# Symposium

# Fontys Engineering and Natural Sciences

## Electrical, Mechatronic and Mechanical Engineering and Engineering Physics

**February 1, 2017**

# Key note speaker

## Rick Wielens – LED Skin, Open Innovation Academy

Rick will share some of his first-hand experiences in user led innovation and open innovation; the new normal for the way innovation is done in companies today. With 10 years in the open innovation industry and 400+ innovation projects there were many good and bad examples.

Most of the corporates and organizations today are aware that innovation is about access and collaboration, not ownership. There is a clear business case for recycling the abundance of technologies and outcomes of user and market experiments from adjacent industries.
In the hyped start-up scene, everybody is looking to emulate asset light companies like Uber and Airbnb, who are leveraging the underutilized assets of others. But even though open innovation is the new normal, few organizations have implemented an open innovation curriculum to cater for this new innovation contact sport. What are the mindsets that you, as you are about to enter the working life need, to be a successful innovator?  From his own experience, Rick will also share a user led innovation start-up: Ledskin. The company was inspired by his surprise and frustration when he witnessed the way one of his children received jaundice treatment. There were many interesting experiences during the journey from the first ‘aha moment’ to the implementation of a medical device solution in real life.

# Programme

## Location:

**Fontys University of Applied Sciences**
Rachelsmolen 1
Building R5
5612 MA Eindhoven

## Time table:

| Time | R5 Auditorium | | | |
|---|---|---|---|---|
| 12.30 | Registration | | | |
| 13.00 | Opening word: Gerben Tigchelaar, Fontys Hogescholen | | | |
| 13.05 | Key note speaker: Rick Wielens, LED Skin, Open Innovation Academy | | | |
| 13.45 | Short break and split-up | | | |
| | **R5_0.22** | **R5_Aula** | **R5_0.23** | **R5_1.35A** |
| 14.00 | IPD3 | IPD1 | Wtb4 | Mech4 |
| 14.25 | IPD4 | IPD2 | Wtb1 | Mech6 (private) |
| 14.50 | IPD5 | IPD8 | Mech7 | Mech2 |
| 15.15 | Break | | | |
| 15.30 | IPD6 | IPD10 | Mech3 | Wtb3 |
| 15.55 | IPD7 | IPD11 | Mech8 | Wtb2 |
| 16.20 | IPD9 | Mech1 | Mech9 | IPD12 |
| 16.50 | Closing and KIVI award nominations | | | |
| 17.00 | Drink | | | |

# IPD 1 – Lab in the box

| | | |
|---|---|---|
| **Client:** | - | - |
| **Contact at client:** | - | |
| **Fontys coach:** | Jeedella Jeedella | |
| | | |
| **Team:** | | |
| Timofei Volkov | Fontys Engineering | Electrical Engineering |
| Nikolaj Zukov | Fontys Engineering | Electrical Engineering |
| Zakhar Kadanovich | Fontys Engineering | Electrical Engineering |
| Sparsh Bhonwal | Fontys Engineering | Electrical Engineering |
| Konstantinos Theologidis | Fontys Engineering | Electrical Engineering |

## Project description

The main goal of this project is to create educational materials for ES and EMBC courses. You will be responsible for the development of porting/redesigning the ES and EMBC assignments and the EMBC mini-project to a SoC board having a softcore. During the porting process there will be interesting design and interfacing challenges that will allow the students understand and appreciate the challenges of designing advanced embedded systems.

# IPD 2 – Self balancing two-wheeler

| | | |
|---|---|---|
| **Client:** | - | - |
| **Contact at client:** | - | |
| **Fontys coach:** | Jeedella Jeedella | |
| | | |
| **Team:** | | |
| David Heurtaux | Fontys Engineering | Electrical Engineering |
| Ion Iuncu | Fontys Engineering | Electrical Engineering |
| Jordan Davies | Fontys Engineering | Electrical Engineering |
| Jonathan van Eijs | Fontys Engineering | Electrical Engineering |
| Stefan Teley | Fontys Engineering | Electrical Engineering |
| Pieter Donkers | Fontys Engineering | Electrical Engineering |
| Natasha Latham | Fontys Engineering | Electrical Engineering |
| Thomas Versmissen | Fontys Engineering | Electrical Engineering |

## Project description

Fontys Engineering would like to design and build self-balancing two wheeler robot which can be used for promotional tasks.

# IPD 003 Active Loudspeaker

| | | |
|---|---|---|
| **Client:** | André Dommels | |
| **Contact at client:** | a.dommels@fontys.nl | |
| **Fontys coach:** | André Dommels | |
| **Team:** | | |
| George Teofilov | Fontys Engineering | Electrical Engineering |
| Tenyo Petrov | Fontys Engineering | Electrical Engineering |
| Lukas Martisiunas | Fontys Engineering | Electrical Engineering |
| Gabriel Natanael | Fontys Engineering | Electrical Engineering |
| Jeroen Huisman | Fontys Engineering | Electrical Engineering |
| Wesley van Osch | Fontys Engineering | Electrical Engineering |

## Project description

The goal of this project is the construction of a home audio entertainment active loudspeaker, which combines physical and electrical aspects together.

From the physical point of view, the selection of the acoustic drivers is of high importance. Because it directly relates to the sound quality of the system and its final price. Also, once these acoustic drivers are selected, the surrounding acoustic enclosure and electronics can be designed for them.

From the electrical point of view, the electronics are optimized for the acoustic drivers and for the necessity of the system, in other words, they are not "over-specified". Therefore, the cost of the electronics is maintained low, without sacrificing end quality.

**What makes our product different from the ones on the market already?**

Having no experience in the audio field, the contribution that we, as a team, provide to this project is an outside of the box thinking. Thus, looking for new ideas and solutions for old problems.

As a main factor to the previous statement, is the creativity brought by the whole team in the development of a quality product at a reasonable price.

Our goal as designers is to achieve the "you get more than what you have paid for". Therefore, as said previously, reasonable price without sacrificing quality.

**What do you mean with: "you get more than what you have paid for"?**

As said previously, an outside of the box thinking, has allowed us to design a versatile system that is decomposed into fully independent systems which can operate separately, together or with other products on the market.

The system is decomposed in two separate systems, the active loudspeaker, and the audio interface. Thus, if a client what's to only purchase one of them or both, he has all the freedom to do it. Our product allows interconnection with a wide range of the similar products on the market.

And as Robert Fripp said: ***"Music is the wine that fills the cup of silence"*** and we, as engineers, provide to clients that quality wine so they can enjoy the music.

*IPD 003 Team. Left to right: Gabriel, Jeroen, George, Wesley, Lukas, Tenyo*

# IPD 4 – One box streaming audio system 1

| | | |
|---|---|---|
| **Client:** | - | - |
| **Contact at client:** | - | |
| **Fontys coach:** | Guido Tent | |
| | | |
| **Team:** | | |
| Bjorn van der Meulen | Fontys Engineering | Electrical Engineering |
| Rudy Coppens | Fontys Engineering | Electrical Engineering |
| Edwin Peters | Fontys Engineering | Electrical Engineering |
| Mariano Otero | Fontys Engineering | Electrical Engineering |
| Tomas Salachov | Fontys Engineering | Electrical Engineering |
| Omid Salehpour | Fontys Engineering | Electrical Engineering |

## Project description

The design of an “one box streaming audio system” to drive a loudspeaker.
Subprojects. Design (simulating, measuring and verification) of a:

1) Connection with the internet, i.e. Raspberry pi
2) Controlling the One Box remote
3) DAC
4) An PA with volume control
5) IR remote or App

1) and 2) are ½ hardware and ½ software
3) and 4) is mainly hardware, small part digital and analogue.
5) pure software

# IPD 5 – One box streaming audio system 2

| | | |
|---|---|---|
| **Client:** | - | - |
| **Contact at client:** | - | |
| **Fontys coach:** | Guido Tent | |
| | | |
| **Team:** | | |
| Ton Leenders | Fontys Engineering | Electrical Engineering |
| Aitzol Pico | Fontys Engineering | Electrical Engineering |
| Linus Moosbrugger | Fontys Engineering | Electrical Engineering |
| Rocco Nardonne | Fontys Engineering | Electrical Engineering |

## Project description

The design of an “one box streaming audio system” to drive a loudspeaker.
Subprojects. Design (simulating, measuring and verification) of a:

1) Connection with the internet, i.e. Raspberry pi
2) Controlling the One Box remote
3) DAC
4) An PA with volume control
5) IR remote or App

1) and 2) are ½ hardware and ½ software
3) and 4) is mainly hardware, small part digital and analogue.
5) pure software

# IPD6: A Sensor for Shear Forces in Shoes

| | | |
|---|---|---|
| **Client:** | Raak-MKB Project “ShoeTIMeS” | |
| **Contact at client:** | Geert Langereis | |
| **Fontys coach:** | Geert Langereis | |
| | | |
| **Team:** | | |
| Al Muhannad Al Rawahi | Fontys Engineering | Electrical Engineering |
| Marthijn Feddes | Fontys Engineering | Electrical Engineering |
| Emmanuel Yeboah | Fontys Engineering | Electrical Engineering |
| Kevin Janga | Fontys Engineering | Electrical Engineering |
| Jorg van de Vries | Fontys Engineering | Electrical Engineering |
| Roel Van den Broek | Fontys Engineering | Electrical Engineering |
| Natasha Latham | Fontys Engineering | Electrical Engineering |
| Dylan van der Zee | Fontys School of Natural Sciences | Engineering Physics |

## Project description

This project is a pre-study for a Dutch funded SiA Raak-MKB project proposal called “Shear force Textile Intelligent Measurement System Shoe-TIMeS”. The overall aim of the project is to make a shoe inlay that enables the measurement of in-plane forces. This is important for diagnostic purposes in orthopedic problems like a diabetic foot.

The aim for this specific IPD group was to develop technology to measure in-plane forces, so called “shear forces”. The group has compared three methods of detecting shear:

- Using a LED light source, and measuring with two light dependent resistors (LDRs) for each axis
- A capacitive measurement to detect displacement
- A resistive measurement using strain gauges to detect displacement

The outcome is an elaborated choice for the best technology that can be integrated in a shoe and that is sensitive enough.

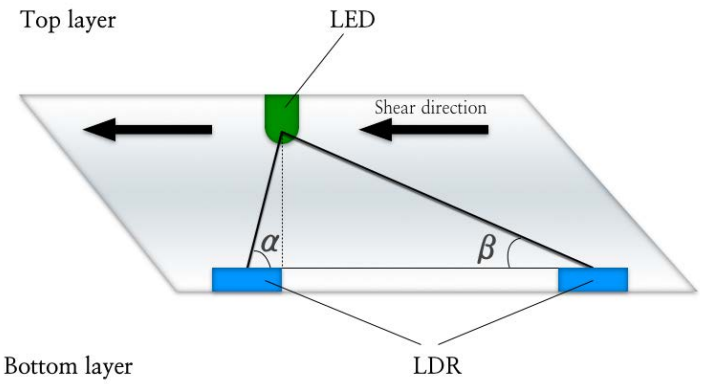



*Figure 1: An optical method to detect in-plane (shear) forces with LED and two light sesnors*

# IPD7: Monitoring of people with a disability

| | | |
|---|---|---|
| **Client:** | Stichting Severinus Veldhoven, Mentech Innovation BV | |
| **Contact at client:** | Erwin Meinders | |
| **Fontys coach:** | Geert Langereis | |
| | | |
| **Team:** | | |
| Reon Smits | Fontys Engineering | Electrical Engineering |
| Ragy Guirguis | Fontys Engineering | Electrical Engineering |
| Imelda Chrisanty | Fontys Engineering | Electrical Engineering |
| Florian Springer | FH Vorarlberg (A) | Mechatronics |
| Ben Lont | Fontys School of Natural Sciences | Engineering Physics |

## Project description

Severinus is an institution where people with mental disabilities get help to live a normal life. A common problem these people have is expressing how they feel and if they are feeling discomfort. This is also why it can be difficult for someone else to assess someone's state of mind. There is a need for an objective and accurate measurement system to determine someone's mental state. This can be done by measuring the heart rate and skin conductance. This data is then combined with acceleration data to determine whether someone is mentally stressed.

The purpose of the Fontys part of this project is to realize a wearable constellation of sensors with which the right set of data can be collected to estimate the arousal level of a patient. The current IPD group has realized a system which makes heart rate, galvanic skin response, and on-body accelerometry real time accessible in a single C#-application. This is the first step needed to find the appropriate set of data for the client.

*Figure 2: Seeed SEN01400P Grove-GSR Skin Sensor Module Board*

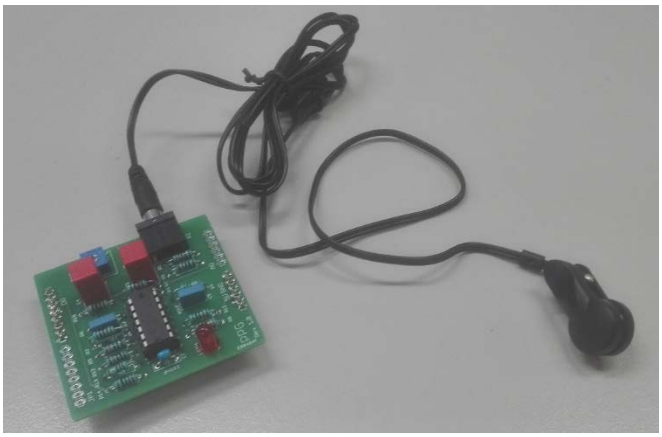


*Figure 3: Heart rate monitor PCB based on photoplethysmography*

# IPD 8 – Greenhouse All

| | | |
|---|---|---|
| **Client:** | - | - |
| **Contact at client:** | - | |
| **Fontys coach:** | Tekin Yilmaz | |
| | | |
| **Team:** | | |
| Steven van Klinken | Fontys Engineering | Electrical Engineering |
| Rick Jonkers | Fontys Engineering | Electrical Engineering |
| Pim Rijkers | Fontys Engineering | Electrical Engineering |
| Fedor Zorin | Fontys Engineering | Electrical Engineering |
| Luc Fiers | Fontys Engineering | Electrical Engineering |
| Bart Tijmensen | Fontys Engineering | Electrical Engineering |

## Project description

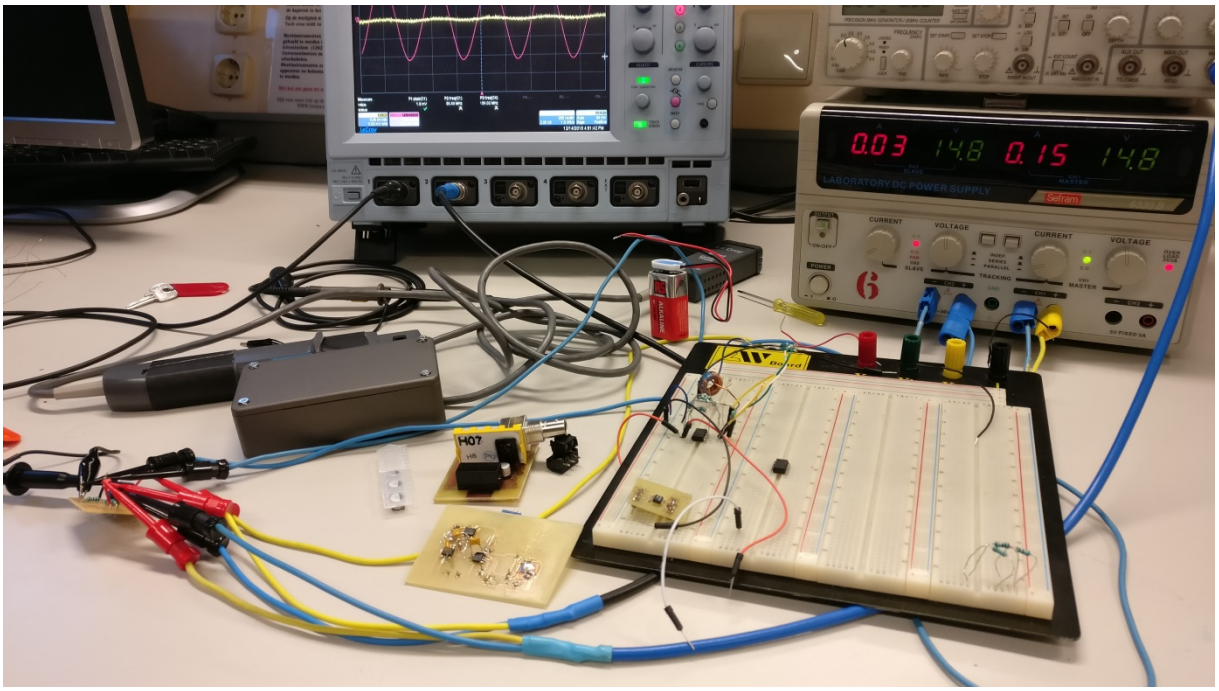
Your own greenhouse for seniors is relevant in the world of self-control and WMO's longer live at home for seniors. The technology in this context we call the Ambient Assisted Living or Active and Assisted Living (AAL in short).
There are left and right fully automated "greenhouse" initiatives in which a lot of Cyber Physical Devices / IoT components are not present. The 'robot' monitors and regulates all the necessary parameters within the greenhouse: including temperature, humidity, water, minerals, CO2 etc.
The team have to deliver a working greenhouse and demonstrate this on a Smarthouse event.

# IPD 9 - Low cost current probe

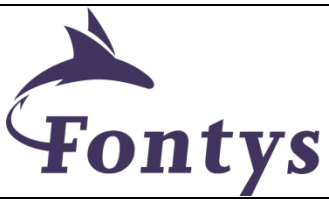
| | | |
|---|---|---|
| **Client:** | Marc Hendriks | |
| **Contact at client:** | - | |
| **Fontys coach:** | Marc Hendriks | |
| | | |
| **Team:** | | |
| Rajitha Balani | Fontys Engineering | Electrical Engineering |
| Pim van Collenburg | Fontys Engineering | Electrical Engineering |
| Beñat Murua Ugartemendia | Fontys Engineering | Electrical Engineering |
| Tom Verbeek | Fontys Engineering | Electrical Engineering |

## Project description

Our project goal is to make a low cost, high precision current probe. The probe is meant to be used in analog practicums in the first 2 years of the study electrical engineering. The probe should cost, as much as 50 euro, the price of a comparable current probe from a well know brand is over 2500 euros. This brings the need for a student made current probe at the practical's.  The probe needs to be able to measure currents up to 20A, with a frequency of 20MHz. The maximum noise output is 1% of the output signal. All of this needs to fit a small stand alone case.e0



# Project IPD 10: Ham radio

| | | |
|---|---|---|
| **Client:** | Fontys University |  |
| **Contact at client:** | - | |
| **Fontys coach:** | Duncan van Meeteren | |
| | | |
| **Team:** | | |
| Marc Tilman | Fontys Engineering | Electrical Engineering |
| IndraSchoonbrood | Fontys Engineering | Electrical Engineering |
| BartTijmensen | Fontys Engineering | Electrical Engineering |
| JavierDiez Hidalgo | Fontys Engineering | Electrical Engineering |
| Šarūnas Kazlauskas | Fontys Engineering | Electrical Engineering |

**Project description:**

Project assignments are design and build a system that receives air band communication from Eindhoven Airport and streams it on a website. It should also receive ADS-B (Automatic Dependent Surveillance – Broadcast) data from nearby airplanes and plot their location and other information on a map. This requires setting up an SDR (Software Defined radio), some streaming / decoding software and a webserver. The antennas will be handmade, a couple of different antenna designs can be compared in simulation and in real-life tests.

**ADS-B:** Is a new generation of monitoring technology, mainly rely on airborne electronic equipment and facilities on the ground to accurately monitor the plane position, height, speed and another data. Before the ADS-B technology, radar is most is the most advanced monitoring method, while accuracy of ADS-B is almost 8 times of radar. After the technology put into use, the ground rely on the ,,eyes" to monitor the aircraft flight. Compared with the traditional, ADS-B has the advantage of low cost, close tolerance and strong ability of surveillance such as small, monitoring ability.

**SDR:** SDR has increasingly became an invaluable research, development, and educational tool within the telecommunications sector with respect to rapidly prototyping new algorithms and paradigms in actual radio hard-ware and evaluating them in the real-world over-the-air conditions. Due to advances in microprocessor technology, radio frequency hardware, and software, SDR has matured into a reliable tool that now is part of almost every communication engineer's toolbox.

**Which choices did we made and why?** Most of the project objects we made by ourselves, like: air band antenna, ADS-B antenna, splitter, LNA, filters. Making air band antenna we had to choose which type of antenna we will use, we had to calculate dimensions of antenna. We choose ground-plane antenna. First to fall we made prototype to check measurements, after that we had to make original, prepare original antenna to put it on the roof, make it stabile, make it available to connect it to the antenna holder.

**ADS-B system:** Using ADS-B technology we are able to receive signals from airplanes that are in line of sight of the antenna. With the received signal we are able to plot planes directions, speed, and flights numbers in real time!

# IPD 11 – Bee tracking system

| | | |
|---|---|---|
| **Client:** | Wageningen University |  |
| **Contact at client:** | - | |
| **Fontys coach:** | Duncan van Meeteren | |
| | | |
| **Team:** | | |
| Bruno Fernandez | Fontys Engineering | Electrical Engineering |
| Orom Isaac | Fontys Engineering | Electrical Engineering |
| Pierpaolo Vendittelli | Fontys Engineering | Electrical Engineering |
| Raffi Ohanis | Fontys Engineering | Electrical Engineering |
| Ricardo Portugal | Fontys Engineering | Electrical Engineering |
| Sotirios Kargas | Fontys Engineering | Electrical Engineering |
| Zhengrong Zhang | Fontys Engineering | Electrical Engineering |

## Problem Description

"*If the bee disappeared off the surface of the globe then man would only have four years of life left. No more bees, no more pollination, no more plants, no more animals, no more man.*" Albert Einstein

During the past years, an alarming mortality problem in bee colonies has been reported around the world. According to data from the Wageningen University, the mortality in the Netherlands is among the highest in the world (average of 22% every year). This matter is of great importance to the ecosystems because a substantial proportion of the flora relies on the bees for its pollination, which can affect a considerable part of the food offer for the animal kingdom, including humans. The main goal of this project is to design a prototype, which will allow the researchers to investigate the causes by tracking the bee activity with central point the hive.

## Assignment Description

In this project, students will deepen their knowledge in: RF localization, LabVIEW & software development, antenna simulation & measuring, RFID, SoC & Raspberry Pi, embedded & operating systems, solar power, GSM network.

The customizability of the final product by the end user is a common practice in our days, as the computational power has significantly increased giving precise solutions to individual needs. For this reason, the programmable interface of the application used is LabVIEW, a graphical development environment. LabVIEW will allow the field researchers to expand the functionality of the system according to the demands of their research without the needs of knowing programming syntax but using the graphical tools of LabVIEW. This will eventually get the researcher one step closer to the truth of the bees behavior while adapting to the ad hoc needs.

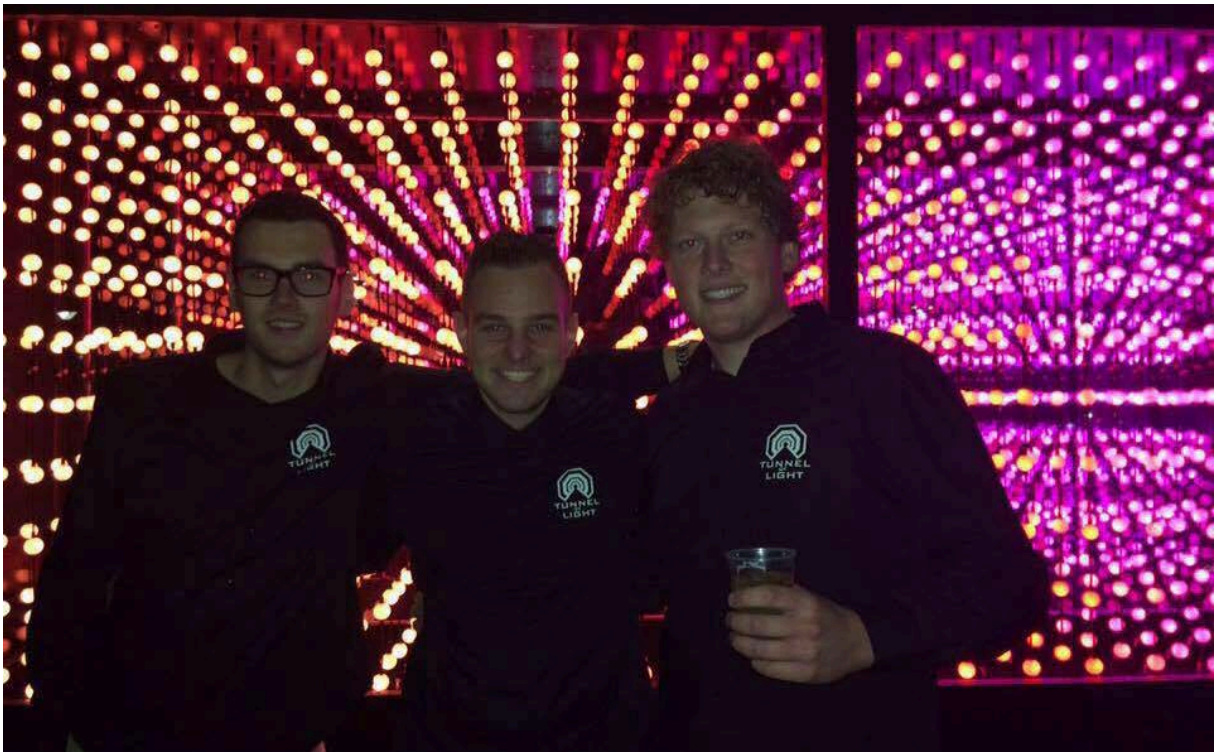
Working one day per week, the 4rth year Electrical Engineering students are trying to design a self-sufficient system, which is able to detect the RF tags, and monitor the flow of bees in the hive. The prototype will also be able to record the data to make it analyzable, making understandable the behavior of the bees during their life span.

# IPD12: Tunnel of Light

| | | |
|---|---|---|
| **Client:** | Glow ‘16 | |
| **Contact at client:** | Tom Weerts | |
| **Fontys coach:** | Enitia Karijodinomo | |
| | | |
| **Team:** | | |
| Peer Hems | Fontys Engineering | Elektrotechniek |
| Sven Verheesen | Fontys Engineering | Elektrotechniek |
| Floris-Jan van den Hoek | Fontys Engineering | Elektrotechniek |

## Project description

From February ’16 till November we worked on an interactive light installation for Glow 2016. We have built a unit of 6x3 meters with almost 3000 balls, 7000 LED’s and !**740.000**! visitors.

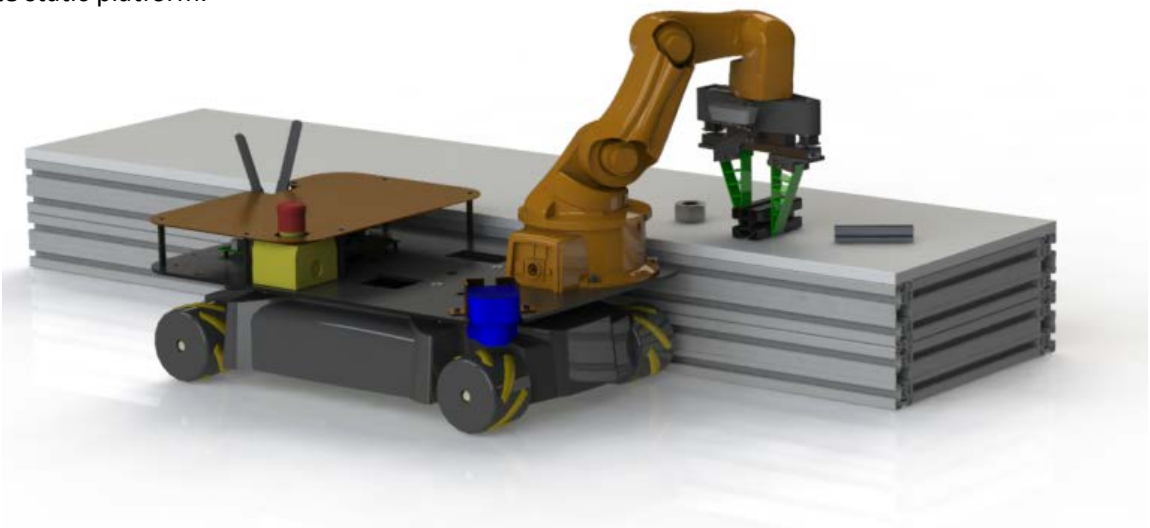


# Mech 1 - Factory of the future: Multi-robot transportation and collaboration

| | | |
|---|---|---|
| **Client:** | Mechatronics development department | |
| **Contact at client:** | Sjriek Alers | |
| **Fontys coach:** | Nelis van Lierop | |
| | | |
| **Team:** | | |
| Bob Clephas | Fontys Engineering | Mechatronics |
| Ruud van Dommelen | Fontys Engineering | Mechatronics |
| Niels van der Heijden | Fontys Engineering | Mechatronics |
| Tom van de Laar | Fontys Engineering | Mechatronics |
| Luuk Voesten | Fontys Engineering | Mechatronics |
| Marcel van Wensveen | Fontys Engineering | Mechatronics |
| Coen Timmermans | Fontys Engineering | Mechatronics |

## Project description

To support the human worker by autonomously acquiring the needed parts. There is one order picking robot: a mobile platform (the KUKA youBot) with a manipulator for order picking/placing. The process will be as follows. A part will be requested by the human operator, the robot system then fulfills these tasks:
- In the picking area, the order picker should detect the required part from a white static platform.
- Manipulation of the required part (picking it up) by the order picking robot.
- The picking robot should autonomously navigate to the loading area.
- In the loading area, the picking robot places the object onto one of the delivery places, this is also a white static platform.



# Mech 2: Collaborative Robot Safety System

| | | |
|---|---|---|
| **Client:** | Mechatronics development department | |
| **Contact at client:** | Sjriek Alers | |
| **Fontys coach:** | Nelis van Lierop | |
| | | |
| **Team:** | | |
| Guido Claessen | Fontys Engineering | Mechatronics |
| Rens van Hulst | Fontys Engineering | Mechatronics |
| Bas Janssen | Fontys Engineering | Mechatronics |
| Luuk Jeurgens | Fontys Engineering | Mechatronics |
| Michiel de Kort | Fontys Engineering | Mechatronics |
| Luc Ahrens | Fontys Engineering | Mechatronics |

## Project description:

For the 'RAAK Geen Moer Aan' project, people are working in the same area as a robotic arm to tighten screws and bolts. It is not safe for people to work next to a robotic arm which is carrying out a task that interferes with the people's workspace. So a robotic arm which tightens screws and bolts in an area in which people are not physically limited to touch the robot, needs to be made safe.

# Mech 3 - Modular and multifunctional robot gripper

| | | |
|---|---|---|
| **Client:** | Lectoraat Mechatronica fontys |  |
| **Contact at client:** | Randy Kerstjens | |
| **Fontys coach:** | Antoon Pepping | |
| | | |
| **Team:** | | |
| Toby van den Bogaart | Fontys engineering | Mechatronica |
| Sam de Jonge | Fontys engineering | Mechatronica |
| Ruud Linskens | Fontys engineering | Mechatronica |
| Robert Delmaar | Fontys engineering | Mechatronica |
| Marcel Verspaandonk | Fontys engineering | Mechatronica |
| Jeroen Meijs | Fontys engineering | Mechatronica |

## Project description

The high-tech industry is producing more smaller batches of high complexity. Reconfigurability of robotic arms is a new theme in the area of robotics. This is currently a barrier why most work is still being done manually.
Flexibility in these production lines is of utmost importance because of ever-changing products. To accomplish this amount of flexibility while maintaining the basic functions of a traditional end-effector, the project has to incorporate feedback into their design. This to prevent crushing delicate products, while still maintaining modularity.

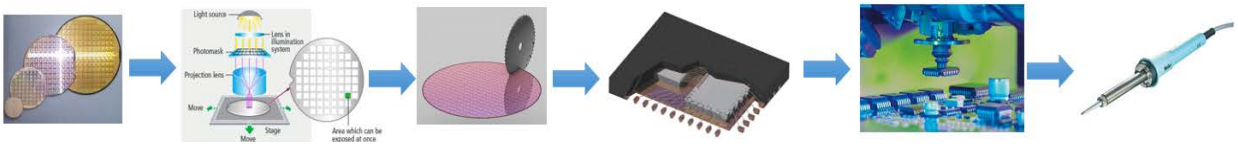
In cooperation with the industry, this project strives to build a prototype which shows that a fast reconfigurability is indeed possible in the so called High Mix, Low Volume and High Complexity environment. These products are usually placed in bins, which brings forth the aspect of binpicking to the list of challenges. One of the other challenges of this project is to physically grab products by using one of three pre-configured end-effectors, which are located on one of two robots, the UR-5 and the ABB IRB-120.

# Mech 4 - FEMM-line Pick and Place

| | | |
|---|---|---|
| **Client:** | David Reuijl | Fontys University of Applied Sciences |
| **Contact at client:** | Paul Goede | |
| **Fontys coach:** | Peter Jacobs | |
| | | |
| **Team:** | | |
| Dries van der Lee | Engineering | Mechatronic Engineering |
| Maikel Michiels | Engineering | Mechatronic Engineering |
| Stijn Maas | Engineering | Mechatronic Engineering |
| Joris van Rodijnen | Engineering | Mechatronic Engineering |
| Martijn Princen | Engineering | Mechatronic Engineering |
| Max van den Eertwegh | Engineering | Mechatronic Engineering |

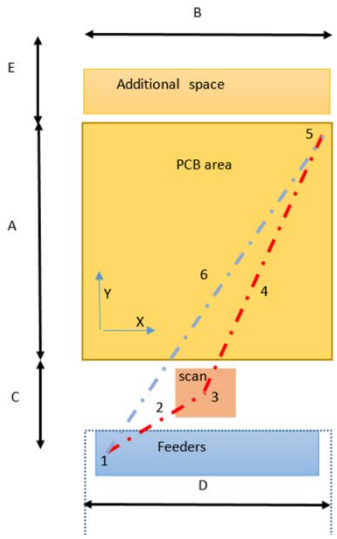
## Project description

In 2016, Fontys started a several years lasting FEMM-line (**F**ontys **E**lectronic **M**echanical **M**anufacturing) project. In this project, Fontys Mechatronics is aiming on making a set of machines to produce electro-mechanical semi-conductor based components (Chips and MEMS) from scratch. The complete FEMM-line is divided into 6 main steps:



*Silicium wafer > Lithography process > cut the wafer > package the chips > place chips on PCB > solder chips on PCB*

This project (one of the subprojects in FEMM-Line) is Fontys' Pick-and-Place Project, in which a machine will be made to pick electrical components from feeding-tapes and place them on PCB's. More specific, the deliverable of this project will be a working X-axis designed with a high accuracy of 10 µm and a speed of 3600 components per hour. This brings several Mechatronic challenges to meet all the requirements.




An impression of the movements and amount of time of the Pick and Placing process. The minimum acceleration and velocity are determined being $57\ \frac{m}{s^2}$ and $2{,}1\ \frac{m}{s}$.

| | | |
|---|---|---|
| 1 | Pick component from feeder | 0,2 sec |
| 2 | Move to scanner | 0,11 sec |
| 3 | Scan | 0,1 sec |
| 4 | Move to position PCB | 0,18 sec |
| 5 | Place on PCB | 0,2 sec |
| 6 | Move to next component on feeder | 0,21 sec |

# Mech 6 - The Screw cap Applicator

| | | |
|---|---|---|
| **Client:** | CMS BV | |
| **Contact at client:** | Toine Cuyten | |
| **Fontys coach:** | Peter Jacobs | |
| | | |
| **Team:** | | |
| Peter Bazelmans | Fontys Engineering | Mechatronics |
| Niels Duijkers | Fontys Engineering | Mechatronics |
| Bennie Godschalk | Fontys Engineering | Mechatronics |
| Luc Hems | Fontys Engineering | Mechatronics |
| Paul Kolen | Fontys Engineering | Mechatronics |
| Stef Pijnenburg | Fontys Engineering | Mechatronics |

## This presentation is not public

## Project description

Cuyten Maintenance Services B.V. (CMS), located in Maarheeze (NL), is a Dutch company specialized in the maintenance of industrial machinery in particular in the food industry. With over 19 years of experience CMS covers a wide range of technical services, from revision operations and support of technical services up to industrial innovations. CMS has started a cooperation with the Fontys Center of Expertise in High Tech Systems and Materials.

A particular filling machine is capable of filling cartons with liquid substances (e.g. milk, yoghurts or other dairy products). The filling process can be divided in multiple stages: unfolding of the cartons, sealing of the bottom side, sealing of the screw caps, disinfection to prevent contamination, filling and closing of the carton.

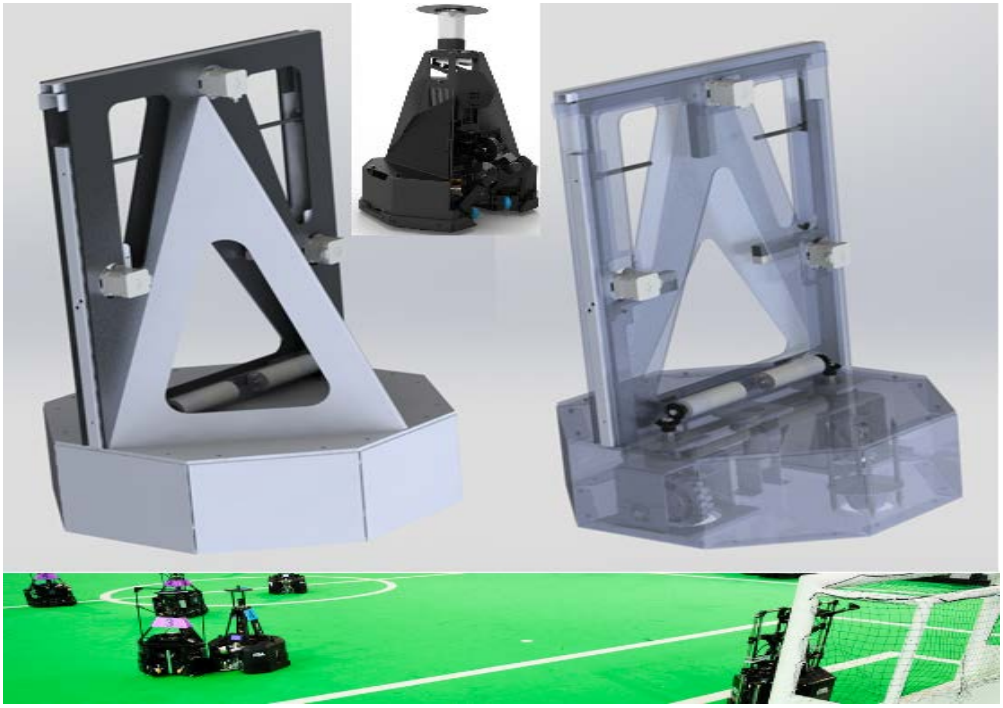
Sealing of the screw caps is done by a screw cap applicator, which was redesigned in this project. The previous version of the screw cap applicator failed in consistency and reliability, which were taking together with other requirements into consideration in the redesign. The aim of this project is to come up with a new innovative concept for the screw cap applicator. One that is fast, reliable, needs little maintenance and preferably easy to install.

# Mech 7 - Komt dat schot

| | | |
|---|---|---|
| **Client:** | fontys | |
| **Contact at client:** | Teade punter | |
| **Fontys coach:** | Michiel van Osch | |
| | | |
| **Team:** | | |
| Rick Hummelink | Fontys Engineering | Mechatronics |
| Daan Widlak | Fontys Engineering | Mechatronics |
| Cas Candel | Fontys Engineering | Mechatronics |
| Wout Kanters | Fontys Engineering | Mechatronics |
| Job van Hoof | Fontys Engineering | Mechatronics |
| Nick Matthijsse | Fontys Engineering | Mechatronics |

## Project description

The task for this project is to design a goal keeper for the middle-sized League of the Robocup. Robocup is a robot soccer competition held world wide and fontys ICT wants to cooperate with MKB companies to participate in this competition. This project focused on the mechanical aspects of turning a regular Turtlebot 5k robot into the goal keeper. This was done by focusing on 3 aspects of the keeper robot, drivetrain, ball detection and blocking the ball. The solution to these 3 are swerve drive for the drivetrain, a front camera and top camera to follow the ball at all times, and a spring powered brace to block the soccer ball. These solutions have been simulated or had a test setup build.



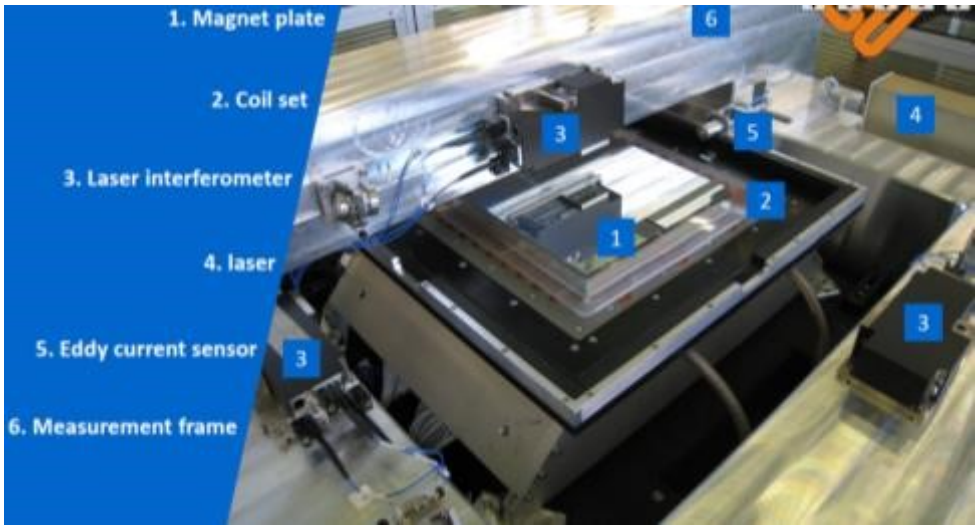
# Mech8: NAPAS

| | | |
|---|---|---|
| **Client:** | Tu/e | |
| **Contact at client:** | Coen Custers | |
| **Fontys coach:** | Antoon Pepping | |
| | | |
| **Team:** | | |
| Jeroen van den Akker | Fontys Engineering | Mechatronics |
| Koen Vermeer | Fontys Engineering | Mechatronics |
| Sil Vaes | Fontys Engineering | Mechatronics |
| Nino van den Broek | Fontys Engineering | Mechatronics |
| Bart van Oorschot | Fontys Engineering | Mechatronics |

## Project description

"The assignment is to fully describe the system, including all subsystems with their interdependencies" of the NAPAS system. The NAPAS system is a high precision positioning stage that are used in the semiconductor lithographic industry. The magnetically levitated planar actuator consists of a moving magnet plate levitating above a stationary coil set. This actuator offers long-stroke capability as well as nanometer accuracy. The advantage is that the magnet plate is fully contactless. The preferred language to describe this system is SysML. This description will then function as a base to improve faulty software and hardware, however the expectation is that hardware will not be changed. This leads to an improved NAPAS system which is well documented.

The goal of this project is to create a complete documentation for the NAPAS setup in sysML. The documentation should be easily accessible. The second step will be a FMEA model of the NAPAS state flow.

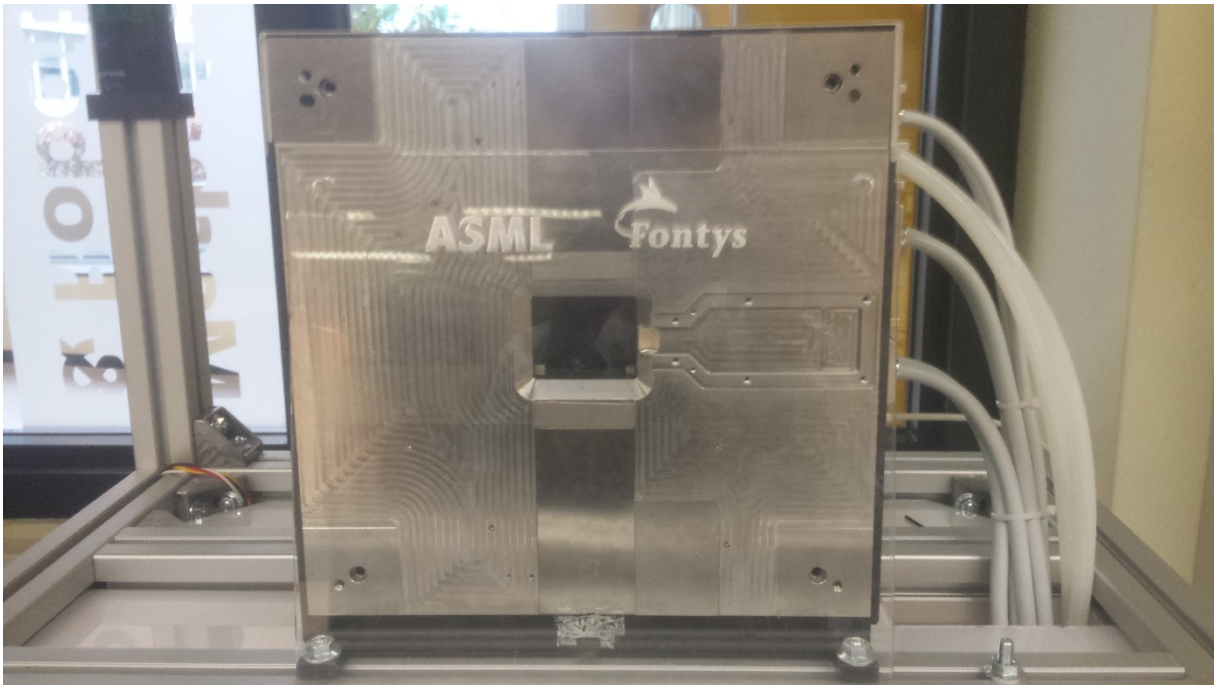


# Mech 9 – Fontys ASML ReMa

| | | |
|---|---|---|
| **Client:** | ASML / Fontys | |
| **Contact at client:** | Roel Merry / Nelis van Lierop | |
| **Fontys coach:** | Antoon Pepping | |
| | | |
| **Team:** | | |
| Arend-Jan van Noorden | Fontys Engineering | Mechatronica |
| Tim van Harten | Fontys Engineering | Mechatronica |
| Rick Oligschläger | Fontys Engineering | Mechatronica |
| Stan Verbeek | Fontys Engineering | Mechatronica |
| Jarco Beek | Fontys Engineering | Mechatronica |
| Luuk Spin | Fontys Engineering | Mechatronica |

## Project description

The goal is to embed a practical use case with ASML hardware in the course to let students experience the practical aspects of system identification. For this purpose ASML has provided a Reticle Masking (REMA) unit of one of their wafer scanners. However, the REMA unit is not directly suitable as test device for system identification purposes. In order to be able to use the REMA as a test device it has to function as a stand-alone device. Since the purpose of the REMA has changed from an ASML waferstepper subsystem to a Fontys/ASML system identification test device, the previous Fontys IPD project group has established a new project specification document.



# Wtb1 – Pounch Dispenser

| | | |
|---|---|---|
| **Client:** | - | - |
| **Contact at client:** | - | |
| **Fontys coach:** | Reza Hosseini | |
| | | |
| **Team:** | | |
| Jip Beijers | Fontys Engineering | Mechanical Engineering |
| John Lee | Fontys Engineering | Mechanical Engineering |
| Bram Persoon | Fontys Engineering | Mechanical Engineering |
| M van der Venne | Fontys Engineering | Mechanical Engineering |
| Cas Verbruggen | Fontys Engineering | Mechanical Engineering |
| M Verhaeg | Fontys Engineering | Mechanical Engineering |

## Project description

No description available

# Wtb2 – Cable break system

| | | |
|---|---|---|
| **Client:** | - | - |
| **Contact at client:** | - | |
| **Fontys coach:** | Henk Hulshof | |
| | | |
| **Team:** | | |
| Joost Frijns | Fontys Engineering | Mechanical Engineering |
| Matthijs Hermans | Fontys Engineering | Mechanical Engineering |
| Ralf Hermans | Fontys Engineering | Mechanical Engineering |
| Niek van der Loo | Fontys Engineering | Mechanical Engineering |
| Nick Wijnen | Fontys Engineering | Mechanical Engineering |
| Robin Zijlmans | Fontys Engineering | Mechanical Engineering |

## Project description

No description available

# Wtb3 - Tarzan Rope Swing

| | | |
|---|---|---|
| **Client:** | DreamX Design | DreamX Design |
| **Contact at client:** | Micky Verhaeg | |
| **Fontys coach:** | Henk Hulshof | |
| | | |
| **Team:** | | |
| Bashir Abba Gana | Fontys Engineering | Mechanical engineering |
| Wouter Mutsers | Fontys Engineering | Mechanical engineering |
| Jeroen Reijkers | Fontys Engineering | Mechanical engineering |
| Luuk schuring | Fontys Engineering | Mechanical engineering |
| Jarno Vermeulen | Fontys Engineering | Mechanical engineering |

## Project description

Have you ever wanted to swing around hanging from ropes like Tarzan and George of the Jungle? If your answer is “yes” than, well, you’re not the only one.

The assignment we got for this project was to design a Tarzan Rope Swing-type of playground equipment, which is to be put at the edge of a pool. The idea is to grab the rope and swing merrily into the water. How far can you jump?

For those of you more interested in the technical side of the story, part of the assignment was to create a construction report suited for approval by the TÜV, the Technischer ÜberwachungsVerein. A lot of research went into how to make this possible, regarding national laws and international norms. This research, together with the more detailed parts of the design process, will be explained by us during our presentation and of course in our report.

We hope this story has made peaked your interest and we would love to answer any and all questions you might have.

# Wtb4 - Medical 3D Printing

| | | |
|---|---|---|
| **Client:** | Dr. Janssen, Orthopedisch centrum | orthopedie groot eindhoven |
| **Contact at client:** | Marieke van der Steen | |
| **Fontys coach:** | Sonja voorn, Hein van de Vrande | |
| | | |
| **Team:** | | |
| Ted Bender | Fontys Engineering | Mechanical Engineering |
| Jordy Cuijpers | Fontys Engineering | Mechanical Engineering |
| Malou van den Eijnde | Fontys Engineering | Mechanical Engineering |
| Brian de Cock | Fontys School of Natural Sciences | Engineering Physics |
| Jochem Brand | Fontys School of Natural Sciences | Engineering Physics |

## Project description

When you have hurt your knee, orthopedists perform certain tests to determine whether your knee is damaged or not and what the level of damage to your knee is. At the moment doctors do this based on experience and the difference between the two knees.

In this project the goal was to create a model with which doctors in training can obtain the necessary experience to perform the knee-tests.

The tests can have 4 different outcomes. The teacher has to be able to choose which of the 4 outcomes will happen at any time on this model. This should be done for at least one test.

At this time, the 22th of December, the expectation is that the mechanical part of this model will be finished within this project for two out of five knee-tests. So one more than the project goal.