

In retrospecthor

PhD from home

Virtual open day

Welcome new colleagues

Connecthor

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The end of the calendar year is approaching and, while the Covid-19 virus is keeping most of us working / studying at home, time off to spend with family and loved ones is well needed. To add spirit to this Christmas season, the editorial team thought it to be an excellent idea to also mail the December issue to the home addresses of the well-appreciated Electrical Engineering staff. This one-time experience makes sure that you don't need to come to the Flux building this time to pick up your favorite magazine.

In September, Guus Pemen took over the role of Vice Dean Research of the Departmental Board from Ton Koonen. You will find his first contribution to the Board Issues section on page 4.

Jurgen Kok, the new president of e.t.s.v. Thor, wrote his first column for the From the President section. You can read about his thoughts and ideas on page 5.

Doing your PhD during a lockdown is not easy. Steven Beumer is sharing his story on page 9.

Jan Vleeshouwers re-read the book "De Maat van de Techniek", a book that UT philosopher Hans Achterhuis wrote in 1992. Jan shares his thoughts and opinions about this book on pages 16 and 17.

In Retrospecthor; for this 52nd issue Mike Wilmer, Secretary and Commissioner of Education of the 52nd Board of e.t.s.v. Thor, has written all about his experiences.

Although we are forced to skip the annual Christmas party this year, we did find a photo of the Christmas tree of last year. A picture of last year's Christmas tree is this year's December issue cover photo. Enjoy.

We wish you a lovely Holiday Season, a very Merry Christmas and a wonderful and joyful New Year!

The Connecthor editorial board

14



In retrospector

How does Mike Wilmer look back on his time with Thor? What did he learn? You can read about it on page 14.

09



PhD in lockdown

How did Steven work on his PhD during lockdown? You can read about it on page 9.

12



Photo page

On page 12 and 13 you can see some interesting ways on how Thor organized activities during lockdown.

11



Virtual open day

How do you organize a virtual open day for more than 1100 prospective students? Read more about this on page 11.

02	Editorial
04	Board issues
05	From the President
06	Introducing
08	Icons of EE: Paul Dirac
09	Lockdown PhD: Power/Weakness of VoIP
10	AME
11	Virtual open day
12	Photo page
14	In retrospector
16	Re-reading "De Maat van techniek"
18	Cable pooling: electric buses
20	Wervingsdagen: EXTRA LARGE!
22	Puzzle
24	Column

Board issues

By: Guus Pemen



This is my first contribution to this section “board issues”. Thus, let me introduce myself again briefly. I joined our Departmental Board last September 1, as vice dean research. I have been working at our department for a long time, since the 1990s, and worked myself up from appointments as a researcher, PhD candidate, postdoc, assistant professor, associate professor, full professor, and now a member of our board. I have also been chairman of our faculty council for an eight-year period; a great position in which I got to know the ins and outs of the department pretty well.

Currently, I am chair of the Electrical Energy Systems group. We are doing fascinating research into transforming electricity grids towards a truly future-proof, sustainable energy supply. Our future grid is a good example of a cyber-physical system; our research takes place at the cutting edge of power systems, electrification, power electronics, local control, digitization, decentralized markets and artificial intelligence. All these ingredients are necessary for our future sustainable energy system to function properly and reliably. The electricity system is not alone in this – these

ingredients are essential for high-tech systems, electric transport and most other modern technical systems. As a group, we are therefore actively connected to our Cyber Physical Systems Center CPSe.

This is a good example of how our faculty functions. Each of our nine groups works from its own research vision and research agenda, and keeps it sharp, challenging, relevant and up to date. But there are many interfaces between our research challenges. Via our centers we can achieve effective collaboration between groups and set up projects that rise above the possibilities of a single group. I highly appreciate this model, and as a board member I aim to make the centers even more beneficial to our faculty.

Of course, as vice dean research, many topics will be put on my agenda. A mid-term research assessment will take place this spring, and preparations are in full swing. The department wants to participate actively and ambitiously in the institutes that are now getting shape at our university. And, of course, we must ensure that our research can continue as well and safely as possible during this Covid-19 period. I recently had a pleasant

and good introductory meeting with our faculty council. It was very positive to learn that the faculty council is also thinking actively about important points of attention regarding the organization of our research. I hope for good cooperation with all sections of the department, and I look forward to being able to support the department in my new position.

Guus Pemen

Vice Dean research

Electrical Engineering and Automotive Technology ■

From the President

By: Jurgen Kok



The year 2020 has been on its way for a while now. In fact, it is almost coming to an end. However, at the time I am writing this piece, I just became the President of e.t.s.v. Thor, and, therefore, my actual year has only just begun. Speaking of years, you might have heard it a lot the past weeks, a lot of people are longing for the new year of 2021. Often because the past year hasn't been too good to them, and they see the start of a new year as a start of a new life. I don't like to put all the stress of turning over your life on one moment, because you actually can't predict what will be happening in a year. Almost every day, something unexpected happens and you have to improvise.

There is a general feeling against improvisation, especially among students I regularly speak to on the sixth floor of Flux, who really enjoy their structured way of living. Every unexpected twist in their life causes a moment of chaos and uncertainty. Out of the blue, everything that seemed so certain a few seconds ago, has turned into total unpredictability, so it seems to them at least. Contrary to these people, who do everything to

avoid these moments, I actually enjoy having some unpredictability and the supplementary chaos in my life.

Namely, these moments are the moments where you can actually show your skillset, because just like famous improvisers such as Charlie Chaplin, the actions you undertake at these moments are not chosen at random. Your actions are actually based on your expertise, it being acting skills for the likes of Charlie Chaplin or, for everybody else, just basically everything you have ever learned in your time on this planet.

The most beautiful thing I think improvisation brings us, is creativity. When you suddenly have to solve a problem, you really have to start thinking to come up with a creative idea. Often, the standard solution won't work, so you have to get off the beaten tracks to find a new solution, and by doing this, new ideas just spawn randomly. I have seen this happening everywhere within Thor over the past months. It is really a pity that a lot of the great activities could not proceed, and that some of the creative new ideas were also cancelled. However, especially quickly coming up with solutions to still make sure activities could take place,

was a great way to improve useful skills by improvising. For me specifically, dropping by at other study associations on the campus to source cantus tables was a great way to broaden my network and to meanwhile make sure I could smash my goal of 10,000 steps a day.

So, don't worry about uncertainty in the future, but trust on your own expertise. Especially when new problems arise, true creativity comes up, which can bring you to beautiful new insights. Of course, there will sometimes be chaos when your plans suddenly fall apart like a house of cards. However, every time I get confused, I know that the next time this happens, I will effortlessly come to an answer, or at least in a less stressful and chaotic manner than before. If things still go awry, you really don't know what you're doing and everything seems to be uncertain, then, and only then, you can actually use the excuse: 'I was just improvising.'

Veel gedonder!

Jurgen Kok

President of e.t.s.v. Thor ■

Introducing...

Hello everyone. My name is Aleksandr Zozulia, and in July I joined the Photonic Integration group as a PhD candidate. I received a specialist degree from Bauman Moscow State Technical University in Russia, with specialization "Optical and optoelectronic devices and systems". I started my career in technology as engineer of optical devices, but after 1.5 years at a company I decided to try myself in science and research, so I applied for a MSc degree in Skolkovo Institute of Science and Technology. During my master's studies I joined Laboratory of Plasmonics and Nanooptics, where I worked on integrated electrooptical modulators based

on edge plasmons in indium tin oxide. My PhD project at TU/e is also related to integrated photonics, but this time I will work on semiconductor lasers with direct-current modulation.

In my spare time I enjoy sport activities such as running, cycling, bouldering, skiing and snowboarding. I play guitar and sometimes write music and songs, mostly in genre of rock/metal. I like traveling, exploring new places, new information, in general I like to do something new every day. I also read a lot of books and watch a lot of movies (well, of course, only when my PhD workload allows me to). ■



Hello! My name is Henrique Freire Santana. I'm 29 years old and I'm Brazilian. I started my PhD in the Electro-Optical Communications Group on September 1st. I hold a Bachelor's degree in Electrical Engineering from Federal University of Paraíba, in my hometown João Pessoa. During my Bachelor's I also had an exchange period in the National School of Engineers of Brest (France), where I lived for ten months. I've recently concluded an Erasmus Mundus Joint Master Degree called PIXNET (Photonic Integrated Circuits, Sensors and Networks). As part of this program, I studied at Aston University (Birmingham, UK) in the first year and here at TU Eindhoven in the second year.

During my PhD I'll investigate photonic integrated solutions for optical switching in optical networks.

In my free time I like to learn languages. I participate regularly in language exchange meetings, where I help people with Portuguese and French and I get to speak Dutch. I've visited six of the Dutch provinces and I'll visit all of them as soon as it's safe again. I also play the ukulele and meditate to unwind. I'm usually on the 9th floor of Flux. I hope to see you around! ■

Nice to meet you! My name is Martijn de Kok and I've been around here at the Electrical Engineering department since I started my Bachelor back in 2014. Precisely six years later, I've started working as a PhD candidate at the Electromagnetics group.

In my two years as master student, I've followed courses at the EM, EES and EPE groups to explore the many different sides and applications of electromagnetism: information transfer, energy transfer and energy conversion, to categorize them broadly. I dove into space-based radio astronomy as part of my internship in Los Angeles, and during my

graduation project I designed a discrete lens antenna array for a radar application at Ka-band. Both projects motivated me to put in my best efforts, thanks to the cool and exciting topics and the fantastic people I met along the way. I have the feeling the upcoming four years won't be any different in that regard.

During my PhD I will be investigating and designing mm-wave antennas and amplifiers for automotive radar, as part of the European NextPerception project. Despite having to work from home for most of the days, I already feel at home at the EM group thanks to the interesting topics and welcoming colleagues! ■



Hello everyone! My name is Lorenzo Ceccarelli, and I joined the EPE group as a Postdoc in September 2020.

I come from a town called Cassino, in central Italy, where I lived and studied until my MSc graduation in Electrical Engineering at the University of Cassino and Southern Lazio, in 2016. I have been living the expat life ever since. After a study exchange in Denmark and a master thesis internship at ABB Sweden, I choose to focus on the field of Power Electronics and pursue a PhD at Aalborg University, Denmark. I spent the following three years studying and evaluating the reliability of power semiconductors in order to design robust and efficient power conversion circuits.

Currently, I work in the EPE group within the ECSEL Progressus project, designing a dynamic voltage restorer (DVR) circuit

with energy storage features, which will provide protection from voltage sags/swells on low-voltage grids with EV charging infrastructure.

I love being a researcher in electrical engineering, because it allows me to actively contribute to the sustainable energy transition. I have a deep passion for nature and earth-conscious living. In fact, after my PhD graduation in 2019, I took a gap year traveling through New Zealand together with my partner, exploring amazing outdoors and learning about organic farming and resilient homesteading. I also love cooking (especially Italian food), playing music, landscape photography, mindfulness, sport climbing and much more.

I hope to get to know many of you soon enough. See you around at Flux! ■

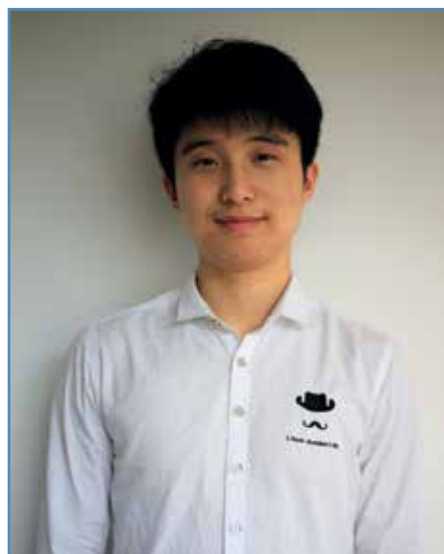


Hello! I am Sen Zhan. I was born and raised in China. I joined the EES group as a new PhD student since September 2020. Before I came to TU/e, I did my master at the Technical University of Denmark studying Sustainable Energy, where I developed a strong interest in power systems, mathematical modeling and optimization. Earlier than that, I received my bachelor's degree in Energy Engineering at Zhejiang University in China.

The PhD project I am working on is titled "Grid Edge Control", which I collaborate on with the three largest DSOs in the Netherlands: Liander, Enexis and Stedin. The project aims to develop both local market-based and technical approaches

to manage voltage and congestion in the distribution systems, which becomes increasingly important with continuous penetration of uncertain and variable renewable energy sources in the low-voltage grid. The results of this project could contribute to more efficient utilization of the grid, opened-up markets for renewable energy sources and more stable and secure electricity supply.

In my spare time, I am actively involved in all kinds of sports, like badminton, pool, swimming, table tennis and basketball. I am looking forward to meeting all of you at Flux and on courts! ■



A warm welcome to all new colleagues!

Icons of EE: Paul Dirac

By: Matthijs van Oort

Every year, a lot of freshmen in Electrical Engineering have to struggle with new abstract concepts that are intangible and hard to grasp. One of these concepts is the use of a Dirac pulse, which is a signal with an infinite amplitude in an infinite short time span. It is not possible to create such a signal in practice, but we engineers use its principles anyway, as it makes our lives a lot easier. The man behind this equation, Paul Dirac, was one of the pioneers in quantum mechanics and therefore helped shaping the field of Electrical Engineering as we know it today.

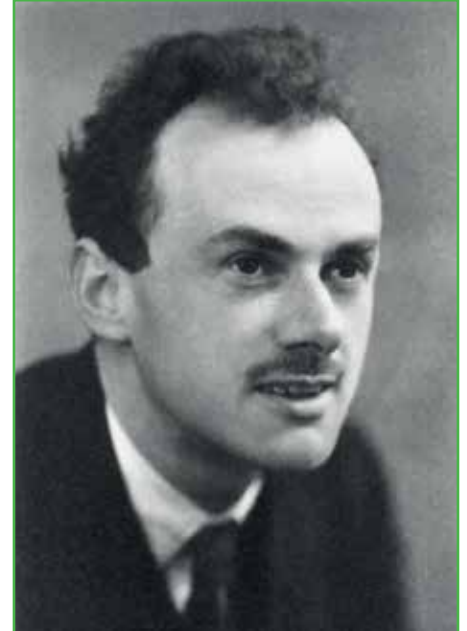
Paul was born in Bristol, England, in the year 1902. While being born in the United Kingdom, his official nationality was Swiss. After passing the primary school, Paul went to an all-boys technical college, which was an institution within the University of Bristol. This school primarily focused on practical technical subjects like metal working and brick laying, from which Dirac gained interest in the technical field of education. Dirac went on to study electrical engineering in the same University of Bristol, and received his Bachelor degree in 1921. However, due to the post-war depression, the economic climate was in such a bad shape that Paul could not find any jobs in the field of engineering. He therefore decided to pursue another Bachelor program in the field of mathematics, which he finished in 1923.

After receiving his two Bachelor degrees with honors, Dirac was allowed at the St John's College in Cambridge in order

to perform further research. Due to his interests in general relativity – which at that time was a completely new concept which was introduced by Albert Einstein – he chose to work in the field of quantum physics. His first steps into the field of the quantum mechanics have been set in motion by a work from Werner Heisenberg, which created a framework based on a quantum theory of Bohr and Sommerfeld. After diving into this work, Dirac found a mathematical relationship between the work of Heisenberg and the Poisson brackets from classical dynamics. This relationship allowed Dirac to obtain quantization rules, and form the basics of the later developed Fermi-Dirac statistics. With this work, Dirac was the first researcher to mention the field of quantum mechanics in a thesis, which he submitted and defended in 1926.

After his PhD, Dirac kept doing research in the field of quantum mechanics. One of his many contributions is his work on non-relativistic spin systems, which helped him constructing the Dirac equation that describes the motion for the wave function of an electron. Next to this, Dirac proposed the existence of magnetic monopoles in 1931 in order to explain the quantization of electrical charge. Experiments to detect such magnetic monopoles have been performed, but there is no direct evidence for their existence yet.

Other scientists around him, like Werner Heisenberg, Wolfgang Pauli and even Albert Einstein, would describe Paul as a modest but very stubborn man. He was very modest by not putting himself into the center of exposure. For example, he did not call the spin statistics Fermi-Dirac, but rather called it the Fermi statistics. On the other hand, he could be very stubborn. For example, where many researchers considered infinity in a prediction as something unacceptable, Dirac used infinity in his quantum electrodynamics on a regular basis. He explains that you should never neglect an infinite number like a very small number, while it could have a big impact on the total result. Eventually a workaround has been developed by using a so-called renormalization technique.



Overall, Paul Dirac has brought science a couple of helpful insights. During his career he developed ways of describing the behavior of quantum mechanics, and during his career he even earned a Nobel Prize for it in 1933, together with Erwin Schrödinger. He was a man with his own view on the world, which was sometimes respected by colleagues, but more often was driving them mad. He was very critical of everyone interested in poetry, saying: "The aim of science is to make difficult things understandable in a simpler way; the aim of poetry is to state simple things in an incomprehensible way". ■



Memorial at Westminster Abbey

Lockdown PhD: power/weakness of VoIP

By: Steven Beumer

More than half a year ago, when COVID-19 had not landed in the Netherlands yet, we had a poll with some of the students on when the university would close, meaning that we would have to work from home. At that time, we laughed about it and of course none of us really hoped that the university would close for a while.

Back to the present. Most of us have found a way to work at home or in the labs all be it limited; however, it still doesn't feel the same as before this crisis. A lot of our meetings and educational activities have been moved to numerous online platforms like Teams, Skype, Zoom, Big blue button, et cetera. Strangely enough these

meetings are more efficient usually, but make us feel more tired, a phenomenon which is dubbed as zoom fatigue¹.

Education strangely feels way more formal in the digital setting, we are running the master course on numerical methods at the moment and usually we saw the students for instructions four hours per week. Nowadays, we answer questions through a forum and through a canvas session where we just see the names. Where we normally would have a chat with the students and promote our awesome capacity group (EM), we now have just questions and silence.

My goal in writing this text is not just to complain about working from home or how isolated it can feel, I think we can

all relate to that. It is also important to look at the activities and things that are still possible.

For example, our highly important coffee and chat breaks were done on Discord to mimic our daily social interactions. Although these coffee breaks would never replace the real experience, even with better coffee at home, they helped quite a lot of us to feel less isolated.

A lot of the conferences that we would normally attend in person all over the world suddenly had to shift to online variants, and although networking is not really that easy in these sessions, it still feels like the real deal and it was still valuable to attend them; even if that means sitting at your desk until midnight due to time zone differences. In fact, it is easier to ask a question after an interesting presentation and presentations can be recorded and reviewed easier.

I have been lucky that working from home worked out quite well for me. There was finally time to write a paper and even to plan some little trips (to safe destinations). I am aware that for others these last few months were much heavier and sometimes undoable. I hope that, with each other's help, we will all get through this.

Concluding, I would like to say that although this crisis has asked a lot from everyone and is still affecting a lot of people nowadays, we should also acknowledge and value the new initiatives that it brought with it. I hope to see you all in a safe way on the campus, hopefully in the near future. ■



Taking a break from work

[1] <https://www.nationalgeographic.com/science/2020/04/coronavirus-zoom-fatigue-is-taxing-the-brain-here-is-why-that-happens/>

AME is an independent developer and manufacturer of high quality electronic products located in the top technological region of the world (Brainport Eindhoven). Our goal is to create innovative products that exceed customer expectations. We accomplish this by integrating product development and manufacturing and keeping a clear focus on the product and its function. Driven by technology, we strive for the best solution combining the disciplines of electrical, mechanical, software and industrial engineering. Through creativity, passion, ambition, motivation and a highly educated level of our employees AME secures its goal of being a profitable company.



Power Conversion



Internet of Things



Sensing & Actuating

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AME is the ideal work environment to develop hands-on experience while completing your studies. You will be involved in challenging real-world projects and work with experts from a multitude of technological disciplines. We invite you to get in touch with us to discuss any internship openings.



Virtual open day

By: Pauline Hoen

On Saturday October 10, 2020, TU/e held its first online bachelor open day. In a virtual environment, visitors could visit Eindhoven University of Technology. The lobby of Atlas and the Blauwe Zaal were recreated to give the audience a virtual TU/e experience. In Exhibit Hall 1 visitors could visit the booths of all bachelor programs. In Exhibit hall 2, the student teams and ESA were ready to answer questions.

As you can see by looking at the photos, the booths of Electrical Engineering and Automotive Technology looked quite real.

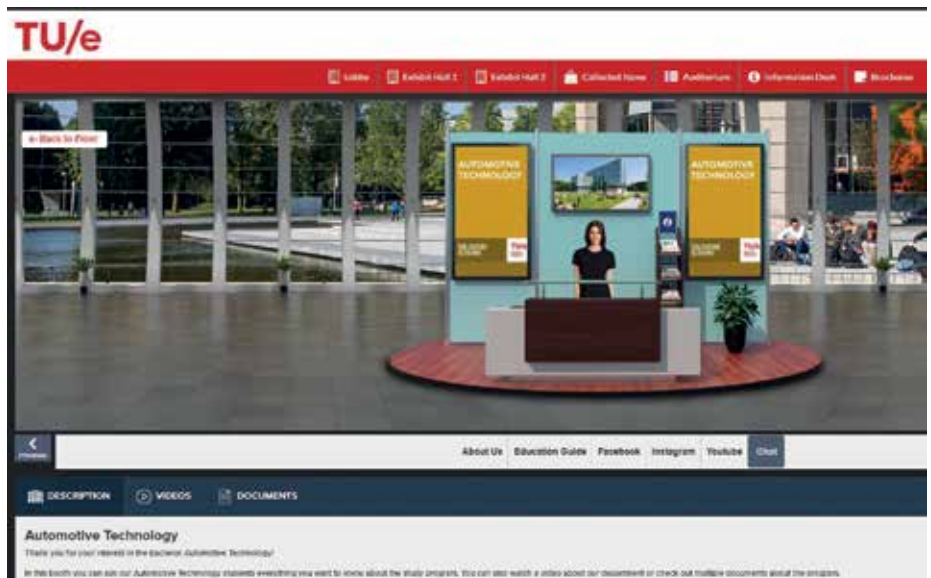
Because of safety reasons, the presentations were not held within the virtual environment built by Vfairs, as Vfairs uses Zoom for presentations. TU/e's company policy is not to use Zoom. Our presentations were therefore held in MS Teams. Inconveniently, visitors needed to go to a different environment to listen to the presentations. This ended up that some visitors never visited the actual virtual fair after listening to a presentation. Nevertheless, the six presentations each were well visited. Together, Automotive Technology and Electrical Engineering had about 600 visitors to the presentations.

In the booth we were able to answer remaining questions in the chat area, but also via video calls. The latter wasn't used very often as most visitors feel uncomfortable using the video call option.

All in all, the first virtual fair was a success. 1117 logins to the fair were counted and visitors rated it a 4.3 (out of 5). The next bachelor open day will be held on Saturday February 27, 2021. It is to be expected, given the circumstances, that this will be a virtual fair too. ■



Welcome by Frank Baaijens

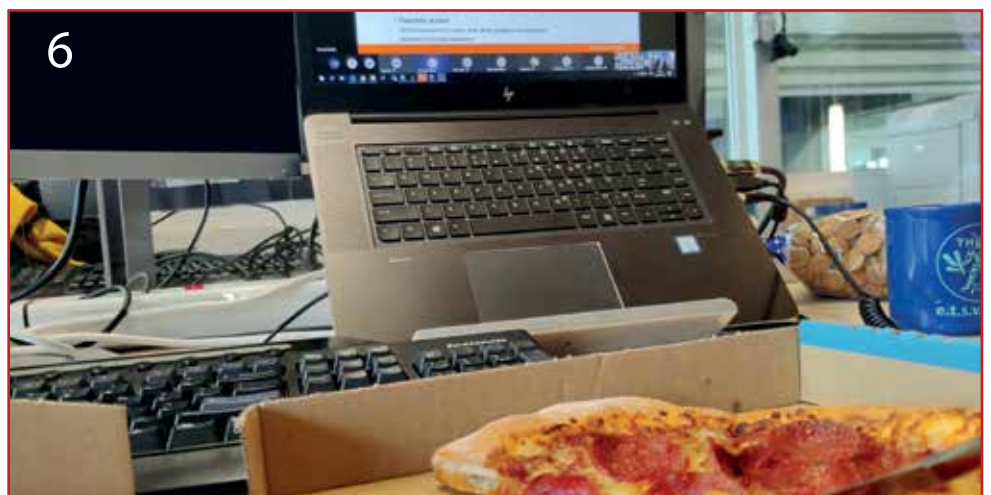


Digital information stand



Plenary session in the "blauwe zaal"





- 1 ACCI pubquiz
2. Tappersopdracht Joost
- 3 & 4. Candidate drink
5. FoodCo FoodGourmet
6. Lunch lecture Sioux
7. Monthly lunch September
8. Online beer tasting Van Moll
9. Opening Het Walhalla
10. Skelthorco Movie Night
- 11 & 12. Annual GMM

In retrospectThor

By: Mike Wilmer

At Thor, a board of the association is usually referred to by their board number, ranging from the 1st board at foundation, up until the current 64th board. As we've recently passed the golden boundary of 50 Connecthor issues, we're closing in on 'recent' board years. In the upcoming Connecthor issues, we ask a member of the board matching to the issue number to look back at their time at Thor. What has this former board member done at Thor? Has being an active member been a benefit to life after Thor?

Life-changing would be a great way to describe the effects that my time at Thor had, although that may sound overly dramatic. I remember that studying Electrical Engineering wasn't always easy. Being on the board of Thor was the first crazy extracurricular opportunity I took during my university life, and it opened the way for many more. Before going into those opportunities, I will tell you briefly why I started my studies, and after the opportunities at university I will tell you where it took me afterward, my current job at the Dutch Applied Research Institute TNO.

I am from a small town in Limburg, called Arcen. Walhalla experts may know this town for its tourist attractions, probably the Hertog Jan brewery. I studied in Venlo and had no clue where my life would take me. I was good at mathematics, German and English, but not at studying per se. I was curious, but also timid. My curiosity made me flirt with the idea of studying Psychology, but then I met an Electrical Engineering student from Delft at a fair in Evoluon. His message was simple: if you want to know how everything works, study Electrical Engineering. In many



Mike Wilmer at the OAJ 2012 photo by Bart van Overbeeke

ways I would find out he's right. Maxwell's "magic" is everywhere, and we studied so much more.

I started studying back in 2006. I lived with my parents at first, but travelling and working overtime weren't a great match with university life. I also still had to learn the discipline that's so helpful to pass those tough exams. More important

to me though, are a sense of belonging and a clear "why". After a year at university, I didn't have that feeling of home yet. In my second year in Eindhoven I broke up with my first girlfriend and strayed from studying. I considered doing something else, and then an opportunity emerged: Thor was looking for board members. A year of personal growth and people focus. That year turned out to be dramatic at times, and, as said before, life-changing. I leave the dramatic details for post-corona drinks in The Hague to those that feel invited.

I was a Secretary and Educational Officer on the 52nd board of Thor. We were a mini-board – two full-timers, two part-timers – and I learned that this asks for team spirit and expectation management. As our lives tend not to have a clear guide book, it took us a long time to figure that out, and the board year was quite hectic. That year has made me grow tremendously though, and I am happy for all the people that have helped keeping us and Thor together. On a personal level, I met people and got into places that define me until today. As an Educational Officer I developed a great network in the faculty and I got to learn about Education



Mike and the rest of the 52nd board



Participation, which later landed me a part time job at the Student Body, and later as an undergrad physics teaching assistant.

A full-time year at Thor got me connections for a part-time board year at its umbrella organisation, FSE, that in turn made me the student master of ceremony at the Opening of the Academic Year in 2012. After a Thor board year I got into a few committees. I learned many practical Linux tricks in the Computer Committee that I use in my current job. Most importantly, the Thor board and the CONTACT study tour to China led to the creation of the SATORI study tour committee, of which I became treasurer. I am incredibly proud of that trip to Japan and the inspiring team that made it happen.

Through personal growth, I also realized that I deeply care about personal expression. When I started studying I trained Aikido, which I continued in Eindhoven with the Samourais, and in which I received a sho-dan, a black belt. With courage from following up on opportunities at Thor and the faculty, I decided to join the Brazilian Martial Art of Capoeira and later (re)founded their association "Impulsao". I also picked up dancing Salsa and Zouk at Footloose. These Latin vibes had me longing for an international internship, preferably in Brazil. If you need things arranged and you have a network at hand, great doors can open. With a little help from a friend at the Signal Processing Systems group, a Brazilian PhD student, I acquired an unpaid internship at the Federal University of Rio de Janeiro. Through another friend I managed to get a place to stay with a Brazilian family that helped

me even to master the language. My stay there would take almost six months, to allow for a full month of Carnival. I managed to skip Dutch winter, and had several cultural revelations.

I finally graduated with the Electromagnetics department. A very welcoming, social and nerdy group that made me realize what I like about Electrical Engineering. On the edge of having-to-pay-back-the-loan limit, I graduated. My connections found me a temporary job at the university front office and a few months later I applied for a Traineeship at TNO. I had taken up on many exciting side quests, and worried that it might negatively affect my job hunt. However, a few months later I passed all the interviews for the program. I spent two years working in three different departments: Computer Networking, Quantum Technology and Intelligent Imaging. I eventually found a permanent work place at the Data Science group in The Hague, where I work a bit on data visualisations and a lot on data engineering and software integrations. My life has changed a lot since, and thanks to, Thor. I have grasped many opportunities and now live in a lovely city by the sea, albeit no Rio de Janeiro. I live here with my Brazilian girlfriend Bruna and we were lucky to have had a long holiday in Brazil last January, before Corona happened.

Looking back at my job interview for the traineeship, I see better why I got the job. My CV is not standard, it shows the quirky opportunities I followed up on and the things I care about. And my grades show that if I really care about something, I can nail it. (10s for Electromagnetics, I'm still proud of that <3). Finding what you care about and showing that, is really important, and opportunities to discover and show those passions come along. I'd like to challenge you to take on those opportunities, be it at Thor or elsewhere. ■

Name: Mike Wilmer
Current job: Scientist Innovator at TNO Data Science, The Hague
Studied EE: 2006 - 2016
Activities at Thor: Secretary, Educational Officer, Computer Committee, Web Committee, Treasurer Satori Study Tour committee
Other: Secretary at FSE, Black belt Aikido (Samourais), Co-Founder Capoeira Association (Impulsão), member of Footloose, voluntary bartender at Bunker; currently on the board of the Young European Associated Researchers (YEAR) network.



Re-reading “De Maat van Techniek”

By: Jan Vleeshouwers

While away for holidays, I re-read ‘De Maat van de Techniek’, a book UT philosopher Hans Achterhuis compiled in 1992 to present and interrelate the views of six early 20th-century philosophers, who were the first to consider modern technology explicitly.

My parents gave me this book as a present when I was doing my PhD research in the 1990s, but it did not resonate with what I was doing then. Presently, the question of what technology is to mankind is much more meaningful to me. I’m fascinated by its tremendous power to change life, I’m more than a little uneasy about controlling this power and I’m astonished by the discrepancy between technology’s omnipresence and the permanent societal change and instability that accompanies it. More particularly, I worry about educating engineers without giving them any general idea of technology, the very focus of the lives ahead of them.

Regrettably, the picture which emerges from the reviews in ‘De Maat van de Techniek’ is hardly one to go by for a life in engineering, mainly because the three overall leads are depressingly pessimistic.

The first general conclusion is that modern technology has become an autonomous force, beyond human control. Man’s sole focus has become to extract resources from nature. From a different perspective: man’s development is lagging behind, so his response to technological development is largely inadequate. Humans are unable to imagine what technology allows them to do, so they proceed blindly; societal organization (e.g. division of labor) is making this even worse. Ethical guidelines are difficult to adhere to and are easily put aside. Innovations resulting from technology erode societal institutions, the corner stones of human life.

As if this is not pessimistic enough, these philosophers construct a solid and rigorous thought edifice around technology, so solid that they are forced to admit that they don’t see a way out anymore. Their analysis has become a trap which puts an end to all hope for a change for the better.

Another general impression from the reviews is that the criticism and the pessimism explicitly includes society and its organization into the picture. Technology is not an isolated activity. Mumford suggests with his mega machine (the origins of which he dates back to prehistoric times) that technology may have been catalyzing developments, but has not been central to whatever endangers society today. The other philosophers also primarily discuss societal problems, and bring in technology rather abstractly, as a homogeneous entity. It is an essential aspect of technology that it has been thoroughly woven into society. But I suspect that the abstract perspective is also caused by the fact that the affinity of these philosophers with technology is also quite limited.

A final lead in the reviews is the observation, perhaps even complaint, that words and language are limiting what needs to be said. Heidegger creates his own dense conceptual forest, but others also have trouble expressing their thoughts. Along with societal changes, language changes as well, to the effect that what is abandoned by society cannot even be spoken about anymore since the words that used to be applicable have unobtrusively altered their meaning. Societies continuously create Newspeak, which is a serious obstacle for reflection.

So, these observations are almost thirty years old. What has happened since? Achterhuis’ successor at UT, Philip de Brey, wrote a short paper² in which he summarizes subsequent developments.

He signals the above-mentioned pessimism, the associated determinism and the lack of technical specificity as root causes of the philosophical development since the 1990s, which has been termed ‘the empirical turn’³. Philosophy of technology ‘*should be more empirically informed, should focus more on concrete practices, technologies and artifacts, should generally engage in description before engaging in evaluation, and should employ a less deterministic, more constructivist or contextualized conception of technology.*’

De Brey evaluates this development against the main goals of the philosophy of technology: to provide an understanding and an evaluation of technology and its consequences for society, and to provide directions for how to act in relation to technology. The *empirical turn* stimulated a ‘*less deterministic and more descriptivist or neutral stance towards technology.*’ It ‘*tends to accept that we live in a technological culture in which the constant introduction and utilization of new technologies is a normal part of how society works.*’ Although moving away from the suffocating pessimism is very welcome, ‘accepting’ is not a particularly philosophical attitude. It seems as if philosophers have flinched from the tough questions they see themselves posed. Or did they perhaps succumb to the current system of funding research? Understandable, but hardly helpful. So, it is not a large surprise that De Brey is concerned that ‘*society-oriented philosophy of technology and technology ethics as they currently exist are not sufficiently equipped to provide full and cogent answers to*’ the questions above. He suggests an agenda for the philosophy of technology that is directed at developing theoretical background. From a distance, this looks as if we are back where we left off with ‘De Maat van de Techniek’. My general fascination and worries remain quite unaddressed.

[1]: Hans Achterhuis (ed.), ‘De Maat van de Techniek’, AMBO (1992). There is no English translation of the book. It reviews the works of Jacques Ellul, Martin Heidegger, Günther Anders, Hans Jonas, Arnold Gehlen and Lewis Mumford.

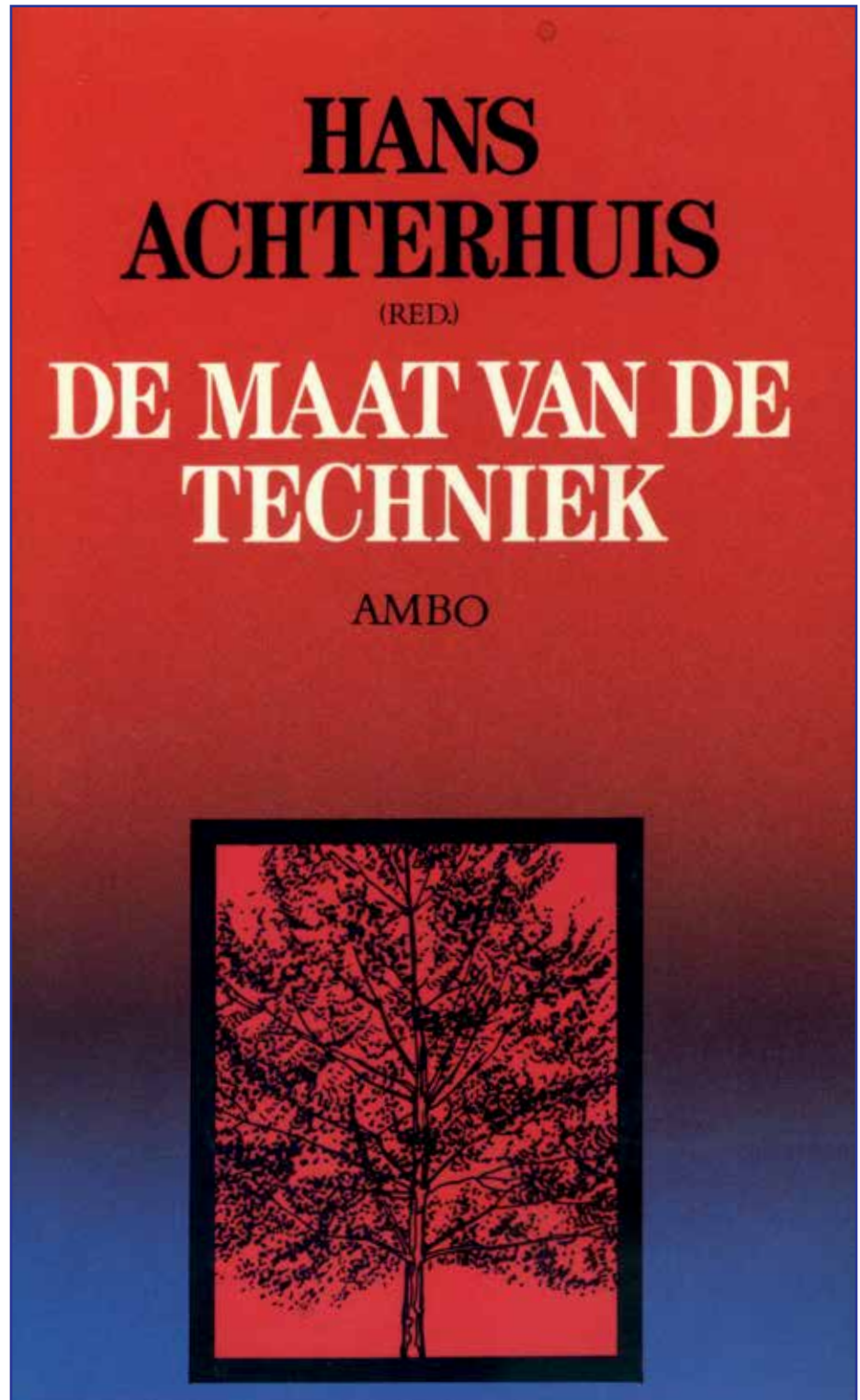
[2]: Brey, P., ‘Philosophy of Technology after the Empirical Turn’ *Techné: Research in Philosophy and Technology* 14:1 (2010).

[3]: With relevant contributions of Anthonie Meijers, who recently retired as professor of Ethics at TU/e.

What about my specific educational demand, our general message about technology? There are at least two topics worth mentioning.

One of the topics is ethics. 'De Maat van de Techniek' is pessimistic on whether there can be a sufficiently powerful ethics to counter improper technological development. De Brey doesn't have high hopes either. Apart from missing theoretical basis, he says, *'very little work is being done to address the question how new technology can be developed in a morally responsible manner. On the one hand, ethics of technology focuses strongly on social-ethical issues concerning technologies that already exists, and, on the other, on the general responsibilities of engineers.'* If this is right, isn't our ethics education like spitting at a fire? If we cannot address the topic more seriously, aren't we just wasting our time? The concept of responsible innovation may be attractive, and recently got momentum through the Dutch 'Teacher of the Year' award for Johanna Höffken⁴.

'De Maat van de Techniek' also suggest a shift of focus for education. Günther Anders concludes that many of the worst activities of mankind are not characterized by a surplus of evil, but merely by a lack of imagination. Anders' ideas were shaped by the 2nd World War, but present day examples abound. He argues that we should train our moral and social imagination, to find its potential and its limits and to become sensitive to the social pressure which makes us conform and adapt. This pressure may be subtle, and as Anders remarks, often has technical aspects, such as efficiency or convenience. It is easy to go with the flow, but it may not be the best thing to do. Being conscious about the fact that there is a choice at the start and the essence of making a difference. If this sounds like the lifeblood of an academic education to you, we couldn't agree more. ■



[4]: See <https://www.tue.nl/en/news/news-overview/23-06-2020-johanna-hoeffken-elected-dutch-teacher-of-the-year/>, or <https://studiegids.tue.nl/opleidingen/bachelor-college/use-leerlijnen/responsible-innovation-for-the-world/>.

Cable pooling: electric buses

By: D. Londema

Witteveen+Bos is an international multidisciplinary and independent engineering and environmental company of Dutch origin, with approximately 1,300 professionals spread over 20 offices in 11 countries. Witteveen+Bos is strongly connected to universities including the TUE, within this framework internships, and master thesis in the field of electrical engineering are part of our strategy. This paper is providing more insights on a thesis developed on the topic of Cable Pooling.

"The biggest challenge at the moment is to estimate how much power is needed", says Van Rookhuijzen. He spoke on behalf of ELAADNL during a conference on zero-emission mobility of the Amsterdam Transport Region. During this day, the mobility sector and the energy sector were brought together because in 2030 the emissions of public bus transport must be zero. This will save 320 kilotons of CO₂ per year, compared to 2018. The route to this zero-emission bus transport is shown in the overview in the left column.

Over the past four years, Witteveen+Bos has done all kinds of projects in this area, for example: feasibility studies in Zwolle, Breda and the Gooi- en Vechtstreek, designing the charging infrastructure for buses in Zwolle and the depot for buses in Utrecht. Also the automation of bridges and high voltage projects for, among others, TENNET.

As a result of this zero-emission goal, PricewaterhouseCoopers (PwC) has conducted research into improving the realisation of zero-emission bus transport. PwC emphasises that effective cooperation with the various parties will ensure the lowest social costs.

This has raised the question of how Witteveen+Bos can contribute with a Cable Pooling strategy and what the

potential can be. In a nutshell, what is the effect of Cable Pooling on the use of the grid connection in a charging infrastructure for buses?

Definition of Cable Pooling

The definition of Cable Pooling is the optimisation of the use of the grid connection by bundling different consumers. A distinction is made between the three variants of figure 1: sharing everything (charging method and infrastructure), sharing charging infrastructure and sharing grid connection.

Similar projects

In the solar energy park De Grift in Nijmegen Witteveen+Bos has applied Cable Pooling by connecting four wind turbines (10 MW) to the existing 10 MW of solar generation. The profit that is made here are tens of percent on the costs and a few percent loss with regards to the generation. The strategy for cable pooling has never been used for transportation purposes.

Limited space

One of the advantages of bundling charging infrastructure is the space that will be saved. If we consider where the major bus stations are located, the space available for charging infrastructure is limited. Ideally, the radius of the circle where both the pantograph and the charging infrastructure should be located between 100 and 200 meters.



Background

2013

The Energy Agreement for Sustainable Growth contains agreements on renewable technologies, energy conservation and incentive policy.

2016

The Administrative Agreement on Zero Emission Public Bus Transport states all new buses will be zero emission from 2025 and all buses will be zero emission from 2030.

2018

The objectives of the administrative agreement are broadly confirmed in the Climate Agreement.

2025

All new buses must be zero emission. By 2025, the new buses will use 100% renewable locally generated energy or fuel.

2030

Public bus transport is completely zero emission. This will save up to 320 kilotons CO₂ per year compared to 2018.

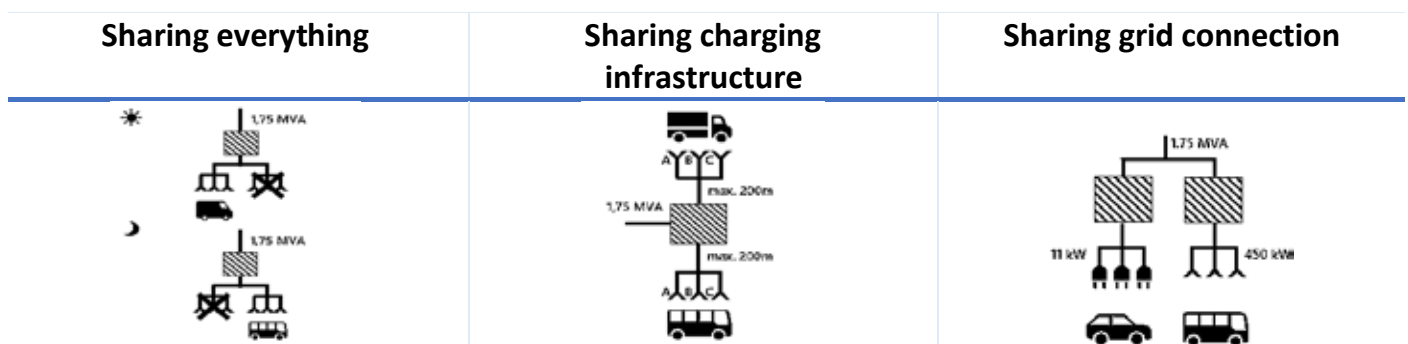


Figure 1: Possibilities of Cable Pooling

For example, the Amsterdam Bijlmer ArenA bus station, shown in figure 2, is located in the middle of a densely built-up area. Next to the bus station with multiple carriers, there is a train and subway station, a stadium and several parking garages and offices. Since Cable Pooling reduces the use of space, it could be the right solution for a location like the Amsterdam Bijlmer ArenA.

Cable Pooling applied

If Cable Pooling is applied, the potential situation will be compared with the situation as it will be if Cable Pooling is not applied. These two situations are called Cable Pooling and No Cable Pooling.

No Cable Pooling is the standard situation in which each carrier installs and manages its own charging infrastructure and grid connection. For example, in a hypothetical situation four carriers of a location have installed their own infrastructure. The profiles of the power usage of each carrier in the busiest hour of the week are shown in figure 3. If we take a look at the power usage of each carrier, it is notable is it never constant.

Cable Pooling is the potential situation where the cable pooling strategy is applied. In this hypothetical location, the usage of the different carriers is added together and it results in the line Cable Pooling.

One of the advantages of Cable Pooling is a more efficient use of the installation so that the average usage of the grid connection is much lower. So, when Cable Pooling is applied optimal use is made of the installation.



Figure 2: Limited space at Amsterdam Bijlmer ArenA.

In addition to this, Cable Pooling is a space saving and cost saving, both capital and operational, strategy. However, there are no savings on energy consumption, only on the grid connection costs.

Energy usage is still far from constant and it has been partially optimised by adding a charging plaza for electric cars. This is the 'Cable Pooling & Charging Plaza'-line of figure 3. The power available to use at the charging plaza depends on the efficiency of the use of the grid connection, in this study a maximum 30% of the total usage. Although this evens out most highs and lows, further research is necessary to achieve the optimal situation. For example, research can be done into peak shaving or other solutions to

optimise the usage of the grid connection. Are you interested in doing research at Witteveen+Bos? Let us know!

Witteveen+Bos projects

We believe in the strength of a personal touch and the added value of working together. In addition to the specially tailored internships, graduations and jobs we design together with each individual, we organise two multidisciplinary weeks in which we tackle a problem with a small team, work towards a solution and develop this into a Proof of Concept. Or, when we have higher expectations, a team works within a week to a defined solution. This way we stay up to date with the latest technologies, knowledge and developments. ■

Are you interested in an internship, to graduate or to work at Witteveen+Bos?
Contact us at theo.ludlage@witteveenbos.com or take a look at the vacancies at our website.

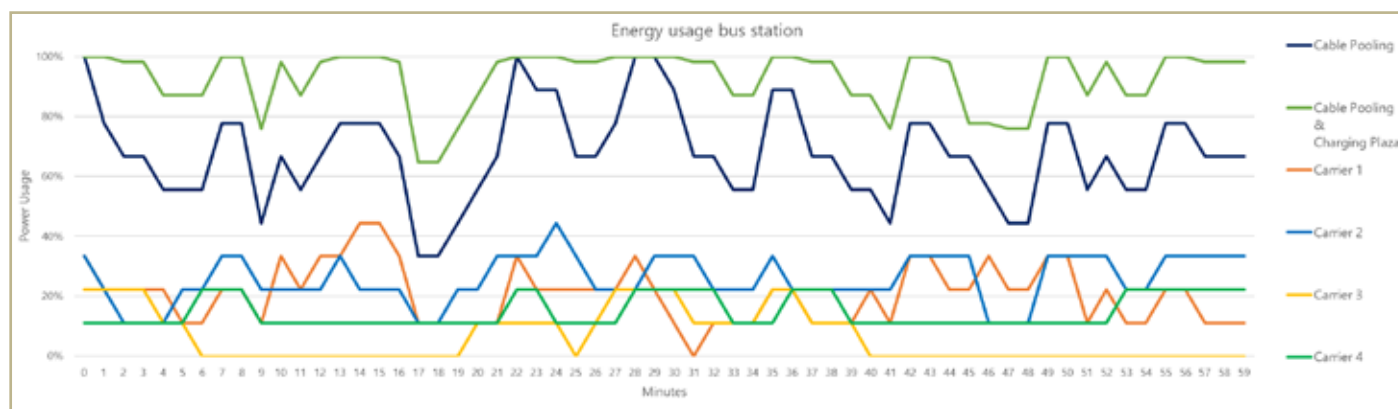


Figure 3: Energy usage example bus station with four carriers

Wervingsdagen: EXTRA LARGE!

By: Nicky Roijen

Most people reading this will know me as Treasurer of the 63rd Board of e.t.s.v. Thor. In the first half of my year I have enjoyed the many activities that our committees have organized or that I have been able to organize together with my fellow Board members. This all came to a sudden stop when, after an amazing Carnival, we had to change the course of our association and dive into a completely new world to discover. With weekly changing guidelines, it was quickly decided to get everything up in the air and run our association digitally. In the end, I think we, as a Board and as an association, have done a great job. This was the same period in which the search for the 64th Board took place. Knowing that the start of their year would be completely different than any year we

have seen so far, I have the greatest respect for them that they started this weird journey.

Thor hasn't been the only association which felt the effects of "the new normal", other associations have also had their fair share of problems. Together with all the other study associations at the TU/e this new normal has been given a place within every association. Unfortunately, there has been one part of the study associations which had it a little bit hard: Wervingsdagen. Few days after the start of the first lockdown, we received some e-mails about them having trouble finding a new group to organize next year's events. Since I think Wervingsdagen has a very important role within the TU/e, and this year would probably bring a lot of new challenges, I

decided to join them in this journey. So, with pride, I can also call myself Event Coordinator & Safety Manager of the 40th Board of Stichting Wervingsdagen.

Since this new year of Wervingsdagen would have some new challenges, looking at the current situation, we thought it would be extra important to emphasize the importance of safety of all our attendees. To do this, we have added a new Board function: Safety Manager. Since I am Safety Manager, it is my job to be up to date with current guidelines and keep an eye on which roads we have to take during organization. One of the roads we took very early in our Board year was to organize the Skill Sessions completely online. We quickly saw that



Photo 1: Nicky Roijen & Kevin Grinwis; Event Coordinators of the 40th Board of Stichting Wervingsdagen.

in December there still would be some guidelines and we didn't want to take a risk here.

However, for the Career Expo this choice is a bit more complicated. For this event interaction between student and company is key. To make the same kind of on-campus interaction possible in a digital environment is a bit of a challenge, but it is a challenge we think will be worth trying to overcome. This interaction should feel as natural as possible. If we decide to make the event on-campus, it should be possible for every student to attend it in a way that they feel safe. Wervingsdagen is not alone in this decision, a project team consisting of parties from the TU/e is looking with us on how to take on these challenges. On top of that we have close contact with the study associations to see how they are handling new regulations and what we can learn from them. Aside from contact with parties related to the TU/e, we're also in contact with different career associations across the Netherlands, companies

that may help us with organizing a digital event and companies that will attend the Career Expo to see in which conditions they will attend it. Together with all these different parties, we are trying our best to ensure the best possible Career Expo.

Our final event is the Interviewing Days. This event is a bit later in the year and there is still some hope that regulations have been toned down in such a way that more physical activities are possible. Even though it is our last event, there already has been contact with companies about possibilities for new, creative ideas or for options of having the regular activities in a safe way. There has also been contact with different venues to see if they have the possibility to host our event with certain restrictions. So far, most of the venues we have visited had multiple possibilities to host the Interviewing Days with a variety of group sizes, even when taking social distancing in consideration. So, we are looking at organizing this event with a lot of positive energy.

Doing a board year at Wervingsdagen during the pandemic is a bit weird, knowing all three events will look more different than ever before. However, as the 40th Board of Stichting Wervingsdagen, we don't see this as an obstacle. We look at it as a mandatory try-out for a new period of our events. There may even be some parts that will stick around for longer. We shall see, and we shall make it EXTRA LARGE! ■



Photo 2: The 40th Board of Stichting Wervingsdagen. F.l.t.r. Anouchka Morsink, Nicky Roijen, Steven Borm, Kevin Grinwis, Renske Koets, Vincent Engbers, Sander van Gansewinkel, Pascal Ickenroth.

Pie previous puzzle(s)



Jürgen congratulating Steven Beumer with a goody bag for getting the Alliander puzzle in the June issue correct.



Sanne congratulating Niek Brekelmans with a pie for getting the puzzle in the March issue correct.



Sanne congratulating Henk Huisman with a pie for getting the puzzle in the September issue correct.

Puzzle

Answer September issue:

The second square was of course the odd one out, as it was the only one that actually wasn't odd. All other objects had a distinct, unique feature, except for this square.

Puzzle December issue:

You have two hourglasses, one which can measure 7 minutes, the other 11. However, you want to know when 15 minutes have passed, how do you do this?



And... action!

By: Tom van Nunen

Almost ten years ago, the Dutch government started making plans to stop handing out the study grants, and convert them to loans. Every four years, a few months before the national elections, some political parties start to talk about rolling it all back. Who knows whether it's really going to happen, or if it's just an election trick.

When they announced the plans, I was in the Board of study association Thor. As you might imagine, this news hit us hard, as it could mean that students would focus only on their studies, and spend much less time on personal development that associations can provide. The expectations for student life as we knew it were not the best, so to say.

We were not the only ones who were worried, and therefore a large manifestation was organized at the Malieveld in The Hague. The TU/e arranged multiple buses to enable students and staff to join. I brought my cowbell to make some extra noise. I still remember that it was on a Friday, and, needless to say, not everybody liked the loud sound coming from the cowbell I guess nothing beats the Thursday-night drinks.

This was one of the only times in my life that I've joined such an activity. I guess that maybe I just haven't had a lot of these issues cross my path. This does, however, not mean that I don't care about anything.

One of these things has already appeared in one of my columns a while ago. It's not something that is worth protesting with signs and banners, but I do find it important that people think about it.

Every morning, I park my bike in the stands below Flux. Almost always, there is someone waiting for the elevator, often with a phone in their hands. When I take the stairs to enter Flux, there's often a lot more of them waiting. I find it fascinating how some people choose to just stand there and wait, even if it would be faster for them to take the stairs.



In this respect, I recently received unexpected help in my cause of getting people to use the stairs more often. The recent corona-related elevator regulations at our university make the waiting times even longer, encouraging people even more to start looking for alternatives.

I truly hope that this new insight will also encourage more people to take the stairs during their working day, for example when going to a meeting or lecture. Even though it might not always be faster, I think one of the things that working from home has learned us, is that it's not at all a bad idea to get up from your chair every once in a while; move around a bit, take on a different pose, divert your eyes away from the screen.

It might be difficult for some people to get enough daily exercise. Let's face it: not everybody is a born athlete, me included. Maybe that's why I like the idea to get some free exercise during the day. It won't get you to the Olympics, but hey.

Don't be afraid: it would take a lot for me to start wearing a yellow vest, pick up a sign, walk around near the elevator and yell at people how bad the elevator is. I might bring it up every now and then, but that's about it, really. But thinking about it like this makes me wonder what it would take for me to take action like that. Maybe we'll never know. What would it take you? ■

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**AT THE SKILL
SESSIONS**

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SHOW YOURSELF

**AT THE
CAREER EXPO**

9 - 10 MARCH 2021

PITCH YOURSELF

**AT THE
INTERVIEWING DAYS**

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