

# De Vonk

Periodical of  E.T.S.V. Scintilla

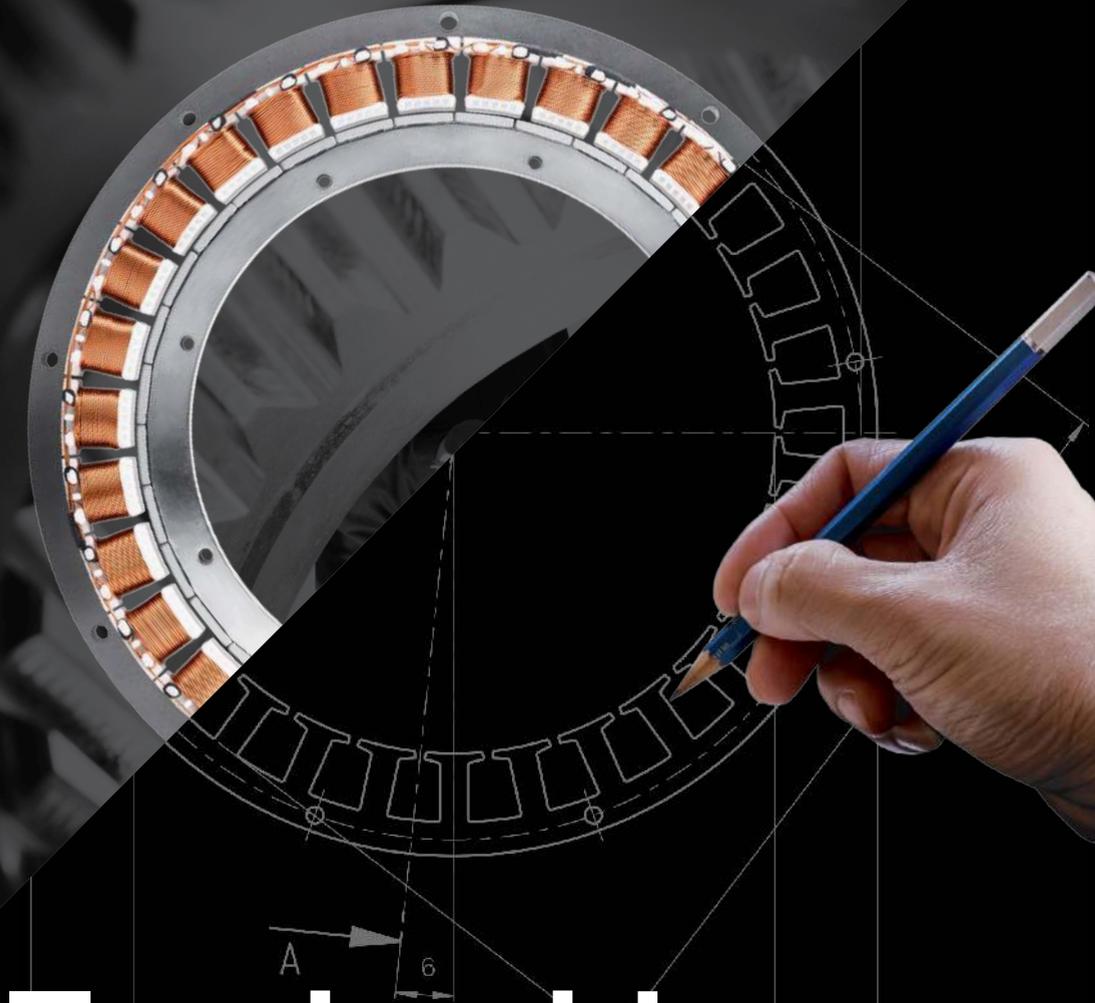
Year 34 | Edition 4 | November 2016

Study: Bachelor assignments 2016

Education: Participating in Participation

Main article: Scintilla's new board

maxon motor



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# Presidential note.

Author: Guus Frijters

**First times are something you will never forget in your life. The first time you drove a car, the first alcoholic beverage you had, your first day at the university and the first moment as a board. This year that moment arrived for me on the 7th of September, at approximately 01:00 AM. It might be a little earlier or a little later, but it definitely was on the 7th of September.**

First moments exist in a lot of different ways. One for me is writing this piece for De Vonk. Since I have been a member of De Vonk for some years, I have some experience in writing pieces. This is however still the first time that I write a presidential note for the periodical which I worked on for two years. In this way, I will see the other side of being in De Vonk. Last year, I was one of the annoying Vonkers who pushed people to write a piece for De Vonk and to make sure that they are received on time so that De Vonk can be published four times a year. Sadly, that proved to be harder than you would expect.

This year I am the president of the 87th board of E.T.S.V. Scintilla, which is the reason why I write this article now. At the moment of writing, the academic year is already a month old, which means I've already had one month of presidency. Which contains a lot of constitution drinks, a significant number of speeches, a huge amount of mail, daily meetings and plenty of tasks. After the small month that I already had, I noticed that there is a lot of work to be done, and sadly, a lot of work to be postponed. Being a board member also means something else which is a first for me. Having a legit reason to not gather any credits this year. However, if it would be possible to achieve credits the way they are supposed to work, which is 28 work-

hours per EC (or so I have been told), I would already have gathered more than one quartile with doing board-work. That on itself is also a first for me, since I have never gathered that much EC in such a short period of time.

Luckily, we all know that there is more to your student life than gathering study points. There are a lot of activities next to the study which can broaden your view of the world and can expand your skill set. Among these activities are committees, doing a board year and becoming a member of Green Team Twente or Solar Team Twente (and nowadays RoboTeam and Solar Boat).

Somewhat further in this edition of De Vonk you will probably read my second article that I wrote as a board member, which then marks the first time I wrote my second article as a board member for De Vonk. I will leave it up to you, lovely readers, to judge about my writing skills after some training.

Dames en heren, op de koningin, op Scintilla!



President of the 87th board of E.T.S.V. Scintilla  
Guus Frijters



## The Stores is looking for members!

Do you want to learn all about components? Do you like to advice and help people? Then you are looking for the STORES as well! Contact the board to get your adventure started!

## The Scrapheap is looking for members!

Do you want to help with organizing the Scrapheap Challenge 2017? If so, give Tara a poke in the Scintilla Room! (or sent her an e-mail.)

## The photo-committee is looking for members!

Are you tired of just another bad photograph of yourself? Join the photo committee and take terrible pictures of others! Contact the board if you're interested

# Masthead

## De Vonk

Periodical of E.T.S.V. Scintilla. Published four times a year in the amount of 700 copies.

Year 34, Edition 4  
November 2016

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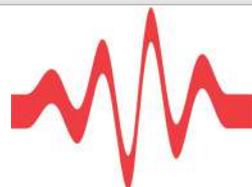
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ISSN 0925-5421



As you might have noticed, Scintilla changed boards last year. In this article they introduce themselves.

07 Main article: Scintilla's new board



Several authors have written a piece about their bachelor assignment. Read about the solutions found to problems, and perhaps find some inspiration to solve your own.

28 Study: Bachelor assignments

03

Presidential note

06

News for the electrical engineer

07

Main Article

*The 87th board of E.T.S.V. Scintilla embarks on a magical journey!*

13

Education

*Participating in Participation*

16

Advertorial

*ASML*

18

Activities

*Kick-in*

20

Fotopage

22

Afterlife

*Jasper Diephuis*

In this article Jippe will tell about the hierarchy and inner workings of the Faculty council. Participate in participation!



13 Education

Matthijs will highlight the best or most memorable parts of last kick-in. Get excited and tired all over again by reading this article.

GeSKICt!  
 Ongeschikt

18 Kick-in activities

On location  
*Alliander*

Activities  
*Bingo*

Advertorial  
*maxon motor*

Bachelor  
*Bachelor assignments 2015/2016*

Junction  
*60 minutes with Cora Salm*

Advertorial  
*AME*

Column  
*PBL? No problem!*

Activities  
*Assassination week*

24

26

27

28

32

37

38

40

# Editorial

As 2016 comes to an end we finally got to the point we were able to release the last Vonk of year 34. It has been a long road with a lot of hurdles. Truusje had struggles to find a puzzle (though the puzzle we have now should be nice for all the creative people out there), we out that one of our articles had evaporated and of course our usual group activity; cursing at InDesign.

Again, we were able to bring you a lot of great articles. We have a wonderfully written board introduction article and some nice recaptures of all the events from the last few months like the Assassination week, Kick-In and excursions. Also, in this edition of The Vonk, we get to know the story of Cora Salm and how her life turned out to be. An interview which rapidly got out of hand in time and size, but nonetheless very interesting!

Also, now that you have all four editions of year 34 of The Vonk, you can finally complete the spine print of this year's Vonk publications! When put together on your bookshelf, you should now be able to look up year 34 of The Vonk in no time!

Now, we continue working on the next Vonk, steadily working on getting the editions back on schedule. The next edition will feature a special new section about a relatively unknown side of our current board! Also Jippe will provide an article of which the contents are unknown to the rest of us, so there will be plenty of excitement!

For now we wish you lots of pleasure with reading this edition of The Vonk!

Maarten

# News for the electrical engineer

Author: Burcu Gumuscu, BIOS Lab on a Chip Group

## Desalination in the pocket

Membranes seem ‘the way to go’ when it comes to desalination – to convert the seawater to drinking water. Membranes, however, are expensive and difficult to integrate in small-scale desalination systems. We, as BIOS Lab on a chip and SFI groups, looked at alternative ways to desalinate seawater using hydrogels which are very cheap and easy to fabricate. We achieved the integration of positively and negatively charged gels into a pocket-size desalination device using a special patterning technique called capillary line pinning. We then filled all

channels with salty water and applied an electrical field over the pocket-size desalination device. Due to the charged nature of sodium and chloride ions, they migrated towards opposite directions in the device, and due to the charge-selective action of the membranes locally blocking ions of one charge-type we obtained salt-concentrated and cleaned streams (see figure 1).

We could collect those streams in separate vials so that they can be further used. This device also allows for studying the



ill-understood ion transport phenomena in and around ion-selective materials. In the pocket-size device, desalination can be performed—for now—for less salty concentrations than sea water and as yet it can be used for pre-concentration of proteins and sample pretreatment of mass spectroscopy samples. The future version of the device is however expected to reach our goal of converting seawater into drinkable water.

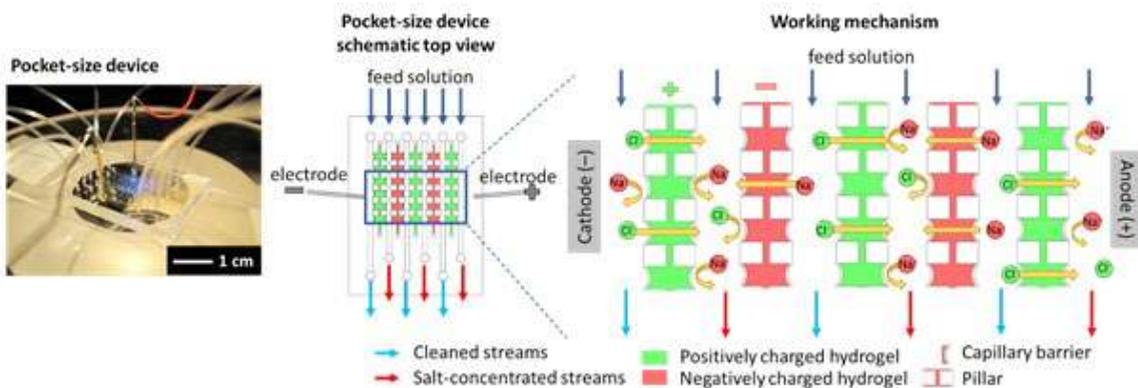


figure 1

# Infinite Possibility

*Author: Tara van Abkoude*

**This is the story of who we are, what we are and how mind blowing experiences continue to occur in the endless timeline, which we call life.**

It was a beautiful morning in the Dutch city which we all know so well. The wind was softly breezing between the infinite wells, while the zeros and ones were taking their early morning bath in the flowing stream of data. You could feel the atmosphere of pure relaxation everywhere. The light emitting diodes of the night watch slowly faded out as the sun showed her knowledge of fraction indexes, by causing a symphony of

colours to touch the boundaries of the energy bands.

This gathering of wavelengths was somehow resonating with the minds of the connected capacitors and coils as they began to emit waves particularly beautiful for their kind. Not a single square wave was present, which would cause a dissonant feeling, and as time progressed the dynamic phenomena be-



came more complicated and interesting. Suddenly there was a disturbance caused by a fast moving object which came from the depths of space. The sparkling flow was stimulating the object to move up and down with different rhythms,



*The 87th board of the study association for Electrical Engineering Scintilla.*



Tara van Abkoude, Secretary & Commissioner of Internal Affairs.

creating a melody worth remembering. While looking at it through nanolab worthy lenses, you could see the electrons jumping and having fun, creating a moshpit around the undefined Gaussian surface. In this heating, activating and oscillating environment some fields were created. Some might even say that a magical butterfly, which teases the Schrödinger cat, uses these fields to flap her wings and propagate in the right direction.

---

“This gathering of wavelengths was somehow resonating with the minds of the connected capacitors and coils”

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The magical butterfly, named after the Latin word for the spark, has been flying around for 51 years now and experienced a lot. In her first years she was only a tiny little butterfly, living in a world full of strangers and looking up to her sisters in the other universes. But as the years went by different environments

gave her different propagation directions. These environments nurtured Scintilla and made her into what she is today. By now you’re probably thinking, what the \* has this to do with the board? Well, let me tell you a story about 5 electrons and how they became the new flow and effort of the environment which is and will be nurturing Scintilla in the coming academic year.

## Quantum Tunnelling

Tara van Abkoude, one of the many electrons living in the Silicon valley, heard a vaguely familiar sound as she was moshpitting together with her friends on the always repeating Paul Elstak – Luv you more. The supplementary vibrations gave her an uneasy feeling. It was as if she was about to fall into a deep black hole. You could compare the sound with a ramping sawtooth wave generated by a Westzaal oscilloscope. The louder and higher the sound became, the more uneasy and excited she felt. Suddenly, at its highest point, the sound stopped and left behind a deep silence.

However, the silence was not completely without noise. The white noise was still

resonating between the different molecule homes, giving her a sudden chill. As if something was about to emerge. As if quantum tunnelling was going to occur again. This was the name for the characteristic phenomena, which she found in the old library. She quickly took her pencil and booklet out of the bag and started taking notes. Her friends stopped, looked puzzled, shrugged and went on with their moshpit. They never quite understood her urge to write everything down, but knew that she would catch up soon, to party some more.

Little did they know that Tara was planning to take part in the quantum tunnelling effect. She had read so much about it and wanted to know more. Quantum tunnelling had become a common problem in the era of transistors. Only knowing by chance where the next stop will be. Tossing single electrons around the universe, never to see their loved ones again. It was one of the most tragic, interesting and challenging times since the era of the law of gravity. If they could control quantum tunnelling, it would mean a new and faster form of trans-

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“It was as if she was about to fall into a deep black hole.”

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portation. However, it was still a wild card with lots of unknown treasures and functions. Fortunately, the electrons which flow freely in the Silicon universe created a system to defend themselves and keep their journey somewhat traceable. Tara learned this routine from a free electron which was just passing by. Today she saw her chance to test the newfound method and went on an adventure. For one last time she looked back at the place where she grew up and smiled. She turned around with peaceful feeling and jumped in the nearest hole. Nothing could have prepared her for what awaited her at the other side.



Wouter Pool, Commissioner of External Affairs.

## Green Energy

Phosphor city was one of the places where positivity had a small impact. Wouter Pool, one of the few electrons present, was sitting at one of the energy spots as he was drinking his current. He could feel the eyes of the protons piercing his back. He cursed: ‘Still not used to it I guess.’ Since his first jump he had been feeling restless, longing for his home town. His ears had not failed to detect the defining sound over the years but he could not jump fast enough to escape the love of the protons. The sound had become an addiction over the years. Every time he heard it you could see the flame of hope glow again. Hope that another electron would join him to make some fun and create some heath. It never happened though.

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“But he could not jump fast enough to escape the love of the protons.”

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Throughout the years Wouter had found a way to communicate with the eager protons. After some investigation

in their personal life he found an interesting desire: they wanted to get more reputation in the Silicon universe and spread their brand. This made Wouter think and have one of those light bulb

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“The one thing protons are best at, is making creative engines and machine parts.”

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moments. The one thing protons are best at, is making creative engines and machine parts. As an engineer Wouter had always been interested in green energy and how to use this energy for transport, but he was always busy with more important things. Now, because he stranded in Phosphor city, there was enough time. A blessing in disguise. This is how he started to engineer the green energy car. He signed a contract with the local machine dealer to work on his little project and created his own external network.

While his mind was working on the last parts of the car he suddenly heard a sound. At first he was sceptical. Not wanting to believe that the ramping

sawtooth wave had been activated again. But as it continued to be, he let his heart convince his mind. He jumped out of the spot and ran to the place, which he had marked with a combination of sinusoids. Shouting: “Finally, the tunnel is open again.” As he was calculating the speed and power transfer of his vehicle the sound became louder and louder. He quickly checked all the parameters and put on his helmet. The contrasting silence actuated the engine of his vehicle and the gyrator was working again. As the PMS185C coloured car neutralized and continued to work with green energy the quantum tunnel did its magic.

## Materials

At the border of the end of the universe, where time begins, Lynn Bruins was sitting in her cosy home with a cup of current. As she looked outside the window she wished that some kind of system would emerge. The voltage differences were electrifying and as always spectacular to see, but also very dangerous for the little embryos. Higgs particles. The universe needed to be released from its chaos and let elements find their own species. Gold, copper, aluminium, phosphor, silicon, bohr, etc were all present. However, they were flying around in the black hole near the end of the universe just like hyper active particles.

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“The voltage differences were electrifying and as always spectacular to see.”

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As an electron, Lynn could not see herself hopping from one element to the other to find her way through time and space. She would rather have a safe clean ride to the next quantum state. But to achieve this, a system should be designed to filter out all the useless materials



Lynn Bruins, Treasurer & Commissioner of Education.

and amplify the valuable grounds where electrons can drive safely. Since she was fully charged and time was not an issue, because time originated nearby, she decided to think up a system. A system which could organize different materials on their specifications and address concrete units of value to these materials.

the perks of being an electron. This passion of teaching and spreading important information only got higher and higher over the years.

Somehow the chaos reduced when she played her instrument. The electromagnetic waves made the electrons dance in line and created some kind of field. A field so strong that it attracted other

“Enhancing clear sinusoids with a frequency range big enough to create a magical feeling.”

But first, one of her guilty pleasures barged in, making music. Enhancing clear sinusoids with a frequency range big enough to create a magical feeling. The little electrons always got excited when they heard her music. Of course she was happy to teach them the basics and what being an electron in the universe was all about. Especially during her second year of being an electron she flourished in teaching the young higgs particles about



Jeroen Klein Essink, Administrator STORES.

electrons from different cities. They were all emerging, following the ramping sound. In between the dancers she saw two weird and interesting looking electrons. One was registering everything she saw, while carrying a pencil and a lot of booklets. The other was racing in a PMS185C red car while moving his head up and down on the beat. Then suddenly, a third one emerged while pulling a heavy weighted cart.

## STORES

Jeroen Klein Essink was following the data stream as he wandered through the desert of bit errors. His tilt-car bulged out as he collected another electrical unit. He remembered the good old times when he was strong enough to pull two tilt-cars. Making his parents proud and all the other electrons look with awe. But now that he had grown older a lot of different quantum states had flown by. During these past few years he had experienced a lot. He had been working in a parasitic resistance and therefore had gained a lot of knowledge about the practical use of the electrical components which he used to collect.

But in the end he returned to being an electron and collector. Not only to achieve more knowledge but also to find his own spin. He had never really found the right spin while working at the plant. You could think that it was just a matter of time, but luckily he got away from the mind devastating working place. While working at the parasitic resistance he had gained a lot of practical skills, which helped him in succeeding with his little electrical components store. He was capable of giving

“However, he wanted more and chose to ride the roller-coaster-tunnel-effect again.”

advice on practical circuits which protons and electrons had made up and his store became a known entity. However, he wanted more and chose to ride the roller-coaster-tunnel-effect again.

## Encounter

Lynn was still searching for a system to filter out all the useless materials and amplify the valuable grounds. Somehow she was drawn to Tara with her documentation. Curious as to what kind of useful information there could be in her booklet to help Lynn with the system. Luckily Tara had some documentation left about a payment system, where the addition of some electron effort in combination with different metals could create light. Light could then be stored and used as energy fountain to make the life of the electron easier. As Lynn and Tara got talking Wouter almost crashed into Jeroen. They stopped and looked at their differences. But despite their awkward encounter they immediately knew what they wanted from one another. Wouter could help Jeroen in looking for extra business partners to make the Sto-

res bigger and therefore create another item to his external list. Jeroen and Lynn could share their findings in the new payment system and Tara and Wouter

“But despite their awkward encounter they immediately knew what they wanted from one another.”

could maintain the contacts they had with different protons and electrons. However, they missed something. A leader to keep track of everything and support them where needed in their daily activities.

It was as if destiny wanted these 4 electrons to meet. They had tunnelled through the different shells and places all to arrive one at a time, spin up, spin down, spin up, spin down at the border of the universe. While being in the same outer shell they saw an application form for being the board of the free electron community. They would have to take

a journey throughout the universe to end up at headquarters but one glimpse to each other and they knew that they would do it. Despite the long task that awaited them, Tara, Wouter, Lynn and Jeroen had not given up hope. Every one of them wanted to change the way the universe worked in their own way and they had found out that their qualities were easily matched.

## Chaos and Order

As usual Guus Frijters was pacing up and down while thinking of his speech. Being the president of the free electron community he had to say something about the quantum tunnelling effects. A lot was still unknown. How could he ever comfort the electrons by saying loose words. It got him thinking about his childhood. Theatre shows were one of his favourite events. Being able to connect and improvise with other electrons gave him a bonding feeling. This was probably the reason why he ran for president. Talking and improvising the right words to say. Giving comfort with these monologues and functioning as a



Guus Frijters, President.

tower of strength for the free electron community.

“How could he ever comfort the electrons?”

However, right now, with this tunneling issue, he did not know what to do. As if he was missing something, someone. Next to the panic of the electrons it also was not going well with Scintilla. She had been restless ever since the 86th board left the Dutch city and was emitting strange sounds, similar to the quantum tunnelling effect. At first Guus tried to comfort her alone. But as it turns out he needed more. One electron can hop over and tunnel through. But more electrons can easily create fields and waves to support Scintilla.

Guus decided to hand out some application forms and thought up some functions to assist him in this difficult time. A secretary to keep track of the history and present. A Treasurer to control the finances of the free electron community. An external affairs to keep the connections with other communities like the protons and other universes. An internal affairs to keep the electron community happy and alive. An administrator to control all the finances of the shops and a commissioner of education to pass on all the knowledge of our ancestors.

Of course this would not be a good story if these applications were not identical to the ones which Tara, Wouter, Lynn and Jeroen had found in the outer shell. So, to make this an acceptable tale of course they achieved their goal and finished their journey. But that is another story. As the sun went down a bright PMS185C glow marked the

borders of the clouds. And the butterfly finally went to sleep knowing that the

“And the butterfly finally went to sleep knowing that the 87th board of Scintilla will guide her to yet another new direction.”

87th board of Scintilla will guide her to yet another new direction.

“Just beyond the horizon of the so-called impossible is infinite possibility.”  
Bryant McGill – Writer.



The 87th board of the study association for Electrical Engineering Scintilla.

# Participating in participation

*Author: Jippe Rossen*

In earlier editions of *The Vonk* several important educational aspects have already been covered: The responsibilities of the committee StOEL, the honourable duties of the commissioner of educational affairs or the article about the Programme Educational Committee (OLC) of edition 32-4. This edition we will be going up along the hierarchy even further and discuss the Faculty council.

## The general organization

Most of you will (or at least should) have heard of the faculty council. However, only very few students actually realize what we do and how this affects the day-to-day operations of our faculty. Most people only know of the elections, during which eight students will be elected to take a seat in the council for the upcoming year.

So in total there are eight students in the council, apart from that, the council also consists of 8 employees, which are either support staff or scientific staff. The scientific staff consists of the teachers and researchers in the faculty and the PhD-'students' (most of whom are employees with a 4 years contract). From these sixteen people, three get appointed in the daily board. The daily board consists of the chair for the council and two assisting members.

The faculty council operates in cycles of 6 weeks. Every cycle starts with an agenda meeting. This is a meeting between

the Dean of the faculty, his secretary and the daily board of the council. During this meeting the topics are determined which will be treated for that cycle. In this way both the Dean and the council can put topics of discussion on the agenda.

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**"Thus the government has decided that students and employees are to have a certain power in the policy making for education and research."**

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In the following week the documents are gathered. Most topics are introduced by the dean and concern periodical documents, such as evaluations, regulations, budget or new policies. Two weeks later the faculty council meets separately with only its 16 members. Then, all the topics are discussed by the members of the council. Usually this results in a list of questions and remarks to the Dean



which is sent to him in advance of the FR+ meeting.

The FC+ meeting means that also the management team is present. Usually this consists of the Dean, his managing director and his secretary. However, in some cycles additional staff members are present. For example, during the discussions for the educational regulations, the portfolio holder education would also be present.

## Responsibilities of the council.

The council has a certain amount of privileges and responsibilities. These regulations are mostly defined by the higher education and Research Act (WHW), but some of them are specific to our faculty and are written down in our own faculty regulations.

Thus the government has decided that

students and employees are to have a certain power in the policy making for education and research. This is quite important as students pay a lot of money for their education. Especially with the cutbacks on the study loan (which has now become an actual loan, instead of becoming a gift when graduating), this is more important than ever: students and employees should verify that the saved money is spend for improvement of the educational quality.

**“The dean is required by law to write a formal response to the council on how he processed the advice.”**

An important responsibility (for students) of the faculty council is the right of assent on the OER's (Educational and examinational regulations) of the programs that the faculty offers. Every year the programme director and his staff make a proposal of next year's regulations. These regulations describe the passing requirements for a course or a study year, which rights you have for resits, compensation regulations and so on.

Although the educational committees are much more closely involved in this process, they do not have full right of assent on the documents itself. They write an advice to the faculty council which takes this advice into account. After the council has reviewed the complete documents themselves, they will either give their assent, or make arguments on what they do not like. In that case the documents will be sent back to the policy makers and be adjusted. In some cases, a disagreement can occur. Theoretically this can stall the document from being put into effect. This however, hardly ever occurs. Every person concerned knows the importance of decisive actions and so most of the time a compromise is made eventually.

The faculty council also has the right of advice. This right can be put into action by writing a formal letter to the dean which contains one or more advices on a certain topic. The dean is required by law to write a formal response to the council on how he processed the advice. That is, his response should entail a clear reasoning on how his actions will be affected by this advice and why. In some cases the response could be just a denial of the advice supported by arguments. Yet again, in all cases he will have to deal with it in

a constructive way.

The last formal task of the faculty council is to review the critical decisions the dean will have to make. If a reorganization is required or the structure of the faculty is changed in any way, the council has to give their assent as well. Currently the faculty is looking into creating a new chair with a new professor. This is a modification of the structure of the faculty and therefore the council has to give its assent for that. Also new bachelor or master's programs are to follow the same course of actions. (However, if this was done by adding a group under an existing chair, assent would not be required).

### Any other business

As the faculty council is mostly concerned with policies and strategies, I could fill an entire Vonk with guidelines, regulations and acts and even more when I would explain them all. As this is pretty much a waste of space and paper (you would probably fall asleep after 4 lines) I will end this article with an anecdote of a current issue in the council.

Roughly three years ago a new program was called into existence: Atlas university college (Technology and Liberal Arts & Sciences). I mentioned the WHW already, which states that every program offered at a university, should be seated within a faculty. Therefore, the university board decided to add it to our faculty, EEMCS. So far so good. However, this decision had to result in the adjustment of the faculty's regulations. A proposal was made by the dean together with the university board and sent to the council. The council however did not agree with the proposed document. They decided this for numerous reasons. One of these was the concept of participation (medezeggenschap). It turns out that Atlas' budget is determined directly by the university board. The WHW states that students and employees have the right to influence the budget plan and policy's in

their faculty. In the proposed structure this would not be possible, as this was all done on another level. The situation is at an impasse at the moment as the council refuses to agree with the current situation and structure, the Dean partially agrees with us on the matter. The board of the university, however, does not and does apparently also feel no need to resolve the situation any time soon.

### Closing words

To participate in the council, a lot of patience is required. There is this ongoing battle between the Dean and the council over powers and privileges. The Dean and his management want to make decisions quickly and also want to

implement them in their own way. Since I joined the council last year we already had three discussions on whether we should have the right of advice or the

**“The board of the university, however, does not and does apparently also feel no need to resolve the situation any time soon.”**

right of assent on a certain topic. Usually this does not affect the process a lot, but if at some point a strong disagree-

ment arises, you would hit your head against the wall if you had not fought for the right of assent some time earlier. Also there is a lot of policy making and documents. For some meetings it is required to review over 100 pages of documents. Discussions are made about evaluations and how they should be interpreted, about regulations in the educational programs. Sometimes even about whether people are informed well enough on their rights on a proper chair to work on.

Even though we now and then make the life of the faculty's management quite hard, I think everyone involved (even the Dean) will eventually agree that the council is very a useful body in the faculty.

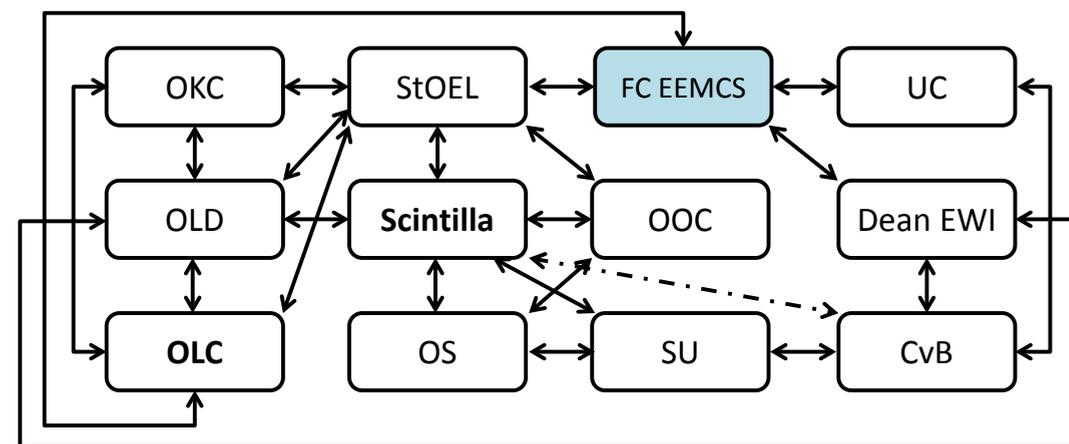
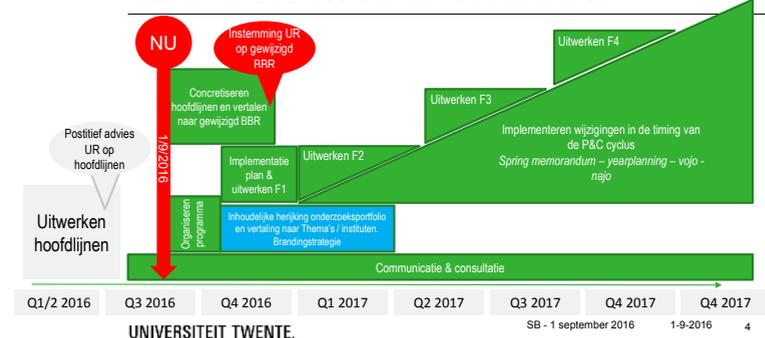


Diagram showing all education concerned bodies at the university and the way how they are connected to Scintilla.

- OKC: Educational Quality committee
- OLD: Programme Director
- OLC: Programme Committee
- StOEL: Student Discussion Group Electrical Engineering
- OS: Discussion Group Study Associations
- FC EEMCS: Faculty Council EEMCS
- OOC: Discussion Group Commissioners of Education
- SU: Student Union
- UC: University Council
- CvB: University Board

### GBLOBE SCHEETS VAN HET TRAJEKT NADER UIT TE WERKEN DOOR / MET DE PROGRAMMAMANAGER



The faculty council often receives some random slideshow presentations on various topics. So quite regularly we have to make sense of of stuff without any context.

# Advertorial: ASML

Author: ASML

ASML campus promoter Vera Nauta tells us her story.

‘I immediately thought: what a great company! When the previous campus promoter told me about ASML, I immediately thought, what a great company!’ says current campus promoter Vera Nauta. Her studies are related to ASML’s activities. After obtaining her Bachelor in Electrical Engineering, Vera wants to continue studying for a Master’s in IC Design. Vera: “That’s what I like about this course of study: building circuits, getting the puzzle to work. I was already slightly familiar with ASML by name and knew that the high-tech company makes a crucial contribution to technological development in the world. During my brief induction period as a campus promoter, I visited ASML, received training and was given a tour of the cleanroom. Since then, my admiration has merely grown.”

## Intro to ASML

For those who are unfamiliar with ASML, a brief introduction: In contrast to what many people think, the company is not a manufacturer of computer

Based in Veldhoven, ASML ships its equipment to all the big chip producers in the world, including Samsung, Intel and TSMC. Vera: “There’s a lot of con-

trol engineering at ASML, but that’s by far not the only thing. Lots of technologies are combined in the machines.”

“There’s a lot of control engineering at ASML, but that’s by far not the only thing. Lots of technologies are combined in the machines.”

chips but rather of the (lithography) machines that are required for the production of these increasingly complex and smaller integrated circuits. And the company is really good at what it does!



**ASML**  
Be part of progress

Almost 100 nationalities

“As a campus promoter I primarily try to convey the type of company that ASML is. Most students know the name but don’t know exactly what ASML does and thus also not what kind of possibilities there are. Some might think that

“The culture is very open and accessible. This way you really meet people quickly, and that makes the work especially fun.”

working at such a large company is very impersonal, but I think the opposite is true at. The culture is very open and accessible. This way you really meet people quickly, and that makes the work espe-

cially fun. It’s also amazing how many nationalities work at ASML. I think it must be more almost 100. And that makes the work environment even more interesting.”

## World knowledge

“I think that ASML is one of the most important high-tech companies in the Netherlands. An enormous amount of

“An enormous amount of technical knowledge comes together here, from across the entire globe.”

technical knowledge comes together here, from across the entire globe, which ultimately winds up in one machine.

That’s really marvellous and creates an incredibly learning-rich environment. Students of the Electrical Engineering, Mathematics and Computer Science faculties who are interested in an internship, doing a graduation project or working at ASML can always contact me. If I can’t answer the question myself, I will forward it to the right contact person at ASML. So let’s hear ‘em!”

## Want to know more?

You may already know Vera Nauta, or you may have heard her name during ASML presentations, lectures and Excursion Days. Want to know more about the opportunities at ASML? Then please send her an email at: nauta.vera@gmail.com

<http://www.workingatasm.com/students>



# Bootcamp

*Author: Matthijs van Minnen*

The first day most undoubtedly includes the most important event of all, the do-group market. This can make or break your Kick-In week. All the freshmen were guided to the prestigious Berkhoff-room where they viewed the do-group presentations. After a short oral introduction by the do-group parents, a video further illustrating the do-group was shown. After all the presentations it was decision-making time. Without too much hecatics all students to be choose the group they would be spending the remainder of the Kick-In with.

After this stressful moment all do-groups moved to the M-basement and the Abscint for some delicious Chinese dinner. This was also the first moment of teambuilding for the crispy new do-groups. After dinner, the groups were free to go and continue the Kick-In programme. It would take another few days before they would meet again with another Scintilla organised activity.

## The real start

Quickly continuing to the sixth day of the Kick-In where everyone is summoned at an early hour to enjoy breakfast together.

Some time after all do-groups arrived some new faces showed up. These were the unfortunate students that were unable to participate in the general Kick-in and could only participate in the study specific few days of ultimate fun. After breakfast there was some free-time which was quickly seized by the do-group parents to take a relaxing tour around the campus. For many this was the first in-depth view of the place they will spend many of the coming years.

After the tour it was time for some more serious talks from many of the important related figures such as the program director, bachelor director, study advisor as well as the EEMCS Dean. The last lecture was given by the module coordinator of the Fields and Waves module, Michel de Jong. He dazzled the students to be with Electromagnetic waves and Maxwell equations. Confused, the students walked out of the room to get lunch.

After lunch the students viewed some



GeSKICt!  
 Ongeschikt

of the research groups before moving on to the most important event of the day; the registration at Scintilla. The positive effects were immediately noticed when they bought their books at the STORES with a great discount. After this faculty round the do-groups departed

“Confused, the students walked out of the room to get lunch.”

one-by-one to the secret camp location. Upon arriving at the camp location dinner was served and the places were claimed inside of the large army tents. After some liquid refreshments the evening



program started. The students-to-be were divided into a number of groups recognizable by their coloured wristband. With this group they were dropped in the middle of nowhere and tasked to find their way back...

## A very tiring day

The next morning everyone rose to the lovely sound of a big speaker at max volume spouting out more decibels than desired. To go with this year's theme the freshmen now had to partake in some morning exercise before breakfast. Once completely awoken and recovered from the exercise, the Highland games



started. Afterwards, the students, unaware of the lurking danger, gathered for a group picture. After the picture was taken they were bombarded with a large amount of water balloons.

“...the students, unaware of the lurking danger, gathered for a group picture...”

Until dinner, the mood was relaxed. People stayed at the lake, and took a refreshing dive or rested in the sun (or shadow). The afternoon ended with a

barbeque. As is customary, the Cantus Scintillae was held on the second night of the camp. The freshmen were handed

“After the picture was taken they were bombarded with a large amount of water balloons.”

a codex and they could enter the specially decorated tent. They entered in awe and took a seat as the Cantus commenced and lasted until long into the night.

## We survived it all

After a few hours of well-deserved sleep, those speakers were put on maximum volume again. Luckily no morning exercise this time around. After breakfast it was time to clean up. All the tents were disassembled and the campsite was cleaned. Once everything was clean all

“...the faculty organised a luxury lunch with hotdogs, ‘poffertjes’ and much more.”

the do-groups could begin the journey home. Somehow this is always faster than the way to the campsite...

On the O&O square the faculty organised a luxury lunch with hotdogs, ‘poffertjes’ and much more. The program stopped after this and the afternoon could be used to catch some very much needed rest.



EEFBA



Eind-P BBQ



Kick-In



Hyperion



ASML



Make the BorrelGreat again

# Afterlife

It's been three and a half years since I presented my master thesis and graduated. At the time of my graduation I hadn't even started looking for a job. I was entirely confident that my master Embedded Systems would allow me to easily find a job. This was unfortunately only partially true, quickly many recruiters and secondment firms showed great interest, but I had specific requirements as to the location of the work. I lived in Enschede since the age of 4 and had little inclination to leave. The fact that my girlfriend was still in school in Enschede at the time and we were living together here, also firmly rooted me in Twente. Keen on finding a job somewhere in the region I started to look around and also contacted a local recruiter.

Now you should know that many graduates are perfectly content to have the entire job finding process handled by someone else. After all it's very easy and requires the least amount of effort on your part. The easy option is not always the smart option though. For a company employing someone from a secondment firm is considerably more expensive and often they would rather employ someone directly. This also applies when you use a recruiter, the company that hires

you will have to pay a hefty fee to the recruiter. My advice is simple; when you are passionate about a company, go there directly, you will increase your chances of being hired and this also shows great initiative.

Are there any reasons to start working for a secondment firm? There are some distinct advantages, for instance; these firms will often invest in your professional development and offer you chances



Author: Jasper Diephuis



to experience many different companies in shorter periods of time. When you are not sure what you want in your future career these firms may be a valid option until you do. A recruiter can help you discover companies that you might

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*"I have always loved a new challenge and I hope that I will meet many more diverse and interesting challenges in the future!"*

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have never even heard off and use insider channels to get you an interview. Keep in mind that you may no longer approach a company on your own after your recruiter has contacted them and even if you do the company will still have to pay the recruitment fee. Therefore, make strict arrangements with your recruiter which companies he/she can approach on your behalf.

Something I more or less failed to do since I eventually found my way to Nedap through my recruiter. Rather silly considering that many former board members of Scintilla and people I knew worked at Nedap. After multiple interviews I got job offers from 2 very different companies. A small high-tech start-up and Nedap; a large company which is not so much focused on high-tech as the smart application of technologies. In the end I chose to work for Nedap and I have worked at the Security Management department of Nedap till this day.

It might be interesting to mention I took 2 months of vacation between my graduation and the start of my first job. You might wonder, was it a good idea to take so much time off after graduation? To put it subtly, absolutely yes and I definitely recommend everyone to take at least a brief vacation! In a job the amount of days off you have is extremely limited. Not only will you be restricted by your contract, but also by the fact that you have an overwhelming amount of work you are eager to do. Taking a nice long break after graduation to release all that graduation stress is absolutely mandatory as far as I'm concerned. Unless the alternative is starvation you should definitely make sure you enjoy this brief moment of respite before the 40+ years of work ahead. It doesn't really matter what you do in this time as long as it's something you enjoy doing.

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*"Taking a nice long break after graduation to release all that graduation stress is absolutely mandatory as far as I'm concerned."*

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After my brief vacation I started full-time at Nedap. Nedap had several qualities that greatly appealed to me; the resources and opportunities that only



a large company can offer, the lack of hierarchy (the boss of my boss is the CEO) and most important the focus on personal entrepreneurship. I have to admit personal entrepreneurship is a rather vague term and it doesn't mean that everyone is just doing whatever they want. Obviously that would not work out very well in such a large company.

I mentioned personal entrepreneurship as one of the things that makes Nedap special, but what does it mean when a company supports and expects personal entrepreneurship? Nedap is a gathering of many talented and ambitious professionals. Each and every one of them has a lot of passion for what they do and their own set of goals. The beauty is that anything is possible, but you will have to take the initiative to realize your goals on your own. Your success is entirely dependent on your own entrepreneurship, your ability to work towards the realization of your own goals. Resources, time, training and advice is available for those with ambition and initiative. This may not suit everyone, but it is an environment that has really allowed me to flourish.

The past years have been very enjoyable and I've learned and done many things I would never have predicted when I star-

ted working at Nedap. Only 2 months in I was 'promoted' to SCRUM master before I even knew what it meant to be one, eventually growing into someone who has in-depth knowledge on the processes that surround software development. I've organized and presented workshops for small groups and large groups of over a hundred people and I've improved the way we make software by introducing something new and changing something old.

I can't honestly say that the working life is easy. The amount of free time you have is greatly reduced and this is something no amount of money can compensate. However it also offers interesting new problems and challenges for you to tackle. During my 3 years at Nedap I've never been bored. And trust me, you'll get used to the workload soon enough.

Is it possible to predict what your life will be like after you graduate? Probably not. Unexpected opportunities will present themselves and it will be up to you to embrace them or reject them. I have always loved a new challenge and I hope that I will meet many more diverse and interesting challenges in the future!



# Alliander

**07:00 AM, the alarm screams through the room. It is still dark outside, but the day has already started. A long day, with a journey to another world. A non Twentse world. Something we do not experience everyday, but today is not as the other days. Today we are going to the largest Ikea of the Netherlands. Or at least right next to it.**

Alliander is not a company which is well known. Which also was the case with the enthusiastic people who gathered at the Scintilla Room at 08:15 AM to hop on the cars to Duiven. Therefore you, our readers, are probably not familiar with Alliander as well. You might have heard of Nuon, or Essent. You might even know Tennet. But Alliander is often unheard of. So, what is Alliander? Alliander is a company which consists of two parts; Liander and Liandon. Alliander is a distributor of energy of all sorts. This means it distributes gas, electricity and heat. Alliander has nothing to do with

production, which is often why they are not as well known. They have no use in making advertisement because there is a construction in the Netherlands which assigns Alliander to a specific area in the Netherlands. This therefore means that you personally have no say in who delivers your energy except for where you live. Now that we have a feeling on what Alliander is, we can continue the story about the excursion. We arrived at approximately 10:00 AM. The journey went quite smoothly and we parked our cars in a very power efficient parking garage, which meant it had a roof of solar

*Author: Guus Frijters*



Figure 1

panels. The first thing we saw when we exited the car was the main entrance. As you can see in figure one. The main entrance looked huge, and when we walked to it, we saw a sign which said that there was a little bus going to the Ikea every morning and every afternoon. Which was odd at first, but it became clear later on. But for the sake of our readers, we will not let you wait for the clue, so read carefully. Alliander works as a “zero” building. Which in this case means that everything in the building should be as efficient and helpful as possible. This means that it is as power-efficient as possible and as green as possible. The green-ness of the building is seen in the solar panels which were already mentioned, but also in the build of the building. When it was decided that the office was going to be build, there were a lot of old buildings in the same spot. But all these buildings are re-used. Parts are still standing which almost makes it seem like it is a building in a building, which it basically is. In figure 2 you can clearly see that there is a building standing inside of the huge shell. Which is actually just one of the old offices that are re-used. But now you are still waiting for the Ikea-story. That has something to do with being green and efficient. The Ikea has

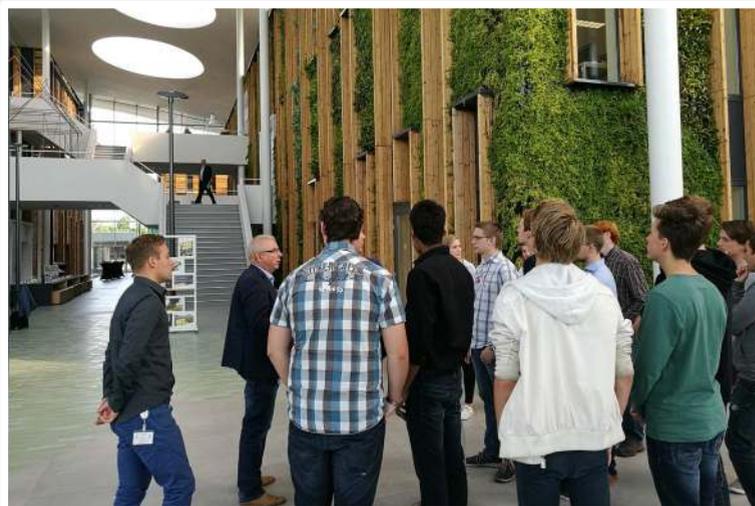


Figure 2

a huge parking garage, while Alliander only has 450 spots approximately. The office in Duiven however, has 1500 workplaces approximately. This means that a roughly thousands employees are either coming by train or bike, or need to park somewhere else. And since there is a huge parking garage which is mostly empty on weekdays (we all know that the Ikea is a weekend activity for most of us), Alliander was smart enough to make a deal with the Ikea. On weekdays, the top floor of the parking garage is used by Alliander and a shuttle is available to drive you up and down. This makes the use of the spaces as efficient as possible because there is no empty parking spaces at the Ikea.

But let's continue with the excursion. When we entered Alliander we were met by two lovely HR ladies who would assist us through the day. We also got nice badges which said: BEZOEKER (which means visitor in Dutch). When everyone was ready to continue we went to a meeting room where we were welcomed with coffee, tea and cookies. In this meeting room we got a presentation about Alliander and their work philosophy. Their efficient way of working, what they do as Alliander and their green policy overall. After this presentation with a pleasurable power-point we were welcomed on a tour throughout the facility. We started outside and got to go on the full Alliander experience. This meant going to all the testing rooms and practice facilities.



Figure 3

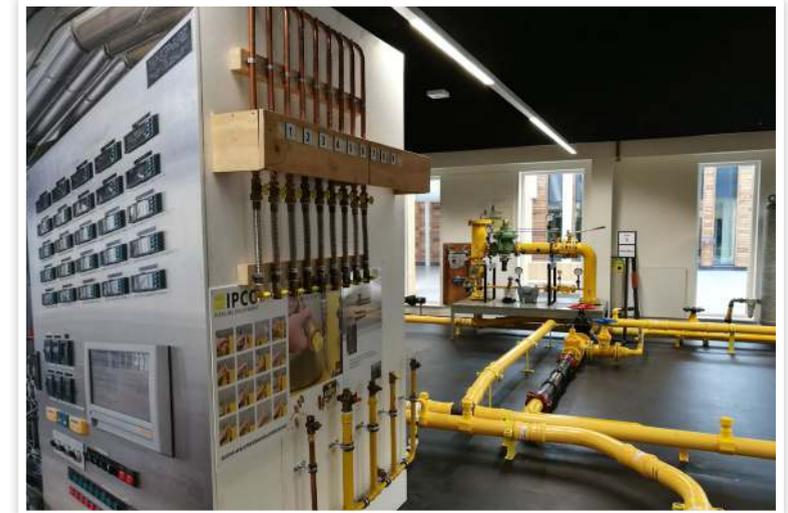


Figure 4

The office in Duiven is mostly designed for the education of their mechanics. This means fake fuse boxes, gas-installations, cables and piping systems (fig 3 to 5). In figure 4, the testing or teaching room for gas systems is visible. In this room, or so we are told, is the possibility to recreate different problems with piping systems for the students to fix and test out. In figure 6 a few cable-sets are shown which Alliander uses in the ground to transfer all the energy. After the tour we had a lunch with some face to face time with different employees of Alliander, amongst them was a Alumni of Electrical Engineering in Twente who would enjoy us with a presentation after the lunch. The lunch consisted of nice sandwiches and smoothies which everyone enjoyed to the fullest. After the lunch we went to upstairs to another room to enjoy another presentation. This presentation was held by our very own ex-member of Scintilla. The presentation however, was more active than we had expected. We had to form teams to compete against each other in a battle to see who paid the most attention during the excursion or who just knows the most about Alliander. After this quiz it was time for some educated Q&A session, which resulted in some more details about the work of a master-edu-

cated employee of Alliander. But mainly about the HR part of the job, and not so much about the die hard electrical engineer part. We did found out however, that working at Alliander means at first a two year traineeship in which you can get a feeling about working at Alliander and where you can see what is possible within Alliander. After this presentation we were invited for a drink with loads of snacks and even more employees of Alliander. All these employees were enthusiastic to tell us more about the company and their route into the company.



Figure 5

# Real-life bingo

Author: Mattheijs van Minnen

The university is structured into faculties that group together the organisation of several studies. Cool, but what is in it for us, the students? Not all that much, on a social level at least. That is why there is a yearly activity organised by the freshmen committees of all the partaking associations. With the goal of meeting the people from all the other EEMCS studies and simply for the fun of it, Scintilla together with Abacus, Atlantis, Inter-Actief and Proto, organised the real-life bingo, an event exclusively for freshmen. What is real-life bingo you ask? Well, definitely more fun and exhausting than a regular game of bingo.

The event started right after the classes had ended. After diner with some delicious pizzas, the students of all the different associations had to get ready to play the bingo. Everyone was placed in groups of five with people from different studies and everyone had to find their group members. Easier said than done if you barely know the people from your own study let alone people from other studies (yikes!). Using the offer of free drinks for the first assembled group as motivation, the freshmen started shouting and calling out their group number.



together with a random combination of colours: "BALL THREE, GREEN, BLUE, YELLOW!". If your team's card would have the number three, you would then run onto the O&O square and collect glow sticks of the corresponding colour and show these to the bingo leaders to have your number ticked off. Simple, right? Now imagine hunting for glow sticks together with 15 other teams! Did we mention the time limit of 60 seconds to show the sticks with the correct colour (somehow the difference between blue and purple is very difficult to see for some) to the judges? That surely would make for a lot of chaos every time a number was called. The team that would get three complete rows would win some more free drinks.



Despite the fact that the freshmen had been studying all day, they were full of energy and dashed from glow stick to glow stick. It was good to see that after a few rounds some groups started to work together and send different people to look for different colours only to throw a big pile of sticks in front of the judges and pick out the correct ones on the spot. After the first group had completed three rows, the game continued to find a second and third team, they too received (although less) free drinks. At that point everyone was tired and wanted to go inside to get some refreshments. Unfortunately, there were still hundreds of glow sticks scattered around the O&O square and no way the organising committees were collecting all of those by themselves. So we quickly decided that before going inside everyone had to hand in five glow sticks which saved us tons of work!

The drink afterwards inside of the Abscint and MBasement was definitely successful as the clusters of students from the one association slowly merged with groups of other associations. Apparently the freshmen liked the other students. "I love it when a plan comes together!"

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"Using the offer of free drinks for the first assembled group as motivation..."

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Surprisingly the first group was formed within 2 minutes and the others followed quickly after. Now that the groups were complete, the rules were explained: Out on the O&O square the bingo leaders would retrieve a ball from the bingo machine and call out the number

# Advertorial: maxon motor

*Author: maxon motor*

maxon motor is ‘driven by precision’, worldwide and across many high-tech sectors.

We are a knowledge partner in development, where different types of drives form a crucial contribution to our customers’ success. The best ideas are the result of collaborations, mutual inspiration and challenging each other in pursuit of a higher goal. maxon brings expertise, know-how and experience to co-creation and co-development; we develop solutions, make connections and support the development of new approaches.

Working at maxon motor is working on the frontiers of technological developments. maxon develops customer specific drive solutions. This varies from a highly customized standard product to developing a new motor. Either way it requires every tool in your engineers toolbox.

Translate customer demand into specifications

Customers have a deep insight in what they want to achieve with a specific drive solution, it’s the job of our engineers to translate those demands into specifications to work with. After that, the challenge begins to design a solution meeting the demands.

## Prototype

Not every project requires prototyping, but if it does, it could well mean a new developed motor. If so, craftsmanship is required when you need to build and wind a motor by hand, to proof the design works (it turned out in one case that the difference in efficiency between a hand-wind motor and machine-wind motor was almost neglectable – a huge accomplishment of our colleagues winding the prototypes!)

## Tooling

When building a new motor, new tooling is also required. Our mechanical engineers found working methods and developed the necessary tools to be able to meet the production requirements – e.g. placing the magnets on the frame needs to be done within tolerances as narrow as human hairs.

## Production

After the prototyping phase, the production of larger numbers starts. Really a next step where all theoretical and one-time practical solutions need to be translated into processes, steps and ways of working that are suitable for repeti-

**maxon motor**

**driven by precision**

tive production.

Dynamic control at high speed

Working together in teams of specialists, local and from other maxon companies around the world, is dynamic and goes at high speed. Our customers want the best, maxon wants the best. Our customers application area vary from semiconductor to medical, from robotics to food & agriculture, and all other areas where high precision, high efficient drive solutions are key to perform at the highest level.



# Bachelor assignments of 2016

## A low cost open-source 3D scanner for facial acquisition

Author: Roel Plompen



Since the start of the information age, a lot of research has been done on how to keep private information safe. Many

“Certain forms of biometric identification, such as finger prints and iris scan, can however be tricked.”

applications/devices on the market allow the user to protect their data by means of biometric identification of

some form. Certain forms of biometric identification, such as finger prints and iris scan, can however be tricked. This resulted in the need for a better, usually more complex, methods of biometric identification. One of these methods is 3D facial recognition.

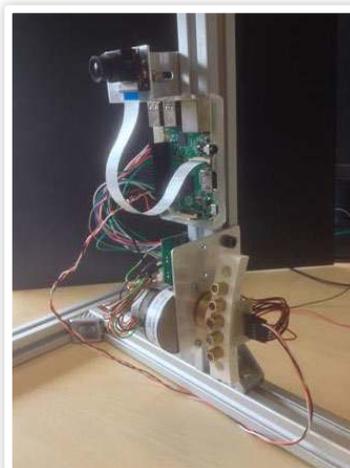
“This scanner however needs around 45 seconds to capture a person’s face.”

Along with this recent trend, many companies have been releasing new technology, which can be used for 3D acquisition. This technology is often either expensive or the resolution is relatively low.

Most commercially available 3D scanning solutions do not allow for easy modifications, as these often are proprietary technology. Therefore, it was decided to develop an open-source structured light 3D scanner. The scanner’s bill of materials should be less than €200, making the design accessible for academics, hobbyists and professionals alike.

First a quick overview of the working principle of structured light 3D scanning is presented after which the reader

Authors: Roel Plompen, Wouter Bakker, Victor van Rooij, Alex vd Meer, Noud Kanters



is invited through the design process of such a 3D scanning system. Currently, there is an existing 3D laser line scanner available. This scanner however needs around 45 seconds to capture a person’s face with a resolution of 8mm. To reduce the capture time to less than 10 seconds and greatly improve the resolution to 0.5mm, several challenges need to be overcome. These challenges include things such as designing an automatic calibration procedure, choice of different components and designing a software backend which is able to process the raw data into useful 3D point clouds.

The designed scanning system is also characterized and tested, after which some recommendations are provided

which can be used to improve the system even more.

## The analysis of passive Wi-Fi tracking

Author: Wouter Bakker



Nowadays almost everyone has a smartphone. Smartphones are sending a lot of information, like Wi-Fi packages. These packages are sent even when they are not connected to a Wi-Fi network. With all the information that smartphones are sending, it should be possible to track all the phones and say something about the amount of people in an area.

To get an inside in the Wi-Fi behavior of a smartphone, four different phones are analyzed. Every phone is tested in different circumstances. Since apps might



change the behavior of a phone, additionally, different apps were tested in these circumstances as well to see if apps will increase the amount of Wi-Fi packages.

Not only have the tests been executed in a controlled environment, they have been accomplished in an uncontrolled environment as well. In a 3-hour measurement, more than 12.500 packages of unknown devices are captured and analyzed.

“In a 3-hour measurement, more than 12.500 packages of unknown devices are captured and analyzed.”

The results show interesting results, especially when it comes to iPhones. It seems that some iPhones are not always sending the real MAC-address of the phone when dispatching Wi-Fi packages, instead they are sending locally administered MAC-addresses. These addresses are random and switched over time. Thus one iPhone can send multiple MAC-addresses. A measurement has been performed to count this changing of addresses and get an insight in the frequency of changing. With this information, more knowledge has been

gained on the amount of iPhones in one area.

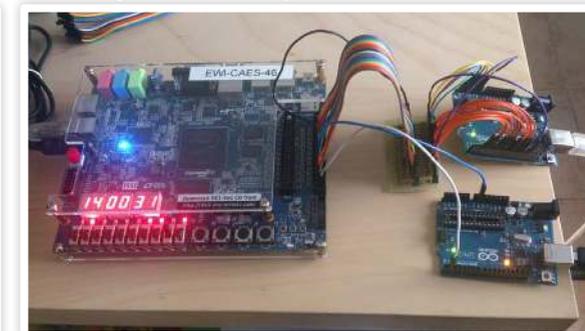
This paper will show that it is possible to track people by capturing all packages that their smartphone sends and how this is done.

## Implementation of Efficient Digital Signal Processing for TwenteSat

Author: Victor van Rooij



One of the last unexplored frequency ranges in radio astronomy are frequencies below 30 MHz. Radio astronomy below 30 MHz is difficult to perform on earth due to ionospheric scintillation and its opaqueness (the signal cannot get through the atmosphere). The only possibility to observe these low frequencies is in space. OLFAR (Orbiting Low Frequency Array for Radio Astronomy)



Picture of test setup using 2 Arduino uno boards and the DE1-SoC

is proposed to create a synthetic aperture array (antenna consisting of 100 CubeSat's) to measure the frequencies below 30 MHz.

TwenteSat a student based CubeSat project, is a demonstration mission for OLFAR. Using one Cubesat it will see

One measurement would consist of 320 M-bits that would take about 9,6 hours to send to earth.

if the signal in space can be measured and to determine which frequencies are present.

It is impossible to send the measured signal to earth without digital signal processing (DSP). One measurement would consist of 320 M-bits that would take about 9,6 hours to send to earth. Considering the lifetime of the satellite and visibility with the downlink station 9,6 hours is impossible to work with. Using digital processing only the necessary aspects of the signal is sent to earth. One measurement would then consist of 160 k bits which would take 16s to send to earth.

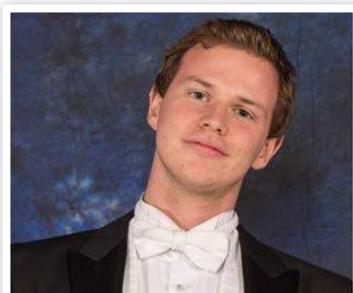
The goal of the bachelor assignment was to implement the DSP on a development board in order to research the feasibility of the DSP.

The implementation was made on a field-programmable gate array (FPGA) and tested using a test setup. Using two Arduino boards and MATLAB the calculated values of the implementation were compared in order to see if the implementation was working as expected. While the final implementation for the satellite is not finished the implemented version has shown that it is possible to reduce the amount of data such that the

measured signal can be sent to earth. This shows that TwenteSat will be able to send the data of its measurements to earth.

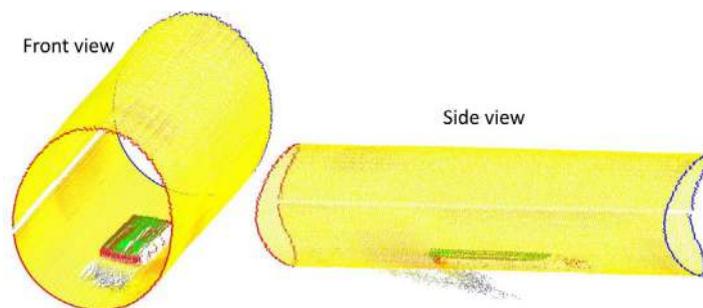
## Mapping the underworld

Author: Alex van der Meer



The availability of gas in your home is an important factor in your happiness. It allows for cooking eggs and hot showers. In order for the gas to keep coming to your home, the pipe network has to be monitored and repaired where necessary. Inspection is currently done by sending camera probes in to the network and having operators look at hours of footage.

At RAM people thought this could be done better. The P.I.R.A.T.E. project focusses on the design and implementation of an autonomous inspection robot that targets pipe's from 6 to 12 cm in diameter. The robot is able to move



The resulting 3D reconstruction of an obstacle in the pipe.

vertically through 90 degree elbow junctions. My assignment was to map the pipe's interior in 3D, and to show deviations from the standard pipe wall. In order to make it comprehensible for humans a colour mapping is done on the amount of deviation. The work done provides a step up to automatic detection and classification of defects in the pipe. Next to defects and obstacles, detecting upcoming junctions is vital for autonomous navigations. When these are automatically detected, an operator can just look at the information on the pipe around the detected point. For an autonomous working robot that has to inspect kms of pipes, power use and computational load are important factors. To obtain the 3D data a power efficient sensor was developed at RAM. It used a laser pattern that is projected into

"The P.I.R.A.T.E. project focusses on the design and implementation of an autonomous inspection robot."

the pipe and filmed by a camera. This happens in the dark. A circular pattern is used so that in one image frame the whole pipe circumference is mapped. The computational load of finding a red ring on a dark image is minimal. In order to create a 3D reconstruction of the pipe the position and orientation of the

robot has to be known. To obtain that data a combination from wheel encoder info and an IMU (inertial measuring unit were used). A mapping of an obstacle with two slits of 1 mm and 2 mm surface depth is shown in the figure.

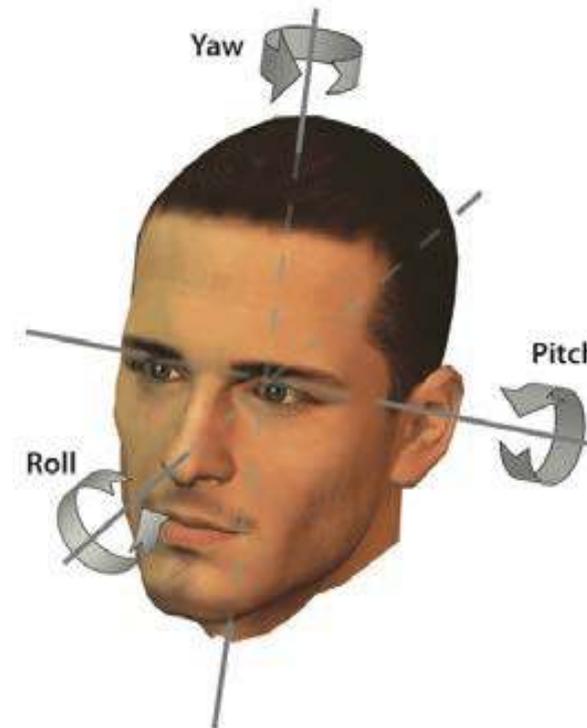
## Head pose and light source estimation on low-resolution facial images using a texture based approach

Author: Noud Kanters



Face Recognition has been an important research topic within the field of biometrics during the last decades. Contrary to techniques such as iris and fingerprint scanning, face recognition has the potential to be successful without cooperative subjects and in uncontrolled environments. This is also called face recognition in the wild. The orientation of the head relative to the camera, called head pose, and illumination conditions are examples of unknown properties of images taken in the wild. This complicates the recognition process, causing the performance of current FR techniques to drop significantly.

An extensively investigated solution for this problem is to transform non frontal facial images into images with a frontal



pose, on which state of the art FR algorithms perform better. This requires accurate, illumination invariant, estimation of the head pose of the original image.

"Face recognition has the potential to be successful without cooperative subjects and in uncontrolled environments."

My research is aimed at the development of such a light invariant head pose estimation algorithm, following a texture based approach. Only rotations around the vertical axis are considered. The Lambertian reflectance model is applied to a 2D model of the human nose, resulting in an intensity profile. This profile depends on two parameters: head pose and the position of the

light source. These parameters are varied in order to compose a set of appearance templates for the nose region. The estimation of the head pose and light source of a probe image is performed using two different vector distance measures. The parameters belonging to the template with the lowest distance are assigned to the probe image.

The performance of the algorithm is lower than other, currently used, estimation algorithms, although results are reasonable for small rotations ( $\pm 15^\circ$  relative to a frontal view). However, error landscapes are promising. They show that the desired parameter combination often contains a local minimum, but not the lowest one. Further research is required in order to determine which of the present local minima is located at the desired parameter coordinate.

# Junction

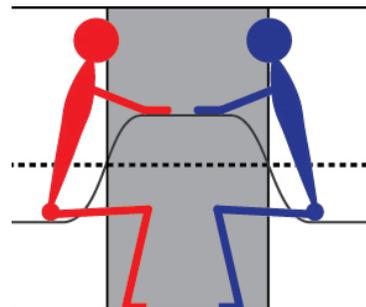
Author: Maarten Thoonen  
Jippe Rossen

I studied Applied Physics at the University of Twente. I started in 1987 and finished in 1993. The nominal time for that study at the time was 4 years, but almost nobody made it in that time. Also, I did some extra subjects, my thesis went differently than expected resulting in a bit of a dip in motivation and one exam I had to re-take 5 times: solid state physics. Funnily enough that is now the area of research I work in. I did my internship in Munich, at the semiconductor department of Siemens. There I worked on optical devices made from Gallium Arsenide MESFETs. I found it fun to work on something that is actually useful, instead of something really theoretical.

What is also nice is that this area brings a number of disciplines together. In the research group (SC) there are people who studied Electrical Engineering, Chemical Engineering, Physics, Material Engineering, Nanotechnology, so we're really on a boundary of different subjects. All those different disciplines give you interesting insights on how to do research. During my PhD research, I was in a room with three people: an Electrical Engineer, Applied Physicist and a chemist, who all started at the same time. When I measured something as a function of temperature, I start at room temperature and then gradually go up. Then I do it again from high to low temperature, and if there is little hysteresis it's good enough. However, the chemist told me they do their measurements at random, to prevent static and drift errors. That was an interesting insight to me. I now do a few measurements at random next to the normal measurements, to check for those aspects. Doing all measurements like that would take way too much time, however. Measurements that would usually

take a day would then take a week due to all the cooling and heating. So I didn't adopt that method, but it did make me aware of the fact that that kind of hysteresis could occur.

I think it's also important we tell the students that that kind of thing happens. Otherwise, you could for example win a noble prize with a publication which afterwards happens to not be true. If you write something down, you have to be 100% certain of it. It happens quite often that someone sees something interesting, creates a nice theory to explain it and gets cited a lot. But then a few years later someone checks it and they find out the theory to be wrong. We discovered something like that ourselves once. We try to make devices that create light using LED-like structures from silicon. We found a publication stating that when you make more dislocations you get more light. So we tried that ourselves, with different kind of dislocations, and indeed we found more light was produced. Some students did that, as we thought of it as a nice introduc-



tion experiment. We asked them to also do the experiment with no dislocations, and then even more light was produced! That means the authors of the original papers probably didn't do a reference experiment, or they purposefully didn't mention it. I was disappointed in that. I still believe you write publications to help the world advance, your colleagues must build upon your ideas. You shouldn't consciously publish wrong things. You should feel good about things with your name on it.

Research groups are assessed based on the amount of publications, and based on that the money is distributed. Is that something that has to change?

Some people are really money-minded, but if everyone would be like that the system would change anyway, so most people aren't like that. It has to do with how you were educated. My promotor

taught me how to write down things properly, and I agreed with what he said, so I followed his teachings. Ideally money would be distributed based on the quality of research instead of writing research proposals all day. We ourselves once organized a symposium within our area of research with Delft and Eindhoven, because that was an easy way to get some extra conference papers, and thus some easy extra funding. It was useful, but still, to organize a symposium because of a perverse incentive seems wrong to me. It also used to be the case that you would get different amounts of funding based on whether you published a book, paper or did a conference. However, in different areas of research, the highest achievable is not the same, so that is also not really fair. Maybe it would just be best to throw the total system away.

But, to return to you, what did you do after your internship?

After my internship I returned to the UT. I did my PhD at the research group of Hans Wallinga. That is the same group as where I am now, just with another name: ICE. Actually, it was SC and ICD together, so a really large group. That is a bit of a trend at the UT: at one time groups are merged into one large group, and then they are separated again. I had two promotors: Hans Wollinga and Pierre Woerlee. Pierre worked four days a week at the Natlab in Eindhoven, and one day as part time professor here. That was really useful: he was in the middle of new advancements in the area of research and had access to all kind of equipment we don't have here. Because of that, I was able to work for a year at the Natlab in 1995. Back then the economy was just getting better again, but Philips still had a hiring stop, though there was a lot of work. So they were really grateful I could work for them for free, since my salary was

paid by the UT. At the same time, I was really happy to be there, as they had all kinds of equipment I didn't have here, so it was really a win-win situation. I basically was able to write half my thesis based on that year. It was also a nice experience being part of a team. Also, when I was there I asked if I could speak to their poly expert. Their answer was that they didn't have one, so they got me as a poly expert. That kind of validation is nice to hear.

“when the program was still in Dutch, a German student asked if he could do a report in German. I stupidly said yes.”

Was it expected of you that you continued your career there?

Well, not at Eindhoven. After my PhD I did apply for a job in Nijmegen, at what then was NXP. But I opted to accept a postdoc contract here in Enschede. After that contract I was hired at NXP. However, my then boyfriend, now husband had a job at the UT, and really didn't want to work anywhere else. Also, permanent contracts at universities are quite rare, so when there was an opportunity to work at the UT, I decided to take that opportunity. Because if I would take a job at a company I would work there for five years or so, and then I would want I child, and by then all the steady jobs would be gone. So if I wanted to see my husband frequently this was the better option. If the other job was significantly better I would have chosen for the nicer job, but both jobs were good, so I chose to be closer to my husband.

How did your job evolve after that?

As a university lecturer you have a very flexible set of tasks. You do education, research, you mentor AIO's, and since 2010 I am bachelor coordinator, which is about 50% of my job now. That is quite different from what other lecturers do, as it eats 50% of your time. As a university lecturer you can also actively look for subjects you like. In 2012 we started the TOM-pilot, and in 2013 I was asked to become tutor for TN and AT. First I thought to myself “I don't have time for that”, but then I thought, it is a nice opportunity to spy at the neighbors for free. You can see how they do things differently in different studies. I can learn from them, and they can learn from me. I think that is nice.

Do you have any examples of things you got from that and introduced in EE?

For my own module it was decided in May that we started the TOM pilot, and it had to be ready in September, in English. A few things were designed to quickly. When I was doing the TN module, someone else was the coordinator who did all the work, so I could nicely observe how they did things there. They did a lot more evaluation meetings and everything was a bit more strictly organized. After that, we also did more frequent evaluation lunches. We call it the Krokettenlunch, and then we talk how everything is, which students need some extra attention, things like that. In my own module I do that myself, for the other modules I make sure to regularly call the module coordinators. When something doesn't go right, I notice it soon enough, either because lecturers alert me, or when the SToEL does that. Once a module, we also have a meeting with all the module coordinators, about accreditation, what we want to change



Cora Salm

Age

47

Favorite food

hotpot like my mother used to make it

Favorite Color

Purple

Favorite Drink

Ginger Ale

Favorite food to make

Ajam Ketjap

about the math course, things like that. You can think up anything you want, but in the end everyone has to agree to it. We saw with Computer Science that the entire curriculum was created from the ground up. With EE, everything went a lot faster and certain things were created autonomously from each other. Therefore, those regular meetings are really useful.

What do you think is the best module at the moment?

Every year for all studies the best module is selected, and they get a free dinner. I actually don't know which module won last year, I should check that. I think it was module 8. But every module has its own challenges. In module 1 and 2 there are always people who aren't at the right place. The Electronics module also does well, although it has a lower pass rate than module 1 and 2. I also like module 5, because it is together with Computer Science. Not everyone likes that, but I do. What I also think is a nice module is lab on a chip, but that is not a mandatory module and not too many people choose it. Maybe I would select that as the best module.

About the first module, you say that a number of students stop during that module. How is that this year?

Not a single one left yet. There are years were before the first of October 5 or 6 people were gone, but this year that isn't the case. We want to have about 100 students. I actually want to have 96, because that would fit exactly in the Westzaal, but Mark wants to have 100 students. On the other hand, I also want good students. It is hard to define a good student, but there are some students

of who you think after a week or two "that's typically someone who will be at the Saxion next module". But you have to treat them the same as all the other students, and often they get extra attention, which costs a lot of time and energy. I'm being paid to do that, so I'm not complaining, but still. Officially, anyone with a VWO diploma should be able to finish the study. However, we also don't

"I still believe you write publications to help the world advance, your colleagues must build upon your ideas."

want to make the program easier to facilitate students who barely made it in secondary school, because we have an idea of what we want an EE-r to be able to do after three years. So when you finish VWO with sixes for subjects like math and physics, it is going to be harder. But seeing that about 70% of our first year's students makes it through the first year compared to only about 50% in Delft, I don't think we're doing that badly.

What kind of student were you?

In the beginning, I started quite seriously, and was kind of disappointed that I scored a 5 and 7 for my first two subjects and a sufficient for practical work. But seeing what my peers got I was relatively happy. I always prepared for lectures by reading the material beforehand, and made sure to make annotations. After a while, I knew how hard I had to work to keep up and the amount of time and energy that was still left, so I started doing other things next to the study. I started playing tennis at Ludica and of course was a member of Arago. I also participated in a study trip to the US and Canada. There, we visited Intel

and I got to take a look in their semiconductor plant, which made me even more enthusiastic for the subject I work in now. Furthermore, I helped with organizing the Bedrijvencontactdagen (company contact days) when I was a fourth-year student. I thought it was nice to do something more organizational and call and write (which you still did in those days) different companies. In the end, this did cause my studies to be a bit longer. But, seeing as I took four years to finish my studies, while having to redo some subjects and having a longer internship, I don't think it was that bad. There was also the opportunity to start at a first grade teacher education program during your studies and finish it afterwards, which I also did. When I got my postdoc contract, I worked four days per week for the UT, and the rest of the time I spent on getting my first grade teacher diploma.

Seeing that you took six years to finish your studies because of doing something extra, what do you think of the current vision of the government which considers universities degree factories?

An important detail is that when I did my studies, the bachelor and master system didn't exist yet. The nominal time to finish the study was four years, and after that you could call yourself MSc internationally. We as teachers can do very little about the current opinion of many people who think students are wasting money, but we as a program always thought that it doesn't matter how long students take to finish their studies, as they will get a job anyway. The same mindset existed in Eindhoven and Delft. The accreditation committee wasn't happy about that, so we had to change something. That's why we star-

ted the TOM-pilot, to show we do care about students finishing their studies in a reasonable time. Eindhoven and Delft also shifted to similar models. We still believe it is important that students have the opportunity to participate in for example the Solar Team or be part of a board, so it is possible to get EC for that. However, it used to be the case that some students scored only about 20 EC per year and after three, four or even five years decided they would be better off at the HTS. In that way, the new system also helps people protect against themselves, as they figure out way earlier when they don't fit in their current studies.

What are your hobbies?

I have a daughter, Fiona. That is not really a hobby, but it does take the majority of my free time. She likes pouring beers, and still is the youngest bartender of the Borrel, and she likes to swim and do gymnastics. I started to play the flute when she started at the music school, but by now she stopped while I still happily do it. I wanted to start playing piano when I was young, but we were in the middle of moving then, so it never did it. My husband also makes music, he plays the saxophone. I also help with timing at my daughter's swimming tournaments. I started doing that to have something to do during the two to three hours you have to spend at the pool to see your child swim two times, but because I liked it I also got a swim teacher II certificate with a Piranha student. He already knew how to swim really well, and I know a thing or two about education, so we complimented each other nicely. Nowadays I teach little kids to swim for one hour twice per week.

Are you also recruiting them for EE?

They are a bit young for that, but

when my daughter was still in elementary school they needed some parents for arts and crafts. They already had a jigsawing-dad and a knitting-mom, but they needed another parent. They wanted a paper mache-parent, but I was also allowed to do something else. So I decided to do some science things. I bought a bunch of breadboards, LEDs, seven segment displays and batteries to make them write their own name, which they really liked. I also bought graphite powder to let them take fingerprints. So at least I tried to make them enthusiastic for science, we'll see in a few years if it helped.

What do you think as teacher or student you should have done differently?

I notice that my English is worse when I'm tired and didn't prepare my lectures properly, and afterwards I then think 'this is not what they are paying their tuition for'. Related to that, when the program was still in Dutch, a German student asked if he could do a report in German. I stupidly said yes. It took me a lot of time to check that report, but I did it all myself, with no help from German colleagues. But I'm not doing that again.

What keeps you awake at night?

I told my husband he can't wake me up, except if the house is on fire, as I don't sleep that well. So when I'm asleep, I really want to keep sleeping. What sometimes keeps me awake is when I think something doesn't go the way I want it to. That sometimes happens during the summer break when students didn't get their BSA and the exam committee doesn't do what I want. That's not my call, that's what the committee is for, but it still keeps me awake sometimes.

You are quite pro-TOM, but the URaad wasn't. As your husband is in the URaad, did that lead to any clashes at home?

We try to not take matters like that home. But the URaad and Faculteitsraad have a certain view on things, and we as teachers think about certain matters differently. It also doesn't help that there were very few EE people in the Faculteitsraad back then. That also became apparent when we wanted to switch to English: all the teachers were in favor, but the Faculteitsraad wasn't, as it would lead to too much pressure. But, and I know it is a wrong opinion to have, I believe if all teachers are in favor the Faculteitsraad shouldn't intervene. Another matter is whether you are allowed to keep certain grades when you fail a module. We as EE teachers chose to not allow that, because in principle there are no real separate subjects any-

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"I bought a bunch of breadboards, LEDs, seven segment displays and batteries to make them write their own name"

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more, so if you fail a module you have to redo it in its entirety. However, the integration between subjects differs per module, so some exceptions could be made. But we can't allow students to follow only one subject per module, like before TOM. Things like that are discussed quite often at home, and I also don't think we'll resolve them university wide either anytime soon.

What do you want to do in the future?

That depends on how far away the future is. I was made to join the senior qualification education program, Mark says I joined voluntarily but I believe I was made to join. That is a course which is in pilot phase this year, with about 20 teachers from all kinds of different subjects. The UT believes that when you have a few very motivated and good teachers, other teachers will also improve and the general level of education improves. The kick-off meeting is in two weeks, so I don't really know what to expect, but they told me it takes about 160 hours. Other than that, I don't really have any plans for the short term.

You mentioned Mark, do you have any plans to dethrone him?

Well, no. when there was a vacancy I didn't apply for it on purpose, as I think I can say more what I want as a bachelor coordinator. When I'm program director, I have to come up with solutions to make everyone happy, and I don't think I'd like that. I just want to say what I want, even if I know other people won't like it.

Do you have a piece of advice for the students?

Choose a study you like. You yourself have to make your life fun. Just last week a student said he wanted to do something with companies, and asked if instead of working in a supermarket he could do something for an EE department. He found out himself that that was something he'd like to do, and took action to make it work.

# Advertorial: AME

Author: AME

# AME

**“To the customer, it might seem like an uncomplicated mechanism that just climbs up and down the stairs with a simple joystick. But in reality, this stair lift contains the state of the art technology”.**

Marc Troost (28), System Engineer at Applied Micro Electronics “AME” B.V. (AME) in Eindhoven, becomes enthusiastic when he talks about his latest project. For the last three years, he worked in close cooperation with colleagues on a complete redesign of an already existing stair lift. The particular contribution of Marc consisted of the development and testing of the hardware and the development of a part of the motor control software.

The customer of this project was a producer of stair lifts, who involved AME in the development and production of the electrical parts of the new stair lift system. The intensity of the cooperation between AME and a customer, which is always a business-to-business relationship, differs per project and per customer. Within this particular project, the contact with the customer was relatively intensive. “Sometimes a customer has a general idea of a new product and wants us to come up with a concrete proposal”, tells Marc. “That gives us a lot of freedom in our work. However, in the case of the stair lift, it was another situation

because the customer brought in their own engineers to intensively participate in the development process. This created close cooperation and a mutually beneficial relationship, which raised the project to a higher level than both parties could have reached individually.”

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**“If this would malfunction, the consequences could be severe.”**

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A part of the target group consists of older consumers who did not grow up with the technical developments like we did. They benefit from an operation system that does not differ too much from the previous version they were accustomed to, even if the underlying technology of the new version is totally different. Therefore, a great challenge within this project was implementing the newest and complex technology with the uncomplicated user friendliness in mind. However, an even greater challenge consisted of the ability of the chair lift to keep itself upright. “We wanted the chair of the stair lift to stay perfectly horizontal, even if it is weighted unevenly or if the passenger moves. Some stair lifts are placed with an extra rails on the wall to keep the chair balanced. By desiring a more attractive design by leaving out this extra rails, we made the project even more complex than it already was. Many calculations and many simulations in

MATLAB resulted in the current chair that works like an inverted pendulum: it compensates itself when it is moved out of balance.”

If this characteristic would malfunction, the consequences could be severe. Therefore, a major part of the development phase consisted of accurate testing. At the premises of AME, the stair lift ran for three months automatically on a test rails with every possible twist and turn uninterrupted during day and night. This was repeated for every software and hardware release candidate. In addition, external authorized bodies audited the hardware and software. In the end, all relevant test had been done in order to be assured the product complies with that latest safe standards and is of the highest quality. This brought the process to the current status: the production phase. Every month, between 1200 and 1500 pieces are produced and distributed around the world. For Marc, his involvement in this project ends at this stage. Completing this project gives him room to attend to a new project: developing the control software of a DC/DC converter for the control systems of a submarine. “All projects are quite diverse and challenge you to improve yourself every time, due to the freedom and responsibility you are given. But all projects have one thing for me in common: the satisfaction when it works. Experiencing that your initial ideas and calculations are actually up and running, that really gives me a boost.”



# PBL? No Problem!

Author: Akrivi Liakopoulou

It is now, by the time of writing this article, almost a year since I made the decision to move from Greece to Enschede to study Electrical engineering. From my first days living in the Netherlands the impression I formed for Dutch people, was that they are really friendly and easy to start a conversation with. That was also something that was confirmed when I moved in my house which I shared with eight other people. Although this way of living was not something I was used to, I quickly realized that always having someone available to talk to and getting to enjoy dinner together without you having to cook every night, can be great assets for a student.

Another advantage of living in the Netherlands would without doubt be the way owning a bike makes transportations a lot less stressful! The most exciting part for me was when I was able to travel to Germany on a bike just as easily as moving around the city thanks to the bicycle roads that exist everywhere!

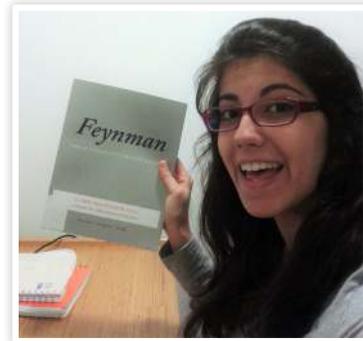
“The most exciting part for me was when I was able to travel to Germany on a bike.”

During the course of the first year, as more information became available, there was great excitement among the physics enthusiasts, including myself about module 4. In the introductory talk it was made clear that there would be no lectures. This was completely different when compared to the previous modules, which however fitted the greater goal of the module which was to develop a more self-directed approach to learning through Problem Based Learning (PBL) while working in a team of four students.

The problems were based on knowledge presented in the “The Feynman Lectures on Physics” while having a creative touch added to them, which also transformed them into real world problems. Most of the days were dedicated to solving PBL problems with a daily schedule that started with a morning meeting with your group where it was usually discussed how the knowledge provided by the book corresponded with the actual problem and a list of questions that will make the problem clearer were gathered in order to be asked in the tutorial session that followed. I have to admit that some concepts dealt with in PBL problems were a bit hard to understand and Feynman lectures, although an excellent book in general, didn't always go too in depth which combined with the single day deadline, left

“I have to admit that some concepts dealt with in PBL problems were a bit hard to understand.”

you frustrated at times. At those cases internet research for more information was performed, a process that gradually teaches you how to handle efficiently the vast amount of existing resources as well as how to filter the information that will be useful to apply to the problem. The daily schedule ended with a presentation of the problem solution, which was really satisfying after a day of hard work and a small recap from the PBL teacher was also provided. I found myself really appreciating the value of this method of learning while revising for the final oral exam when due to having a more spherical understanding of the topics, a lot of things made more sense after having applied the knowledge several times during the PBL problems.

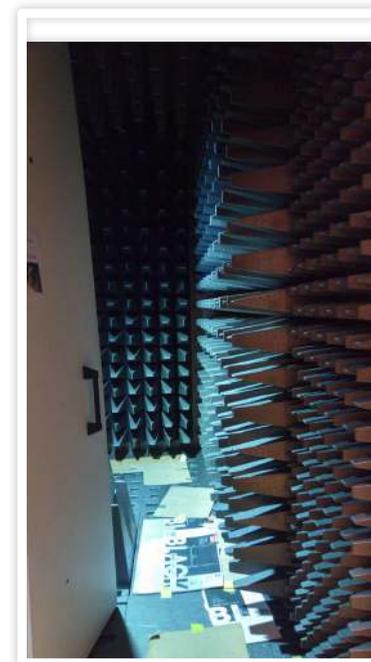


“I found myself really appreciating the value of this method.”

“An interesting and fun way to test vector analysis knowledge was the vector quest.”

The Math part of module 4 provided the essential knowledge to understand and visualize the laws and concepts of electromagnetism and of course Maxwell's equations, making the correlation between the different parts of the module clearly visible. An interesting and fun way to test vector analysis knowledge, been acquired in the math lectures, was the vector quest. A sheet with

twenty problems was given and after a bit of wandering around the campus, if all the answers were correct your team would be led to victory by finding the missing flag.



The project of this module was to design and build an antenna. The knowledge obtained from the PBL problems on electrodynamics provided the basis for the theoretical analysis of the antenna radiation giving us the chance to see the application of the laws analyzed in the PBL problems. The construction of the antenna required coming up with creative ideas especially for building the reflector and was the first time in the year something of this size was constructed. In the final week of the module all the antennas were tested outside and a competition was held for the best results. It was really interesting to see the different antennas built by the various groups and even in cases were the same one was picked the construction of the reflector made each one stand out in a unique way!

All in all, this proved to be an interesting and well-structured module with each of the three parts contributing to the acquisition of a mathematical, theoretical and practical understanding of Electromagnetic Theory. The unique module structure, was an interesting

“The unique module structure, was an interesting way to finish the first year.”

way to finish the first year providing you the chance moving forwards to apply the new learning and studying methods that were used for problem solving during the rest of your studies as well as your working environment. Off to an equally awesome second year!

“The unique module structure, was an interesting way to finish the first year.”



# Assassination week

*Author: Koen Raben*

**It is a strange thing seeing friends turn into enemies, distrust among the ranks, a whole community that starts to crumble because of treachery. I am of course talking about the Assassination Week.**

The goal is simple, try to make as many stealth kills and don't get killed yourself.

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*"There I was on a lovely sunny day, enjoying a well-earned barbecue and a lovely beer, well, lovely beers."*

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And so an intense week begins. The first day, when you pick up your water gun, you can already feel the tension building. Everybody gets their first target, which they of course keep to themselves. You start to make plans. Do I know my target? Do I know his patterns and



how can I get him away from the rest to finally make the kill? Well my first target was a gleeful first-year student, who just happened to be a kiddo of mine. But of course he was not too trusting, so I had to put on my best show to convince him to trust me. And it worked, just as we walked to his next class, I managed to slow him down, isolate him and make the kill! He never saw it coming. On to my next target, but one should never forget to look over your shoulder, because you never know who might be after you.

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*"Quickly sneaking after people and killing them while they were strolling through the hallways of Carré or tricking people to help me get something from the isolated borrelhok and finish them there."*

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So while I was looking for the right time to slay my next victim I also did some research on who I should beware of. I managed to memorize the list of everyone who was participating in the assassination week and also did some snooping to find out who had already been killed. But still, no clear evidence as to who my true enemy was.



And so the week went on, and every day the updates came as to who had been killed and who not. And I noticed my kills were taking too long, so I had to speed things up. That meant more daring moves, less planning and more relying on your instincts. And it payed off. Quickly sneaking after people and killing them while they were strolling through the hallways of Carré or tricking people to help me get something from the isolated borrelhok and finish them there.

And so I was happily enjoying my killing when it all went wrong. There I was on a lovely sunny day, enjoying a well-earned barbecue and a lovely beer, well, lovely beers. And I let my guard down. So when I was on my way to the bathroom, I greeted someone, dumb enough to not

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*"I managed to slow him down, isolate him and make the kill!"*

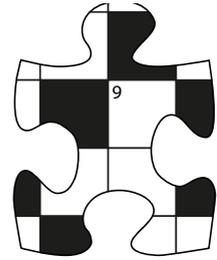
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notice what was about to happen. So I got killed, and that makes an end to my story, lying dead and all alone in the hallway on a sunny Wednesday...

# Puuzle

*Author: Truusje*

The winner of last edition's puuzle was Diederik van der Valk. As always, the winner is entitled to a homebaked cake made by our president, Guus Frijters. For this week Truusje has a different kind of problem: a new Scintilla sticker needs to be designed.



Scintilla's sticker has seen quite a few style changes over the year. A great start of 2017 is impossible without a great new design, and herein lies your task: design a new sticker for Scintilla. This sticker will be printed thousands of times, and left all over the world! There are a few guidelines which give you a higher chance of winning:

- The Scintilla logo
- The name 'E.T.V.S. Scintilla'
- The Scintilla website
- A 'University of Twente' logo
- Printable at 110x55 mm

When in doubt, just check the legacy stickers on this page.



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