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ATTENTIS

Periodical of S.A. Astatine

Nuclear Fusion

Marvelous Movies

Greek Gods

Science Today

Contents

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Fresh

Astatine

Recurring

Editorial

Dear readers,
This edition will mark the final one of volume 13. Quartile four has just started (at the time of writing that is), so everyone is busy trying to keep their stuff together for just two months more. I am feeling it myself too. Coming out of module seven, it is mainly weird not having your entire day planned for you. Hell, free time is hard to manage it seems. Then again I am thoroughly enjoying my 2 hour a day schedule, and I am absolutely not bragging about it.
Although this Attencie is a little shorter in size (2 pages), I think the contents are pretty cool nonetheless. First off, I want to thank Jelle immensely. His article on Nuclear Fusion is not only incredible, he also contacted us whether we wanted to include it. It is a great read. Luckily it does not end there, though. The Kandis will introduce themselves (at the time of writing, even we are not yet allowed to know who is in there), Christophe is ranting again, about science this time. Also, there are some Astatine activities in here. Nothing too fishy, except maybe the sushi workshop.
That's a quick summary for this edition. You will see the Attencie again next year (hopefully four times). I hope you enjoy reading this one and try to take good care of it. It deserves it, it was a rough year.
Editor in Chief
Sander de Ridder

From the AT staff

At the time of writing it is April and the last module of the year has started. Only a few more weeks and it is time for the summer vacation. Time to make plans. Not just for the summer, but also for the coming academic year. First year students need to think about which option to take for module 6. Second year students need to think about which master to choose, which will influence their minor options. Also, they need to think about doing a semester abroad as part of their curriculum. Each choice come with its own deadline and in most the examination board plays a role, directly or indirectly.
The examination board plays an important role in the life of an AT student. Although a big part of it is not directly visible to the students, for some of its tasks the examination board needs to interact directly with the students.

In the invisible part, the examination board is responsible for the quality of the tests and for making sure that students meet the final qualifications of the AT programme. In order to warrant the quality the tests the examination board appoints (qualified) examiners for the courses and monitors the quality of the tests.
The rules and procedures set by the examination board is published in the 'Rules and Regulations of the Examination Board', available on the AT website. In this document the examination board sets the conditions and procedures for tests, retakes, repairs, exemptions and fraud. In addition it describes the requirements and procedure for approval of the course list, bachelor assignment and graduation.

In the visible part of the work, the examination board interacts directly with students. This happens in four situations:

1. When students request approval of their course list. An approved course list means that the set of courses is deemed of sufficient level and quality that the examination board will issue a diploma when all the courses on the list have been passed.
2. When students request approval for the bachelor assignment (which can only start after the assignment has been approved!).
3. When requesting graduation. Although this is a formality after the previous two, the request starts and speeds up the process of graduation and produces the desired diploma.
4. When a suspected fraud is reported. The examination board will hold an inquiry, which includes an interview with the student, and comes to a verdict.

All in all the examination board has a big responsibility. As a consequence, in the coming reaccreditation of the AT programme, the work of the examination board will be closely checked by the reaccreditation committee.

From the Astatine Board

Dear beloved reader,
I know this must sound cliche, but more than half a year has passed already, and what a time it has been. Being at Astatine 8/5, while it almost feels like 24/7, is challenging at times but splendid almost always. With only such a short time remaining as board member, I will take this chance to give you my opinion about Astatine in the past and in the future to come.

Looking back, the first thing that springs to mind is the half-yearly GA. As board, this event is something we look forward to. It is the first time that our members get an opportunity to officially address all their concerns or voice their praise about our way of managing all activities at Astatine. While we were confident it would all go well, we even momentarily had the thought of making it the shortest GA in Astatine history -but that was soon deemed impossible- it is always a relief when it actually goes well. Let's hope that the next one will go as smoothly as that one, and I challenge you to come up with hard questions because I bet you can't ;)

That's enough about our GA, let's look to the future! During the final module as board, we can make our chests wet (not proper English, I know, you could ask a Dutchie what it means). Why? Well, it is our last real chance to leave our mark on Astatine during our board year. This will need to happen while turning the kandis into the next board of S.A. Astatine as well as possible, while there are activities around every corner and beer turns up, all of a sudden, in everyone's hand. Oh boiii, I can't wait for those summer BBQs where the beer is free (or almost free) and the sun shines on your already burnt arms because this is not your first BBQ (I am white as can be so no avoiding that). Yes. This time of year might be the best there is.

It has been my honor giving you a short update about Astatine and I hope you enjoy reading the other articles in this ATtentie or at least laugh at the beautiful pictures in this edition. Will I see you during the ultra epic, chill, and overwhelming BBQs? Well, I sure hope so. See you there and as we always say: ~~Joe Joe~~ 14 'Vo! (sorry, can't help myself)

Nuclear Fusion

Why Invest in Fusion?

Consider the following scenario: it is 2050, the horizon of the Paris agreements. Fossil fuels are now completely banned to eliminate greenhouse gas emissions.

Yet, in the past decades, energy consumption has far from decreased under exponential population growth and ever increasing standards of living. What are the options to satisfy this energy demand? There are, of course, plenty of renewables to choose from. However, many of these are not widely applicable due to environmental conditions or lack of supply. Think of hydro- and geothermal electricity, tidal power and wave power. While these energy sources are important and should be developed and employed wherever possible, they will never be able to fulfill a significant fraction of the global energy demand. There are three options that remain with the potential to power the world: wind, solar and fission power. These are the ones that are currently advanced enough so that they could support the energy transition from fossil fuels to completely clean sources.

Fission, despite its potential, seems unlikely to contribute to this transition. The total installed capacity of nuclear reactors has not significantly changed for the last 20 years, and after the Fukushima disaster in 2011 construction of new reactors world-wide decreased to levels not even sufficient to sustain the currently installed capacity [1][2]. Unless public opinion changes drastically very soon or politicians world-wide come around, it will be mostly up to wind and solar technologies to fill the gap. What will the world look like, with terawatts of installed wind turbines and solar panels?

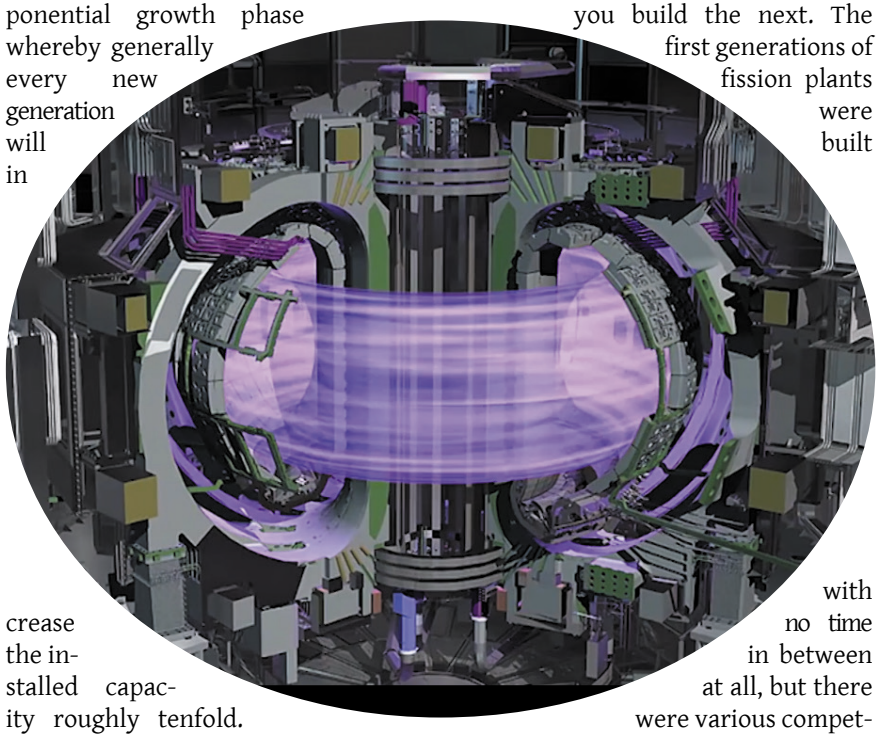
The answer is, probably, 'crowded'. While these technologies are fantastic innovations with nearly limitless potential and, for the moment, really all we have, both are necessarily very demanding in terms of area needed. A future where everywhere you look, you see energy production is certainly better than no future at all, but not ideal. Enter fusion.

Nuclear fusion is the process whereby two light particles, hydrogen for instance, collide at high energies. They fuse to form a new, heavier particle like helium, releasing large amounts of energy in the process. This is how the sun creates its energy. It is not to be confused with the nuclear reactors that already exist: these use the opposite process, called 'fission', where heavy atoms like uranium split to form lighter atoms, also releasing energy. Scientists have already recreated the fusion process on earth. Fusion energy, in theory, combines some of the best aspects of renewables and fission while simultaneously solving some of their issues. The convenience of existing fission power, compared to wind and solar, is that it is a very compact source of energy. To put this in perspective: a 1 GW nuclear power plant occupies less than 3 km^2 of land, 1 GW of solar panels would take at least 30 km^2 and a 1 GW wind farm would occupy over 300 km^2 [3] [4]. This is not even taking into account the low efficiency of wind and solar technologies compared to nuclear plants, and the variation of electricity generation due to weather conditions. The latter highlights another asset of nuclear plants: they continuously generate the same amount of power, regardless of weather and geographical location. Fusion reactors will have the same advantages: reactors with a large output in a small space, that operate day and night regardless of external conditions.

Now, with fission there are two major concerns: waste and safety. Nuclear fission produces hazardous decay products that stay radioactive for (tens of) thousands of years and need to be stored deep underground for that time. Reactors are, in general, extremely safe, but in the unlikely event a failure does happen it has the potential to be extremely devastating. Fusion reactors have neither of these problems. While a fusion reactor does produce some small amount of radioactive waste, it is not nearly as dangerous and persistent as that of fission reactors, needing only to be stored for a few years only several meters below the surface. Additionally, there are no runaway reactions in a fusion reactor. Should the process disrupt, the reaction simply dies out and the worst that could happen is that the reactor walls melt. This would be a problem for the reactor, but not to the people surrounding it or even working inside the plant at the moment. And, of course, it is just as renewable as the other renewable energy sources, using hydrogen (the most abundant element on earth!) as fuel and producing helium, which is not harmful.

"Okay", you might think, "*so why does this not exist yet?*". Great question! In essence, while fusion is an ideal source of energy, it is just really hard to do. The physics behind fusion is increasingly well understood, but there remain unsolved technical challenges that have refrained mankind from realizing a working reactor until now. A big step in the right direction will be made by ITER, a large-scale experimental reactor currently under construction in the south of France, expected to go into operation in 2025. If all goes well, ITER will act as a 'scientific proof-of-principle', meaning it will demonstrate the technical feasibility of producing fusion energy. Its goal is to produce more energy from fusion than fed into the system by a factor of ten, but not yet supply net energy to the grid. In areas like power management, certain safety aspects and control, ITER will make the step from research to application development. In 2035, ITER will commence experimentation using the same fuel a real reactor would use. This will provide vital data on safety and fuel management. The next step after that will be DEMO, a DEMOnstrational power plant, currently in the design stage and planned for construction somewhere after 2040. It will be bigger than ITER, but in many regards simpler because it will no longer be a scientific experiment. This device will demonstrate the possibility of using fusion as an energy source. It will bridge the gap between 'application development' in ITER and 'demonstration and deployment'. In some areas, however, ITER alone is not enough to provide the knowledge and experience necessary to build a DEMO, especially in the field of materials. Additional research and testing facilities are therefore necessary (and planned) to operate alongside ITER to make sure we are ready to build DEMO.

After DEMO is successfully realized and has shown a few years of results, around 2050, we can finally begin constructing the first generation of fusion power plants of ten or so reactors. Fusion, as any energy technology, will then go through an exponential growth phase whereby generally every new generation will increase the installed capacity roughly tenfold.



The speed with which this goes is determined by the construction time of new plants, and how much we want to learn from a previous generation before building new reactors. With 10 years of construction time and 2 years of operation before building the next reactors, installed fusion capacity will double approximately every 3.5 years. After about 20 years, installed capacity will enter a linear growth phase, another five decades or so, until growth will halt [5]. This will likely be in the early 2100s. But is 2 years between generations enough? Wait less long, and you are less sure your previous reactor works as you expect before you build the next. The first generations of fission plants were built with no time in between at all, but there were various competing concepts being tested, all of them only small in size, so building each one was less risky. Fusion reactors are necessarily large-output (at least 500MW, but really 1 GW or more) devices, and through ITER and DEMO only one reactor concept is actively being pursued on a large enough scale. Other concepts lag even further behind this, by years if not decades. It

would help if, unlike the international cooperation that ITER is, reactors could be built by individual countries. That way, more reactors can be built in parallel allowing for faster growth and innovation.

The question then arises: can countries do that? Fusion reactors are, by many standards, expensive. The current ITER budget hovers around 20 billion euros, DEMO will likely cost 1.5 to 2 times that. While the newest fission plants also have construction costs on the order of €10bn, the very first fission plants merely cost several hundreds of million euros in today's currency [6]. Perhaps surprisingly, more than half of the cost of construction of fusion plants is non fusion-specific, mostly steel and concrete for the supporting buildings and steam plants. Regardless, for fusion it is not possible to start out making smaller reactors that are safer and more attractive investments like it was for fission. This will reflect in fusion's cost of electricity, but this only becomes relevant once fusion is producing significant percentages of the world's energy demand. By then, it is expected that costs have lowered significantly, as happens over time for any technology. Still, high investment costs might prove an initial barrier to exponential growth of the technology. Hopefully, there are sufficient other incentives like the lack of and/or discontent with alternatives, return on investment by surrounding industry and innovations and possibly others that will propel the technology forward at a sufficient rate.

Assuming countries can afford to spend 30 billion euros on the first generation of fusion plants, why should they? Many of the reasons have already been listed: clean energy, abundant fuels, safe reactors and waste, large energy density and output, independence from geographical location and weather conditions, development of job- and revenue-generating industry and spurring innovation. The abundance of fuel and weather-independence creates the possibility for countries to control their own energy production, providing sociopolitical advantages. Fusion energy is not only continuous but also expected to be reliable, ensuring high availability.
This is not to say there do not exist alternatives that might possess a combination of these advantages; energy storage technologies to smooth out weather dependence for wind and solar energy exist, as do carbon capture and storage concepts and cleaner fission concepts, but these are even further behind in development than fusion. No currently available technology that is on par with or more advanced than fusion combines them all. The ability to harness the power of the sun, not through solar panels but from actual artificial suns right here on earth, lies within the grasp of mankind. Let's make it happen.

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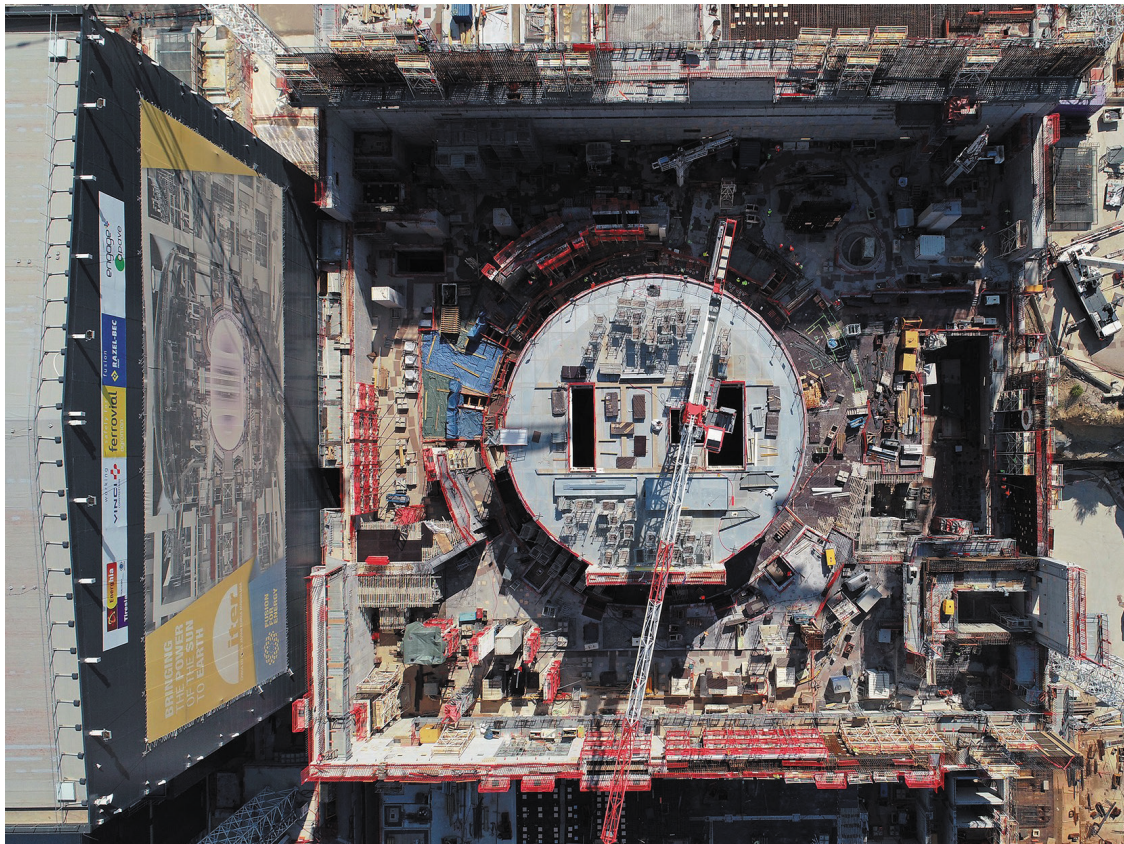


Myths Retold

As you know, the majority of people on Gaia[1] believe that the beginning of time and the universe started with the Big Bang. While this theory is commonly understood as the truth, it is actually quite wrong. Ever heard of Darwin's theory of evolution? Well, sorry to break it to you, that's a lie. Somebody had to tell you. Do you believe that thunder is created by a potential difference between the earth and the clouds? Wrong again. At least, if we are to believe the ancient Greeks. According to them, it all started with 'chaos', humans didn't evolve from monkeys but are created by Prometheus shaping the figure of men and thunder is plainly the rage of Zeus. Intrigued? Well, keep reading and I will tell you all about the ancient Greeks and their Myths.[2]

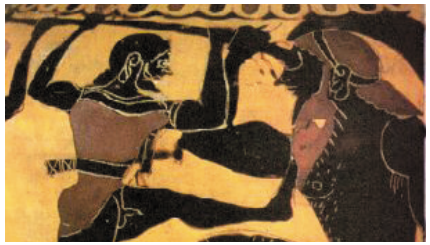
The Greeks believe that it all started with Chaos. Unlike the Big Bang, an instantaneous event, you could imagine Chaos as if it were a kind of a grand cosmic yawn. At the beginning of everything, there was Chaos. Out of this Chaos, all kinds of creatures were born. There was Gaia, the earth, Erebus, the darkness, Ouranos, the sky [3]and son of Gaia, and a few others but I won't bother you with all of them. What is important is; out of Chaos, the First Order, the common name for these creatures, were born before time. When did time start? Well, that all started when Ouranos covered his mother Gaia. I must warn you, the Greeks didn't seem to think incest was a bad thing (incest = wincest?). So when the sky covered the earth[4], Time was born and it gave rise to the Second Order (the Titans), the Third Order (the Gods), humans, your T-shirt and that piece of bread that you ate earlier today.

That's enough about The Beginning for now. Let's get to the interesting part, the Gods or after the Clash of the Titans[5], the Olympians. Do you know who they are? Try to name them all. I'll give you one name, it's an easy one I must admit, Zeus the bringer of Thunder. While many of the Gods have fabulous, violent, and humorous stories about their birth, I don't have the time for them all so I will stick to a limited few.

According to the Greeks, there were 12 Olympians[6]. Zeus, Hera, Poseidon, Demeter, Hades, and Hestia are all children of Kronos and Rhea. Then you have Ares, child of Zeus and Hera (yes, indeed. Zeus and Hera are brother and sister. Don't say I didn't warn you). While Zeus and Hera are married, Zeus is not really a faithful husband. He likes to lie with as many women as he can without Hera knowing, something that did not always work out. Hermes, Apollo, and Athena are all children of Zeus and other women[7].

If you counted correctly, I have mentioned 11 so far.There is still one left, a goddess with such an extraordinary story I can not, with a conscious mind, tell it in one sentence.

The story I am about to tell you has all the traits of a great Greek story. There is violence, it is humorous, it is entertaining, it is ticklish absurd and the story includes classic themes such as passion, hate, and love. The story begins with Ouranos and Gaia. Ouranos and Gaia had already created many children, however, one day Gaia gave birth to the Cyclopes. The Cyclopes are said to be so ugly in the eyes of Ouranos that he dared to push them back into Gaia's womb just after they were born. Gaia was furious about this and decided she would throw Ouranos of his throne, but she needed a little help with that and so she went looking for help. She passed by all her children asking for their help, but none, well almost none, thought it wise to help. However, it was her youngest and strongest child Kronos that was very willing to help Gaia. Like any God, these creatures were immortal but that doesn't mean they can't be overpowered. So at nightfall, Kronos' scythe sliced at Ouranos genitals and cut them clean off. Afterward, he threw the genitals off Mount Othrys, and far into the sea it created Cyprus when it landed. But that is not the only thing it created. Out of the sea, Aphrodite arose, who resembles Beauty itself. That was a very short summary of how Aphrodite was born. I must say, the Greeks must have had a large part of the brain dedicated to fantasy. The degree of absurdity is just almost too much, which also makes it hilarious.



All good things come to an end and so must this article.[8] But before I do, I want to give some final remarks. When/If you dive into the world of the Greeks, you might find yourself wondering what inspired the Greeks to invent such a world, full of elaborate characters and incidents. Well, that is certainly part of the fun. I hope to have given you a short introduction to the ancient Greeks, their cruel, mad, beautiful and incredible world. If you would want to know more, I can recommend 'Mythos' by Stephan Fry. It is certainly where I got my inspiration from and it goes a lot more in-depth for many more stories. Well, enjoy the rest of your day and thank Prometheus while you're at it![9]

1 Mother Earth
2 Liar! I could never tell everything about the Greeks with so few words.
3 Ouranos is still to this very day greek for 'sky'
4 Both literally and figuratively speaking
5 Long story, don't have time to dive into it now.
6 Hades is technically not an Olympian since he spends all of his time in the Underworld
7 Athena was technically born out of Zeus' head
8 I imply it was good, but that decision is really up to you. At least, you got to the end. So that is something.
9 He gave humans fire! And was punished by

Astatine

Parents Day

On the 22nd of March 2019, the annual Parents' day of Astatine was organized. Since September 2018 students have embraced a whole new life and lifestyle. A lifestyle that involves hard working, studying and researching but of course also parties and activities. Most of the time students can be found on the beautiful campus doing their own thing, apart from the weekends. In the weekend it is time to go "home home" back to your parents, they want to know what is going on with you and what you have been doing. Maybe you tell your parents about the Horst or about Astatine, but unfortunately parents have no clue about what you are actually telling them about, it's all just words without a clear meaning to them. Therefore, the best way to change this is of course to bring the parents to the campus themselves and let them show you what you are talking about. This happened on the 22nd of March. Parents came from all over the Netherlands to the Parents' day.

The day started of with a lecture from prof. dr. ir. H.J.M. ter Brake about superconductivity. This was followed by a trip to the rapid prototyping lab and a "catch your match"-game. During the "catch your match"-game the knowledge of both the parents and the first years was tested. Everyone got a sticker on their back with a word or a picture and they had to find out what or who they were by asking other parents questions. Once they knew this they could walk around and try to find their match. After the lunchbreak it was time for a short campus tour. We walked to the design lab, the "werkplaats" and of course the TAP. The board was present in the TAP, apple juice was served as a replacement for beer, which created the typical TAP vibe. In order to add to this vibe we of course all sang the Astatine song together.

Due to the very nice weather that day we could show a bit more of the campus to enjoy both the green campus and the sun. When back inside the pubquiz was started, there were various questions about Astatine, the students, and the Parents' day itself. At the start of the day parents received a goody-bag including a booklet in which Crazy 88 challenges were placed. For example, parents had to make selfies with a board member and place a sticker on their kid without them noticing it. At the end of the day the results of both the pubquiz and the Crazy 88 were revealed and the winners got their own Astatine mugs.

As OuCie we want to say that we had a very good time organizing this event and are happy that it was so well received by the parents.
Groetjes OuCie

Jenny Agerbeek

Shitty Kickstarters

Ever since Kickstarter saw the light of day in April of 2009, it has become somewhat of a phenomenon. Crowdfunding your personal ideas is already a legitimate way to start up -uh- startups. Some truly amazing products have been funded by the website. Cards against humanity, Oculus Rift and a surprising amount of back-packs hit the market successfully. Then there are a lot of projects that get backed -a lot- but in the end do not end up meeting expectations or deadlines, or get stuck in manufacturing errors. There are, off course, also tons of projects that just do not get backed enough. And then there's the topic of this article, or rant, or straight rip off from reddit (I'll cite that as my main source). Projects that promise things that are, well, impossible. Or just plain stupid.

One of the most notorious projects is one that promised a diving mask without a oxygen tank. Triton said it could extract the oxygen present in water to allow users to breath. Okay. Okay okay okay. Sounds cool. Doesn't work. So sadly, no, you cannot turn yourself into a fish (yet). However, enough people believed in the project, and backed it. The Triton is at the time of writing still active, promising proof on video that it works. For 30 -yes 30- whole seconds. Really wish I could hold my breath for that long. Oh wait, I can!

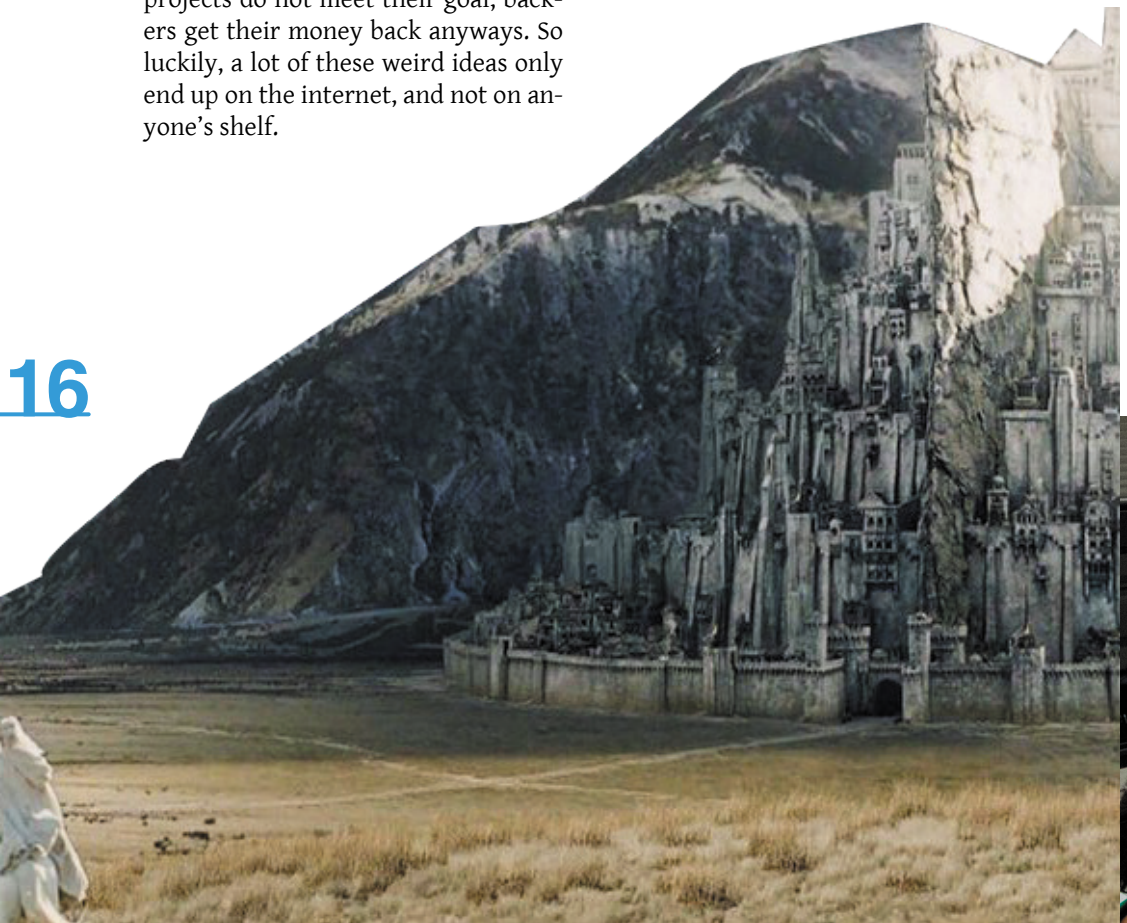
A project that may even be more absurd than the diving mask exists. Something that, if you would take a second to think about it, would not work in any of the infinite number of parallel universes where the idea pops up in someones head. Not even the one where it is supposed to work. Admittedly, it would actually be pretty epic if it would work out, but as said it won't. Someone, somewhere, had the bright idea that he could recreate Minas Tirith, a city from Lord of The Rings. As a tourist trap. In the UK. They aimed for 1.85 billion pounds to be backed. High tier rewards would promise backers houses within the city itself. Plans were to make it an actual functioning city, partially tailoring to tourists, and partially lived in by permanent residents. Citizens could be appointed the title of Lord or Lady, accompanied by a horse-drawn carriage and all other privileges. No matter how awesome the idea sounds, there is a reason why Tolkien's works are considered fantasy.

Besides catering to the imagination, some kick-starters just end up providing ridiculous solutions. Juicero, a start-up founded in Sillicon Valley, promised users freshly pressed fruit juices. Requirements? A four hundred dollar Juicero system, and a packet of juice costing about 6 dollars. The catch? The packets could just as well be squeezed by hand, even faster with some determination. The downside of this being that your hands are not connected to the internet, which the Juicero was. This was to ensure users

Sander de Ridder

would not drink juice that had passed its best by date (present on the package). Given, the things expired within a week, so it was a useful addition, except for the fact that the packages could only be shipped to seventeen states in the US before going bad.

Don't get me wrong, kick-starters can lead to some incredible products. But sometimes people just come up with non-existent problems, ignore science, or are maybe a bit to blinded by the grandeur of their idea. And if projects do not meet their goal, backers get their money back anyways. So luckily, a lot of these weird ideas only end up on the internet, and not on anyone's shelf.



Astatine

Sushi Workshop

LoA and ImCo decided to chopstick their heads together and came up with an amazing event: The Astatine Sushi Workshop! It wasabit difficult to make, but the results were great! Beforehand a promotional video was shared based on the cooking skills of Vjeze Fur, everyone loved it soy much that there was a great turn up at the event!

Organised by LoA and ImCo, 30 members of our association made some true Sushi Art under guidance of our own Sushi Master: Judith. She did a very rice job. From California 'till Enschede, everything went on rolls. After the instructions were given, everyone started to make their own Sushi. It was hard at the beginning, but after a while, everyone was hooked!

There were a lot of options to choose from; cucumber, surimi, salmon, rice... you could basically avocado what you want! you could roll inside-out, outside-in or in the shape of a bag of fries. This gave a lot of different and creative outcomes.

After the workshop the best part of it all took place; kibbling nibbling! If your own sushi tasted funny, that would probably be the clownfish. But, since there are more fish in the sea, it was also possible to taste some made by the others! This was a good excuse to switch tables and sit next to someone you think is a catch.

It was o-fish-ally a success! Want to know if this activity will happen again next year? Stay tunad!

Sea you later ;) LoA and IMCo

p.s. I am sorry for the raw jokes. But, what could I say, salmon had to make them.

Natasja Schaafsma

Gala

The theme of this year's gala was Drive in Dancin'. Which obviously implies a 50s or 60s theme in which you will bring all your hot chicks by car to the gala. Except, this time we are swapping the fancy car for a bike and the hot chicks for your friends as we are from Advanced Technology and there aren't a lot of female participants here. The gala was not only organised by our beloved GalaCie, but together with the gala committee of study association Proto.

The gala started off just as any gala. You make sure that you have your suit ready for the evening, which is done with a quick check through your closet. Next, you go to all your lectures of the day talking to everyone about how completely wasted you will get this evening.
Just to clarify to those who have not attended a gala, there is an open bar where they will serve you an infinite amount of alcoholic beverages which contain strong alcohol such as Bacardi, vodka, Liquor 43. Make sure that you buy tickets way in advance such that you cannot remember you ever bought them. This will make it feel like the entire evening was for free.

Now that we have cleared that up I will continue with my story by telling you the next thing that happened during the day. So having finished all my lectures, I decided that if I wanted to feel really well during the night I was in need of a 'goede bodem'. Thus when doing the groceries for dinner I bought at least twice the amount we would normally eat.

After dinner, I had plenty of time to get prepared, which means 15 minutes before we were meant to arrive at the Jaargetijden I had a shower and got myself dressed. When entering the gala we were provided a welcome drink which got the evening started. As soon as the doors were closed and everyone was inside, the starting dance was initiated where the boards of both study associations danced with their partners as an opening of the dance floor.

The music was taken care of by the band Undressed Broccoli. They provided the gala with live music for the entire evening which gave a really nice atmosphere. During the evening we were also provided with deep-fried snacks. Lastly, the photographer arrived who gave us the possibility to get some really bad, but funny, photos. Some classy ones and some less classy ones, as one might expect.

To be fair, I cannot remember a lot of the evening except that I had a lot of fun (visible on the photo's made) and had the pleasure of enjoying multiple drinks with friends from AT, people of Proto and my do-group family.

Astatiny

Tiny Astatine News

Bata

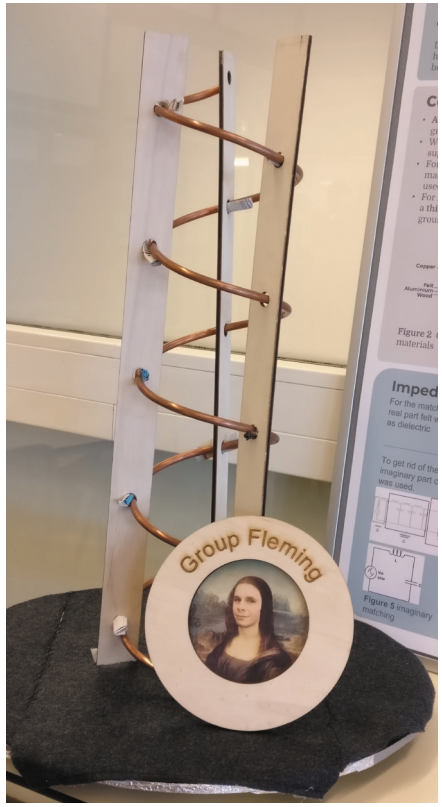
Astatine's A-Team participated at the batavierenrace again, the worlds largest relay-race! We ended up 180th out of the more than 350 student teams, which is pretty decent for a non-serious team of students -some of which hungover. Despite, there were still heroes that day! Willem Looman, the fastest A-Team runner of the day, started the first stage running an average 15.67 km/h and getting to the finish line as the 20th! At a later stage Dries Cavelaars ended up 17th and Julia Nauta even became 16th! The race ended with Bram Schotpoort crossing the finish line and everyone having a well deserved dinner at Astatine's BBQ.

Did you know that

- The origin of the coconut has been lost to history
- Yannik was unaware of the existence of Liechtenstein until 25/03/2019
- Wind is directed due to gravity (according to Rik)

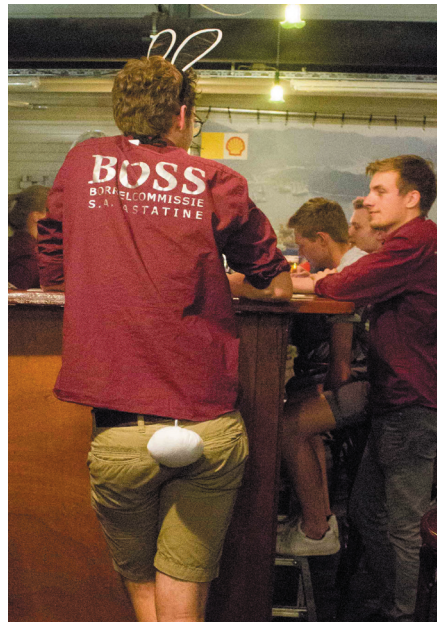
Grand Antenna Event

The ever (in)famous module 7 saw its closing on april 15th. All project groups had been sweating on making the best antenna. Marconi and their Yagi Uda antenna won by quite the margin. Their signal was almost 10 dB stronger than all others when sent up to the seventh Horst floor, from the pond in front of the complex! After lunch everyone got to present their poster, and Marconi got to collect their price (it was beer).



Kandi Barbecue

The new Astatine board has been announced! As is tradiation, this was done during a nice barbecue on the O&O square. Lots of food, drinks and fun, and not that high quality meat. And, of course, the Candidate Board. But more on that further on in this edition.



Facts

Let's get something straight about science

Hi everyone! It's time for another rant. This time, it's about the misrepresentation of the function of science, both within and without the scientific community. Wikipedia uses a definition I quite like:
Science is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe.

Notice how nothing here mentions truth? This is the crux of what I find contradictory about some of the discourse I hear about science. Trying to relate science to truth is a sure-fire way to get into a whole bunch of contradictions. To this end, we'll first start off by looking at where this distinction should be made and why. Then, I'd like to take a look at some examples of this happening that are hopefully somewhat relatable. Finally, there'll be some sort of an explanation as to why I think this is important.
Before we start, I should put in a little disclaimer that a lot of this is a matter of opinion, and very much open to debate. Let's go!

So, to paraphrase the wikipedia definition, science is the endeavor of building **models** of phenomena we observe in nature. This is pretty much the best humans can do. Our senses and motor functions allow us to interact with the environment through performing experiments and to retrieve information through observation. Observation, here, refers to any translation of something nature is doing to a human-readable format: anything from watching an apple fall off a table to a csv of temperature data.

Now, even thinking we can glean useful information from this is based on two assumptions. The first one is that the universe is **causal**. That is to say that any information you extract from nature is the result of information about the system from the past. Every effect has a cause. No one can confirm or deny this as doing so would involve using the concept of causality (ew). All we can say is that it is consistent with our interactions with nature. Secondly, there is the axiom of **time-invariance**. This is the concept that causes, as previously described, are the only phenomena that have any bearing on effects. Simply put, if I try an experiment today, and then repeat it tomorrow with the exact same inputs, I can expect to extract the same results from it.

What's interesting to note is some of what science doesn't assume. For the sake of example, we'll consider our models as equations : effects_m = model(causes_m). Causality and time-invariance allow us to state that nature works something like : effects_n = nature(causes_n). As far as science is concerned effects_m =/= effects_n, causes_m=/=causes_n, and model=/=nature. In plain English, the causes you assume to be relevant to the effects you describe can be different in number and in nature to what you use for your model. Also, the effects themselves may be different in number and in nature to the effects you describe in your model. Lastly, your model doesn't necessarily relate the two like nature does. In control engineering, we refer to these discrepancies as disturbances, noise, and modeling errors respectively.
So, referring to a model as the truth is a bit weird. If the **truth** is being close to nature, then there will always be errors such as those described above making any model untrue. In addition to that, it is impossible to verify that there aren't extra causes at play canceling out to produce the same effect, for a given experiment.

So, science tries to make as **accurate** a given model as possible, but in general, it is always going to be different from nature. In other words, **wrong** (if we do indeed want to call something wrong if it is distinct from nature). However, not everyone talks about science in such a manner.

Professors do this a lot, in my experience. They'll refer to some relatively simple model of a phenomenon, say something to the effect of "[...] but this is wrong. In reality, this actually is like [some more complicated model". For example, "The ideal gas law is wrong. A pressure-temperature-volume relationship actually looks like the van der Waals relation". I think everyone in (or studying) science has experienced something like this.

You can see this outside of the scientific community as well. Merriam-Webster's definition of science is as follows:
Science: knowledge or a system of knowledge covering general truths or the operation of general laws especially as obtained and tested through scientific method.
What even is a general truth? Ironically, Weebster's makes no attempt to define it here. I bet they can't.

I can imagine that you're wondering why I'm writing this huge fricking wall of text about such an inconsequential topic. Science can go on and has been going on without everyone being aware of this for thousands of years. Professors are obviously just trying to avoid such a debate as their job is to instruct in the particularities of specific models. In this, you would be quite right. However, here's why I think this is important.

In general, I observe misunderstandings from this on quite a frequent basis, in the scientific world. For models explaining similar phenomena, there is often discussion about which one is correct. Often, these models will make different assumptions, and so it is usually more appropriate to use one or the other depending on which assumptions break down in a given scenario. Or, a model could use concepts that are more or less familiar to a given individual, making it easier or harder to understand. One should note that I see these kinds of problems a lot more in lectures and in education than in academic papers. As for those outsiders to the scientific community, keeping this in mind could facilitate communication, especially when they have to work with scientists. It might make it easier for people to have a more accurate expectation of what scientists do and what they can deliver.

So, science, whether it be natural, social, or other, is the process of making models. Nothing more. One should not expect it to necessarily expect it to reflect the truth, as fundamentally, is has nothing to do with that. This leads to some misunderstandings that could otherwise be easily avoided. Thank you for coming to my TED talk.

Marvelous Movies

Imagine being tasked with writing an article about something you know nothing about. Now imagine you are in module 7, every other day being totally life draining. Now also imagine being me, a master procrastinator. Yep. This article was originally going to be about CGI. Two pages (that's 600 words) about a technology that could deserve its own volume. That's a lot of pages for a topic of which my knowledge ends at 3D animation. So eat it, Walt Disney, Adobe After Effects and colour #00B140. I'm going to ~~ramble~~ talk about something else.

I will stay slightly on topic. The original idea came from movies (duh), and there is one particular franchise that continues to boggle my mind at times. And with *Avengers: Endgame* being in my schedule for upcoming Wednesday, let's talk superhero movies. Let's talk Marvel Cinematic Universe (MCU). *Spoiler alert!*

The whole thing started off over 10 years ago, with the first *Iron Man* movie that debuted in 2008. The movie was well received, and set the stage for a connected universe that, at that point in time, was perhaps no more than a dream. Although the heroes showed up in movies that were not theirs, ~~I was~~ most were unaware of what was coming. Another Iron Man movie comes out, Thor sees the light of day, and Disney takes over Marvel along with the Marvel Studios. Four years after Iron Man, it all starts coming together. *The Avengers* hit the screens. A superhero team up on a scale that hasn't been seen before. Albeit New York gets destroyed in the process, the grandeur of it all somewhat makes up for it.

That leaves phase one completed. Not everything was memorable (nobody even talks about that *Hulk* movie), but my, was I hooked. And phase two? Yeah, it gets so much better. Phase two does arguably contain the weakest movies, but *Guardians of the Galaxy* is, in my opinion, the best film to date. The main importance of phase two is that is makes the setup for phase three. This is the part where is gets so much better (I said that it would, didn't I?). Looking at the list of this phase, it is filled with movies that I consider incredible. *Civil War* sees some more superhero team up, but movies like *Doctor Strange* and *Thor: Ragnarok* are also incredible stand alone hero movies, despite that I generally like stories with multiple points of view. Also, *Infinity War* sees half the universe wiped out because some purple guy snapped his fingers. A movie where the heroes do not win for once. I loved that, even if it will be undone in Endgame.

Now why did I write an entire article summarising the MCU? Partially because I'm so hyped for Endgame. Even more hyped than I was for I*nfinity War, Civil War* and *Guardians of the Galaxy*. I have a love for story arcs that are set up far larger than one would expect at the start. Waiting ten years for everything to fall into place was a mild torture, but the payoff will no doubt be huge. Most of these movies already have such a payoff. A convergence of the whole plot. The Avengers as a movie functioned as the convergence for phase one. *Infinity War* and *Endgame* will now converge the entire MCU. Despite its three hour runtime, it will probably feel like being over in the snap of a finger.

Dread it. Run from it. Destiny arrives all the same.

My New Friends

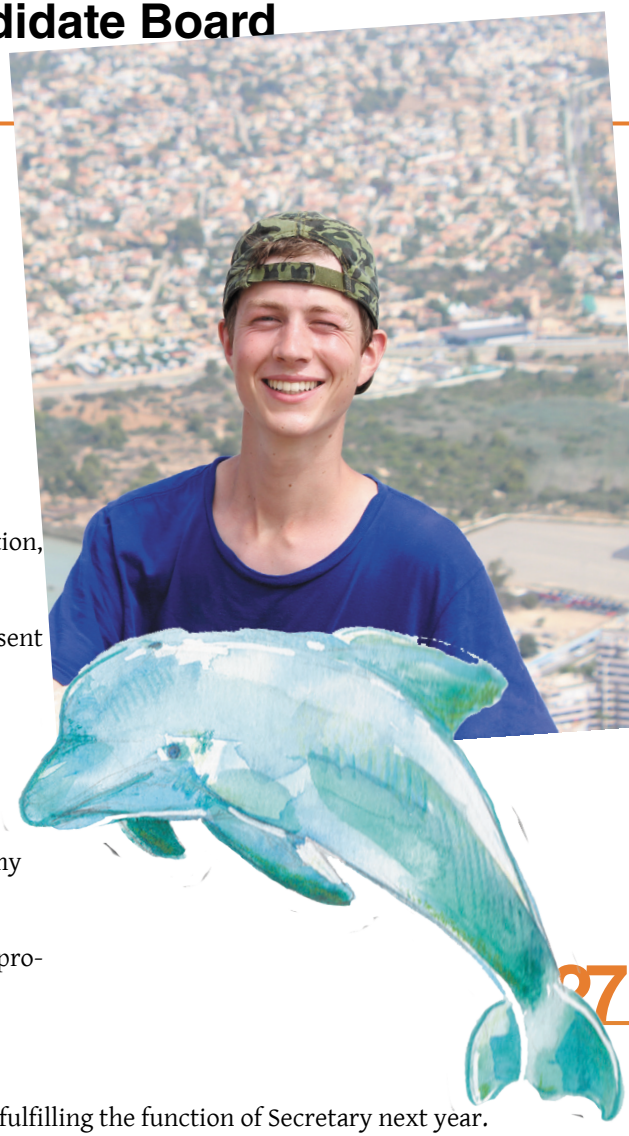
Siân Hallsworth

Date of Birth
10 October 1998
Birthplace
Barbados
Zodiac sign
Libra
When I grow up I want to be
Commissioner of Internal Affairs
I like this function because
I get to interact with members a lot as I oversee the committees. Astatine literally has a committee for everyone and I'm excited to see the new ideas for activities and have experiences outside of my general interests.
Favourite quote
"Im old enough to know better, but young enough to do it anyway" - Random internet post
Looking forward to
learning new things
Favorite ice cream flavour
Strawberry-cheesecake with the bits of cheese-cake base *heart shaped eyes emoji*
Weird fact about me
I take at least 6 pens to each exam cause I'm afraid my pens will keep running out of ink during the test
Favourite animal
huskies cause they fluffy + pugs cause they constantly look derpy
Favourite colour

Hey guys! My name is Siân and I'm so excited to be your Candidate Commissioner of Internal Affairs. During my time at Astatine I have been a member of the ImCo and the DeCo. I am also part of the Stichting Studiereis Astatine (SSA) and a member of Chasse. Im a past Frisbee kiddo and a proud Frisbee Momma. Astatine is a phenomenal association and I can't wait to (*fingers crossed*) do my part in its continued progress.

Introducing the Candidate Board

Tom Veldman



Date of Birth
7 August 1999
Birthplace
Rijssen, Overijssel
Zodiac sign
Leo
Hobbies
Scouting, programming
When I grow up I want to be
Secretary
I like this function because
I have an impact on the association, and a lot of free time.
Favorite quote
" 's Avonds abscint, 's ochtends absent -Jan van der Dussen
Looking forward to
Finishing the moving of Astatine
Favorite ice cream flavour
Cookies
Weird fact about me
I'm right handed, but often brush my teeth with my left hand.
Favourite animal
Dolphin but I dislike bugs in my programs.
Favourite colour
#FF9900

Mogguh! I'm Tom and I hope to be fulfilling the function of Secretary next year. I'm currently a member of the ITco, the YACCA and of course the Candidate 15th Board of S.A Astatine. I began my Astatine career as a 5st generation Sublime kiddo, though some of you will know me better as parent of the first generation of Piranha. I look forward to a busy year, where the entirety of Astatine is going to move to Carré. Besides that, I hope to play an integral role in keeping Astatine Alive, Accessible and Amusing.

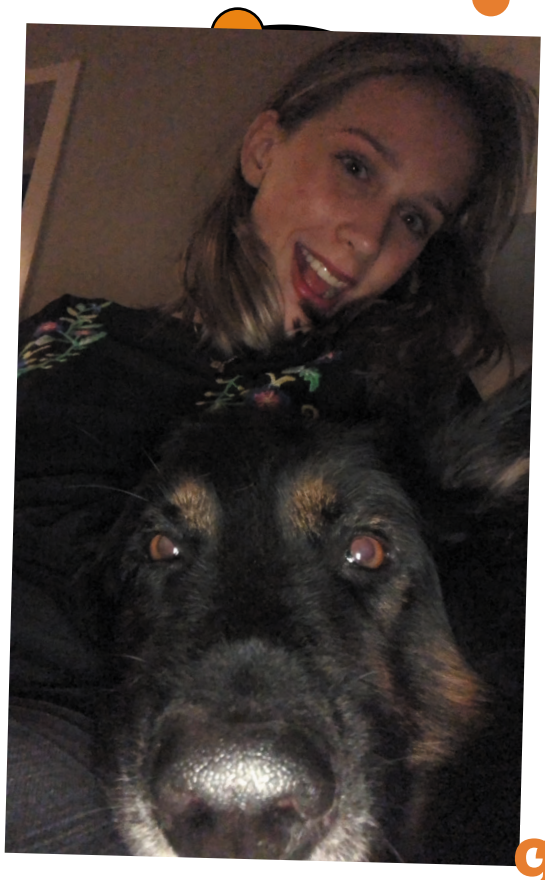
Smilla Staps

Date of Birth
31 December 1998
Birthplace
Oisterwijk
Zodiac sign
Capricorn
When I grow up I want to be
an external affairs
I like this function because
I can organize the coolest excursion and lunch lectures for you. Also earning money so the activities you want to organize can be executed
Looking forward to
Having an amazing time with my fellow board members
Favourite plant
I love all plants. All the plants in my room get a lot of love. I would especially mention my pilea. I bought this plant really small, but it is growing fast and I am really proud of it!
Favorite ice cream flavour
Dark chocolate lavender
I don't like
raw green bell peppers
Favourite animal
Monkey
Funny fact about me
Apparently I know a lot about cookies

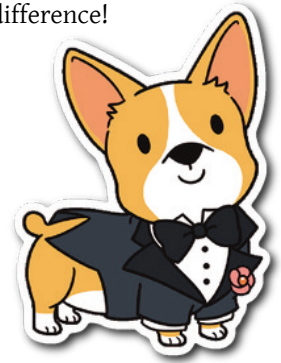
Hi I'm Smilla and I am the candidate External Affairs for the 15th board of Astatine. I'm currently in the BOSS where I am drafting a lot of beers with a lot of fun, the LOA where I can organise the nicest activities and the BuCom where the most amazing trip through Europe is coordinate. I began my Kick-in as a Purring Panther and liked the atmosphere within Astatine from the first day on. During the first two years I did several committees and look where I am now, being a candidate board member for the 15th board of S.A. Astatine

Marly Nales

Date of Birth
4 November 1999
Birthplace
Rietmolen ''de Reetmölle'', Gelderland
Zodiac sign
Scorpion
When I grow up I want to be
commissioner of educational affairs
I like this function because
I get to do something for the study
Favourite quote
''Ik loef dit zo hard'' - Alfred Tratlehner
Looking forward to
not having exams
Favorite ice cream flavour:
Yoghurt-Forest fruit
Funny fact about me
When craving for sugar, I buy sour candy so that I won't eat it all at once (your tongue will hurt)
Favourite animal
Lex, my fluffy and intimidating bohemian shepherd (see picture)
Favourite colour
Red (changes often)
Favourite plant
my self-grown basilicum

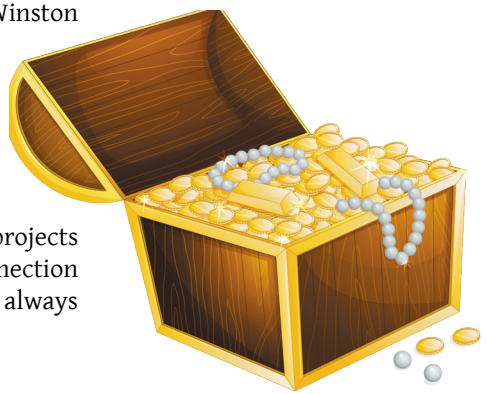


Hey all, my name is Marly and I am your candidate commissioner of educational affairs. For the last 2 years I have been active within Astatine, doing committees like the Nicat and Oucie and currently the LoA and Bucom. I am really happy that the coming year I can (hopefully) make even more of a difference!



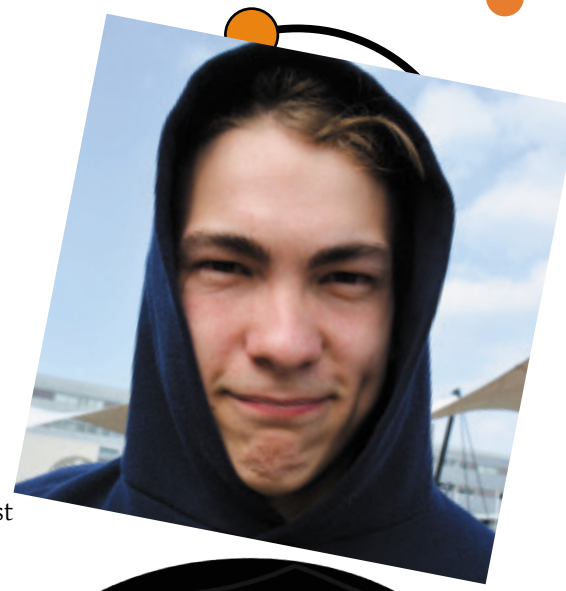
Simone van der Hoek

Date of Birth
12 August 1997
Birth place
Groningen
Zodiac sign
Leo
Hobbies
Fierljeppen, ice skating
When I grow up I want to be
Treasurer
I like this function because
I can do things for the association and I would like to introduce some changes in the current system.
Favourite quote
"Success is not final, failure is not fatal: it is the courage to continue that counts."- Winston Churchill
Looking forward to
next year
Favourite ice cream flavour
Hazelnut
Weird fact about me
things that are left on the table during projects like screws, bolts, iron rods, coax connection parts and many more object like these will always end up in my pencil case.
Favourite animal
Dogs
Favourite colour
ocean blue



Hey everyone, my name is Simone and I am the candidate Treasurer for the 15th board of Astatine. Currently I am a member of ImCo, we organize many fun culture related events and BuCom, in which we will go on an awesome trip in the last week of May. I am really looking forward to next year together with everyone and hopefully we can make a difference.

Ward Huijskes



Date of Birth
29 January, 1999
Birth place
Kersteren, Gld
Zodiac sign
Aquarius
Hobbies
Waterpolo, swimming, reddit and wasting time in the members' room
Favourite colour
Purple
When I grow up, I want to be
Chairman of Astatine
I like this function because
I want to make sure we'll be the best board of Astatine ever!
Favorite quote
"The problem with quotes on the Internet is that it is hard to verify their authenticity."~ Abraham Lincoln (the internet)
Looking forward to
next year
Favorite ice cream flavour
FroYo blueberry
Funny fact about me
Contrary to popular belief, if I'm wearing headphones it means I don't want to hear what you're saying, not that I can't hear what you're saying.
What you should know about me
If you get to know me, I'm not actually that big an asshole

Hello, My name is Ward, I am currently in the TIPCIE, Kitcat, BapoaCie and the candidate 15th board. I'm really looking forward to the challenges of the next year and I am optimistic that we can have positive impact on Astatine. I hope to see you at the GMA and (*knocks on wood*) the Constitution drink afterwards!









BOSS



Avoiding Burnout

A lot of us know the feeling of burnout. Even small tasks start to feel like a drain, stress builds up just thinking of unwanted work. Be it caused through paper work, committees or the study itself. Once you really overloaded yourself for a long period of time,w these all feel like a drain. Let's dig into what, for most students, causes this feeling in the first place and how to avoid it.
Let's first look at a definition of burnout: "Burnout is a state of emotional, physical, and mental exhaustion caused by excessive and prolonged stress." [1] It goes along with being overwhelmed and/or terribly bored by most of the tasks you are given in your everyday life. Once you ruled out that you're not just given tasks completely unsuited to you, the real question is how to get rid of this
feeling of burnout.
Most commonly, burnout is caused by continuous work overload, so the obvious solution is taking breaks. You might say that you just don't have time for breaks, but look at these great reasons to take a time off anyways.

1. There has been a lot of research going into the decrease of productivity through overworking yourself: if you work 60 instead of 40 hours, your efficiency is so low that you effectively get less done than you would at 40 hours of work. [2] So you might as well reduce it all to the neighborhood of 40 hours to get those much-needed breaks in!

2. Parkinson's Law: this does not refer to work-related neuro-degeneration. It is a completely different observation noted by Parkinson. The work you do expands to fill the time you make
for it. Make 6 hours of time for a task that takes 2 hours and you will take 6 hours for it, procrastinating, stressing and being inefficient. The inverse also works to some extent: make less time and be more efficient. So there is some more spare time for breaks!

3. Working till exhaustion kicks in leads to a lot of errors. Yes, negative efficiency is a thing! This
happens when you are so tired that you begin correcting "mistakes" where you didn't actually make any, or just make something that needs correction otherwise!

So the next time you see your eyes passing over the same passage of text for the 3 rd time in a row,
you might just want to take a break! But there are other ways to eliminate inefficiency and make time for breaks. Easiest of all, change your work-environment when it's too noisy [3]. It does not actually appear to matter at which time of the day you study, this just depends on the type of person you are [4]. The most difficult switch for students has got to be getting a sleep cycle. This is a theoretical concept said to exist outside universities, and people that cling to it are more awake during the day while having fewer issues sleeping in in the evening. But let's start with baby steps and reduce our work-load to below 40 hours.
Good luck!

[1] https://www.bidsketch.com/blog/everything-else/prevent-burnout/
[2] https://cs.stanford.edu/people/eroberts/cs181/projects/crunchmode/econ-hours-productivity.html
[3] https://www.helpguide.org/articles/stress/burnout-prevention-and-recovery.htm/
[4] https://www.oxfordlearning.com/best-time-day-to-study/

(Not so) Cheerful Chef Puzzle

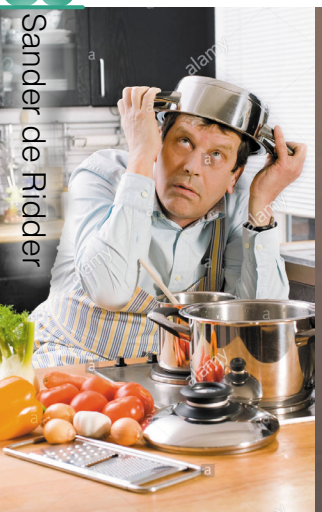
Recipe for Disaster

So we forgot to ask our regular chef, Roos, to make something nice for this edition. So you'll have to do with this, my recipe for disaster. Please read through the whole recipe carefully before starting.

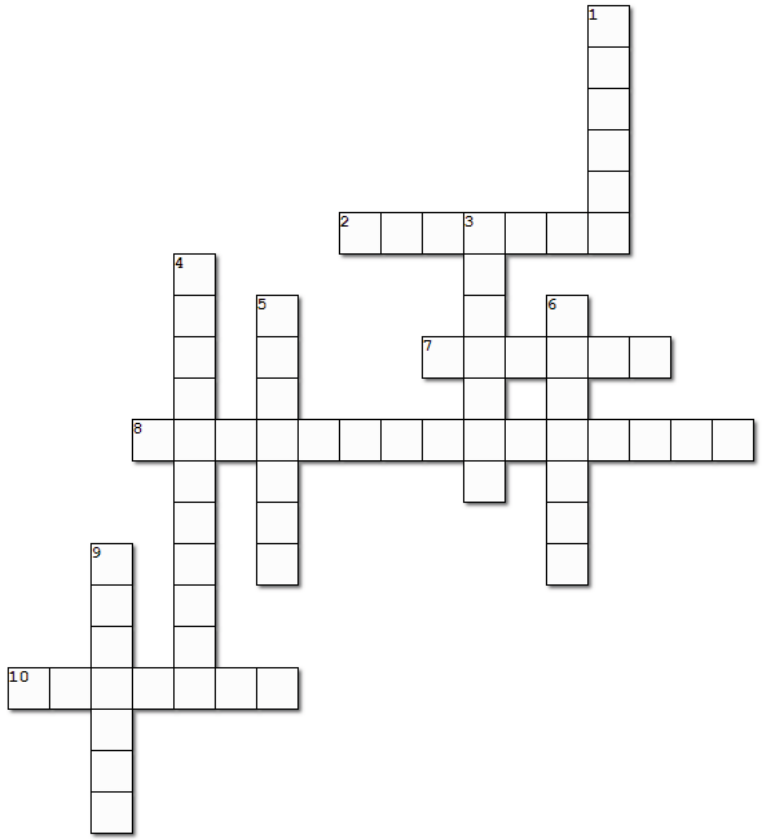
Ingredients
A slight dose of panic
2 PTSD flashback to PBL
1 Oven ready pizza

1. Forget to ask Roos (or whomever is your regular chef) to write a recipe.
2. Panic.
3. Turn on the oven at like 200 degrees centigrade.
4. Grab whatever you have lying around. Any household will probably have some onions, garlic and bouillon lying around. See if you can find any vegetables as you want it to be healthy. If these are absent, panic some more.
5. Start boiling enough water to make the bouillon. Cut the onions. garlic and vegetables.
6. Realise you did not need the oven for this.
7. Have an existantial crisis over what is wrong with you.
8. Throw the stuff you just cut into the oven.
9. Wait I meant the water. Did you even turn off the oven?
10. Let it boil at low heat until it starts thickening. It should still look like a soup-ish kind of thing, however.
11. Realisation 1: it tastes horrible. Throw it all away.
12. Realisation 2: you have a pizza left in the freezer. Congratulate yourself on planning ahead by turning on the oven and actually buying pizza.

Enjoy this classical student meal! It tastes even better eating this after a party. Serve with more pizza on the side as you may not quite feel full after just one.



Sander de Ridder



Across

2. Name of the newest Avengers movie
7. _n
8. Those who check the examination board '...' committee
10. Incest =

Down

1. Bram.Krikke
3. Astatine Committee name of the organization of the gala
4. Drinks served at the TAP during Parents' Day
5. Name of a start-up founded in Sillicon Valley
6. what is the name of the impersonation of the sky
9. Being in a state of emotional, physical and mental exhaustion due to exessive and prolonged stress.

Rueb van Asselt

We push technology further

to print microchip features that are finer

to make the energy use of a battery more efficient

to make electric cars the standard

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