

De Vonk

Year 42 | Edition 1 | July 2024





SKIC Camp

VINUM

Scinterklaas

Christmas Dinner

Presidential note

Author: Jelte Martens

Hello everyone,

The sun is shining again, the sky is blue, and the mobitap is back in use; all signs point to it being summer again and with summer comes of course the inevitable end of the year. That also means the final stretch of my board year, and my very last presidential note. Such approaching endings tend to make me a bit melancholic, so I thought it best to look back a bit on what has passed.

A lot of things can change within an academic year. Naturally the things related to your study change. You might have finished your bachelor's, gotten your BSA, or achieved anywhere between 1 – 60 EC. Study isn't everything though (Something EE students tend to forget), and in your personal life things tend to change as well, hopefully for the better. However what I feel can change most in a year is your outlook on things. For me at least it has definitely been a turbulent time. Starting out in September fresh faced and full of energy, I quickly

discovered that being your own boss as a board can be a lot of work. Not that I didn't enjoy it, I have learned a great many things and had opportunities that I would otherwise never have had. But now with the end in sight, almost all things there are to do done, and at least some of what there is to learn learned, the year has felt a bit like a charging RC-circuit, quickly shooting up at the start and now slowly asymptotically approaching the end.

With this end in sight, I think the biggest



change for me this year is that I have started to actually look forward again to my studies. If you had told me those months ago, when I started my board year, that I would actually look forward to resuming my studies, I would never have believed you. And that's a good thing, such a change in perspective has given me a bit of new energy. So, if I can still give some advice for the coming year, its to change some things up. Go do a board year, a student team, travel around a bit, or try something else because doing the same thing for five years straight is just boring.

In any case, this being my last presidential note, I wish you all happy holidays and good luck for the coming year.

Dames en Heren,
Op de Koningin, Op Scintilla!

Jelte Martens,
President & STORES Administrator of
the 94th board of E.T.S.V. Scintilla



Masthead

De Vonk

Periodical of E.T.S.V. Scintilla. Published once a year in the amount of 800 copies.

Year 42, Edition 1
July 2024

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ISSN 0925-5421



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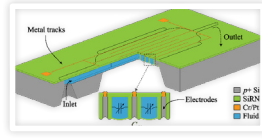
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Maarten started his PhD in 2023 and is eager to share his passion project about designing microfluidic liquid analysis sensors, while also telling some more about what doing a PhD is like.



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Editorial

Dear Vonk reader,

As this is the third yearly physical Vonk in a row, the tradition has officially started! The previous two years really helped with rediscovering the knowledge required to create such a booklet. This allowed us to focus on finding great articles, also for a large part from outside of the fairly small committee. (A big thank you to all authors!)

This large influx of articles specifically written for this Vonk also allowed us something unique in comparison to the last few years: all articles are original to this Vonk! We were planning on repurposing some articles from the website, but this led to a Vonk which was too thick.

If you are wondering what the previous editions look like, I also got good news! The digital Vonk archive is online again, this time on sofa.scintilla.utwente.nl. If you have read every article in here and still need more, I highly advise looking there as well.

This edition we again tried to make something to enjoy during the summer holiday. On one side with some great reads about or from some familiar faces, on the other hand some possible activities to try out. It's got plenty of puzzles, interesting history, and more.

Lastly, I would like to say that if at some point you're reading this Vonk and would like to contribute to the next edition, do send us a message! Our already small committee will most likely severely reduce in size next year, which means some extra hands would be greatly appreciated. For now, I wish everyone happy holidays and much reading pleasure.

See you around!
Rienk

Evaluating Evaluation

Author: Alfonso Capitano

Imagine you're done with your module: you can finally relax after handing in your project report, did your final resit and now, leaving it up to fate, you're able to move on. You then receive an email asking you to fill out an evaluation form. The Student Evaluation Questionnaire or SEQ for short. As it turns out, the overall percentage of students filling out these forms is extremely low; sadly making the SEQ an unreliable source of information to truly evaluate the courses.

This year, among other points of focus, Scintilla's Taskforce for University Developments and Improvements (STUDI) made it their main goal to increase the reliability for evaluations of courses within the Bachelor of Electrical Engineering (EE).

What is the SEQ exactly

Taken from the university website, the SEQ is described as follows: "The Student Evaluation Questionnaire (SEQ) is being carried out by the Quality Enhancement Support Team (QUEST) of the Centre of Expertise in Learning and Teaching (CELT) of the University of Twente. In close contact with the Quality Assurance departments of the faculties a schedule of modules to be evaluated each quartile is set up. QUEST is responsible for the dissemination of the survey and reporting of results. The SEQ is a standardized questionnaire which allows for comparison of modules within and across study programmes."

Representation

To draw conclusions that make sense for a course, a set of participants large enough to represent a significant portion of the students, or large enough such that a normal distribution is formed, is

needed. Bachelor modules in EE boast on average a hundred participants. This way, for enough participants, a standard distribution should start to form; for instance, when you're plotting a course grade. These statistics can then be correlated to answers people would give to open ended questions or followed up by the faculty's Educational Quality Committee (EQC).

"Big talk, but does implementing this change mean there's actual improvement? The answer is yes!"

The issue is that, for the SEQ, the participant rate has been declining over the years. It certainly does not help that, questions can be added, but not removed from the questionnaire, making a lot of the contents questionable with respect to their relevancy.

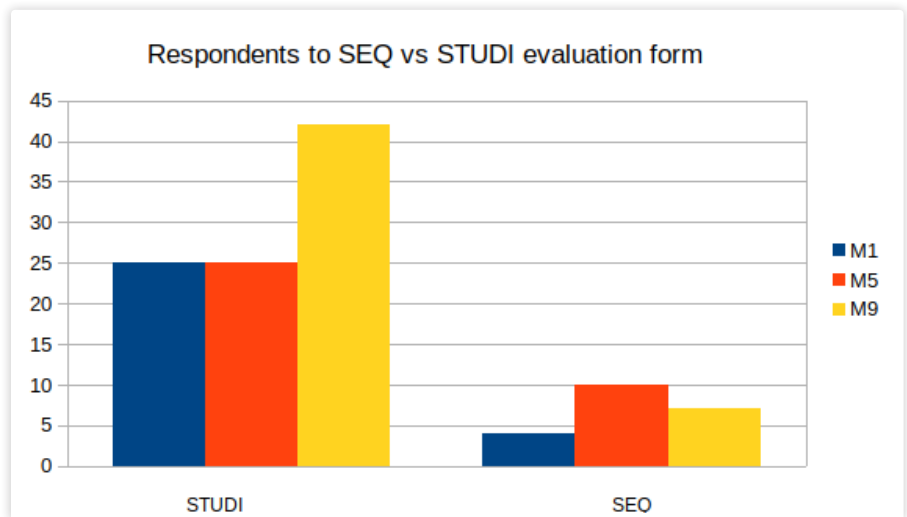
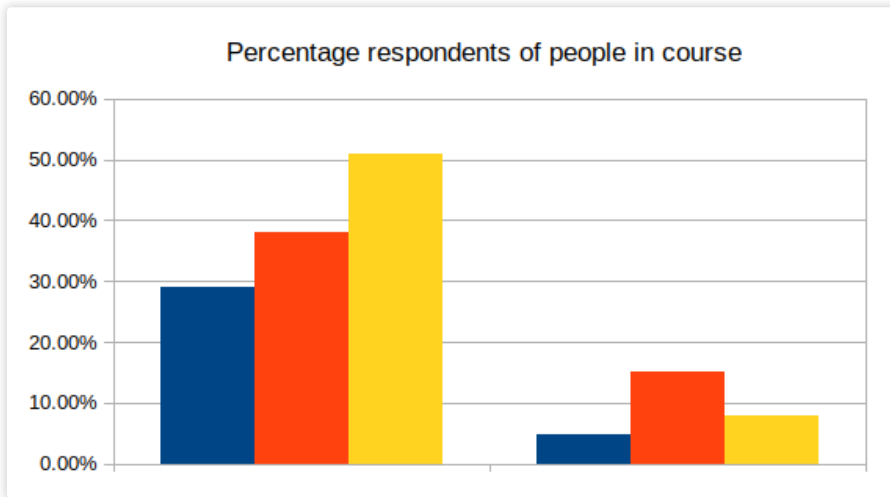


STUDI evaluation forms

This is where we as Scintilla come in: Following the evaluation forms used by dr.ir. A.J. Annema's in spirit, forms were made to be handed out and filled in during classes. All the data was then put



"Ideëen bus"



Results

into an excel file, after which the forms were destroyed in Scintilla's "Idëëën bus" to ensure anonymity. From this, a decent statistical approximation for the course evaluation can be made. A point of attention from a lot of the students that did not want to fill in the SEQ was that "it took too long to fill it in"; something we've tried to improve with the resulting one double-sided page long form. The questions on the form are also directly about the course, instead of general questions.

Big talk, but does implementing this change mean there's actual improvement? The answer is yes! As you can see in the charts, the response rate for the STUDI form is a significant improvement to that of the SEQ. Of course this is not the only thing that happened this year, so if you're interested be sure to ask me about other projects we have running! We from Scintilla strive to try and improve conditions for both Bachelor and Master students of EE and I will see a lot of you next year.

If you have your own ideas on how to improve Electrical Engineering at the UT, or if you feel inspired in making a change for the study, email us at: STUDI@scintilla.utwente.nl. We also organize STUDI-nights regularly during or before exam weeks! If you're looking to study with your peers, with dinner and often with Teaching Assistants, be sure to check Canvas or the calendar for when the next one is being organized.

Meet the Kandi's

Author: candidates for the 95th board

Our candidate board consists of only three people, which is fewer people than the normal five or six board members. Nevertheless we have every intention to make sure that next year will be a great year. We have a lot of work ahead of us but as a strong and united board we will push through this. The three of us are all part of the Elco do-group, therefore we already have this close relationship. We hope to have a great time with you and other members of our amazing association.

In constitutional order, our first candidate board member is Nathan Roussel. Nathan is French, which would make him the first international board member. He also likes to solve Rubik's cubes in his spare time. He is the candidate President, which entails keeping good coherence within the board and being the face of Scintilla. He is also the candidate commissioner of Internal Affairs, which means he will be the go-to person for events within Scintilla.

Secondly, we have Jannes Thomas Koopmans. Jannes likes to play volleyball and make excuses for not running. He is the candidate Secretary and will be who you are probably going to be mailing. He will always have a pen on him, handy for jotting things down. As well as this, he will be the STORES Administrator. This will make him responsible for the STORES finances.

Last but not least, we have Reinder Hedema who is the candidate Treasurer. In his free time he likes to play guitar and hangout with friends while enjoying a beer. Although 95 is his favourite number, he will have to like all the numbers and manage the entirety of Scintilla's finances. Reinder will also take on the function of keeping SWIPED stocked, making sure you always have access to your favourite snacks.

Unfortunately, not all functions were able to be distributed. This means that some of these functions will have to partially be filled up by our lovely previous board members and assisting committees, which will be overseen by us. We hope to see you around in the Scintilla Room or around at Scintilla activities! Enjoy what is left of the year and we will see you after the summer break.



f.l.t.r. Jannes, Nathan, Reinder

A shoutout to Scintilla's little companions

Author: Rick Ruitenbeek

We, as students at the university, often see each other on campus, in the Scintilla room or at other places here in Enschede. But some of us have other close friends that are not seen in the lecture halls. In fact: they are not even allowed in the lecture halls. Of course I am talking about our pets! For this reason, the editorial team of De Vonk has asked our readers to tell all about what makes their pets special, such that the rest can learn everything about their little companions that we don't see every day.

Name: *Finn*

Kind of animal: *Dog*

Owner: *Hidde Laagland*

Fun fact: *He is Turkish and loves to be carried.*

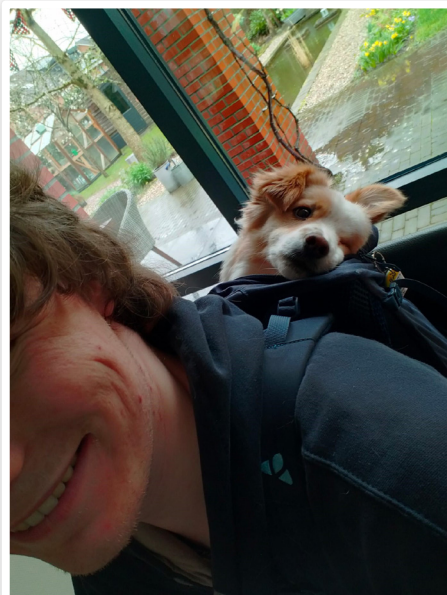
Likes: *Attention.*

Dislikes: *Fireworks and not being near his older sister Lobke.*

Hobbies: *Begging for attention.*

The biggest trouble he's caused: *Pooping in the house during New Year's Eve.*

Another fun fact: *He is a pirate.*



Names: *Liz and Nel (or Lizzy and Nelly)*

Kind of animal: *Kittens*

Owner: *Bart Schuurman*

Age: *<1 year.*

Fun facts: *Nel can open doors and do backflips against a wall. Liz will wake you up in the middle of the night by climbing into curtains.*

How they got their names: *Nel comes from the craft beer "Mooie Nel" and Liz comes from "Elizabeth", a character from the TV series the Blacklist*

Favourite toy: *Laser or sunlight reflected from watches or mobile phones.*

Favourite colour: *They are colourblind.*

Fun anecdote: *Nel will be the first to explore new environments. Liz will be the first to devour anything that looks like food.*

Crocheting

Author: Pauline Lettinga

Hello dear Vonk reader,

As some of you may know, one of my hobbies is crochet. You can see me crocheting during lectures or meetings or most often while binging away shows on Netflix.

I first learned to knit (which is a very different thing, using two knitting needles instead of a crochet hook) during primary school. My grandma and aunt knitted a lot, my aunt even gave me a knitting pattern subscription for my birthday once where she would send me a cute pattern to make every month. During the second part of secondary school, I spend less time knitting, but when corona hit when I was at University I started again to pass the time and later went on to crochet as I wanted to make some stuffed animals, which in my opinion is easier to crochet than knit. My point with this story is: crochet is a fun hobby, which you should try too!

As you might have guessed, this article is here to teach you how to crochet. To really get you to try it, I have found a pattern which even combines it with Electrical Engineering. You can make your own resistor with your favorite value. This example is obviously for my favorite resistor value 92Ω .

What you will need:

- A crochet hook (preferably matching the needed size of your yarn)
 - Yarn in the colors you want to use (since the project is really small, you do not need much)
- (although the thickness of the yarn does

not matter for this project (it will just make it bigger or smaller) try to have all colors in roughly the same yarn to get the most clean result)

- Stuffing (if you do not have proper stuffing, the insides of an old pillow or some ripped old clothing will work)
- Scissors
- Needle
- Some patience (the beginning can be a bit frustrating, but trust me, if you give it a proper chance it is really relaxing and fun to be able to make things.

In order to make the resistor (and most projects like these) you need to know a couple stitches and their abbreviations.



Due to the limited space I have, I will not go into depth on the stitches themselves, but looking them up online gives many pictures or video examples for you to follow.

The stitches are:

MR: magic ring

ch: chain

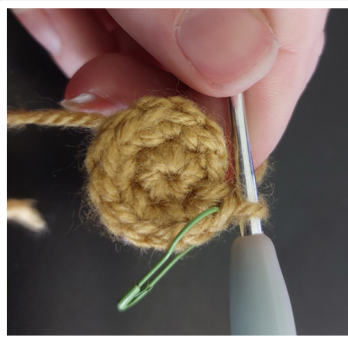
sc: single crochet

Inc: (increase) 2 sc in one stitch

Dec: (decrease) Insert hook into next stitch, pull up a loop. Repeat the first step, pull through all three loops on hook



a completed resistor with a value 92Ω



The first few stitches including a stitch marker

The number between brackets after each round is the number of stitches you should have after that round. One stitch is one “v”. It can help you keep track of rounds and stitches by inserting a stitch marker (or just a piece of yarn or something) in the first stitch of every round.

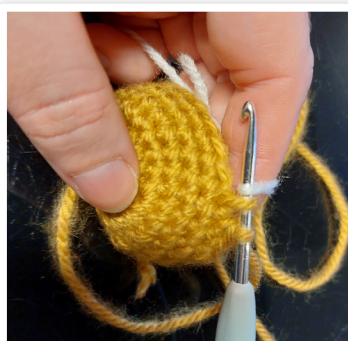
Round 1: MR 6 (6)

Round 2: Inc 6 (12)

Round 3: Inc 12 (24)

Rounds 4-7: Sc around (24)

Now it is time for our first color change. You have practiced the single crochet quite a bit, so I believe in you. So with the Sc you wrap your yarn around your hook a total of two times right? What you are going to do is insert your hook normally, wrap your base color around the hook and pull through. Now grab your new color, wrap around the hook and pull through all loops. Now you can keep Sc as normal with the new color!



The start of the round with a new colour (round 8-9)

Rounds 8-9: Sc around with new color (24)

Did that go okay? I hope so, because we are going to do something new and exciting again. Row 10 will again be in the first color, so make sure you switch again in the same manner as before.

Round 10:

(Sc 1, dec) 8 times around (16)

Round 11: Sc around (16)

Rounds 12-13:

Sc around with a new color (16)

Rounds 14-15:

Sc around with the base color (16)

Rounds 16-17:

Sc around with a new color (16)

“Although the fiber arts are more of a winter hobby, it is just a lot of fun and can definitely be done in the summer as well.”

Round 18:

Sc around with the base color (16)

Round 19:

(Sc 1, inc) 8 times around (24)

Round 20-21:

Sc around with a new color (24)

Rounds 22-25:

Sc around with base color (24)

Round 26: Dec around (12)

Now it is time to stuff your creation. I like to stuff my projects quite firmly so they keep their shape better. Try to move the stuffing around a bit to get your resistor in the right shape.

Round 27: Dec around (6)

Now you are going to close the hole by cutting the yarn and threading that through the remaining stitches with a

needle and pulling it closed. Depending how adventurous you still feel, you can make a simple loop with yarn at the end of your resistor to be able to hang it somewhere. If you are confident you can make a cord of 20 chains.

Make sure your ends are all neatly tucked into your work, and don't forget to send a picture of your creation to everyone you know (especially your mother or grandma).



Top view of the finished resistor

If by now you feel inspired to make more. The internet has many patterns for you to make. I like ravelry.com for the nice filters you can use when searching for items, or Pinterest. Hit me up for some Pokémon patterns, but beware, those are more difficult than the one you have just completed.

Although the fiber arts are more of a winter hobby, it is just a lot of fun and can definitely be done in summer as well. If you get stuck, I would love to help, so just reach out! I cannot wait to see all your creations!

Do you want to share this or another crochet (or other) creation? Let us know at: vonkkopij@scintilla.utwente.nl Maybe your submission might be featured in an online vonk article.

Programme Connection Wind At Sea (PAWOZ)

Author: Joost Kerpels



Electrical Engineering

What exactly does the PAWOZ project entail?

Robin Gerrets (design lead): A large wind farm is being built above the Wadden Islands. This energy (both 2 to 10 GW of electricity and a hydrogen pipeline) needs to be transmitted to shore. The corresponding cables can be buried in the sea bed, but because the Wadden Sea is very shallow, a waterway with a width of a football field must first be dredged to allow access to a cable-laying vessel. Because the cables pass through a sensitive (Natura 2000) area, we have also worked out a variant with Royal HaskoningDHV in which the cables are laid in bored tunnels beneath the sea bed. These tunnels must have a length of as much as 27 kilometres.

What part did Witteveen+Bos play in this project?

Robin: The idea is that hardly ever anyone needs to enter the tunnels. Therefore, you want to avoid having many systems in the tunnel that require occasional maintenance. We researched how to minimise the number of systems while handling the heat produced by the cables and how to minimise the risks in terms of short circuits and electromagnetic interference. But we also looked at the overall maintenance concept and the method of construction: how do you get a 27-kilometre-long cable into a tunnel?

What are the electrical engineering challenges?

Isabelle Vlasman (lead electrical engineering assets): In electrical engineering, it is important to carefully consider the consequences of short circuits, electromagnetic interference (EMC) and earthing.

What are the risks in terms of short circuits?

Isabelle: A short circuit creates an unwanted connection between the conductor of a cable and surrounding earth screen. This may cause a sudden current flow directly to earth along a path with very low resistance. As a result, the current becomes very large, releasing a lot of heat and creating a plasma channel of ionised gas between the live part (525 kV DC) and the earth. This is called an electric arc. The energy released can be significant. So significant, in fact, that temperatures of tens of thousands of degrees can occur, metals will vaporise and expand, and both shock waves and pressure waves can occur that can compromise the tunnel. A realistic worst case scenario for this, however, is difficult to determine. There is much less familiarity with HVDC than with HVAC and, in addition, there are other factors that make the PAWOZ situation different from usual. In collaboration with KEMA (Keuring van Elektrotechnische Materialen Arnhem, Dutch inspection



and certification body), we are currently conducting research into this and trying to estimate the consequences.

What was this project like for you?

Isabelle: For me, the biggest challenge was to conduct research within a very short period of time on a topic with which there is not much experience. We had to make the right choices in what was essential in order to draw an initial conclusion. For me, the best thing about this project was that we could really pioneer and hopefully make a significant contribution to a greener future, where a huge amount of sustainably generated power can be transmitted to shore without disturbing the ecology of the Wadden Sea.

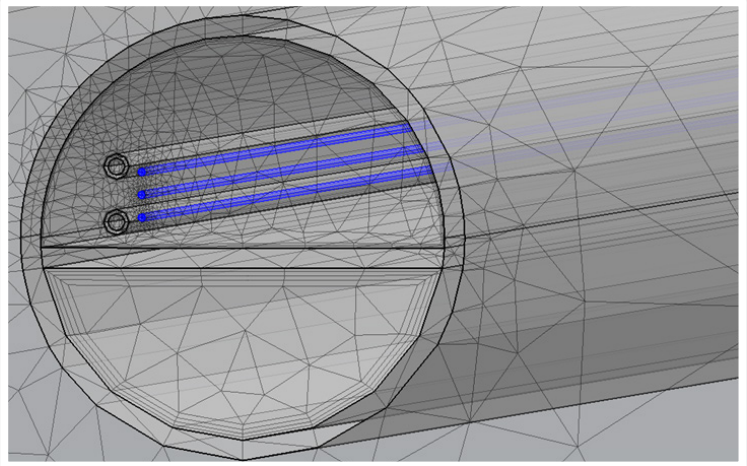
Heat Generation

What about the temperature in the tunnel?

Rajiv Kapildewsing (cooling systems project engineer): Each set of cables transmits about 2 GW of power. The loss in the cables is approximately 1%, and all that loss results in heat. In other words, one set of cables is responsible for generating some 2 MW of heat. The surface temperature of the cables themselves may not exceed 80 degrees Celsius. So cooling is required to keep both the tunnel and the cables in operational temperature.

How can you achieve that in such a tunnel?

Rajiv: We have considered various concepts. We first looked whether ventilation could provide adequate cooling. We assessed this by using calculation models we normally use for the design of (road) tunnels. However, with a 27-kilometre-long tunnel, it is very difficult to achieve sufficient airflow along its entire length without excessive pressure differences. This proved inadequate for the types of cables selected. A variant involving additional water cooling was then worked out.



Finite element model. The cables are shown in blue, with the cooling water pipes next to them.

How was this calculated?

Rajiv: We performed a finite element calculation (in Comsol) containing the model of the tunnel, the components of the tunnel and the environment (the ground around the tunnel). We used this to determine that heat generation can be contained with ventilation combined with water cooling. What is special about this is that this was a new challenge with much left to explore.

“Luckily, engineering is people’s work, and interactions between specialists are truly meaningful and fun!”

Installation Concept

Why isn’t it possible to just pull a cable through the tunnel?

Teun de Smalen (project engineer): Ideally, you want the cable to be delivered as a single 27-kilometre piece. This in itself is not new – just think of submarine cables. However, at 70 kg per metre, such a long cable is very large and heavy. One of the challenges is inserting the cable into the tunnel. For starters, the

force to be delivered or the reduction in friction must be sufficient to pull the cable in. Secondly, the cable itself must not be damaged under the required pulling force. To solve this, two concepts were devised to insert the cable: a monorail system and curtain rail system.

Can you explain the monorail system?

Teun: with the monorail system, a guide rail is placed throughout the tunnel and extends outside the tunnel. Modules then ‘ride’ over this monorail to support the cable during insertion. This ensures the modules have little rolling friction, so no large pulling force is required to move the modules forward. This concept was already used for the canal tunnel.

Electromagnetic compatibility

What role do electromagnetic fields play in a high-voltage system?

Jelle Tams (project engineer EMC): Strong electromagnetic fields are created around high-voltage cables due to the high currents. When these fields have a frequency higher than 0 Hz, according to Faraday’s law, this creates an electromagnetic coupling with metallic structures in the environment, specifically earth mantles, earth conductors,

metal pipes and other conducting structures. Thereby, the following applies: the higher the frequency, the stronger this inductive coupling. The consequence of this coupling is that it induces a voltage in conductive structures that can be undesirable and very dangerous. This may result in serious shock hazard to persons.

Even though within PAWOZ, it concerns HVDC cables, higher harmonics are still present. This is due to the rectifiers that generate the HVDC voltage.

What makes this project unique to you?

Jelle: It is a very challenging project, which requires modelling the effects of electromagnetic fields with multiple frequency components. The complexity is further increased, as different pipes and conductors are interconnected through the earthing network and thus also affect each other. It is pioneering between technology and regulations. Since the standards are written for an AC system with only a 50 Hz component, in addition to modelling and calculation, careful consideration had to be given to which situations are actually safe or unsafe.

Safety and Maintenance

How do you ensure a safe tunnel with low maintenance?

Floris Kool (project engineer safety): Maintenance in a 27-km-long tunnel with only cables and pipelines requires a different approach. The tunnel, cable and pipelines require almost no regular maintenance other than periodic inspections. Installing systems such as lighting and a power supply would greatly increase maintenance demand. Therefore, the choice was made not to install systems in the tunnel tubes and to design everything low-maintenance. Inspections are performed remotely, virtually eliminating the need for staff to enter the tunnel.

I have been researching how to safely apply this maintenance concept. Staff will enter the tunnel in a vehicle yet to be designed. This vehicle must be self-reliant in a tunnel that has no lighting and is inaccessible to emergency services. I worked out the safety concept and drafted the functional requirements for a maintenance vehicle. For instance, the maintenance vehicle will have an escape module that will allow staff to escape in case of a fire on the vehicle.

What was this project like for you?

Floris: It is an interesting combination of the technical complexity and the complexity of the different organisations working together (such as TenneT and Gasunie). Since there is a clear need, such a unique solution as this can be developed with project partners who all have their own way of working.

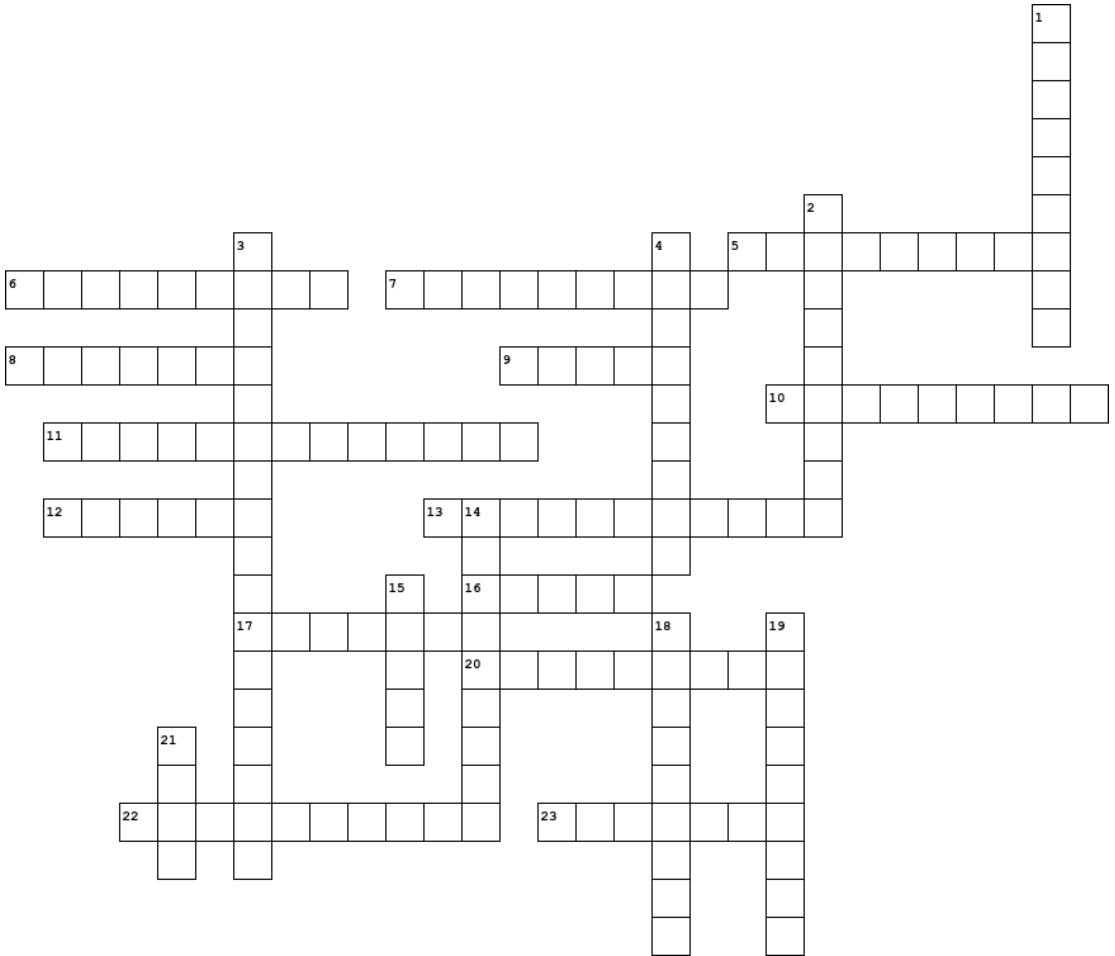
Conclusion

Collaboration between different disciplines, both internally at Witteveen+Bos and with clients, is paramount. Luckily, engineering is people's work, and interactions between specialists are truly meaningful and fun! At the same time, we are making a tangible contribution to the energy transition.

*Would you like to know more about this project or other Witteveen+Bos energy projects? Contact me or one of my colleagues.
www.witteveenbos.com > career*



Crossword



Across

- 5. Short-lived electrical event.
- 6. Real and imaginary.
- 7. Signal booster.
- 8. Electrical potential in motion.
- 9. One-way street for electrons.
- 10. Circuit laws namesake.
- 11. Magnetism by current.
- 12. Conductivity toggler.
- 13. Voltage shape-shifter.
- 16. Current-blocking coil.
- 17. Electron's journey loop.
- 20. Electricity's no-entry sign.
- 22. Signal wiggler.
- 23. Power consumption measure.

Down

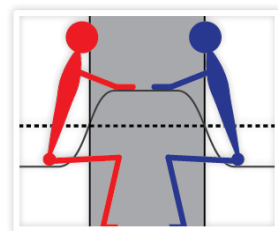
- 1. Electricity's smooth highway.
- 2. Charge stasher.
- 3. Microscopic circuit city.
- 4. Power creator.
- 14. Current direction controller.
- 15. Sudden electrical surge.
- 18. Attraction and repulsion force.
- 19. Wave's repetition rate.
- 21. Overcurrent protector.

*Do you think you have the correct answers? Let us know at:
vonkkopij@scintilla.utwente.nl!
You might win a price!*

Junction Mathieu Odijk

Author: Wouter Nijenhuis

Mathieu Odijk is professor at the BIOS Lab-on-a-Chip research chair and has been very involved in the education of the bachelor Electrical Engineering. The Vonk met up with him to ask him some questions so we can all get to know him a bit more!



How did you come to study Electrical Engineering?

At the end of high school you were supposed to choose a study and I was trying to decide if I wanted to become a theater technician. My physics teacher at that time said to me that I was going to bore myself doing that and that I should not do it. I also had a granddad, who never had the possibility to study because there was just no money for it. He worked as an electrical technician in the port of Rotterdam. Because he had no education on that subject he had taught everything himself. Later when I was in my third year of study I took some devices he made apart and tried to reverse-engineer them. I have to say those were no simple machines, even with my knowledge from the study I really had to do my best to grasp how all the transistor circuits worked. In primary school he already gave me electronic hobby kits for me to build with. So, he was one of the inspirations to start Electrical Engineering. I was also looking into doing chemistry since my father was a chemistry teacher. If you look at where I am now you could say I have not really made a choice, while I started with electrical engineering I am involved in both worlds.

How did you end up at the University of Twente?

My brother studied in Delft and with his stories and my personal feeling it was not a location I liked. When I went looking here it was very nice weather and at the student housing immediately everyone was sitting outside with couches from the living room. It almost felt like a Centerparcs but only with students. But the most important reason for going to Twente was the “Drienerlose Pop Or-

“From doing a lot next to my studies I have learned a lot, it is not all about the knowledge you gain from your subject but also about all the knowledge you gain from doing projects your enthusiastic about.”

ganisatie” (DPO). DPO was the music venue of the UT like the Metropool in Hengelo. They organized concerts like Krezip and Sting. One time even “Doe Maar” started their revival tour with them in Enschede.

You were active at DPO, did you do more next to your studies?

I was active at DPOs kind of employment agency called “Enschede Ploeg”. It consisted of people who thought it was fun to do more with building stages and setting up sound installations. They called up to MOJO concerts and asked if they needed any people for helping setting up and so a group of about 150 people came about who went all over the Netherlands to help at building up concerts. So, eventually I was becoming a bit of a theater technician still. Sadly your generation has a much higher pressure to graduate due to the lack of study funds but luckily I did not have that yet. Eventually I was working more at concerts than I was studying. Say 120 days out of the year you could find me in Ahoy, Goffertpark or GelreDome. This was not that sensible and studying was not going that fast.

How long were you studying for eventually?

Well as you could hear I did not do it in 5 years, it was 7.5 years. But I really learned a lot of doing this next to my studies. You can imagine that if you arrived at an event with a big group of

people that you should learn how to coordinate with everyone. At festivals you often got a vague task and getting that done in time was a sort of project management. But eventually I thought it was enough so I put Enschede Ploeg on the back burner and started focusing on my studies. So while I first studied subnominal, in the last two years of my study you could say I did overnominal.

Which subject did you choose to graduate in?

In the old education system you had to choose a minor and a major. For the minor I got a teacher degree, which I would say was not really a minor. It felt like the full teacher education which again costs a lot of time. For my major I studied Biomedical Technology, which was not yet a separate study. I got the course Biomedical Signal Acquisition from Wouter Olthuis and he was so enthusiastically giving the course that I followed him to BIOS and graduated there. He was so enthusiastic that I am even still here!

Have you always been part of BIOS after graduation, or have you gone somewhere else in the meantime?

Well, my education was not always going that well so I thought I needed to leave the university as soon as I graduated. So for my internship I went to IMEC in Belgium and for the first time I was doing some real research on making organic solar cells. The research did not really work out, but now we have OLEDs which are technically the same things. For the first time I was very motivated to work for something I liked and they even asked me to do a PhD over there but I did not accept that. I came back to BIOS for my thesis and I again found that I liked figuring some-



Prof. Dr. Ir. Mathieu Odijk

Age	43
Favourite food	Deserts
Work music	Rock & Metal
Best Electronics	Tesla Coil

thing out down to its core and having theories that you could apply to real life situations. Then Wouter Olthuis also asked if I wanted to do a PhD. So I got the question two times and thought: maybe I need to reconsider doing a PhD. After some solicitations at companies I chose for the PhD. During my post-doc I did several extended research visits abroad, but always returned to the UT.

Where should students know you from?

Together with Cora I am still the module coordinator of module 1. I set up the sensors project and the final project. I also teach a bit in the MATLAB course. Jorien is now responsible for it but I also did the plagiarism sessions for a long time. Of course I have a role in the lab-on-a-chip minor module. In the Masters Micro Sensors and Systems (MSS) track

I do some more courses and I teach quite a bit in the Nanotechnology program. For example the Nanotechnology Design Project.

Since the first interaction with you for a lot of students is during the plagiarism course. How do you view you are seen as a strict lecturer for that course?

Someone has to do it of course. And I find it very good that we are very strict in those sessions. At some other master level studies you may have one out of three reports that just light up red when they go through Ephorus [a plagiarism checking software]. Those students have just never had a Mathieu that has been strict in their first year and they have been getting away with it for too long. I mean, in your bachelor and even in your masters you will be supervised and it is not the biggest of problems but one time even a PhD student wanted to send a paper and it was full of plagiarism and if that goes through with the UT affiliation on it, it sheds a very bad light of

course. Because these things still happen I think it is very good to still be very strict during those session in the first year.

What is your take on plagiarism now with the rise of AI tools?

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Mathieu working at Lowlands for the offspring

You have been very involved in the education of Electrical Engineering as chair of the EOC and the reform of the bachelor in the last years. What moved you to also pick up these challenges?

I first was the module coordinator of the IEEE module 1 and I saw that we had to renew the curriculum to more connect with the rest of the bachelor and other courses. Next to that the pandemic started and with that we had to revamp the whole module anyway. We already had the idea to put the themes of module 1 and 2 together and spread them over a half year. But we still saw that the first module, which needed to be a kind of introduction to the whole of EE, was still too full of subjects. So we put the focus on Electrical Sensors and Actuators (ESA).

The course was totally not COVID proof since it mainly consisted of tinkering in the Westzaal on the project. So, in a short time we developed the module ESA and made the project fully modular in a way that everyone could make the components on their own and hand them off to someone else which could add their part of the project. And with the Analog Discovery you could do everything at home. Even with everyone sitting at home, which were not the most fun times, there are still some very nice videos of people that present their rotary displays or strong man games from their bedroom on Teams. After that we started to also integrate module 3 and 4 to make the first year almost one coherent part.

The Lab-on-a-Chip group is not always directly seen as an Electrical Engineering discipline. How would you explain to a first-years that it truly is?

What defines an Electrical Engineer is that they are very good at designing things. We are very good at breaking systems down in their respective building blocks. We are trained in looking at specifications and building a concept and after that troubleshooting and analyzing what is needed more. What we do at BIOS is we develop a lot of physical systems where this is needed. Next to that we work with flows and while it is not with electrons, it is with liquids. And Ohms law is also applicable here in that situation. The system can be analyzed with a potential, or pressure, and with a flow, or current. The Nernst-Planck equation, that people may know from device physics, can also be used to look at how molecules move to electrodes in electrochemical processes. After those electrodes we are back to our very safe electrical circuits that we know and love. So, we can make systems that behave perfectly like the electrical equations but we use a water molecule instead of an electron. These systems also need to be made, and we do that in the clean room. These manufacturing processes are also an essential part of electrical engineering. It does not really matter if you make a solar diode or MEMS in silicon, or these systems in other materials.

I like that this discipline is very broad and that I don't really need to choose for a very specific subject. One day I am looking at some electrochemical processes the other day you look at organs in a chip to minimize animal testing or we can see how we can capture carbon. In that way we are trying to solve current global problems with an engineering mindset.

If you look back at the research you have been involved with, what is a subject you are still very passionate about?

There are a lot but if I have to choose, I have to look at projects that are very busy with trying to solve issues we have now with the changing climate. I am a bit worried about how everything is going now with the predictions saying that we will go above the earlier predicted global warming, and we practically only have two years left of CO₂ emissions before we reach the cap for CO₂. We all know we will not stop after these two years. This means that if we go above that cap we also need to think about negative emission technologies to bring back the CO₂ levels to what we think is manageable. I am not saying that we do not need to stop with emitting greenhouse gasses, we need to do both. On one hand stop with the emissions because even if we stop now we still need to get some CO₂ out of the atmosphere more quickly than we can do now.

The technology we are working on now is 'enhanced weathering' of olivine. This mineral is present in the same abundance as sand and if it reacts with CO₂ you can use the output in making concrete. You can use two thirds less sand and use this instead and you can store CO₂ permanently in the concrete. At BIOS we are looking at how the reaction of CO₂ and olivine goes and how we can improve it. During the reaction a passivation layer of a sort of glass forms on the outside of a clump of olivine and we want to get rid of it. One of our solutions is to look at using supercritical CO₂ where it behaves as a liquid and a gas simultaneously. The CO₂ has to be brought to a high pressure and higher temperature and that can be safely done in micro-reactors. Because we use these micro-reactors the costs of doing experiments is going down significantly

and observing the reaction during the process is also much easier than using full-scale reactors.

What are hobbies you like to do in your free time?

I am very fond of top rope climbing and next to that I like cycling. I do road cycling but I am more fond of the mountain bike. On the mountain bike you are forced to empty your mind because if you are distracted you could crash hard against a tree. I can recommend doing the Haaksbergen Trail just to the south of Enschede, and there are a lot more a little farther away at Lochem or Rijssen but then you have a half-day trip if you want to do those.

What is an advice you would like to give students?

I mostly want to say you have to enjoy the student life around all the studying. I was in the fortunate position to have had less pressure in having to graduate since I had student grants from the government for seven years of my study, and the costs of a student room was not that high yet. From doing a lot next to my studies I have learned a lot, it is not all about the knowledge you gain from your subject but also about all the knowledge you gain from doing projects your enthusiastic about. So if you are able to do it, take a year in the Super Bike or Solar Boat Team. Or become active in a sport or study association. All these available opportunities are also what makes it so special to study in Twente. The memories you make in those situations stay with you a lot more than those you make during the lectures which go in one ear and directly come out the other.

A shoutout to Scintilla's little companions

Author: Rick Ruitenbeek

We, as students at the university, often see each other on campus, in the Scintilla room or at other places here in Enschede. But some of us have other close friends that are not seen in the lecture halls. In fact: they are not even allowed in the lecture halls. Of course I am talking about our pets! For this reason, the editorial team of De Vonk has asked our readers to tell all about what makes their pets special, such that the rest can learn everything about their little companions that we don't see every day.

Name: *Laro*

Kind of animal: *A red cat*

Owner: *Pauline Lettinga*

Age: *15, I think?*

Fun fact: *He has his own kids seat next to the couch, which is one of his favourite spots.*

How he got his name: *We couldn't think of anything, then my dad suggested Laro, which we liked. He later explained its short for Land Rover, which is his favourite car brand.*

How you two met: *Marktplaats.*

Likes: *Sleeping on people, preferably as inconvenient as possible.*

Favourite toy: *He doesn't play or hunt that much anymore, but it used to be half-dead mice or birds. He would not kill them immediately since them trying to run away and then catching them again was too much fun.*



Name: *Lobke*

Kind of animal: *Dog*

Owner: *Hidde Laagland*

Fun fact: *She dislikes bread.*

Likes: *Walking.*

Dislikes: *Being carried.*

Favourite food: *Sausage.*

Hobbies: *Sneaking onto the couch when we aren't looking.*

Fun anecdote: *She is the happiest when you come home; she takes you by your hand to the carpet so she can lay on her back.*

the SUN



COGITO ERGO SUN

Laatste Nederlandstalige communicatiemiddel van E.T.S.V. Scintilla, rots in de branding

REDACTIONEEL

Beste lezer,

Wij onderbreken uw reguliere Vonk-leeservaring met een kakelverse uitgave van de SUN! Daarom zijn de komende pagina's niet alleen uitzonderlijk in lay-out (want dat scheelt de Vonkredactie weer wat werk), maar ze zijn ook uitzonderlijk in taalgebruik! Deze SUN is geschreven in de voertaal van ons Vaderland. Nu kan ik de reden daarvoor uitleggen d.m.v. een anekdote over onze superioriteit over de Angelsaksen, maar ik kan u ook wijzen op het vaandel van dit artikel.

We begrijpen dat niet elke Vonklezer de Nederlandse taal volledig beheerst, maar gelukkig is het nu zomervakantie, en de vakantie is een ideale tijd om nieuwe hobbies te proberen, zoals een nieuwe taal leren! Om u alvast op weg te helpen heeft de redactie speciaal voor u een spoedcursus Nederlands voorbereid! Klaar? Daar gaan we! "Beer is tasty" = "Bier is lekker", "Thank you bartenders!" = "Tappers bedankt!", and for the rest you can ask ChatGPT.

Afijn, nu alle gekkigheid voorbij is kunnen we terugkeren naar ons gebruikelijke programma. Normaliter

vieren wij met elke SUN dat het vrijdag is en dat het een goede reden is om bier te drinken, maar het bijzondere aan deze SUN is dat deze voor de verandering niet daggebonden is. Maar de kans is groot dat u deze Vonk/SUN tijdens de zomervakantie leest, en gelukkig is elke vakantiedag een goede dag om bier te drinken!

Proost!

VAN HET BESTUUR

Hallo hooggewaardeerd lid,

Ook in deze speciale editie van de SUN is er een plekje vrijgelaten voor een bestuur, en dan wel voor het 94e bestuur. En, sprekend voor de gehele groep, is dit een geheel eer geweest voor ons. De kans is namelijk vrij groot dat dit het laatste stukje is namens ons. Dat mag echter de pret niet drukken, aangezien bij elk einde er ook weer iets begint. Een nieuwe fase. En zo zal dat, vanzelfsprekend, ook gelden voor jullie zeer geapprecieerde lezers. De meesten van jullie zullen het komende jaar weer nieuwe vakken, stages, onderzoeken, baantjes, en commissies opnemen met allerlei frisse, nieuwe uitdagingen. Maar, voordat we over die immense hoeveelheid arbeid beginnen te pein-

zen, kunnen we ons beter concentreren op het hier en nu. Het is namelijk zomer, tijd voor onszelf en gezelligheid (I hope you know the last word here). Dus onderneemt! Geniet van het weer en de natuur! Organiseer een reis! Of komt samen met familie en vrienden! En rust vooral lekker uit, wat uiteindelijk het allerbelangrijkste is aan die periode na een druk collegejaar.

We horen graag over al jullie verhalen bij terugkomst in de SK, tijdens de Kick-In, en/of aan het begin van het studiejaar. Ook al zullen we dan hoogstwaarschijnlijk geen huidig bestuur meer zijn.

Met warme groet,

Sjouke Spijkerman
Commissaris Externe Betrekkingen
en Vice-President

LIMERICK

Een brouwer die weizen brouwde
fijn,
Merkte op: "het klimaat moet scho-
ner zijn!"
Hij gebruikte windkracht,
Voor bier vol met pracht,
Nu smaakt elk slokje zonnenschijn.

BIERADVIES

Het is zomer! Dat betekent natuurlijk weer heerlijk op het terras met een radlertje. Dankzij deze bekende zomerse vloeibaarheid met fruitige nasmaak loopt bij velen het water in de mond. Uiterst handig natuurlijk, gezien dit meteen uitdroging door de vreselijke hitte voorkomt. Toch kan het gebeuren dat het water minder in de mond begint te lopen na 5 of 6 stuks van deze versnapering. Dit is uiteraard erg gevaarlijk, gezien dit niet alleen het risico vergroot op uitdroging, maar ook het genot laat verminderen. Gelukkig heeft de redactie hier een oplossing voor gevonden. Het is een splinternieuw concept, men schijnt het Weizen te noemen. Deze troebele rakker is bedacht door de Duitsers en is een van hun betere uitvindingen. Weizen bestaat in allerlei soorten en maten. De redactie raadt voor op het zomerse terras het Paulaner Hefe-Weißbier aan in normale grootte (0,5 l). Deze Weizen is gebrouwen volgens het Duitse Reinheitsgebot, heeft een alcoholpercentage van 5,5% en is vol van smaak. Een uitermate goede vervanging voor radler vanwege de overeenkomst in fruitige frisheid. Als hiervan het water u niet in de mond loopt kunt u het maar beter gaan drinken om uitdroging te voorkomen.

LIEVE SUNNY,

Door de geringe hoeveelheid studie in de zomer heb ik ineens tijd om na te denken over andere dingen dan “hoe de fuck werkt mobility online?” Het probleem is al-

leen, deze gedachten zijn niet zo zomers als ik had gehoopt. Het nieuws is namelijk ontzettend negatief over de staat van de wereld, met het klimaat en dergelijke. Nu vraag ik mij af wat ik zou kunnen doen om de wereld iets minder bar klote te maken tegen de tijd dat ik mijn EE-diploma heb. Kan ik het beste iets moois uitvinden wat een probleem oplost? Kan ik het beste mijn ziel verkopen aan de ING zodat ik veel geld kan doneren? Moet ik in de consultancy gaan om rijkemensenproblemen op te lossen? Het roer omgooien en als zendeling in Zimbabwe gaan werken? Of simpelweg denken “ach ik eet geen vlees ben al beter dan de gemiddelde Nederlander” en een biertje open trekken om mijn zorgen te vergeten?

Met verontruste groeten,
Klimaatpessimist

LIEVE KLIMAATPES- SIMIST,

Heel begrijpelijk dat je, nadat je je jarenlang zorgen hebt gemaakt over EC's en mobility online, gaat nadenken over de Grote Problemen. Je hebt duidelijk zelf al oplossingen bedacht, dus heb je mij nog wel nodig?

Maar goed, laten we de opties eens doornemen:

Probleemoplossende uitvindingen

Met jouw uitvinding de wereld red-den klinkt heldhaftig, bijna alsof je je eigen superheld wordt. Maar, wees voorbereid op wiskunde (je dacht na je diploma ervan af te zijn hè...), en misschien een schurk die je lab wil overnemen.

Je ziel verkopen aan de ING

Zorg in ieder geval dat je een goede rente krijgt voor die ziel van je. En een goed pensioenplan!

Consultancy voor de rijken

Wie weet? Misschien kun je ze overtuigen om hun geld in klimaatprojecten te steken. Pas wel op, want na te lang werken in deze sector word je zelf rijk, en dan heb je zelf rijkemensenproblemen...

Zending in Zimbabwe

Als je van avontuur houdt en niet bang bent voor een beetje malaria, waarom niet? Plus, denk aan de verhalen die je daarna kunt vertellen!

Een biertje opentrekken

Een dieet van lauter bier is misschien niet eens zo'n gek idee. Je vermijdt vlees, en je kan die flesjes recyclen, hoe duurzaam is dat?

Het advies van Sunny is daarom bier drinken. Het is duurzaam en vooral een stuk leuker dan je zorgen maken.

Met overbodige groet,
Sunny

WEERBERICHT

Wat voor weer zou het zijn in Den Haag? Geen idee. Veel te ver weg. Veel verder weg dan de zomer! Verwacht zomerse temperaturen van 21 juni tot 21 september, met afwisselende perioden van regen en droogte. Temperaturen variëren van -10°C tot 42°C , afhankelijk van hoe hard de klimaatverandering doorzet, en of jullie met het vliegtuig naar je vakantiebestemmingen gaan. Bestemmingen verder weg hebben vaak significant andere klimaten dan hetgeen we in de Ab-scint gewend zijn.

The Campus Carillon

You've probably passed it numerous times without thinking about it, but the grey tower on the Carillonveld has an interesting history.

Author: Johan Verzijden

History

The year 1964 marks the opening of the UT, known back then as THT (Technische Hogeschool Twente). At this opening, the mayors of the surrounding municipalities gave the university a very special gift: a tower with a carillon, designed by the famous Dutch architect Gerrit Rietveld. The 49 bells, 30 of which were named after a municipality, were hung in the top of the tower, with a cabin just below it from which the carillon could be played. Soon after the opening, the THT appointed a teacher and founded a special association for the carillon, called the Campus Beiaard Kring (Campus Carillon Circle). When nobody was playing, a computer took over to play a small chime once in a while. Around 2010, cutbacks in the culture budget brought an end to the lessons. But in 2020, the city carillonists of Oldenzaal and Enschede, Hylke Banning and Esther Schopman, decided to revive the lessons and now teach the art to students, staff members and anyone else interested. The Campus Beiaard Kring is also slowly being brought back to life, organising concerts on the Campus Carillon and excursions to other carillons.

Carillon, what is that?

A carillon (also known as 'beiaard' in Dutch) consists of at least 23 bronze bells, tuned to a chromatic scale. They most often hang in a tower and are played by hand or automatically. Its origins

lay here, in the Netherlands of the 16th century. Today, the Netherlands counts 188 carillons, the most in any country in the world. That is why most Dutch people know the instrument, while it is quite unknown in the rest of the world. To play a carillon, one moves a clapper (a cast iron ball hanging from the inside of the bell) towards the bell to strike it. These clappers are connected to a keyboard by means of steel wires, which allows you to easily strike a bell with your hands by moving a key. The lower (bigger) bells also have pedals, so you can play those with your feet.

"I have been playing the carillon on and off for almost four years now and it has been a wonderful experience."

My experience playing the carillon

I had been playing classical piano for about ten years, so I had quite an advantage when learning to play carillon. However, I still had to learn playing with my feet, which you don't do on a piano as you may know. Also very new for me is the openness of it all: when playing the piano, only people in that room or next door will hear you play. The carillon is way louder and out in the open,



meaning that a lot more people will hear you. So how do you practice then, you may ask. To prevent exposing residents of the Calslaan or the Sky to hours of bad music, we have a practice keyboard at the Vrijhof. The arrangement of the keys and pedals is identical, but moving them strikes tuned metal bars instead of bells. I have been playing the carillon on and off for almost four years now and it has been a wonderful experience. We've played Sinterklaas and Christmas songs, gave a concert during the Night of the Night (to raise awareness for light pollution) and performed with folk dancers. Last April we collaborated with Belletrix, the student managed library on campus, and we are currently planning the upcoming 60th birthday of the tower!

Do you want to know more about playing the Campus Carillon or have a look in the tower? Don't hesitate to get in contact with me at johanv@scintilla.utwente.nl. If you want to register for a trial lesson, contact our teachers at campuscarilloncircle@gmail.com or come see us at the Apollo Culture Festival during the kick-In!

The PhD: From high peaks to low valleys

Author: Maarten Bonnema

After years of studying Electrical Engineering you might be fed up with study books, scientific literature, design software, simulation software, risky experiments, drowning in the complete unknown, and especially the writing. This probably sounds extra familiar for those students whom already went through – or are in the middle of – the process of their bachelor's or master's thesis. However, there is a young group of people at the university that actually enjoy (most of) the aforementioned academic stuff: they are the PhD candidates. Who are those people, why did they opt for this, and what is it like? In this article I will make an attempt to answer these questions as clearly and concise as possible, as if it were a journal article ;). My name is Maarten Bonnema and I am currently pursuing a PhD in the field of microfluidic sensing here at the UT.



In 2022, I worked on my master's thesis in the track currently known as Micro Sensors & Systems. Working on your master's thesis gives good insight into what it is like to do research as a PhD candidate. You are working on your own research topic within a larger context of the research chair, choices regarding the planning, design, and system architecture are all up to you. The sense of freedom – and responsibility – only strongly increases once you opt for a PhD position. More than halfway through my master's thesis I was asked whether I wanted to continue working on microfluidic sensors for another four years. My choice has been a simple one: if you really enjoy what you are doing, why not continue doing so? A company based in the Achterhoek called Bronkhorst High-Tech was willing to fund the PhD position. So without looking much further, here I (still) am.

I am working on small sensors that can measure physical properties of the liquid flowing through. The sensing of liquids is essential in flow chemistry, pharmaceutical industry, and the food & beverage industries. Fluid properties can be seen as a unique fingerprint, through which we can determine what fluid is flowing through. Our sensors are

designed using the physics taught in the MEMS bachelor and master courses. We use the same techniques used to fabricate the chips in your phone, but only at a 100x times larger scale: the micrometre range. One of the advantages – and actually one of the most fun and interesting parts – is that the fabrication can therefore be done here in the

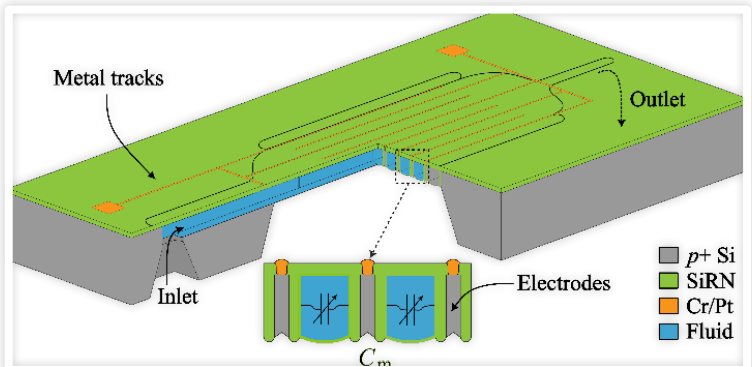


Figure 1: Drawing of a microfluidic relative permittivity sensor, designed in a highly doped silicon wafer. The ceramic material 'Si3N4' is a type of low-stress silicon nitride. Adapted from [1].

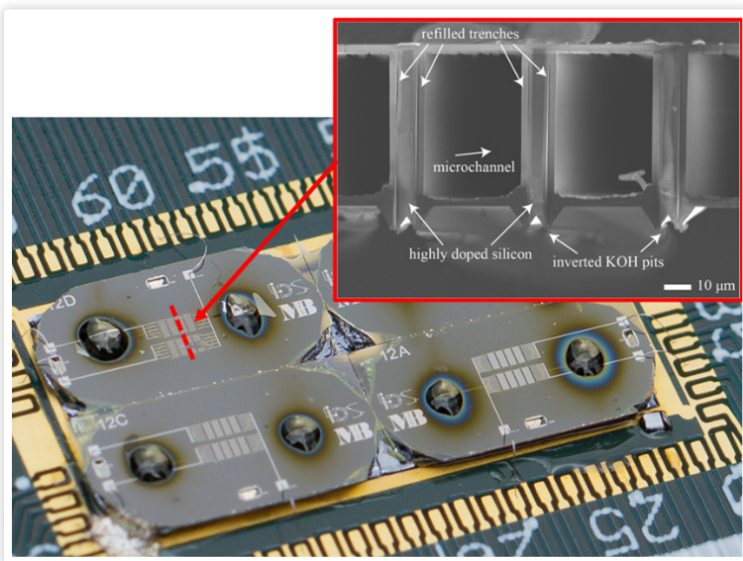


Figure 2: Photograph of the final chip, consisting of four sensors in total, mounted on a PCB. The sub-image shows a cross-section of the actual sensor. Adapted from [1].

Mesa+ cleanroom. The fluidic channels have the size of a human hair and can be electrically, thermally, and mechanically actuated. The resulting output signal is a measure of the physical property, such that the liquid can be recognised.

To give an example, Figure 1 shows a microfluidic relative permittivity sensor with channels at the surface of the sensor. It consists of an inlet at the back side, after which the fluid is divided over nine parallel channels of $40\ \mu\text{m}$ wide, before it recombines and exits the sensor again. Each microchannel is designed to mimic the behaviour of a (simple) parallel plate capacitor, yielding: $C_m = \epsilon_0 \epsilon_r A/d$.

The metal tracks on top contact the conductive silicon pillars in the sidewalls of the microchannels. The metal is patterned such that the capacitance of each channel is electrically placed in parallel, strongly increasing the capacitance of the sensor. After about three months of fabrication in the Mesa+ cleanroom, the sensor is finished and ready to be mounted on a PCB. The final sensor chip is shown in Figure 2, including a cross-sectional scanning electron microscope

image (for comparison with Figure 1).

After the fabrication stage, only the characterisation and measurement stage remain: does the sensor actually work as intended? By connecting a gain-phase analyser, we managed to measure relative permittivity values ranging from pure nitrogen gas ($\epsilon_r=1$) to pure water ($\epsilon_r=80$) within 3% accuracy of full scale.

The last – and possibly most important – aspect of academic work is spreading, communicating, and discussing your results. We submitted a conference pa-

per to the IEEE MEMS conference and were invited for a poster presentation in Austin, Texas, USA. Besides the honour to discuss your work with peers from all over the world, this also provided the opportunity for an awesome holiday. After the conference, I flew to Las Vegas from which I made a road trip along Route 66 visiting the Grand Canyon, Bryce National Park, Zion National Park, and Death Valley.

To conclude, pursuing a PhD is a highly personal choice. It is much more versatile than people might think. Some important aspects when considering one are, besides the research topic itself: your supervisors, the environment of the university or department, your PhD colleagues on the project, and the willingness to dive into the scary unknown for a few years. People who pursue a PhD enjoy the freedom and flexibility that comes with it, while coping with pressure and responsibility.

References

- [1] Bonnema M J S, Veltkamp H, Alveringh D, Wiegerink R J, Lötters J C 2024 IEEE 37th International Conference on Micro Electro Mechanical Systems (MEMS)



Figure 3: View of the Grand Canyon (South Rim) halfway towards the bottom of the canyon.

Living in the Age of Technology

Author: Rick Ruitenbeek

At the end of September 2023, the members of the seventh edition of Scintilla's Piece of Cake Committee (better known as SPOCK7) took off on a three-week study tour through all corners of South Korea. You may have already heard some tales of this study tour in the Scintilla Room or in a previous Vonk article on our website, but in this article I will tell you more about what else is to know of the events before and during the study tour "Age of Technology".



The name of the study tour committee may be deceiving, because organizing a three-week trip to the other side of the world is not an easy task, especially when you are going to visit many cultural sites and academic institutions while you are there. This is why the 92nd board of Scintilla initiated the organisation of the study tour way back in February 2022 (1,5 years before the study tour would start!) by forming the "Studiereiscommissie" (Study tour committee, SRC), which is tasked with choosing a destination, finding qua-

lified participants (a.k.a. members of "SPOCK") and establishing the organisational structure of the study tour.

But how do you organise a study tour? This task may seem simple: buy plane tickets, book some hotels and knock on the doors of some universities and temples. But if you have 1,5 years to put in the works, you can take the time to further develop a plan of campaign. For the logistics of such a trip you need a group of people planning out your travels. But of course, living abroad costs

money, so why don't we assemble a group of people that looks for companies that want to pay for these things? Of course we would then also need people to manage this money, and someone has to make the study tour to make appealing to companies...

And that is how you organise a study tour! The members of SPOCK are divided into four committees: a Travel committee responsible for planning out the hotels, dinners and transportation of the tour, an Acquisition committee acquiring deals and sponsorships from companies, an Administration committee managing all the money income/outcome and a Graphical committee that creates the corporate identity of the study tour.

So, for 1,5 years the 19 members of SPOCK7 worked hard through many hours of case work, meetings and action points. But on September 29th 2023 it was finally time for all the hard work to pay off: the participants would take off to explore the rich history, unique cultural heritage and rapid technological development of South Korea, to experience the "Age of Technology".



Our first week out of three was spent in the massive capital of South Korea: Seoul. Here we got the time to get accustomed to the time zone, the pleasant climate, the iconic cuisine and the people around us, this was particularly easy since we landed during a time of national holidays. On our first full day in South Korea, we partook in a very iconic activity: a travel to the demilitarized zone (DMZ), where we learnt about the South Korean perspectives of the Korean War and even took a glimpse into North Korea. In these first few days we also took off to the Seoraksan National Park where we went on some hikes through a gorgeous mountain range and Buddhist temple. Unfortunately this led to our bus being caught in the traffic heading back to Seoul for National Foundation Day, which resulted into a six-hour drive back home (not so fun fact: this is enough time for two-thirds of the Lord of the Rings trilogy).

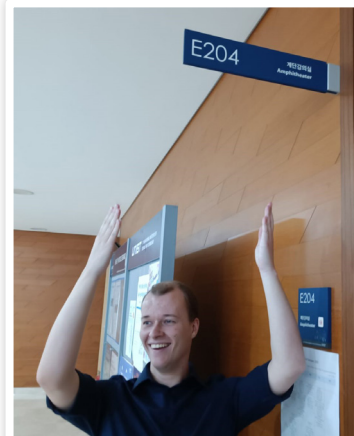
After this cultural enrichment it was time to get back to business, because the first company visits were on our agenda! Through the study tour we got to visit plenty of companies, universities and research institutes. While we first stuck to our Dutch roots by bringing visits to the Korean offices of ASM, ASML and the Dutch embassy, it is safe to say that our visit to the LG headquarters is widely considered the highlight, since they gave us a true VIP experience! For LG this was the first time that they accepted a group of students to see their 'Science Park', so they decided to go big and offer an exclusive tour along a fancy cutting-edge exhibition and they even offered lunch from private chefs in their VIP



lounge on the top floor of their main building (which was a first even for our tour guides!).

But after an eventful week it was time to move on to our next destinations. After visiting the enormous Seoul Firework Festival we travelled to Daegu, Ulsan and Busan, either via high-speed train or one of our many fancy travel buses with cool LED lights. A true highlight was our university visit to UNIST, which was founded in Ulsan in 2007, making it one of the youngest universities of South Korea. It clearly goes more with the times than the other universities we visited, and it showed the most resemblance to our own university; even the Scintilla Room (E204) can be found in UNIST!

Through the study tour the quality of stays also improved, from 'compact' guest houses and hostels with sketchy



red lights we slowly made our way to real hotels. But despite these luxuries we still managed to let go of our earthly attachments during our stay at the Haeinsa Temple (which is on the UNESCO World Heritage List!), where for a day we lived among the Buddhist monks to truly experience their culture, eat their horrible food at an unreasonable pace and wake up before sunrise to empty the mind.

Though we had the opportunity to truly find our real selves, it still felt like all the old palaces started looking the same (though I still believe that this is not entirely our fault). It was time to truly take a break, since it must be said





that a study tour isn't a holiday with the constant early alarms and professional representation at companies and universities! So we took a 45-minute flight (this is eight times shorter than our bus from Seoraksan) to Jeju Island, a.k.a. the Hawaii of South Korea. There we had a full weekend to tour the island and enjoy the warm weather. It was here where we had our 'secret evening activity'! Of course I cannot share the details of this activity, so maybe you should check in with your favourite SPOCK participants (hint: check your fourth edition *Codex Scintillae*).



After this beach episode we took off to our final destination: Daejeon. This city is considered the "Silicon Valley of South Korea", since it houses some of the most prestigious Korean research institutes such as KAIST and KRICT, so of course we had to bring them a visit. This was also the moment where the Admin committee found out that we had more money left than anticipated, so that made our evenings in Daejeon just a bit more fun!

But slowly and surely the end of the study tour came near, so we decided to close it off with our last communal meal at a more expensive restaurant in Incheon, where our airport was located. Sadly, this turned out to be our most

unfortunate eating experience yet, since basically everything that could have gone wrong went wrong. From cold meals and starters after main courses to raw lobster and forgotten main courses, this dinner resulted in a lot of disappointment and a harsh one-star review from a professor, but an iconic closing to the study tour nonetheless.

The next day most people took the plane back to Schiphol, but for some others this was not the end of the cultural voyage, as some participants took off to Japan, Thailand, or The Philippines for a true holiday.

Though the study tour has come to an end, you can still catch glimpses of our experiences outside of this article! Our website, ageoftechnology.scintilla.utwente.nl, contains daily updates that were written during the study tour, along with a Polarsteps of our travels. Additionally, a photo album can be found in the Scintilla Room! And of course you can ask other SPOCK participants for some of the best stories, since they are most likely still found around the Scintilla Room.





Sjaarscino



Tesla Ceremony



SCALA Summer BBQ



This morning whipped cream, this afternoon windmills

Technology is never finished. People are always looking for improvements. How can things be more convenient, faster, safer, tastier? The answer to such a question is often a matter of creativity: a technical solution that differs substantially from what is usual, in short, an invention. If you trace human history, you will see that our progress is intertwined with inventions. It once started with fire and the wheel; and now, in the 21st century, we are almost to the point of sending someone to Mars.

YOUR
CAREER
@VO

From invention to patent

What drives all those inventors among us? It could be anything, of course. I think the prospect of recognition and reward plays a big role. To get that, however, it is important that not just anyone can copy the invention. Almost everywhere in the world, therefore, inventors can apply for a patent: a document that gives the holder the exclusive right to prohibit anyone else from commercially applying the invention. This encourages inventors and companies to keep innovating and, in the process, share their knowledge with the rest of the world.



The patent authority has strict requirements for a patent. Rightly so, because otherwise companies could ban almost anything to each other. Applying for and obtaining a patent is therefore specialist work: it requires technical and legal insight, as well as a lot of puzzling. How exactly does the new idea differ from previous ideas? Which aspect actually provides the essential improvement? And how can you argue that the idea is not obvious? That kind of puzzling is my daily work.

Is it correct?

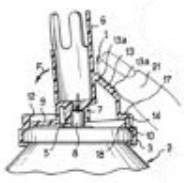
I have been a Trainee Patent Attorney for one year now. Together with my colleagues, I help inventors and companies obtain patents so that they can ultimately reap the benefits of their innovations themselves. In consultation with the client, we first draw up the patent application: an accurate description, often with drawings, of the important aspects of the invention. Usually, the patent is not granted immediately. The patent authority first comes up with examples that partly match the invention. We then set to work to demonstrate that the invention is indeed new and inventive. During that process, we always advise the client on the steps to take.

LOVE
TECH

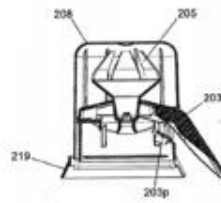
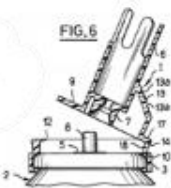
LOVE
SCIENCE



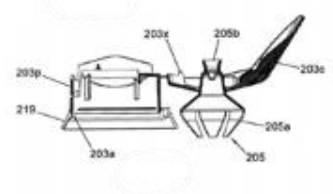
Patents & Trademarks



1986



2020



For example, this morning I was puzzling over whipped cream nozzles. Our client figured out how to make the head of a whipped cream nozzle more user-friendly and hygienic. According to the examiner at the European Patent Office, that idea was already known in 1986. That would mean that the customer cannot get a patent for this. But did the examiner get it right? Are his arguments correct? My conclusion: the 1986 nozzle is missing an essential aspect compared to the new nozzle. Take a look at the pictures above. What do you think for yourself?

New puzzles every day

This afternoon, I continue writing on a patent application for a new type of wind turbine. A completely different client, a completely different subject and a different stage in the procedure. But still technical and legal puzzles. Of course, I would love to tell more about it, but that can only be done later, after the application has been filed: until then, the invention must remain secret!



Tomorrow I have another lesson on the legal aspects of my work. The lecturer is a judge in his daily life, so he should know about it. Over the next two years, I have to show in six exams that I can do this work even without my mentor's guidance. Quite a task, but more than worth it for such a challenging and varied job. Another few years later, I can start training trainees myself alongside my daily puzzle work for clients. And so we go on and on: as long as inventions are being made, patent attorneys need not be bored for a moment.

Do you have a technical master's degree, a good feel for language and are interested in a job as a Trainee Patent Attorney? Visit our website vo.eu/word-octrooigemachtigde/ and watch the video how to become a Patent Attorney.



Interesse?

Denk je dat het traineeship bij V.O. iets voor jou is? Stuur ons dan jouw CV en motivatiebrief. Wanneer wij ook denken dat het vak bij jou past, volgt de sollicitatieprocedure. Deze bestaat uit twee gespreksrondes met octrooigemachtigden, daarna volgt een assessment met focus op taalkundig gevoel en technische inzichten. Kom je daar goed doorheen, dan ontvang je van ons een contractvoorstel.



Meld je direct aan via www.vo.eu/career



Wil je nog meer weten?

Neem dan contact op met programmacoördinator Karlijn Both via k.both@vo.eu of 06 10 11 25 17

Je kunt op ieder moment starten bij V.O.

A shoutout to Scintilla's little companions

Author: Rick Ruitenbeek

We, as students at the university, often see each other on campus, in the Scintilla room or at other places here in Enschede. But some of us have other close friends that are not seen in the lecture halls. In fact: they are not even allowed in the lecture halls. Of course I am talking about our pets! For this reason, the editorial team of De Vonk has asked our readers to tell all about what makes their pets special, such that the rest can learn everything about their little companions that we don't see every day.

Name: *Suzy*

Kind of animal: *Cat*

Owner: *Eva Plas*

Age: *16*

Fun fact: *She's the one living in our student house for the longest time, making her the 'huisoudste'.*

How she got her name: *Don't know, she's lived here longer than I have.*

Likes: *Food, wet food to be exact. Or cheese. And hugs.*

Favourite toy: *Pen caps, apparently.*

The biggest trouble she's caused: *Eating food meant for other house-mates that were eating late.*

Another fun fact: *She baby.*



Name: *Wasbever*

Kind of animal: *Pinguinmeeuw*

Owner: *Pieter Paasman*

Age: *Almost 2*

How he got his name: *We were inspired by the sticker of 'Mokerdikke Wasbever' and when we were candidate board, we found a different stuffed animal in the shape of a penguin. We couldn't keep that penguin, as it belonged to someone else, so when we got Wasbever, we decided to name Wasbever after the penguin and a seagull due to the similarity.*

Likes: *Giving out emotional support to the 93rd board.*

Dislikes: *Being brassed by other associations.*

Favourite food: *Red wine.*

Favourite colour: *CMYK: 0% 93% 79% 0%*

Hobbies: *Joining the Cantus Scintillae (Wasbever has attended over 5 cantus!).*

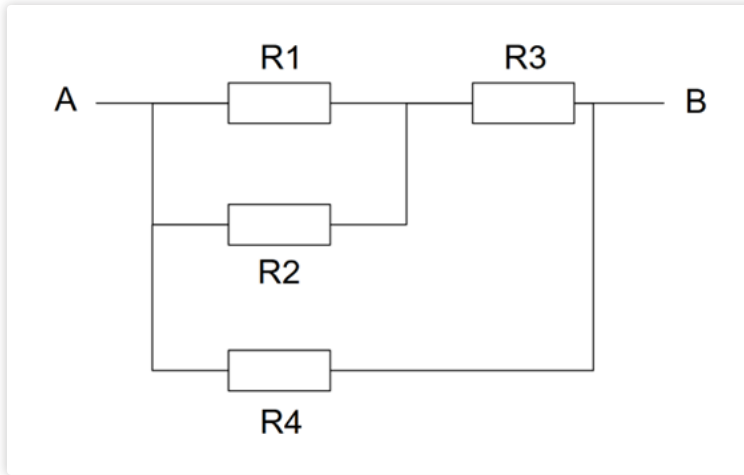
The biggest trouble he's caused: *Brassing battle between Abacus and Scintilla.*

Another fun fact: *Wasbever has kids! During the GM where the 93rd board and the 94th board switched places, the newly appointed board gave us a wonderful present: four tiny versions of Wasbever the Pinguinmeeuw with accessories based on our board functions! We are all very thankful :)*



First-years Assignments

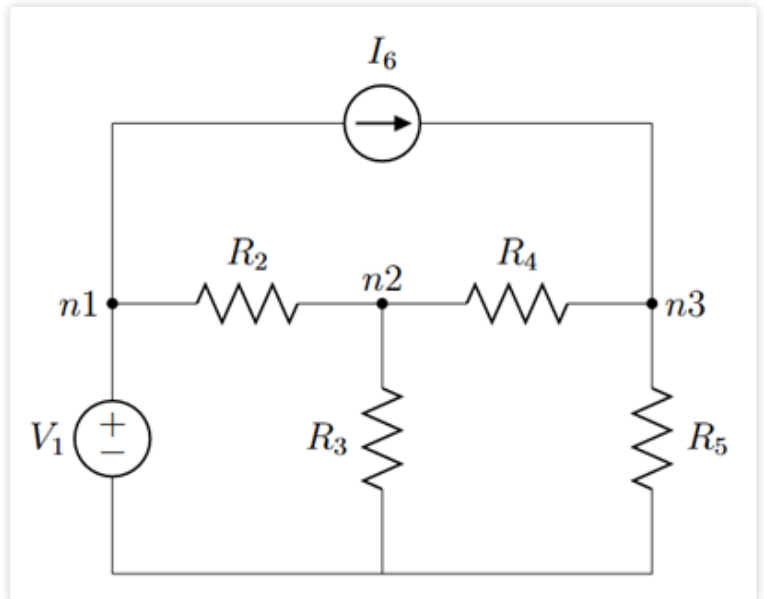
Author: Truusje



1. Wow you are an electrical engineer! You know your way around circuits, right? Well, if you are so smart: find the equivalent resistance of this circuit. Of course, like you are used to: no fractions within fractions...

2. Let's reminisce the days where the circuits were simple and endless LTspice was not needed to verify your mistakes. Use the node voltage method to derive a set of linear equations from which v_{n1} , v_{n2} , v_{n3} can be solved.

Now, when we assume that $R_2 = R_3 = R_4 = R_5 = 1\Omega$, $V_1 = 5V$ and $I_6 = 3A$, find the values for v_{n1} , v_{n2} , v_{n3} using the set of equations we derived!



*Do you think you have the correct answers? Let us know at:
vonkkopij@scintilla.utwente.nl!
You might win a price!*

Afterlife

Author: Robert Italiaander

My name is Robert Italiaander, and I am a former electrical engineering student. It has been more than 2 years since I left the University of Twente. The editors of the Vonk asked me to write an article reflecting on life after graduation.



The Student Life

From a young age, I knew that I liked to create things with my hands. So when the time came to choose a field of study, I was certain it had to be engineering. I considered mechanical and electrical engineering, ultimately opting for the latter because I believed it presented the most intriguing challenges. I thought that building systems with electrical engineering skills offered unique problem-solving opportunities.

So the first question of what I wanted to study was solved. Now, the second question: where am I going to pursue



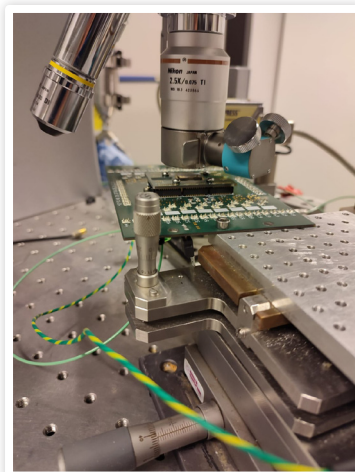
my studies? Upon my first visit to the campus, I was convinced the minute I arrived. The vibrant campus life, along with the countless opportunities and activities, persuaded me to enroll at the University of Twente.

Additionally, Enschede has an ice-skating track. During my high school years, I was a passionate speed skater. However, the nearest ice track was over an hour's drive away. Therefore, Enschede having its own ice-skating association was a significant advantage for me. During my freshman year, I became an active member of Scintilla. I initially joined the Sjaarscie, and together with the rest of the committee, we organized the memorable activity "Game of Thrones". This activity combined adventure, competition, and companionship, concluding, of course, in an amazing drink.

Entering my second year, I took on the role of chairman for the SKIC (Scintilla's Kick-In Committee). Together with the rest of the committee, we organized an amazing camp. In subsequent years, my roles within Scintilla evolved, from

secretary to chairman of our beloved Borrel committee. As president of the Borrel, I acquired two skills that will serve me well for the rest of my life: pouring a perfect beer and leading a meeting of Borrel members who are gradually but surely becoming intoxicated.

As my undergraduate journey neared its end, the time came to start with my bachelor's thesis. Fascinated by the combination of mechanical and electronic components on a chip, I delved into the





The Afterlife

realm of MEMS. Here, I studied the pressure dependency of a Micro Coriolis Flow sensor. I found a useful correlation between the pressure in the Coriolis tube and the upward bending of this tube. These correlations were found in my simulations as well as in the real measurements that I conducted.

“Should I pursue a master’s degree or start my working career?”

Upon completing my bachelor’s degree, a crossroad emerged. Should I pursue a master’s degree or start my working career? Both options were compelling to me. On one hand, I wanted to acquire more technical skills, but on the other hand, I was ready for life after being a student. I looked forward to living together with my girlfriend, perhaps even getting a dog.

In the end, the latter option was more compelling to me. Then the question arose: where do I want to work? As I mentioned, I was not finished learning more technical skills. Therefore, I continued my learning journey through a technical traineeship at Alliander.

Alliander is the grid operator responsible for more than a third of the low and mid-voltage electricity grid and the gas infrastructure of the Netherlands.

The traineeship I undertook consisted of three different six-month assignments. What you were going to do during these assignments was up to you; the only condition was that there was a department where you could carry out the assignment. Another important part of the traineeship was De Baak’s personal development program. Initially, I was quite skeptical about this; I thought all that personal development was meant for non-technical people.

My assumption was that when you start working, only your skills matter. However, during the course, I found out that knowing yourself, understanding your strengths and weaknesses, is incredibly important. Without this self-awareness, it’s hard to improve yourself, and it also helps to determine what you enjoy and where you want to go in your career.

The first assignment I undertook at Alliander involved investigating how many more households can install heat pumps on the low-level electricity grid if the heat pumps are controlled in a smart way. It turned out that at least 20% more heat pumps could be connected with smart control.

During this time, I moved in with my girlfriend. We settled into a house in the countryside of Gaanderen, a town in the Achterhoek (back corner) where we both grew up. After a few months, we bought a very cute black Jack Russell named Lilo. I adore living together with my girlfriend and our Jack Russell.

For my second assignment, I sought something more practical than theoretical. I ended up at a place called ElaadNL, a knowledge and innovation center that focuses on the impact of EV charging on the electricity grid. Elaad was founded by all seven Dutch grid operators



in response to the increasing number of EVs. Since all these EVs need to be charged using the electricity grid, it is of utmost importance to understand their impact. A significant part of this understanding involves measuring and testing them. Elaad has a test lab where we do exactly that. While explaining the exact procedures involved is a bit lengthy for this article, you can imagine that working in a test lab requires a lot of practical skills. During this assignment, my job was to lead the project of installing a new advanced test system capable of testing chargers up to 360 kW.

“One piece I am proud of is my barbecue furniture, made using recycled wood.”

After my time at Elaad, I had to choose my third and final assignment. For this, I was seeking something more akin to a job than a short-term project. Therefore, I decided to work as a high-voltage substation engineer. During this period, I was involved in designing substations. Although I found the technical aspects of substations intriguing, the work itself



became somewhat repetitive for me. Additionally, the construction of substations is a lengthy process. Sometimes it can take over 7 years, this is a bit lengthy for me.

After completing my three assignments and the personal development course at De Baak, I finished my traineeship. I learned a lot about the E-Grid, but more importantly, I learned a lot about myself. I had to make a choice about what to do next. The work I did at Elaad was the most interesting to me. I

am now working full-time for Elaad as a project manager and technical expert. Although Elaad is small (around 50 employees), it has a huge influence on the industry. I get to work with the biggest car manufacturers, which I find to be a really enjoyable part of my job. I am involved in projects where we help the industry implement and test new charging methods, such as vehicle-to-grid. Another reason I chose for Elaad is that I can use my hands once in a while, for example, by connecting a fast charger station or driving around on the forklift.



In my free time, I still like to create things. One piece I am proud of is my barbecue furniture, made using recycled wood. For me, this was the perfect combination of my two hobbies: building things and barbecuing.

I hope that for anyone wondering whether they should pursue a master's degree or not, I've shown you that it's possible to have an interesting work experience without a master's degree and that you can also specialize while working.

Biking through Enschede

Enjoying the summer weather in typical Dutch fashion, on your bike.

Author: Hidde laagland

Say goodbye to winter's chill and hello to summer's warmth – it's time to get back out there! Sure, you've probably explored downtown and scoped out the UT campus, but did you know there's a whole bunch of cool stuff waiting for you beyond those familiar spots? Yup, hidden right in our backyard are some seriously sweet walking and biking trails, just waiting to be discovered. And guess what? Our local cycling association D.W.V. Klein Verzet has created two beautiful adventures!

Route 1:

Starting off with a short ride of 24.2 km, we start off at Scintilla from which we head north towards the beautiful forest of Landgoed Hof Espelo from which we continue towards Twente Airport. If you're lucky you can see some planes being scrapped at the outlook point. After this short detour, we can continue in the forest as we head off to the Lonnekermeer. During your route there you can also have a look at the WW2 memorial and learn a little bit about the local history. But as you continue on, you'll find yourself at the Lonneker Meer, where you can take a short breather and enjoy this beautiful landscape. Once you've enjoyed this beauty the route continues on through the forest heading back to the university. However, before we reach the campus first there is a stop at the Theetuin Driene. Here you can have a nice lunch, or drink a beer or two, savouring the weather before finally cycling back to Scintilla.

Route 2:

The second route is a bit longer, being 37 km, however do not be deterred to ride this route, as it continues through rutbeek where you can relax for one to two hours in the lake and enjoy the day. This route starts at the Enschede train station. From this, we head towards the Landgoed Smalenbroek, a small but beautiful forest through which we can cycle. Then continuing to the Wesselerbrink where a short round around the lake can be enjoyed, before heading off towards Rutbeek. Here you can take a quick dip in the lake and enjoy the weather, or just relax on the beach. Once you are ready to continue towards het Buursezand. Where you can enjoy the Heath. From which we return to the centre.

Ps. Be safe, local rules and regulations still apply



Route 1

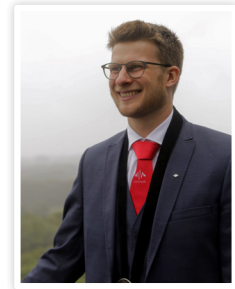


Route 2

A view of the past: Scintilla Bulletins

Author: Wouter Nijenhuis

In 1965 Scintilla was founded. No whatsapp, no e-mail, no website, not even the Vonk existed yet. How did you get the news to your members about what was happening? In that time Scintilla had a monthly magazine in which almost everything happening around Scintilla was published: Scintilla Bulletin.



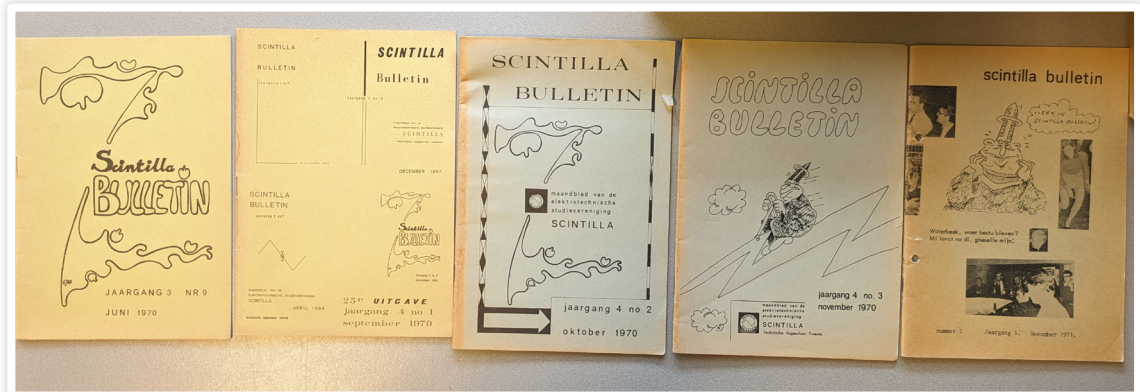
History

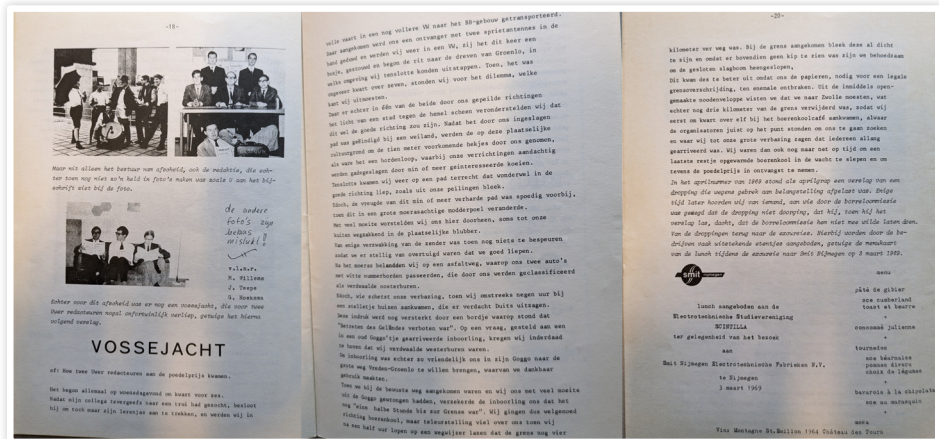
Scintilla Bulletin started in the fall of 1967, a little more than two years after the association was founded. The board of that year wanted more electrical engineering students to join Scintilla and thought of an incentive. The idea of Scintilla Bulletin was to let the students know what was happening around the study specifically and to be an addition to the more general press of the Technische Hogeschool Twente (THT). The first editions were a big hit and by the third edition the Scintilla Bulletin had its own editorial team. In part due to Scintilla Bulletin the amount of mem-

bers at Scintilla grew in the year 1967-1968 from 60 to 110 of the then 170 EE students. After the second year of the bulletin Koos Elsenaar took it upon him to restructure the magazine. It went to an A5 format and with some advertisements the cost of production went down so much it could be freely distributed to all the Electrical Engineering students. This sadly made Scintilla Bulletin cost a lot of time. After struggling through the 4th year of production an attempt was made on continuing for a new year, but the edition of November 1971 was likely the last edition that has been published and could be found in the archive.

Content

Scintilla Bulletin fulfilled the function of almost all the communication channels we have today. Like the website it gave an overview of the activities and announced the General Meetings. In the later editions it was also a place for companies to advertise their job offers and products. Just like the Vonk today it was filled with fun articles, but the main focus of Scintilla Bulletin was to highlight the educational news around Electrical Engineering. In every edition there were scientific articles related to research done at the THT. The research chairs also published their job offers,





research positions and student jobs in Scintilla Bulletin. In the first year of the magazine the first students graduated for their baccalaureate (similar nowadays to a BSc) and their reports were published in the Scintilla Bulletin. This became one of the biggest sections in the magazine, with it even making it into the curriculum that you had to publish your project otherwise you would not pass. Because there was no centralized platform for publishing evaluations of courses all the results were shown in Scintilla Bulletin as well. The early start of the STORES can also be found in the Bulletin. It started as a little section named 'Scintilla's Componenten Inkoop' and due to popularity grew into 'Commissie Componenten Verkoop Scintilla' (CCVS). They used the bulletin to announce new order windows and highlight some cheap or special components available.

It had been so well regarded even Abacus wanted to use Scintilla Bulletin for their news before they split off. One of the editors, Albert Visser, switched to applied mathematics but did the illustrations of Scintilla Bulletin before he left. He was the one that made the patron saint of Scintilla Bulletin: St. Bul (named after the first diploma you received after finishing your first year of studying 'propedeuse bul') which you can see on the front of the last two years of the magazine.

One article to show how different the times were and how that reflected in the content can be seen in the article about the 'Vossejacht'.

Editorial Team

The known members of the editorial team as found in the archive:

- 1969 AJH Bouwmeester
JG (Koo) Elsenaar
HL Joruncé
MWLM (Marcel) Willems
JJ (Joris) Teepe
G Hoeksma
- 1970 A (Albert) Visser
GPM (Trudi) Teepe-Mirck
- 1971 W. (Wim) Mulder
RV Sterk
HF Menschaar
GH te Slighte

The home base of the editorial team was one of the student houses on Matenweg to have a correspondence address and a phone number for urgent matters. Editing and printing one Bulletin took about three weeks since the deadline of articles was set in the first week of the month before. Most of the layout was done with typing out written articles and then cutting and pasting on blank paper. Afterwards, the reproduction at the school could scan it and print it. The school also had its own delivery service

which distributed the Bulletin to all members of staff and students.

The people who made Scintilla Bulletin were very passionate about the project. They describe their mission to add a critical view to the education of Electrical Engineering and student participation at the THT. With editorial comments about no elected student members in the Senate of the school and in the Education Quality Committee they gave the student attention and made it known by students to take action against it.

The lives of the students were very different, and it is surprising that they even had time to work on Scintilla Bulletin if we look at an excerpt from an introduction of a new member of the team: (translated) "Miss Teepe is currently a first years student at the THT, she is a fifth year student at the university of Utrecht, a teacher at the Jacobuscollege in Enschede, editor of the [magazine of the study association in Utrecht] and last but not least a housewife."

Sadly the collection of bulletins is not complete in our archives. We do not possess the first two years of publications and from the years we have, we are missing a lot of the editions. We would be excited to make an addition to this article if we ever get our hands on a full collection. If you have any stories about the bulletin or even know of the existence of some of the bulletins please contact us!

Another Railway company?

Author: Sjouke Spijkerman

As Commissioner of External Affairs it is inevitable that some time you will hear the following around the association room on a Tuesday morning: “Another railway company at today’s lunch lecture?” Although to some it seems that anything related to Power Electronics and/or infrastructure has something to do with railway engineering, there is a core of truth in here. Already this year we had lunch lectures from Arcadis and NS and further lectures are planned with more firms delivering high tech solutions for railway infrastructure and material. This poses the question on why such a great number of companies are occupied with the relatively small Dutch rail network and causes me to wonder what the origin of this situation is.



Due to allegedly low efficiency and high costs, something had to change within governmental organisations according to Dutch politics. While in the 60s and 70s several investigations were conducted on privatisation, the Netherlands was ready for a change only at the start of the 80s. Dutch politics became characterised by a movement towards more market working and less government

influence. For this a few goals were set such as reconsideration on expenses and decentralisation of governmental tasks. Consequently, this also led to privatisations in all fields, which was started in an attempt to increase efficiency and reduce costs. [1]

For the “Nederlandse Spoorwegen (NS)”, the Dutch Railways company,

this was the case as well. In the early 90s, a large amount of governmental funds had to be invested to compensate for structural losses within the organisation. In combination with European policy to increase commercial autonomy of rail in 1995 it led to the privatisation of the NS.

Despite it being called a privatisation very often, the aim was rather to make NS independent from the government financially. This went along with more freedom of entrepreneurship. [1]



NS cargo before the takeover by DB cargo.

“Despite it being called a privatisation very often, the aim was rather to make NS independent from the government financially”



A fragmentation of the NS followed. The engineering department got split into Holland Railconsult and Articon. NS Goederen were sold to the German railways, NS infraservices became part of Strukton (a company previously erected by the NS) and all material and workshops came in the hands of Ned-Train. All this concluded in 2003 by transferring management of the task organisations of Railinfrabeheer, Railned, and Railverkeersleiding to Prorail. NS transformed from a holistic train industry company into a mere transport provider. [2]

Although the government accomplished in reducing governmental subsidies to the NS, the anticipated success did not arrive. Due to a desire of a commercial railway company that was able to generate profits, budget cuts were made which resulted in an overall deterioration of service and trains being on time. And to this day, the NS did not achieve financial independence from the Dutch government as well as the streamlined management desired, partly due to events such as the corona crisis and heavy inflation, while additionally being plagued by competitors for a concession of the main rail network. [3,4]

While with certainty it can be stated that the changes the NS went through did not solve problems as well as was hoped for, it can be argued that this development was an impulse for the Dutch ecosystem of engineering firms. Articon, which later became Arcadis, was able to expand its expertise further towards railway infrastructure. Movares grew out to be much larger than merely a railway consultancy company for Dutch rail with also taking on projects abroad. And the once so called Ned-Train was merged with Ricardo Rail introducing another large engineering firm in the Netherlands, causing the NS to develop further the already rich pool of (railway) engineering firms in The Netherlands with many more originating from or affiliated with the NS.

References

- [1] Stellinga, B. (2012). Dertig jaar privatisering, zelfstandiging en samenwerking. Amsterdam University Press.
- [2] Infraside. (2021, March 17). Scheiding van beheer en vervoer | Infraside.
- [3] NS jaarverslag 2023. (n.d.).
- [4] Argos. (n.d.). Zelfstandiging Nederlandse spoorwegen.



Engineering Solutions, nowadays by Movares.

A shoutout to Scintilla's little companions

Author: Rick Ruitenbeek

We, as students at the university, often see each other on campus, in the Scintilla room or at other places here in Enschede. But some of us have other close friends that are not seen in the lecture halls. In fact: they are not even allowed in the lecture halls. Of course I am talking about our pets! For this reason, the editorial team of De Vonk has asked our readers to tell all about what makes their pets special, such that the rest can learn everything about their little companions that we don't see every day.

Name: *Jilles*

Kind of animal: *Dog*

Owner: *Reinder Heddema*

How he got his name: *It was the name of a random captain of a skütsje from the third division of skütsjesilen.*

How you two met: *Not so great, he almost immediately peed and shit in the house when he saw me.*

Likes: *Belly rubs.*

Favourite colour: *Green.*

Hobbies: *Running in circles through the house really fast.*

Another fun fact: *He can roll on command.*



Name: *Jelle*

Kind of animal: *Baby brother*

Owner: *Roos Meijers*

Age: *Idk, 20 or something.*

How he got his name: *My parents thought of really good names for me, but they couldn't use a boy's name for me, so they recycled that name for my brother.*

How you two met: *You don't want to know.*

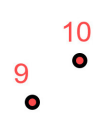
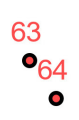
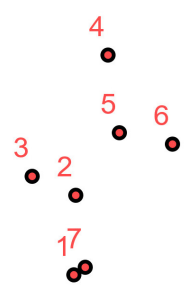
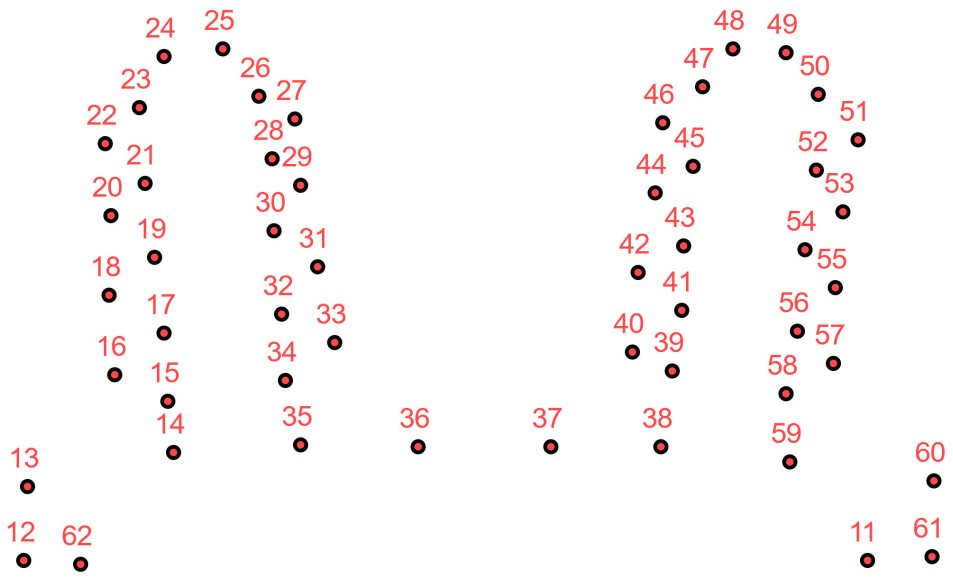
Likes: *Food.*

Favourite food: *Everything.*

Favourite colour: *#E4002B*

The biggest trouble he's caused: *Well, it all started about 20 years ago...*

Another fun fact: *He is also a Scintilla member.*



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