De Vonk

Presidential Note

Author: Ewout Baars

Dear Scintilla Member,
The busiest month of the year has passed already. Hopefully you have been sweet this year and got a lot of presents. Probably you asked another electronic toy from China which was really helpful and funny for you while your parents don't even know how it works, what it does and what they bought for you. All together they are happy because you are, and you are happy because you have again a very cheap but useful component from China.

After all those nice presents I hope you enjoyed dinner with your family and for the "lucky" ones even with your parents in law. Many of you have probably, just as with Scintilla's Christmas dinner, taken their very small pans from the basement and tried to make some very small food with it, raclette. While waiting for your hamburger which you put in there half an hour ago to be ready, you have a nice conversation with your neighbor. Most of the time about what you did last year and what your great plans are for the coming year. Going to the gym more often, drink less/more alcohol next year or gather a few study points, are a few possible answers you might have given. At the moment you are reading this, you might wonder what happened to those big plans and you might give the gym another try.

A few days after Christmas the moment had finally arrived. With a bang 2018 was over and with about a thousand other bangs 2019 had begun. You might look forward to what 2019 will bring or you are one of those people saying that also the 1st of January is just another day in your regular life. Whatever you think about the new year or whatever your plans are for 2019, I whish you the best luck for the whole year. I hope you will reach all of your goals and fulfill all of your plans, I hope you win the lottery (and share a piece of it with me) and I hope you will find or keep your true love. I hope 2019 will be the best year of your life. In the end, it is still you who has to accomplish your goals and still you who has to cope with all the problems along the way, but I believe everyone is capable of making 2019 their year.

> *"Don't be afraid to go forward slowly, just be afraid to stand still."*

I wild like to finish with a Chinese saying and I want you to remember it everyday of 2019. Hopefully it will help you through the year.

Dames en heren,
Op de koningin, op Scintilla!

Ewout Baars
President of the 89th Board of E.T.S.V. Scintilla

Masthead

08 Main Article

We have something special to show our readers. Quickly go to page 8 to find out what the future of the Vonk will hold and be amazed.

22 RoboTeam

With their soccer robots, the RoboTeam Twente will be scoring for the future. Read all about the design behind the robots that will be competing in this year's Robot Cup.

Minor 20

Timon shares his experiences about doing a minor abroad. Go to page 20 to read about his adventures in Sweden.

Study Evenings 26

As part of their educational policy, the 89th board started organizing study evenings for Scintilla's members. Romano shares his first experiences with these evenings.

Editorial

Dear reader,

For over 37 years, 'de Vonk' has found its way to Scintilla members free of charge by mail, bringing stories relevant for Electrical Engineering students right to your doorstep. Everytime we, as the editorial team, finish a new edition, we hope that you will be just as thrilled to read the fine selection of stories as we were when putting them together.

While the last few editions touched upon the history of Scintilla as an association and the events that have shaped the current form of the Vonk, this edition will look ahead to the future. Over the past few weeks we have been working on a new platform to keep on sharing the stories with you that we are so proud of, in a financially sustainable manner. Although this means that the paper magazine will find its way to your homes or offices less often, the increased flexbility enables us to further improve the wide variety of stories we as a committee would like to share with you.

The main article reveals how stories will find their way to you in the new format and we are very excited to fully unravel the digital platform on the launch event we will be organizing on March 12th.

I hope you will have lots of fun reading the articles that have collected in this first edition of 2019 and are very curious to hear what you think of the new platform!

See you around,

Stef

News for the Electrical Engineer

Author: Maarten Thoonen

Augmented Reality and Deep Learning for Biomedical Imaging and Robotics

By the Robotics and Mechatronics group

Peripheral artery disease is a major complication of diabetes that causes narrowing of blood vessels and reduced blood flow to the legs and feet. This reduced blood flow can lead to ulcers and sores that are slow to heal and susceptible to infection. Peripheral neuropathy, another complication of diabetes, impairs sensation, making it difficult for patients to assess the severity of their condition. Left untreated, this chain of complications can result in dead tissue that sometimes requires amputation. By diagnosing reduced flood flow before the condition becomes severe for patients with diabetes and similar conditions, my research group at University of

Figure 1. Augmented reality visualization of blood flow in the wrist and hand.

Twente is developing a handheld device that scans tissue and produces real-time, augmented reality (AR) visualizations of blood perfusion (Figure 1).

Currently, clinical systems that perform similar diagnostics cost tens of thousands of Euros, require a clinical visit, and must be installed, configured, and operated by trained technicians. Our device will be affordable--early prototypes cost less than 500 Euros--and suitable for in-home use.

Acquiring Data and Implementing SLAM Algorithms

SLAM algorithms are commonly used by robotics researchers to map an environment and determine a robot's location within it. To simplify tracking, these algorithms often use corners, edges, and similar clues– the corners on a doorframe or the edge of sidewalk, for example. I needed SLAM algorithms that could determine the position of the device in relation to the tissue. Because the human body does not have distinct edges and corners, I needed to modify traditional SLAM algorithms, tailoring them to my specific application. In order to do so, I have trained deep learning nets in order to recognize reliable skin features which can be tracked in sequential frames. These features did not only help to create 3D representation of the skin, but also helped me to localize the

camera position with respect to the reconstructed surface. In addition to this feature modification, I designed a new SLAM workflow as well. Most of the well-known SLAM algorithms are designed for creating sparse point clouds (not very dense 3D reconstruction of the environment) because of the heavy computation needs of 3D dense reconstruction which cannot be easily implemented in real-time. However, our project requires very dense reconstruction of the skin, in order to give better diagnosis opportunities to doctors. Therefore, the new SLAM algorithms which I have implemented within this project framework, generates a dense 3D reconstruction by a key frame selection method. In this new method that I designed, only the selected key frames are used for dense 3D reconstruction and the rest of the input camera frames are used only for camera localization (without overloading the algorithm with unnecessary dense 3D reconstruc-

tion when it is not necessary). The key frames for dense reconstruction are selected in a way which provides opportunity to do 3D dense reconstruction of the largest possible area with the lowest number of highly overlapping images.

Real-Time Augmented Reality Projection

All the main phases of the algorithm – data acquisition and filtering, localization, mapping, and AR projection – run in real time. To create the AR projection (as represented in Figure 2), the algorithms calculate the 2D image of the 3D construction that would be visible from the projector's point of view and then send that image to the AR projector, which displays it on the surface of the patient's skin.
My group continues to make improvements to the system to support in-home use, even as we explore additional appli-
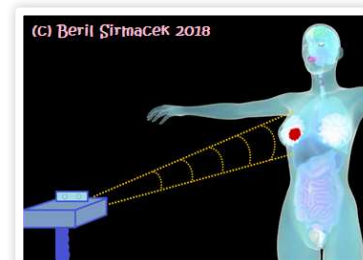

Figure 2: The developed technology leads to further AR projection applications which can show tumors. (We are open for partnerships to collaborate with hospitals.)

cations for the technology and the potential for incorporating new imaging sources. For example, we are working to ensure that the device operates well under a range of lighting conditions and with a range of skin pigmentations. We are also considering enhancing the algorithms to use data from MRI systems and to assist physicians with surgery planning by enabling them to visualize internal structures via AR before inserting a needle for a biopsy or performing other surgical procedures.

About the Author
Beril Sirmacek holds a Ph.D. in computer science. In 2017, she joined the Robotics and Mechatronics (RAM) group at University of Twente, where she specializes in deep learning, simultaneous localization and mapping, and augmented reality.

UT Page: *https://people.utwente.nl/b.sirmacek*
Personal website: *http://www.BerilSirmacek.com*

## Prof. Mark Bentum's new position

Last year we said goodbye to TE Chair and EE Program Director Mark Bentum, as he left the UT for a new job at Eindhoven University of Technology. Although he truly enjoyed his time in Twente and would have loved to stay, he received an "offer he could not refuse": he got the opportunity to become a Full Professor and combine his two passions for radio engineering and astronomy. Next to his new position in Eindhoven Mark will maintain his job in ASTRON for two days per week.

On Friday November 2nd he delivered his inaugural lecture, which was well attended by family, friends and colleagues in Eindhoven, but also by a large group of former colleagues and students from Twente. In his lecture he outlined his dream of developing the OLFAR

space-based radio telescope, consisting of a swarm of satellites that enable radio astronomers to analyze the lower frequency part of the Cosmic Background Radiation and hence learn more about the way the universe developed briefly after the Big Bang [1]. Furthermore he outlined his views on academic education.

Although we will dearly miss him, we wish Prof. Bentum all the best with this new challenge, and hope to see him around often!

[1] M. J. Bentum, C. J. M. Verhoeven, A. J. Boonstra, A. J. van der Veen and E. K. A. Gill, "A novel astronomical application for formation flying small satellites," in Proceedings of the 60th International Astronautical Congress, Daejeon, Republic of Korea, 12-16 October, 2009.
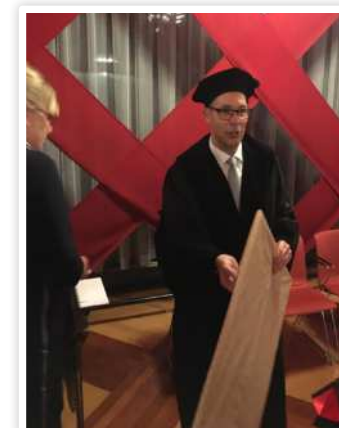
A New Vonk

Author: Melissa Tijink

The last couple of weeks the Vonk committee has been working on something new… Something that will change the Vonk drastically. The way it is made, shared and read. The Vonk has decided to go online! The idea is to share our articles on an online platform alongside producing the analog Vonk this year, with the goal to go completely digital in 2020.

It was clear to us that the Vonk needed a change. The committee starts to get old and there came some comments from members about the way the Vonk is distributed and read. So we started brainstorming. How can we still produce the Vonk, while reaching as many people as possible, without unnecessary printing? We started to look at modern newspapers and magazines and their online platforms. A great example to us is the UToday, which mainly exists online and once in a while produces an analog edition.

This idea of going online was quite bold and we did want to reason thoroughly why we would do this, and whether we wanted to go completely online or if we wanted to still produce analog editions. Our analysis came to some clear benefits of going online:

First of all it makes it possible to upload articles when they are ready. With the 'analog' Vonk we have a hard deadline for publishing, because the files have to
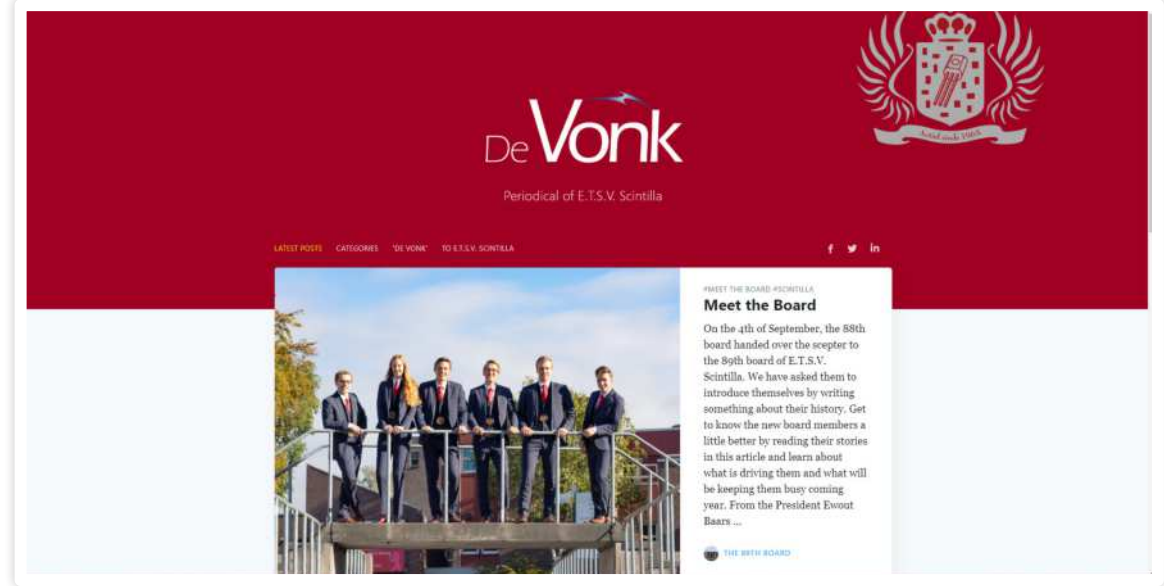

Figure 1: Main page of the new Vonk website.

Figure 2: Main page of the new Vonk website (scrolled)

be sent to the "drukker". This means that research groups sometimes don't have an article, because it is just not finished yet. With an online Vonk this 'hard deadline' vanishes. This also mean more possibilities for freelance writers for the Vonk. Whenever they have a cool idea, they can send it to us. Articles will be published when they are still relevant and not two to three months after.

Furthermore the online Vonk offers other forms of content such as videos. With the shift from analog to digital in a lot of daily life applications, video is a often-used format to present news. It might be nice to see videos from activities or projects people have worked on.

> "Articles will be published when they are still relevant and not two to three months after."

As mentioned before, the aging of the Vonk was one of the reasons to spice things up a bit. We think that going online will appeal more to younger members that will create the Vonk in the fu-

ture. The highschool students nowadays have digital textbooks and do everything with their laptop or iPad. They have to make vlogs as school assignments. With this in mind, it might not be as attractive to them to work on an analog periodical as their skills are more suited for the digital platforms.

A question that a lot of people asked was whether we would still reach as many people. I think that we will, if not more. This new way of publishing articles also offers opportunities to share the articles on social media, such as facebook and linked in. The Vonk will be brought to your attention the whole year around, when cool new articles are posted, instead of only four times a year. I think we all check out articles online, maybe via social media shares, maybe even regularly on the websites themselves. In this sense our change to a digital platform is quite logical, as it would fit more in your existing habits than picking up an analog magazine.

After discussing this idea we decided it was time for a proof of concept. To see if it was even possible to create an online Vonk and what this would look like. GoHugo was suggested. Hugo is an open-source site generator that has a lot of built-in functions. It offers many 'standard' themes of which we liked Caspar Two the most.

You are probably wondering: how does this Hugo work? I will explain that, but I can imagine that you are even more curious to how it looks…

Well at the moment of writing the Vonk is not yet online, but I can see what it will look like on a 'localhost'. The frontpage will look like like shown in Figure 1.

And if we scroll a bit, we can see the articles presented for reading as in Figure 2.

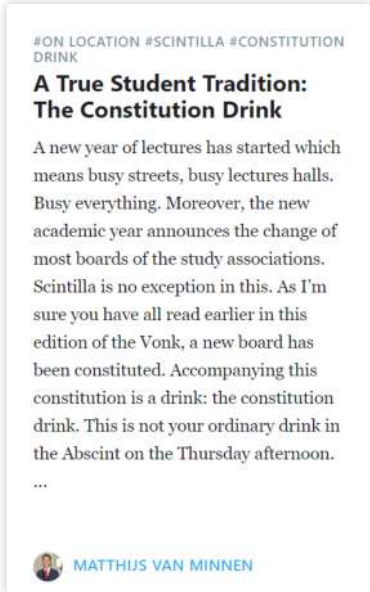So we see the latest post on the front

Figure 3: Article preview.

page. The main article is clearly visible and a bit bigger than the rest. The inspiration for this look we got from looking at numerous news and magazines websites. It is also very clear who wrote the article, the author is in blue mentioned with a small picture. At the moment it is not yet possible to sort by author, I hope this will be implemented soon. Something that might not be visible in the previous picture is the hashtag system. In Figure 3 we see a preview of an article. You can see the #-system better. It is possible to click on the hashtags and find articles with the same hashtag. This way you can easily find articles of your interest.

Besides the hashtags, which to my opinion, are more content related, we also have categories. In the analog Vonk we usually have articles of the same type: main articles, junction, on location, presidential notes etcetera. These categories are also implemented on the website. So you will still find your favorite type of article on the website.

So how does it work behind the screens?

The articles have to be uploaded as markdown files and it has to start with some information on the title, author and the tags (see Figure 4). The layouting is pretty straightforward, it resembles the layouting on whatsapp a bit. Make letters or words bold by putting them between stars. It is also possible to add images, tweets, instagram posts and videos to the articles. The articles have to be sorted nicely in folders in the overarching 'content' folder of the website. When the Vonk will go online and the whole committee will start working with it, the articles have to be put onto the Vonk github. The hugo server does the rest.

There will probably be some readers at the moment who think: oh no! What will they give the students-for-a-day now? Or the alumni? And no Vonk anymore on the coffeetables next to the Scintilla room? Do not worry, we will still publish an analog Vonk once in a while. We were inspired by the UToday,

> "I think we are ready to make the next step to adapt to and explore the new possibilities that the internet has to offer us."

they collect some of their interesting articles over a period of time and create a magazine out of it.

As Vonk we are very enthusiastic about this idea and our proof of concept. We decided to go through with the online Vonk. Personally, I stand behind this idea fully. Last week I was checking out some very old contracts of Scintilla. In 1997 (one of the oldest I could find, present in the Scintilla room), we already

```
1   +++
2   title = "Meet the Board"
3   author = "The 89th Board"
4   description = ""
5   tags = [
6       "Meet the Board",
7       "Scintilla",
8   ]
9   date = "2018-12-01"
10  categories = [
11      "main article"
12  ]
13  nomenu = "main"
14  authorAvatar = "img/89.jpg"
15  authorDescription = ""
16  image = "img/89.jpg"
17  +++
18
```

Figure 4: Markdown article details.

placed company profiles on our website. We were very modern and had already a website in the young days of the internet. I think we are ready to make the next step to adapt to and explore the new possibilities that the internet has to offer us.

The official launch of the online Vonk will be at March 12th and you are invited to this event! Since this year is about perfectioning the online Vonk, we kindly ask you to email any comments or ideas to vonk@scintilla.utwente.nl. If you got just as enthusiastic as us and would like to help forming this website or if you have a cool idea for an article or video, feel free to contact us.

If you cannot wait until the official launch, checkout this QR code to see the website. We are very proud of it and we hope you will enjoy it and visit it many times!

On location: Thoringcar

Author: Matthijs van Minnen
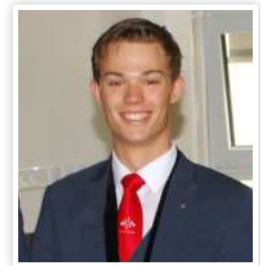
Scintilla went on a trip to the constitution drink of e.t.s.v. Thor. This year, not only Scintilla's board went, but they took along everyone brave enough to wager the two-and-a-half-hour trip to Eindhoven. This came down to 40 Scintillianen in a touring car on their way to Eindhoven; the Thoringcar trip.

It is common for the board of Scintilla to attend the constitution drinks of both brother and sister associations. Which is the same for the boards of all the other association. As such, we were happy to receive the board of Thor during a constitution drink of our own in September and the dinner thereafter. We can only assume that the (candidate-)board members of Thor had a few drinks too many when they invited anyone attending the dinner to their constitution drink in October. Next to the board members from both ETV (Delft) and Scintilla, our 'pedellen' (see Vonk 36-4) were also present. They cheered after hearing this wonderful invitation and the idea of bringing an entire touring car of people was quickly conceived.

Some preparations and a month further and the Thoringcar is ready and waiting for passengers behind the Cubicus. The 40 enthusiasts enter the bus, and we are on our way! Everyone was eager to get to Eindhoven, which might explain the tropical temperatures in the bus, or maybe that was the malfunctioning air-conditioning... Anyway, the mood was great, and many opened their Codex Scintillae to sing a number of songs to kill some time. Special to the occasion was the Thoringcar information guide, which included some background information about the tour, Thor and songs for those who forgot their Codex Scintillae. Using this, the trip flew by quickly and it wasn't long before we arrived on the TU/e campus.

After finding our way to the right building and the right floor we found Thor's Walhalla. Unfortunately, we were a few minutes early, so we arrived in front of closed doors. An advantage was that as soon as the door opened, we were the first to enter the Walhalla (besides the people from Thor) and could head straight to the bar. It took some time before there were more than the 40 people that were not part of Scintilla in the Walhalla, but this did not stop us from having fun.

With 40 like-minded people at a constitution drink it is easy to initiate a 'bras-actie'. Unfortunately, the epic 'pedelstaf' was off-limits. So, we set our sights on the guestbook which was conveniently located outside the Walhalla and close to the exit. Covertly, we communicated our 'time of attack' and when the clock hit five thirty, we moved on the book. You would think that 20 Scintilla people tugging on it would help to move it to the door very fast, but unfortunately our attempt failed. After another unfruitful attempt we were kicked out by Thor because the constitution drink ended.

Many flights of stairs and a stroll to the restaurant later and the 40 of us were enjoying a splendid meal in the city centre of Eindhoven. After soothing our hunger, we got back to the bus. Luckily, the bus driver would still have us, even after ingesting a lot of golden liquid enthusiasm. Personally, I had a great trip home as I was vast asleep. Others still had some energy left and repeated what they did on the way to Eindhoven, namely, a lot of singing!

The trip was very successful, and we look forward to receiving the board of e.t.s.v. Thor and its entourage in September!

Advertorial ASML

'More than a Tech Job'

Author: Pieter Smorenberg

Meet Pieter Smorenberg, a 2017 Delft University of Technology graduate who recently found himself back at university, this time explaining to students how technologically fascinating his job is. Originally from Amsterdam, Pieter couldn't have guessed that he would find so many technical and social opportunities in Veldhoven at ASML, the fast-growing tech giant.

ASML

Be part of progress

Pieter studied precision and microsystem engineering, and now works as an applications engineer in customer support at ASML. He also spends some of his time as one of over 400 'ASML Ambassadors', giving guest lectures at his alma mater university or promoting STEM among school-aged children in the region.

> *"We have annual technology conferences where you can learn about what's going on in your department, and across the company."*

"The more I tell people about working here, the more things I realize I appreciate about the company," he says. "A lot of people don't realize just how big ASML is in the semiconductor industry.

You realize it when you visit the campus in Veldhoven. You see the big tower, the cleanrooms, the huge gardens and parking lots; it's impressive. And then at the complete other end of the scale, almost all of the metrics we work with here are practically at an atom level – no other company is producing such advanced chip-making equipment." ASML is the world's leading provider of semiconductor lithography equipment, in an industry worth $438 billion. All of the world's top chipmakers are our customers, including Samsung, Intel, and TSMC.

Pieter has certainly found more than he expected in Eindhoven. "Coming from Amsterdam and Delft, I was a bit uncomfortable about moving to Eindhoven. But actually it seems like everyone is moving here. A lot of my friends from university are here, and there's a lot going on that you only discover after you get here. It's not a 'small city'. It's a melting pot – people come from all over the world to live here."

Pieter has also found more than a career at ASML. "There's so much going on in our company, technically as well as

> *"ASML is the world's leading provider of semiconductor lithography equipment."*

socially. We have annual technology conferences where you can learn about what's going on in your department, and across the company. This is really unique to ASML. You can develop your network, and learn a lot about what other people are working on, and get ideas for yourself. I'm like a kid in a candy store at these conferences."

Celebrating our technology isn't the only way we have fun at ASML. "I sometimes go for drinks with the 'Young ASML' group for young ASML professionals," Pieter says. "You get to meet
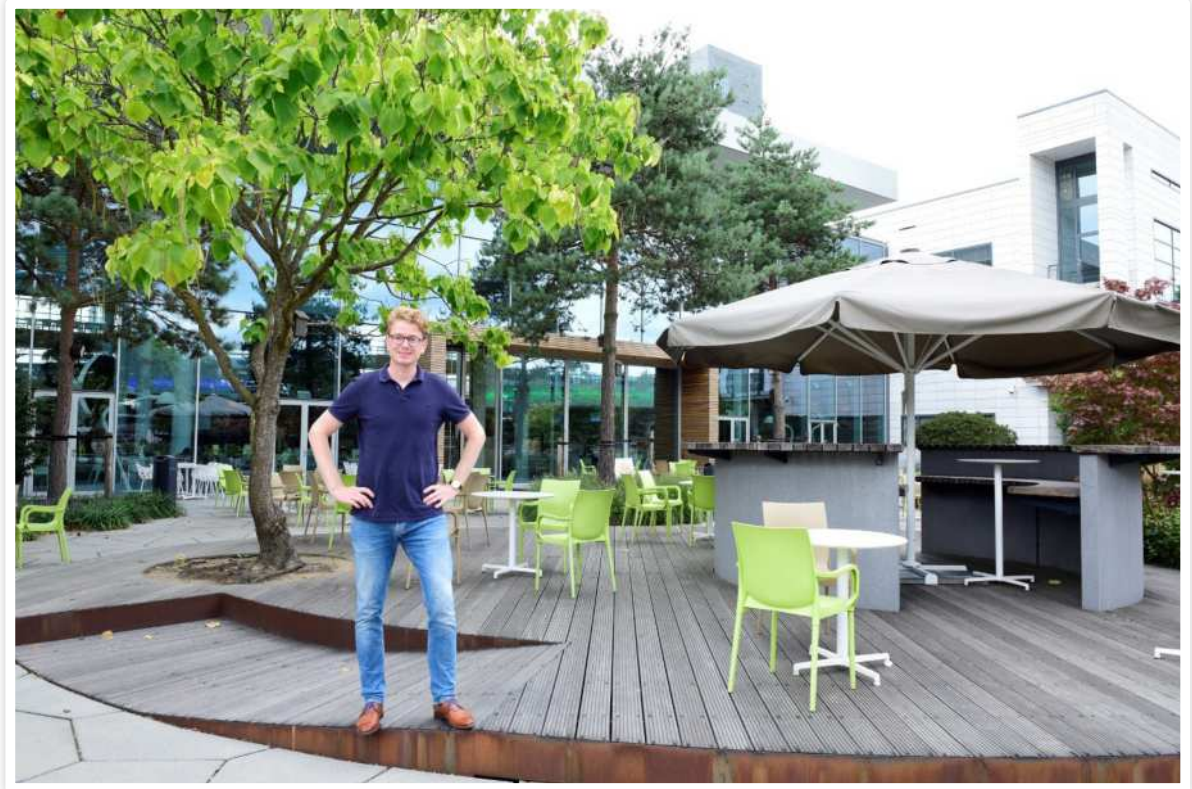
colleagues from all kinds of different departments. It's a really open-minded atmosphere, because everybody is there for the same reason: to share a good evening with each other." The ASML campuses are like small cities – more than 12,000 people work just at the Veldhoven campus alone. Young, old, male, female, LGBTI+, living abroad, you name it – it's easy to feel at home at ASML.

> *"The more I tell people about working here, the more things I realize I appreciate about the company,"*

As a customer support engineer, Pieter also gets to travel a lot, listening to ASML's customers and helping them to achieve their technology roadmaps. During his travels he experiences other cultures first-hand. "You learn a lot – socially and culturally as well as technically. It's been an eye-opener for me. We're diverse, in terms of education, background, and nationality, but we're all working together as one team because we all have the same goal: make this incredibly complicated technology a reality."

Deciding on what your next step will be after your technical master's degree can be challenging. The ASML business course can help! This course will teach you about ASML's semiconductor manufacturing technology and help you develop both the hard and soft skills you'll need to work at a leading-edge tech company.

Find out more at workingatasml.com/businesscourse.

About ASML

ASML provides chipmakers with everything they need—hardware, software and services—to mass produce patterns on silicon, helping to increase the value and lower the cost of a chip. Our key technology is the lithography system, which brings together high-tech hardware and advanced software to control the chip manufacturing process down to the picometer. All of the world's top chipmakers like Samsung, Intel and TSMC use our technology, enabling the waves of innovation that help tackle the world's toughest challenges. ASML has 19,000 employees worldwide. We are headquartered in Veldhoven (The Netherlands) and have over 60 offices in 16 countries.

Afterlife: Harmen Droogendijk

In the rubric 'Afterlife', alumni in Electrical Engineering from the University of Twente look back at their time as a student. They take us along their study time and subsequent career path and share what defined their period at Scintilla and the University of Twente. In this Vonk's edition: Harmen Droogendijk.

Author: Harmen Droogendijk

Study period (2003-2009)

About 15 years ago, I started my study electrical engineering at the University of Twente together with approximately 80 other students. It were my first days at the university campus and it was my first meeting with the study association Scintilla as well. I still remember the camp during the introduction week near

Enter, the beautiful games we had outside and also my first Cantus-experience. Those memories also came back vividly this summer, when my oldest daughter (8 years old) went to the same camp site for her first sports camp.

During my bachelor period in the former Hogekamp-building, I spent more and more time with friends in the Scintilla-chamber in the basement of the building, both study-related and social. It

was in 2005 when I started with my first committee within Scintilla - the Symposium committee - with the role as officer external affairs. Since it was a lustrum that year, we aimed for a great symposium based on parallel sessions with a goal of 10 speakers. Ultimately, we succeeded and we realized a very nice symposium entitled "Security on the Edge".

Shortly after the symposium, I was asked by Hubert Flisijn whether I would like to be candidate for the new board of E.T.S.V. Scintilla. I decided to accept this invitation and I joined the 74th board of E.T.S.V. Scintilla within the role of secretary for the period of March 2006 till October 2006. Since in those days boards were installed for a period of 6 months, I was subsequently also part (as secretary) of the 75th board of E.T.S.V. Scintilla in the period from October 2006 till March 2007. Both periods were really enjoyable, ranging from activities like board meetings with breakfast, constitutional drinks, organizing activities, meetings with sister-boards in Eindhoven and Delft, and so on.

Meeting at the start of the 74th board of E.T.S.V. Scintilla

When I left the board after one year I went back to my study again and luckily, my bachelor study was almost finished. The only part that was missing was the "IOO" (Dutch abbreviation for "Individuele OnderzoeksOpdracht"). During

> "Both periods of my board year were really enjoyable, ranging from activities like board meetings with breakfast, constitutional drinks, organizing activities, meetings with sister-boards in Eindhoven and Delft, and so on."

the past years I discovered that I liked multidisciplinary assignments a lot, which were preferably related to physics. Therefore, I went to the former TST-group (Transducers Science and Technology) where I found an interesting assignment on characterization of a micro Coriolis mass flow sensor (supervisor: Remco Wiegerink). In the summer of 2007, I successfully fulfilled the assignment and decided that this assignment paved my way.

My master in electrical engineering started in 2007 and focused on microsystems. In a two-year period I followed several courses on mechanics, physics, system-on-a-chip design, MEMS (micro-electro-mechanical systems) and so on. I looked for an internship in the accompanying field and preferably in a company that represents working in the Netherlands. Therefore, I did my internship in the end of 2008 at the company Bronkhorst High-tech in Ruurlo, where I worked on modeling of the IQ+-flow

Graduation ceremony in the Hogekamp-building (room T4)

sensor. In the beginning of 2009 I started with my graduation assignment, which was again within the TST-group by supervisor Remco Wiegerink. This time, I worked on the design and fabrication of a sensor for gravitational acceleration. The ultimate goal was to realize an accelerometer that was sensitive in such a way, that it could measure gravity gradients, being a mean for soil composition and therefore e.g. oil exploration. After a great time on the 7th floor of the former Hogekamp-building and in the 'old' cleanroom I successfully graduated in room Hogekamp T4, with drinks afterwards in the "Tombe". Now, I could

sit back for some weeks and prepare for my first job: PhD!

PhD (2009-2014)

In September 2009 I started my PhD in the former TST-group under supervision of professor Gijs Krijnen. The assignment for my PhD was the optimization of biomimetic flow sensors by means of nonlinear techniques within the BioEARS-project. BioEARS is an abbreviation for Biomimetic Engineering of ARray Sensors. During the past years, biomimetic hair flow sensors were developed using MEMS technology and a dedicated fabrication in the MESA+ Nanolab. Since these sensors showed a clear functionality with respect to responsivity to air flow and associated directivity, the next step contained improving its functionality by means of nonlinear techniques like parametric amplification and stochastic resonance.

These techniques provided a clear starting point for further research, since I did not only investigate parametric amplification for a MEMS hair flow sensor, but also for a micro Coriolis mass flow sensor and a micromirror. For characterization of the hair sensors, I explored characterization methods using a loud-

Lecture at the Transducers' 13 Conference in Barcelona (Spain)

speaker, a dipole sphere and a standing wave tube. Based on my findings on parametric amplification, I was able to demonstrate the mechanism of EMAM (electromechanical amplitude modulation) on the application of a time-varying spring constant in relationship with a harmonic air flow. I also developed new sensor types from the hair-based flow sensor, namely a hair-based accelerometer and a hair-based gyroscope. Using both models and measurements, I developed a comprehensive model to compare artificial hair sensors to biological hair sensors for flow measurement by means of responsivity, power transfer and impedance matching.

After approximately 4,5 years of working as a PhD-student a lot of exciting research was executed, several sensor models were designed, fabricated in the MESA+ Nanolab and characterized, and lots of results were obtained. My time as a PhD-student was really a great time, not only because of the total number of journal papers (11 in total), but especially because of the nice conferences I was allowed to attend (e.g. in China, Taiwan, USA, Ireland, Spain and France), the combination of design,

fabrication and characterization of sensors (theory and practice), and the colleagues I had.

During my PhD I also successfully attended the educational track "Promovendi voor de klas", which allowed me to obtain my degree as a physics teacher on high school. In the year of 2012, I followed several courses on didactics, and I had several

Assessment of (a part of) a bridge control system

groups (3rd and 4th year) at the high school Twents Carmel College in Oldenzaal.

Witteveen+Bos (2014-now)

In the last months of my PhD I started to look around for a nice and challenging job. Since I had no intend to leave Twente, I focused my job search on companies within a certain radius from Enschede. During this search, I experienced there were mainly two possibilities: i) stay within the world

of high-tech, ii) something new and/or different. Based on the information I received on the various vacancies and possible jobs, it became clear to me that I was actually looking for a job with a multidisciplinary role, the aspect of working in project teams and with a non-technical component (i.e. management and commerce). Therefore, I applied for a vacancy of project engineer on my background in electrical engineering at Witteveen+Bos within the field of infrastructure. During the interviews I had, it quickly became clear that working at Witteveen+Bos would not only comprehend engineering, but also consultancy and management for both small and big (multidisciplinary) projects. I decided to accept the job offer, and started working at Witteveen+Bos as of March 2014.

The first projects I got involved with were the renewal of the locks Keersluis Maassluis and Vlaardinger Driesluizen. These two object were located in places near Rotterdam, and the technical installations of these objects were both old and incompliant with safety regulations. Based on a site visit and design guidelines, we made a final design on the renewal of the electrotechnical and mechanical installations, together with a new climate-system in the control room and other (minor) activities. From this final design, a contract was develo-

Receiving my PhD from prof. Gijs Krijnen

Business Experience IMPAKT 2018 at Witteveen+Bos

ped for a tender, in order to contract a contractor for actually carrying out the building activities outside. These projects immediately introduced me into the strong multidisciplinary aspects of projects within Witteveen+Bos, together with working in projects and client contact.

At the moment, I have been employed at Witteveen+Bos for about 5 years, and in that time I worked on probably more than 100 projects. Among these projects, there were several huge projects (duration >10 years, cost: >millions of Euro), very small projects (~1 week, cost: few thousand Euro) and everything in between.

Among these huge projects are, for example, the redesign of the A10 at the southside of Amsterdam (project Zuidasdok). In this project, I was involved on the renewal of the control systems of the movable bridges in this highway, together with the nearby rail bridges and lock. Specific questions in this project were the application of the Machinery Directive and the design of the control room building. Another great project to work on was IMPAKT by Rijkswaterstaat. Within that project, we assessed the safety and security of hundreds of bridges, locks and tunnels of Rijkswaterstaat throughout the Netherlands.

Currently, the main projects I am working on are the Oosterweel Link in Antwerp (Belgium). In this project, we are working on the design and contract for 'closing' the highway ring in Antwerp, which will comprehend the design of seven tunnels. All the tunnel technical installations for these tunnels need to be designed in detail, together with the associated control system, for which I am involved in the project team. At the moment, I am working two days a week in Antwerp together with both Dutch and

> *"One of the great aspects of Witteveen+Bos as a company is the encouragement for entrepreneurship."*

Belgian colleagues on this project. Next to this project, I am project manager of the rehabilitation of the Ganzensluis near Kampen (client: Provincie Overijssel), which is a very strong multidisciplinary project, not only involving other technical disciplines, but also permits, ecology, etc.

In addition to my project roles as engineer, consultant or project manager, I have been group leader of the group Sensors, Systems and Safety within the business unit Smart Infra Systems since 2017. This groups currently consists of 6 members throughout the Netherlands and even one member in Belgium. This role brings me a (new) challenge on personnel management, education and training, which I like a lot. Due to the variety of locations for both projects and group management, I travel a lot (by train). Luckily, working in the train is often possible, allowing to convert travel time to work time.

One of the great aspects of Witteveen+Bos as a company is the encouragement for entrepreneurship. To illustrate: the job market is not just a responsibility of our HR department, but our employers themselves are encouraged to put effort in this field. For example, many of our employers still have ties with their old student associations. In my case, this represents the contact I have from a professional perspective with E.T.S.V. Scintilla. This year, we organized the Business Experience IMPAKT at our office in Amsterdam. A great example of collaboration between both my colleagues and students.

Personal life

After my period as a student electrical engineering I decided to keep living in Enschede, where I actually still live. Though, some things have changed since 2003. For over 10 years now, I am happily married with my wife and during these years we became parents of four children (2 daughters, 2 sons). In my (spare) free time I play tuba in an orchestra, in which I also have the role of chairman of the board.

SCALA's Christmas Dinner

Scinterklaas

EEFBA

Archery Tag

Studying abroad: Sweden

Author: Timon Kruiper

In the third year of every UT bachelor student's program it is time for the minor. This is a period of half a year where you can basically choose what you want to do. Staying at the UT and studying some High Tech Human Touch courses is an option, or going abroad and basically have holiday for half a year.

Well, obviously I chose to go for that last option. I chose to go abroad to Scandinavia, namely Sweden. To be a bit more precise, I lived for half a year in Linköping (pronounced as Lin-sjeu-ping). Linköping is located approximately 2.5 hours from Stockholm (for Swedish terms this is quite close). It is a similar city to Enschede in terms of po-

pulation size and student numbers. The Linköpings Universitet (you couldn't guess this) is located on a campus near the outskirts of the city and a great place to study for a few months.

I followed a few computer science courses, a nanotechnology course, a course on power grids and I learned Swe-

dish. This was of course really handy to communicate a bit more with the locals, beautiful Swedish blond girls and some Swedish housemates. For passing the Swedish course I also received 7.5 credits, which was a nice addition!

I lived in a student corridor with 9 other students, each having theirown room with a bathroom and I shared the kit-

chen and living room. This was quite new to me, since I'm still living at my parents place in the Netherlands, because I live close to Enschede. Thus, a lot of 'normal' things, like cooking, laundry and cleaning were new to me. This ho-

> "I would really recommended doing your minor abroad, since it's such a great experience."

wever is something you get used to quite quickly and was good for my personal development... studying abroad has so many advantages. The other students in my house were a few Swedes and other international students. They were really nice and we had a great time, having parties in the house, drinking beer together and cooking together. The beer however was quite expensive. The alcohol consumption in Sweden is completely regulated by the government, since the only shop where you can buy alcohol is a shop from the government itself and it's not cheap. Luckily, my parents brought some delicious Grolsch beers, so that was no

problem for me most of the time.

Studying abroad doesn't just consists out of studying and staying in Linköping. I have always heard that Sweden has beautiful nature and really wanted to see that myself. The international student association of the university organised a trip to Lapland. Lapland is an area above the arctic circle in the north of Norway, Sweden and Finland. We were with a group of 40 students and we had an amazing time. We slept in small cabins, drank

beer around a fire while the temperature was -15 outside, enjoyed a sauna on top of a frozen lake and cooled down in the ice cold water of the lake. We also did dog sledding with really cute huskies and visited a beautiful national park close to the border of Norway. Finally, I even saw the aurora (northern lights) and it was such an unforgettable experience. I did a lot more different trips, like visiting the capital of Sweden, Stockholm and other cities near Linköping. These trips most of the time started with a 'fika' in the morning and some sightseeing in the afternoon. If you were wondering what 'fika' is, there is no direct translation to English, but it's basically a Swedish word for having a break with a coffee and something sweet. I liked this Swedish tradition and it was fun having a fika with the other Dutchies and Swedes in town every now and then.

I would really recommended doing your minor abroad, since it's such a great experience. You get to learn about yourself, live in a different culture, get to know a lot of different international students and other awesome people. It was such a fun time and if you get the change just do it!

Scoring for the Future

Author: RoboTeam Twente

"By the middle of the 21st century, a team of fully autonomous humanoid robot soccer players shall win a soccer game, complying with the official rules of FIFA, against the winner of the most recent World Cup", that is the ultimate goal of the RoboCup soccer competition. However, to achieve this a lot still needs to happen.

To get there, the RoboCup is divided into three main leagues: humanoid, middle-size and small-size, with each their own challenge. The humanoid league focuses on the operation of humanoid robots, the middle size league focuses on the image processing on the robot itself, and the small-size league is focused on quick decision making and communication between the robots.

The RoboTeam Twente will participate in the small-size league for the third time in July 2019, in Sydney. With a team of 15 students, both part-time and full-time, we work towards this big competition. To achieve this we have students from Technical Medicine, Applied Physics, ATLAS, Creative Technology, Advanced Technology, Computer Science, European Public Administration and of course, Electrical Engineering! These students are divided into artificial intelligence, control, electronics, mechanics and public relations.

The mechanics team is responsible for the mechanical design of the robot. Are all parts in the right place? Are all parts strong enough? Is the center of mass low enough so that the robot does not fall over? These are all questions that the mechanics team is busy with from day to day. Currently, the mechanics team is busy improving three main parts of the robot: the dribbler, chipper and ball sensor. This first part is a little rod that spins forward, giving the ball a backward spin when it's tou-ched. This lets the ball come toward the robot, thus allowing the robot to move around with the ball. The second part, the chipper, currently prevents this from happening perfectly, because it touches the ball while dribbling, so that needs to be changed. Thirdly, the ball sensor allows the robot to "see" the ball, but it is currently a bit too far removed from the ball. In the new design, the ball sensor will be placed directly behind the ball.

As for the electronics team the main focus this year is extending the current possibilities of the robot. The electronics domain encompasses the driving of the wheels, circuitry for kicking/chipping, communication and the processing and driving of all these elements: the microcontroller.

One of these improvements is the motor controller, which will allow the control team to guide the robot more accurately and improve its reliability. This is done by allowing the robot to execute finer motions by means of additional sensory components as well as improved power circuitry to make the motors behave more linearly.

A second improvement is making the robot more aware of its state by monitoring subparts of its circuitry as well as the code that is running on the robot. This allows the robot to compensate for itself and/or send this information back to the AI.

The sending to and from the robot is also being changed as it was clear from the last competition that it was not good enough for our specifications. The main change will be in the possibility to reliably send data to and from all the robots in a set time. This means that there has to be a scheduling and communication protocol setup. The challenge here is to make a lightweight, low/constant latency pipeline capable of sustaining 11 robots in a varying noisy environment.

The biggest bottleneck in the small-size competition is the software. With eight cameras above the field, we can see everything, and our robots do not need their own camera. However, vision is still a big challenge as we have to merge data from eight different sources, each with their own delay. With a small robot with wheels, operating the robot is easier than it is in for example the humanoid league, but still very challenging. As our robots are able to move at high velocities, controlling the robot is a big challenge. Camera data has a delay, but we still want to know and control whether the robots go where we want them to do. Making

quick decisions, fully autonomous, in a dynamic field with 16 robots moving at high velocities is hence a big challenge. This challenge we put with two teams, control and artificial intelligence.
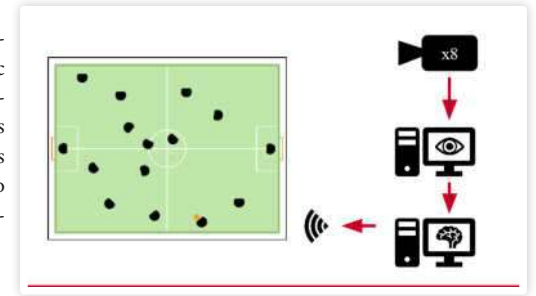
Control is all about, pretty much what the word already says, controlling the robot. We need to send the right signals to the motor drivers when we want to drive, send signals to the kicker and chipper to kick and chip, and of course, avoid obstacles when we want to drive. While doing this, we continuously want to receive feedback on where the robot is, and whether this matches where we want the robot to be.

This year, we decided to do the obstacle avoidance together with path planning using so-called Bézier curves. We first create a Voronoi diagram, essentially a set of lines between the obstacles that are safe to travel for the robot and then we find the shortest path from point A to point B across these lines. Now that we have a short path to the desired location, we want to make it smooth such that the robot can follow the path without having to make sudden changes in direction. This is where the Bézier curves jump in. It is a parametrized curve based on control points that we put on the lines from the shortest path we found. Since these Bézier curves have the property that it always lays in the polygon spanned by its control points, it is guaranteed that the robot will never hit an object as long as it stays on the curve!

When the robot is properly controlled, the only challenge left is decision

making. We get updates from the cameras 60 times per second, so we can also make decisions 60 times per second. In each of these ticks, we need to decide for all the robots what the best strategy is. How many defenders do we need? Where should the keeper position itself? The system needs to be able to do everything itself, without human interference, which is a big challenge. When the opponent passes the ball, we need to decide in a split second whether one of our robots can intercept the ball, and how. This decision making is largely structured in behavior trees. Basically a graphical method to structure behavior. The code behind this is similar to a lot of if-else statements. We, for example, let a robot in sequence check 1) whether it has the ball, 2) whether it can see the goal and 3) kick. These behavior trees can be used for various tasks. Added to this we want to start experimenting with machine learning this year. Soccer is an intuitive game and a lot can be programmed by humans, but we believe that we can let parts be trained by the computer itself to make decisions even better. The main technique we want to use for this is machine learning, which basically comes down to letting the robots "train" the same action over and over again, giving it a reward when it succeeds. This way it learns which actions to take when, to for example learn how to score a goal.

With all these innovations put together, we will travel to the RoboCup in Sydney, which takes place from 2 July to 8 July. If you are interested in our progress you can visit us at https://roboteamtwente.nl/.
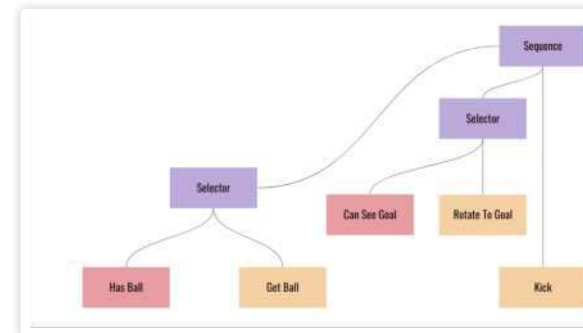
Advertorial:
Maxon motor
Turning ideas into solutions

Author: Maxon motor Benelux

Maxon motor is a Swiss company specialized in state-of-the-art precision drive solutions. maxon drives are present in submersibles up to 6000 meters below sea level, but also on the planet Mars. In the most extreme conditions maxon is the right partner to call.

In the Benelux, Maxon is dedicated to help customers in the industrial sector. Among others, the semiconductor industry is very important.

Here we noticed a special interest for direct drive solutions and high torque motors. Even though the maxon motor catalogue allows you to choose from over 8000 types of drives, the larger motors that maxon motor benelux were looking for were not in it. So the team in Enschede started to design and build its first motor, of course with help and assistance from colleagues at the headquarters in Switzerland.

The requirements of the new motor were that it needed to be 275 mm in diameter, it had to be very flat and also frameless, in order to be easily built into the customer's machine. The performance advantage of a frameless motor is in the increased rigidity (stiffness) that it provides when designed into a machine. There are no mechanical elements between the motor and load (couplings, belts, pulleys, etc.) so dynamic performance is improved. In addition, because there are no mechanical parts to wear, the lifetime of the entire system is increased and maintenance costs will be reduced.

Magnetic field

First there will be a short explanation about how brushless DC motors work (also called BLDC motor, but by maxon called EC-motor). EC-motors can have an inner runner or an outer runner, meaning the rotor is the inner ring or the outer ring of the motor. In our case we needed an inner runner.

The inner ring will consist of magnets with alternating polarity. The ring with the magnets glued to it is, in our case, the rotor. The stator consists of a laminated plate with the windings on it. The rotor of the motor is set in motion by a mo-

ving magnetic field. This magnetic field is generated when current is brought through the windings.

The windings consist of three phases: 1, 2 and 3. At any given moment two groups will be powered and one will not be. So, in the case of the diagram below, in order to make the magnet turn Phase 3 will be powered and produce the South in the magnetic field and Phase 2 will be powered with opposite voltage and produce an North magnetic field.
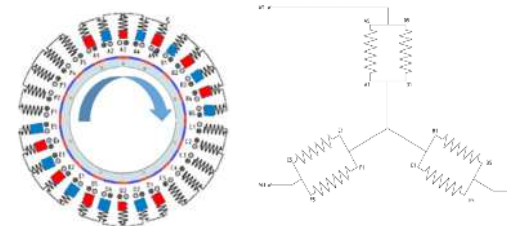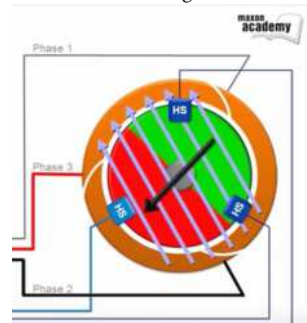
In this case coils A and D are powered with a current following the signs in the drawing. Coils B and E are powered with a current in the opposite direction as the signs in the drawing

Phase 1 remains unpowered, once the magnet has rotated 60o, phases 1 and 2 are then powered. Essentially, two thirds of the coils are powered at any given time, in order to rotate the magnet.

In the case of the EC-i 275 there 32 poles, this means that the situation is a bit different, but there will still be 3 phases.

Six commutation states

Each time the rotor moves the angle corresponding to approximately 1/3 of the length of a magnet, the current in the coils will have to change direction in order to keep the rotor turning. This change in direction is called commutation. In order to explain the commutation sequence a simplified representation will

be used. Below you can see the six commutation states that are needed to make a 2-pole rotor turn 360°.

In order to have this commutation a controller is needed. The input for the controller must be in the position of the rotor. There are several ways to do this, but one clever way to measure the back-emf of the coils is to make sure it is not powered all the time. Another way is by means of Hall sensors: three Hall sensors positioned at 120° are able to define the six states that are needed to make a 2-pole rotor turn 360°.

If the rotor has 4 poles, then the Hall sensors would have to be placed at 60° from each other.

In the maxon EC-i 275 there are 32
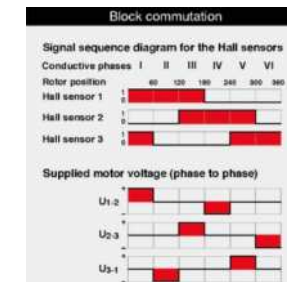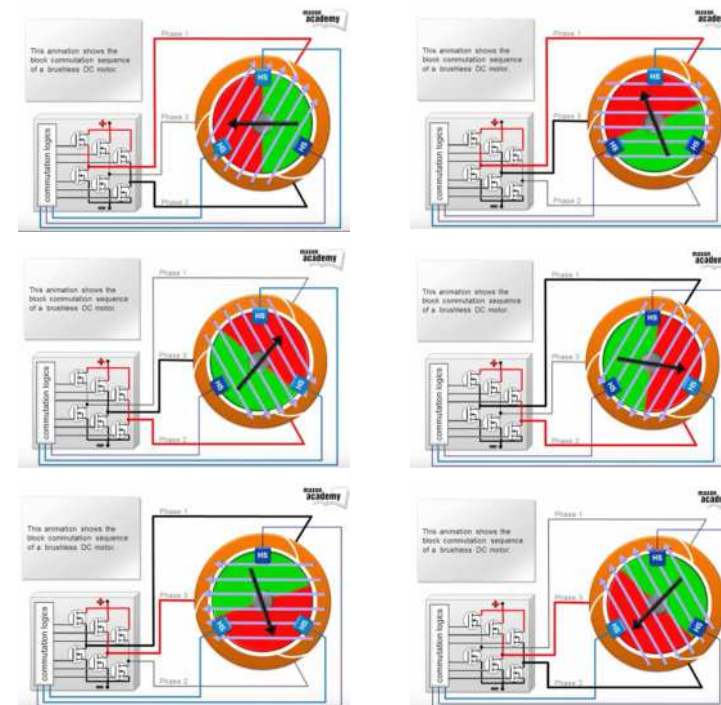
poles on the rotor. This means that the Hall sensors need to be placed at 7.5° from each other. In practice, placing them at 7.5° can result in an undesirable location, in that case a multiple of these 7.5° need to be chosen: 15° or 30°. In the case of the EC-i 275 the Hall sensors at 60° resulted in the most practical position. To have a nice and clean design and

Motor Data (provisional)			511966
Values at nominal voltage			
1 Nominal voltage	V	48	
2 No load speed	rpm	266	
3 No load current	mA		
4 Nominal speed	rpm	275	
5 Nominal torque (max. continuous torque)	mNm	12000	
6 Nominal current (max. continuous current)	A	7.65	
7 Stall torque	mNm	51600	
8 Stall current	A	30	
9 Max. efficiency	%		
Characteristics			
10 Terminal resistance phase to phase	Ω	1.6	
11 Terminal inductance phase to phase	mH	10	
12 Torque constant	mNm/A	1720	
13 Speed constant	rpm/V	5.55	
14 Speed/torque gradient	rpm/mNm	0.0052	
15 Mechanical time constant	ms	4	
16 Rotor inertia	gcm²	71000	

facilitate assembly of the motor, all connections to cables and hall sensors are made by means of a PCB. The end result looks as follows:
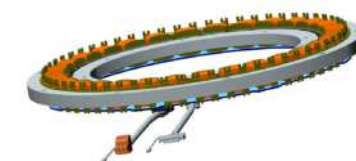
Visit us at:
www.maxonmotor.nl

Study Evenings

Author: Romano Ferla

While I was still a candidate-board member, we (myself and the rest of the then candidate-board) thought of the idea to increase the presence of study support from our association to our members. We came up with the idea to organize study evenings, where students could study in a supportive environment. With this idea we started and after gathering information about such evenings from other study associations we setup our first study evening in the eighth week of the first quartile. Up till now we organized three of these evenings, each giving lots of feedback.

After we came up with the idea and brainstormed a bit about it, I found out that Scintilla was one of the few associations that did not organized study evenings. Instead of reinventing the wheel ourselves, I visited some of my educational affairs colleagues to acquire the do's and don'ts about these evenings. Eventually I talked with Proto, Stress and Communiqué and visited a study evening of Arago. It surprised me that each association had a different approach in the organization. Maybe they did reinvent the wheel themselves?

Other associations

Proto organizes study evenings already for a couple of years. Currently they have two to four study evenings in one module. Most of their study evenings are for specific subjects, where they managed to get support from the study and have regularly teachers and student assistants present at these evenings.

Stress started about two years ago with their study evenings, in contrast to Proto they have less collaboration with their study. Now and then they get student as-sistances (SA's) from their study. If not, they make sure to get one or two older year students for guidance. They organize the study evenings specifically for one subject.

Communiqué is again different, as they managed to get teachers to be there voluntary due to the lack of SA's. They do have a 'Study Buddy Committee', which consists out of a number of students that have high grades and are willing to help others. Communiqué prefers to organize general study evenings, due to the low number of students in their study.

The fourth association I went to was Arago, it surprised me that they did not have any collaboration with their study. Even though they had a high number of attendees. Like Communiqué, Arago organizes general study evenings.

Setup of our study evening

Besides the differences of above, associations differed with strategies when to plan their evenings. With this knowledge, we made a setup for our own stu-dy evenings. Stress and Arago seemed to have the most overlap with our situation. Which was that we just started with the idea, where Stress and Arago were just organizing these evenings for about two years.

Our goal with the study evenings was to create a suitable environment which encourages students to study either alone or with their peers and where people can enter and leave whenever they want. You could see it as an enhancement of the university library, with fellow students and free coffee and tea. Hopefully, just like any other activity, people would convince one another to go to such an evening. Besides this goal we defined the format of a study evening and the support during a study evening.

For the format, the evening could be subject specific (like Proto and Stress) or general and thus open for everybody (like Communiqué and Arago). Since we had no idea what the popularity would be, we decided to start with general study evenings and with the possibility, if the evenings are very successful with a high number of attendees, to organize subject specific evenings.

For the support, we thought of printing exams for the relevant subjects. Though this proved to be difficult with certain subjects due to the very limited amount of exams on the database. Therefore mailings were send around to promote the exam database. Other materials, such as notebooks or pens would also be provided.

In addition to the support by providing materials, we had to look who would do the guidance. The options were, looking at other associations, to invite teachers, SA's or older year students. We brought the idea of getting SA's up by the study, unfortunately they were not too fond of it. There was a fear that it would replace tutorials (which seemed to be already not popular amongst students). The predicted effect of the study evenings seemed to be one big misunderstanding, as the other associations showed. The main difference with a tutorial is that students are free to attend and leave the evening as they please. Students decide themselves what they want to learn and how they want to learn, whereas a tutorial is often succeeding a lecture were people work on specific problems. We just provide an environment for people that wanted to study anyway that evening, hoping of course to convince others too. Nevertheless for the guidance we were up to ourselves, but as Arago showed this did not have to be a problem.

First evening

So prepared with our idea, after a bit of organization and the necessary promotion we (still the board) were sitting in the Westzaal, in the eighth week of the first quartile. A bit later than the planned 17:00, as there was still a lab going on of Create. We divided the Westzaal into two parts, one for working in silence and one for discussion. Chitchat was not allowed in the Westzaal, but if people wanted to they could do it at the table with coffee and tea outside. Exams of Digital Hardware, DiffDiff, Programming and module 1 Calculus were lying on the table, ready to be made.

The evening went well, some people showed up in the beginning and some more after dinner time. People seemed to like it (though the Westzaal was a bit cold). We made sure most of them filled in the small evaluation form. First to third years students showed up, most of them learning for module 1 or module 5 subjects. Though some of them used the evening to work on grading projects, labs or doing some committee work. Most were really happy with 'the learning environment'. For the 'provided exams' and 'guidance with questions' the opinions differed a bit, though most of the atten-

dees gave it either 'okay' or 'good', on a scale from 'bad', 'okay' and 'good'. Everybody said that they would come again (if they needed to). Some also gave suggestions for next evenings, such as bringing cookies and more exams. About 20 people showed up (without older year students and board members).

Following evenings and the future

With the recommendations of previous time we organized another one during the last week of the first quartile, for the people that had to do a resit. This evening was quite similar to the previous one. On a third evening, in the second quartile, another evening was organized. Unlike the previous two, only a few students came to the evening. However the people that came were really dedicated to work and happy with it being organized. Some also mentioned that they used this evening to just get work done, as the environment is very motivating.

While writing we have another study evening planned, in the last week of the second quartile. We are still looking at different actions we can take in the future. These are for example whether we organize the evenings more frequently (possibly some without guidance from older years students), or if we want to organize study evenings with a more specific theme. One thing that is sure, is that we will continue with the study evenings.

Is it APPE(L)aling?

Authors: Céline Steenge & Lynn Bruins
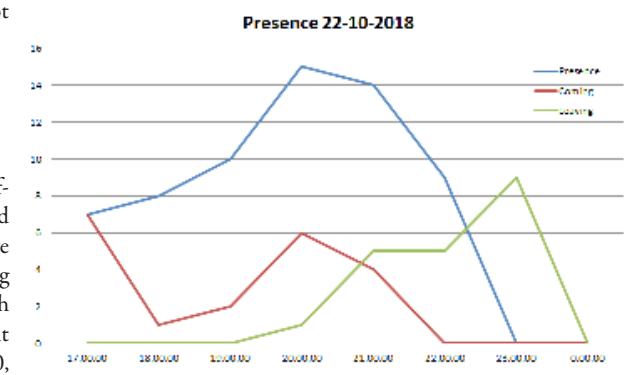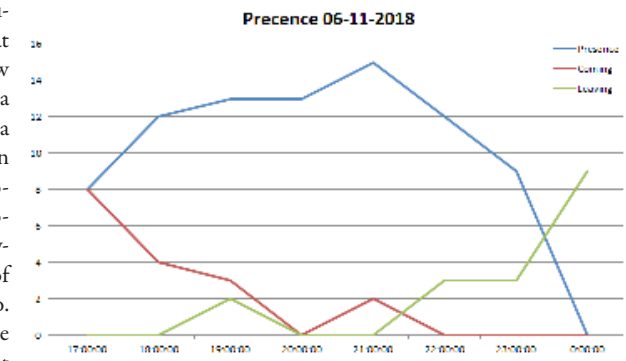
Since this year, we have a new caterer on the UT: Appèl! Since we from the Vonk were curious about their food, we tried some for you. We have tried a spring roll, a panini, a bagel salmon and a cup of soup. A review for all of this can be found here, but of course you could also try it out yourselves.

First, we would like to start on the appearance of the Waaier (or any other canteen). This part has really been improved. We went from

To

We think this looks better. Furthermore, they added some products. This means that the vegan people also can have their lunch in this canteen. There is still the opportunity to have a warm meal, to grab your baguette or have some soup. The prices are still somewhat high, but when you want to grab a well-filled sandwich, you can go here.

First the spring roll. Everyday, another dish will be presented, just like Sodexo had. Today there was an Asian theme. For €3.50 you could get a spring roll with extra's (krupuk of course being the

> "This means that the vegan people also can have their lunch in this canteen."

most important one). The smell was really nice, though we were a bit hungry. The taste of the spring roll was okay. Compared to the price and size, the filling was little, mostly bean sprouts. Conclusion:

not bad taste, somewhat overpriced.

Next the panini. We already know the panini from Sodexo times, but something has changed! They added the

> "If you just want a fancy lunch, take a baguette which is less expensive and still looks fancy."

taste ham with brie. Although it was not stated on the label, there was also some sort of tomato sauce on which really im-

proved the panini. For only €3.35 (why the 35 cents? Make it €3.00 or €3.30 or €3.40 or even €3.50), you could enjoy a warm panini for lunch. Overall: nice taste with good filling.

Then the bagel with salmon, the most expensive of the four (€4.10). It looks fancy, but this could be due to the bagel. Although we bought it at the university canteen, there was a thick layer of salmon on the bagel. Together with egg, a bit of salad and a sauce (still do not know exactly what is was, but it was a nice combination), we enjoyed our bagel.

Would a small bun with salmon be as nice and less expensive? Probably. But than it would not have the fancy appearance. As a result: if you are willing to pay extra for a bagel, try it. If you just want a fancy lunch, take a baguette which is less expensive and still looks fancy.

Then last, the soup. Since the influenza epidemic is around us, we helped ourselves with some soup (yes we had some sore throat). Despite the fact that it was basic soup, the taste was nice. We filled a cup for €0.80, which surprised us. For only €0.80 you can have the soup that makes your sore throat a bit less sore! And you do not even have to cook it yourself! Whenever the soup was a bit to boring, you can always add some Maggi/

spices to it. Correspondingly: great soup for that price.

So did Appèl improve the food on the campus? We could not find something we did not like in taste. The prices, yes those are sometimes a bit high. We have spent €11.75 for a lunch for 2, without drinks. But, we did not try everything in the canteen and we only went to the Waaier. Appèl has all canteens on campus (okay except the canteen in the sports centre) and every canteen has a different theme. The Ravelijn has for example an Italian theme. In UToday, Appèl stated that the Spiegel have a more egg products focused theme and the Horst cafeteria will be the place to get 'Bliss Bowls'. So we will see whatever Appèl will bring us in the upcoming year.

What the Vonk?!

Text frame with paragraph style 'title'.

Lay out the layout

Text frame with paragraph style 'subheader.'

Spacing determined by object style 'author'.

Object style 'author'.

Pitures have object style 'picture' so they are placed in a nice canvas.

Author: Jippe Rossen

In the previous edition I have discussed the complete process from goofing around during a meeting, to the publishing of an article. While doing this, I skipped over a rather important aspect of an article: the layout.

The layout is in fact by far the most time consuming aspect of creating our magazine. Roughly 90 percent of the articles that are published by the Vonk are actually written by members of our association. This decreases the workload on our committee, but also ensures that each edition of The Vonk is a very good reflection on what our wonderful association stands for and was has been happening over the past few months.

Starting the process

The starting point of every layout session is the raw article. There are various ways the resources of an article could be delivered to us. As a committee we prefer to obtain the article as a plain text file with seperate files for images. However, we do not impose these requirements on our writers. Usually it is already enough work for them as it is to write an article, so we give them the freedom to deliver us whatever format they would prefer. If we are really unlucky, we only receive a pdf generated by LATEX. These pdfs obtain end of line characters after every line, which have to be removed manually. Also sometimes we receive Word documents with the images embedded in them. We then need to extract the images from the file and save them manually. This is not much work, but does require extra steps.

The Vonk layout

Text frame with paragraph style 'subheader'.

For making the actual magazine, our committee uses Adobe InDesign. For each article we start of with a bare template. Besides the content that needs to be added, there are some other things that need to be set properly.

- The structure

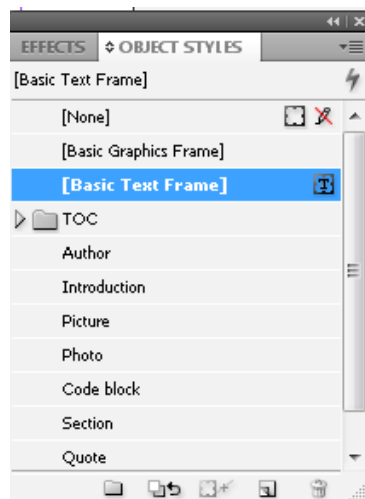Every article needs a title and potentially a subtitle. In our design template,

Figure 1: The toolbar that holds all predefined object styles that are used in The Vonk.

we have defined various styles that allow us to do this. In total there are five kinds of styles: object styles, paragraph styles character styles, cell styles and table styles. For creating The Vonk, we only regularly use the first two.

The object style determines how an object behaves. Examples of objects are: every single image, the title, a column of text, etc. Figure 1 shows the objects styles that we use for The Vonk. These presets make sure that the text wraps
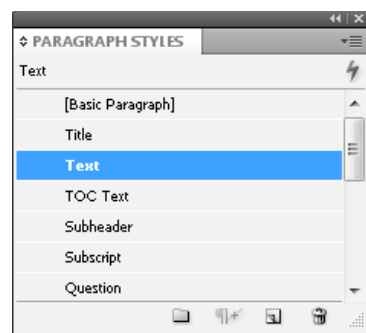
Figure 2: The toolbar that holds all predefined paragraph styles that are used in The Vonk.

around an image nicely, that every image has a border around it, and also that the objects have the right spacing with respect to one another. For instance, the object style 'author' includes margins on the top and bottom to make sure that the introduction starts below the underlining of the author and also that there is a predetermined amount of whitespace between the author and the (sub)title.

The object styles themselves also include a paragraph style. The paragraph style holds settings for all text that is present inside that specific object. When applying a paragraph style to a certain object, it automatically sets the font, the font size, bold or italics, and so on. For instance, the introduction is automatically put in bold font.

Paraygraph styles can also be applied individually. It is therefore possible that an object holds multiple paragraph styles for different parts of that object. The test you are reading now is part of the same object as the subheaders, but the subheaders obviously have a different look and thus also a different paragraph style.
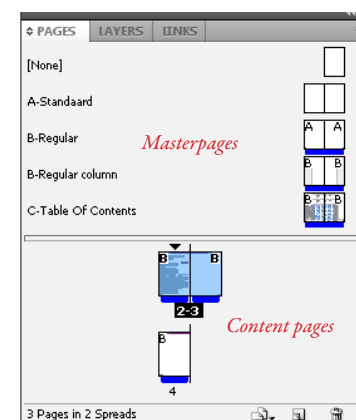
Article section is edited in the master page

Masterpages

Content pages

Figure 3: The pages toolbar that lets you select that masterpage or the regular content pages. In this figure content pages 2 and 3 are active.

- The masterpage

During the design there are in fact two layers present: the actual content and the master page. Each of these have their own specific function.

The content layer holds the content of the entire article (doh..). This means that all the article specifics are to be put in this section.

If the master page is then selected, all the the content disappears. You are then

left with the bare template again. The master page defines the color scheme of the article, but also manages the footers of every page.

While doing the layout of an article you have to be careful to not put the content in the master page. Eventually all masterpages are syncronized with one another. If you use a masterpage with content in the masterpage, this content is then projected on every other article as well!

The above is quite easy to fix, but if another master page is used for the synchronization, the content that was present for that specific article is wiped clean. So if you are not careful all your hard work may be for nothing.

Finishing up

Once all the text is put in the file and the article has a nice header in the right color, some creativity is required. Although we try to obtain articles with a number of words that corresponds to the amount of space that we reserved for it, this is not always the case. It is almost impossible to make articles smaller. You cannot just remove text and also the spacing and font size cannot be altered. Therefore we almost always opt to extent articles if the word count does not comply with the set amount of pages.

> *"Quotes are great to fill up some empty space in your articles!"*

However, even when we have the approximate right amount of words, if you just put everything in the layout, you are almost certainly going to have some white space left. This is were your creativity comes in. Sometimes you can easily resolve this by cropping or resizing an

Mastercolor determines the color of the article

Pictures have object style 'picture'. This includes text wrapping but adds no canvas.
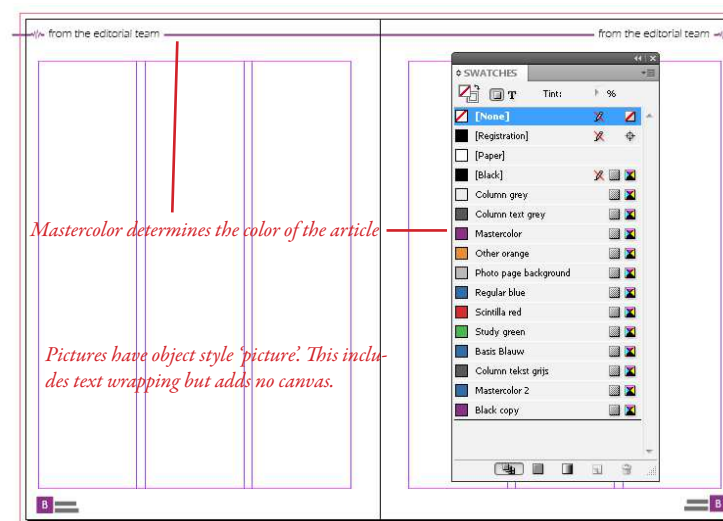
Figure 4: An example of what the masterpage of a regular Vonk article looks like. On the Right, the toolbar that controls the color schemes is shown.

Text variable which is synchronized between all articles when completing the entire Vonk.

image. However, one of the most powerful tools of an editor is in this case the quote! Quotes are often used to attract the attention of a potential reader who is browsing the magazine, but they can also be very handy to fill up some empty space. If you ever wondered why some articles have three quotes and some have none, you now know they are used to simply fill up some unused space!

By the way, if you start layouting for The Vonk, you will quickly find out that the most efficient way to find appropriate quotes for an article is to simply do a text search on exclamation marks!

Article specifics

Some sections have a layout that is drastically different than other articles. An example for this is the table of contents (TOC). The TOC is in fact that different that we have created a seperate master page for it (which is also shown in figure 5). This master page does not include the usual items such as a title and predefined text boxes. Instead it has placeholders for all the items that are in the TOC.

This master page also includes the masterhead. The masterhead usually does not change very often. The number of copies varies a bit depending on the number of members Scintilla has and also the people that have worked on The Vonk change from time to time.

The masterhead also includes the date of publishing and the edition number. As you may have guessed, these are specific for each edition. We keep track of these over the entire document by using text variables. Text variables can be assigned a value in the masterpage that will be used as the template for all the other articles. After synchronizing all the master pages, all text variables will be updated and show the right numbers. If you have paid attention you may have guessed

that the masterhead of the TOC will require manual updating. This page uses a different masterpage and will thus not be updated along with all the other articles. *Object style 'Quote' gives quotes nice borders and controls the text wrapping*

> "The best way to find quotes for an article is to search for exclamation marks!"

In the table of contents, all the articles that are published in that edition are listed in the center. Unfortunately, these have to be created and organized manually. This is usually one of the last steps that are performed when finishing the layout. The colours of the numbers are defined in very much the same way as the color scheme of each individual article and should correspond to the family class an article belongs to.

In figure 4 the swatches toolbar is shown and all the various article families we use for The Vonk are listed here. We got Scintilla red for every article that is associated with Scintilla itself. There is study green for all study related articles such as bachelor or master assignments, but

also changes to the programme or the educational model belong to this family. The Vonk also has some recurring articles such as the Solarteam, Green Team, Roboteam and our datasheet, these are to be coloured by regular blue.

For the 'What the Vonk' articles I actually created a new color style in purple. As you can see this is is currently still named 'black copy'. This color style has not been added to our template yet and so I still had to add it manually to the list. For the next edition I will have added 'editorial purple' to the template and it will be ready to use.

Closing remarks

I am pretty sure that I have forgotten countless little quircks and particularities about doing a layout, but I hope you have now a much better view on how The Vonk comes together. If you have become wildly enthousiastic by reading this, and my previous 'What the Vonk' article (how could you not?), then do not hestitate to contact us about contributing to this great magazine at vonk@ scintilla.utwente.nl. You can of course also always stalk one of the board- or committee members.


Figure 5: The masterpage of the Table of contents page.

Puuzle

Author: Truusje

Dear friends,

As always, Truusje has prepared some puzzles for you, our dearest readers. This time, you get to solve two interesting logic puzzles she totally just devised herself. Send your answers to vonk@scintilla.nl in order to participate. The winner of last edition is Michel ten Bulte. You have earned a nice cake, the Vonk will contact you to arrange your prize.
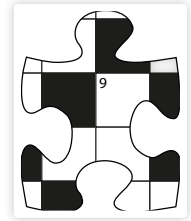
Three people are in a dimly lit room. Their unknown host announces through a speaker that he has drawn a dot on each forehead, with either black or white paint. All three can see the dots on each others forehead, but not the one on their own, of course. The host requires them to raise their hand if they see at least one forehead with a white dot. The person able to guess the colour on their own forehead is the winner of the game. What the participants don't know is that they all have a white dot on their forehead. Assuming all three are great at deducting, how can they figure out their own dot colour?

Truusje and her friend are trying to reach Square Island, which, as its name implies, is perfectly square. Around this island lies a perfectly square moat of 5 meters. To reach it, both Truusje and her friend brought a ladder. Problem is, each of the ladders is exactly 4.8 meters in length. How can they reach the island anyway? Note: the moat is really, really deep, so you can't reach the bottom with a ladder. Also, the ladders are made of metal, so they don't float.

Good luck,
Truusje

Square island
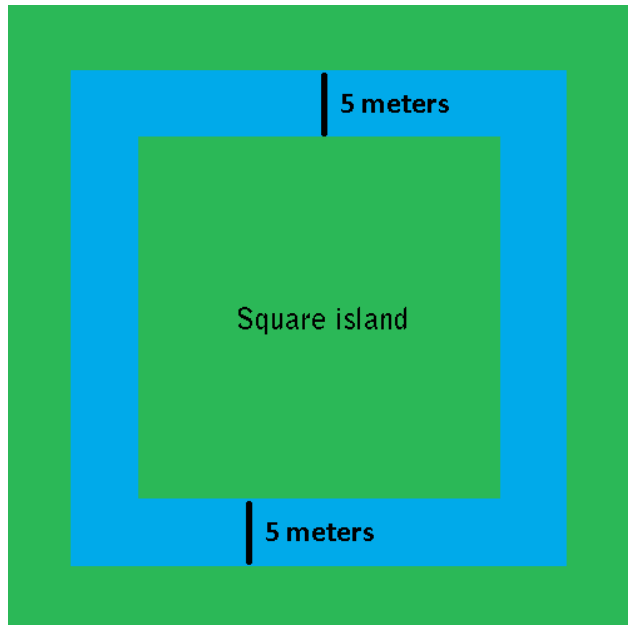
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