

PORTFOLIO  
NIEK MARKS



# Hey,

My name is Niek Marks,  
a technical focused industrial designer,  
with a love for simple mechanical solutions, prototyping  
and manufacturing techniques.

My passion is to understand every working principle of our world.  
From simple mechanical solutions to complex systems.  
Every day brings a problem or product that has to be unravelled and understood.

Since I was young there has not been a single product in my life that I did pry open with a  
screwdriver and hopefully that fascination will never vanish.



# BACHELOR TU DELFT

From September 2007 until July 2010 I have attended the Bachelor program of Industrial Design Engineering at the TU Delft.



# BAMBOO CHAIR

This chair is developed for babboolea, a bamboo product producing company. The chair is intended to be integrated in outside wooden floors used in gardens or on green roofs.

Because of its foldable design it is especially suitable for situations where space is scarce.

Invisible when not in use



Simple to unfold

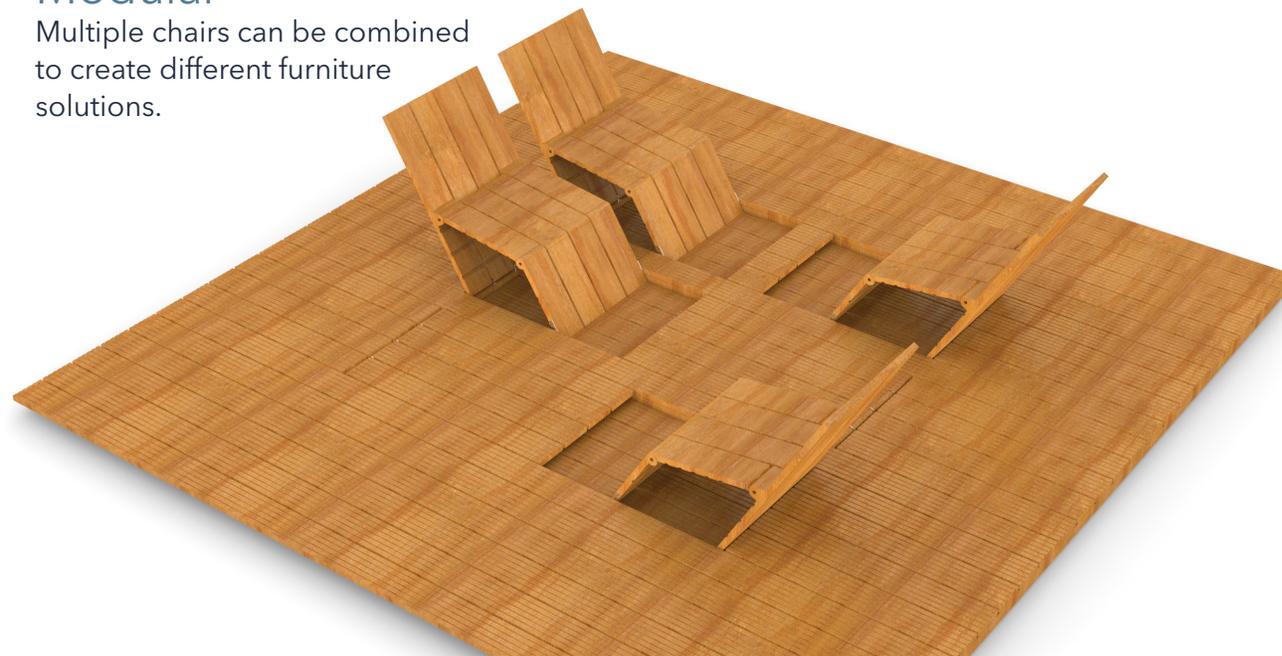


Automatic locking hinges



## Modular

Multiple chairs can be combined to create different furniture solutions.



Model  
Scale 1:10

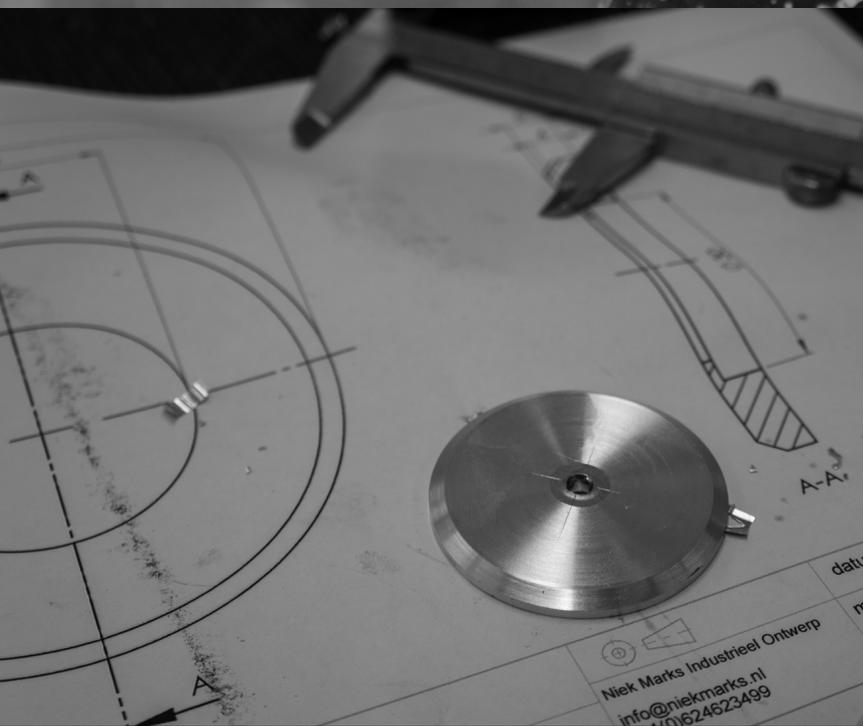




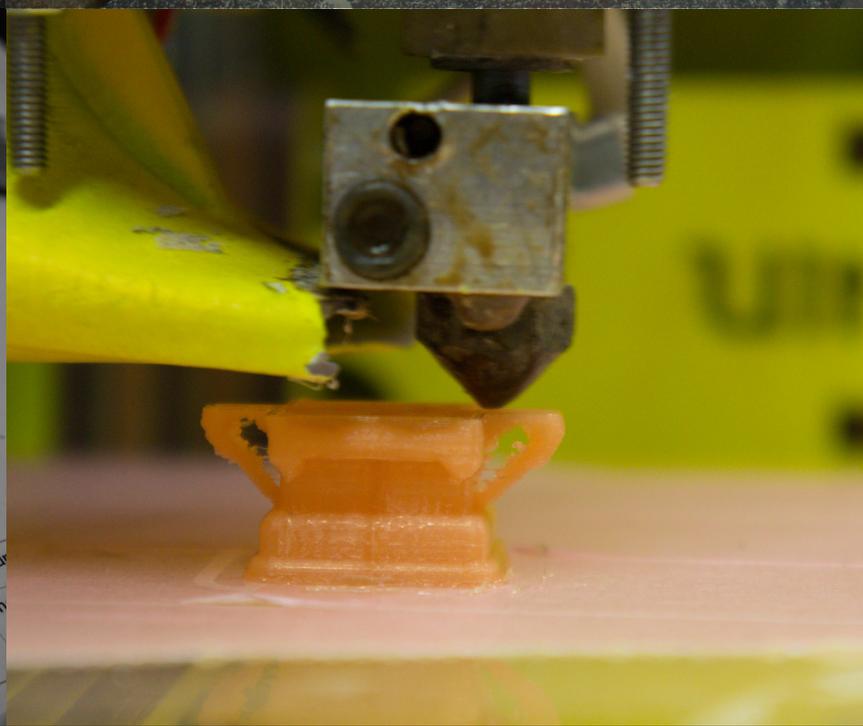
Milling



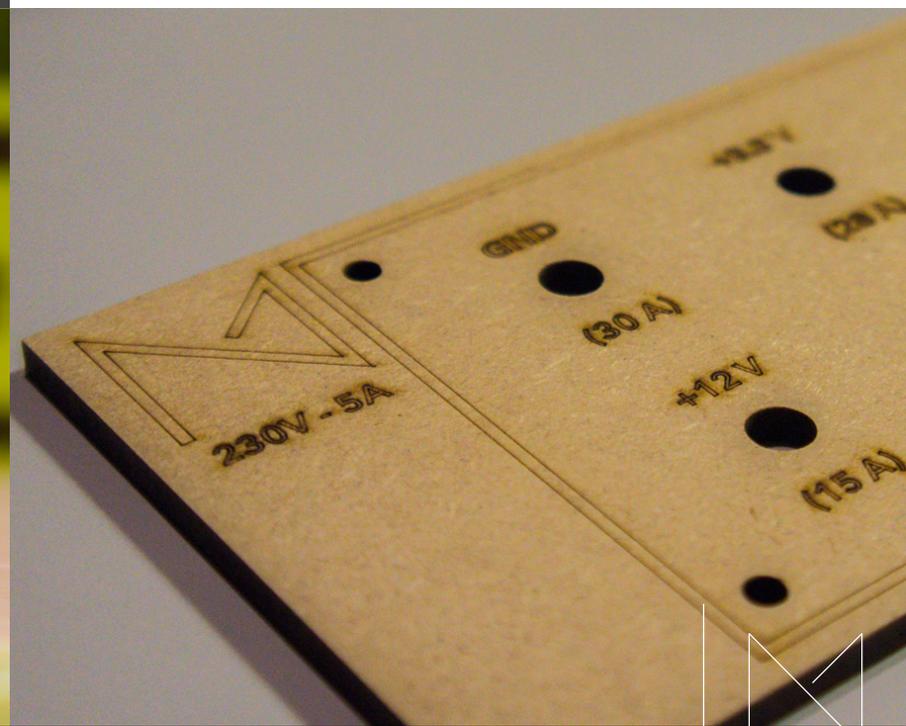
CNC-Milling & Turning



Turning



3D - Printing

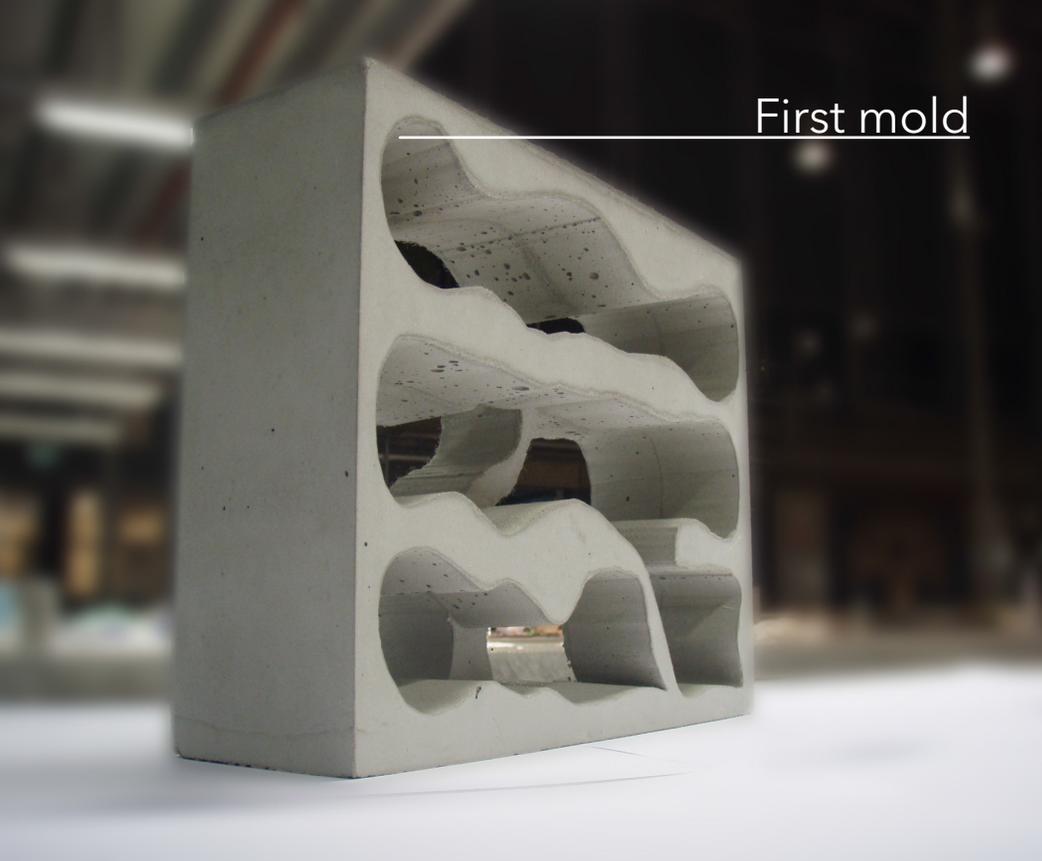


Laser cutting

# MINOR ADVANCED PROTOTYPING

During the minor Advanced prototyping at the TU-Delft I specialized in basic prototyping techniques, 3D-CAD modeling (Rhino and Solidworks) and using augmented reality to test concepts.

I have been teaching these skills to other students since 2009 as a student assistant at the TU Delft.



First mold

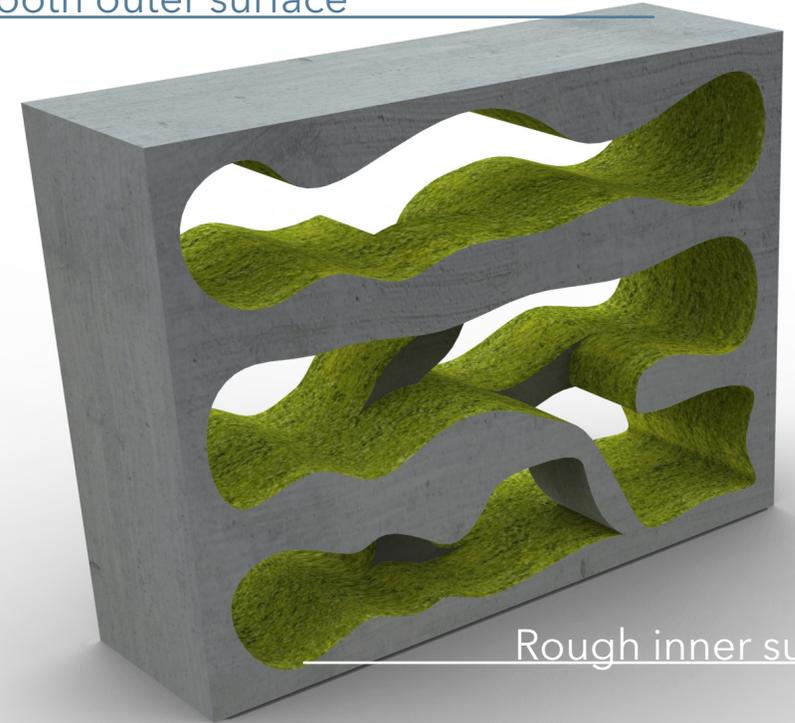
## Concrete object

This project has been an exploration into the possibilities of concrete moulding.

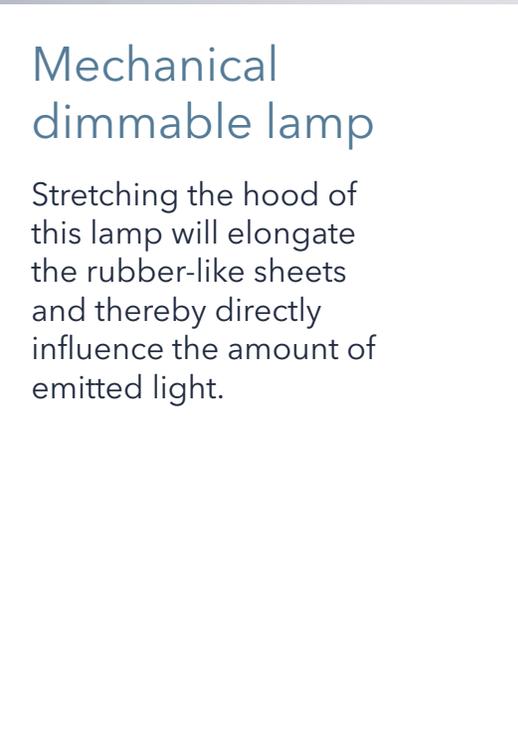
The final object is a concrete block that can be incorporated into urban situations. Where the rough inner surface will serve as a growing medium for organic material such as moss.

This will result in a miniature world where kids can play with their toys and visualize their fantasies.

Smooth outer surface



Rough inner surface

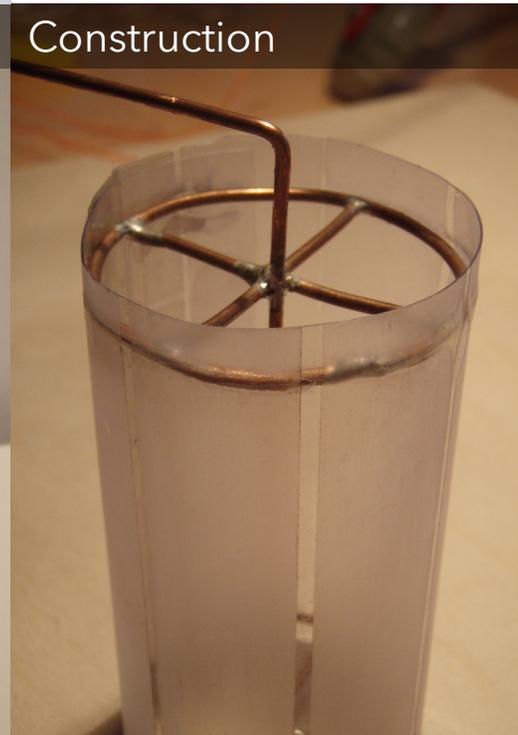


## Mechanical dimmable lamp

Stretching the hood of this lamp will elongate the rubber-like sheets and thereby directly influence the amount of emitted light.



Foam



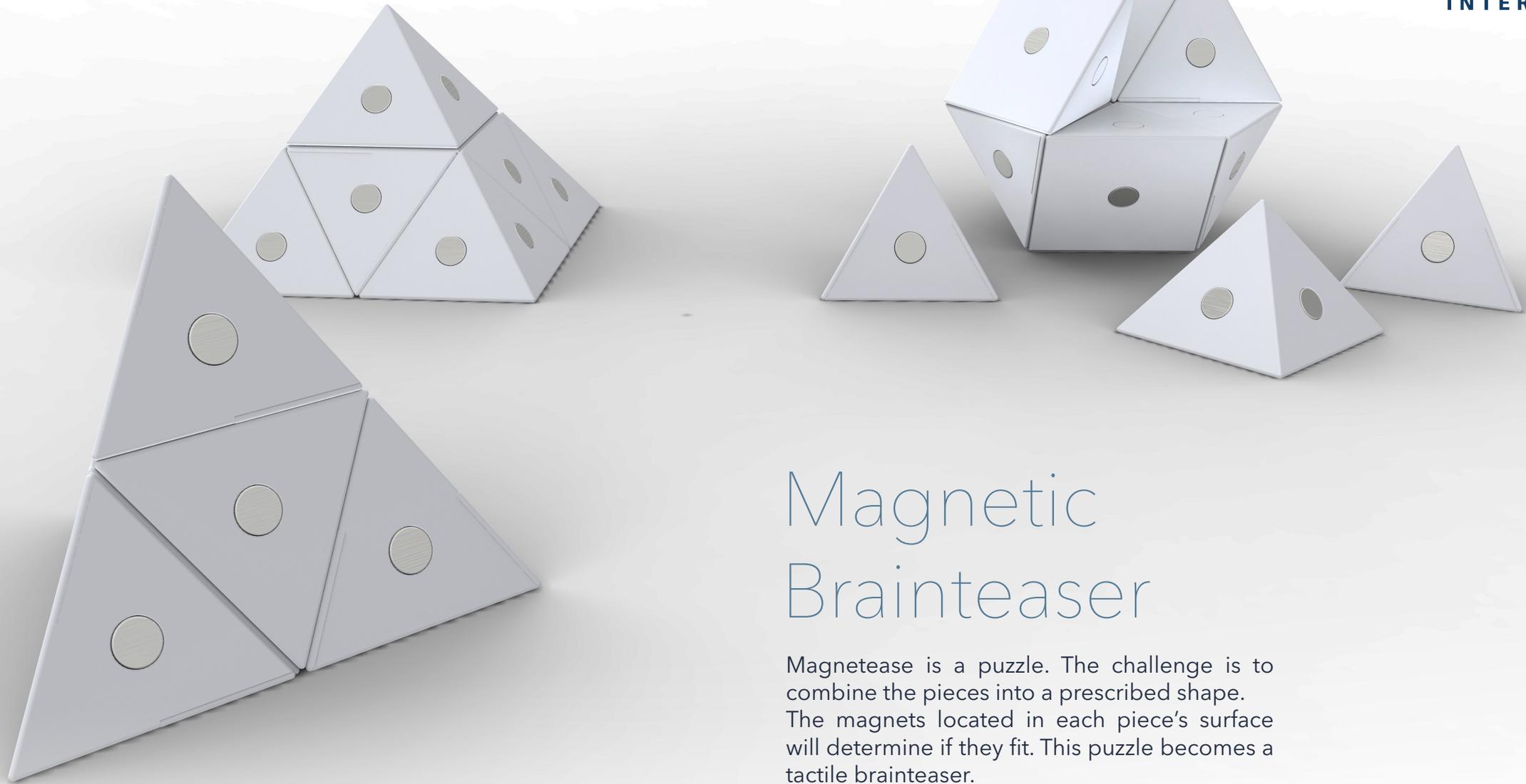
Construction



Working principle

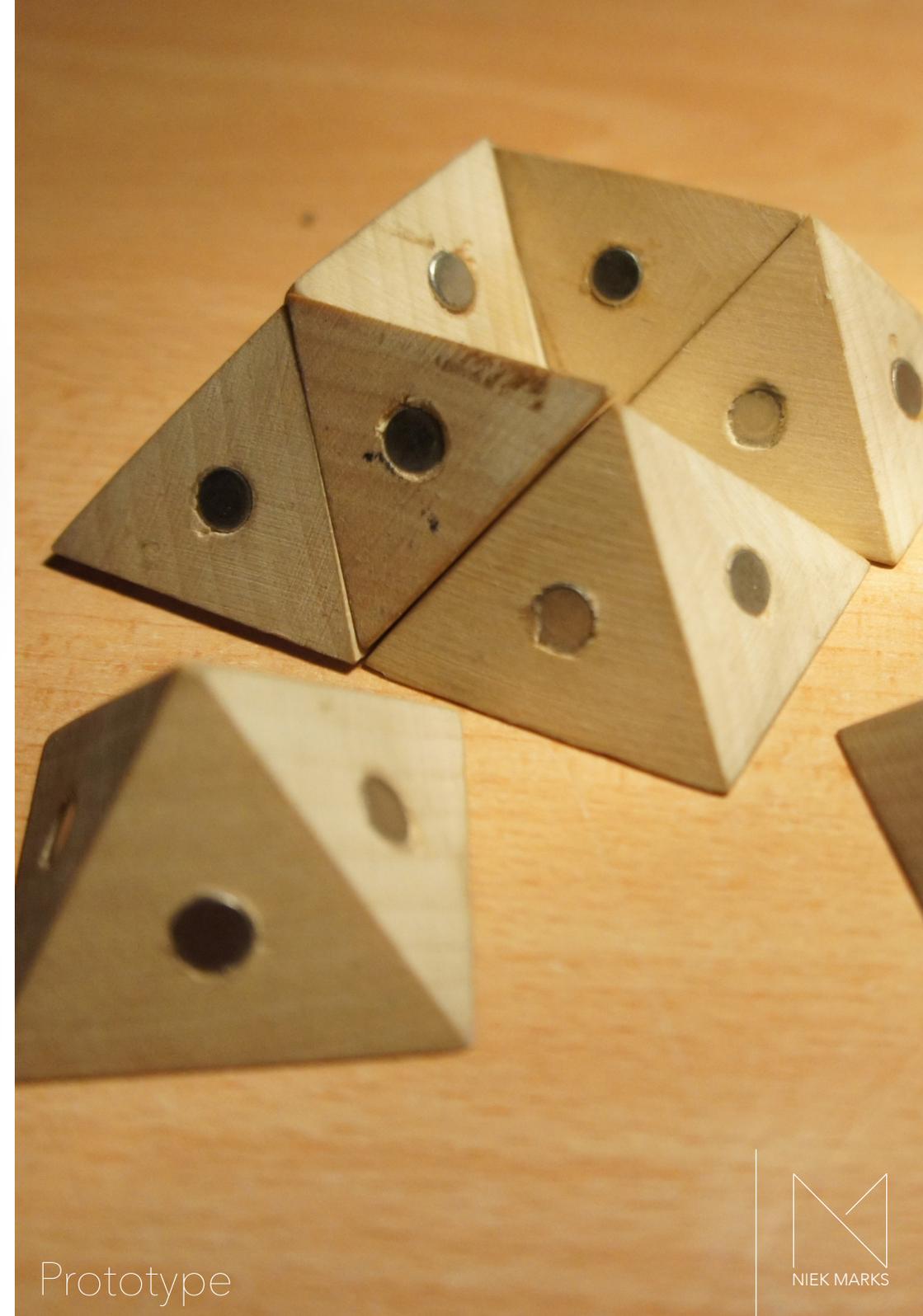
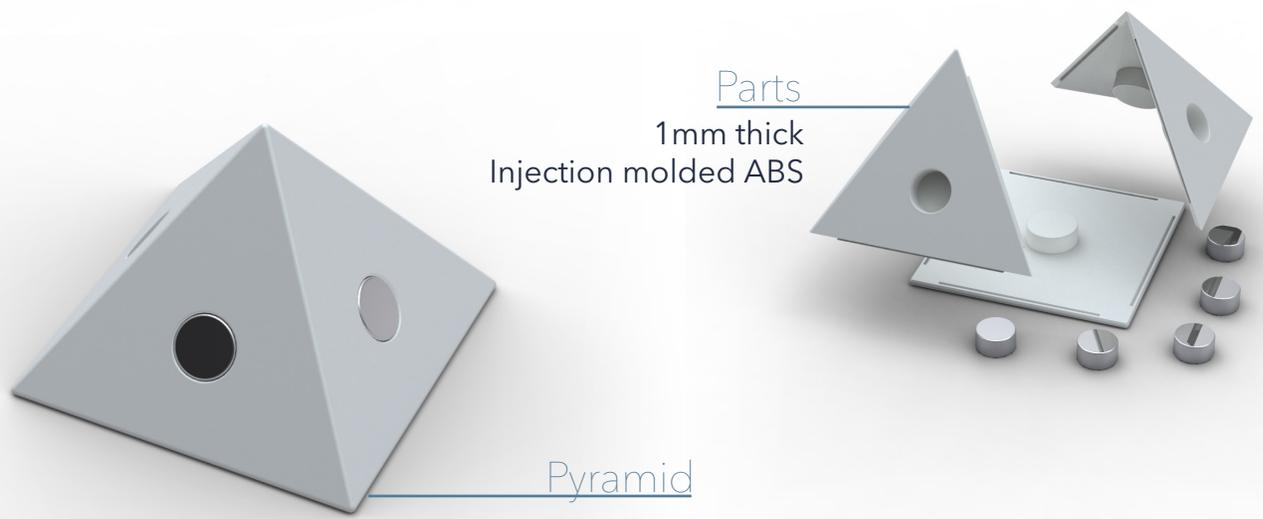
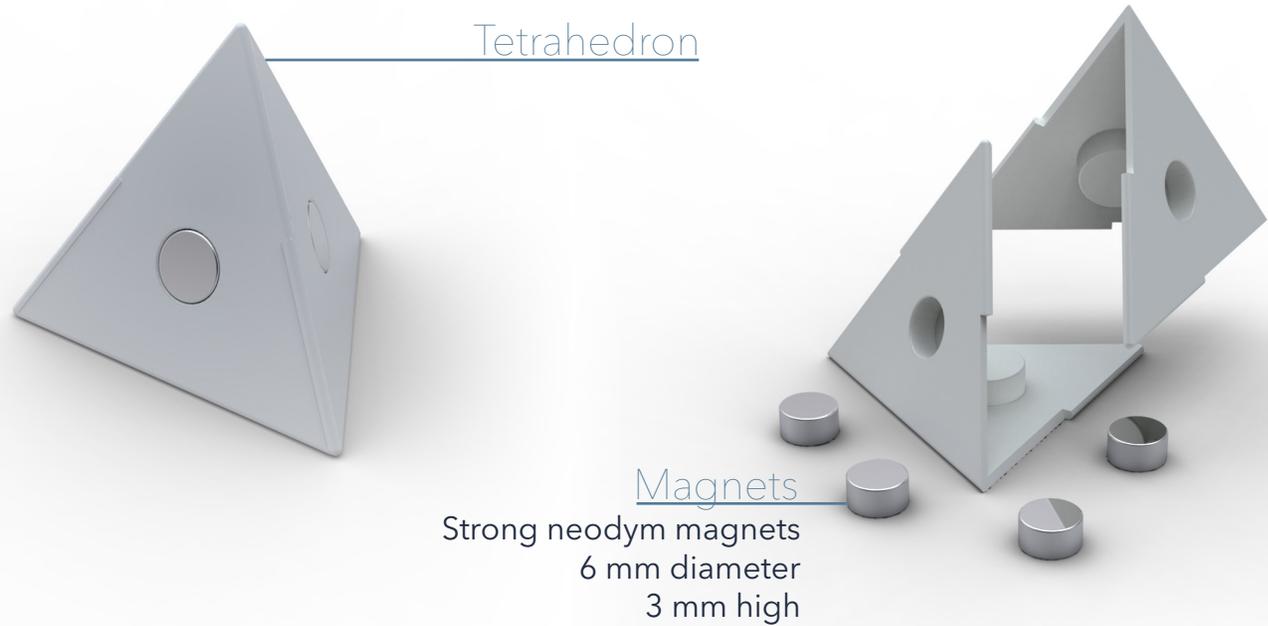


Final prototype



# Magnetic Brainteaser

Magnetease is a puzzle. The challenge is to combine the pieces into a prescribed shape. The magnets located in each piece's surface will determine if they fit. This puzzle becomes a tactile brainteaser.



# Master TU-Delft

Since 2012 I have been attending the Integrated Product Design Master at the TU-Delft. IPD focuses on the entire process from design brief to that of a completed, materialised and validated product or prototype.

Within the IPD master I have followed the "Medisign" specialization. Designing for medical applications has learned me true integrated product design with great attention to manage all the expectations and demands of the numerous stakeholders.

# STAIRLIFT for Thyssen Krupp



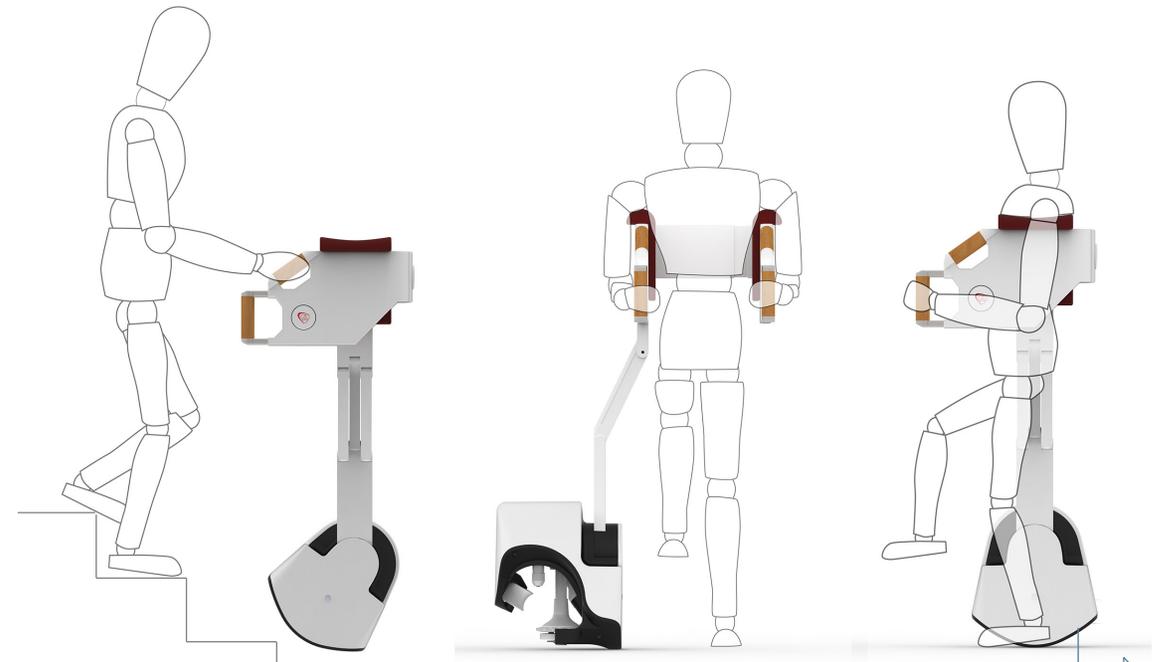
## A new stair lift concept

The guardian is a revolutionary stair walking support concept that has been developed during the Advanced Concept Design course at the TU Delft.

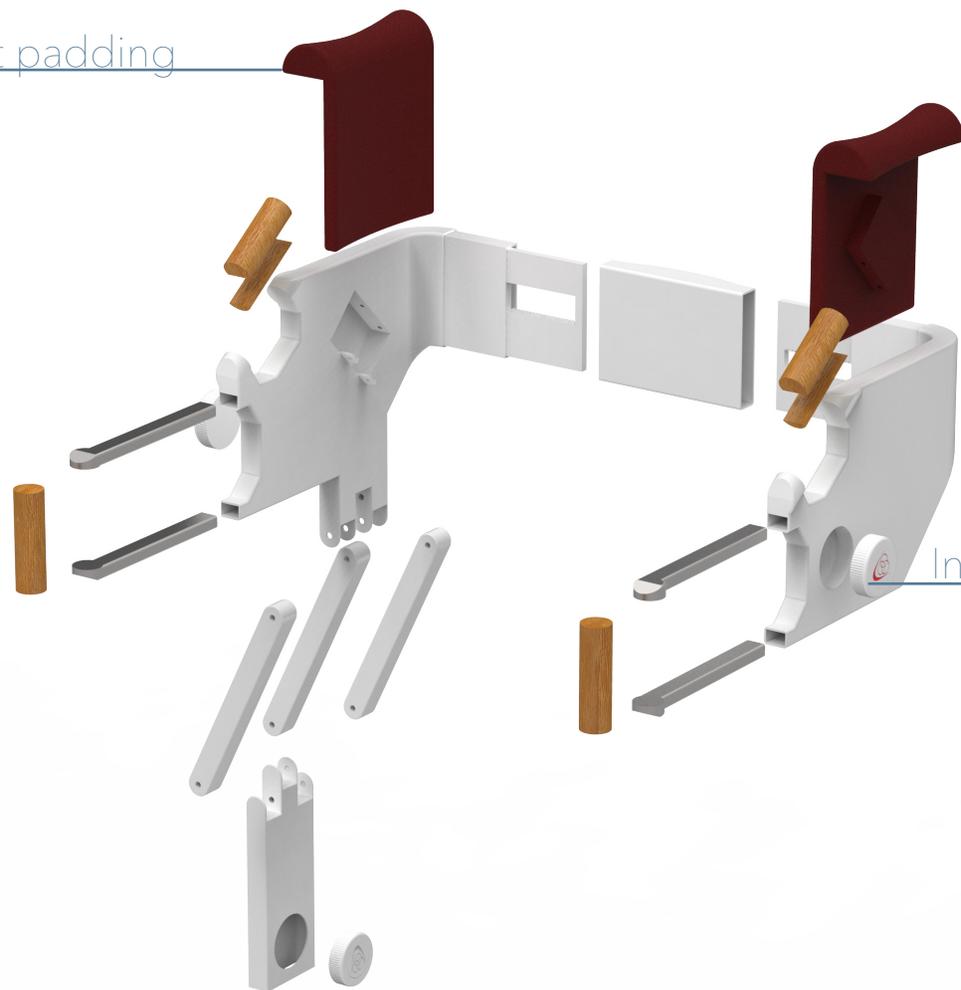
## Medisign

The main disadvantage of current stair lifts is that they lead to less physical activity and thus to physical deterioration of elderly.

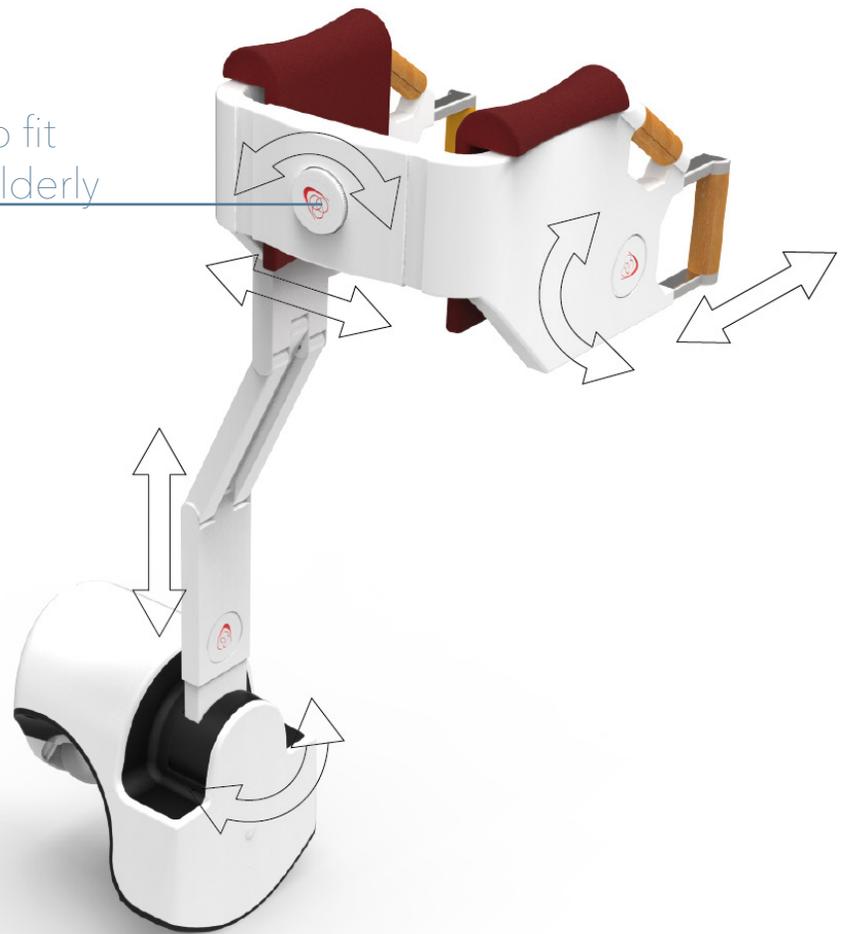
That is why the guardian is adapted to the human locomotion to help somebody climbing the stair instead of just lifting them up or down the stairs.



Soft padding



Adjustable to fit 95% of the elderly



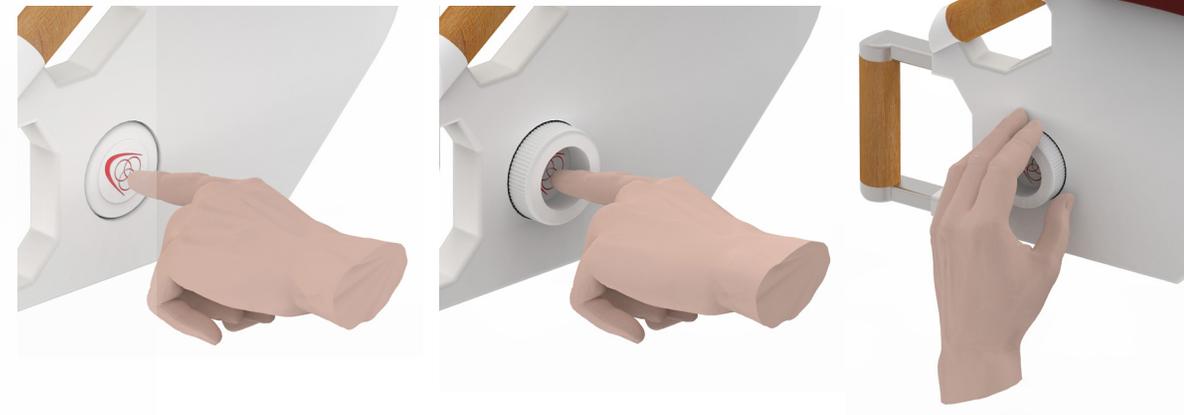
Intuitive adjustments

Standard drive motor



Load sensors

Quick and easy adjustment knobs



# ORGAN TRANSPORTATION CONTAINER

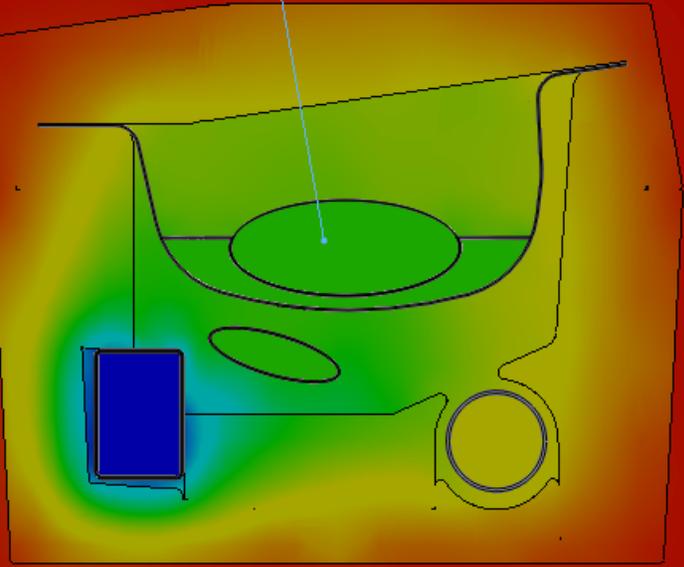
The Airdrive Next has been developed for the Dutch company Oxiplenish and utilizes their unique mechanism that enables portable Machine Perfusion (a technique to preserve organs during transportation). The final design has been prototyped, digitally simulated and tested in the real world to ensure its working principle.



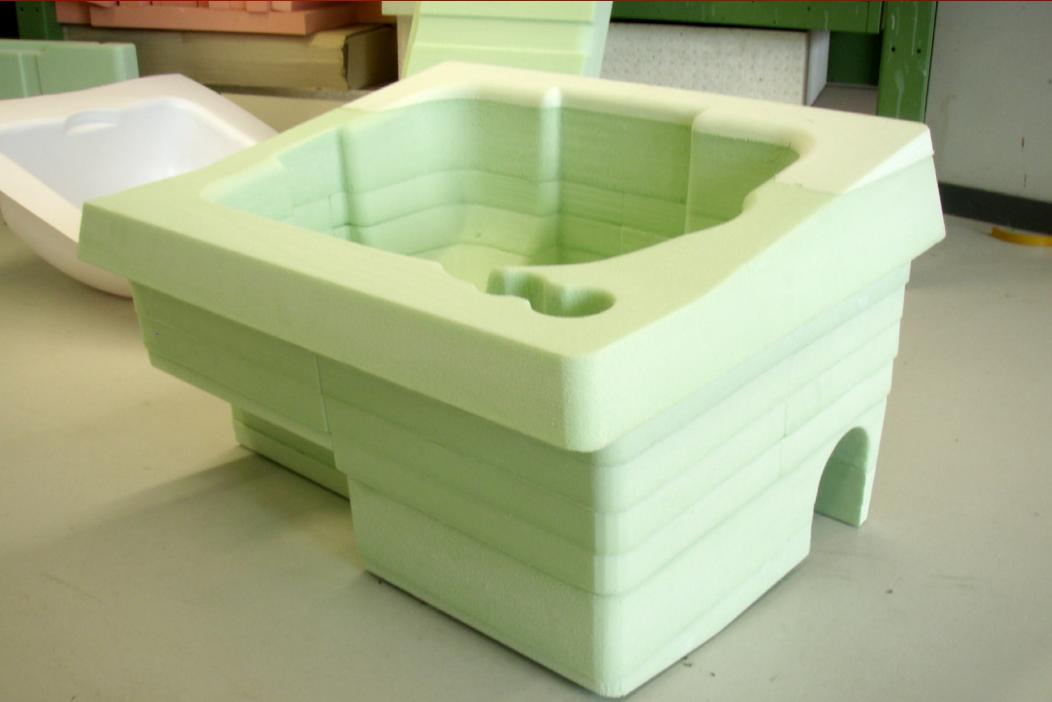
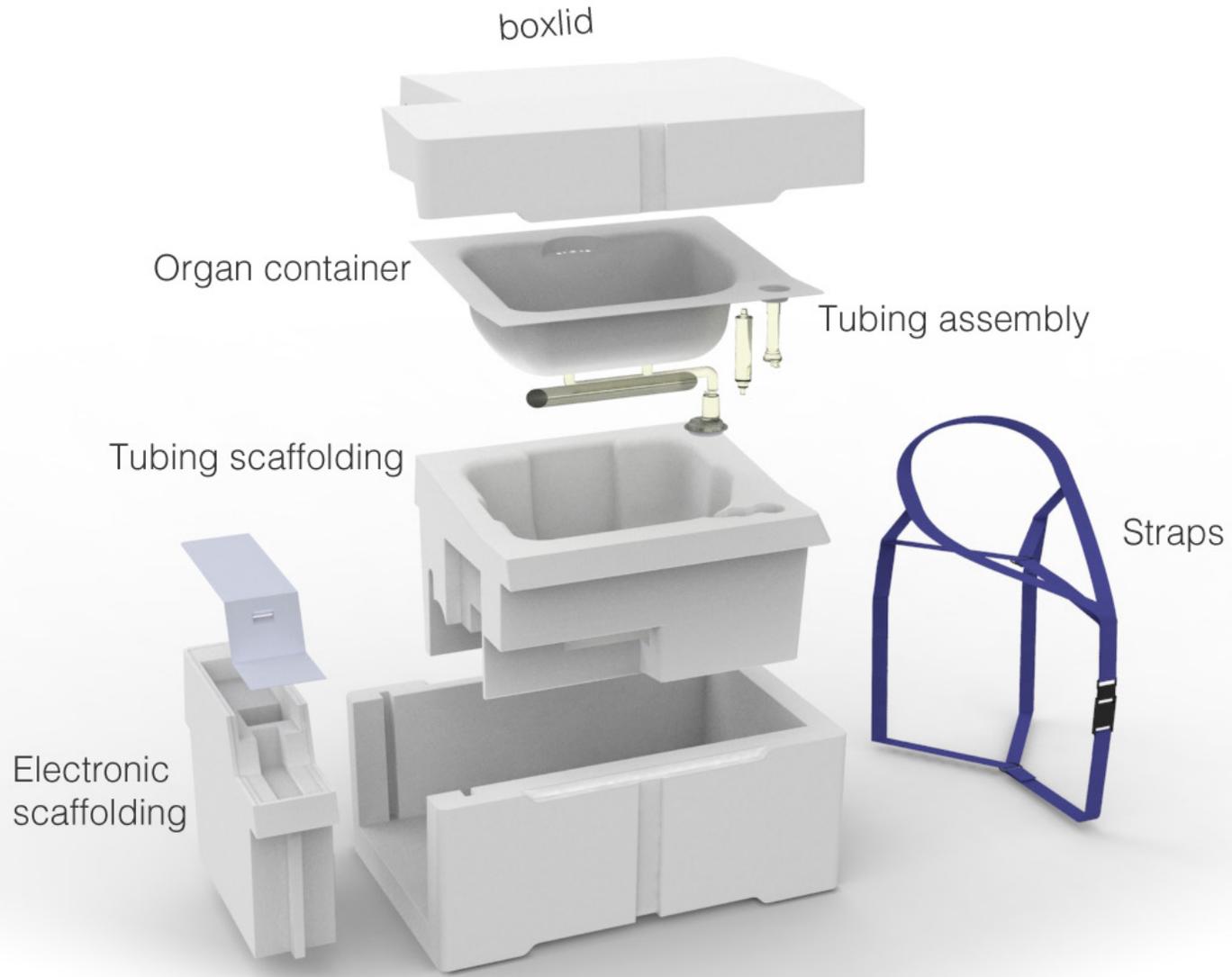
TU Delft | AED  
Company | Oxiplenish  
Team members | J. Jansen, L Bosman,  
V de Gelder, Z Wu



# Insulation Simulations



# Exploded view



1:1 Prototype

# PIPESUPPORT

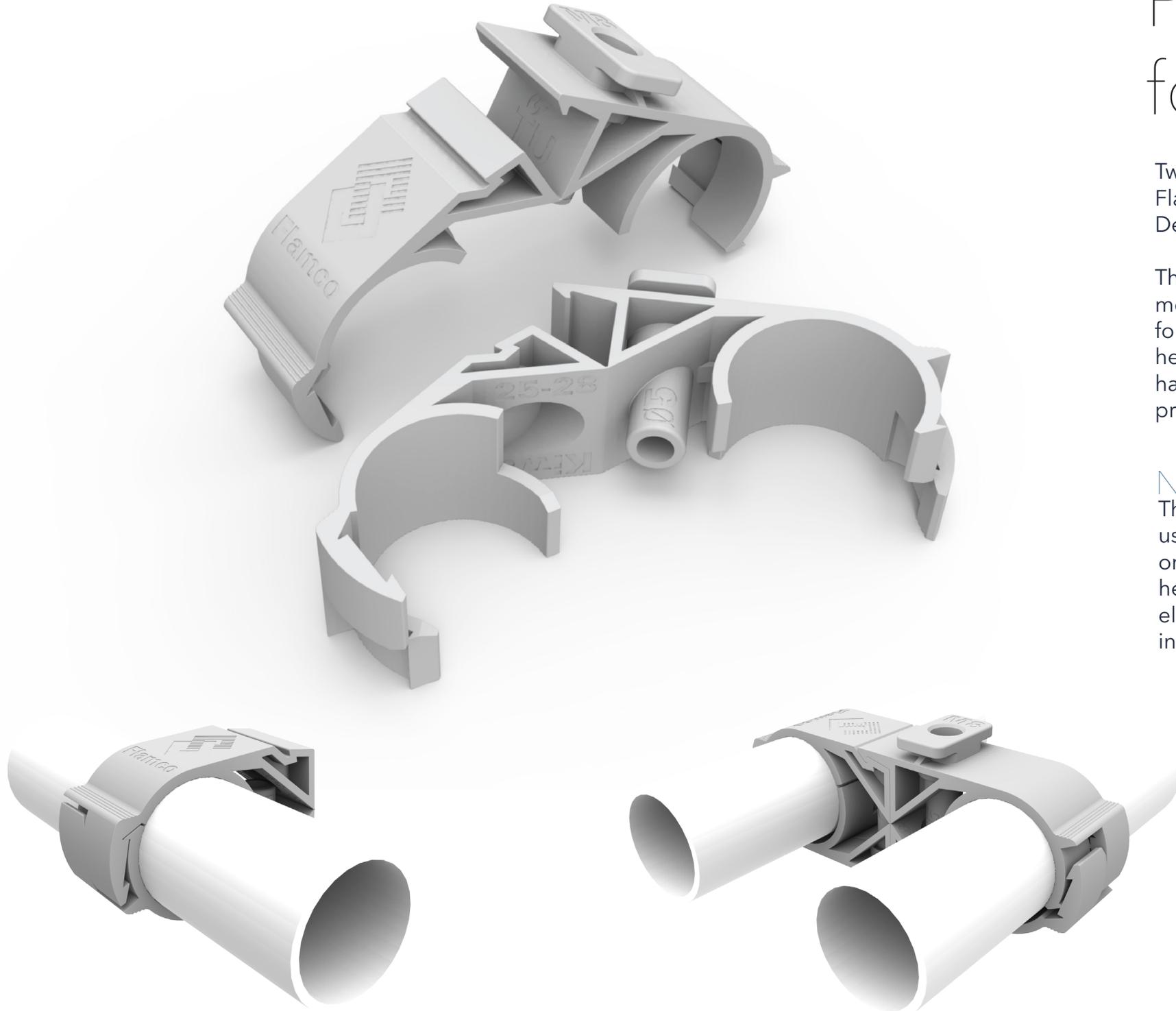
for  **Flamco**

Twinclix is a product that has been developed for Flamco during the Joint Master Project at the TU Delft.

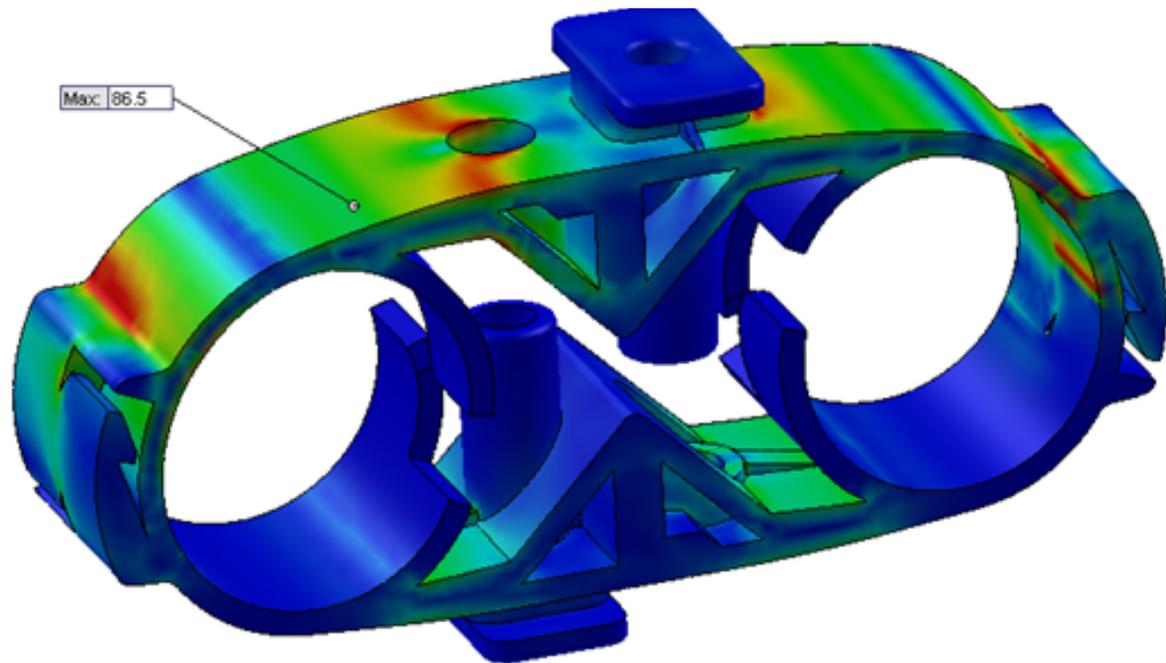
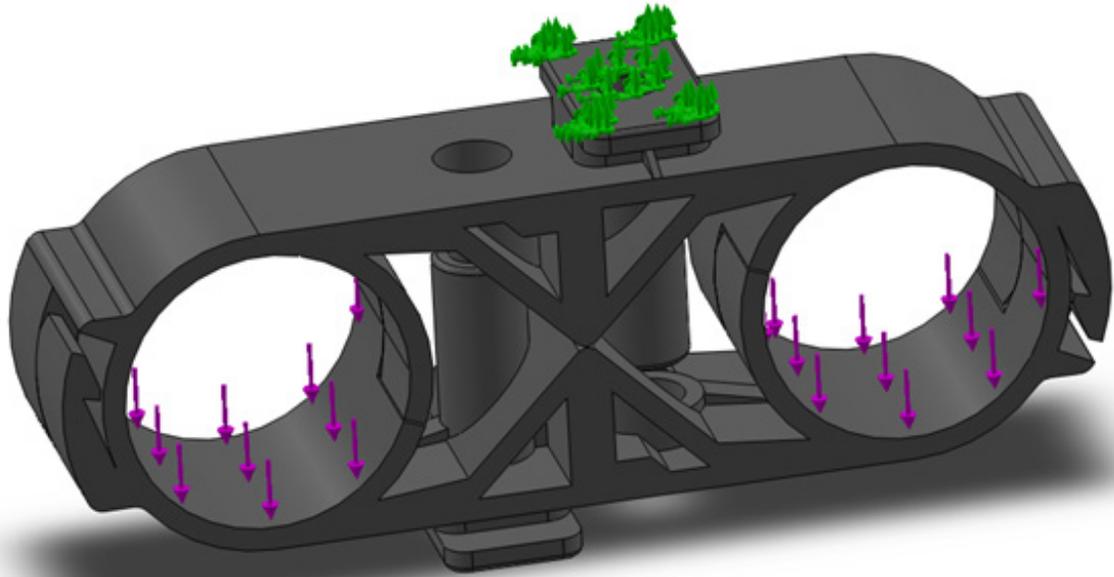
The assignment was to create a new pipe clamp to mount pipes to walls, ceilings or any other surface for medium sized pipes. Since pipe supports are heavily patented and the market is conservative it has been a major challenge to come up with a new product.

## New Concept

The TwinClix is truly new. A single clamp can be used in two scenario's, to support a single pipe or to support two pipes. Since for instance central heating systems will always have two pipes this will eliminate almost half of the work to fix these pipes in a building.



## Simulation



## Prototyping

Multiple prototypes have been 3d-printed to test design iterations



# BLUEDOT FOUNDATION

Bringing student products to the market

## The Foundation

From September 2009 till September 2011 I have been part off the BlueDot foundation. BlueDot is a platform for students who have product idea but do not have the knowledge or the funding to take this to the market.

## My role

Within BlueDot I have been responsible for the technical side of the product development. This included building prototypes, guiding the realisation of the first series and negotiating with suppliers.



## Pose by Malik Tas

“Pose” is a small desktop LED light. The big parts are milled out of solid aluminium and finally anodized for a beautiful and durable finish.

In close cooperation with Malik I have been responsible for the production of all the parts. For the first serie of ten pieces this included over 40 CNC milled parts and more than 70 hand milled or turned parts. This product has been brought to the market and is currently on sale at multiple locations in the Netherlands.



L' Offre  
Designer: Roel Roskam

My Role:  
Handmade first 40 prototypes  
Managed the first production run (500 pcs)



Frolic Feather  
Designer: Nils Al

My Role:  
Handmade 10 aluminium bases  
Package design  
Electronics assembly of +20 pcs



ALUminate  
Designer: Goran Aleksijovski

My Role:  
Prototype creation  
Handmade 20 pcs  
Handmade 50 Aluminium wick holders  
Package design



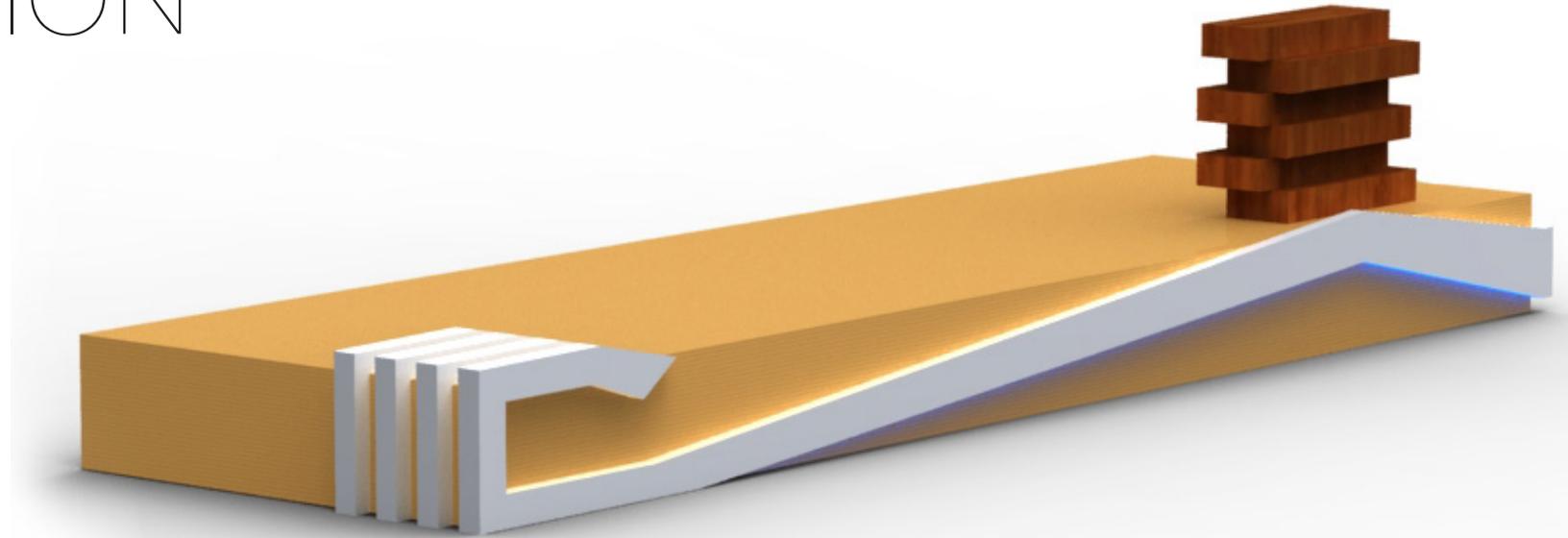
# Additional projects

Besides projects for the TU Delft I have conducted multiple personal and professional projects. Primarily focusing on

- Prototyping
- CAD-modeling

# STAGE DECORATION

For the TU-Delft we developed a temporary stage decoration that reflects their technical image and enriches the look of the current stage while blending in with the already in place lighting solution.



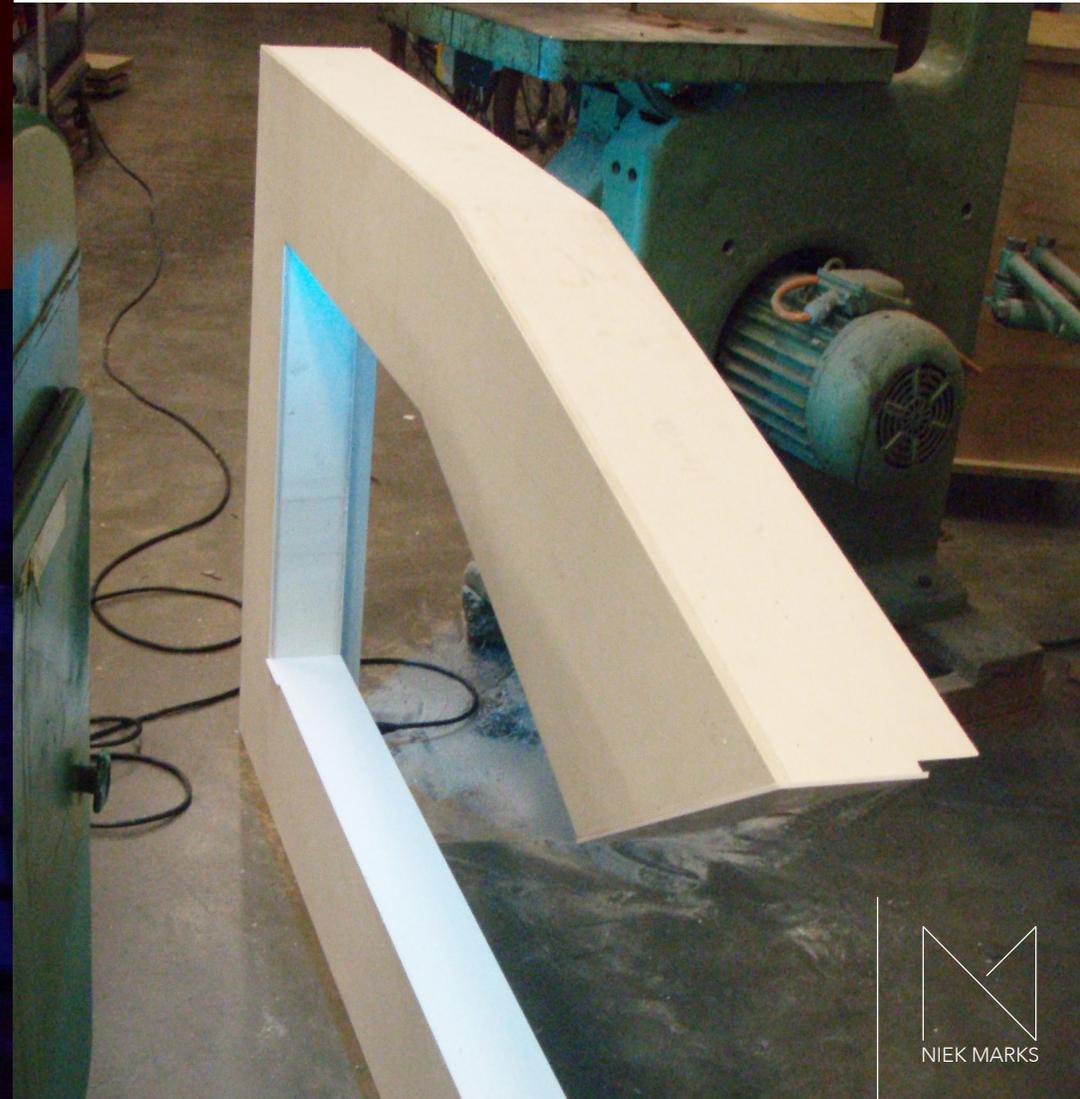


### The design

Since the decoration is not always displayed, the final object is subdivided in over 12 pieces of 1.5 meter. These pieces all fit in one flight case to ensure safe and proper storage.

### Full RGB color

The stage decoration is equipped with over 20 meter LED RGB lighting. The color of the object can be changed in real time from a remote location.

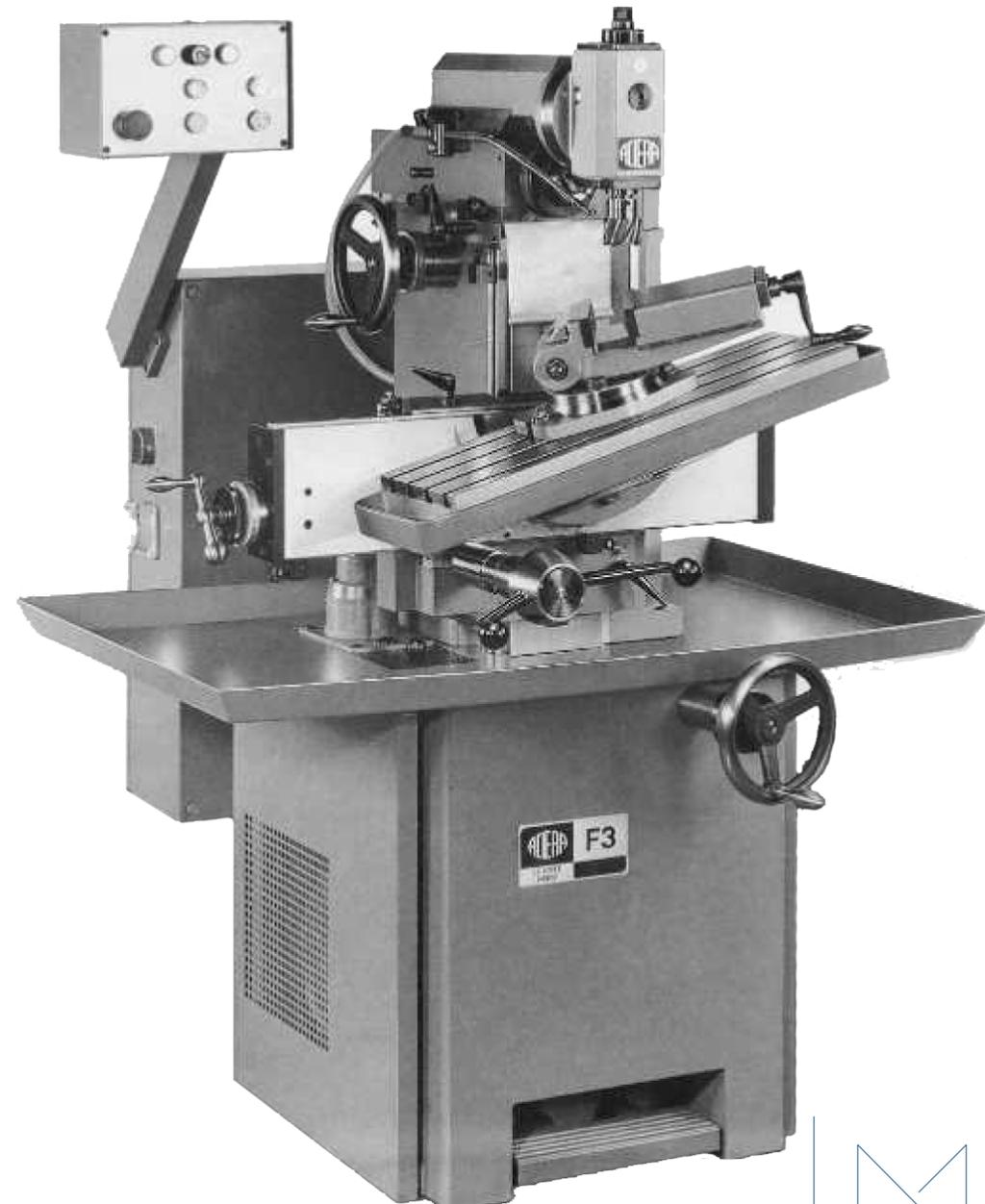




# Internship at Studio Ninaber

As part of my internship I retrofitted a, 60 year old, Aciera F3 milling machine with stepper motors and new spindles to convert it to a CNC milling machine.

This highly technical and practical assignment gave me the opportunity to learn about specific mechanical systems and solutions. Besides this knowledge I also practiced working on all the common machines in a wood / metal workshop such as milling machines, lathes, basic metal sheet working machines, welding, etc.





### From Scratch

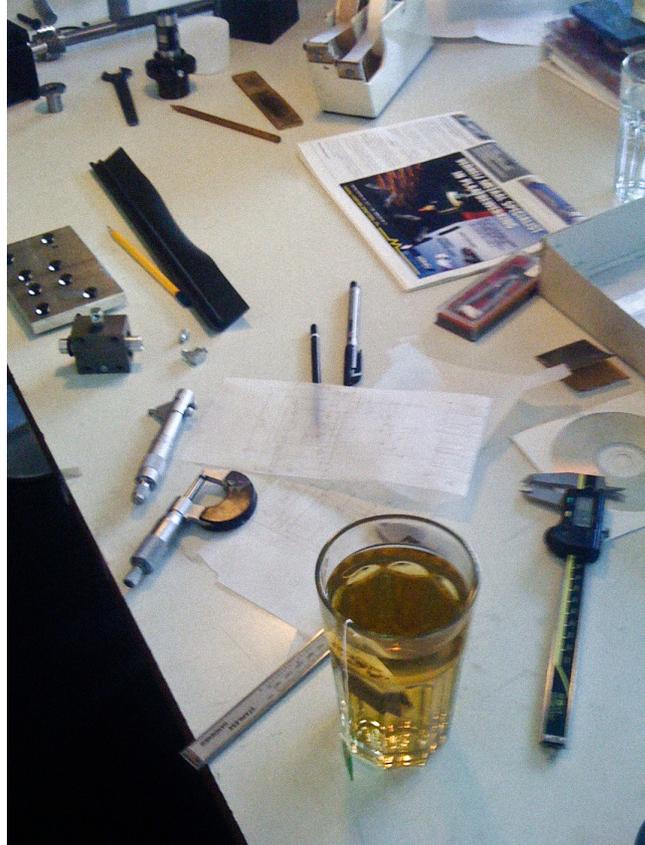
This build was far more elaborate than just mounting three motors. We rebuild the entire mill by first taking out almost every part, cleaning and that rebuilding it with the new technology included.

By doing so I have learned how a fantastic machine, that has been around for over 60 years, is constructed.

### Parts

For this build we bought the motors and standard equipment. But all the connectors and mounts had to be designed and made by hand.

Shown in this picture is a couple between the motor and the shaft. This is only one of the many parts I build.



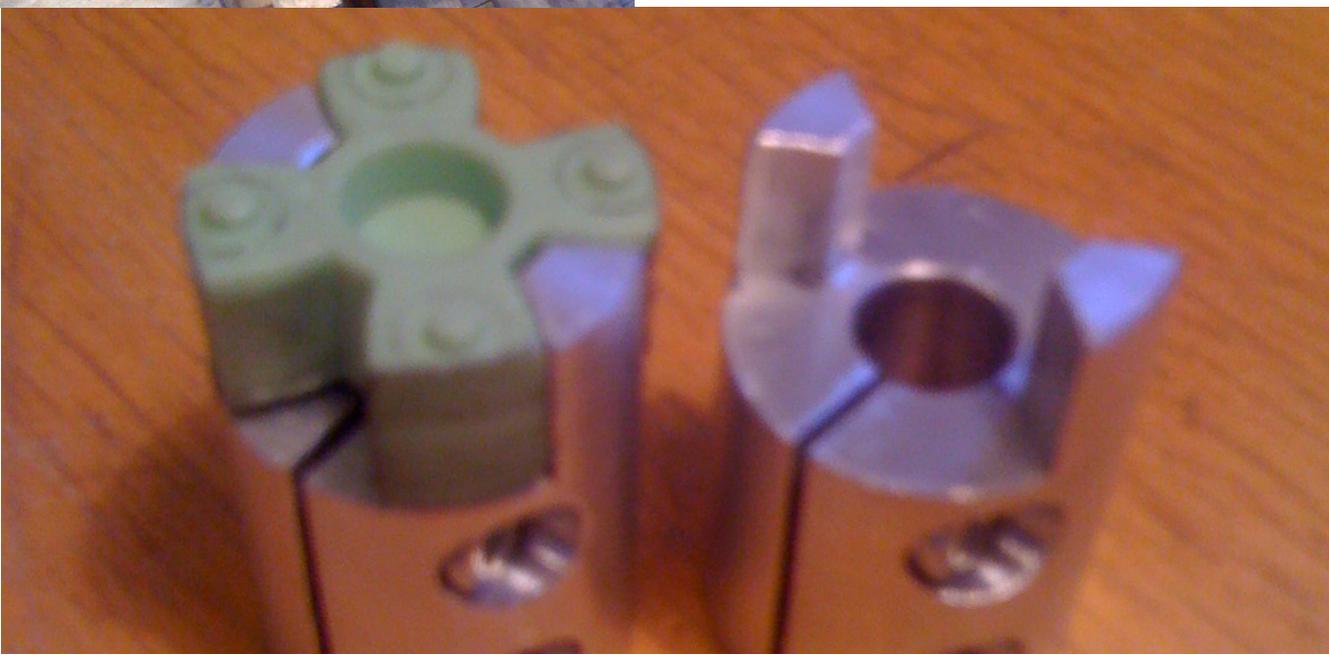
### Workplace

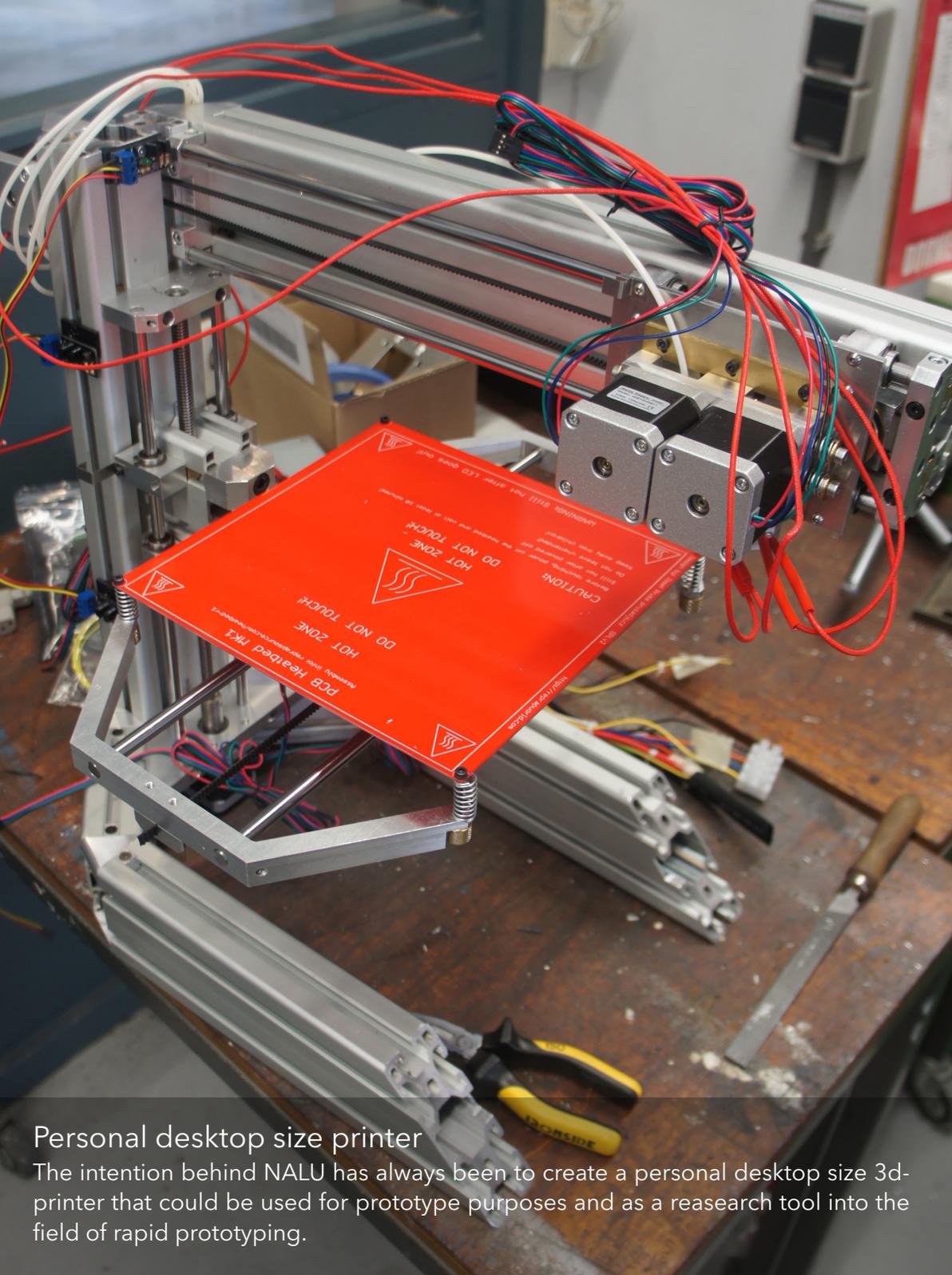
During the entire build, around six months, I have not been behind a computer for a single second. The entire build is done based on hand drawings and calculations. I have developed a feeling for sizes, tolerances and materials beyond that is ever possible behind a computer screen.

### Working Machine

One of the best days of my internship was the day we started-up the CNC-Mill and milled our first object.

The final result was a CNC-milling machine that was accurate up to 0.01 mm and strong and stable enough to mill any metal.

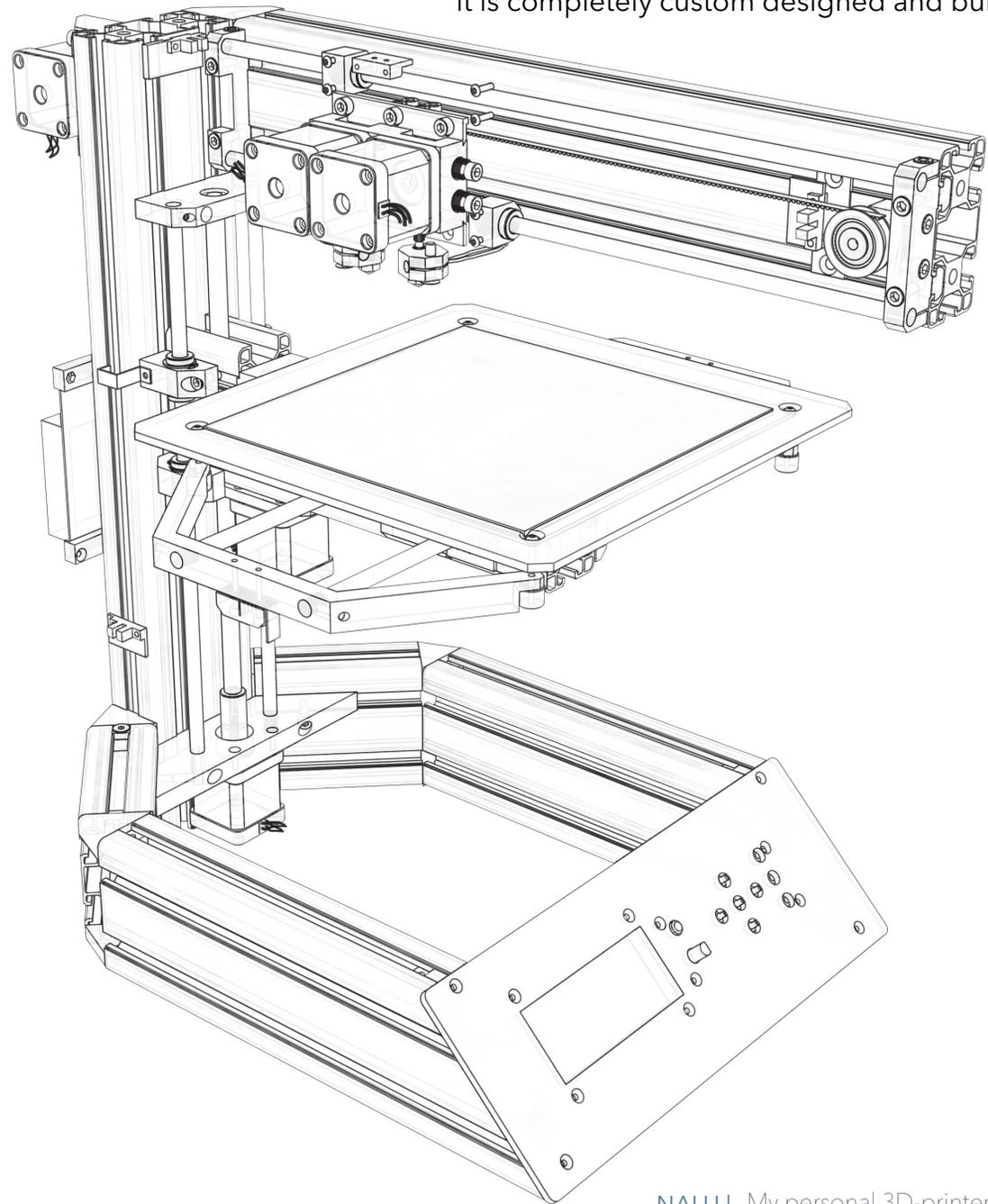


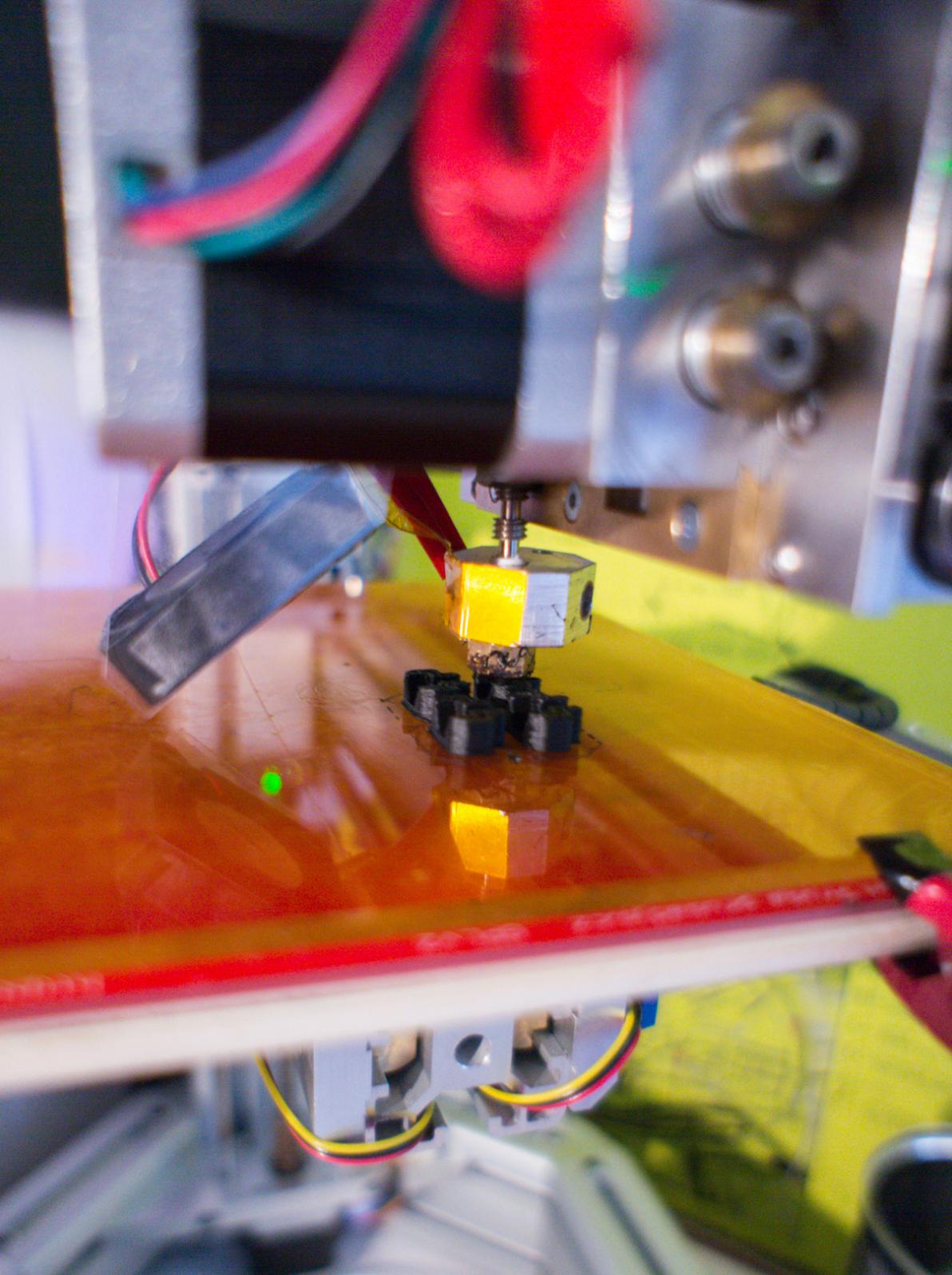


Personal desktop size printer  
The intention behind NALU has always been to create a personal desktop size 3d-printer that could be used for prototype purposes and as a reasearch tool into the field of rapid prototyping.

# NALU 3D Printer

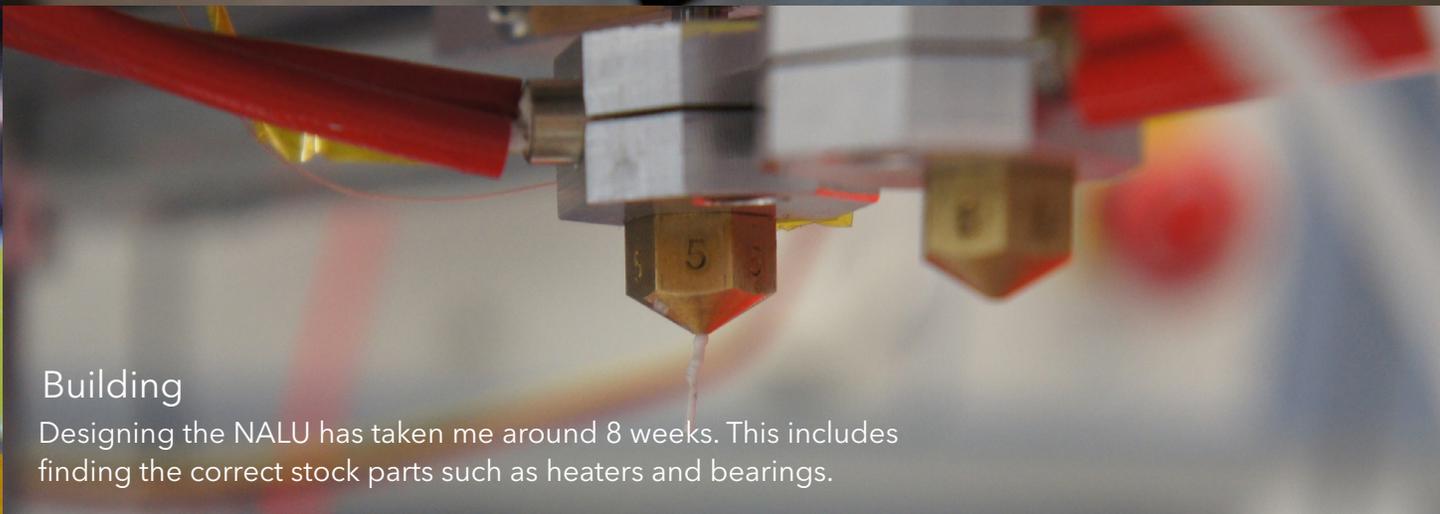
The NALU has been one of my biggest projects so far. It is completely custom designed and build 3d-printer.





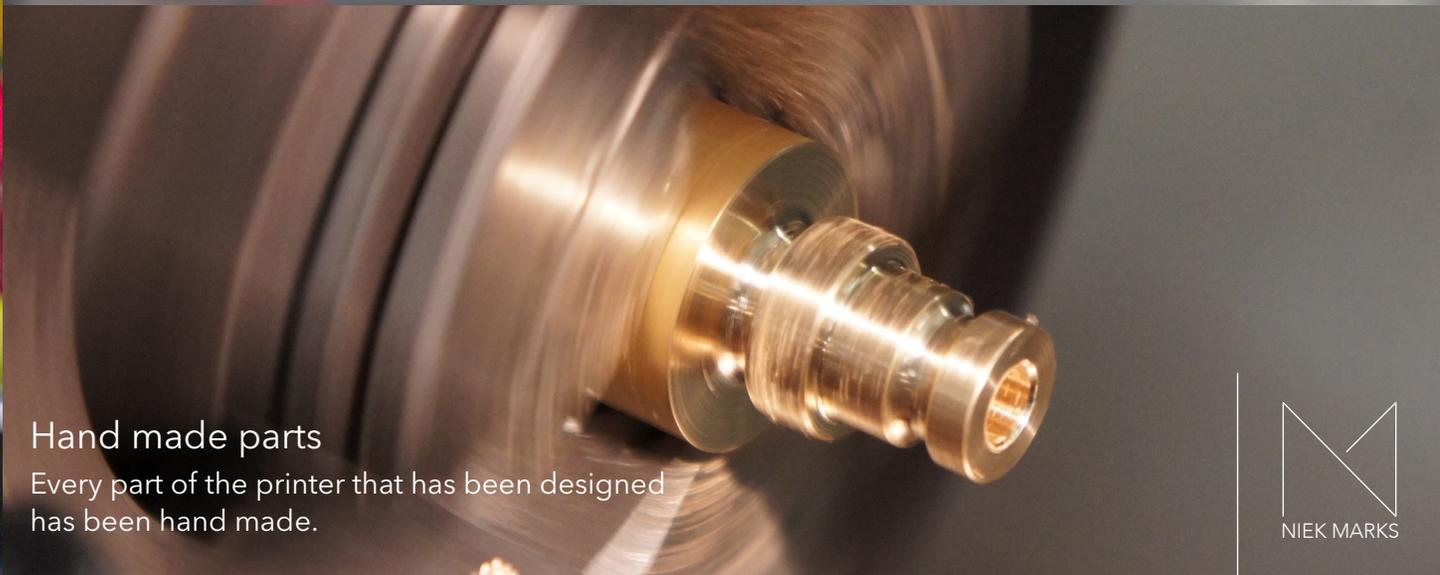
### Autonomous

The printer is fully autonomous due to its keypad, display and SD-card support



### Building

Designing the NALU has taken me around 8 weeks. This includes finding the correct stock parts such as heaters and bearings.



### Hand made parts

Every part of the printer that has been designed has been hand made.



Thanks,

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