based Horizon Europe framework post-2020.



At this critical juncture, Waag has the opportunity to fundamentally influence the future of our city, and to play a leading role in the technological, societal and ecological transformation of Europe - urgently necessary to secure our collective future. This time around, the pace of change has accelerated, affording us not 25 years, but just a decade to make a difference.

About the Public Research agenda

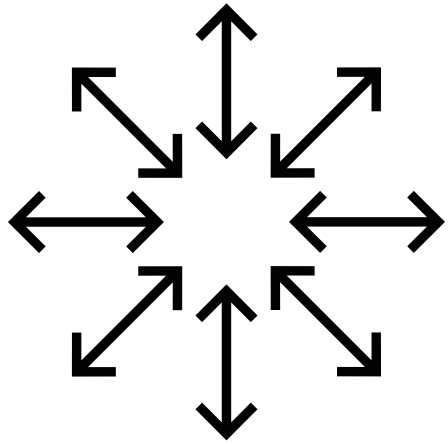
This document constitutes the policy framework for Waag in 2019, defining research questions for our four research groups (Code, Make, Learn, Care), alongside major lab activities and platforms. For 2019, the UN Sustainable Development Goals will be adopted as overarching impact indicators for our activities over the coming decade, guided by Kate Raworth's images of the planetary doughnut and 'embedded economy'. As a core policy document, this agenda is regularly updated in strategic sessions with senior staff.

Strategic priorities 2019

In 2019, Waag will start integrating the Sustainable Development Goals as key performance indicators for the organisation, emphasising gender equality (5), innovation (9), inequality (10), sustainable cities (11), climate action (13), and strong institutions (16), with selected additional goals addressed by specific research groups (care, education, production, life on land, work). Waag embraces these goals in both an ethical, collective sense, and in an emancipatory, individual sense. In line with these goals, Waag subscribes to the Dutch Code Cultural Diversity, seeking to enhance inclusivity and equity in its workforce and activities. In 2019, 'strategic projects' will be added to the research portfolio, developing new research lines and focussing on improving the structural funding position of Waag, in anticipation of renewed policy phase on local, national and European levels from 2021.

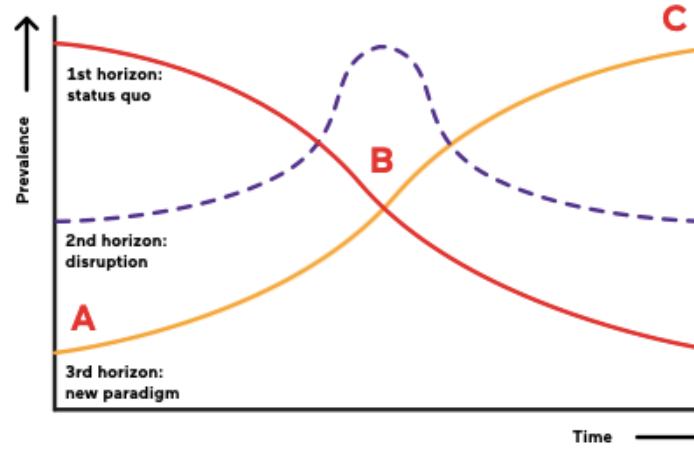
In Amsterdam, Waag is one of the initiators of the so-called 'Amsterdam Approach'. Since 2018, this 'cooperative innovation model' has been adopted by the Amsterdam Municipality, with Waag increasing its contributions to the method and implementation of this approach through Smart Citizen, Commoning, Co-creation and related projects.

Waag is a cultural institution with a limited structural funding base made available through the four-year policy frameworks of the Amsterdam Fund for the Arts and the national Creative Industries Fund NL (15%). On top of this, Waag funds its activities on a project-basis, including significant Research & Innovation funds from the European Committee



Research framework

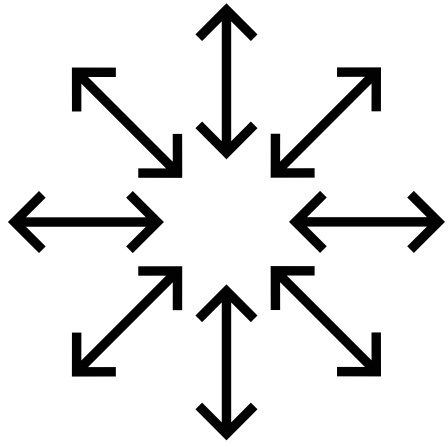
Waag's research framework is structured as a theory of change, based on the Three Horizons model of transformative innovation (Graham, 2016), further explained [here](#).



In this model, the 1st horizon shows our present, closed and extractive consumer society. The 3rd horizon depicts growth towards Waag's vision of an open, fair and inclusive techno-society. The 2nd horizon represents technological, societal and ecological disruptions that influence the development of the 1st and 3rd horizon.

Waag's research goal is to stimulate the development and adoption of open, fair and inclusive technologies in society. Waag therefore focusses on building relationships between the disruptive (2nd) and the generative (3rd) horizons, working on the complex interactions between emergent technologies and social bodies.

The three horizons model offers three key moments of intervention for Waag in technology development: in creation (A), adoption (B) and continuation (C). This allows Waag to structure and measure its activities according to its theory of change.



The research agenda follows this structure, with each research group specifying its annual plans along these key intervention moments, guided by the following three questions:

- A. *Creation* - what key emergent technologies do we seek to understand - artistically, ethically and culturally, and what is their relation to societal and ecological dynamics?
- B. *Adoption* - how can we design and prototype possible open, fair and inclusive interactions between technology and society?
- C. *Continuation* - how do we spread and sustain transformative innovations in society?

The research agenda thus describes group's proposed research activities in terms of Waag's operational units: the groups themselves, their thematic labs and resulting impact platforms. This allows the research agenda to connect research in the qualitative terms specified above with its operationalisation in terms of budget, acquisition goals and personnel requirements.

A. *Research Groups*

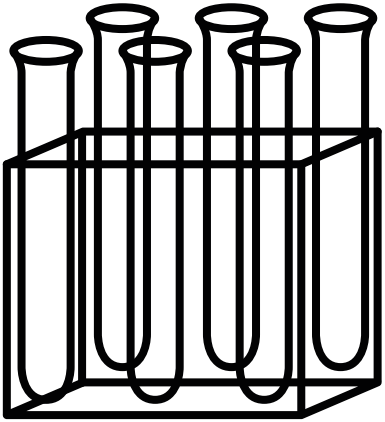
Research groups annually identify and contextualise their key research questions, which are expected to be drivers for technological and societal change in the coming decade. These questions focus the exploration of emergent technologies in relation to societal and ecological issues and trends, informing existing and future lab activities.

B. *Thematic Labs*

Labs are the engines of Waag research, designing and testing open, fair and inclusive interactions between technology and society. Labs gather research findings from groups to formulate design questions and methods, developing viable prototypes for adoption of open, fair and inclusive technology. Labs have thematic focus, allowing them to operate in specific societal domains, and to formulate concrete value development strategies.

C. *Impact Platforms (per 2020)*

Platforms are established to spread Waag's most viable innovations in a sustainable way. Platforms are types of infrastructure that support and spread open, fair and inclusive innovations and methods that were prototyped in Waag's labs together with partners.



Methodology

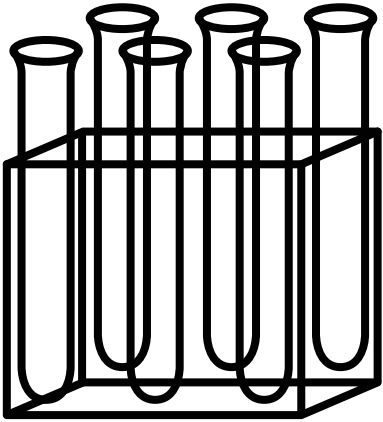
Public Research starts from the premise that society is a research community. This premise has a number of important consequences that make it distinct from, yet open to scientific and industry research practices. Public Research is fundamentally interdisciplinary, as it conducts research with heterogenous and phenomenon-specific communities. In each case, it is not the matters of fact of scientists, nor the matters of interest of industry, but rather the *matters of concern* of citizens that are articulated through collaborative research.

The multiplicity of approaches and findings that Public Research produces, implies a fundamental complementarity of different research methods, communities, and their composite outcomes. Deciding what methods and outcomes are relevant given a certain phenomenon is thus not a question of objectivity, but rather one of ethics. Therefore, Public Research positions itself as a fundamentally democratic mode of research, which in the practice of Waag consists of five main methodologies.

Smart Citizens

Smart citizens are a product of our digitally-rendered cities. They respond to societal challenges from a position of technological empowerment and civic engagement. In our increasingly automated habitats, smart citizens work together by making to reclaim agency towards the processes, policies and systems that shape our world. In doing so, they contrast the narrative of passive, individualist consumers with that of collaborative forms of agency and care.

Using information and IoT technologies, Smart Citizens form communities of practice that support inclusive dialogues, seeking to understand and act on civic possibilities for tackling the multitudinous problems our society is facing. Smart Citizens believe everyday people can learn almost anything given enough time, effort and proper guidance. They see open source tools, DIY design ethics, and knowledge sharing to be crucial to understanding today's complex world.



Co-creation

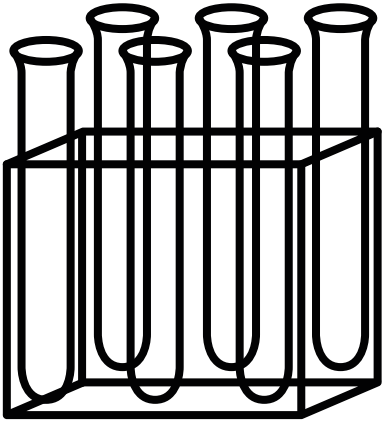
If we want to develop and design for society, society needs to be included in that process. We need an approach that involves the largest number of perspectives in addressing the urgent challenges of our time. Complex challenges are defined by many interdependencies; highly varied (and sometimes 'invisible') stakeholders, a context which is subject to sudden changes, limited funding or a lot of different agendas. Instead of being limited by these factors, they can become assets once you include them in a co-creative process.

Co-creation is a values-based, inclusive approach that focuses on bringing together different societal actors around matters of shared concern. It's an interdisciplinary process that emphasises the complex web of relations surrounding any issue, ensuring fuller understanding of challenges related ownership and agency for subsequent activities or actions. As a generative method co-creation allows for more latent knowledge to emerge: our hopes, our dreams, hunches that don't have the right words yet, but are fundamental to understanding the context of a potential intervention and do justice to lives and experiences of those involved.

Critical making

If you can make almost anything, the question is not what to make, but how to make. This entails critically reflecting on practices of making, and creatively shaping alternative modes of production. Critical making addresses the question how hands-on productive work – making – can supplement and extend critical reflection on technology and society. It seeks to bridge the gap between creative physical and conceptual exploration of technologies and their potential uses, in the spirit of 'learning by doing'.

Critical making understands making as an ethical practice in the sense of being an 'ethos'. This suggests that ways of making arise from their environments while also shaping them; critical making reflects as much on the situation as on the occupation. Making is therefore approached as a physical, artisanal, technologically mediated and embodied process that is embedded in natural-cultural environments.



Commoning

Commoning is the joint management of resources by communities with an aim of assuring their sustainable use. Commoning fosters bottom-up initiative and encourages community self-determination by tying together social and economic practices. Think of a food cooperative which brings together consumers and farmers and helps them build a food system based on fair pricing, healthy farming and social cohesion. Or a collaborative, digitised collection of cultural heritage, which strengthens accessible, cultural commons.

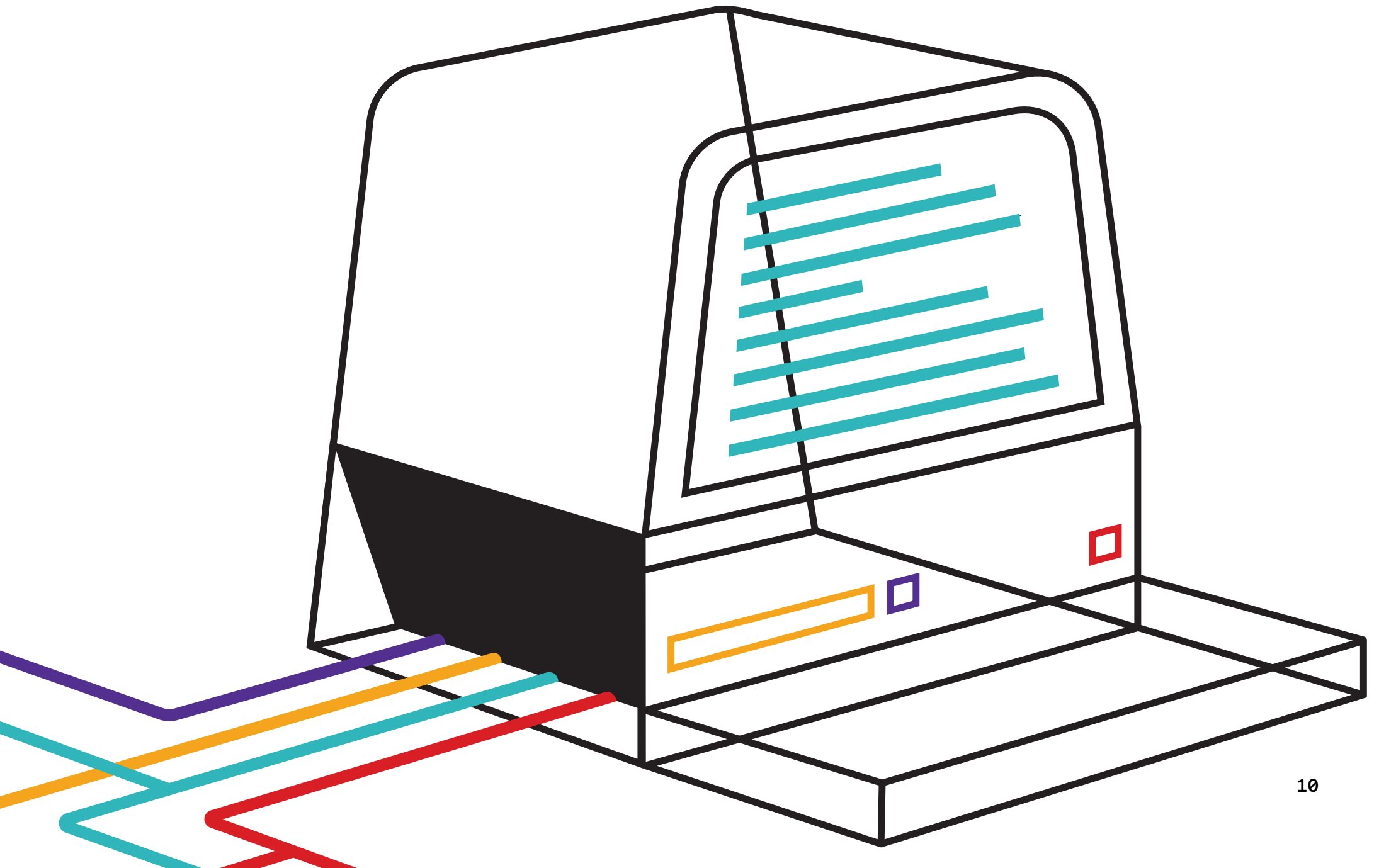
Commoning proposes an alternative to market-based modes of organisation and production. Rather than emphasising profit based on extraction of human and ecological resources, commoning emphasises the sustainable management of resources to ensure their ongoing value to communities. This means commoning shifts the economic emphasis from value-extraction to value-generation, and the social focus from anonymous command-and-control to inclusive collaboration.

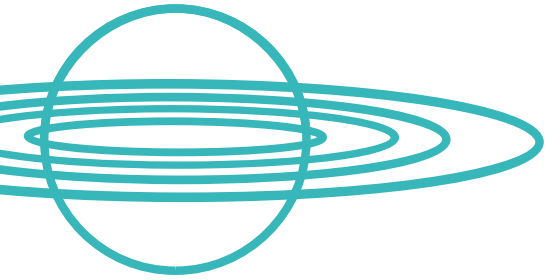
Art ~ Science

Fundamental, exploratory and curiosity-driven research is practiced both by scientists and by artists. Both have their own procedures and outcomes, yet contribute to human understanding and our mediation of the world. The meetings of art and science constitute interdisciplinary engagements of artistic and scientific practices, based on the shared procedure of theorise-and-experiment. This leads to fascinating questions of complementary outcomes - how can composites be made from knowledge generated with academic rigour and with cultural meaning?

At the same time, these encounters reflect upon each other, shining light on the cultural embeddedness of sciences and the material agency of art. Art science stimulates open and inclusive practices in the early stages of research and innovation. It is transdisciplinary in its engagement of citizens with a broad understanding of emerging challenges (artists, creatives, thinkers), generating a deeper understanding of societal and environmental matters of concern. It culturalises a diversity of research approaches, extending capacities of innovation, as well as the cross-domain mobility of involved researchers and innovators.

Code





Research questions

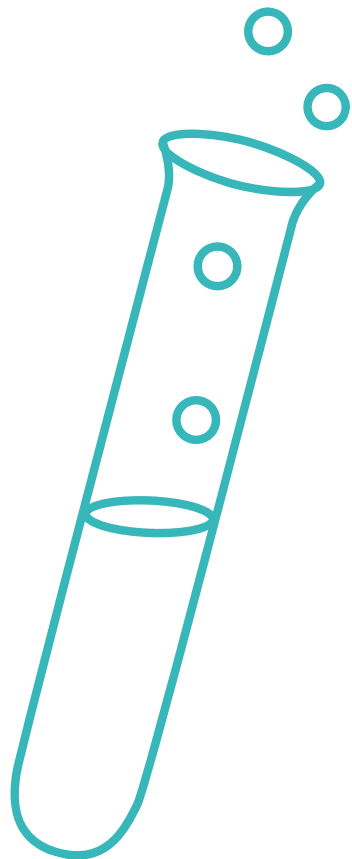
Concepts like platform economy and 'smart technology' change the position of citizens in society. New skills are expected, new knowledge is assumed. Code explores these developments with a positive, yet critical eye. We are enthusiastic about the opportunities emergent technologies offer and critical of the new power relations that they entail.

Code researches ways in which technological emancipation of citizens can be achieved and technology can be democratised. Technology has the potential to be an instrument of social innovation and justice; we look for and develop practices that stimulate this potential. Our research is done with citizens, agencies and governments. We raise awareness, organise stakeholders and design concrete alternatives.

Code works with 'smart citizens', beyond the corporate "smart" city. Here, citizens and governments create language and tools to work on alternatives and actively contribute to open technology that builds on cooperative mechanisms.

By contributing to open technology that builds on coöperative mechanisms we work to stimulate dialog in and about digital society and enable citizens and institutions to participate and engage. Specific topics are:

- Commons: how can we create and maintain shared value?
- Digital identity: how can we understand our digital selves and act on our digital rights?
- eGovernment: how can we shape government and democracy in a digital future society?
- Accountability design: can the systems we design be made to share accountability for the decisions we make?
- Urban challenges: how can technology help us finding solutions for ongoing urbanisation?



Smart Citizens Lab

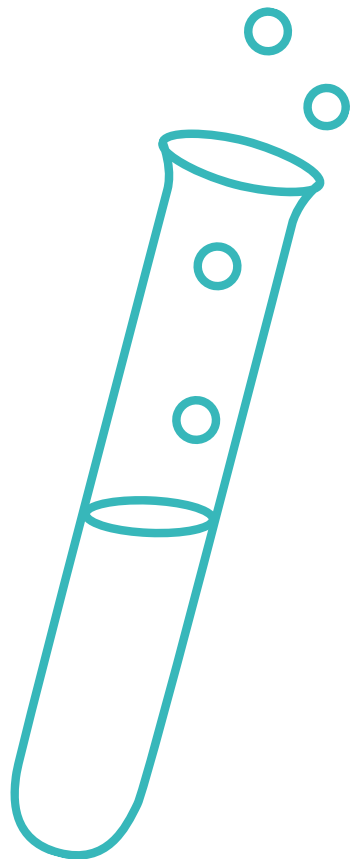
The Smart Citizens lab explores tools and applications that help make sense of the world around us. We work with citizens, scientists and designers to tackle environmental issues and urban challenges ranging from air and water quality to noise pollution and gamma radiation. In recent years, improved access to open hardware tools and maker spaces, as well as the creation of online data sharing platforms, has made possible the design of low-cost, open-source sensors that citizens can use to measure the environmental health of their neighbourhoods.

By collectively measuring and making sense of their environment, citizens become aware of how their lifestyle affects the ecosystem and, hopefully, adopt more sustainable behaviour as a result. Furthermore, citizens develop agency and restructure the level playing field of more traditional stakeholders like policy makers, scientists and private corporations. Goal: institutionalisation of citizen sensing activities.

- Spreading: increase the number of communities and citizens engaged in sensing and number of sensors deployed.
- Impact: strive for impact on urban challenges and environmental issues through behavioural change, collective action and policy influence.
- Design question: how can Citizen Sensing projects be leveraged into an open platform with partners?

Focus 2019

- Focus on citizen sensing as public research practice, supporting citizen science as academic research, policy innovation and societal impact
- Consolidate position of lab in EU/NL, as leading Citizen Sensing lab in EU with focus on citizen engagement and co-creative approach
- Strong presence in Amsterdam and the province of Noord-Holland with:
 - Amsterdam Sounds on sound pollution
 - Hollandse Luchten on air quality
- Expand our knowledge on water-quality sensing
- Formulate a long term vision for Citizen Sensing platform and hardware development



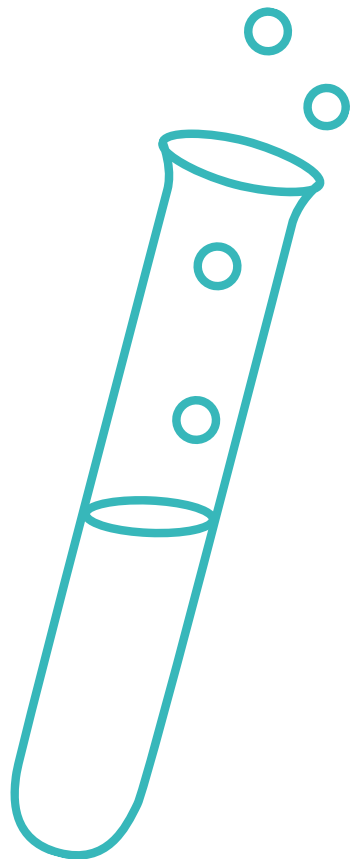
Commons Lab

The Commons lab works towards the understanding of present-day commons and develops new forms of commoning. Commoning is the joint management of resources by communities with an aim of assuring their sustainable use. The Commons lab focuses on designing digital, financial and juridical platforms that support self-organisations and the networks they are involved in. The lab also engages in artistic and public manifestations in order to broaden the interest in the commons.

The Commons lab has a track record in digital commons. In a thoroughly digitalised society, data have become the means and ends of governance. We can witness the gravitational pull of data in virtually all sectors of society - from business, health and sustainability to social interaction and communication. The approach of data commons bridges the old domains of open data (making knowledge accessible to all) and closed data (securing data against wrongdoers). In practice, any dataset must be simultaneously secured, maintained, made accessible, valorised - but to varying degrees given different circumstances. Data commons articulate the cooperative management and decision making required to achieve this balance of values.

Focus 2019

- Data commons on the municipal level: co-creation and co-design of commons-based solutions for the governance of (for example) mobility-related data.
- Connecting circularity, sustainability and ecology to the commons in a range of small-scale research and design projects, such as on new types of land commons. These projects relate to the Sustainable Development Goals.
- Exploring the tension between reformative, 'quadruple helix' commons and more radical, 'autonomous' commons, for example through the `trusted_open_reg` project. This contributes to the research field of social innovation.



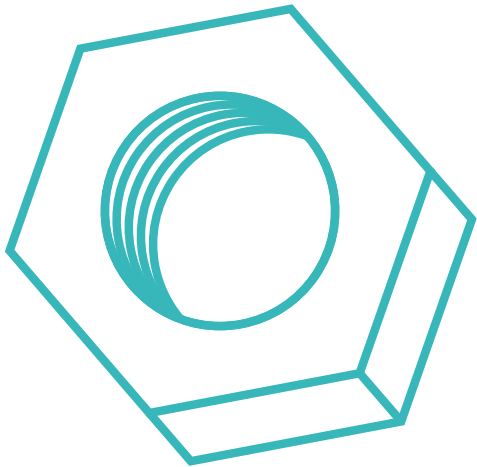
Future Internet Lab

The Future Internet Lab democratises the access to technology and critically follows and designs the technology for democratisation.

Our society rapidly becomes more dependent on technology that transcends the human capacity to understand, control, and influence. Now that refrigerators, toilets, thermostats and even tampons are becoming digitally connected to the Internet, it is important to ensure ourselves of open, transparent and inclusive design processes, prioritised by all stakeholders. The lab focuses on Internet of Things, big data, artificial intelligence, quantum computing and conducts research into the ethics of emergent technology, models and algorithms.

Focus 2019

- Become a visible organisation in the EU NGI community
- Engage more with coding communities, focussing engagement on PublicSpaces
- Create a strategy to realise Public Spaces as a project and as a platform
- Formalise work on internal tools for Waag
- Capitalise on our Decentralised Personal Data Management through new projects and research
- Present findings DIL and DECODE (and define follow-up for DECODE)
- Stimulate a practice of making and building tech validating our theoretical position.



Platforms Code

digitaleidentiteit.waag.org

raising awareness of digital identity,
methods, tools and citizens participation

gammasure.org

providing a map with gamma radiation
measurement data

hollandseluchten.waag.org

citizen platform for measuring air quality in
Noord-Holland

chamberofcommons.waag.org

platform mapping out common initiatives

academy.waag.org

policy lab offering for governments

digitalsocial.eu

overview of Digital Social Innovation
initiatives in Europe

code.waag.org

archive Code projects with demos and
open source code

maptime meetup

community around digital maps

datamission

community around coding for social
impact

sensemakers

community around low tech sensors

making-sense.eu

toolkit, book and documentary

Active A'dam communities

Buitenveldert, Buiksloterham,
Leidsegracht, Nieuwmarktbuurt,
Zeeburgereiland

decode-project.eu

high visibility in EU, platform to show our
experience on digital identity

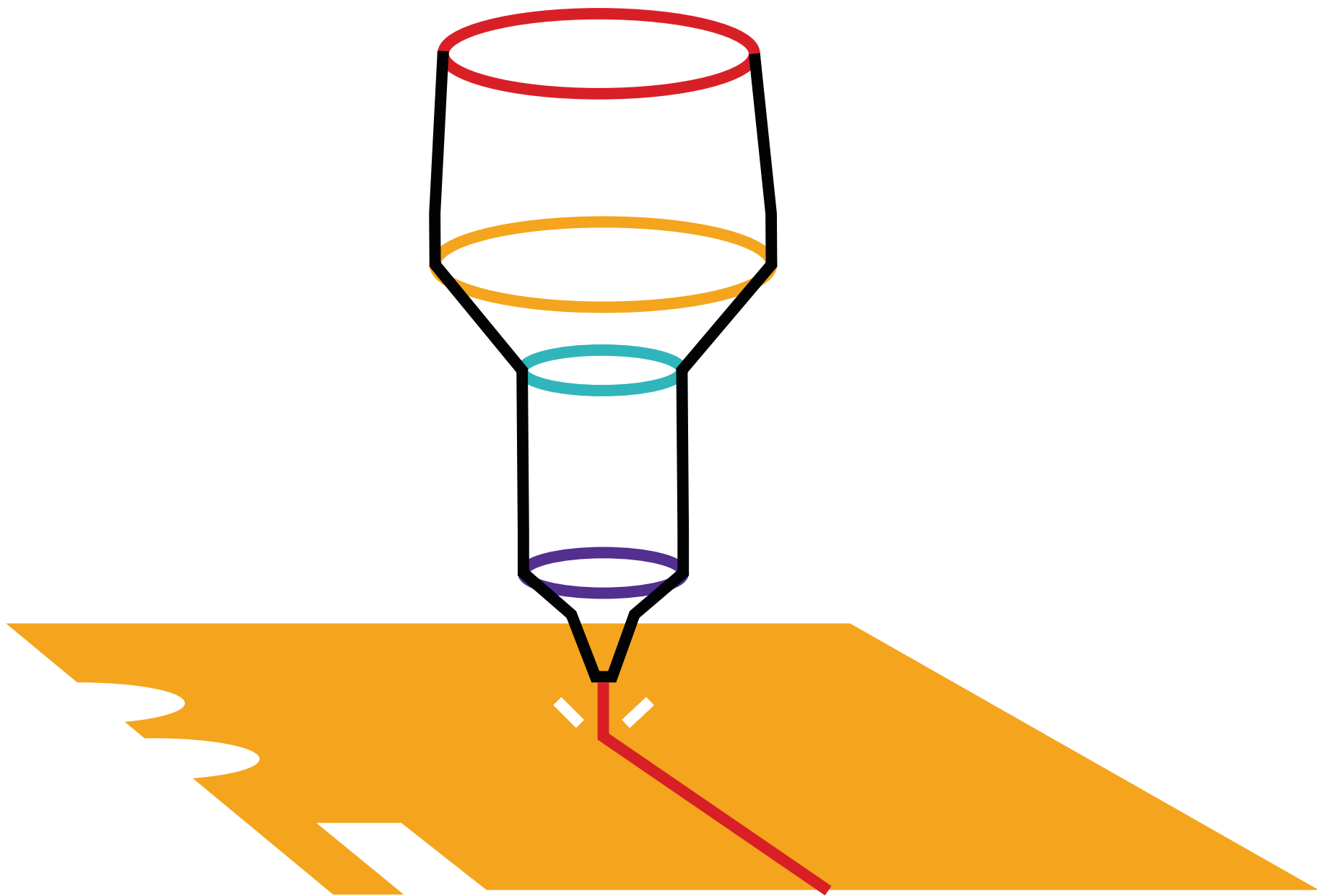
clarity.codefor.nl

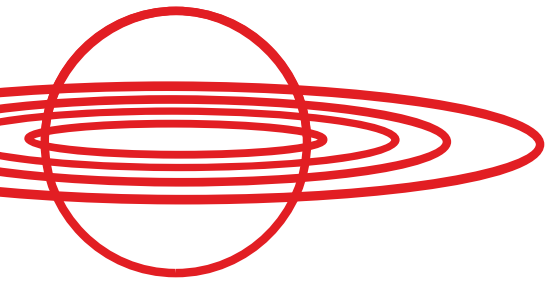
potential EU collaboration platform for
aggregating knowledge and people
around topics

citizen mobility kit

overview of mobility tools for citizens

Make





Research questions

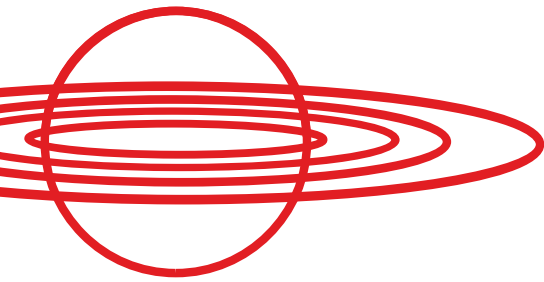
A much heard trope in innovation is: if a technology can be developed, it will inevitably be applied. But technologies don't appear out of the blue; rather they are man-made material and performative practices. It requires action to understand that technologies are not neutral - that they carry values of the culture that produces them. To understand a technology, one must be party to its making.

Making represents the history of mankind, following an evolutionary logic – no needle invented before the yarn; no Internet before the pencil. Before the industrial revolution making was a way of living. Industrial scale production alienated many from making things, moving material production such as textile and consumer electronics industry out of cities, to concentrated global production regions. Digital communications, however, also enable the 'trans-localisation' of industrial production; digital designs can be sent to remote machines and personalised fabrication returns to cities to strengthen consumer positions. *If you can make almost anything, the question is not what to make, but how to make!*

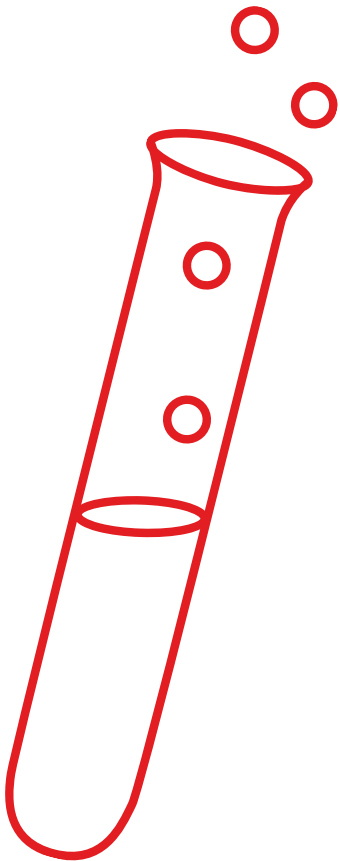
This is even more pressing when we realise that copy-paste technologies are reaching beyond 'maker matter'. Our mathematical understanding of information and the understanding of biology as information technology, copy-paste methods (CRISPR/CAS9) make life itself make-able, which leads the Make agenda to question how to relate to scientific knowledge production, or knowledge 'making' and technology.

Making as an ethos and individual practice of cultural appropriation of technologies ranges between working with accessible methods and materials, to making remote, emerging and 'high-tech' methods and materials accessible. Making is a practice of emergent relations and emergent technologies and a practice of criticality - captured in the notion of *understanding by doing*.

The Make agenda pursues techno-sciences where certain technologies, hardwares, protocols, experiments, materials and collaborations can and should be open and public. Here public research reaches beyond a DIY making method, as not all technologies are hand-make-able yet they need to be public, fair, open and inclusive. DIY is an emerging cultural practice that expresses the urgency of creating-by-making new relationships between us and our made environments, which are both social and technological; societal and ecological.



1. How can making become self-critical in relation to its socio-ecological context? If you can make anything, what processes and practices of making should we pursue?
2. What is the materiality of making? What are the limits of 'open and transparent materials', in relation to economies of making and economies of the Commons?
3. What are the machine we make and manufacture with? Can we upgrade the applications and outputs of machinery by hacking the basic tools of every lab to give others the possibility to innovate their practice?
4. Can we construct soft robotics using simple technologies enhanced by multi-material 3d prints of meta-materials, incorporating biomimetic elements like air pumps and silicon? How can soft robots enhance healthcare, industrial assembly, environmental exploration, or creative expression?
5. Can we use robotic methodologies with fibres and yarns to create alternative composite materials, and design products through the new production flows of the materials?
6. How do we make machines, materials, experiments, protocols and projects: can we open them by describing and documenting and distributing the documentation?
7. What does making mean in a post-anthropocentric era, when relations between human and non-humans shift and relations between objects become multi-directional? Are we cultivating organisms and things, or vice versa? Are we multitudes?
8. How can we conceive of making as a mode of critique, wherein practices such as art making, artistic research or frictional design can critique contemporary modes of production and making, thereby disconnecting making from solutionist trajectories?
9. How can we better recognise new societal and environmental margins and improve the quality of relations they are embedded in? Aren't those who struggle the best to signal inequalities and the ones who can contribute most to the development of mutual values?
10. This research mentality also looks at power relations of making: how can feminist theory help us understand the relationship and agency between the marginalised makers and the made world.



Make labs

Make consists of three physical laboratories, all of which are the first of their kind in the Netherlands. They support research labs seeking to understand revolutions in (accessible) technology and a cultural ecosystem of co-creating, making and artistic research.

Fablab Amsterdam: Urban & Rural Manufacturing

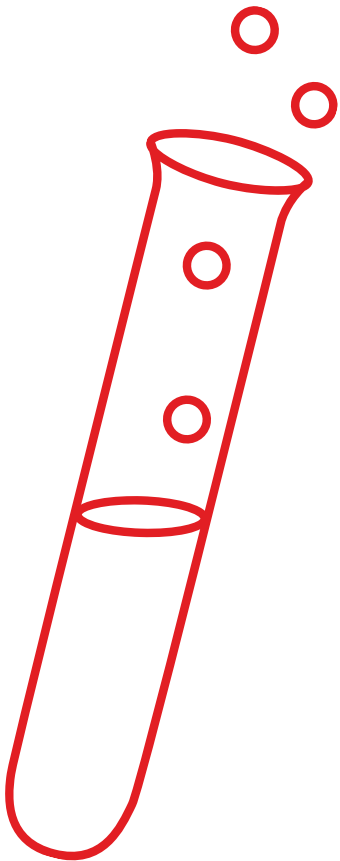
New digitised, customised and modular production and fabrication methods and machines change the way we make our living and working environment. Equally, ecological challenges require systemic interventions in production processes and resource management. Such interventions can only be achieved by actively collaborating with those living in these systems. This includes citizens as well as ecosystems, leading the Fablab to employ maker-methods to sustainably mimic nature's building capacity and engage the innovation capacity of communities.

- Reflow – applying Make research in urban development and creation.
- Critical Making – if everything is makeable, what do we make and how do we make?
- Fab Academy, worldwide distributed education in digital fabrication

Open Wetlab: DIY Biotechnologies

Can we make life? And what are the consequences? Ever more organisms around us can be modified and made to produce pharmaceuticals, materials, and foods to make human lives easier and healthier. The Open Wetlab researches what happens when this practice leaves academic and industrial laboratories and becomes a widely accessible practice. Can we then produce more societally beneficial biotechnologies, and what do these look like?

- BioHack Academy - learning to build and use your own biotech laboratory
- Gene.coop - cooperative genetic biobank to give citizen control and access to research



TextileLab: Open materials and transparent manufacturing

Experiments with new materials unleashed technological revolutions that have significantly influenced modern history. Machine-made textiles were one of the most important achievements of the first industrial revolution, benefitting many with new materials, but also leading to enormous socio-economical and ecological change.

The TextileLab researches the production of new materials utilising new raw materials and manufacturing methods. Can these potentially spur new socio-economical and ecological change, this time for good? Fair, open and inclusive making should be sustainable and utilise circular materials (including energy consumption), and materials that mimic nature's capacities.

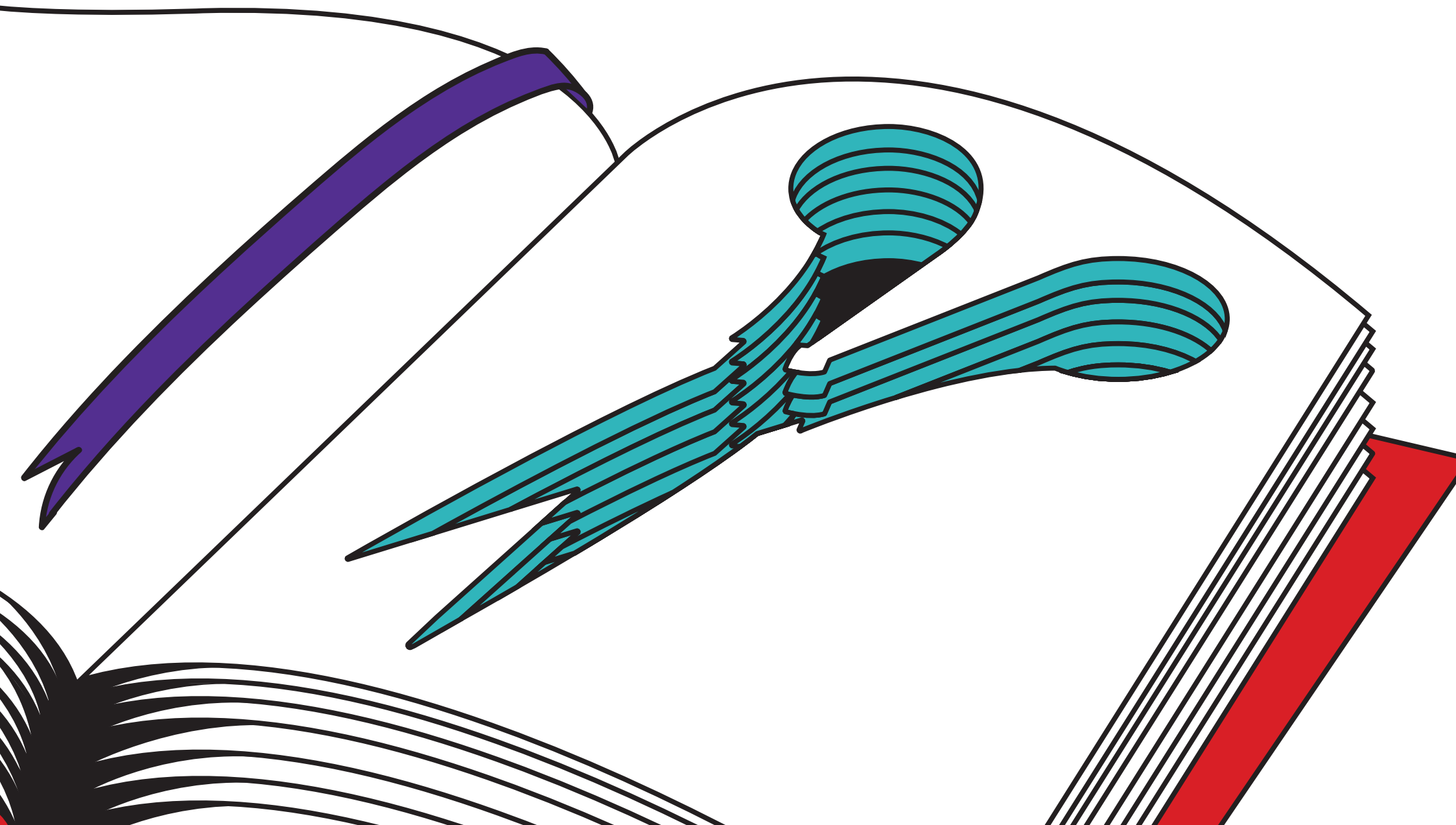
- Material archive and manufacturing
- TCBL - Textile and Clothing Business Labs
- Fabricademy - a six months course in experimental textiles and clothing

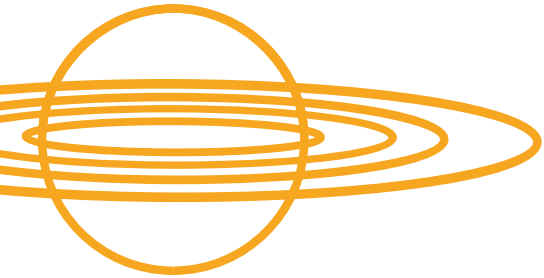
SpaceLab (new 2019)

Outer space is not just an object of scientific observation, it is also a very specific cultural space with large societal impact. The SpaceLab seeks to empower citizens to adopt space technologies in creative and critical ways, by providing access to space data, expertise and facilities for engaged citizens to develop more societal, humanistic or artistic applications; rethinking relations between society, economy and environment through a creative and critical envisioning human habitation in outer space; and providing better understanding of what we are becoming in disembodied and 'disembedded' outer space, involving humanistic and cultural studies in space-related research.

- Out of the cradle - exploring human outer space activities
- Space Sight
- Supre:organism - residency for artistic research

Learn





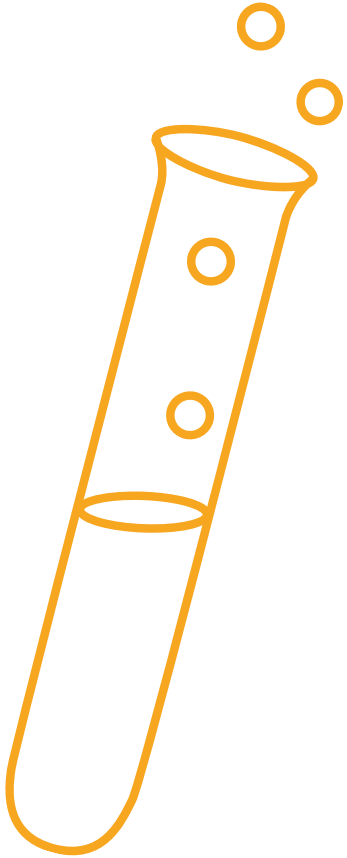
Research questions

Education and culture enable us to meaningfully participate in society, to form perspectives on a changing world and to help us find new ways to learn. But how do emergent technologies influence contemporary learning? How do you - as an individual or a collective - develop social, technical and creative skills to improve your own life and/or that of others? How do we strengthen learning with and from each other, within and between people and communities?

Learn explores emergent technologies in order to research and develop applications that enrich learning and user-experiences. We seek to help people develop a maker mindset, and the technical and creative skills needed to function and find their place in, and shape society.

Learn runs four Labs: Maker Education Lab, Creative Learning Lab, Future Heritage Lab, and the new Co-Creation Lab. Emergent technologies that are central to Learn projects in 2019 are:

- Digital Fabrication: in maker education and professional development camps Learn explores and teaches digital fabrication technologies in order to help people develop a DIY, creative and critical stance towards new technologies and societal challenges;
- Neuro technology: Learn researches how neuro-technologies can influence, improve and enrich learning-experiences;
- Augmented Reality: Learn explores how augmented and mixed reality can enhance and personalise storytelling in historic locations and how it can transfer embodied skills;
- Artificial Intelligence: Learn experiments with democratising and tinkering with AI and researches responsible use of AI in, for instance, smart toys;
- Quantum technology: Learn dives into the domain of quantum technology to explore its societal relevance through public engagement;
- Sensor technology: Learn explores how new sensor technologies can be applied to facilitate children to research, understand, map and improve their living environment;
- Robotics: Learn facilitates DIY robotics by the development of low-cost and accessible tools and explores the opportunities and threats of outsourcing education to robots in our public programme.



Maker Education Lab

The Maker Education Lab investigates how a maker-mindset and 21st-century skills can help people to find a meaningful place in our increasingly technological society. Learning from a maker perspective is learning through making, connecting our heads and hearts.

We focus on how creative and technical skills allow people to critically reflect on, own, use and create with new (digital fabrication) technologies. The lab is active in primary and secondary education as well as in lifelong learning, with pupils and professionals. The lab seeks to spread the insight that technology is not sacred, but made by humans, so as to cultivate active, critical and independent attitudes. Our mission is *Maker Access for All*.

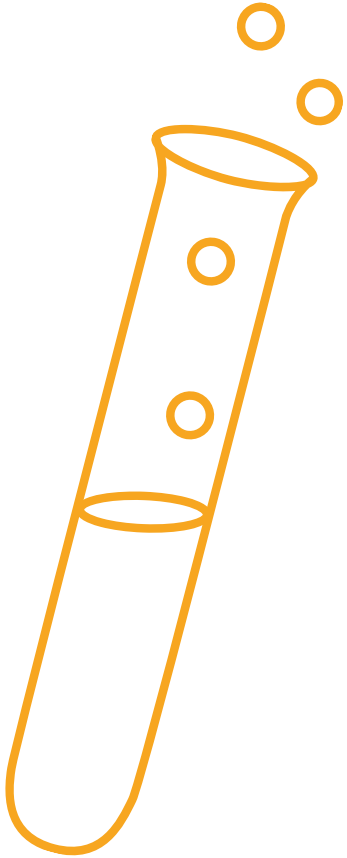
Focus 2019

In 2019 the lab will deepen its understanding of different approaches to maker education; developing, testing and publishing formats for critical making in education, smart textiles, social innovation and entrepreneurship, data physicalisation and art-based maker education. The lab will formalise, digitise and open its (modular) teacher training and professionalisation formats, scaling methods and activities in the Netherlands and abroad.

The ambition of 'maker access for all' will be continued, by further developing the infrastructure of physical maker spaces across the city of Amsterdam, supporting other cities and organisations to do the same. In particular, we seek to develop understanding of principles and adopt new practices regarding cultural sensitivity, inclusivity and equity.

The Maker education network will be further strengthened through the organisation of and participation in knowledge sharing events and conferences Maker Education Clubnights. The lab will collaborate with Make to raise public awareness and engagement on circular economy and waste management via creative system interventions for sustainability.

Projects in which we aim to realise these ambitions are, amongst others: DO IT, Maakplaats 021, Teacher/Librarian Maker Camp, Plasticfabriek, Brave New Learning Conference, Ars Electronica (festival) and FabLearn (conference).



Creative Learning Lab

The Creative Learning Lab develops contemporary, exciting forms of education with experts from education, the arts and new media in which our bodies and senses are more explicitly used in learning experiences. With technical and physical means, the lab enables children to be creative, to acquire sensory (learning) experiences, to express themselves better and to tell meaningful stories. To this end, the lab uses methods such as storytelling, playful learning and prototyping, asking how emerging technologies can be used to research and develop novel educational formats and applications for future learning?

Focus 2019

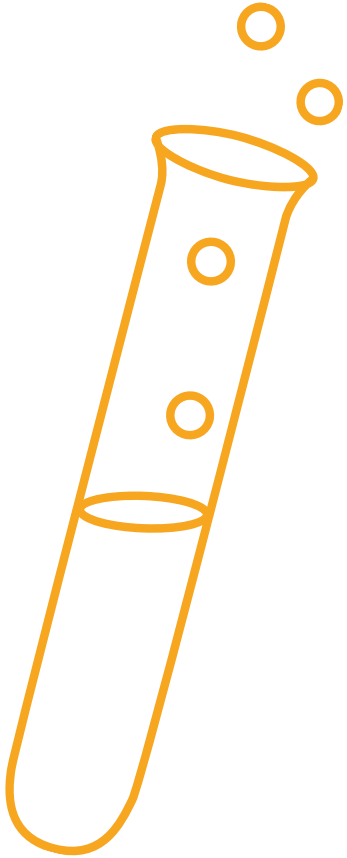
In 2019, Creative Learning Lab will research if and how neurofeedback interventions can promote a growth mindset and positively affect learning performance and/or motivation.

Citizen science experiences with children will be scaled through a national space-project cooperation, enabling children to map their environment in a playful way using modern sensor technology and DIY instruments. With the aid of selfmade sensors and small scale tests, children can monitor and intervene in their direct surroundings at home or at school.

Starting in 2019, tinkering with AI will be explored in order to understand if it contributes to raising awareness, fosters informed decision making and offers action perspectives. What happens if an AI interferes in the relationship between parents and children? Does our communication change? What are the consequences of outsourcing *friction and education* to an AI? How do play and imagination change if toys become smart?

The lab researches and documents non-formal and informal STEAM learning by mapping and connecting the European and local field on an organisational level, evaluating trans-disciplinary learning programmes and gaining insights in so-called 'learning ecologies'. Learn aims to expand Creative Learning activities on 'design for change and new humanities' in cooperation with a humanitarian innovation lab at a refugee camp at Lesbos.

Projects in which we aim to realise these ambitions are, amongst others: SySTEM 2020, AI Barbie, SUSHI, Smart Kids Lab & SpaceBuzz, BrainBeliefs and LATRA.



Future Heritage Lab

Changing societies and visitor expectations challenge cultural heritage institutions to transform their products and behaviour. The Future Heritage Lab approaches heritage as a dynamic concept, where people interact freely with objects, stories and associations to create new meaning, to increase engagement with collections and to relate them to their social, historic and contemporary contexts.

The lab works in co-creation with artists, researchers, museums and archives to develop interactive installations, applications and methods that change the way we experience heritage. The lab seeks to create actionable perspectives for audiences and professionals, using heritage to enhance personal development, social cohesion and creativity, fostering new visitor experiences, new meaning and greater public engagement?

Focus 2019

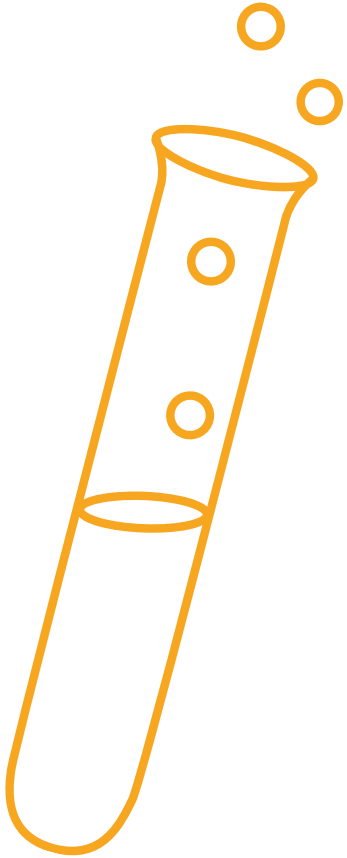
Despite the global interest in crafts, several heritage crafts are threatened by ageing master crafters. In the H2020 project *Mingei* the lab explores what constitutes a heritage craft, how it can be digitised, made accessible and connected to new domains such as maker spaces.

The lab will organise the third edition of *MuseumCamp* focused on professional development within heritage institutions, and start an *Archeology Maker Camp* in cooperation with the Dutch Archeologie Dagen.

Successful collaborations with botanic gardens as hubs for informal learning will be followed up, focussing on food security and citizen science with Dutch botanic gardens in *Plant!*.

Current mixed reality endeavours will be through the funding and development of a basic and intuitive AR toolkit which will allow heritage professionals to easily experiment with AR.

The exploitation of the *meSch* platform will be further explored through national storytelling projects, as has been done in 2018 through the location-based *Koorbanken* application.



Co-creation Lab (new 2019)

Many issues across multiple domains simultaneously impact healthcare, education, urban development and the public domain promote the need to involve end-users and professionals at all levels and through all layers of society, allowing for collectively imagining, building, and experiencing new futures. This requires open, transparent, inclusive and creative practices.

Co-creation is a method to engage stakeholders in design processes, by way of thinking, designing, and building together in multidisciplinary teams in which personalised and unique experiences arise. By helping people construct their own solutions, we allow and enable crucial information and ideas to enter into the development process and empower the people to be in charge of their own situation. Engaging artists in these processes stimulates and enables speculative design, and helps to stretch the boundaries of the way we think about technology, identity, interaction, intuitive design, and gameplay etc.

Focus 2019

Waag's research agenda is nurtured and stimulated by research and deepening in the various thematic labs dealing with the above mentioned domains. Given the importance of and attention to inclusive and participatory practices in the outside world, Waag intends to strengthen its position and visibility on co-creation and participatory methodology with the Co-creation Lab.

The Co-creation Lab is responsible for research into, and development and improvement of co-creation and related methods. The lab connects co-creation with the various methods within Waag's public research practice in other labs. The lab aggregates and disseminates the knowledge that Waag has in the field of co-creation and other participatory approaches.

The *Co-creation Navigator* is one of the main outlets for open and transparent communication on Waag's methodology - which will continue to evolve over the course of the year. Its outreach strategy will be further optimised and made available as learning tool in new domains.



Platforms Learn

Learn runs and hosts several platforms via which we interact with our different stakeholders.

Co-creation

ccn.waag.org — repository of co-creation methods and process with an online coaching tool

co-creation.waag.org — best practices in heritage

Maker education

makereducation.nl — online resources of bottom up maker education practices

maakplaat021.nl — growing number of Amsterdam-based maker spaces embedded in libraries

Maker Education Clubnight — maker education meet-ups to bring together the network of Amsterdam teachers and library professionals who are involved in creative education

DO IT platform & toolboxes — website with maker-toolboxes for facilitators and children

fabschoolino.waag.org — microcontroller for the young maker, adopted and provided by Conrad

abcmaken.nl — online platform with maker education inspiration/ repository

FabLearn — maker education conference/ festival

Teacher Maker Camp — maker education inspiration and training program

SYSTEM 2020 — online platform mapping of science learning outside the classroom in EU

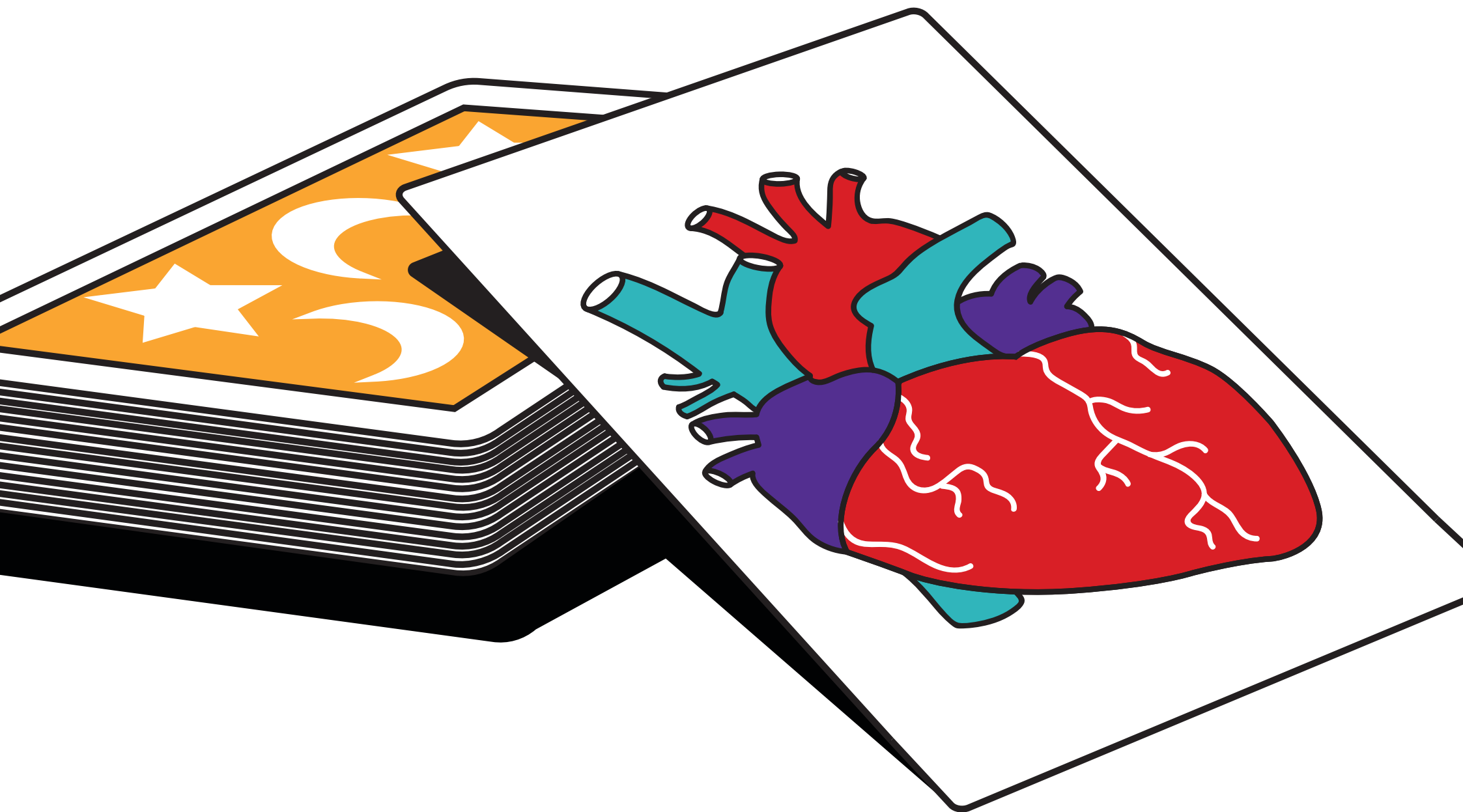
Future Heritage

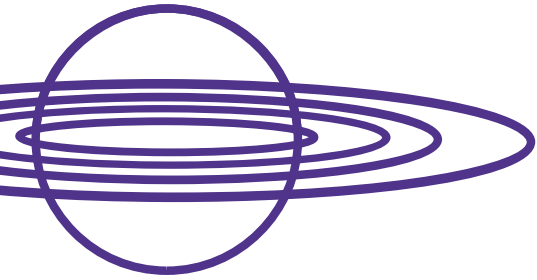
Digital Museum Network Amsterdam — Meet ups for heritage professionals

MuseumCamp — explore the potential of digital experiments and creative techniques in exhibitions

meSch authoring tool — IoT platform for prototyping

Care





Research questions

Society is changing, technology is omnipresent and that affects the care. Care researches how we can support healthcare users with technology in a personalised way, using methods from the *creative industry*. In addition, we develop concepts and prototypes that can make a meaningful contribution. Our starting point is the concept of 'chronic health', which assumes that nobody is 100% healthy.

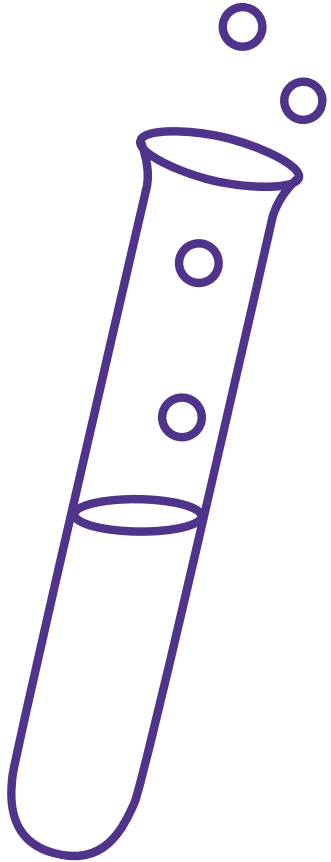
As an overarching research question we propose: How do we support users in healthcare with technology in a personal way?

In healthcare we see that there are no suitable applications for many problems: no existing services or products are available, do not match patient needs or are too expensive. Under the umbrella theme 'MakeHealth' we link the world of culture to the domain of healthcare to come to 'open', 'fair' and 'inclusive' designs.

Care uses actors from the creative sector within the healthcare sector, and connecting both disciplines. The cross-fertilisation enriches the knowledge of the 'creative professional', the patient and the healthcare provider. Design thinking and design research are part of this. We work in co-creation with users, researchers, artists, hard- and software developers and designers on new (healthcare) applications and innovative concepts for the healthcare sector. As a result, we simultaneously create acceptance and (shared) ownership.

The overarching research question leads to the following sub-questions:

- How can we use the methods from design thinking to develop interventions that meet the needs of healthcare users in a personal way? This leads to open source healthcare applications; how do we apply these in practice?
- How are business models impacted by open source applications? We investigate this through the development of service road maps;
- How can a transdisciplinary approach shape the above research?
- Which legal and ethical issues follow from the MakeHealth principles?



MakeHealth Lab

In the MakeHealth Lab we conduct research on how innovative open source interventions may be developed by bringing together – amongst others - patients, healthcare providers, researchers, artists, designers and makers. Fab Labs and maker spaces are used as a means to promote transdisciplinary collaboration; the creative process connects people within and between disciplines.

Focus 2019

Within MakeHealth we focus on: Make - Research - Educate.

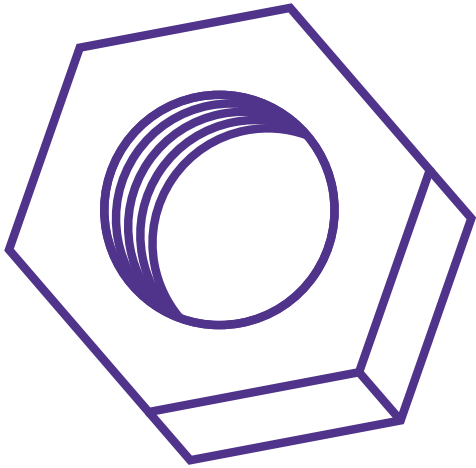
We do this through:

- 1) Citizen science
- 2) Critical making
- 3) Transdisciplinary research

Ad 1) Together with '*Mijn Data, Onze Gezondheid*', the international conference and expert meeting BeyondRCT-2 was held September 2018. How do we ensure that, in addition to RCTs, there is also room for research, based on the questions and knowledge of patients themselves? This may lead to different starting points to conduct research.

Ad 2) MakeHealth shows that there is a need for critical making sessions, such as MakeHealth Live Lab, in the field of care. We continue our creative activities within MakeHealth under this heading.

Ad 3) We identify dynamic practices and collaboration in the field of art, science, including the humanities, but also practices that extend beyond the academic world, and are embedded in society. It involves combining profound disciplinary expertise with more open and holistic methodologies, in which both the research processes and the output are co-designed. The users are involved in the process from the beginning. This approach is, in our view, particularly relevant when it comes to complex societal challenges.



Platforms Care

Care has a comprehensive network, both local, national and global. In the city of Amsterdam and its surrounding, Waag's Care group is part of a strong consortium with partners such as Amsterdam University of Applied Sciences, the University of Amsterdam, VU University Amsterdam, AHTI, the Amsterdam Economic Board, GGD Amsterdam, SIGRA, healthcare institutions, and 'stadsdorpen' (city communities).

Nationally, cooperation takes place with UMCs, university colleges (HKU), hospitals, rehabilitation centers and design courses (Design Academy, Willem de Kooning Akademie) and patient federations.

Internationally we aim to expand and strengthen the network of MakeHealth. We also actively seek out business partners, with which sustainable development and market implementation of personalised healthcare applications can be realised. We will continue and expand contacts with Wellcome Trust (UK) in the field of transdisciplinary research.

Platforms include:

- MakeHealth network, careables.org
- Embassy of Health (Dutch Design Week Eindhoven)
- Citizen Science/Beyond RCT
- 3Package Deal Social Design (AFK)
- Designing Community of Care (Creative Industries Fund NL)
- Critical Making collaboration Care
- Transdisciplinary collaboration Care;
- Service road maps 'open' healthcare solutions

Public Research Agenda

2019



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