


12-2

ASTATINE

Volume 12
Number 2
April 2017

ATTENTIE

Periodical of S.A. Astatine



Introducing the
SSA board



Pop Culture

BAZINGA!



Interview with a
Sodexo employee

Autonomous cars

The "ATTentie" is the periodical of S.A. Astatine, which is issued four times a year. The ATTentie is distributed among members of Astatine, sponsors of Astatine and employees at the University of Twente connected to Advanced Technology.

Volume 12 / Number 2 / Issue 49
Copies: 750
Date of issue: April 2017

Editorial staff

Jasper Gerritsen • Editor in Chief
Frank Esselink • Editor
Jelle Schrief • Editor
Yannik Wotte • Editor
Sander de Ridder • Editor
Roos de Vries • Editor
Christophe van der Walt • Editor

Address

S.A. Astatine
t.a.v. ATTentie
Post office box 217
7500 AE Enschede
Tel. 053-489 4450
Bank: 1475.73.769 (Rabobank)
attencie@astatine.utwente.nl
www.astatine.utwente.nl

Printer

Impakservice IJmond
Tel. 0251-272 430

With thanks

Ralph Brantjes, Cham Bustraan, Zahra van Egdome, Elise de Groote, Herman Hemmes, Bas Koster, Paul Rupert, Roelof Jan Velthuijs.

If you want to contribute to the next ATTentie, you can send in articles via email: attencie@astatine.utwente.nl
Authors remain responsible for the contents of their works.
The editors preserve the right to modify or reject received articles.

© S.V.A.T. Astatine 2017, all rights reserved.

Fresh

- 11 Diary of a German
Yannik Wotte
- 14 Autonomous cars
Daphne van Dijken
- 26 Pop culture
Christophe van der Walt
- 29 Meditation
Yannik Wotte
- 30 Magnetars
Jasper Gerritsen
- 34 Fooling neural nets
Jasper Gerritsen
- 36 Insects
Frank Esselink

Astatine

- 4 From the AT Staff
Herman Hemmes
- 5 From the Astatine board
Roelof-Jan Velthuijs
- 10 Dies, Astatine's birthday
Ralph Brantjes
- 12 Introducing the SSA board
- 18 Astatiny

Recurring

- 2 Colofon
- 6 Interview with Paul Rupert
Christophe van der Walt, Jasper Gerritsen
- 20 Photo pages
- 22 Interview with Fred
Roos de Vries
- 39 Cheerful Chef
Zahra van Egdome



Dear reader,

I'll be gone now. It's the 49th edition ever and I'm proud to have contributed to a whopping 20 of those. Joining the ATTencie as a first year's was a great decision. It gave me the opportunity to work on my design and writing skills. Unfortunately, all things must come to an end, and thus my ATTencie career ends with this edition.

I'm happy to introduce our new Editor in Chief, the very bright Roos de Vries. I am sure she will continue the legacy of the ATTencie very proficiently.

This edition we have some really good stuff lined up for you. Yannik gave you some insight into his life in his diary and Frank wrote about insects and the lack of criticism in journalism! Very surprisingly, Roos interviewed a Sodexo employee.

Enjoy and goodbye,
Editor in Chief,
Jasper Gerritsen

From the AT staff

Herman Hemmes

Time for change and time to choose
At the time of writing it is January, only a short while after the new year has started. This time of year often inspires resolutions to change things and/or make certain choices. I was thinking about changes and choices related to my work as part of the AT program.

When thinking about changes, my first association is module 1. Is it time to change things?

The answer is yes! The first ideas for changes in content and organization are already forming. The first thoughts for coming academic year already started to form after the feedback and the evaluations at the end of the module.

For instance, the math line in the first year has been adapted, which affects the first four modules. Next to that, the content of modules 4 and 5 is being reshuffled. In order to keep all aspects also available for students that deviate from the regular study planning, the implementation will take two years. For other modules, the changes in content and organization are smaller, but still relevant, as they are intended to improve the module. Like in module 1, these changes are a result of evaluations and the experiences of the teaching staff. Looking at the big picture, the AT program is not static, but is continually adapted to meet the current needs.

Making choices is also a big part of the

AT program. Already in Module 6 in the second year a choice can be made between topics from different specialization available to AT students (to get a taste, so to say...).

All these choices are closely related to the “big choice”: choosing a master program. The most important ones being:

- Which master program? at UT or abroad?
- What to choose for the free module(s)?
- Do a semester abroad as exchange student?
- What is an interesting bachelor assignment topic?

For most standard options (at the UT) information is available on the AT website. If you go for something more exotic, the effort needed to come to a result increases. Especially for a semester abroad or a master abroad the preparation needs to start quite early. To help the students explore the different options, information sessions on master programs and an info session on the bachelor assignment are organized. Also, help in finding and preparing for the bachelor assignment has been created, in the form of the course Preparation Bachelor Assignment.

Most importantly, when the process of struggling through the options and choices becomes a chaos, there is always the study advisor who can offer advice on how to tackle the issue at hand.

From the Astatine board

Roelof-Jan Velthuijs

Half a year has passed already! And what a blast it has been so far. However here I want to talk about one of the weird realizations I had lately. The time of finding a new board has begun.

As the beginning of the year is quite hectic, you are busy getting acquainted with all the ins and outs of being a board. You are running around trying to get the grip on all the tasks you have and want to do. However now that I have gotten the grips of what's going on, the search for the next board has already started. I guess time flies when you are having fun.

The first thing that we try to do is pick up everyone's attention about the possibility of becoming a board. Making people think about it is important, as a whole year will probably be devoted to be a board. A few activities are organized as well to understand the different aspects of being a board. Then it is their turn to make the most important

decision: do I want to become a board, yes or no?

And then everything goes really fast. During the 4th module, we had to get the hang of all that was becoming a board. We had to think of a direction to go to with the association, get to know the other associations and learn function specific skills. This is also the time wherein you get to know your new fellow board members quite well, and it was such an epic time to be alive.

Anyway, im getting carried away right now. I'll leave it at this. If you want to know more about being a board member, come by the board room and talk with us.

I hope you enjoy this ATtentie,
Roelof Jan Velthuijs



A talk with technical staff Paul Rupert

Christophe van der Walt and Jasper Gerritsen

Could you introduce yourself?

Well, you know my name, so that's no secret. –laughs- I'm 52 years old, I'm married and I have three children: one daughter and two sons. I live near Haaksbergen, and I've been working here for already thirty years. So I was twenty-two when I first got here.

Were you interested in technical matters in your childhood as well?

Yes, it started with cars and motor cycles: a lot of experiments with these and then we would build electronics: parts of transmitters, amplifiers; that kind of stuff.

Just as a hobby?

Yes, as a hobby, but also as a group. We would do it together with a lot of friends. This was throughout high school, but also in my village. It started with making a club for people who were interested and then you start to build something together. I was ten years old then.

And that went on throughout high school I imagine?

Yes. I went to high school and then I went to an MBO, I studied electronics, electrical engineering and then technical industrial automation. Then,

in Eindhoven, I studied optics. Then there was a possibility to go work at the UT's ICT so I studied this as well (AMBI-modules and a lot of workshops).

Can you tell us a bit more about what that period was like for you?

Yes, I started here at the UT as an intern. They told me that there was a possibility to hire me at a later date. I went to another factory for half a year and then there was a place for me at the UT. It was clear for me and I came back.

Directly as technical staff?

Yes, it started with being an amanuensis (lab assistant) at the practical rooms. The practical lessons were different from nowadays. Back then the people in the second year had a period of four weeks where the first hour of a day was theoretical and then they spent the rest of the day on doing experiments. There was strict control on preparation and the practicum lessons where measuring technique, optical, digital technique and simulation (analog and digital) As an example; no computers or webcams in the optical room but photo cameras with film rolls, students had to make the pictures with

cameras and then develop the photos themselves, so that was a lot of work and I did the logistics for this and the instruction for this.

And where were you based back then? I can't imagine the Carré was even thought of yet.

Ah yes, I was based in the Hogekamp. The rooms were bigger than nowadays and we got more rooms. This was necessary because the setup of the experiments was larger, nowadays the experiments are a lot smaller. You can put them on tables. I was a member of a practicum group there but was also technical staff for a research group there.

So you were also a researcher at the same time?

In a way. I had to build the technical setups for research. By way of an example, we, as a group, had to build a heat exchanger for district heating and we did installed those in Utrecht, Nieuwegein, Almere also in the big greenhouses near Delft.

And do you think the atmosphere of the University was different back then?

Yes it was. The great difference is today, there is little time

to cover content. So, you don't have the time to learn, to really finish things. In the past, there was enough time to do the measurements yourself and to prepare yourself for the next time. Today when you are finished, there is always another project starting right after that.

You have no time to reflect.

Yes, I think that must come back. You must find some time to have in reserve, some spare time. So you can look back.

Yeah I think a lot of students feel that way.

Yes. It's not only the students, it's also the staff who don't have time. If you look at all the equipment in the chemistry room, I have downsized them and made new ones. Everything that's in white [insert picture(s)] at the other side of the room is designed by me, I have made them. Before, there were a lot of very big scale experiments, so I have made it to table size. That's one of the things I have been working on in the last twelve years. We couldn't take them with us in Carré, because the rooms are very small.

Interview: Paul Rupert

Could you give us an example of the new chemistry set-ups you've made?

If you want I can show you pictures of how it was compared to how it is now. That's no problem. I will look up some pictures of how it was in Langezijds and how it is now (see below).

Maybe it would be interesting now to elaborate a bit more on the work you did in the factory before you came here?

It was to service heat exchangers. This work was not really what I wanted, too monotonous. It was in the eighties and there was not so much work at that time. In our home the motto was: first have a job and then continue looking, and that's what I did. Before I finished my study, I worked at my parents' grocery store. When my father died I had

Figure 1 - The old Langezijds chemistry setups



to take it over. So I temporarily stopped school and this took about three years. Most of the work was in delivering some ordered food/stuffs to customers.

When was this, were you working at the university?

Yes, this was at the time I was in school, so I left school for one year until everything was going smoothly in the shop and then I started at school to finish it. But every day after I left school I went home and worked at the shop to do the work.

So you didn't have much time left doing all of that

No, but in our family also when I go to school and I come back I must first help around the house and then we would have dinner and then I could study. So I had to work before I could start studying.

Figure 2 - The new ones



So it was sort of normal in your family...

Yes, we were very used to this, and I think in all families in an environment with a lot of work (companies and farms) were too. In addition, life in small villages often involves larger areas around the houses and they want to make a big garden. This is not always possible in a big town. Many students now also have to work to pay for their studies, so the situation has not changed much!

What about your hobbies then?

The greatest hobby is my family. One of my children does horse riding, so that's a lot of work. But now she is 22 so we are trying to tell her that she must do it alone. –laughs- She is working now and is also studying accountancy at Nyenrode business university. She had six horses so... –laughs- she is bringing it back to two and that must happen before July. Then I have a son who needs support because he has a handicap. He loves to work in the greenhouse. That's also a lot of work. I go with him for swimming, two times a week. And the other son does mountain biking so that's also some work. And then I have

three motorbikes, old timers from the fifties, and I am preparing them to make them new. So that's a lot of hobbies. –laughs- **I don't think you have time left after that**

No I don't think so. I have my own house and a piece of land for the horses and the green garden so I have to maintain this. Then commitments to the clubs/ villages are taken time too. [...]

Maybe that's a nice last question, what do you think of AT? Would you consider studying it if you could go study now?

Well... It's not easy. I love to calculate, I love mathematics, I love engineering and electrical instruments. I don't know if I want to do that, but I like creative things, and most of all working with my hands. AT is probably a good decision if you want more than only theoretical things. Yeah, I must say though, I love the enthusiasm in the students. That is why I do this job, people build stuff in their own time. For a smile of a student I will do a lot. –laughs- **I think that's a nice closing statement.**

Dies: Astatine's birthday

Ralph Brantjes

On the 23rd of December, the official Dies of Astatine took place. That is why, on the 20th of December, Astatine celebrated their 12th anniversary! The 13th board of Astatine took this opportunity to show their culinary skills to all its members. As entrée, we got to enjoy a nice soup, some lovely Dutch 'hutspot' as main course and (my personal favourite) monchou cake as dessert.

After the very enjoyable dinner the 13th board of Astatine donated a keg of beer, a 'fustje', to all its members and the 13th board of Astatine had the great idea to combine this with about 60 dice. Here is where you can see how Astatine is a tad different from associations like Abacus: where Abacus would start playing massive games of Yahtzee, we, the ladies and gentlemen of Astatine, started throwing dice in each other's beers forcing people to chug their beers and take the dice out.

This meant that the fustje of 50 litres was gone in about 30 minutes: great job people!

After this barbaric tradition, naturally, a game of good old-fashioned beer relay had to be held. This was of course won by the BOSS because they are 'Pilsbazen'. Everyone had a very fun time and it sure was an anniversary to remember. It was the perfect drink to end 2017 on and celebrate Christmas and new year's. On behalf of the whole association I would like to thank the 13th board of Astatine for cooking us a tasty free dinner and organizing the most escalating Astatine drink of the year!



Diary of a German

Yannik Wotte

29th January 2018
Entry 1089.b

Paragraph 1a
Guten Tag Diary,

Today, a person was a whole minute late to one of my meetings. I showed my dismay by politely saying nothing about it whatsoever, carefully controlling body language to hide my upset. If this occurs again, I may consider breathing heavily or sending charter 32C on good manners.

Paragraph 1b
The author must excuse themselves, all the turmoil made them go lax on their behavior. The introduction, conventionally displayed in paragraph 1a, follows now: The treated account of day 20.49/Q (See introductory book for explanation of code) is written in the Netherlands. More specifically, in Enschede, Overijssel. Classical music and folk are influencing the writer respectively at the time of writing.

Paragraph 2a
As is the wont of this treatise, personal stories are written down in the following.
At 12:50, a friend asked me how

I was feeling: I referred them to The Germans and how they feel when: Edition of 2018, Chapter 12 on lunchbreaks. I left the friend, personally having the good feeling of clearing a misunderstanding. I wanted to spend the entire afternoon working efficiently, but I breathed twice at 16:56. That was probably connected to my increasing anticipation of sharing beer with friends, but I hope to show more self-control tomorrow.

Paragraph 2b
As usual, beer is evaluated in its own paragraph. It was great.

Paragraph 3a
By going to sleep at 22:30, this account is officially closed.

Astatine

Introducing the new SSA board

Yannik Wotte

My MOTives for joining THE miRRacU-lous SS(I)A are both rarely seen and surprising in their nature: I like to travel and experience new cultures. My goal as part of the board is to make the trip fun and unforgettable for everyone involved. All rare feats for board members of a sto-dy trip, indeed. Especially since the culture differs so strongly from what is seen in Europe, Hengelo seems like an interesting destination. But there are no companies Seattled in Hengelo, so we must look at places that are closer by. My main Ko-reaterion is that the destination continent starts with an A – most other letters are inferior.



Cham Bustraan:

After having a great time as a regular participant in the planning and learning more than I thought imaginable, I suppose it was inevitable that I would be in the board of the SSA. This time around I'll take up the function of external relations and I can't (Ku)wait to get started. However, to ensure we'll be earning all that Doha I need a good committee behind me so be sure to apply for the SSA! O man, I'm almost at the word limit but I think this piece has done what I wanted to du, bai.



Christophe van der Walt:

Hi! My name is Christophe, and I'm the new secretary of the board. I joined the board because it seemed like a great challenge, and also because of how un-phó-gettable previous participants said the trip was. I really look forward to providing the same experience for any future participants. Feel free to tao-lk to me about joining.

Looking forward to it, and let's hope they don't banh mi for these terrible puns I'm making!

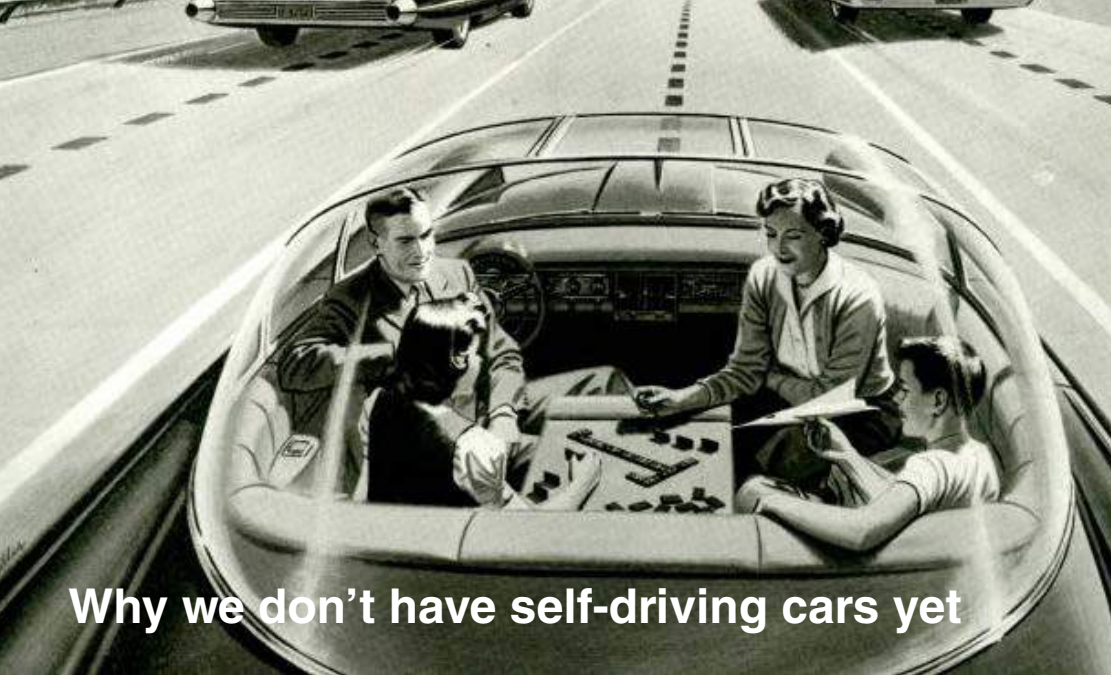


Bas:

Hello there, my name is Bas, and I'll be the treasurer for the next studytrip. After joining the study trip last year, and having an absolutely awesome time, I wanted to be able to give other people the same experience, or better, if possible.

Working towards a common goal is always nice, but something as large as this is quite another level. As a large group has many opinions and views, this common goal can help put people's noses in one direction. In all this, I hope to do my part, by managing the administration of the study trip.

I hope y'all will join on an awesome trip!



Why we don't have self-driving cars yet

You have probably heard a lot about them or even seen videos of them for quite a while now. However, you have most likely never seen one on the road. Self-driving cars is a well-known topic, but when will the robots finally hit the road, if they will?

To answer this question, we first must define the self-driving car. Therefore, some smart people came up with the five levels of driving automation, with a level 0 of no automation. As of level 3, it is considered an automated system. Level 4 is already quite hard to reach, since it needs its backup for when automation fails also to be automated. Level 5 might even be completely impossible, where the human does not have to do anything at all anymore.

Fully self-driving systems is at the moment an open problem without

solutions. Currently people are trying to tackle and solve this problem but, (spoilers!), no-one has found a solution just yet. Even Artificial Intelligence has not been able to solve this problem.

To understand what is actually so difficult about self-driving cars, we have to break down the problem into two parts: perception and control. Perception is all about sensing the environment and surroundings of the car, while the control part makes sure the car is moving at the right speed and does what is wanted.

The sensing of controls can be split into two parts as well: exteroceptive and proprioceptive. Exteroceptive sensors include the camera, radar and LiDAR sensors. Examples of proprioceptive sensors are GPS, inertial navigation systems, wheel

encoders and compasses.

The main disadvantage of the proprioceptive sensors like GPS and INS are their inaccuracy. They use satellites to locate the system and have an error of typically a few meters. Therefore, the exteroceptive sensors are necessary to more accurately locate the system. Next to that, these sensors are necessary for learning about the environment. A camera for example can determine if a traffic light is red or green, which is rather essential information at a crossroad.

But we have all these sensors and use them in daily life, what is the problem of using them then? For humans, it is quite easy to look at your environment while driving and detect for example a pedestrian crossing with an old grandma waiting. We can expect the intention of the grandma, she wants to cross the road, so we stop the car. For a robot, this is a lot harder to do. Therefore, deep learning approaches are used in order to train a system to recognize its environment. However, unfortunately, it takes quite some time to learn a computer the difference between a bike and a car and it is still not 100% accurate.

Another problem with the perception part is the weather conditions. This is a problem we as humans face as well, it is a lot harder to see with heavy rain or snow. This uncertainty in

sensing results in an uncertainty in execution, which makes the controls part fail.

Different weather conditions or even different roads are not only a problem for perception, but also for controls. It can cause quite some difference in for example the friction between the tire and the road, making the physical model of the car less viable.

To dig deeper into the controls problem, one must know more about different types of control for an autonomous vehicle. A car behaves with nonlinear system dynamics. Solving these kind of problems is a lot harder than linear system dynamics. Next to that, a driving car is a time-variant system, rather than a time-
























invariant system. If you have ever taken a controls course, you have most likely only dealt with linear time-invariant dynamics.

For solving the time-variant part, several methods exist. For example, the linear-quadratic regulator (LQR) finds a solution of the system at minimum cost. LQR is currently

The 5 levels of driving automation

For on-road vehicles

		 Human driver	 Automated system		
		Steering and acceleration/ deceleration	Monitoring of driving environment	Fallback when automation fails	Automated system is in control
Human driver monitors the road	0 NO AUTOMATION				N/A
	1 DRIVER ASSISTANCE				SOME DRIVING MODES
	2 PARTIAL AUTOMATION				SOME DRIVING MODES
Automated driving system monitors the road	3 CONDITIONAL AUTOMATION				SOME DRIVING MODES
	4 HIGH AUTOMATION				SOME DRIVING MODES
	5 FULL AUTOMATION				

Source: SAE International

Vox

used in cars as cruise control and for lane keeping systems. Model-predictive control (MPC) can even go a step further, including boundary conditions. This is for example a cyclist the car has to steer around.

The good thing about these methods is that it can be solved real-time, which is quite necessary while driving a car. The downside is, however, it can only comprehend linear systems.

Therefore, these methods do work for small changes, like lane keeping, but have more trouble and can get quite unpredictable when actually relying on these methods.

Nonlinear trajectory optimization is a method that can deal with nonlinear systems. It can also deal with constraints and solve for time-invariant systems. Actually, the only downside of this method is that it

cannot solve real-time. Therefore it is currently used in low speed lane changes or turns, but cannot fully solve the entire controls of the self-driving car.

Luckily an autonomous vehicle can be broken up into smaller parts, out of which quite a few already exist in cars nowadays. For example cruise control is a beginning of a self-driving car and has been around for a while. Lane departure warnings, forward collision warnings and pedestrian collision warnings might not be autonomous, but can still help the driver a lot while driving safely.

More active safety systems like lane keep assist, emergency braking and seatbelt tightening are the beginnings of a self-driving car, but there is still a long way to go.

So, what needs to change in order to reach that level 3? The problems are at geo-fencing, creating a virtual environment by means of GPS. This makes it easier to predict its environment if the car knows exactly where it is and how the road ahead looks

like. Next to that we have scenario-fencing, making sure a car has seen every scenario on the road possible (which is rather impossible) so it knows how to enhance and adapt.

Besides all the technological difficulties, there are some legal implications. Who is responsible in a car accident for example, the driver or manufacturer? Liability is an issue for which no laws exist at the moment. How is all of this tested and regulated? It would simply take way too much time to test every self-driving car in every situation on the road. Some social implications are a problem as well, are we okay dying by a robot? If the car can make final moves in an accident in order to save the driver instead of the passenger, should the robot do this?

To conclude, there are still quite a few unsolved problems and uncertainties when it comes to autonomous vehicles. Therefore, it will most likely still take a while before our driver's license becomes completely useless.



Astatiny

Tiny Astatine News



Hoodies

The Deco is back and has brought you their first new item: a Hoodie!

Company days

During February and March the Bedrijvendagen Twente took place. These offer great opportunities if you are looking for internships or job opportunities, but also if you want to learn skills concerning contact with companies. A wide range of activities is available to get to know your future employer. Join next year!



Flowtraders Excursion in Amsterdam

On the 30th of January, Astatine went to Flow Traders in Amsterdam for an excursion. In this excursion, participants got an impression of the branch of technology in finance and its opportunities for AT students. This company is mostly interesting for students oriented towards software, a great place to use your creativity.



Ski Trip

"The ski trip was awesome. From the huge variety of pistes to all the hot chocolate you can drink, It was an awesome experience. Nothing else would be worth the early bedtimes and the bruises!"
- Enthusiastic ski-trip goer



Astatine Sailing trip

The trip will be held from Friday 27th till Sunday 29th of april. But if you want to celebrate Kingsday somewhere else, it is also possible to start the weekend on Saturday. Exciting and relaxing as always this trip is sure to get your head out of your studies and into the summer.

Made possible by Brunel



MISS WORMWOOD, MY DAD SAYS WHEN HE WAS IN SCHOOL, THEY TAUGHT HIM TO DO MATH ON A SLIDE RULE.



HE SAYS HE HASN'T USED A SLIDE RULE SINCE, BECAUSE HE GOT A FIVE-BUCK CALCULATOR THAT CAN DO MORE FUNCTIONS THAN HE COULD FIGURE OUT IF HIS LIFE DEPENDED ON IT.



GIVEN THE PACE OF TECHNOLOGY, I PROPOSE WE LEAVE MATH TO THE MACHINES AND GO PLAY OUTSIDE.



MY BILLS ALWAYS DIE IN SUBCOMMITTEE.





FRED

A venture into the mind of a Sodexo employee

Roos de Vries, Yannik Wotte

Roos de Vries and Yannik Wotte

You're reading the Attentie, so I'm guessing you are, or once were, active at the UT. And, if so, I'm gonna go on to wager that you've done at least one of these things: gone to a meeting for the free lunch, grabbed a muffin while cramming for an exam, gotten a hot dinner before a drink, or even bought a coke in the Bastille. If you've ever bought even a crumb on campus, then you have probably done business with the UT's very exclusive catering provider: Sodexo. Whatever your opinion of the food may be, Sodexo can be trusted to keep you from going hungry: easily available, fairly priced, and fast. This got me thinking: it's got to be quite an operation to run the five kitchens and several more coffee corners on campus, serving over 1000 meals a day. What's it like to work for such an organization?

In the following interview with long time Waaier Kantine employee Fred van Tol, Yannik Wotte and I try to get some insight into the behind-the-scenes workings of Sodexo.

Could you tell us a little bit about yourself?

Fred van Tol is in his 50's. He grew up in Arnhem, where he trained as a horeca (hotel, restaurant, and catering) employee. He began his work in hotels and restaurants, but out of a will to travel, eventually took a job from an international night train caterer, manning the kitchen, bar, restaurant, and of course, the push carts. After that he took a job with Sodexo, making pringles in Mechelen, Belgium. In 2008, he saw an advertisement for a cook's job at the UT. He was hired for the job and moved to Gronau, Germany. Fred has been working as a cook on the UT campus since then.

In his free time, he enjoys hanging out with his grandkids : going on walks, going to the park, seeing the water-labyrinth at Gronau station. He also likes listening to music, and goes to jazz festivals every year.

Could you describe your job? What is in a day's work? What are the best and worst parts?

A workday in the Waaier Kantine exists of three shifts: a morning shift, an afternoon shift and an evening shift. The morning shift prepares food for dinner, warms up food for lunch, and serves lunch. The afternoon shift warms up food for dinner and begins preparing food for lunch the next day. The evening shift finishes preparing lunch for the next day, serves dinner, and cleans up. The staff is usually done by 7:30, which is very nice compared to working at a dinner restaurant, which may not close until after midnight.

Almost all the food (vegetables, burgers, fries, turkse pizza, breaded chicken and fish) is prepared on site by cooks like Fred. Sodexo prepares for about 250 students and staff per meal, less during exams and on Fridays. But if 300 people suddenly show up, Sodexo must be ready to feed them all. They ensure this by preparing well ahead of time and always having a frozen backup plan. Luckily, the number

of customers is usually pretty consistent. But not always- Fred remembers one Friday night when 150 people showed up instead of the usual 30/50 on a Friday night. Sodexo is always planning ahead and cooking ahead.

To make sure that all customers can be served promptly and punctually, the staff sets very clear deadlines. They always have meals warmed at least 15 minutes before the doors open. I tried to ask Fred what happened if things were late. But, he seemed to balk at the prospect. "You just do it," he said, "We can't be late. The customers are waiting."

In the past, there have been times when there were not a lot of employees to carry the load. At those times, Fred and his colleagues had to work very hard. Generally, though, the employees work together to keep up the atmosphere, have a sense of humor, and motivate one another. They have a job to do, and all know the drill. And the consistency is a huge perk, too. "You get used to it."

What's it like catering to students and faculty?

Sometimes students walk by and hardly even look up. But not only is that impolite... it's a missed opportunity. Talk to the Sodexo people, because the kitchen bases its weekly menu off student requests. For example, they noticed that students tended to get bored of the same type of food every day, so now the menu switches daily: fries on Wednesday, Turkish pizza on Friday, etc. Don't ignore Fred. Tell him hi next time!

Another thing some people do is order weird food combinations. "Such as spaghetti and meatballs. What??"

- End of Interview -

Nothing is definitive about the potential Sodexo takeover. And, nobody in the Waaier seems very worried about it. I'm going to interpret their rather passive attitude in the following way: I don't think Fred, or many of the other employees, will lose their jobs. Changing the UT catering service must be such a big handover that the only significant changes will happen at the top of the ladder. Perhaps the employees will get new uniforms. Perhaps they'll serve different flavors of yogurt. But, the essence of the organization will remain the same.

One thing I noticed while interviewing Fred was an interesting duality in his view on his work. On the one hand, he is committed and knows exactly what his responsibilities are. On the other hand, he doesn't seem to be worrying about the looming Sodexo takeover at all; nor does he seem to have very strong opinions about his work. He says he works mainly on autopilot. That must be an upside of working for a huge company like Sodexo: everything has been thought out already. If you don't feel like thinking, you don't need to.



Commentary

Science in pop culture

Christophe van der Walt

Why do people make fun of scientists in pop culture?

Instances when people have made fun of pop culture that have pissed me off:

- *Transformers, the Last Knight* (cocky physicist trying to save the world with “math” and “science”. Michael Bay shows him who’s boss)
- *I, Robot* (Peter Bogert is an uptight mathematician who always gets condescendingly corrected by Susan)
- General portrayal of scientists as scruffy, slight individuals who narrowly-mindedly obsess over their work

Are they really like this? Are they easy targets? Is it Xenophobia because of all this unfathomable, impressive stuff scientists do?

It’s nearly impossible to escape pop culture. It’s in our books, it’s in our films, it’s in our music, and by extension, it’s in all our everyday interactions with people. This makes pop culture not only a mirror of public opinion, but means that it can also shape public opinion in and of itself. What I seem to be noticing more and more is the portrayal of scientists as these arrogant, jargon-spouting men and women who ultimately don’t really know anything real about how the real world really works. This disturbs me: if ‘checked-out bookworm’ is the general public’s view on scientists, this view is vastly different from my own experience of them. So, where and among whom is this happening? And why is it happening? Let’s maybe first look at some of the most blatant evidence I’ve seen.

The first offence that comes to mind is Tony Hale’s character from *Transformers: The Last Knight* (spare me your judgement, the explosions were cool). Hale plays a physicist or engineer. (Michael Bay doesn’t seem to give a crap about the distinction). This man has a plan to keep a planet from crashing into Earth, and the plan uses science. He spends most of his screen time obnoxiously shouting a mix of technobabble and very generalised science-y words like “physics” and “math”. Here’s an actual quote from the movie: “I’ve got a Hail Mary for you! How about physics?”.

Michael Bay then takes great glee in making the guy squirm and protest as the characters decide to “trust in the prophecy” instead, and go for the plan that just sounds cooler. What really hammers in the nail is that, in true *Transformers* fashion, none of this has any actual relevance to the plot. The writers could have removed 90% of this scientist witch-hunt (which would have put a bit of a dent in the movie’s 150-minute runtime) but chose to keep it in for a specific reason. The only marginally logical reason I can come up with is that it’s better to believe in magic than to base your decisions on science. Maybe I’m reading too much into this and Michael Bay is just going through his usual algorithm for wasting as much of his audience’s time as possible, but this struck me as an oddly specific jab.

The character of Peter Bogert from Asimov’s *I, Robot* triggered me as well. Peter is a mathematician. His character is nuanced. Asimov uses him to warn against the dangers of ambition, but emphasises that the main character, Susan, is much better equipped to deal with problems in robotics than Peter is. Throughout the book, Peter makes decisions that seem to be perfectly grounded in logic, which Susan usually tears to pieces. Through these tirades, Asimov will usually make quite a decent point regarding an aspect of the problem the reader doesn’t consider. However, these points are usually very one-sided and fail to address many arguments that would support Peter’s cause. This has the effect of dismissing anything Peter says without reason, not unlike how Michael Bay dismisses Tony Hale’s character. The apparent senselessness of it also makes it seem like Asimov gets some form of pleasure from doing so. Yet, I should mention that I am biased in this matter: I have many other problems with *I, Robot* and the way in which Asimov goes about making points about human psychology. However, I like to think anyone reading the book would at least cringe a little bit at some of the potshots taken at Bogert.

So, there seems to be a trend in pop-culture of portraying scientists as arrogant people who put a lot of effort into acquiring knowledge that is ultimately far-removed from the truth.



“The explosions were cool” - Christophe van der Walt

But why is this? Are all scientists really like that? Are scientists particularly easy targets? Is this portrayal a reaction of the layman to all the awesome things scientists know about and can make? Here's my take:

The answer to that first question is quite an easy one. No, scientists are not all insecure idiots whose arguments have no real-world value. Scientists come from all walks of life, and as such, they can't all occupy the same personality type (duh).

Another thing to consider is whether scientists are easy characters for storytellers to make into antagonists. Indeed, they do appear as the bad guys in a lot of books and movies. The "evil/mad scientist" archetype is widely used throughout cinema and books (maybe try to insert a pic of Dr No). A good explanation for this is that scientists spend their days doing things that people don't understand. What probably doesn't help is that, for scientists, communicating what they do is, at times, quite hard. This leaves people with a bunch of important-sounding words and maybe the promise of a very science-fictiony end goal. Tony Hale's character might simply be a parody of the layman's contact with scientists.

Yet, it might be slightly less superficial than that. It might be easier to think that scientists are incapable buffoons than to accept that they might be able to create such things as a black hole at

CERN. I obviously can't prove much of this, but I think these are quite plausible explanations, unscientific as they might be.

So, scientists get a bad rap. Indeed, their portrayal in a lot of stories is quite far removed from the scientists I know. However, even though their depiction may initially seem rather unjustified to people who encounter scientists daily, this may just reflect how the general public sees scientists. If this proves to be true, scientists could pay more attention to this aspect of their PR. This is especially critical in a landscape where institutions like NASA are getting their budgets slashed, and where science is having to compete with "new age" pseudo-science in the medical field.

LIFE-CHANGER
(Psychologists hate this simple trick)

Give me 5 minutes of your time to tell you why you should pick up meditation. It'll be the deal of the century, trust me.

Let's start with a few of the advantages that will help you most in everyday life. Lack of motivation to study, trouble to calm yourself down after a stressful day or being distracted easily: these are just a few issues that you can tackle with meditation. You can already get them in the beginner's package for 19.99€ a month! Train your mind to be able to decide what to think about. Don't get me wrong, with the beginner's package you won't always be calm and controlled. That is unrealistic. For perfect self-control, you will have to make use of both the Zen-mattress (50% off, for 150€!) and a meditation light to help you focus (A mere 20€, + 40€ if you want to determine the color). Then you did the first step to being your own master.

Now that you bought the essentials, let's get started with the tutorial. If that is not enough, you can sign up for a free trial session! If you expect esoteric instructions for being in peace with the world and everything else, I'll have to disappoint you: Meditating is straightforward.

First, choose a calm spot to sit comfortably. Place your Zen-mattress on the ground in front of you and put the

meditation light in its center. There is no need to go into fancy positions, just assume a healthy one in a chair besides the Zen-mattress (take care to not look at the Zen-mattress throughout the meditation!).

Now the essential part: Try to stop thinking. Not just about our one-of-a-kind deal for Zen-soap, but about everything. Initially you'll manage for a good 5 seconds, maybe 10 if you're good at it. Then thoughts will start popping up. Treat them like the random noise they are: Do your best to not follow a thought and go back into thinking about nothing. Don't feel demotivated if you drift away and end up following thoughts: That is going to happen a lot. But try to get back into letting thoughts pass by as much as you can.

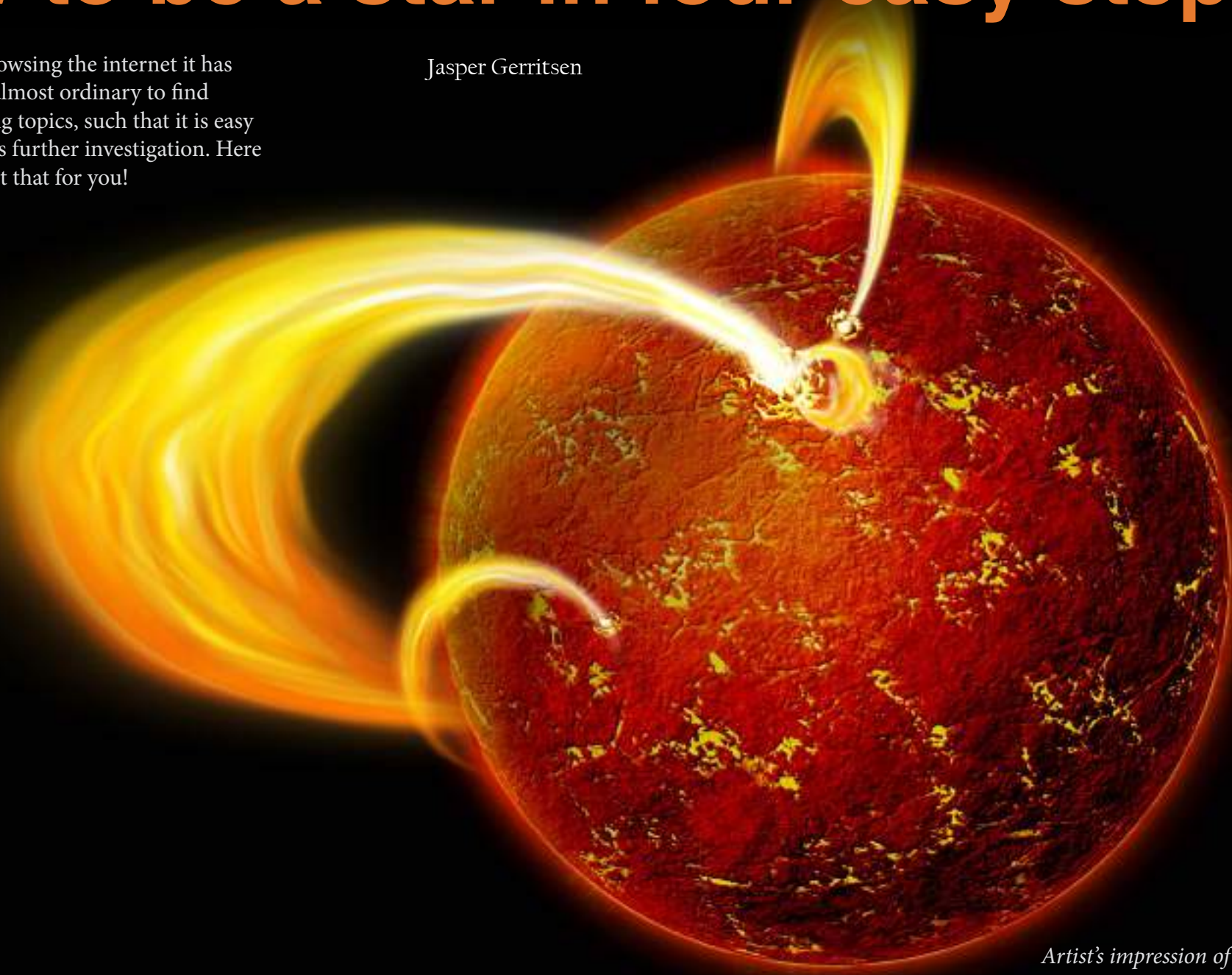
Congratulations! You are now meditating. It will get easier the more you pay for it, just like any physical sport. And that's what it is: A training of sorts. You will have to do it regularly, and at our registered meditation centers, to preserve the short-term benefits™ and see the long-term benefits™. Do not skip visiting the meditation centers, even though you will already feel calmer after the first session. Benefits™ will not stick around otherwise!

Stop thinking!

How to be a star in four easy steps

When browsing the internet it has become almost ordinary to find interesting topics, such that it is easy to dismiss further investigation. Here we do just that for you!

Jasper Gerritsen



Artist's impression of a magnetar.

Above is an artist's impression of a magnetar. This thing is absolutely insane, but to understand why we first need to talk about neutron stars. My mother told me I could be anything so let's take a look at how to become a neutron star.

Step 1: be a huge star

Acquire 10 to 29 solar masses and you're in the ballpark to become a beautiful explosion.

Step 2: collapse

In order to fulfill our potential we'll have to run out of fuel next, because our core not only provides us with warmth but also with the pressure to sustain this incredible mass by preventing it from imploding. Now as the pressure in the core increases fusion will create larger and larger nuclei until eventually further fusion does not release additional energy and nothing is left to prevent complete collapse. The star material rushes towards the core at almost a quarter the speed of light (!), simply because of the gravitational pull.

Step 3: explode

Our childhood dream has at this point devolved into a painful supernova. An enormous explosion of energy flings star

stuff in all directions. This is very interesting but we'll leave it for now to get on with our story towards the magnetar.

Step 4: become a neutron star

As all the material gets crushed together the protons and electrons form neutrons and clump together in an extremely sturdy ball of only a few tens of kilometres in radius. That's right, the density has become so high because all the space between the electrons and their nuclei is gone, because there is mostly just neutrons left in the aftermath of this cosmic size can crush. This new core is stable not because of any reactions taking place, but instead because it just can't get any more dense than this. From now on it only gets scarier. Not only is this ball of neutrons basically densest object in the universe at roughly 10^{14} times the density of water, it is also spinning at rather extreme speeds. Because angular momentum is conserved if the star was spinning just a tiny bit before it shrunk it must certainly be going like a record, baby right now. As it turns out, the fastest spinning neutron star is doing just that at 43000 revolutions per minute.

Again, that's almost a quarter the speed of light for surface velocity!

We're now only one step removed from being a special kind of neutron star: the magnetar. Neutron stars are already heavily magnetic, even though they are mostly neutrons, if there happen to be a few protons in the star they will be that much more impactful towards the magnetic field. For comparison let's look at the strongest MRI scanner in the world, this gives us around 10 Tesla, now your run-of-the-mill neutron star will give you a whopping 10^6 Tesla. But that's not all, because this is just the run-of-the-mill one, we're interested in the highly magnetic ones: the magnetar.

The magnetar is the magnet to end all magnets, the MRI to end all MRIs. Its magnetic field is in the order of 10^{10} Tesla. To give an idea of what that would mean: what would happen if you would stand too close to one? So you want your particles to stay intact? You want to have normal atoms? Nah, can't do that, the magnetar will just stretch

them into long rods of particles. You want covalent bonds? Nope, can't have those, magnetar is here to wreak havoc. All sorts of weird stuff starts to happen: X-ray photons might split in two or merge together. The vacuum itself is polarized, allowing for double refraction.



Double refraction in a calcite crystal

In a field of about 105 teslas atomic orbitals deform into rod shapes. At 1010 teslas, a hydrogen atom becomes a spindle 200 times narrower than its normal diameter. Now let's be happy we're far away from these magnetars next time we use our creditcards.

Computer art

Fooling Neural Nets

Jasper Gerritsen

Based on the paper: *"Deep Neural Networks are Easily Fooled: High Confidence Predictions for Unrecognizable Images"*
Author(s): Nguyen A, Yosinski J, Clune J
Year: 2015

If you want a computer to recognize a pattern neural networks are the way to go, especially deep ones are really splendid for classifying all kinds of stuff, most notable though is their performance in visual recognition. They're actually so good you might want to start comparing their skills to human levels: what actually is the difference which remains? To find this discrepancy researchers from Cornell University and the University of Wyoming have conducted a study in 2014 producing pictures of which Deep Neural Nets (DNNs) are very sure should be some familiar object but which humans find utterly unrecognizable. In particular they used evolutionary algorithms to find these images the neural nets would be the most confident of belonging to a certain classification, in the process trying to distill the characteristics the neural net deemed most important for distinguishing that specific object.

This research gives insight into one of the largest problems in the use of neural networks: they are black boxes. "Even though we make these networks, we are no closer to understanding them than we are a human brain", says computer scientist Jeff Clune at the University of Wyoming in Laramie.

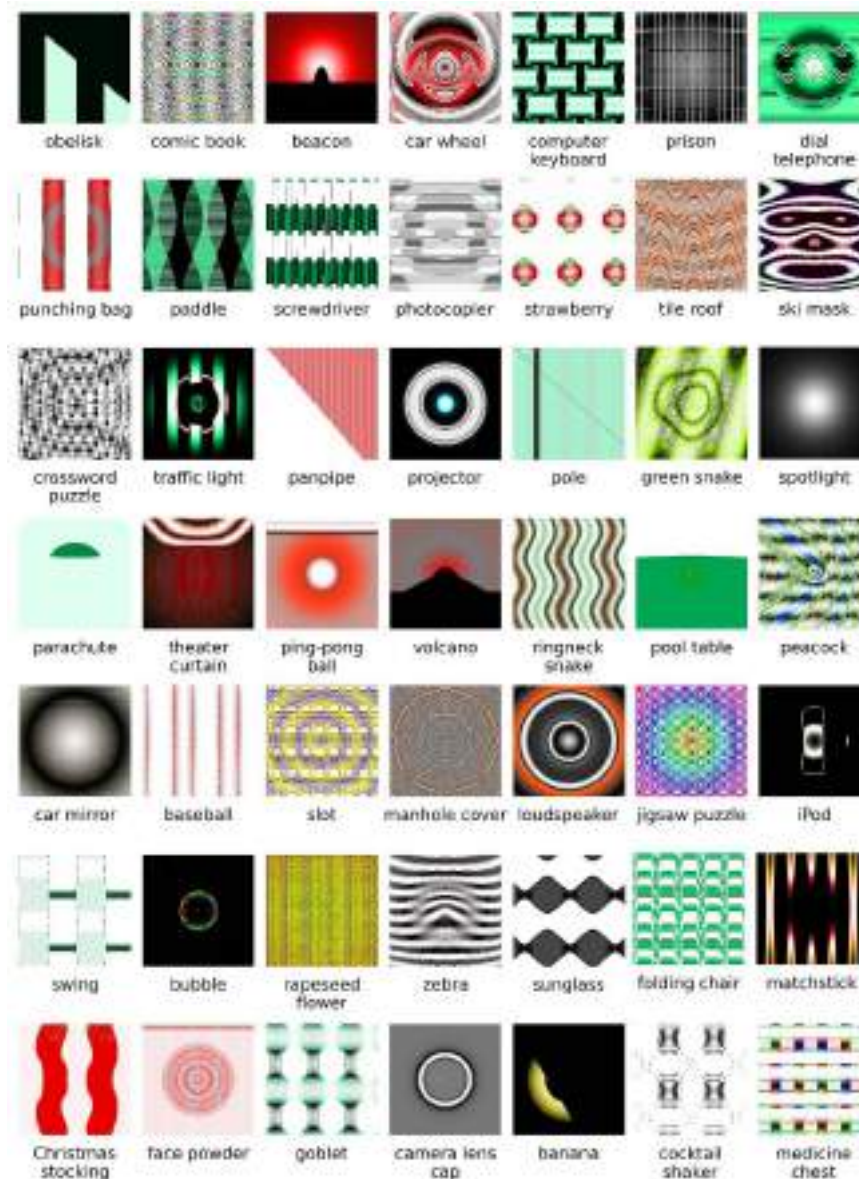
The insight gained by the network is not gained by their creators, an area where these optical illusions for AI might come to aid.

In last year's 11-1 ATTentie we also published about the phenomenon of perceived creativity in neural nets. Then it was in the form of the Deep Dream technique: a network trained for example to recognize the Windows operating system is supplied with an image of say Bill Gates you get the following artsy result:



In this 2015 paper a similar principle is at hand, however in this case the point of interest is not necessarily the artful combinations between images but rather the defining characteristics of an object according to the algorithm.

This also gives rather interesting results, in fact the collection of images on the next page was accepted into the University of Wyoming 40th Annual Juried Student Exhibition.



The original idea for this article was quite different from what it is now. A couple of months ago, I read an article about the rapid decline in insect population in the last 27 years. They even added the large number of 75 percent. In my head I was like: Why haven't I heard this sooner. And I wanted to write an article about it, about the impact it can have etcetera to point out this, in my opinion, important fact. But then the confusion came in when I read an article that stating that the whole research was based on loose facts. This made me so confused to the point I started doubting everything. So let me get you as confused as I am right now.

The original story.

To begin with I will write about the original story and my actual thoughts on it. Recently a whole hype train of news emerged about a research done in Germany combined with people from the Netherlands. They started investigating the combined mass of all flying insects at a couple of locations in Germany. They did this with special malaise traps, which are ideal for catching the bugs. The insects were gathered with some intervals during the year and the results were written down. After some years, they wanted to investigate a declining trend in the total mass caught, which was getting lower each year. In order to investigate this, they set up traps in more locations over Germany, particular

selected so that it represented various nature locations around Europe. After 27 years of data collecting they started to implement the results in a report, which eventually published. They found that overall the number of flying insects decreased for 75% with a peak of 83% in the summer months. Although they didn't point to a specific culprit, they stated some similarities with other insect researches and that it should be investigated further. But the point that is made is that the rate of decline is alarming enough to take immediate action. Otherwise the impact on the ecosystem and wildlife would be irreversible. This is going to be a problem, as we as humans, but also other species rely on these flying

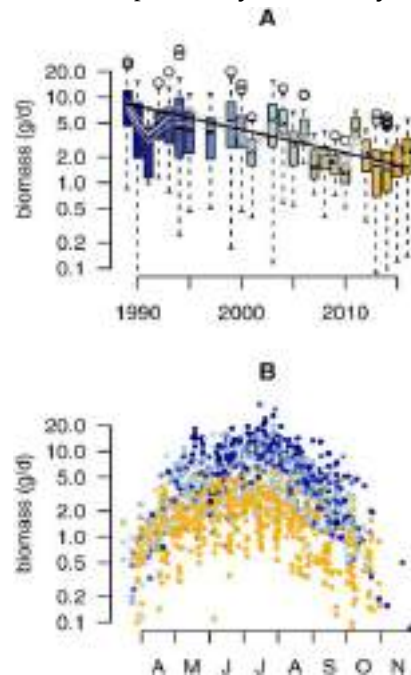


Figure 1: The statistical results gathered by the research. Note that the biomass in grams per day is in logarithmic scale. The blue dots represents the early years of the research, the yellow dots the later years.

insects. They help us to grow food or are food themselves. If they are gone, life is going to be much tougher.

Doing research

For me this sounded plausible enough to dig deeper into the story. So as usual I went to Google and started. I was a bit amazed. Almost every newspaper had written an article about it. Page after page was filled with headlines describing doomsday scenarios, ecological Armageddon and other terms. When looking into those articles, most of them were just mere copies of the same story over and over. No one went into detail. They just covered the basics with just some two line columns.

Until I found one article that stated that the research was unsound. It was based on some clever statistics, in order to cover the ill based results. This article was made by a journalist who is specialized in statistics. He comes up with some points, which indeed make the article arguable.

Wait a minute...

The author points to the data set. The locations were, in most case, only sampled once in order not to disturb the overall population by taking it all away. Only in some locations they sampled it multiple times, but the years in which they were sampled are too far apart. This does not represent the natural fluctuations that are present. It is like taking the temperature in a random village in the Netherlands as the average temperature for the whole country. In my eyes a fair point.

Furthermore there is a small problem with the locations. It is more localized than initially is stated. Although they selected locations in nature, it is mostly around the town of Krefeld, home to the research group. Let the

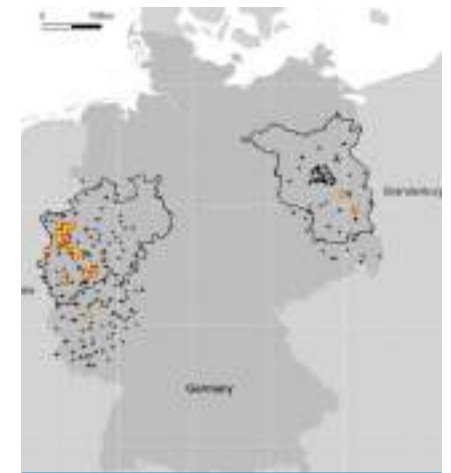


Figure 2: All the locations used in Germany.

problem be that it almost lies in the industrial heart of Germany, namely North-Rhine Westphalia. This doesn't mean that it is worrying that there are fewer insects there, but does this really represent all of Europe?

Another statistical error was to include all data points into the graph. This means that large fluctuations can have a large impact on a graph, especially when you start in a record year. By removing the extremes upper and lower values, the loss would only be 30% which is still worrying.

And this is where the problem starts. It got me thinking, why all the doomsday scenarios if it is too early to tell what is really going on. Things like: Is this really representable on a global scale? What caused the decrease of all sorts of insects? Why are some species, bats as an example which solely rely on flying insects, growing in numbers? How can we inform people about this? Even the German research group states that, although the results are alarming, the result is quite extreme. They only looked at the bulk; maybe one insect species has increased in number, whilst others decreased.

The problem is that almost nobody even tried to give a critic view into the article. Nobody contacted specialist to give their view. Instead, they took it as granted and instantly raised campaigns on banning all kinds of insecticides, blaming everything on farmers and so on. Politics needed to be in-

olved in order to save all the insects on the planet. Everything was blown out of proportion and easily copied over.

There even a large discussion between research groups, blaming each other to be ignorant. This whole problem is becoming more and more an excuse for a political debate.

I think that is a big problem Nowadays everything seems one-sided. The whole idea of science, namely to be critical to all research, is gone. Everyone already has their conclusion ready, without even investigating a bit more, so that the problem is really understood. Even when a person is critical, he is personally attacked by the opposition, who think that is a lunatic by telling nonsense stories. They all miss the point. Criticism is needed to make science better, not politics.

Original published report:



Article stating the nonsense.



This is recipe inspired by a meal I had when I was eating at a friends place, I hope you enjoy it as much as I did.

Potato cakes

- 1 Grate the potatoes.
- 2 Put the grated potatoes in a bowl with about 5 spoons of flour. This makes sure the potato sticks together.
- 3 Season the mixture with some salt, pepper and paprika powder, about 2 teaspoons each. Heat a pan with a layer of oil.
- 4 With a spoon make some potato heaps in the pan, fry them on one side until brown and crispy and then flip them. After that they are done!

Creamy beans

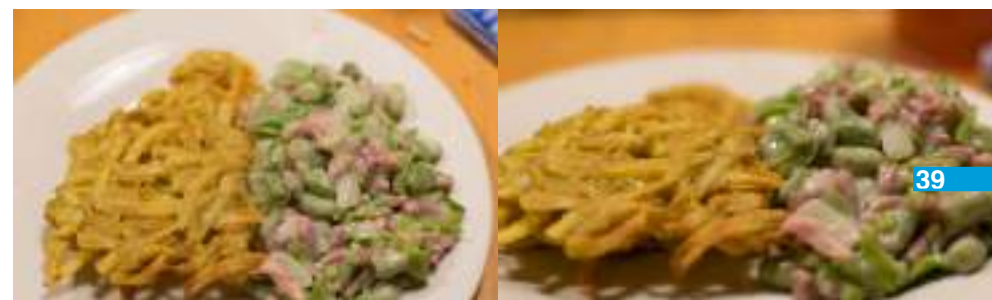
- 5 Dice the onions into small pieces.
- 6 Fry the onions in some olive oil until glossy.
- 7 Add the bacon and fry until crispy.
- 8 Add the snijbonen, fry for about 2 minutes and add a teaspoon of pepper.
- 9 Add the crème fraiche and stir until it is mixed.
- 10 Then your creamy beans are done.

Don't add any salt to the bean mixture since the bacon is already very salty!

If you don't want to put that much effort in grating potatoes you could also fry some, cook them or something else. This recipe is also nice with rice instead of potatoes.

For 4 persons:
Creamy beans with grated potato cakes:

800 grams stringbeans in pieces
2 onions
250 grams crème fraiche
600 grams bacon
1kg potatoes
Flour for the potato cakes



**We push
technology further**

**to print microchip
features that are finer**

**to build smarter
solar panels**

**to supply
solar powered
cars**

**to help save
the environment**



Do you dream of changing the world of innovation? Do complex technological challenges appeal to your imagination? We are looking for you. ASML always wants to get in touch with eager and curious students.

Join us at workingatasml.com/students

ASML

Be part of progress