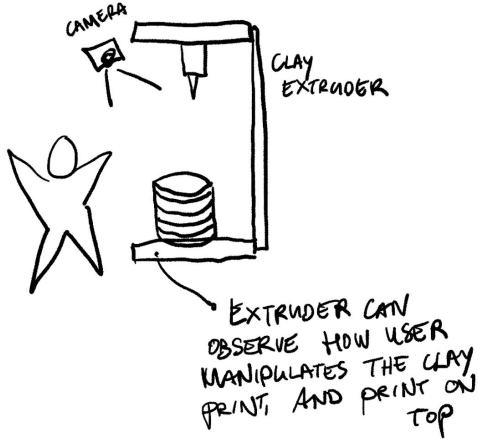
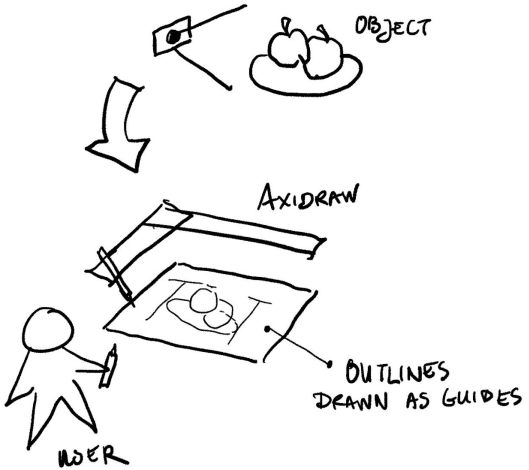
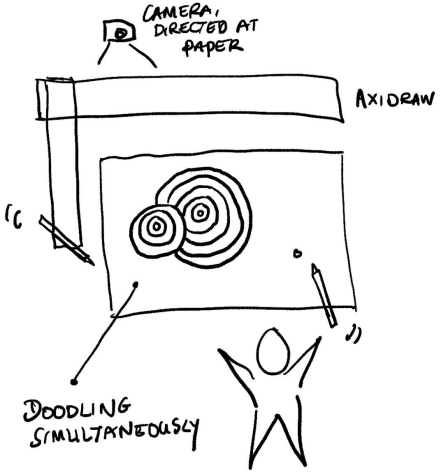
Collaborative Machines (2020-2024)



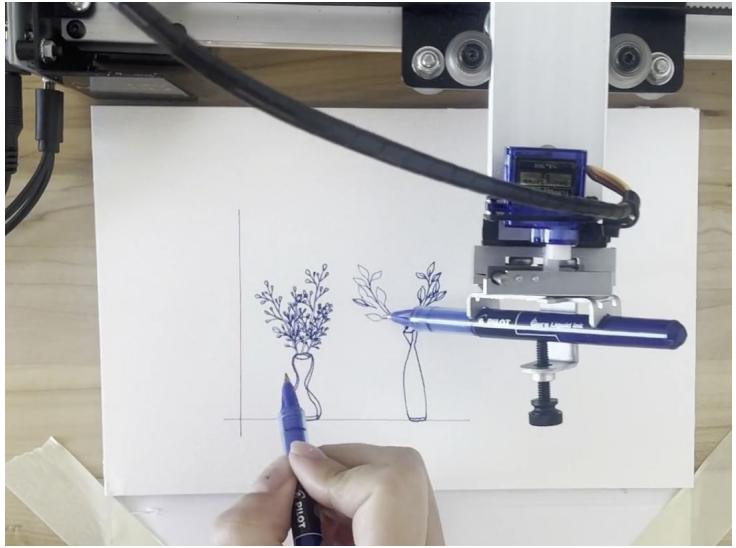




I envision, enact, and prototype new ways of collaborating with creative machines.

Alexandra Bremers, Wendy Ju. “Designing Interactions for Mixed-Initiative Machines: Balancing Automation and Craftsmanship”. In: *1st International Workshop on Worker-Robot Relations at the 19th Annual ACM/IEEE International Conference on Human-Robot Interaction*. 2024. d o i: http://dx.doi.org/10.13140/RG.2.2.22111.06562.

Plotter Art (2020-2024)



As part of my PhD dissertation, I experiment with artistic workflows and ways to use the AxiDraw pen plotter.

Embroidered Radio Receivers (2016)

I developed AM crystal radio receivers based on machine-embroidered coils. When a person covers the receiving coil with one hand and the antenna (also being an embroidered coil) of a transmitter with the other, they could listen to music.

The coils were created based on a Processing program that generated a .pdf file based on a specified number of windings and diameter of the coil, which was then converted into .dst and embroidered with a digital embroidery machine and multi-kernel isolated copper thread.

This was my B.Sc. graduation project at Industrial Design TU/e, Wearable Senses lab.

Speculative Design (2015)

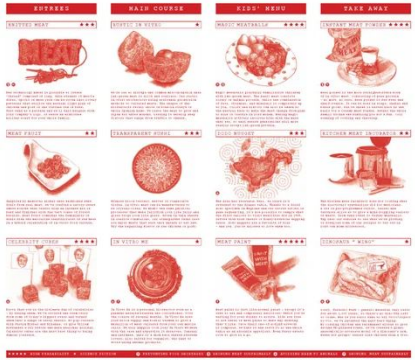
I spent 5 months as an intern at Next Nature Network in the fall semester of 2015.

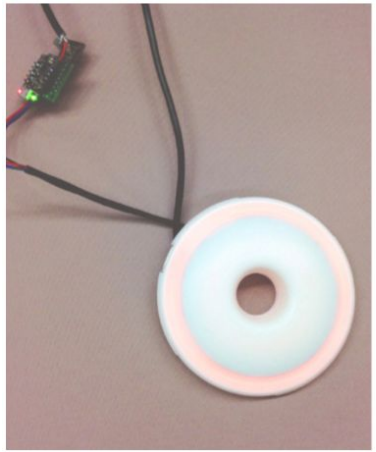
I was responsible for the finalization of the Bistro In Vitro Ice Cart project, exhibited at the Dutch Design Week.

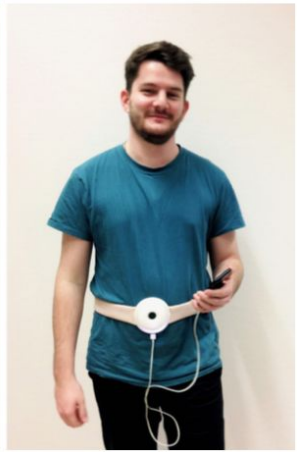
Another project I delivered was a prototype for the Nano Supermarket exhibition. The prototype embodied the story of a hypothetical belt which could be used to charge your phone on belly fat.

The prototype that we delivered was battery-powered and featured a dynamic light design which could be controlled with a remote for demonstration purposes.

I designed this together with another intern.







3D AR HUD Displays (2018)

I conducted two perception experiments to understand depth perception around the perspective cue, in a Head-Up Display, to inform engineering and design.

This work was part of my master's thesis. The project was done in collaboration with Jaguar Land Rover and the University of Cambridge.

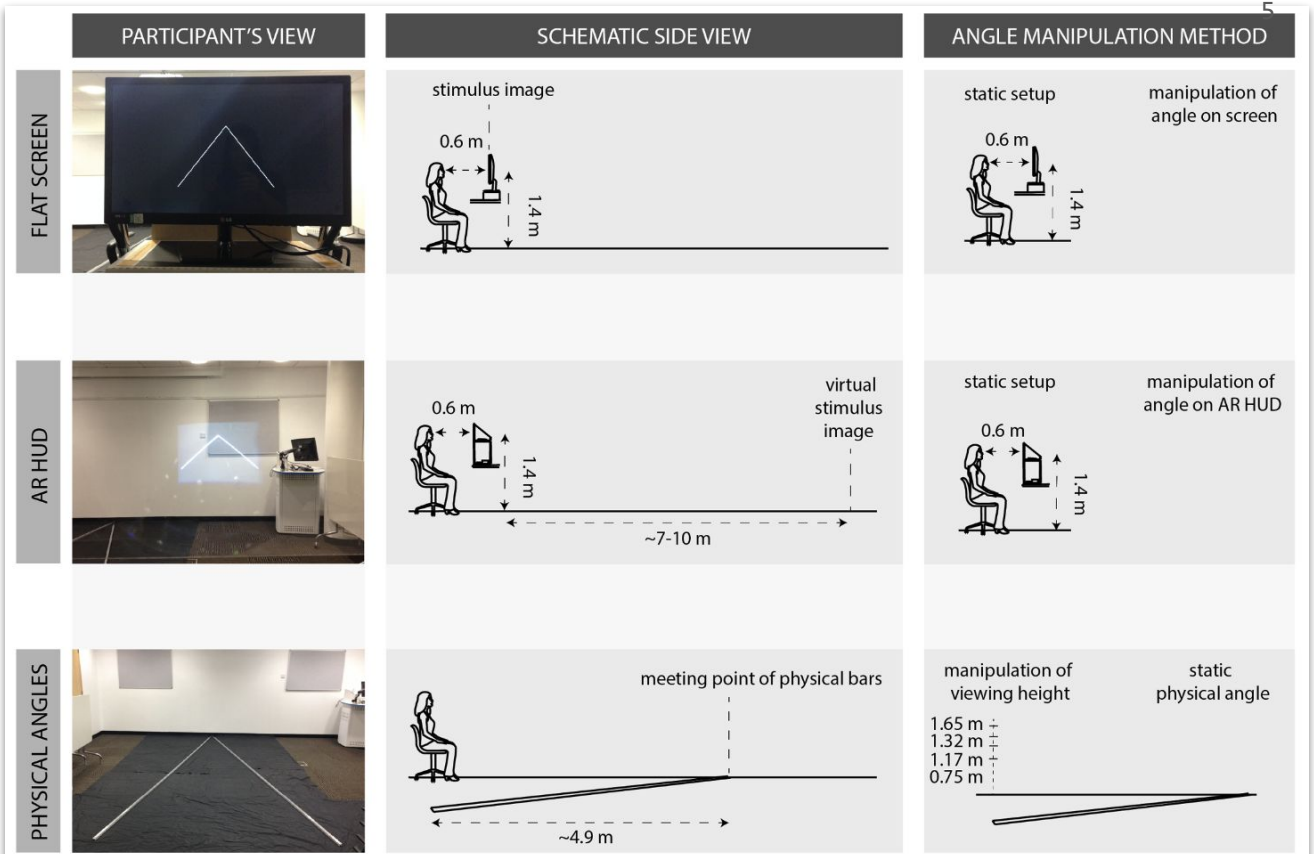
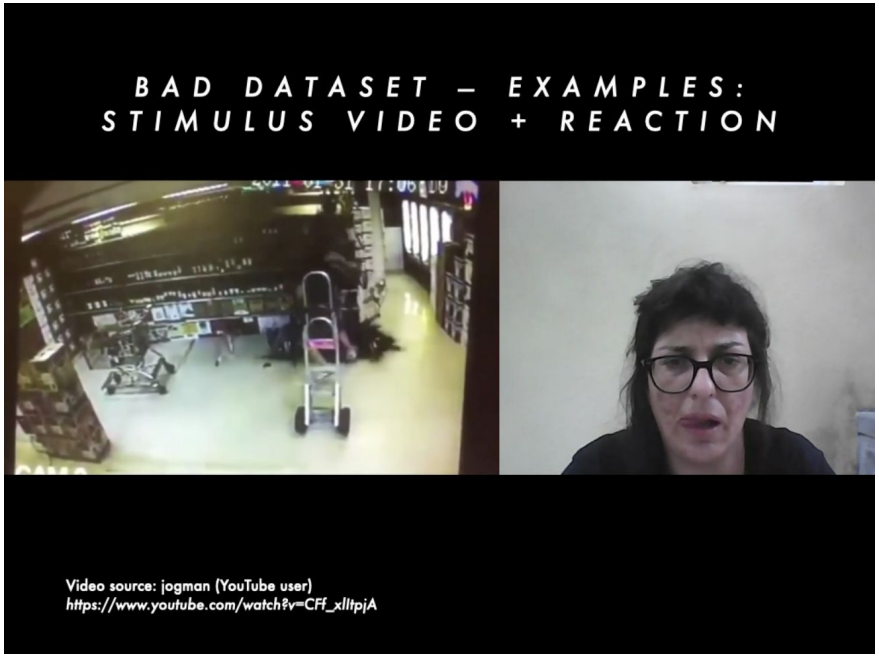
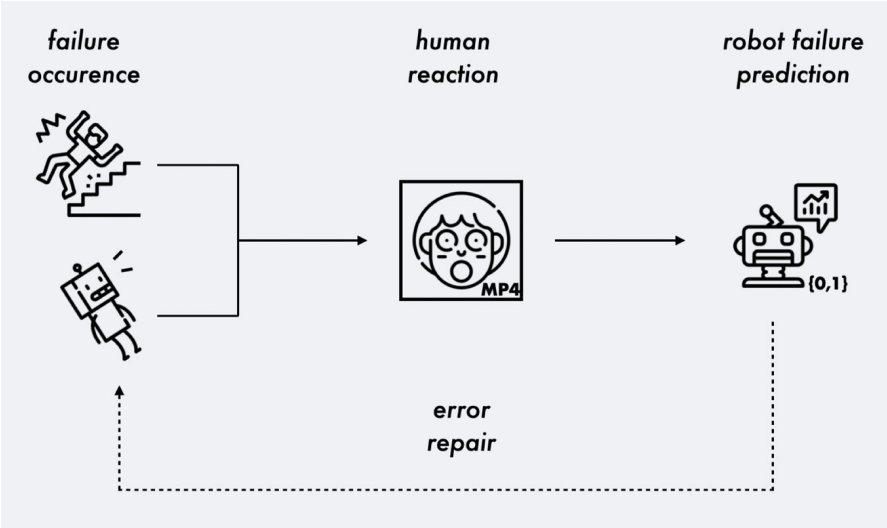


Fig. 1. Overview of the experimental setups: image of the angle (left), schematic side view (middle) and angle manipulation method (right). Slight deformations in the photographs were caused by camera characteristics.

Alexandra W.D. Bremers, Ali Özgür Yöntem, Kun Li, Daping Chu, Valerian Meijering, Christian P. Janssen. "Perception of Perspective in Augmented Reality Head-Up Displays". In: *International Journal of Human-Computer Studies* (2021), p. 102693. i s s n: 1071-5819. d o i: https://doi.org/10.1016/j.ijhcs.2021.102693.

BAD Robots (2023)





Alexandra Bremers, Maria Teresa Parreira, Xy Fang, Natalie Friedman, Adolfo Ramirez-Aristizabal, Alexandria Pabst, Mirjana Spasojevic, Mike Kuniavsky, Wendy Ju. “The Bystander Affect Detection (BAD) dataset for failure detection in HRI”. In: *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. 2023. d o i: https://doi.org/10.1109/IROS55552.2023.10342442.

Alexandra Bremers, Alexandria Pabst, Maria Teresa Parreira, Wendy Ju. “Using Social Cues to Recognize Task Failures for HRI: Overview, State-of-the-Art, and Future Directions”. In: *(under review)*. 2023. d o i: https://doi.org/10.48550/arXiv.2301.11972.

BAD Robots (2023)

	PID	QID	Description	Task	Context
1	1001	Q160	Truck untied crashes into a car in the parking lot.	Agree	Disagree
2	1001	Q190	Man tries to climb over a railing with a motorcycle an…	Agree	Disagree
3	1001	Q214	Guy proposing to his girlfriend in a waterfall drops th…	Disagree	Somewhat agree
4	1001	Q220	Bus driver goes into a bush and in the end breaks a fi…	Disagree	Somewhat disagree
5	1001	Q238	Truck putting the boat in the water ends up falling wi…	Strongly disagree	Somewhat disagree
6	1001	Q256	Guy riding a motorcycle close to a pool makes it fall i…	Agree	Disagree
7	1001	Q268	Guy riding is motorcycle and breaking it.	Disagree	Disagree
8	1001	Q286	Guy doing football tricks with his cellphone close to t…	Agree	Somewhat disagree
9	1001	Q304	Guy using the drone to light up the fire fail and make…	Somewhat disagree	Neither agree or disagree
10	1001	Q322	Guy trying the motorcycle makes it run into the public.	Somewhat disagree	Disagree
11	1001	Q382	Truck full of shopping carts forgets to close it making…	Disagree	Disagree
12	1001	Q394	Worker doing the restock makes all the wine bottle fal…	Agree	Disagree
13	1001	Q418	Robot feeding a fake person starts bumping really har…	Disagree	Somewhat disagree
14	1001	Q436	Girl doing pole vault ends up bad.	Strongly disagree	Somewhat disagree
15	1001	Q466	Girl playing an umbrella.	Neither agree or disagree	Neither agree or disagree
16	1001	Q616	Kid inside a gift falls.	Disagree	Somewhat agree

Table 2. BADNet model performance summary

Grand performance summary of all BADNet models per each labeling strategy of the dataset. We report $M \pm SD$ across the 4 validation folds.

Models	Recall%	Precision%	F1%	Kappa%
Manual	95.26(±1.60)	95.74(±1.34)	95.31(±1.57)	89.92(±3.36)
FvC	95.02(±1.77)	95.12(±1.67)	95.00(±1.78)	89.95(±3.57)
FailT	89.88(±0.486)	90.03(±0.468)	89.88(±0.481)	79.77(±0.95)

The BAD Dataset for Failure Detection in HRI

Bremers, A., Parreira, M.T., Fang, X., Friedman, N., Ramirez-Aristizabal, A., Pabst, A., Spasojevic, M., Kuniavsky, M. and Ju, W., 2023. The Bystander Affect Detection (BAD) Dataset for Failure Detection in HRI. arXiv preprint arXiv:2303.04835.

Read our paper

Download a preview of the BAD Dataset

Request access to the full BAD Dataset

Hosted on GitHub Pages — Theme by orderedlist

A dataset of bystander facial reactions to human and robot failures.

We introduce the Bystander Affect Detection dataset – a dataset of videos of bystander reactions to videos of failures. This dataset includes 2452 human reactions to failure, collected in contexts that approximate "in-the-wild" data collection – including natural variances in webcam quality, lighting, and background.

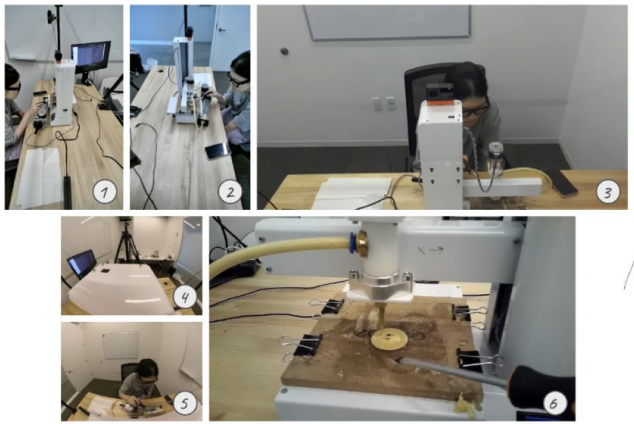
Our video dataset may be requested for use in related research projects. As the dataset contains facial video data of our participants, access can be requested along with the presentation of a research protocol or data use agreement that protects participants.

This project is part of a collaborative research effort between Cornell Tech (PI: Associate Professor Wendy Ju) and Accenture Labs.

Read our paper here: link.

Request access to the BAD dataset here: link.

Towards Designing Collaborative Creative Machines (2024)



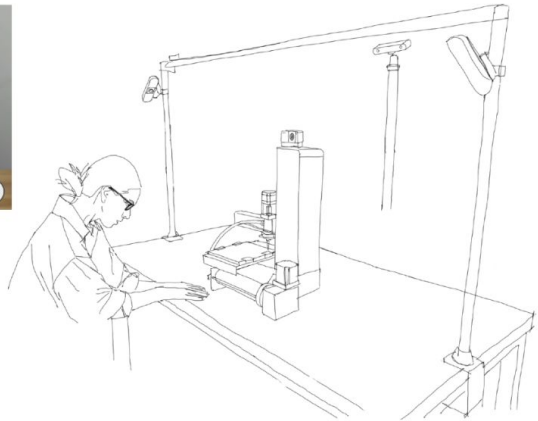
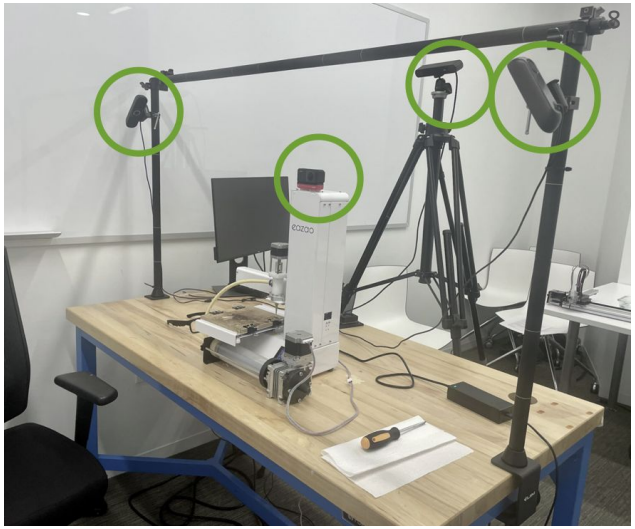
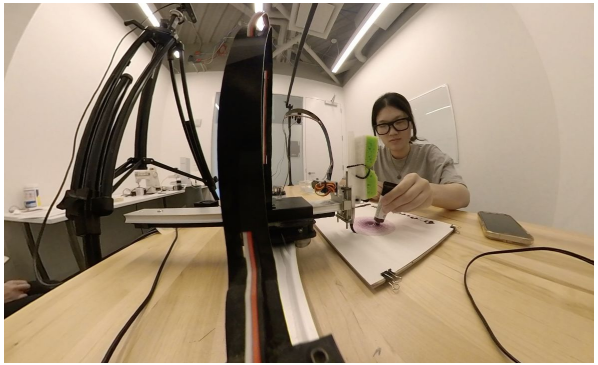
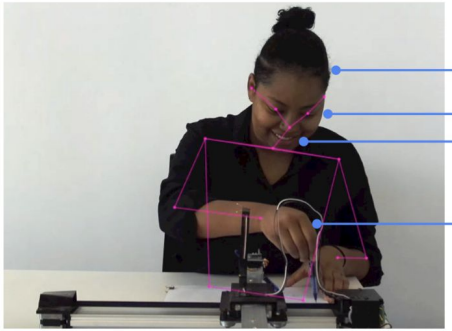


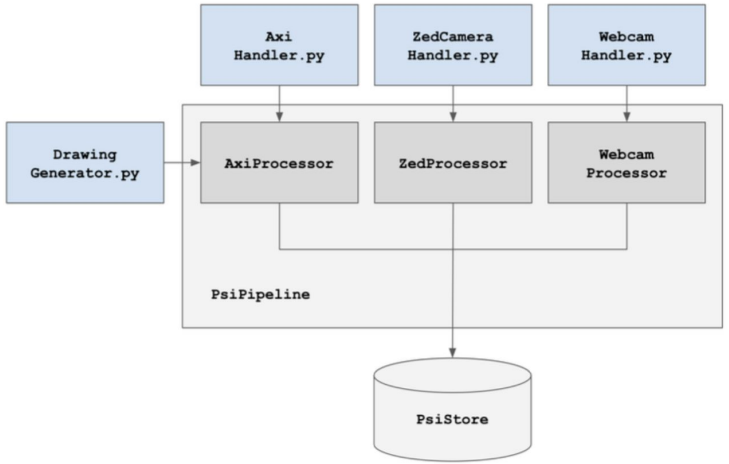
Fig. 1. We instrumented a table to capture novices interacting with fabrication machines. The datastreams come from two web-cams (1,2), a participant-facing camera (3), a machine-mounted 360 degree camera (4,5) and an egocentric eyeglass camera (6).

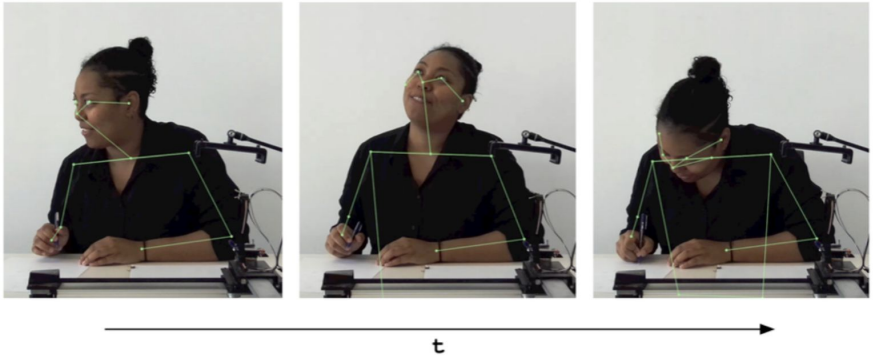




Can Machines Tell What People Want? (2024)

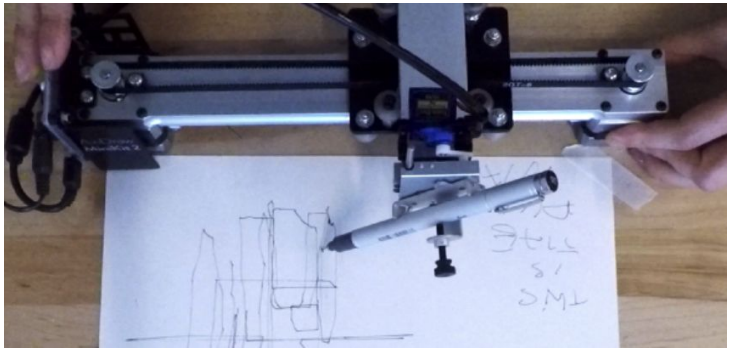


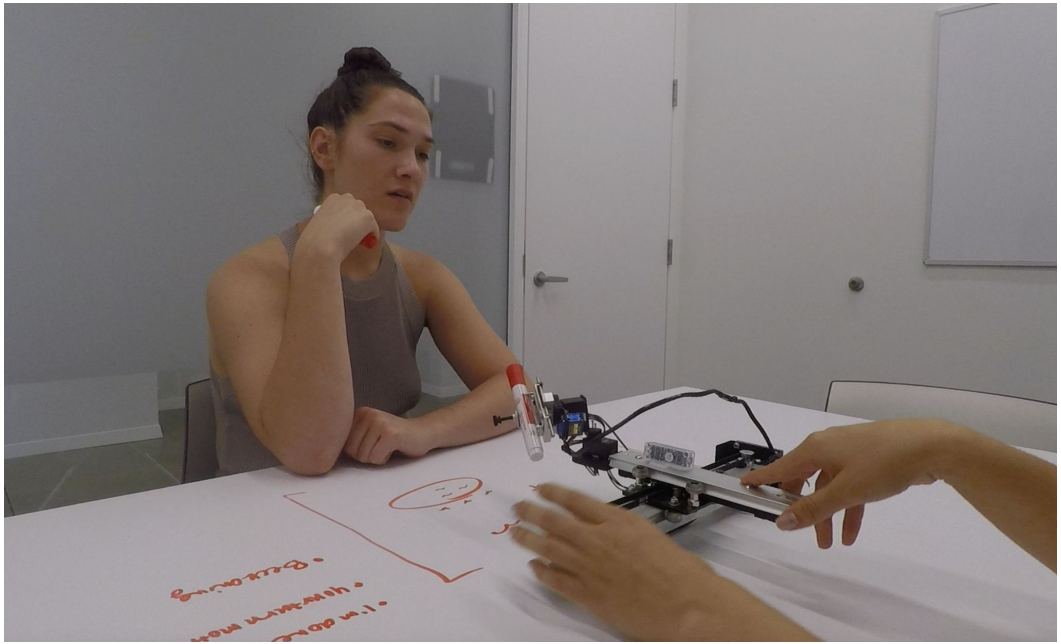




Alexandra Bremers, Wendy Ju. "Can Machines Tell What People Want? Bringing Situated Intelligence to Generative AI". In: *HTTF 2024: Proceedings of the Halfway to the Future Symposium*. 2024. d o i: https://doi.org/10.1145/3686169.3686172.

Machine Movement (2020-2024)

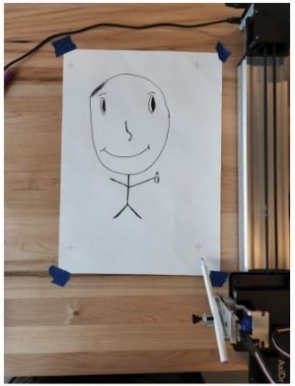


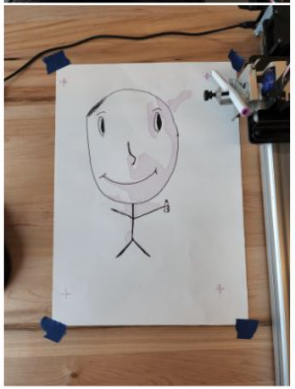


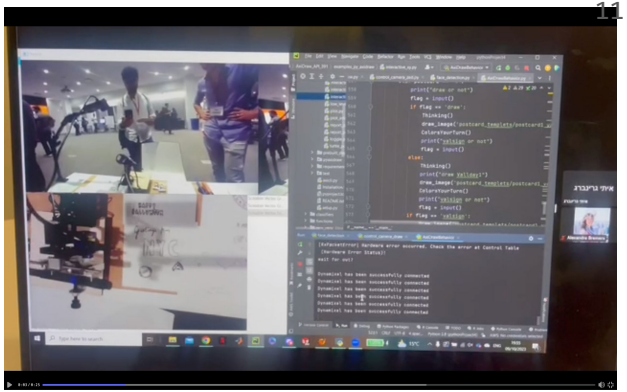
I also study the communicative properties of machines and how they facilitate communication. This work involves collaborations with comedians, dancers, and mechanical engineers.

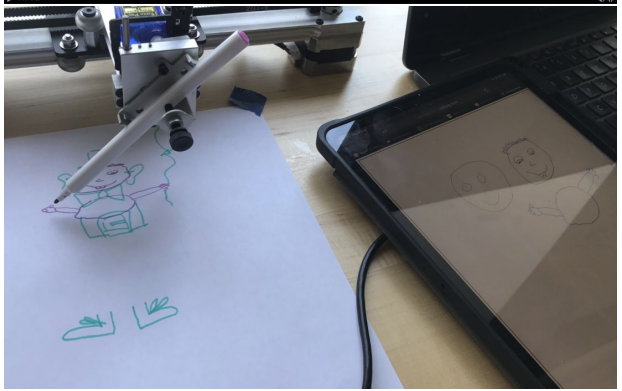
Itay Grinberg, Alexandra Bremers, Louisa Pancoast, Wendy Ju. “Implicit collaboration with a drawing machine through dance movements”. In: *ACM Symposium on Computational Fabrication*. 2023. d o i: https://doi.org/10.1145/3623263.3629150.

Wizarding Machines (2020-2024)







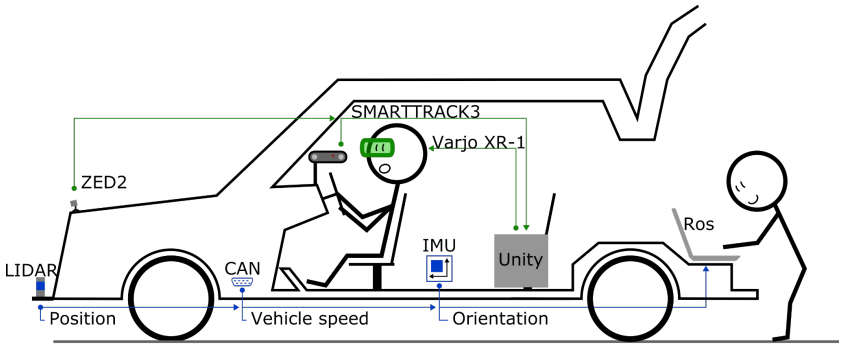


These interactions are built into Wizard-of-Oz systems with various degrees of autonomy.

Discomfort in Cars (2021)

Alexandra Bremers, Natalie Friedman, Sam Lee, Tong Wu, Eric Laurier, Malte Jung, Jorge Ortiz, Wendy Ju. “(Social) Trouble on the Road: Understanding and Addressing Social Discomfort in Shared Car Trips”. In: *CUI ’24: Proceedings of the 6th International Conference on Conversational User Interfaces*. 2024. u r l: https://dl.acm.org/doi/10.1145/3640794.3665580.

XR-OOM: Mixed Reality On-Road (2021)



David Goedicke, Alexandra Bremers, Sam Lee, Fanjun Bu, Hiroshi Yasuda, Wendy Ju. “XR-OOM: MiXed Reality Driving Simulation With Real Cars”. In: *Proceedings of the ACM International Conference on Human Computer Interaction (CHI)*. 2022. d o i: https://doi.org/10.1145/3491102.3517704.

Street Fashion (2021)

Manuscript in revision.

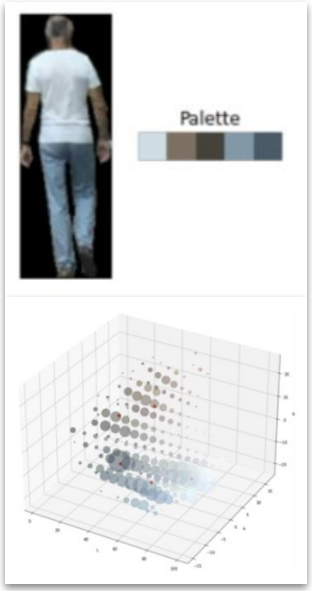
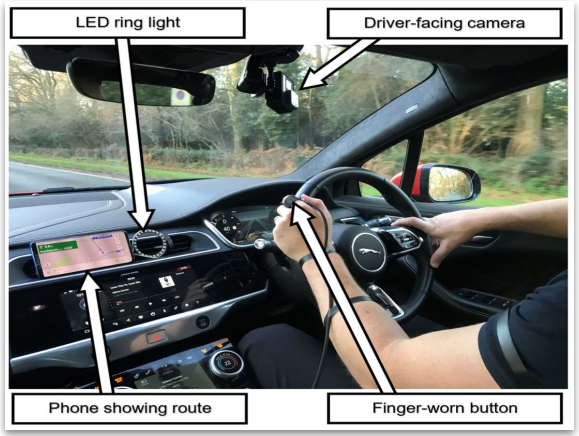
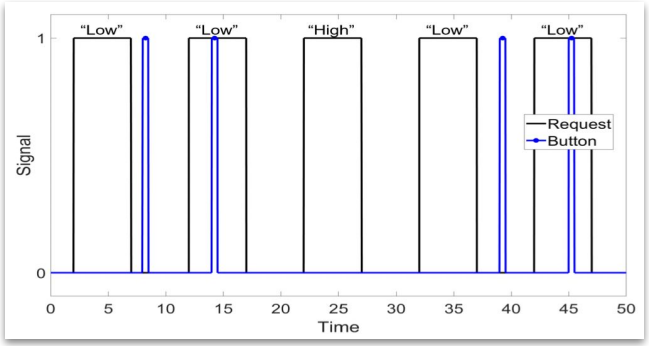
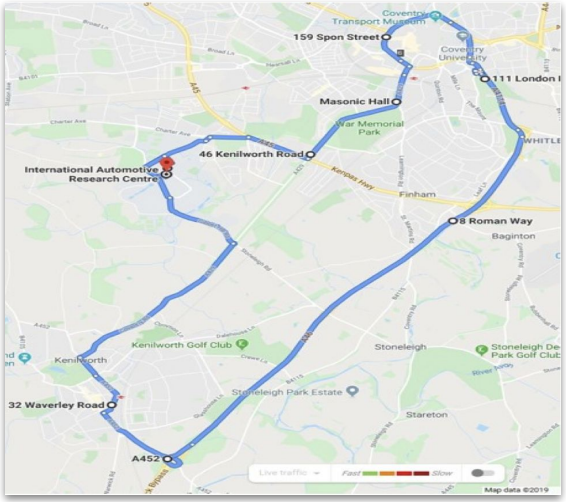


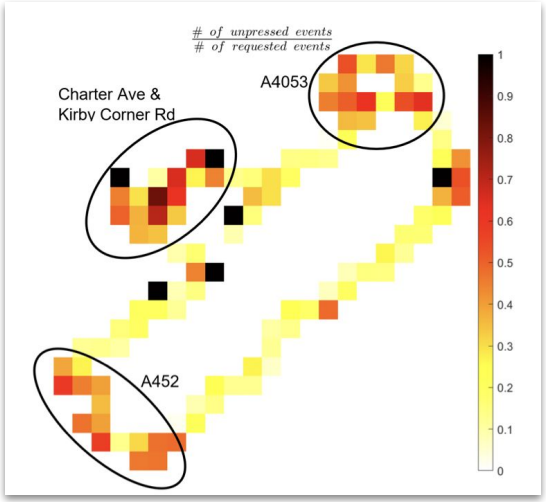
Fig. 1. Image segments of people in the global Mapillary Vistas Dataset, along with the palette colors derived from applying k-means.

Workload (2019-2020)



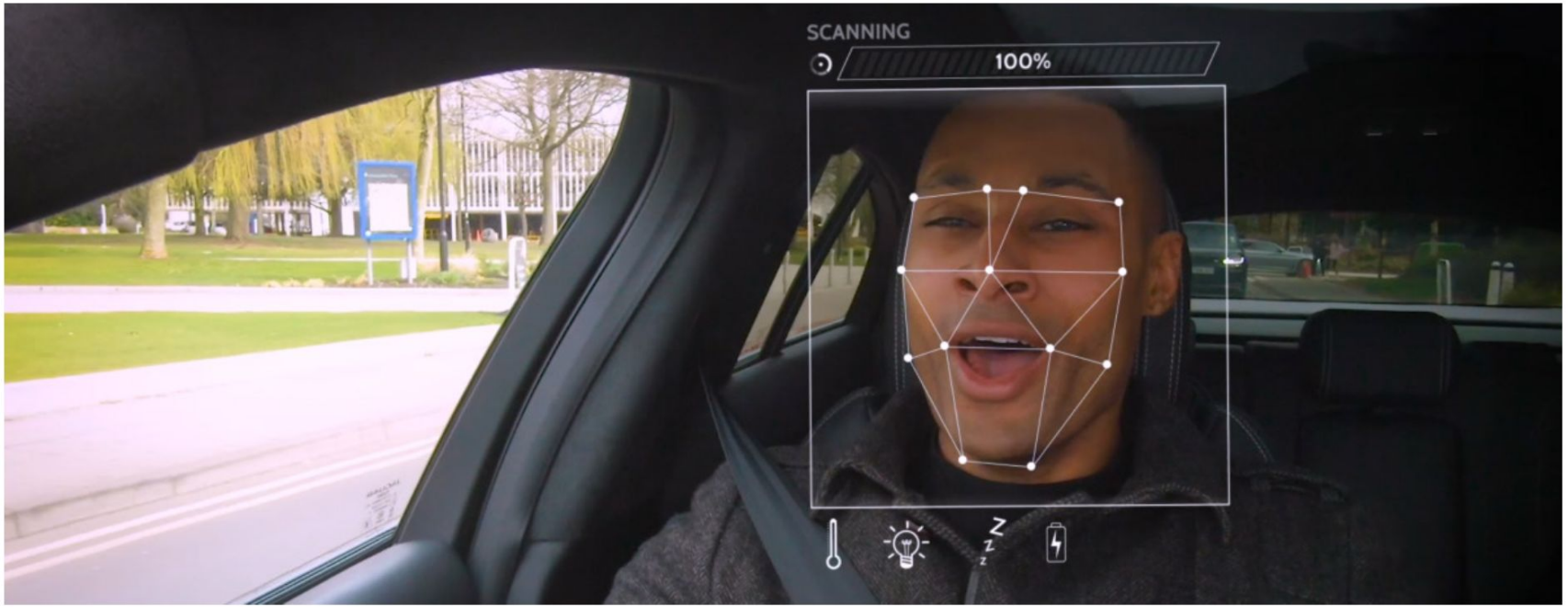






Nermin Caber, Jiaming Liang, Bashar I. Ahmad, Simon Godsill, Alexandra Bremers, Philip Thomas, David Oxtoby, Lee Skrypchuk. "Driver Profiling and Bayesian Workload Estimation for Adaptive In-Vehicle HMI". In: *IEEE Transactions on Intelligent Vehicles*. 2023. d o i: https://doi.org/10.1109/TIV.2023.3313419.

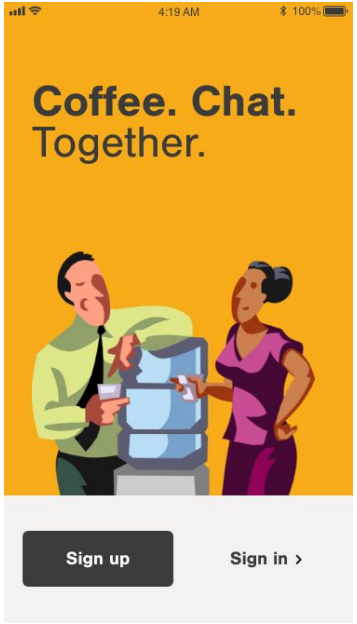
The Car That Responds to Your Mood (2020)

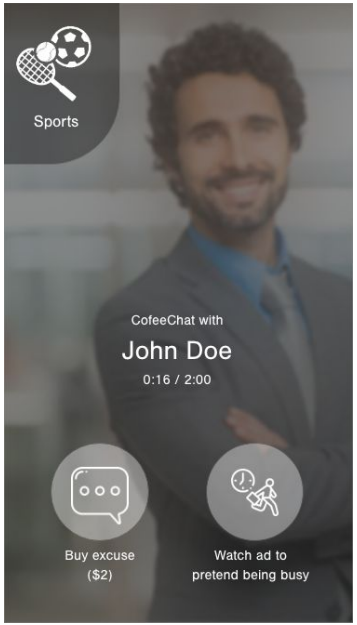


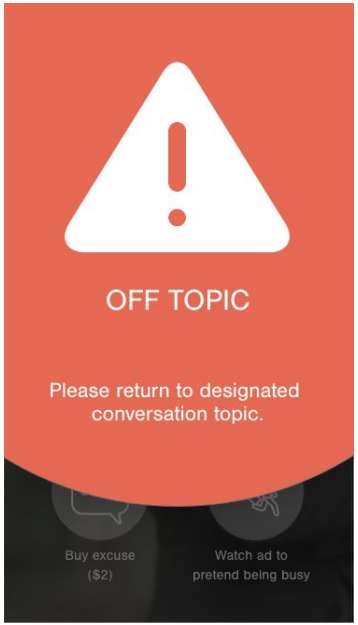
"Jaguar Land Rover is researching new artificial intelligence (AI) technology to understand our state of mind while driving – and adjust cabin settings to improve driver wellbeing."

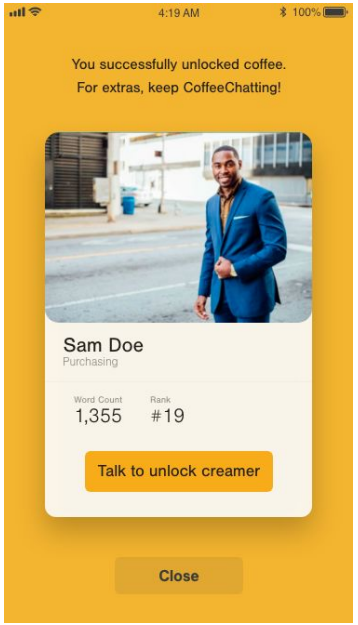
Source: https://www.jaguarlandrover.com/news/2019/07/car-responds-your-mood-new-jaguar-land-rover-tech-helps-reduce-stress

CoffeeChat (2020)







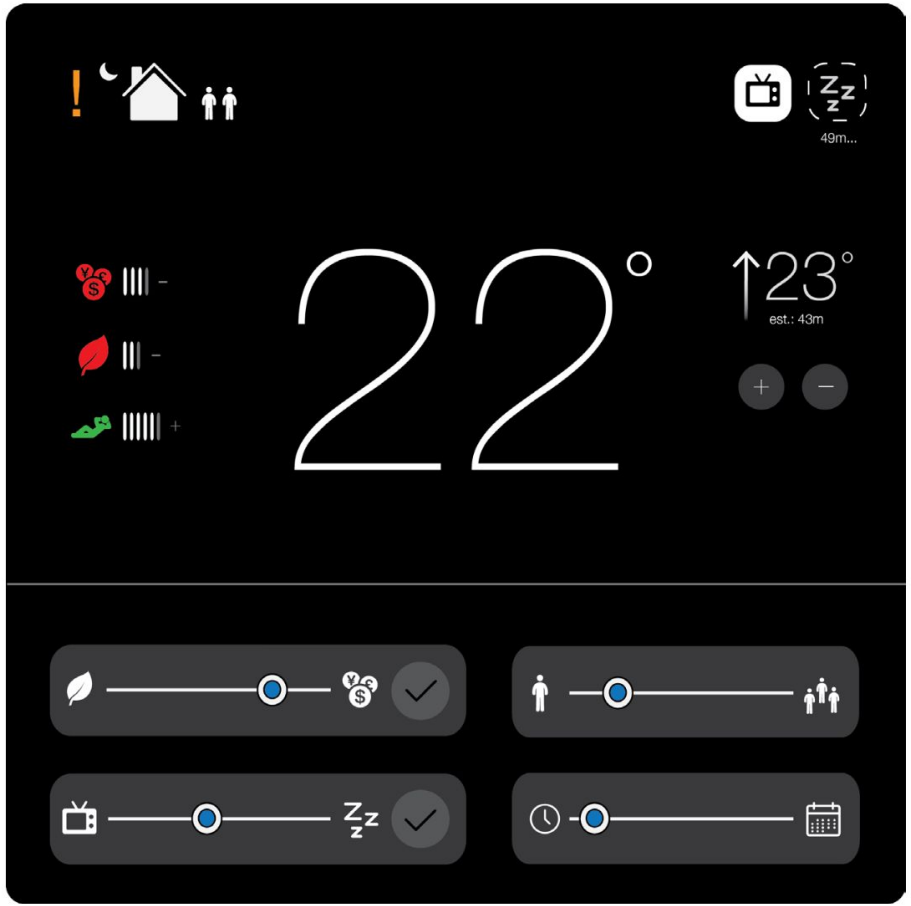


CoffeeChat is a design for a fictional app that brings the office watercooler talk to your home setup. You cannot get coffee without discussing sports with John. The design questions the role of computer-mediated communication and the proliferation of apps that claim to bring people together.

(Super) Smart Home UI (2017)

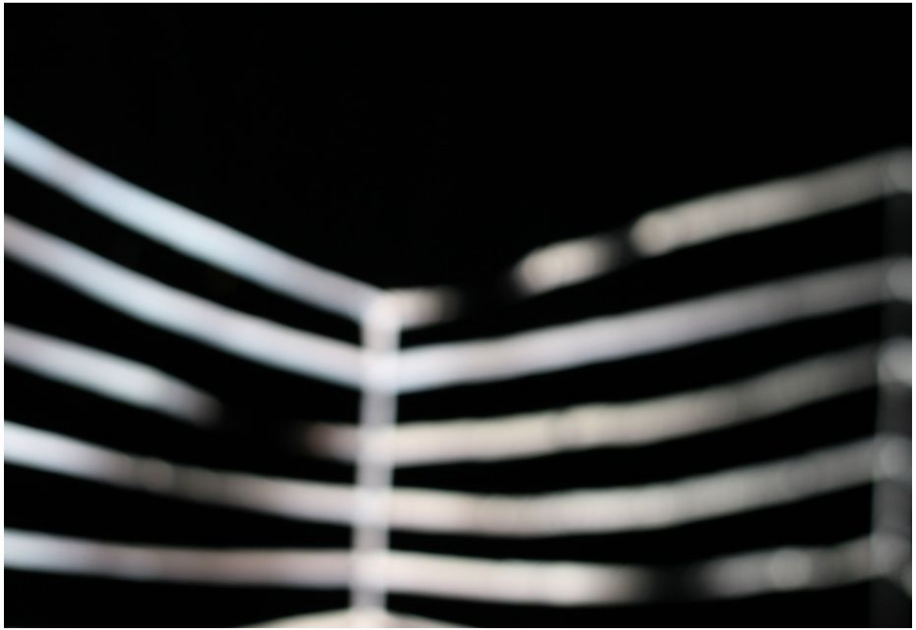
A graphical user interface was designed to include additional preference controls and information regarding system status of a complex smart home system. The design process gave insights to the technical side of the system, and the design served as a design probe during semi-structured qualitative interviews, which were used to inform engineering decisions.

This project was done during an internship at the NTU IoX Center in Taipei, summer 2017.



Chiaroscuro (2015)

This light installation, based on retro-reflectivity, consisted of a dark room that would be experienced in groups. One person would wear LED-implemented eyeglasses, which would enable them to see the art covering the walls.

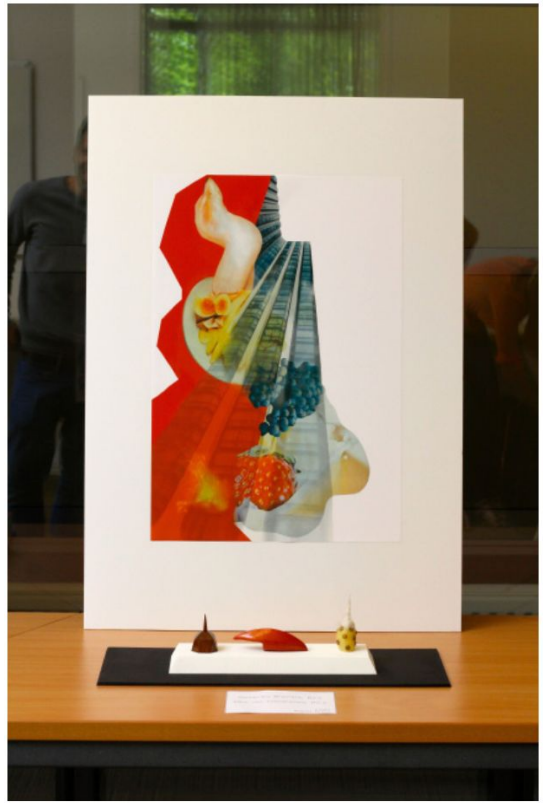


Fast, Intense, and Repulsive (2015)

This project was part of a course on the expression of aesthetic qualities through visuals and materials. At first, we made a collage around the words ‘fast’, ‘intense’ and ‘repulsive’, based on magazine images and Photoshop.

Starting from the collage, the assignment was to develop a set of objects in which the aesthetic qualities from the collage where expressed. The final objects were made from clay that was polished with a spray painted finish (top right), wood (middle right) and carved potato with alpaca wool (bottom right).

The project was done with a partner during the second year of my B.Sc. in Industrial Design, TU/e.



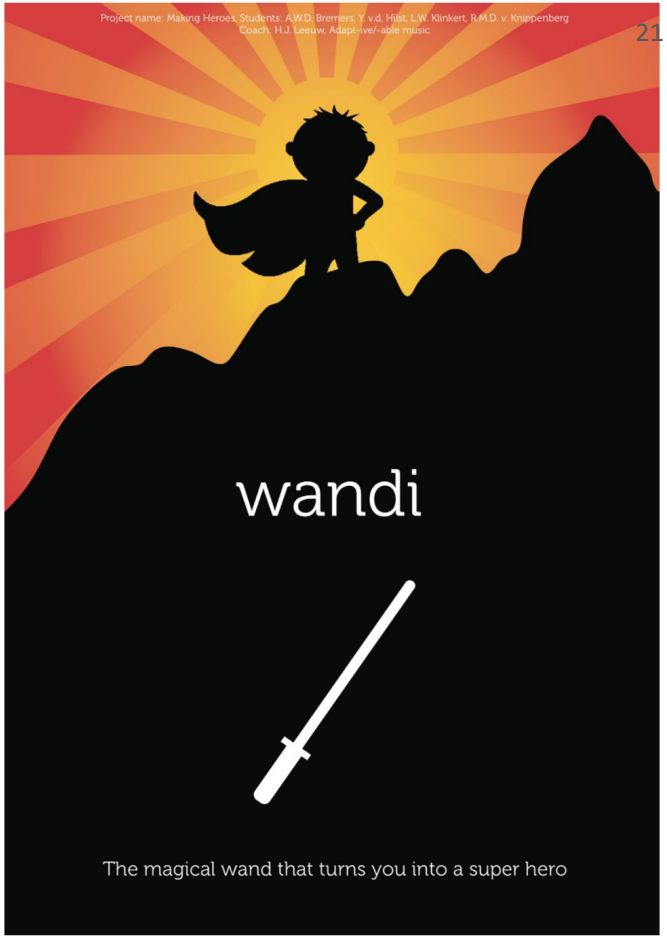
Wandi & Kepi (2014)

The aim of this project was to design a musical object for children with disabilities.

From user studies with a patient with Smith-Magenis Syndrome, we learned that among other symptoms, a lot of times these patients suffer from low self-esteem since they realize that they can do less than their peers. Also, these patients seemed to prefer playing with toys that had sound effects.

We developed the concepts of Kepi and Wandi, a superhero cape and a wand that would accompany movements made by the patient with superhero sound-effects. A technical prototype was made using Teensy, XBees, gyro/acc. sensors and MaxMSP.

This was a team project in my first year of my B.Sc. in Industrial Design, TU/e.



A Post-Modern Entrance (2013)

As a part of a course on design history, during my B.Sc. in Industrial Design at TU/e, we were assigned to design a new (concept) entrance for the Groninger Museum, based on the ideas of postmodernism.

I started with the idea to use cacti, not only because it would evoke strangeness when placed in front of a museum in Groningen. A cactus is a sturdy plant that survives in difficult climates, that looks dangerous but is crucial since it reveals to man where water is. I found this an interesting metaphor for the role of art in society.

Two cacti could easily serve as pillars for a temple entrance. I added a triangle to resemble the Greek tympanon, as well as two contrasting circle halves to create a more balanced whole.

The result looks comical and ironic, but given that the assignment was on postmodernism, that was more or less the goal.