HONORS ACADEMY
YEARBOOK
BACHELOR PROGRAM
2019
2020
Projects
Memories
Experiences
July / August 2020
Dear Honors Bachelor students,

You have started to read our first ever Honors Academy Yearbook! I hope many more yearbooks will follow, though hopefully next year Honors students will also be able to showcase their hard work at the Symposium.

It’s mid-July, I have just started my new job as Dean of the Bachelor College and reality is sinking in: in a few months a new Dean of the Honors Academy will be appointed. A perfect moment to reflect on the past 2.5 years in which I have had the honor of being your Dean.

"My piece of advice to you is to always keep asking yourself why you do the things you do!"

I became Dean of the Honors Academy because of my interest in educational innovation and my strong belief in the importance of continuous personal development. The COVID-19 situation has proven to be a catalyst for both. I have always been impressed by Honors students’ motivation to learn and to create something new. These past few months I have been amazed by your creativity, flexibility and determination to work on your projects in often difficult and uncertain circumstances. When reading your project pages in this Yearbook, I see what you have achieved despite COVID-19. I feel incredibly proud and thankful to have had the opportunity to work with and for you.

Of course, the work is never done. The Honors Academy staff is looking forward to the results of the yearly evaluation survey. These will help us create a better Honors experience. Next year we are welcoming a number of new coaches and starting a new track, Networked Society. Furthermore, we are taking on the challenge of organizing the Honors Academy in the 1.5 meter university, while creating a stronger Honors community feeling.

For you, work and personal growth will also continue, whether by doing another Bachelor and Honors year or by moving on to your Master program. My piece of advice to you is to always keep asking yourself why you do the things you do. The answer to this question can help you become more efficient, effective, goal-oriented and motivated. I can tell you from my own personal experience: it works! It has helped me get to where I wanted to be, a position where I can help people learn, develop and grow, now as Dean of the Honors Academy at TU/e, working with bright, highly motivated and skilled students!

My congratulations to all of you who have finished this Honors year successfully! Good luck in the near future and stay safe!

Best regards,

Prof.dr.ir. Ines Lopez Arteaga
Dean of the Honors Academy
CONTENTS

Artificial Intelligence 04

Competitive Programming and Problem Solving 12

Empowerment for Health & Wellbeing 28

H.S.A. Confluence 40

Energy Transition 42

High Tech Systems 50

SensUs Organization 56

Smart Cities 66

Smart Mobility 86

Honors Academy Staff 92
How can society and science benefit from AI?
Which are AI downsides?
Which are AI limitations and how they can be overpassed?
Do I really like working on AI or is it just the societal hype?

Take few more reflections moments.

One common approach would be to define AI as the study of intelligent agents. Agents can be anything, from devices to pieces of software. They can learn from data/environment/experience to maximize their chances of succeeding in a goal. Reflection moment: Are these really universal truths? Traditional AI problems involve reasoning, planning, learning, perception, pattern and image recognition, etc. AI encompasses several subfields. Within this honors track, the main focus will be on data mining methods, but also other subfields (e.g., machine learning, symbolic reasoning, evolutionary computation) and related fields (e.g., complex systems, neuroscience, optimization) will be addressed. The work is performed in multidisciplinary teams, following the problem-based and design-based learning approaches. All teams focus on the technical and scientific aspects of AI, except one which will focus on AI philosophical aspects and the teams interact with each other.
Track coordinator
Wouter Duivesteijn
Applied research: AI esports competition

The goal of our project was to make an agent that would be able to successfully play a game called Isaac's labyrinth, which was made by the organisers of the competition Fruitpunch AI. To accomplish this, we explored deep reinforcement learning, specifically curiosity learning, which we implemented to gain new insights in the models and their applications.

In the game made for the competition, the goal was to maneuver through a labyrinth and collect fruit. After enough fruit was collected, the agent had to return back to the centre in order to win. We made an agent that made use of curiosity learning to reward the agent for exploring new areas of the labyrinth. Next to this, we made use of Proximal Policy Optimization (PPO) with use of the Actor-critic method. This was the system that would decide which action to take. It consists of an actor and critic model. The actor model selects an action and the critic model corrects the action based on the reward obtained from taking that action in order to get the most reward. The combination of these models makes our agent. However, we didn't manage to finish the model in time due to difficulties early on in the project. Nonetheless, we managed to set up the framework and believe the only thing still missing was to have the correct types of variables be communicated between the models. In the future, we would have trained and tested the agent after which we would have optimized the models or looked for different approaches.
Looking back at this Honors year

Best memory
The best memory we have from our project was when the agent actually did something in the environment. We had quite some trouble getting it to work and when it finally did it was just such a good feeling!

Most valuable lesson learned
The most valuable lesson we learned during this project was to start earlier with the actual programming. This will help to get yourself familiar with the way the theory is put into practice. We started off with doing a lot of research, but not so much with directly applying this. However, in hindsight this is something we would definitely recommend to other Honors students in this track. To put effort in both researching the topic as well as familiarising yourself with applying it.

Piece of advice
Another piece of advice for future Honors students is to not be afraid to ask for help. You’re here to learn and to develop yourself. This doesn’t mean you have to do everything by yourself. Ask people that have more experience or more knowledge on the topic for help. It can save you a lot of time and frustrations.

Have fun
One other thing we want to share is to make sure you like the project you are working on. Make sure you enjoy what you are doing as it will make you feel more motivated and it will just make the entire year so much more fun.

"Our advice: Just start doing it!"
"AI is likely to be either the best or worst thing to happen to humanity"
- Stephen Hawking

**Fundamental research: Reinforcement learning**

Our team’s goal for this project, was to have an introduction in the world of Artificial Intelligence and Reinforcement Learning. We wanted not only to learn how to implement some algorithms but also to understand the logic and mathematics behind them. That is the primary reason that we chose to work on fundamental research; it would allow us to truly understand these complex and new topics. We chose to do this by examining and re-creating a paper by S. Fujimoto et al. in 2018, in an academic paper named “Addressing Function Approximation Error in Actor Critic Methods”. In this paper, a state of the art reinforcement learning algorithm called “TD3” or “Twin Delayed DDPG” is presented.

By the end of the project we were able to fully recreate the paper we wanted to recreate. Along the year, all team members worked individually and collectively on creating small reports on AI topics and especially Reinforcement Learning related topics. These topics including both mathematical theorems as well as algorithms. We managed to implement the DDPG algorithm from scratch and on top of that we extended the algorithm to finally create TD3, the algorithm from the paper. After reproducing the paper's results using our own TD3 implementation we focused on creating a new environment in which Reinforcement Learning algorithms could be trained at while trying to test our TD3 implementation on it. Generally, we had difficulty implementing all the algorithms mostly because of our inexperience with reinforcement learning techniques but we eventually managed to implement and reproduce everything discussed in the paper we were recreating.
Looking back at this Honors year

Best Memory from this Honors Year
Definitely one of our best memories was in the beginning of the project when each of us would research a different topic and we would do small lectures to each other to explain the things we researched. Those small lectures were not only interesting but also super fun because of all the joking around between and during those lectures.

Most valuable lesson learned
Definitely the most valuable lesson that we learned was that researching a topic is so much more difficult than it actually sounds. Not only you have to know a lot of things about this specific topic, but you also need to be creative and draw inspiration from other domains, topics and problems and see how you can use all that to further improve the knowledge we have on one topic.

Piece of Advice for Future Honors students
Do something that really interests you as a project. For us, the fact that the project was something that truly interested us gave us great motivation to complete all our goals even if there were many setbacks during the whole academic year. Also, being interested in your project makes working on it even more fun so in even stressful periods.

THIS IS OUR TEAM

Jari Martens - 2nd Year Student
Mariia Turchina - 1st Year Student
Max Meijer - 2nd Year Student
Lulof Pirée - 1st Year Student
Panagiotis Kyriakou - 2nd Year Student

"Punch Yourself" - AI Generated Inspirational Quote
Fundamental research: Reproducible research in Computer Vision

In this project, we aimed to reproduce a paper by Richard Zhang, on making certain computer vision techniques more robust, and possibly build further on it. The used algorithms are called CNNs, short for Convolutional Neural Networks, a specialized version of classical neural networks used in AI. These CNNs are used to classify what is depicted in an image. For example, such a network can be trained to recognize whether the animal in an image is a cat or a dog. A problem with these CNNs is that the accuracy of the classifications can vary a lot when the image is shifted just one pixel. This is what we tried to improve in our honors project, using ideas signal processing.

We started of by reading into the topic, learning about the theory behind neural networks, convolutional neural networks, and shift invariance. We also looked into related fields of computer vision to obtain an overview of current research directions. This took quite a big part of the year, but we acquired a lot of knowledge and experience, which was already a nice result for us. Next, we started reproducing the paper. We measured how much shifts in the image affect the accuracy of our model. In some cases, the improved model worked better and more consistent, but unfortunately there were also quite some cases where the improved model performed worse. So, we were not able to get the promising results that Zhang got in his paper. There are some explanations for this. Firstly, we used a smaller and simpler dataset, and we trained our model for a shorter amount of time on computers with less performance. Also, we needed to crop the images, and apparently our model did not like it when we cropped the head of a cat or clog off the picture. These setbacks took quite a lot of our time, so we were not able to extend Zhangs paper. Even though the project was not a great success when looking at the results, we learned a lot about AI and CNNs.
Looking back at this Honors year

Most valuable lessons learned
The entire experience has been really rewarding to us since it gave us the opportunity to learn about what's current in the field of AI research and the steps required to reproduce and validate those results. Doing this project also helped us develop our personal skills, both from a technical and a soft perspective but, in the end, the most valuable lesson we gained comes from developing a mindset of continuous growth.

At the beginning we had a limited understanding of the topic but, by working as a team, planning our task diligently and sharing our results, we were able to take advantage of each others interests and expertise and advance our knowledge of CNNs in a very short amount of time.

Advice for future honors students
Learn to learn on your own. Don't rely on the track to teach you everything. The track can give a basic learning structure but you need to fill the contents by yourself. However, if there's a problem, do not hesitate to ask your team members or tutors for help.

Try to apply the strength of every team member. One of the best parts of honors academy is that students from different faculties will be mixed based on projects. This is very similar to the real working place and we need to learn to work with people that have different backgrounds, ethnicity, values, etc. If every team member can contribute their expertise in the project, you will have results very different from what you had in your mind.

THIS IS OUR TEAM

First year honors students:
Lucas Beerens
Adrian Cucos
Tim Kraakman

Second year honors students:
Guangyu Chen

Coach:
Wouter Duivesteijn

"Artificial intelligence is one of the most profound things we're working on as humanity."
- Sundar Pichai
In this track the students learn about algorithmic problem solving and related computing skills, and put that to the test by participating in competitive programming contests.

In the year 2019-2020 the students have been very busy in the track with activities ranging from participating in and training for programming contests to executing research and company projects. While the first year students focused on developing their algorithmic problem solving skills, organizing training sessions and participating in programming contests, the second year students showed their prowess in top international programming contests and combined that with a research project, company project, or developing our training server. All students also participated in the track seminar, where they conducted research into one of their favorite computer science topics and shared this with the entire track in presentations of 30-45 minutes. Overall, the students not only improved their technical skills in programming and problem solving, but also further improved their professional and personal skills along the way.
Track coordinator
Kevin Verbeek

I'm an associate professor in the Algorithms, Geometry, and Applications cluster of the Mathematics and Computer Science department. I have been coordinating my track since 2015, and I still enjoy to stimulate talented students to reach their full potential!

The year 2019-2020 has been an exciting year with some unfortunate circumstances. One of the most exciting things this year was to host the Northwestern European regional contest in Eindhoven. This programming contest is the regional final of the International Collegiate Programming Contest, the largest and most prestigious student programming contest in the world. With three of our own honors and ex-honors teams joining the 123 best participating teams in Northwestern Europe (Benelux, Scandinavia, Germany, UK, and Ireland), and with several other students from the track helping in the organization, it was a very exciting experience, where one former track student managed to win the contest! In 2020 we were unfortunately hit by the coronacrisis, which made it significantly harder to collaborate or train. However, I'm proud that the students in our track handled it very well, continuing to plan training sessions, properly finalizing research and company projects, and even giving seminar talks online. Although it was impossible to suitably conclude this year, I'm eager to see everyone again next year, or, for those who graduated honors, I wish you a succesful remainder of your academic career!

Coaches

Willem Sonke
I am a researcher and scientific programmer in the ALGA cluster of the Mathematics and Computer Science department. Last year was my first year as a coach in the CPPS track. I coached two very different projects: one research-oriented one, and one about implementing a website. Both projects were very interesting to witness as a coach. I also liked the students' seminars, which taught me several things I didn't know yet.

Pantea Haghighatkhah
I am a Ph.D. student in the ALGA cluster in the Mathematics and Computer Science department. I joined the Honors Academy only in the second half of the past year supervising several first year students. It was interesting to observe that, even in early stages of their study, students can grow interested in very different directions of Computer Science. I look forward to see how these various tastes will be translated into projects in the next academic year.
"It is supposed to be fun!"

TRACK COMPETITIVE PROGRAMMING AND PROBLEM SOLVING

Competitive programming competitions group 1

In the first year of the CPPS track, we do not have one specific project. Instead, we aim to compete in various programming contests.

Throughout the year, we have participated in numerous programming contests. This started with the Eindhoven Algorithmic Programming Contest (EAPC) in September, which we performed quite reasonably in. It would be a while until the next contest, so we spent the ‘downtime’ learning about various algorithmic techniques. These ranged from the relatively simple shortest-path algorithms to the more complicated max-flow algorithms and (basic) computational geometry. We also applied these techniques by practising various problems from past contests.

The next contest that some of us participated in is Google Hash Code. In this contest, you are presented with an NP-hard optimization problem. Since finding the actual optimal solution is typically a very time-consuming computation, we have to make do with approximations. These approximations yield a number of scores on given datasets, on which participating teams are ranked.

Our goal was to finish within the top 1000. In the end, we exceeded this goal by ending up in the top 600. Another contest that most of us participated in is Google Code Jam. Even though this contest is also organised by Google, it is quite different in its setup. Here, you are given a number of algorithmic problems to solve. Depending on your performance, you may be allowed to move on to the next round. None of us made it past round 1, which is what we expected to achieve.

We also all prepared and gave a seminar on an algorithmic topic, e.g. linear programming and partisan game theory.
Looking back at this Honors year

Best memory from this Honors year
For us, the best memory of this Honors year is participating in contests near the end of the year and being able to see the progress that we have made throughout the year. At the beginning of the year, there were certain problems that we thought were quite difficult. However, with the experience we have acquired since, we were able to solve them (quite quickly in fact). This, however, does not mean that we are able to solve all problems.

Most valuable lesson learned
The most valuable lesson that we have learned is that we are not able to do everything. There have been plenty of problems that we have not been able to solve. A notable example of this is problem G of 2008’s EAPC, Choir. No matter how much time we spent on this problem, we were not able to solve it. However, this encourages us to keep practicing problems, so that we may eventually be able to solve those really hard problems.

"A computer does what you tell it to, not what you want it to do."
Our objective was to create a new problem website to aid students from the CPPS track to train for programming competitions.

**Backstory**
In the "Competitive Programming and Problem Solving" track there exists the constant need to practice for programming competitions. Students have to develop problem-solving skills, and the most effective way to do so is by solving as many problems as they can. This is done by having a website where students can pick problems, solve them, and submit them to check if they are right. However, the problem website we were using became outdated, both in terms of the user interface and the backend. Users started experiencing slow loading times, and maintenance became too troublesome. This is why we made it our objective to develop a completely new problem website that would solve all of these issues. We called this website Gavel.

**Achievements**
Gavel achieved to solve many of the problems of its predecessor. The main points we achieved in our development of Gavel were that we:

1. Created a modern, intuitive front-end
2. Created a secure, fast and reliable back end
3. Created a reliable development pipeline
4. Kept the desirable functionality from the old website
5. Added more features to improve user experience

These achievements make us really proud. This is because we did not only improve aspects that benefit the users, but also aspects that will be useful for future developers.

**Follow up**
We have laid the grounds for future developers to make Gavel even more useful for the changing needs of students. Things like adding support for different competition types or adding advanced user profile customizations. It is up to the future developers to make this a reality.
Looking back at this Honors year

Best memory from this Honors year
Our best memory as a team happened when we finally put Gavel online. We had been working for months in order to develop a good, reliable, first version of Gavel. We had tackled challenges like performing authentication, adapting the old database information into the new system and developing a user-friendly interface. The heavy lifting was hopefully over, and we just had to upload our website to the production server. This process was arduous, but when it was finally over we all felt a sense of relief. We finally had a working site!

Valuable lessons learned
There are several lessons that we learned throughout the process of this project. However, the most important one in our opinion is to keep strict internal deadlines. This is useful in several ways, it allows your team to keep a schedule and reach your objectives, but it also allows the team to identify if a teammate is underperforming. This keeps the team focused and it also facilitates conversations regarding under-performance. Ultimately, keeping in mind that even though some development tasks might seem independent, everyone needs to keep constant communication about their progress.

Advice for future Honors students
Firstly, choose a project because you enjoy what you will be doing, and not only because the idea seems interesting. For example, we choose this project because we are all interested in development, and we enjoy the challenges that come with it. Remember that you will be working on the project for long hours, usually after already finishing other university assignments. Therefore, enjoying the project itself will make it so much easier, and will make the whole process so much more fun.

"We finally had a working site!"
"Since much depends on rivers, it is important to be able to identify changes in river networks over time."

**Computational River Analysis**

Given two graphs, each representing the same river network at two different moments in time, we wanted to compute the realistic mapping between the vertices of the graphs.

Though historically being manual labor, tracking these changes using computation can help us understand river networks better, and can aid in constructing better models to track and predict important river network changes. Our main solving method, which is based on the Hungarian algorithm, showed the best results when it came to generating mappings that would optimize the total euclidean distance of the mappings we generated.

Future avenues for research include reducing the temporal instability of the input data, as well as defining and developing methods to quantify the performance of utilized algorithms with absolute, instead of relative values.
Looking back at this Honors year

Best memory from this Honors year
Software development often requires quite a bit of work before you can see tangible results. Reaching the point where your work starts giving results on which you can base the answer(s) to your research question(s) is very satisfying and opens the door to experimentation. Reaching this point ourselves was awesome.

Most valuable lesson(s) learned
Testability of your algorithms is super important. Our methods only allowed for relative comparison between the multiple algorithms we wrote. To counter this, future research should also focus on developing clearer evaluation methods, that should provide an absolute value for the quality of an algorithm within the context of the problem you are trying to solve.

Piece of advice for future Honors students
Try to start generating results early on in the process. This is useful for both your report and the quality of the final results. It often gives new insights with which you can improve your work. An agile software development approach can help with this. Be sure to also emphasise good team communication, which allows for regular discussion and sharing of ideas.

"The goal of this project was not only to deliver a good result, but also to gain new experiences."
"There is always another approach."

**Applied Research: Optimizing vehicle routing**

The goal of our project, organized in collaboration with consultancy firm CQM, was to optimize vehicle routing. More specifically, we have many pickup and drop-off locations and time restrictions for those locations. We also have a list of available vehicles and a starting location for them. Every day, all pickups and drop-offs need to be handled in a timely manner. Our task was to come up with routes for vehicles such that we need as little vehicles as possible, and these vehicles would need to drive as little distances as possible, to handle all pickups and drop-offs. Finding good solutions for this problem saves a lot of time, money, and prevents unnecessary pollution. This problem is quite general in a sense that it can be applied to multiple domains. For example, package delivery or a planned taxi service.

Our honors team had an advisory role in this project. CQM had an existing algorithm to solve the problem, and we were looking to improve it. Our team has been doing research into different methods to solve the same problem. Our work went in cycles of first coming up with promising ideas, then executing them and seeing if they worked. After trying a new solution out, we reflected on it and went back to the drawing board for either improvements or an entirely new approach. At the end of the project we had come up with an alternative algorithm that performed better than the original approach. We explained our findings and advised CQM on how to continue with their project.
Looking back at this Honors year

Keep looking for solutions
There is always another approach to your problem. If you are stuck, or your current approach does not provide satisfactory results, your main goal should be to find another angle of attack. You will find it, and it will help you. The initial approach of using the Simulated Annealing algorithm we pursued did not allow us to achieve the desired results. Therefore, we investigated adaptations and alternatives. Switching to Integer Linear Programming resulted in the performance gains we were after. Further tweaking allowed us to reach our goals and surpass CQM's approach.

Work your own way
Initially, we worked with the codebase supplied by CQM. While their C++ code was efficient and well-written, it was also difficult to understand. After a number of weeks of struggling, we decided to rewrite the entire project in Java from the ground up. Not only was our team more familiar with Java, but this architectural process also provided us with significant insight into the inner workings of the implementation. In the end, this allowed us to obtain significantly superior results. Thus, never be afraid to express your desires for the workflow! After all, you are the one carrying out all the hard work.

Seeing the fruits of your labour
The best element of a long and difficult honors project is the moment you finally get to reap the benefits of all your hard work. For us, this moment was once we had properly tuned our Integer Linear Programming definition to such a degree, that our implementation started to outperform the original Simulated Annealing algorithm. In some cases, it won by a huge margin. The manner in which this reflects the value of your work provides a boost in motivation for the entire team. Both large successes such as this moment, as well smaller achievements, are vital for the morale of your team, and allow you to reach further milestones.

THIS IS OUR TEAM
Joris Goddijn
Hidde Koerts
Tom Suelmann
Venislav Varbanov
[All 2nd year honors]
Under the supervision and coaching of Kevin Verbeek

"Complex algorithms to solve real word problems."

CQM
Consultants in Quantitative Methods
In the Eindhoven Algorithmic Programming Contest, all members of CPPS were expected to compete in their first official contest.

The goal of this event was to gain experience with contests in general and put everything we had learned in the weeks prior to the contest to the test. In the track, everyone got a quick introduction in many important aspects of problem solving, making sure we would be ready for the contest but also to give us an idea of what we had to master in order to be successful on such contests. This was also a good way of deciding our goals for the upcoming year in terms of contests we wanted to participate in and goals we wanted to accomplish, now that we had an idea of what we were up against.

The EAPC, was a preliminary contest for a contest named BAPC (Belux), after which you were able to pass to the NWERC (NorthWestern European Regional Contest) and eventually the world finals. The track was divided into groups of 3 called subgroups. These subgroups were our first ‘teams’ in which we would compete, however, once we got to know more about the group as well as the difference in goals and ambitions members of the track had, new groups were formed. Oftentimes, groups were contest-specific, but some groups remained permanent. In the picture above, you can see various teams working their way through the given problem set. Worth noting is that teams had 1 laptop only, meaning you had to be smart about who would get to code while someone else would work out problems. Whenever a problem is solved, the team gets a balloon with the color of the problem!
Looking back at this Honors year

Best memory from this Honors year
One of the best memories of this Honors year was our placement in the Google Hashcode contest. Before the contest, our team had a 'minimum goal' of where we wanted to end up in the rankings. Google Hashcode has thousands of teams participating (over 10,000!), which means that being in the top 1000 teams was already a great accomplishment. Prior to the contest, however, a second-year Honors team told us that this was their aim last year, but they didn't succeed. Not wanting to discourage us, he warned us to not be disappointed if the result wasn't top 1000 in the end. Instead, we broke expectations and ended up 588th, beating all other first year honors teams and all but 1 second year team.

Most valuable lesson(s) learned
Remain patient! Contests might be about solving problems as quickly as possible, but if you start too quickly without enough proof that your specific solution will definitely work, you will end up grasping at straws and debugging way more than necessary before you finally solve the problem. You can't run faster than your legs can move either or you'll lose stability.

Piece of advice for future Honors students
Be realistic at first, but don't be scared to dream. Competitive Programming has competition as its major element, and it makes sense for anyone to want to accomplish something worth mentioning. Use your first year to explore, experiment, and learn more than just good problem solving. After all, you are competing in teams, and competing is not about performing best yourself but also getting the best out of your teammates. Moreover, code hubs as seen in the pictures are also a lot of fun, so enjoy the experience!

Our Team

Teams are ever-changing per contest, which means that there is not one team to give credit to. In context of the mentioned contest, Hashcode, the team consisted of Jan Hoekstra, Marco Pleket and Martijn Leus, from left to right in the picture below.
"Tell me and I forget. Teach me and I remember. Involve me and I learn."

TRACK COMPETITIVE PROGRAMMING AND PROBLEM SOLVING

Programming contests and practice
group 3

A part of our contribution for the Honors Academy consisted of participation in various types of programming contests. We aimed to get as much hands-on time applying interesting algorithmic concepts that we learned throughout the year.

The main goal that we set at the beginning of the year was to gather as much experience relating to implementation of algorithms rather than simply studying them. In order to accomplish this, we have participated in multiple contests, each of them putting stress on different focus points, such as efficiency of fast solving time. By doing this, we managed to gain more confidence in our set of skills and we learned how to approach contests with the right mind-set, which was something that proved to be valuable for our development.
Looking back at this Honors year

Best memory from this Honors year
When looking back at the astonishing amount of lovely memories from the past year, choosing one as the crème de la crème may seem a daunting task. However, upon further brainstorming our team decided on describing our participation at the Google HashCode competition. We will never forget our moment of enlightenment when we realised that, when tackling cost optimisation problems, trying to look for the most elegant solution since the beginning is the inadequate strategy! One must always start small, incrementally improving one’s solution, trying to win points little by little. After an hour of trying to compute a complex solution to no avail, we switched to the most straightforward techniques, seeing immediate effect.

Most valuable lesson
By far, the most precious insight from this year in the eyes of our team was the following fact: While working on a solution it is of an extreme importance to know when to quit. This may seem quite counter intuitive, however in most cases if you have doubts in regards to the logic behind your solution, or if things do not seem to be starting to be pieced together as you continue to hypothesize and envisage the final implementation, most often this fact purely means that something is off and your solution may be wrong. Algorithms should flow naturally.

"Elegance is not a dispensable luxury but a factor that decides between success and failure."
The Cookie Baking Problem

A bakery wants to optimize the number of cookies it can bake with its oven! This ‘cookie abstraction’ was useful to understand the problem.

For some healthcare scans, radioactive substances are injected into patients to be picked up by the scans to see (sub)structures inside the human body. Unsurprisingly, these radioactive substances must be produced, and this project is about how to efficiently produce these. The cookies that have been mentioned are actually ‘pellets’ of a very expensive material. These pellets are put in a container which is then beamed with a heavy-ion nuclear beam to make the material radioactive. Afterwards, the pellets are submerged and dissolved in acid to make the substances needed.

As it is much easier to talk about ‘cookies’ and an ‘oven’ than about ‘pellets’ and a ‘container with a heavy-ion nuclear beam’, the problem was abstracted into a cookie baking analogy.

Therefore the problem is as follows. A bakery wants to optimize the number of cookies it can bake with its oven. There are however some complications/restrictions. First, the oven does not heat the whole oven proportionally, meaning that the sides of the oven do not get as hot as the middle of the oven. Moreover, two types of cookies need to be baked on a per demand basis. Lastly, a cookie is done baking when it has a certain color, which is defined by a threshold.

To find an optimal way to bake the cookies, thus to shuffle cookies around after every baking round, different strategies were tried. Firstly, Monte Carlo Tree Search was applied to the problem to try to approximate an optimal solution. Although it was educational and fun to apply this algorithm, the searching space of this problem was simply too big (namely $10^{-4}4000$). Therefore, the project was continued by searching for a good greedy algorithm. This greedy ‘paths’ algorithm eventually resulted in very good results.
Looking back at this Honors year

The most valuable lesson that I learned this year is the value that a good mentor and coach can have. Because of the two awesome coaches that I had this year, I have learned more than I ever thought possible. I had meetings with both my coaches for which I wandered in being a bit down and not thinking that we were on the right track. However, after an hour of meeting, I always walked out full of motivation to continue working on the project.

The best memory of my year, as I worked alone on this project, was actually not from within the project, but from H.S.A. Confluent, for which I was the treasurer of the board this year. Although everything that I learned from doing a board year is incredibly valuable, the best memory has to be the last event that we organized with H.S.A. Confluent this year, which was the active member appreciation event. Every year, we organize an event to thank all the members that have made the year possible and have worked in the committees of H.S.A. Confluent. It was incredibly awesome to see everyone come together in the corona times and see the community that we created over the course of the year.

As advice for future students, just go do what you really want to do! At the start of the year, we were choosing projects within our track, and I was the only one who wanted to do AI. Although it was odd for a CPPS project to be done alone, I was set on doing a project regarding AI and thus I did! The year I had was awesome and I would not have swapped my project for another!

"I get really hungry for cookies whenever working on this project."

THIS IS OUR TEAM

‘Our team’ consisted of me, myself and I as well as my awesome 2 coaches. My name is Robin van Hoorn.

Firstly, Kevin Verbeek, competitive programming and problem solving coach, guided me through the project and helped me develop the ideas of our greedy algorithms.

Moreover, Albert van Breemen, founder of VBTI, guided me within VBTI, the company with which I worked, and helped develop the ideas surrounding all AI applications.
What makes people move?
How come it’s so hard to become and stay physically active? Why are we so bad at maintaining important routines, such as medication, rehabilitation and exercise?

In this track, we aim to tackle these important challenges through a human-centered design approach.

Students have used a range of novel technologies to investigate medication intake routines by developing smart pillboxes. Others designed a movement tracking system for hospitals to help people get out of hospital bed sooner. Furthermore, students investigated sedentary behaviors through smart-home devices, created AI-powered wearable EEG’s and even set up experiments to stimulate food knowledge in high school students.

We hope we can contribute new knowledge and technologies to investigate (un-)healthy behaviors and leverage data as a creative material to engineer new products, systems and services that empower people in their quest to be healthy.
Track coordinator
Roy van den Heuvel
PhD Candidate at the Department of Industrial Design, Systemic Change Research group. Track coordinator for 6 years, and coached around 70 Honors students so far!

This Honors year kicked off with great projects, enthusiastic students and some really good ideas in tackling important problems in healthcare and wellbeing. I’ve really enjoyed the curiosity and enthusiasm of all students; not only in projects and coaching, but outside that as well. I really liked the workshops we did in the evenings, as well as the DDW Health tour with drinks and the final online pubquiz. Despite the coronavirus, I’ve seen students commit to their ideas and managed to creatively solve the many problems that arise when you’re doing human-centered design and you can’t talk to other people in person.

I’m also really happy that this year, we had one Honors student project publication accepted at the ACM DIS’20 conference, and submitted another one to ACM UbiComp’20, and are planning to submit more. I’m really proud of the academic qualities of our track students, great work everyone!

From high-tech research tools, to social healthy game-apps to coach-potato sensors!
Students delivered a wide range of ideas this year. Emma, Minne and Miheva designed a smart pillbox, used to see if people take their medications correctly. Almost like an exam, it’s pretty hard to remember if you did everything right!

Building a non-invasive, privacy-proof movement tracking system is pretty difficult! Together with MMC, Marinne, Linda, Edyta and Roy managed to come up with a novel concept that embeds into existing patient bracelets, and built a proof of concept! Patient: Move that body!

Getting high-school kids to learn about food is not as easy it you think! Mingco started an experiment to teach highschoolers about food through the Gamebus app ecosystem. Corona made that a bit harder, but it’s very necessary nonetheless!

Understanding why people sit for so many hours a day can be tricky. That’s why Yasemin and Loebrna created both couch-potato sensors and shoe-sensors, to get people active again!

Finally, Sjors used a wearable EEG to research that famous feeling of ‘flow’, using machinelearning to detect when you’re in a flow state, he hopes to help people identify what makes them focused at work.
The goal of our project is to present the first design stages of the creation of a physical product that aims to understand and improve the health-related behaviour of women who are aged at least 45 years, by the use of data enabled design approach.

The design direction that we chose relies on the needs of this target group, especially the needs to achieve a healthy lifestyle. To be able to achieve this goal, the Fogg’s behavioral model was taken into account specifically with regards to the trigger types on popular support tools such as digital applications that focus on behavioral change. The method in this project mostly focused on user journeys at the first stage, afterwards through ideation sessions and finally through surveys that were sent to the target group. After user journeys and brainstorming we found that digital applications were not sufficient to act as a trigger to change unhealthy behaviors. Thus, it was found that a physical trigger which is adapted to the daily lives of the target group was needed, specifically a physical product embedded into object(s) frequently used in daily life, namely a shoe insole and a sofa. Thus our project aimed to achieve the goal of women having a trigger that would be effective in improving their daily physical activity. This was done by getting first degree knowledge through data collection from their side and thus understanding their daily habits.
Looking back at this Honors year

Best memory from this Honors year
The best memory that we had in this Honors year was definitely meeting new people and having fun while learning and improving ourselves. This was especially the case during our track events where we got to know each other even better, for example by going to the GLOW walk or to the Dutch Design Week! But it was also during the casual track meetings that still allowed all teams within the track to be involved in each others process.

Piece of advice for future Honors students
The biggest learning point and with that most important piece of advice that we as a group can give to other honors students is in regards to time management. Communication between team members is an essential step for a successful process. Since an honors project will always be an extra load on the students, it can only flow well if personal schedules are communicated consistently and are taken into consideration throughout the year.

THIS IS OUR TEAM

Loebna Sabbah - 1st year
Honors student

Yasemin Yasarol - 1st year Honors student

Coach:
Roy van den Heuvel
"Allowing myself to make mistakes elevates my capabilities."

**Bon APPétit Boxmeer**

The goal of the project is to create an educational program for high school students about nutrition and a healthy lifestyle. The data is analyzed to learn about team dynamics and behavioural change.

The goal of the project is to create an educational program for high school students about nutrition and a healthy lifestyle. The data is analyzed to learn about team dynamics and behavioural change.

Due to the outbreak of Covid-19, the project is postponed to a later moment to continue. This event showed us that we have to be flexible and adapt to any situation.

One thing I have learned during this project is to make my personal development goals dependent on myself rather than others. Unforeseen events can occur, but it should not influence my development entirely.
Looking back at this Honors year

Advice for future Honors students
My advice for future Honors students is to choose a track and project you genuinely are interested in. The Honors Academy will not make you smarter or give you a guaranteed job at the company of your dreams, but it offers all the tools you need to develop the best version of yourself. It is significantly more interesting and easier to finish this journey with the right motivations.

THIS IS OUR TEAM

Member:
Mingco Xu Ming Glastra,
2nd year Honors student

Coaches:
R. Nuijten and
R. v.d. Heuvel

"Having fun with what you are doing will make you automatically better at it."
"The long-term goal is to gain insight into patients’ movement habits and use this information to propose interventions to stimulate physical activity in hospitals."

**Track Empowerment for Health & Wellbeing**

**Hospital Patient Tracking**

In the project, the goal was to design a tracking system to facilitate the search for patients with dementia and/or delirium for nurses in a hospital. Consequently, the nurse can spend more time on other responsibilities. The tracking system could then also be used as a movement tracking system, creating opportunities to design a healthier hospital environment that stimulates more movement, leading to a faster revalidation.

The project led to a real-time location tracking system using UHF antennas and passive tags that could reach to a distance around 4 meters. These tags could be stuck to the inner side of the already existing hospital wristbands, so that patients wouldn’t be constantly reminded of being tracked. Once a patient would move past an antenna, this antenna would identify the patient via the encrypted key and send the location and patient information to the nurse via the internal system.

After evaluating the concept with people experienced in working with persons with dementia/delirium via survey, it became evident that these experts approved of the idea of tracking patients and alerting nurses. However, they also saw some shortcomings, such as the expected removing or destructing reaction of patients towards the system, mostly regarding the wearable tags.

Looking back, the plan was to test the tracking system with users (read: nurses). However due to a problematic planning and situation, we were unable to fulfill this plan. In the future, we want to suggest testing the system with actual users, regardless of their background to generate more useful feedback. Secondly, we suggest involving more experts into the project. By receiving such help, you can make your project more substantiated, in-depth and prevent minimal progress. Lastly, we want to suggest using a more data-enabled approach, so that the stimulating movement part and tracking part become more connected in the project.
Looking back at this Honors year

Best memory from this Honors year
This year we have experienced many educational, exciting and fun moments. Visiting the hospital and talking with the nurse about the problem was one of the most interesting experiences. Thanks to these meetings we got a lot of information for our project. Next to that, we did some fun things with our track, like visiting Dutch Design week, drawing workshops and a pub quiz. You can develop yourself with the Honors Academy but you also meet new people and experience great things together.

Most valuable lessons learned
Collaborating at the project with people with different backgrounds was challenging, but we have learned a lot from each other. We have become aware how strong the connection between health and technological progress is. While listening to the other presentations in our track, we could realize how much nowadays people’s well-being depends on new technologies. Moreover, we have learned how important it is to set personal deadlines and stick to them as much as possible. Often some problems might occur, but dedicating time to the project will always lead to a step forward.

"Seeing patients has changed the way we thought about potential users of our system."
"More than 50% of medicine is not taken as prescribed."

**TRACK EMPOWERMENT FOR HEALTH & WELLBEING**

**MedApp**

Understanding the routines around medical adherence

Adhering to the prescribed medication schedule is one of the crucial steps that lead to successful recovery or treatment for chronic diseases. However, more than 50% of prescription medicine is not taken as instructed. Existing interventions that focus on reminders often lack detailed insights into people’s daily intake routines. Ubiquitous sensor systems in combination with qualitative data can facilitate detailed insights into medication routines. We draw on the Data-Enabled Design framework to gain a better understanding of behaviors around medicine intake. This study implements the contextual step by collecting data with a sensor module as an attachment to an existing pillbox. The resulting data is then discussed with the participant to reveal novel insights into medication non-adherence. We show the first promising results from a one-week user-test with one participant and discuss the next steps in the Data-Enabled Design process.

To implement the first contextual step of the Data Enabled Design framework in the context of understanding medication non-adherence, we designed a sensor-enriched ‘add-on’ to the popular ‘Anabox’ [1] (see Fig. 1). Extending existing products in such a manner could lower the potential threshold for people to use a system. The sensors measure what the participants do with their pillbox throughout the day. By visualizing the quantitative data and discussing the results with the user in an interview, we come to more detailed insights into use and experience.

The Data-Enabled Design method can offer designers and researchers a novel approach to build towards a better understanding of daily routines and which can eventually contribute to design interventions to increase medication adherence.
Looking back at this Honors year

Some of the best memories from this HONORS year include organizing a focus group with the MedApp users and seeing the enthusiasm of all of them. This was really motivating and pushed us to work harder.

The biggest learning point we got from executing this user study was that even a small dataset can give you a great insight into the general direction your project is going on. Therefore a piece of advice would be to always set up a pilot test for your studies.

Lastly, getting in touch with your users as much as possible, from the earliest stages of the process, is very important. You should plan this out and try to stick to that planning, as things tend to take up more time than expected.

All in all, the HONORS Academy was a great learning experience filled with exciting moments, that culminated in a very interesting project.

THIS IS OUR TEAM

M.S. Calota (First-year HONORS student)

E.T.A. Driess (Second-year HONORS student)

W.A.M. Dekker (Second-year HONORS student)

R. van den Heuvel (HONORS Coach)
Objective Mental State Monitoring via Consumer-Grade EEG Equipment

A technical proof of concept for the usage of minimally intrusive EEG-equipment in the quantification of mental states. This may prove important for in situ mental state monitoring, for which future applications may range from at-home epilepsy patient monitoring to work efficiency improvement in the workplace.

In recent years, electroencephalogram (EEG) technology has become an important tool in the objective assessment of mental states. Most work done in this field, however, has primarily focussed on medical-grade EEG equipment, which, while yielding a large amount of channels and good signal quality, is a rather bulky and intrusive setup. Less intrusive, consumer-grade EEG equipment may prove to be more appropriate when researching mental states or general behaviour in situ. In this project, it is attempted to quantify the flow state, a mental state associated with complete concentration and increased work efficiency, through the creation of a neural network trained on EEG data acquired with the consumer-grade MUSE headband on 10 subjects. Here, target data is obtained by tracking subject performance in a repetitive pattern-searching game, normalised to a range of 0:1. The final model yields a mean absolute error (MAE) of 0.0885, which leaves some room for improvement, yet serves as a successful proof of concept for consumer-grade EEG equipment in the assessment of mental states.
Looking back at this Honors year

I think the most valuable lesson learned for me this year was the fact that people can generally deal with quite a large workload and achieve great results as long as they’re doing something they find truly interesting.

For me personally, this manifests itself in the fact that I took a gamble in setting up a project myself on a topic I liked quite a lot, being EEG, as opposed to joining a team working on a project set up by the track. I think this paid off in the sense that I found working on this project quite easy, which resulted in the fact that the amount of work I could put in the project increased quite a lot.

My advice to fellow honors students is to put some effort into finding a project you really love, even if that means having to set up a project yourself with help of your track coördinator or coach. I found that the effort pays off.

"As long as you make sure to like what you do, the rest will sort itself out."
This year we had the privilege of welcoming many new Honors students to our community at the introweekend. A highlight of the year was the Gala, and we would have loved to visit Russia this summer.

Despite the lockdown, we were happy to see our community thriving online. Furthermore, we are impressed by how well everyone adapted to the 'new normal'. You can be extra proud of completing your Honors year in these unprecedented circumstances!

It was an immense pleasure to have served this community as the fifth board of H.S.A. Confluenta, and hope you will treasure the memories you made this year.

Board

Chair & External
Tom Suelmann

Secretary
Marijn Stijvers

Treasurer
Robin van Hoorn

Internal
Benjamin Rodatz
Introduction Weekend
To get to know each other, we all went to the Intro weekend. Get to know your peers at a once in a lifetime sleepover on campus! An awesome event to get to know everybody, the Honors Academy and the Association. Next to educational workshops, we did all kinds of fun activities and had an awesome barbeque!

Network Event
Everything comes together at our network event. Together with our fellow students from our sister association Ockham from Enschede we had great conversations with people from all sorts of companies!

DHC Conference
H.S.A. Confluente is part of the national network of honors associations called the Dutch Honors Community. This year, the first DHC conference was organized by our own members in Eindhoven. Here we got to meet new people and make new friends with all fellow honors students from all over the country!

Monthly Drinks
Every month (COVID-19 excluded) we had one of our joyful drinks at Hubble. After all the stress from studying it is incredibly nice to just relax once in a while. We will be happy when the next (physical) monthly drink is announced and hope to see you there!

Lustrum Gala
This year, we turned five! That had to be celebrated with a wonderful gala to open our lustrum season. Even though there was some trouble with a stolen theme in the beginning, we found it back in time. A great winter wonderland evening where members, alumni and sister associations all had a wonderful time.

Members Connect Dinner
Seeing all our members together enjoying themselves over food, what better things are there to see? This is one of our new traditions, yet a beloved one already! All our committees cooked (or baked) a nice dish, which we could all enjoy together. Looking forward to next year!
TRACK:

ENERGY TRANSITION

Students from our Track contribute to forwarding the energy transition by addressing climate and energy related problems through research in, design of, and sometimes even implementation of energy innovations.

Our students this year formed four multidisciplinary teams and focused on the following topics; electrolysis of CO2 to formic acid, nanogenerator development based on the triboelectric effect, recycling of e-waste and the development of a decision-making platform based on the analysis of energy data. Team RenewCO2 and Team Nano were about to start lab experiments when the Dutch lock-down measures were set in place. This hampered their progress on the experimental part of their projects. Both teams however, adapted remarkably well and changed their focus to the business/marketing side of the project, (continuation of) simulations and writing down their theoretical findings.

Team RED managed to finalize their electricity data system and is ready for implementation of her interactive platform in the Atlas building at TU/e in September.

Team CORE is about to start the implementation phase of their first recycling plant. For persevering and looking at the positive side of things, you should all be very proud of yourself. All have worked nearly independently as teams, took much responsibility and above all ensured a positive atmosphere to work in, within the teams, even in this difficult period. Well done!
Track coordinator
Mara Wijnker

I’m project leader at the Eindhoven Institute for Renewable Energy Systems. I have been coordinator of the Energy Transition Track since 2013. Facilitating the projects of excellent students of our university has been a privilege as our students always persevere to a point where they are able to amaze you. It’s often not the objectives they reach as a team, but the steps they take as an individual to make this happen, because they are part of this well-functioning, highly ambitious team.

This year, all our teams managed to have a socially engaged team, seemingly without much effort, which is remarkable. This has been very beneficial in the (socially) difficult period caused by the measures taken to prevent dissemination of COVID-19. What I learned on top of this, is that our students are resilient. They are highly motivated for, and dedicated to, their team’s objectives. Therefore, they still managed to deliver. Although community building in our Track and interaction between teams were put to the test as well, all teams gave a good presentation and response to other teams during the final meeting of our Track. Thank you for your continued dedication and effort.

Coaches
Han van Kasteren

I have been working at the Honors Energy Transition track since 2015 mainly because I can contribute to implementing sustainable solutions for society by guiding students with their innovative ideas. Like every honors year also this year it has been a pleasure to see students grow in their personal development and the results of their efforts towards new energy solutions. I am especially proud of how honors students realize their dreams despite scientific and practical problems. The honors students realize sustainable products which existing companies and scientist cannot make thus entering the new era of transition to sustainable energy systems.
Enabling the recycling of E-waste

Team CORE

Team CORE is a student team from the Eindhoven University of Technology. By making use of a process called elementary retraction we are trying to bring us one step closer to the zero-age, a time where all waste ends up as new raw materials.

Quick Recap of This Year

Technical
Proof of Concept (POC)
Thermal Models
Research about Pyrolysis and Melting

Business
Market Overview (SWOT and PESTEL Analysis)
New Partners and Projects
Investment Deck (Investor profile and mapping)
Collaboration with USE Basic - “Co-Creation of Smart Health, Smart Energy or Data Visualization” course
Looking back at this Honors year

Best memory from this Honors year
Team nights

Most valuable lesson(s) learned
Time management
Collaboration with and within the subteams
Communication skills
Presentation skills

Piece of advice for future Honors students
Be ready for challenges
Prepare yourselves to be open-minded

THIS IS OUR TEAM

1st year Honors Student:
Sinan Tumer Yasarol

Coach:
Han van Kasteren

"The Greenest Student Team on Campus."
Team Nano is developing triboelectric nanogenerators, tiny generators that convert ambient kinetic energy into electricity in a sustainable way.

Fabrication of these new designs is due to start at the beginning of the 2020-2021 academic year.

Triboelectric nanogenerators can potentially be used in a wide variety of applications, from lighting, to Internet of Things, to medical devices. In fact, Team Nano is currently having talks with companies in these fields about the use of triboelectric nanogenerators in their products, which might lead to fruitful collaborations over the course of the 2020-2021 academic year.

Team Nano formed in September 2019 in the Energy Transition Honors Track. Team Nano has now grown to 9 members, both from within and outside of the Energy Transition Honors Track. Due to the multidisciplinary nature of triboelectric nanogenerators, Team Nano is a very multidisciplinary team, with members doing majors in Applied Physics, Mechanical Engineering, Chemical Engineering, Electrical Engineering, and Computer Science. 

Over the past year, Team Nano has created several new triboelectric nanogenerator designs, incorporating these nano-scale modifications.
Looking back at this Honors Year

Best memory from this Honors year
Some of our fondest memories of this Honors year are the memories of our Team Nano team evenings. Whether they were at someone's house, or in Hubble, or online, our team evenings were always filled with joy and games and banter. We can honestly say that everyone is looking forward to our next team evening.

Most valuable lesson learned
Being a multidisciplinary team, and working on different aspects of our projects, it was difficult at times for everyone to keep track of the progress made by the others. Over time, through a stage of trial and error, we managed to find ways for smooth cooperation and communication between all nine team members. This was certainly a challenge none of us encountered to this extent in our Bachelor’s program, and in that sense is has definitely been a valuable lesson that the Honors Academy enabled us to learn.

Piece of advice for future Honors students
If you are doubting whether to join the Honors Academy or not, we as Team Nano members recommend that you give it a try. Your two years in the Honors Academy can be an incredibly enriching experience, academically, professionally, and socially. If you put in the effort yourself, there are plenty of people within the Honors Academy and outside who will go the extra mile to help you achieve what you want to achieve.

THIS IS OUR TEAM
Sid Suri (1st year)
André Gama (1st year)
Dimitri van Dam (1st year)
Noud Seijger (1st year)
Nigel Rising (1st year)
Atalante Koolen (1st year)
Thei Breukers (2nd year)
Yuran M. Lamas
Michal Stepinski
Mara Wijnker (Coach)
"Twenty-five years ago people could be excused for not knowing much, or doing much, about climate change. Today we have no excuse."
- Desmond Tutu

**TRACK ENERGY TRANSITION**

**Team Renew CO2**

A step on the road to a cleaner future for all of us and a planet inhabitable everywhere for everyone: Transforming CO2 into formic acid to prevent the greenhouse effect before it happens. To reach this feat our team is developing an electrochemical reactor.

In our first year as official Honor’s team we set out to form the foundations necessary to facilitate further progress. We tackled managerial challenges considering how to best set up the structure of our team, set up a foundation and gathered funding. A large effort in the past year was the development of a thorough theoretical framework of our electrochemical system: models describing everything from the quantum mechanical states of CO2 on our catalyst to the fluid flow through our membranes and reactor chambers. Further development of these models will continue into the next year. The development of an experimental setup sadly was delayed due to the pandemic. Instead we revised our processes and made new plans for a clear proof on concept ready to be tested at the start of the new academic year.

Through countless meetings, hours spent diving into the literature and many meetings with outside experts we managed to lay the foundations for further work next year. We’re looking forward to a practical try-out of all the ideas we gathered, building upon the team structure we found to work for us. The models we started building in the last year will require further refinement and will be adjusted to the experimental data we will gather. Carbon capture and utilization techniques are underdeveloped and desperately needed for our sustainable future. We will continue to push this avenue of the energy transition, so that together we can all keep enjoying our planet.
Looking back at this Honors year

To all past and future team evenings! Work and effort definitely are important to achieve results. But to do work you need to make the team work as well, and what better way to achieve this than to all sit together and share stories (and maybe a few drinks)? Did you know that the microphones in lecture rooms can also be used for alternative purposes outside of lecture hours? Would be a shame to waste this potential, efficient usage of technology is an important part of sustainability after all.

Literature is an endless black hole There is always more information out there. There are always more papers to be found with more details, new information and more complex explanations. How do you decide when you know enough to stop reading? If no one would stop reading nothing would get built. But as Frank Westheimer said: “A couple of months in the laboratory can frequently save a couple of hours in the library.” Getting this balance right was and will always be a challenge.

No structure, no results There can’t be any measurable progress without set goals to achieve. And for this goals there needs to be structure in the team. Figuring out how to do this right was a challenge throughout the year: how many meetings should there be, what should be said when, which platform do we use to communicate? This definitely took some experimentation but the time spent there was valuable. In the end one needs to try things out to see what works.

Too many cooks might spoil the broth, but ... ... many scientists don’t kill technologies. Different backgrounds and departments bring different viewpoints and skills, which was incredibly valuable for our progress. Sure, miscommunications are bound to happen when different people have different background knowledge, but once these are cleared up there is much more to be gained from the new ideas that are discovered.

"We sort of pretend that digging trillions of tons of fossil fuels from deep under the earth and putting it into the atmosphere-- we’re pretending that that has no probability of a bad outcome.”
- Elon Musk
This track focusses on the design of high tech systems, involving physical modeling, mechanical and electrical design, software engineering, and many other knowledge domains. Due to the interdisciplinary nature of this track, it aims at creating an environment where bright young minds from different study programs come together and create new concepts and systems. For the past few years the focus has been on Aerial Robotics.

In 2019-2020 this track focused on two projects. The first led to a new student team, Syfly. Syfly has the vision to help protect the planet by gathering data and monitoring ecosystems, with a sensor network of Unmanned Aerial Vehicles. In the present academic year the focus was on the agri-food industry. The team designed a fixed wing drone from the ground up and acquired thermal image crop data for a company. Pretty impressive for one year of work! We also started a new project to design a drone referee for the robotic soccer league. The students made a lot of progress, managing to autonomous fly a quadcopter and simulating some maneuvers for the intended application, ending with a solid foundation for the coming years.
Track coordinator
Duarte Antunes

I am an Assistant Professor at the Control Systems Technology group at the Mechanical Engineering Department since 2013. I joined the honors academy in 2015, starting a new track, the high-tech systems track, which has mainly focused on Aerial Robotics. I have decided to join this endeavor since I was attracted by the possibility of interacting with excellent and motivated students. Since then I am very grateful to the 5 generations of students I collaborated with for all they have taught me, and I hope they also have learnt a few things from me.

This year I was amazed how students can work so well independently. In the previous year, I kept trying to direct them along the project, but this year I decided to give them the full ownership and responsibility. Once students feel the project is theirs they give their blood, sweat and tears to make sure they accomplish their goals and dreams. Sometimes the dreams are too far from what is feasible but if you are not allowed to dream while you are a student, when will you be?

---

Coaches

Alex Andriën

I have been working as a PhD candidate at the TU/e since 2017, working in the Control Systems Technology group of the Mechanical Engineering department under the supervision of Duarte Antunes and Maurice Heemels. From the start I have been involved in the HTS honors track, so that is three and a half years already! The past year we started a new project (design a drone referee for the robotic soccer league) and it was also the first time for me to coach an honors project by myself. And what a project it was! We, well actually mostly the students(!), made a lot of progress this year. The thing that impressed me most about the students was their independence and especially their resilience, adapting quickly to new, unforeseeable events such as the corona situation.
"Drones overall will be more impactful than I think people recognize, in positive ways to help society."
- Bill Gates

**Track High Tech Systems**

**Drone Referee**

Fair play is the basis of any game, and we probably all know how frustrating it is when the rules are not maintained. In football, referees require a great overview of what goes on in the field to enforce the rules. With the help of drones the Drone Referee project aims to assist a human referee by giving more accurate information during the game, and eventually to replace the human referee all together.

The outcome of the project was planned to be an autonomous drone referee for robot football games. The first goal was to make the drone fly autonomously following the ball during the game. The second goal was to enforce 3 rules: Out of bounds, goals and fouls.

We started of with a tiny drone, which we upscaled to be able to carry a camera and have a longer flight time. We mounted sensors on the bottom to allow for stable autonomous flight.

Using the camera the position of the ball and the field lines was obtained, and with this information an algorithm could be designed to make the drone follow the ball during a game.

Due to the University shutdown these parts could not be tested. However, they were all put together and tested on a simulation environment. The path of the ball during an official match was replicated and the drone was able to keep the ball within its field of view successfully.

The game rules have not yet been implemented by the drone, and we believe it would be possible to expand the line detection system to enforce the out of bound rule and to detect goals. Furthermore a robot collision detection system could be developed to enforce fouls during the game.

This technology could be applied in the future for human football as well as for other sports, for example in racing (following cars).
Looking back at this Honors year

Our workspace
During the project we had a very enjoyable workspace. Twice a week we would meet in the Leolab, in the Gemini building next to a robot football field. During the work we often found an excuse to have a break when other students were testing and presenting their fascinating robots on the field. The lab had a large cabinet filled with drones and electronics we could experiment with, to make our project work. We also had a lot of fun watching our drones come to life and inevitably smash against the ground/ceiling/walls/etc.

Most valuable lesson: Self-directed learning
In exact or technical subjects there often is a clear set of predefined steps to go through to reach a goal. This is not the case in the Honors academy: We set our own goals and we had to acquire the neccesary skills to tackle the problems faced while achieving the goals. Getting stuck on hardware problems, not being able to communicate with the drone, and software bugs were all scenarios in which we had to figure out a possible solution ourselves as engineers. Therefore, self-directed learning was the most valuable lesson learned this Honors year.

Advice for future Honors students
Make clear goals from the very beginning and start to think about how you want to reach them. We spent quite a bit of time on things that were not that important at the time, and we could have reached our goals faster had we made more agreements earlier in the process.

For example, we spent a lot of time trying to get analog cameras to fit into our project when it was clear they would not. Instead, we bought a second analog camera thinking the outcome would be different from the first. In the end we used a digital camera, which we could have tried from the beginning.

Expect hardware failure and weeks of delay. When we upcaled the drone, the motors were not connected correctly and we even had to notify the manufacturer that their circuit scheme was misleading.

Last but not least: Always wear safety goggles when near propellers.

"Within Honors, we had the freedom to set our own goals."
"If you can’t fix it with duct tape you’re not using enough duct tape."

TRACK HIGH TECH SYSTEMS

SyFly - Aerial monitoring

Data is, and always has been, imperative to tackling any issue. However, when the process to obtain data is expensive and labor-intensive, it becomes much harder for most people to access it. Syfly aims to be a sensor network for the planet, generating and democratizing access to data which can then be used to monitor and protect key natural ecosystems. Syfly does this by employing autonomous fixed wing aircraft (or drones) equipped with sensor payloads that can be used to monitor key features of natural landscapes. The real-time data generated can then be immediately uploaded to a cloud and accessed by any party anywhere on the globe; the goal being to increase the accuracy, accessibility and quantity pertaining to data while lowering the costs and labour traditionally involved.

The team started in August with the vision to help protect the planet by gathering data and monitoring ecosystems. We planned to do this by creating sensor networks; Or in this case, a network of autonomous UAVs that could monitor and gather aerial data. We were put in touch with CSSF, who connected us with parties in the agri-food industry. After talking with many individuals, we decided to work with HerenBoeren in helping them thermal image their crops. We started by acquiring and modifying an autonomous drone with a modular sensor bay. We fit it out with infrared, NDVI and normal cameras, and started testing and collecting data, as well as working on software to stitch the images together. We conducted our first autonomous flight right before the Corona pandemic hit the Netherlands. Our aircraft was able to follow a planned way point mission on its own! We also 3D printed and built up our own landing gear for the aircraft! This means that with the assistance of LIDARs, it can now take off/land autonomously! Thanks to CSSF, we were also able to obtain an updated telemetry unit and LIDARs. We need one last test flight to ensure everything is working and then we will be ready to fly over HerenBoeren! Unfortunately, with the current Corona regulations the flying field has been closed. Since wrapping up HerenBoeren, we wanted to create something bigger and make a continued impact, so we went underway a month of research with few members of team. We have been in contact with multiple individuals from KNMI about working together with them to find problems and build solutions to address them. They all agree that there is definitely potential in the space of meteorology to use drones to collect data. As of now, we are working on identifying a specific problem statement for KNMI to come up with a solution, as well as working on the technical feasibility of an ultra high endurance aircraft that can fly for weeks by using solar power, and hydrogen as energy storage. We have built up a model on MatLab and have been in talks with staff from the chemical department of the TU/e!
Looking back at this Honors year

We had many memorable and fun moments. It was enjoyable as a team, we learned valuable lessons from our mistakes that are memories now.

Best memory from this Honors year
Was thinking that we can do a test flight at TUe Flux Field. Initial throwing test of the plane was made after assembly. Usually our tests were done inside but we thought we could handle a bit more power at outside. We thought that it would be fine because there was grass. Things got out of hand after throwing and our plane crashed so hard on nose to grass. We thought nothing would happen because it was grass but that was not the case. It was almost destroyed we had to use a lot of duct tape to fix it.

Most valuable lesson(s) learned
We learned how to learn from the market before creating something for the market, how not to do a test flight, and Matlab R2002B is always the answer :).

Piece of advice for future Honors students
Working in a team with the same vision is the most valuable way to increase your own learning goals and the most important make sure to have fun during your learning process, don’t just keep trucking along. Celebrate your success, and reflect on your mistakes.
The Corona crisis shows the critical importance of knowing whether someone is healthy or diseased. Without testing, no one knows whether they have been infected or not, leading to confusion and a lot more opportunities for the virus to spread. So biological sensing is very important! That’s why we want to tell you about SensUs.

SensUs is the one and only international student competition in the field of Sensors for Health. Each year, we challenge students from all over the world to develop sensors for a large problem in healthcare. Every year SensUs has a new theme. The theme of SensUs 2020 was Epilepsy and the international Teams developed sensors so that patients and doctors can rapidly and easily measure the levels of anti-epileptic medication.

In the SensUs Organization, we develop new ideas and solve complex problems by working together. You can join if you are analytical and structured, or creative and out of the box, or somewhere in between.

The students develop expertise in communication and judgment, in sensors for health, and in management skills. They learn to communicate and negotiate with companies, and with students from all over the world.

In SensUs, you work on the future of healthcare and learn what it takes to make international impact. We are team SensUs and we compete for the quality of life!
Track coordinator
Menno Prins

SensUs is organized by students from the TU/e. The students set the goals and define the rules, they coach the Teams, and organize the entire contest week where all participating teams come together in Eindhoven. Teams participate from North-America, Asia, Africa, and many countries in Europe. Last year, the SensUs Event was viewed by over 20.000 people globally. The students develop expertise in communication and judgment, in sensors for health, and in management skills. They learn to communicate and negotiate with companies, and with students from all over the world.

I am honored to coach the students of the SensUs Organization track. My mission is to train and inspire young scientists and engineers and to lay the foundations for solutions that will in the future improve the quality of life of patients. SensUs brings talented young people together from different scientific disciplines and from different countries, which nurtures collaborations and stimulates innovation.

SensUs started five years ago. Every year the students develop new initiatives and bring the competition to a next level. Insights are gained, new ideas are generated, tested, and implemented in the competition. SensUs is a vibrant community. Every year I am excited and proud to work with the students and see how their efforts generate new activities and a smashing competition!
SENUS ORGANIZATION

Chairs&Co

Keeping an overview of the Organization and the progress of the Teams. With an interdisciplinary student team and participating Teams from all over the world, this is a great challenge within the Chairs&Co subgroup.

The Chairs&Co subgroup consists of two Chairs, a Secretary, and a Treasurer. The two Chairs are leading the SensUs Organization and are in charge of keeping an overview of the different subgroups. The Secretary is in close contact with the participating Teams and checks their progress via Feedback Moments. The Treasurer keeps an overview of the budget, making sure that the budget is well-spent. As Chairs&Co, we make sure that the members of our Organization act professionally and ensure the quality. Moreover, activities for the whole Organization are organized by the Chairs&Co, including Personal Evaluation Sessions, Alumni evenings, and Fun Activities.

This year, the Organization faced a great challenge since the amount of members shrank with 10 members compared to last year. We had to learn more about maintaining great communication between the subgroups, prioritizing tasks, and being a strong team. As an Organization, we kept innovating in order to take on new challenges.

The Chairs took upon the great challenge of recruiting new members. We can say this was a great success, increasing the total members in the Organization by 10.

"Let's compete for quality of life."
COVID-19 Changes

Due to the COVID-19 situation, we as an Organization had to change our whole way of working. We went from meetings on campus to online meetings. Furthermore, we were not allowed to organize our physical SensUs Innovation Days anymore and we had to change our whole Event to an Event that was going to take place online. This was a real setback for us, since we were very excited to finally meet all the Teams in real life after this year. However, we have managed to reset our expectations and worked very hard to arrange an online Event.

This change asked a lot from us as an Organization but also from the Chairs&Co group. Keeping an overview of what everyone was doing, became increasingly difficult when meetings could not be held in person. All of a sudden, one of the best aspects of working in a student team, collaboration, became very difficult. We managed to change this with a lot of different ideas, like extra Fun Activities and working together in a shared Discord channel.

This is something that will stay with us for a long time. We are proud that we managed to adapt to the situation very quickly and we are convinced that the new Event setup in August will be amazing!

Looking back at this Honors year

Our best memories are the plenary evenings we had. Together with the whole Organization, we had plenary evenings where we discussed organizational-broad topics and challenges. Afterwards, we ate together and had some fun. Throughout the year, we have seen that the team got closer to each other, and we saw the positive effect on the quality and progress within the team. A fun memory is the Fun Activity we had, where fries, a table, and aluminum were enough to have a great evening.

Looking back, I can say that you can often do more than you think at the start. With at the beginning a smaller Organization, but still a lot of enthusiasm within the group. I can say we achieved a lot. We challenged ourselves and set out new initiatives. This requires a well-functioning Organization, a good and fun setting, and good planning skills.

Furthermore, what will stay with us is how cool it is to work in a multidisciplinary team and have the same end goal!

"The challenge to keep an overview of a multi-disciplinary international Organization."
The Public Relations (PR) department stands for the national and international promotion of SensUs and strives to create brand awareness worldwide. We are responsible for the image of SensUs. The goal of the Public Relations department is to spread the mission and vision of SensUs over the globe using different channels.

To reach a broad audience and share our content internationally, we use various social media channels. We manage the team pages of Facebook, Linked-in, and Instagram. Besides our public social media channels, we also update our own platforms: SensUs Connect for our community and SensUs Digital for the audience during our Event. To further create awareness about SensUs, we write articles and do interviews for external journals. This year, SensUs focussed on improving the treatment of epilepsy, so it was an honor to be mentioned in ‘Het Epilepsie Magazine’. In addition, we are responsible for the physical promotion actions on campus, for the representation of our team during open days, and collective recruitment activities. The PR department is also a very creative group within SensUs since the PR department is in charge of all visual designs used by SensUs, such as partner folders and online posts. Furthermore, PR is in charge of producing and directing the videos that are used for promotional activities, such as the after movies, personal stories to create awareness for the theme of SensUs, and recruitment videos. To facilitate optimal promotion for the final Event in August, PR binds partners that match with the theme of that year. Since the theme this year focuses on epilepsy, Het Epilepsiefonds and Kempenhage, a neurological research institution, became our partner.

This year, the PR group consisted of only two people. In the beginning, it was difficult to manage all our tasks and we had to change the way we work. Throughout the year, we learned how to work more efficiently.
Looking back at this Honors year

Best memory of this Honors year
Looking back at this year, we have experienced so many things! What we experienced to be really exciting was pitching SensUs at the Dutch Design Week and in front of the board of the Dutch Technology Week. Another good memory is when our partner CLB invited us for a seminar where we had really interesting presentations from inspiring people (and a very luxurious lunch). Besides all the things that we have learned from our tasks, we will always remember the good times with our team during dinner or during working sessions where we had a great time.

Piece of advice
A piece of advice for future PR-members, you do not have to reinvent the wheel. Previous years are a great example of how to do your tasks. Give it your own twist and do not be afraid to ask! Nobody becomes stupid from asking questions.

“PR is about creating content and managing communications – in whatever format it is.”

THIS IS OUR TEAM

Tatum Simons
(first year HA student)

Cecile Hamming
(non-Honors student)

Coach:
Prof. Menno Prins
Technology

The Technology subgroup organizes the Testing Event that takes place within the SensUs Event in the last week of August 2020. During this week, the Teams that participate in our competition travel from all over the world to Eindhoven to meet each other and demonstrate their biosensors in a large public Event. The Event is visited by more than 300 people and viewed online by more than 10,000 people.

Every year, student teams from all over the world come to Eindhoven during the SensUs Innovation Days to present their biosensor and findings for a societally relevant healthcare theme. The Technology subgroup is responsible for organizing the Testing Event of the SensUs Competition and works on the most important segment of testing - the protocol and making the samples. This includes making testing plans and critically evaluating the testing while working in the lab and closely collaborating with hospitals and professionals that give us advice about our next steps. Another aspect of the testing is evaluating the results that the Teams present and assigning points to decide on the winner of our Analytic Performance award, which is achieved through developing an algorithm that grades the Teams on a number of important aspects. Furthermore, our subgroup researches the potentially interesting themes and biomarkers for the following year, where many brainstorm with professionals in the relevant field are arranged for information and suggestions. This year, through contact with professionals at Erasmus MC, we started looking into the option of testing in saliva instead of blood for the next year’s theme. This would bring an even higher level of innovativeness into the Event and make the biosensor less invasive for private patient use.

This year, due to COVID-19 circumstances, the physical Event was changed to an online version, which meant that the Testing Event and the Analytic Performance award could not take place. We came up with the solution to allow Teams who had lab access at some point during the whole crisis to still test their prototype biosensor in their own labs, using the protocol that SensUs had initially developed. As of now, we are in close contact with a postdoc student at the TU/e, who still has lab access and kindly offered to make our samples. Overall, we try to appreciate the work that Teams have put into making a biosensor, regardless of the unfortunate events that took place.
Looking back at this Honors year

Best memory of this Honors year
There were many unforgettable experiences within such a big family that SensUs is. Some of them are plenary evening dinners that really brought us together and made us stronger as a team. Furthermore, the Technology subgroup Fun Activity was the one that really helped us connect more as a smaller group, which made our future work more productive and efficient.

Most valuable lessons learned
The most important lesson learned is that there is always a solution to a difficult situation. When the whole Corona crisis occurred and all the labs were closed (and still are for students), it seemed like our subgroup was stuck in one place, without any available solution. However, together, we stayed strong and patient, and tried to continue our work as much as we could with the current happenings. Finally, we received help from a PhD student from the research group of our coach and we still managed to build an Alternative Testing Event scenario to the best of our abilities.

Piece of advice for future Honors students
The best advice to give is to never be afraid of the challenge. Everyone should embrace it and make the best out of every obstacle that they face because it is out of these situations that people grow the most. To face those difficulties, it is always priceless to have your team have your back. Therefore, never forget that your team is there to cheer you on!

“This always seems impossible until it’s done.” – Nelson Mandela

THIS IS OUR TEAM

Jorrit Baartman (non-Honors student)

Henry Kwan (soon to be Honors student)

Ivana Stijepovic (first year HA student)

Coach: Prof. Menno Prins
“A journey of a thousand miles begins with a single step.”

TRACK SENSUS ORGANIZATION

SensUs Events

The Events subgroup organizes the SensUs Event that takes place in the last week of August 2020. In this week the student teams from all over the world come to Eindhoven to meet each other and demonstrate their biosensors in a large public contest event. The event is visited by more than 300 people and viewed online by more than 10,000 people.

Normally, the participating student teams will come to Eindhoven for a whole week where they have different kinds of activities and we will close the week with a big event where they pitch their ideas and test their biosensors. The Events group has to organize the complete program including the activities at different locations, workshops, catering throughout the week, and the accommodation at the SensUs village.

However, it is not possible to let the teams come to Eindhoven this year due to the corona crisis. Therefore, the whole event had to be changed into a digital event at the last minute. The week was shortened into only 2 afternoons where the teams can meet each other and our partners. We have arranged a complete scenario for the two days, where each hour is divided. This scenario has been filled to the brim with interesting talks and discussions about biosensing and personalised medicine.

As of writing this piece, we are busy with preparing for the online event. We are busy with the designing the awards, negotiating with the digital platform company, looking for interesting content for the case studies and making a detailed scenario.

We hope that everything will also run smoothly online and we hope to see you all on the 28th of August!
Looking back at this Honors year

The best memories from this Honors year are the many fun times and activities that we have had with the SensUs Organization. For example, the first fun activity with the whole Organization, where we played hide and seek in the Matrix building or all the plenary evenings where we also ate together. Furthermore, the Honors Introkamp was very nice, where we really got to learn each other. Finally, the SensUs Event will probably be the best moment this Honors year, then all pieces will fall together and we will see the results of our hard work. However, we still have to wait several weeks before this takes place.

The most valuable lesson that we learned is that we have to stay flexible. Even after big changes at the last minute, we had to keep going, make new plans and communicate everything well. We should not worry and look at improvements that we can implement. We should stay critical, stay innovative and have fun!

"Having fun is of utmost importance, so plan a fun activity now and then and grab a bite together!"

Our main piece of advice for future Honors students is that they should keep having fun and keep on improving. Mistakes are only mistakes as long as you do not improve afterwards, so do not be afraid to try out different things. We learned a lot during this year, but we also made mistakes, luckily the rest of the Organization had our backs and gave us valuable feedback.

We hope that everyone had a good time and we hope that everyone else learned as much as we did.

“Unity is strength… when there is teamwork and collaboration, wonderful things can be achieved.”

“Good fortune is what happens when opportunity meets with planning.”
SMART CITIES

Smart Cities addresses a variety of topics from the perspective that smart and innovative solutions are required for the built environment.

Implementing these solutions is challenging: life in a city is dynamic because of the numerous participants that are involved, all with different needs, interests, and expectations. Further challenges include the jumble of clear and unclear interaction of users, and the continuous developments in boundary conditions. Yet, on the other hand cities are quite static too, as it takes many years, many time-consuming administrative measures, and often judicial processes to implement a real reform. A process of 10 years from idea to implementation is rather the rule than the exception for urban changes.
Track coordinator
Faas Moonen
"I enjoy designing architecture with the group."

Track Smart Cities

Architectural competitions

This year our group has been taking part on two architectural design competitions: the first asks for a parasitic architectural design in a dense city and the second competition focuses in designing an observation tower for a horse farm in Latvia. With our parasitic design we wanted to address societal problems of a dense city and for the tower we wanted to create architecture with a focus on the surrounding natural context.

For the parasitic architecture competition our task was to create a small building attached to already existing building in a dense city and define a function for it. We looked through several dense cities around the globe and problems they are facing. Finally, we chose Mexico City as we wanted to address the problems with gender inequality and the high rates of homicides of women. The building responds to the problem by creating a connection point between the existing public services and women in need of these. The tiny building can be placed on top of a building in a dense setting and offer a community centre like setting with different courses and possibilities for urgent counselling for those in need.

The observation tower design focused on creating a structure, which would offer a new perspective of the surrounding nature for the visitor. By combining concepts of traditional use of wood and idea of climbing, our group came up with a tower with two contrasting elements; the regular repetitive timber grid and spiralling staircase, which both come together at the top floor as an open indoor space with big windows. The tower thus attracts tourists to climb up the tower and reach the top with a wonderful view to the fields with roaming horses.
Looking back at this Honors year

This year was already a second year for our group to be working together. Last year we worked on creating a mycelium structure and this year we continued with same people on architecture competitions. The mycelium project was focused very much on experimentation.

Once that project came to its end we were grateful to have a meeting with our honors coach who encouraged us to take on a new project, which would give us a different kind of challenge and allow us to grow on new areas. We explored variety of design competitions and ended up with the two competitions very opposite to each other. We have been enjoying this project a lot because our design capabilities have been challenged and the two different competitions have forced us to grow in conceptual designing as well as in more tectonic designing.

Above all the new skills we have learned, we are very grateful on how close the team has become. Our group has different kind of personas and together we complement each other well. Working together in design allows us to solve problems quick and come up with very different variants in order to find optimal solutions. Besides this we have become very good friends outside of honors and it is typical to have dinner after our meetings. The two years as honors students have given us a chance to grow as designers and develop new skills. We hope that everyone would be encouraged to have an open communication within their teams and with their honors coaches in order to find a way to get most out of their years in the honors program.

"I think our team cohesion is very good and we work productively and well together."
For this project, we are designing for a festival by the sea in Renesse, in the west of the Netherlands that will be held in the summer of 2021.

The main idea is to develop concepts for a no-footprint, fully sustainable event that can accommodate up to 5000 or 6000 people. The attendees will arrive at the nearest city, from where they are to bike to the location. The initial area that was considered for the beach, is a stretch of 1000m of coastline, with possibly different “sections”, or areas in the festival.

We would like this festival to be an example for similar projects in the future. This means that the project must also be economically viable and reasonable. Additionally, the team aims to develop an innovative solution and design for a festival that brings together people and nature, sensibilise them to the ideas of sustainability, and set an example of how to incorporate them into everyday activities without having to compromise.

The group was to design a bio-based stage, pavilion or structure to promote sustainability for the festival. Various bio-based materials and modular options were considered. The group researched structural connections, material properties and interesting architectural styles to incorporate in the final design. The final design was inspired by Peter Zumthor’s Thermal Vals in Switzerland - with the idea of having a core that supports a roof plate. This allows for a plan that allows a free flow of people and breeze, while also having a central covered space that offers shelter in case of rain. We looked into different options for this core, and are still in the process of deciding our final design. The delay in the project timeline allowed us to have more time to explore new designs and material possibilities. We hope to make a design choice at the beginning of next year, and spend the rest of the year on more technical aspects of the design.
Looking back at this Honors year

Most valuable lesson
One thing that we learnt a lot was the importance of being self-driven. In such a project, with real-life implications and maximum freedom, we realised that it's easy to brainstorm without getting anywhere. It is essential for us to have a purpose for what we do, and push ourselves to expect more from ourselves. We learnt how to be structured in our thought-processes and work without too much external guidance— and this is something that can't really be learnt in lectures or classrooms.

Piece of advice for future Honors students
Do fun activities with your honours group! It's not just about working together or getting the job done, but also about meeting interesting people and having fun along the way. :)

THIS IS OUR TEAM

Mike Newell | Y1
Vandhana Kannan | Y1
Yang Mei Frings | Y1
Foas Moonen | coach
"Equestrian sport allows innovative approach to go in hand with the sport's traditional image."

TRACK SMART CITIES

Equinnolab Sustainable High-Tech Facilities for Equestrian Sports

The aim of this project is to design a sustainable framework for an equestrian facility, that would perform as a stable for Olympic horses, as well as a space for athletes to practice and improve their results through data analytics techniques.

Our group acts as a central party that connects smart technology provided by Equinnolab with a well rounded design worked on by this group in collaboration with FAAM architects. Our goal is to create strong research and concepts that we can provide as a product and service to those looking for more sustainable and intricate training facilities for their equestrian sport horses.

Over the first year of this project (2019-2020), our team has researched the main driving concepts including existing problems related to equestrian sport and horse keeping, two worlds perspective (horses and jockeys), general concepts in construction, wellbeing of a horse and customer requirements. Moreover, to have our hands-on experience all team members visited Equinnolab stable (Weert). The site visit allowed our team to see practical issues of nowadays horse stables, as well as get to know the client's perspective on current state of the facility. This primary knowledge in combination with literature research was concluded with a list of initial design ideas that covers the improvements of horse stable standards, circularity of the facility, training machinery advancements and implementation of data analytics tools.

The follow-up process of the Equinnolab Sustainable High-Tech Facilities project consists of developing our Visions and Strategies for the final design. For the upcoming stages, co-operation with our client and other parties (Wageningen University, FAAM Architects) is necessary, as the project requires a multidisciplinary approach. Thus, after the completion of first-year research and preliminary ideas brainstorm, more concrete solutions will be addressed in the upcoming stages.
Looking back at this Honors year

Best memory from this Honors year
Our team agreed that visiting Equinolab horse stable in Weert was the most remarkable experience of our first year Honors program. Initially, we all chose to take part in this project because it imposes a challenge of working with animals (horses) along with humans. Normally, the built environment students tend to look at people as their target group (or users). Thus, interacting with horses from the stable, as well as performing daily routine of cleaning, feeding and training together with the facility’s employees provided us an extensive practical knowledge of this field.

Most valuable lessons learned
The most valuable lesson our teams has learned is that it’s important to start off the project as quick as possible. Unfortunately, due to the project being brand new it can be challenging to launch the research without any direct guidance and any previous work being done. This is why the stage of getting familiar with the topic can take longer than it should. It is important to outline concrete goals and work for specific deadlines. Respecting those formalities is another crucial point that must be prioritized in team projects.

Piece of advice for future Honors students
What we would advise future Honors students is to manage your time wisely and improve collaboration skills within your team and with your coach. Choosing for Honors means that there will be extra workload put on top of your current study. Therefore, organizing your weekly agenda would make it easier to manage your time. However, in case you see that you cannot finish some tasks assigned to you in a team project it is better to communicate with your team and project coach to resolve and maybe redistribute the tasks on time.

"We all chose to take part in this project because it imposes a challenge."
**Foodroots**

The food industry is responsible for around twenty five percent of greenhouse gas emissions, but it’s often difficult for consumers to determine which food products are ‘green’. New TU/e student team FoodRoots thinks it has a solution to that problem.
THIS IS OUR TEAM

Thomas Fransen
The design and construction of a modular lightweight pavilion using origami principles.

Our project called Hypar aimed to design and construct a novel modular lightweight pavilion, which showcases the possibilities of the usage of origami in the built environment. The idea of folding a piece of weak material into a stiff form creates the possibility to design efficient and therefore sustainable lightweight structures. Furthermore, the adaptive and flexible nature of origami makes it possible to store the design compactly and deploy it relatively quickly, which makes it suitable to design temporary structures that need to be constructed, taken apart and transported to a new location in a short amount of time, like festival venues or shelters in distressed areas.

The pavilion was presented at the Dutch Design Week and Form and Force 2019 structural design symposium in Barcelona. The final design was made of 500 separate origami modules, called hyperbolic paraboloids or “hypars”. It is possible to assemble the pavilion in any shape or form. The hypar itself was chosen, because of its adaptable nature and load bearing capabilities, which made it perfect to complete our vision. However, the translation from concept to design formed our greatest challenge. A design based research was conducted to test different configurations, connections, materials and production processes. This led to processing flat sheets with a CNC laser cutter and afterwards the dreadful tasks to fold every single module by hand. In the end all the effort paid off, because we achieved the design we had in mind. The structure could be constructed and disassembled in a few hours without the use of any tools and the full 3x3x3 meter pavilion can be stored in a box of 0.5 m³. The project received great feedback from experts and showed great opportunities for the novel and sustainable use of origami in the built environment.
Looking back at this Honors year

The honors project was a great experience. It gave us the opportunity to learn and achieve a physical product, which would never be possible without the support of our coaches and determination of all our team members. The possibility to realize a design gave us valuable new insights in the challenges of logistics, detailing and production when you translate a design concept to a real structure. The project showed us what you can achieve with great perseverance and passion.

One of the most rewarding moments was when we built the first full-scale prototype. Previous small scale models were working quite well, however, this one initially did not work at all. After a long day of working, we could not think of any solutions. Disappointed we started deconstruction of the model, then we flipped some of its parts upside down and all of a sudden we noticed that it solves the problem. It was a coincidence that we flipped that, it did not result prior to any discussions, however, it solved the problem immediately. Without any serious design changes, we were able to continue the project and manage an upcoming deadline. It was not only a very rewarding and motivating moment but also we all recognise how important it is to be aware of “out of the box” solutions. We would have sacrificed a lot of time to solve it again with hard methods, however, with careful observation, we were able to get it done immediately.

Undoubtedly, the highlight of the past year was the presentation of our project at the Dutch Design week and Form and Force symposium in Barcelona. It was great to show the result of our hard work and receive all the positive feedback from both the general public and experts in the field. Furthermore, the symposium made it possible to get a unique taste of all the innovations in structural design and to be introduced to this side of the academic world. The week in Barcelona not only was a great learning and networking opportunity but also just a great experience to live with the whole team.

We think we would advise future honors students to take care of team cooperation. Cooperation starts when one cannot do something by himself/herself and starts to work on it with others and challenges from honors academy are certainly demanding cooperative effort. Even though it might be hard at the beginning, cooperation is like a craft, it can be learned by doing and all future students should focus on mastering that craft.

"There is no way we will make it, it can't even stand upright."
"Students enjoy lower rent and elderly are less lonely."

TRACK SMART CITIES

Smart Modular Housing

It is predicted that by 2025, the Netherlands will have a housing shortage of about 43,000 rooms. On the other hand, 700,000 elderly people in the Netherlands report being lonely. Our goal is therefore, by using modularity, to create integrated affordable housing for both.

The team aims to utilize the strengths of smart modular housing in order to resolve the housing shortage, give an alternative to expensive existing possibilities, and aid those who face loneliness, including the elderly as well as student body. The idea is to create a community in which the elderly are surrounded with lively activity, as approximately 6 out of 7 elderly Dutch citizens prefer to live at home rather than at a nursing home. Therefore the students can help their neighbors and keep them company. On the other hand, students can gain from their elder neighbors by learning new things such as cooking or gardening. As a result, the students will also derive benefit of lower rent costs to compensate for the time spent with their elder neighbors. The community that the team is aiming to shape by utilizing smart modular housing is a way to approach the issue of loneliness and boredom amongst the elderly, and housing shortage amongst student.
Looking back at this Honors year

Most valuable lessons learned
The most valuable lesson learned is that team management and collaboration are just as important as the content of the project itself. Focussing on your team structure and planning is important and we therefore have some advice for future Honors projects.

Piece of advice for future Honors students
Planning and creating hard deadlines to make progress with the project is crucial. Initially we had long term goals and monthly goals. This didn’t quite help, as our progress was extremely slow and everyone seemed a bit lost. Creating a proper planning with weekly goals and setting hard/compulsory deadlines for ourselves really helped us and in a way forced us to work towards them. This is something that we acknowledged in the later stages of the project and is extremely beneficial for a successful project.

Secondly, team bonding activities are fun and always help in improving the interaction of the group. Group mates tend to get to know each other better and is beneficial for the overall working of the project. During our meetings, we would always talk about doing team bonding activities such as a meal, going out for drinks or even project related activities such as site visits. However, these plans are always left in the talks and bringing up the topic always leads to a giggle amongst the group.

"Team bonding activities are fun and always help."
"Changing the Game of Housing."

The goal of the project is to design new innovative houses that will ensure protection from Electromagnetic Field (EMF). This project is one of the first attempts where EMF shielding is kept in mind since the beginning of the design phase until the very end which brings it as a new product concept. The society in the Netherlands and in many other countries is exposed to such a huge amount of EMF without having any choice. The consequences are proven as the disease of Electromagnetic hypersensitivity and therefore public health should be protected. That is what we would like to offer to every person – to have a choice to be protected in their own house.

The outcome of the project will be a tiny house that will have EMF protection. We have decided on four main aspects which have to be fulfilled with our design which are EMF protection, utilities, affordability, and comfort. In our house, it will be still possible to use all kinds of apparatus, despite their radiation while keeping the cost of the shielding as low as possible. Additionally, the house will be designed in a way that everyone living in the house is comfortable. The most significant outcome is the decision for the frequency which is between 20kHz and 3GHz. This is the frequency range that we aim to block through the EMF shielding.
Looking back at this Honors year

Best memory from this Honors year
At the beginning of the year, an Honors weekend was organized which all the first year of Honors students joined. That weekend can be considered as the best memory since we met lots of people from different Honors tracks which it helped us to extend our network. All the activities they planned was fun and of course it ended with a drink at Hubble.

Most valuable lessons learned
One of the most important thing we learned as a team is the importance of team work because when we are not on the same level, we had difficulties about following each other’s work. As a team we all knew that the communication within a team is so important, however we also learned this year that external communication is also essential. Because of the the problems about external communication, the work has been delayed and we couldn’t get the outcomes we want on time.

Piece of advice for future honors students
We advise future students to work with dedication and punctually because otherwise the workload will be enormous for some weeks. Therefore, the best way to handle the work is to divide throughout the semester. Furthermore, communication skills are essential when you are working with a team, especially when it is multidisciplinary because it is so important that you understand each other and know how to express your opinion.

"The possibilities are endless."
"Accelerate the energy transition through an innovation guiding platform."

SMART CITIES & ENERGY TRANSITION

Team RED

The data model that Team RED is developing is intended to easily calculate changes in the energy system. The software uses building specification and electricity sensors data that we get from the university, as well as local weather data. The model can simulate the placement of energy assets of three different categories; generation, storage and sinks; and will then calculate the effect of these additions. The data model evaluates the impacts by calculating a variety of technical, social and economic indicators of the investment.

Over the course of the last year we created a prototype model that provides the basic functionalities of our product. This includes a limited set of innovations that can be implemented in the model. The model brings several data components together in order to make simple and accurate decisions. Furthermore, The team has been working to finalize the Atlas Project. The Atlas building located at the university will soon have a touch screen table with the built-in software to display the model created by Team RED.
Looking back at this Honors year

Memories
This year Team RED participated in the Dutch Design Week expo for the first time! This was a fantastic experience for us, in which we could show case our product to an extremely broad audience. We learned so much from this event and gained a lot of great feedback that shaped the development of our product throughout the rest of the year.

After successfully qualifying as one of the 4 selected projects from the TU/e contest last year; Team RED this year participated in the first ever 4TU Impact Challenge. This was another amazing experience for us, to be able to compete with our idea against the best projects from each of the 4 Dutch technical universities. In addition to the contest itself, this day included presentations to the head of the Dutch national police, and Prime Minister Mark Rutte.

After a lot of hard work directed towards the development of our project and the events in which we participated, we decided to take a break away with our first ever team weekend. The weekend was themed "off the grid" and we spent two nights away in the Belgian countryside with a short day trip to the Christmas markets in Monschau, Germany. This was a great moment for our team bonding, and massively improved the closeness within our team.

THIS IS OUR TEAM

Ernesto Buñuel Garcia (2nd)
Julia van der Vleuten (2nd)
Ruben Lathuy (2nd)
Micha Arnoldus (2nd)
Elise van Wijngaarden (2nd)
Hassan Sewailem (2nd)
Niels Adaloudis (1st)
Martina Gjermeni (1st)
Ana Maria Suso (1st)
Amar van Uden
Diogo Gamiero Carvahlo
Pietro Maschera

And a special mention to:
Khalid, Pius, Meie, and Fjord

THE TOKEN CAN BE PLACED ON ANY PREFERED BUILDING
The Solar Decathlon is an international competition that challenges university teams to design and build highly efficient and innovative houses powered by renewable energy. The main goal is to tackle energy transition by blending architectural design and engineering knowledge with innovation, market potential and building efficiency.

We embrace a new approach to building construction, with demountable connections and reusable materials. From an adaptable building we spark a change involving a shift towards a dynamic built environment. Buildings can then adapt accordingly to the needs of the users and respond to the changes in the market demand.

We embrace the situation of renovation and vertical extension of an existing building as it is the one which is most applicable to growing and densifying cities, especially in Europe. However, we want to abandon the correlation between vertical extension and monotonous and alienated atmosphere which moves away from any form of interaction. Our vertical extension rather recalls a village-kind of building, where inhabitants are prompted to share facilities, interact, and influence each other.

Our project becomes real in a fragment of the whole building. Our demonstration unit will consist of two apartments and some shared facilities, so that visitors can experience the atmosphere of the building.

The demonstration unit perfectly showcases the new way of living envisioned by VIRTUe. In fact, changes in habits cannot fully happen if it does not also start from the most private sphere, the home.

The inhabitants within their apartment are activated to gradually transform their daily habits through positive encouragement. Interactive smart control systems and guiding interior design elements cooperate to prompt these changes.

The unit will be built on campus and in Wuppertal in respectively 2021 and 2022.
Looking back at this Honors year

Best memory
The best memory of this year was the entrance to the competition. We had been forming a team and working for 4 months, when our proposal could be celebrated after hearing we would participate. It was the ideal reward for the delivered work and a big motivation for the next 2 years. In only a year, you know that in team work you carry the hard moments together, but you celebrate even harder because it’s a team accomplishment. We are really looking forward to further designing.

Another milestone was the preliminary design presentation. For the first time we presented to all the companies together. The interest turned out to be pretty great, with around 90 people connecting from all different architectural, structural engineering, project planning, construction companies to a MS teams call. The feedback we received showed us that we were on the right path and gave us even more motivation to be determined towards our goal.

Most valuable lessons learned
In a complex working structure that Team VIRTUE is, communication is key. Solve things before they become problems by doing things today rather than tomorrow and by talking to the right people. If you are stuck, be fair and see if someone who knows more about this topic can give you a few simple tips. Take experienced people’s advice seriously and don’t try to reinvent the wheel, only then you can make actual progress.

"With our concept, RIPPLE, we want to propose a solution for the disconnection between people and the changes they want to see in cities."
In the field of Smart Mobility and in particular Cooperative Connected Automated Mobility, we see many opportunities to use technology to solve mobility problems. By adding smartness, we aim to decrease the negative effects of traffic jams, traffic injuries and deaths down to 0% and even lower the overall emissions from traffic and mobility solutions as a whole. Mobility impacts us all in our daily lives and the number of people, from industry, academia and government, trying to provide mobility to all of us is therefore immense.

In recent years, the main technological drivers are developments focusing on automation, Internet of Things, Big Data and Artificial Intelligence, making it smarter in conjunction with sustainability aspects on the field of green mobility.

With the trend towards further automation, connectivity and cooperation of all modalities of transportation, Smart Mobility is further evolving towards Cooperative Connected Automated Mobility. This field focuses on connecting self-driving vehicles, traffic management systems, mapping, efficient powertrains but also vulnerable road users (such as pedestrians and cyclists) and other modes of transport in order to establish a mobility system for all.

In year 2019-2020, the track had two projects on focusing on two different aspects of Smart Mobility:
- 5G-MOBIX: Remote driving for AD vehicles: the team focused on the development of a remote driving system for automated vehicles, which helps accelerating the transition towards fully automated driving. The team managed to develop a system, that next year will be expanded and further tested in real life conditions with a real self-driving vehicle.
- Team POLAR: this team aims to develop a sustainable and automated research vehicle that is able to perform research on Antarctica, with the least amount of impact on the Antarctic climate. This year, the team started and provided a first feasibility study. The team is currently expanding into a student team to achieve this goal.
Track coordinator
Jos den Ouden

Jos den Ouden is project manager for Cooperative Connected Automated Mobility working with different departments on European research projects. Since 2017 he is involved in Honors Academy as a coach, and since 2018 he is also the coordinator of the Honors Academy Smart Mobility track.

The Smart Mobility track aims to involve Honors students in these projects in order to explore new solutions to real world mobility related societal issues and at the same time it provides a platform to Honors students to get into contact with companies, research institutes, governmental institutes and other university faculty early on in their academic career.

We were happy to have had 2 different teams this year, with different goals, but also in different development stages; one focusing on connected automated mobility (5G-MOBIX - Remote driving) with a slightly more focused on technology development and the other focusing more on green mobility topics (team POLAR), with a focus on feasibility study. Both topics fit very well within the Smart Mobility track, combining both sustainability (a collaboration with Energy Transition track) and cooperative and connected mobility. Because of the difference in topics, there was a good collaboration between the two teams was this year. Being the main coach for 5G-MOBIX - Remote Driving project, I am proud to have seen the team get to a working prototype and concrete results. Even with the COVID-19 limiting the possibility to showcase and test the prototype thoroughly, the team has managed to still ‘remotely’ develop the remote driving functionalities for the vehicle and provide a first Proof of Concept.

I am also proud that we have shown what collaboration can do: not only within and between the two teams, but also between tracks, with the collaboration with Energy Transition. We will definitely continue and explore this kind of collaboration further in the future.

Coaches

Han van Kasteren

I have been working for Honors Smart Mobility track mainly because I can contribute to implementing sustainable solutions for society by guiding students with their innovative ideas. Like every honors year also this year it has been a pleasure to see students grow in their personal development and the results of their efforts towards new sustainable solutions. I am especially proud of how the honors students realized their own team called POLAR starting from a very general idea of exploring the South Pole in a sustainable way. The team realized a concept for a prototype and a roadmap how to realize their dream of implementing the vehicle in a real artic environment. I have no doubt about experiencing the realization of this dream in the near future.
"We are recreating the car of ‘Black Panther’"

**5G-MOBIX - AD vehicle remote control**

Enabling a remote driver to take control of an autonomous vehicle experiencing an emergency, over a 5G network using a suitable user interface.

Autonomous cars are rapidly becoming reality. However, these cars will never be immune to failures. Just like a normal car today can have a puncture, a sensor of such a vehicle could break down and result in the car losing its autonomous capabilities. Over the past year, our team has successfully created a framework for this scenario. It uses sensorial input of the autonomous vehicle, sends it to a remote station and translates it into a clear visualisation which can be used by a remote driver to control the car.

Every separate aspect of this application is working: the real-time connection between the car and the remote station, the compression and decompression of sensor data, and the final graphical user interface.

Unfortunately due to COVID-19, the team was unable to test the unified application in action with the test vehicle. When continuing this project next year, this is something we are looking forward to.

Next to all the technical implementations, this project enabled us to work in a multidisciplinary team in which people could express their goals and interests. Although it might not be unique to this project, it made sure that everyone stayed motivated, which is a great thing.
Looking back at this Honors year

Being a team of six, it is extremely important to collaborate and communicate. Without a nice working atmosphere and good communication, the project is likely to fail. Therefore, we held multiple group activities, which were both very fun, and helpful for collaborating purposes (this we have to say of course?). Anyway, one of these activities was laser tag! Not everything has to be directly related to your project and the TU/e. To stay productive, it is sometimes better to take a break. This activity has become one good memory of this academic year.

Furthermore, to keep it educational, we attended a conference in Helmond at the Automotive campus. Here we were able to ask all our questions and we had some exciting conversations with professors and employees who are working on similar projects.

A piece of advice for new Honors Students: your skills will always be valuable in a project one way or the other. It is up to you and your team to figure out how. If one possibility fails, there is always another. You will get stuck every once in a while, but that's part of the process. For example, we have been looking at four different ways to connect the vehicle to our remote station before we found the one that was just right, without getting enormous delays. The same holds for getting GPS/satellite and point-cloud data in one single program. Yet, it worked out every time. This is partly due to the determination of each individual group member, and partly due to the support the group members give each other.
"Together we ensure a green future."

**Team Polar - Antarctica 2048**

Antarctica contains around 80% of worldwide fresh water. If this is all melted the water level will rise 60 meters. Besides this our team want to address 2 problems on Antarctica. The Antarctic Treaty and the way research is currently done on Antarctica. The goal of our team, together with Wilco van Rooijen (project initiator) is to develop, design and produce a sustainable, autonomous research vehicle for Antarctica.

This research vehicle will make people aware that the Antarctic treaty is ending and it will make the infrastructure on Antarctica more sustainable. This year a feasibility study was conducted in order to see if this project is actually feasible. The outcome is a 70 page document which covers numerous different technologies from area's like power supply, power storage, chassis type etc. This document will be the basis of next year where the goal is to start detailing the whole vehicle and make the first prototype.

Since the project is very broad and very challenging, a bigger network and bigger workforce are needed to make our goal a reality. Therefore, the team is now not only a Honors Team but also a Student Team at Innovation Space. There is still a lot to do in the coming year but if the team keeps the motivations and determination this project will become reality in 3 to 4 years.
Looking back at this Honors year

The past academic Honors year was memorable in itself for team POLAR. At the start, we, a group of six inexperienced but enthusiastic students, started to realize our goal: to create the first vehicle that drives to the south pole powered by sustainable energy sources. This project embodies our two biggest dreams:

- To make people more aware of the need for more sustainable infrastructures.
- To show that sharing knowledge allows for more efficient and rapid developments.

During the year, we transferred this high-level goal into a feasible project. Based on the scientific information gathered, team POLAR is up for the challenge to build the first prototype in the coming year as a proof of concept.

We have learned some valuable lessons over the year. In the first place, we are lucky to already have quite some stakeholders participating in this project. However, this requires good communication between all of them as well. We noticed the importance of thinking the communication structure through: at what interval do we meet with each person?, who has to be present?, which knowledge has to be shared?, etc..

In our project, this was a critical factor for the progress of the team. Secondly, we were confronted with the fact that not all problems can be solved with a linear design process. The complexity of our goal requires a parallel combination of researching, designing, testing, and, experimenting. Experiencing this was meaningful to us.

"Dromen, Durven, Delen, en DOEN!"
- Wilco van Rooijen

THIS IS OUR TEAM
Magnus Frankevoort
Ewout Hulscher
Arthur Kernkamp
Ognjen Mišić
Paulien Teuwen
Thijs Wester
Coach:
Han van Kasteren

POLAR
PART OF ANTARCTICA2048
My name is Rachel van de Pol and I started in February this year as secretary and administration officer of the Honors Academy. I am responsible for the student administration and organisational tasks. When I started, my first event was the Interim presentations. I attended some nice presentations and was immediately impressed with the level of the work and the students. I am very passionate about my own work myself and it is great to see that our students are passionate about their work too. Despite the challenges in the past few months you have proven to be flexible, innovative and determined to finish your project. Congratulations!

My name is Kathinka Rijk, and I am a Policy Officer Education in the Staff Office of the Executive Board. Within the Honors Academy, I work on many topics concerning educational policy, but mainly focus on the program in the master. TU/e Honors Academy is a very inspirational environment to work in, I am constantly amazed by the wonderful results achieved by the Honors students. I enjoy hearing the stories about the interesting journeys students make to get to these results. The work of the Honors students really shows that when you combine innovative ideas, enthusiasm, hard work and team-spirit, magic happens! Congratulations on the results you achieved, especially in this strange "COVID-19 year"!

My name is Lenny Apon and I am the Education coordinator of the Honors Academy and innovationSpace. My tasks focussed mainly on coordination, organisation, communication and try to create a cross-over between the great activities which takes place at the honors programs and at innovationSpace's vivid community. I am impressed by the great honors projects and I am happy to see some of you as a (trial) student team at innovationSpace. I am sure we will see many of you with great careers as start-up or CEO of one of the organizations of the future.
I have started working as a policy officer for the Honors Academy Bachelor program in May 2020. It is my job to develop and adjust legally sound policies and regulations that guarantee the quality of the Honors program. Furthermore, I help to organize several events that take place during the Honors year, such as the kickoff event, workshops and the interim project presentations. Next to this I am chair of the Student Council meetings and in regular contact with the board of Confluente. A big motivator for me in my job is being surrounded by highly motivated people who want to grow both personally and professionally. I get a lot of energy from that. So working with Honors students and the Honors staff is right up my alley! I am looking forward to experiencing an entire Honors year.

I’ve been working for the last 2 years with great pleasure as a policy officer and advisor for the Honors Academy. The best part about my work is the close interaction with the highly talented and motivated students and being able to implement new ideas to lift the program up to a higher level. Such improvements and changes take time but with a lot of motivation, continued efforts, and a great deal of enthusiasm you can come a long way. I see that in the Honors students, and they always motivate me to do better and be better. I am sure with this mindset and their persuasiveness, they will move mountains in the future!

After having completed the Honors Academy as a student in 2018-2019, this year I joined from the other side as a student assistant for the Honors Academy. In this role, I handled communication tasks and provided input from a students’ perspective. Furthermore, this gave me the chance to enjoy the Honors Community for another year. The constant flow of inspirational ideas and the dedication displayed by students every year is truly inspiring, and a booklet like this beautifully highlights how innovation is stimulated by the Honors Academy.
#ownyourfuture
the
future
starts
today