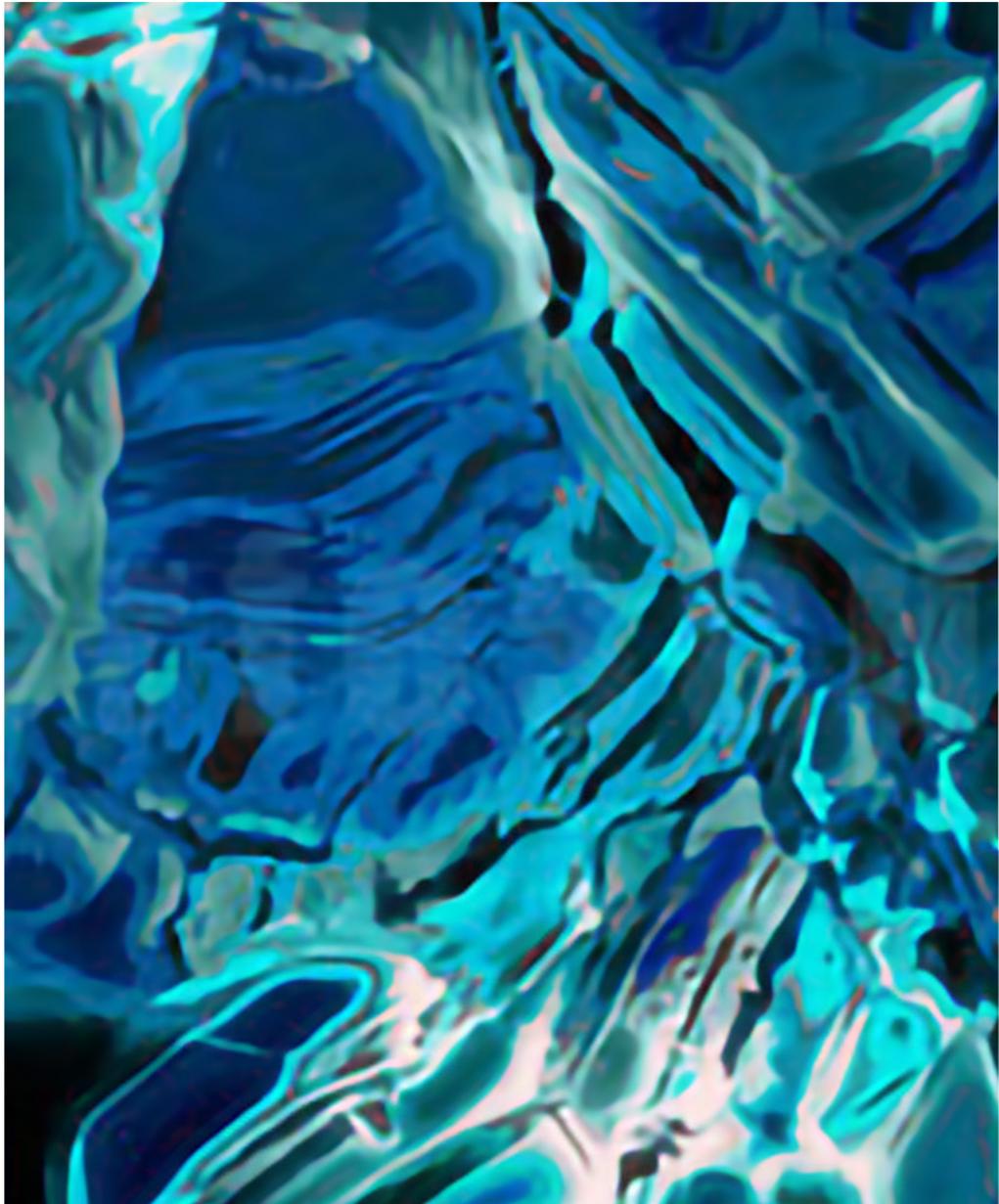
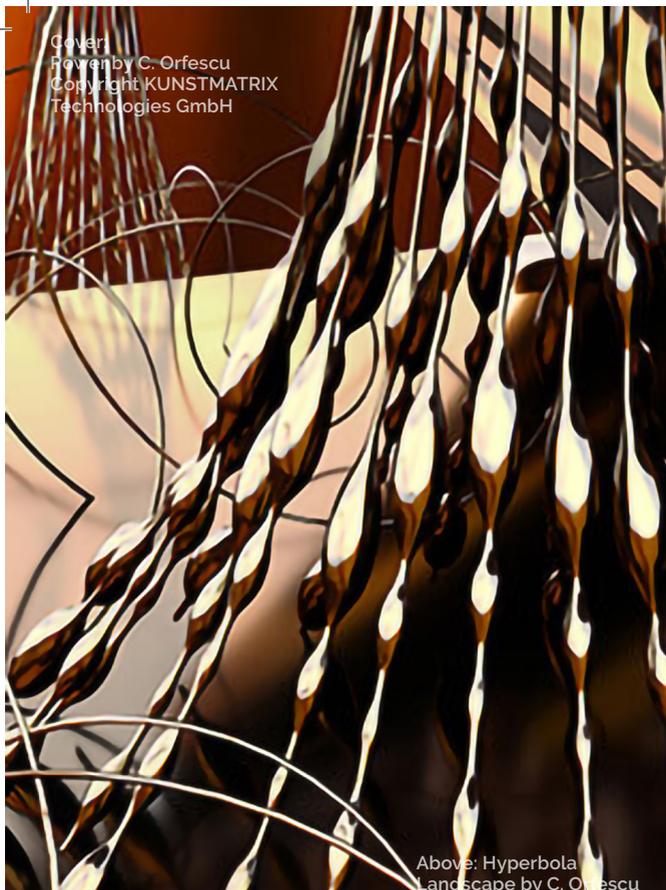


mRNA



YEAR 7 // ISSUE 2 // APRIL 2022

CLAIRE'S PATH // VOLUNTEERING // THIS IS LOVE // INTERVIEW SERGE DONKERS
NIGEL // GUIDE TO STAIRS // DON'T LOOK UP // 10 YEARS OF NANONEWS



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Landscape by C. Orfescu

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COLOPHON

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EDITORIAL

ANNEMIEKE MATHISSEN

Hello again dear readers,

I hope that all of you have stayed healthy since the release of our previous mRNA, which you already received last year. From the perspective of our little committee, quite a bit has changed - the beunweekend in which this edition was made marked the arrival of two new committee members and the departure of our two most experienced members, Sten and Margot. Needless to say, we will miss their InDesigning expertise, as well as their ability to improve the PPI (pixels per inch) of that one pesky image. To our newcomers Josephine and Kelly I say welcome, and I hope you like rijstwafels.



An exciting milestone that you may not know accompanies 2022 is that a decade ago, the Nanobiology programme was about to first come into existence. As you will read in this "10 Years of Nano" themed edition, September 2012 was a defining time for the Nanobiology programme. In an interview with Serge Donkers, you can hear about what went on behind the scenes, and hear the origin story behind the programme management's "just smile and wave" joke. You can also get a picture of what the programme curriculum looked like at this time, the scientific discoveries that came out in parallel, a special piece from one of Hooke's oldest members, and much more.

In addition to articles that are in line with the theme, you will find topical pieces. In one piece we give several suggestions for those who would like to do volunteer work in Delft or Rotterdam. Here you can also find ways to support the victims of the conflicts in Ukraine. Our hearts go out to everyone affected by the situation.

Of course, there would be no Nanobiology without its founder, Claire Wyman. Although we all had different levels of contact with her, by playing such an important role in creating the environment in which we have learned and grown as people, she has drastically shaped all of our lives. Several months before her passing, she reached out to us to tell her story of how she became the woman with funky earrings, an iconic braid, and xkcd cartoons that we all know and love.

With that, I invite you all to reminisce and laugh while reading this edition of the mRNA. Enjoy!

At your service,

Annemieke Mathissen
Editor-in-Chief of mRNA 5.5

FROM THE BOARD

TOM DE LAAT

Dear members,

The second semester is well on its way already. Spring weather finally arrived while many of you were studying hard for your exams. Others might have been busy starting their BEP. Nevertheless, I know that many of you took some time to make the most of the hours of sun you could get, as you should.

With the rising temperatures, the world is finally opening up again as well. For us, this meant we were able to organise and enjoy physical activities again. From bubble football organised by ATP and glow in the dark mini golf with all the committee members to many Tuesday drinks in Bar het Lab and a surf trip to Gran Canaria, I saw a wonderful community coming together again with all kinds of people from all cohorts. These people, no matter how different from one another, all have one thing in common: they study Nanobiology.

That community started back in 2012, when 75 students started their first year of this programme, pioneering a completely new field of physics and mathematics applied to the smallest scale of biology. In 2022, a year that marks the 10th anniversary of our study programme, the Nanobiology community is bigger and stronger than ever. It is that community that I think Prof Dr Claire Wyman envisioned 10 years ago when she founded the programme. I know she was always immensely proud and enthusiastic to see all that came out of our beautiful programme and association.

With the gala, Kinecie's rally weekend coming up, I am sure I will see much more of that community that I am so proud of. I hope to see you all there.

I have spoken.

Tom de Laat
President of S.V.N.B. Hooke 2021-2022



In Memoriam

Prof Dr Claire Wyman



Claire was our first honorary member and was extremely important to both the Nanobiology programme and S.V.N.B. Hooke. On the 19th of February 2020, our general members assembly voted in favour for her to be our first honorary member. Her reaction when she heard that she would be allowed to hit the gong at the end of the assembly sparked joy in all of us. Claire was an amazing person and we are happy that we have had the opportunity to get to know her and learn from her. S.V.N.B. Hooke will always continue trying to make her proud.

MY PATH FROM THERE TO HERE

CLAIRE WYMAN

In November 2021, Claire sent us a story in which she described her career, her motivations, and how she came to be the director of a new and unique bachelor's programme. Additionally, she agreed to an interview with us and she sent us her PhD thesis, along with a "read me" text. You can find both below this story. Enjoy reading about Claire's career path and listening to the interview. We hope you will be as inspired by her as we are.

Dear Nanobiology community,

I wrote to you about the beginning of my illness and more recently my decision to step down as director of the program. Although we don't see each other in person these days I still feel very much connected to the Nanobiology community. I want to share some thoughts with you, and this time over study choices (mine) and how our paths in life are often not what we expect but are still fun and rewarding and successful. Just see where the journey leads you.

I am a professor at the Erasmus MC with an adjunct appointment at the TU Delft and have had the privilege of setting up and running, as director, the Nanobiology program we all know and love. How did I get here? Not on a straight arrow path for sure. I will share with you now.

Let's start in high school. Chemistry was my favorite subject, probably because the teacher was really good and we did interesting experiments. To avoid other subjects I liked less (languages, social science, history... too much reading) I had the duty of assisting the chemistry

teacher setting up labs for one hour a day. From this I learned about basic lab stuff and I learned a lot from my mistakes (that is a common theme and if you don't make mistakes and acknowledge them you won't learn as much as you can). I also took advanced placement chemistry in my senior year. Passing a national exam based on this course gives full credit for first year university chemistry. Indeed, I got a good score and thus placed out, with credit, of first year university chemistry and could start with the usual second year course of Organic Chemistry.

"Just see where the journey leads you."

You would think I studied chemistry at university (University of Maryland, Baltimore County, UMBC). Well, actually no. I left high school mostly wanting to get trained for a job to be independent. My family had healthcare professionals but no scientists, so I first thought of a fast track to healthcare. Becoming a doctor takes ten years in the US and was not attractive. I looked into Nursing but that did not require chemistry and my credits would be lost. Medical Lab Tech fit the bill and I started university with the intention to enter this training after two years of general course work. I was living on my own and to supplement parental support needed work. I got a job in a chemistry lab, at first to clean glassware and make bacterial media and such. In the lab I asked a lot of questions and pretty soon they were asking me to do more experimental support and eventually my own small part of their research project. I learned that it was fun and very interesting (what will the results be?) to do experiments and that the people in the lab were smart, funny and enjoyed their work.

This shattered my bias that they had to be boring nerdy folks without interesting lives. I got hooked on the lab life. What to do about my “career” plans?

“I prevented the undergrad assistant from melting the lab bench with a massive acid spill.”

I still wanted to do something in healthcare but now with more research orientation. It turned out another university in Baltimore had a program linked to their school of public health, so lots of different health applications were possible. I transferred to the Johns Hopkins University for my junior and senior years to get a degree in “Natural Sciences: Public Health”. Along with general science and humanities courses (I had to take a language, Russian, to graduate), the courses at Public Health included; anatomy, histology, epidemiology, infectious diseases and health policy. These were all very interesting and broad based. When I graduated, I was still not convinced that an academic path was for me, so I looked for relevant work. By that time, I was attached to a partner whose work centered in Baltimore and it was becoming home. I landed a job as a lab tech back in the UMBC department I had studied in because it was easy with recommendations from my former lab. I was tasked with purifying a protein supposedly related to aging in *Paramecium*. I learned a lot about protein purification, got pretty good at it, broke the largest piece of glassware I ever used and prevented the undergrad assistant from melting the lab bench with a massive acid spill. Then I was sexually harassed by the boss, reported this to little response, and quit.

My next job as technician was for a clinical study on asthma. The lab did fundamental work on the physiology of asthma and commercially contracted drug studies. I helped in both. This involved inducing asthma in patient volunteers under different conditions (drug, placebo, or our different triggers in our fundamental work), and measuring their lung function. I learned a lot of physiology, appreciation for patient volunteers and that I can't deal with filling out forms for drug companies. One study had to be dropped because a patient in another city died on high dose. This was scary and I had to call patients to say the study would end (though details were discussed between them and doctors of course). This was all interesting, but I did not see myself moving forward in this field. I was thinking of going back to biochemistry type work but with a purpose.

“I can't deal with filling out forms for drug companies.”



In public health I had learned about tropical diseases, which are fascinating in the strange organisms that cause them, with both organisms and diseases having sufficient mysteries to investigate. In a youthful enthusiastic science-can-save-the-world mood I applied to the Johns Hopkins School of Hygiene and Public Health for a PhD program in immunology and infectious diseases and was accepted to one of the labs working on *Leishmania*. I learned a lot of things: how smallpox was eradicated, that immunology in its state then was not worth studying because they did not even know if cell types with different names were different types, that some scientists are terrible teachers, that an international student body is great fun and never boring, and again, that learning from mistakes can be the most informative part of science.

“I learned that learning from mistakes can be the most informative part of science.”

You see, one winter I left for Christmas break but not before finishing my lab task of making the media that our *Leishmania* grew in. I returned to find my lab mates puzzled and excited. Suddenly the enzyme we studied was expressed and active about 10X what it had always been. After much discussion on phases of the moon and such we came to scrutinize the media I made. Fortunately, I kept records of what I actually did, as opposed to just a copy paste recipe. It turned out I had left out a key ingredient, whereby the little *Leishmania* could still live but needed to pump up some salvage enzymes, one of which we studied. This was new and important information, a serendipitous discovery of first order. I only regret that I left the lab shortly thereafter and am not associated with publications of this work.

Since no one in my family had gone into academics at this level I was unaware that I could actually get paid instead of paying for this type of studentship. The Johns Hopkins University is a private institute and rather expensive. As a PhD student one has to pay tuition. I did get scholarship and grant support but still had to pay some tuition and of course food and rent, requiring loans. I was taking out loans each semester and acquiring debt.

“I was unaware that I could actually get paid instead of paying for this type of studentship.”

A summer course at an institute in Woods Hole, Massachusetts taught me a lot of fundamental molecular biology and sparked my interest in this (then) new field. The course was also huge fun and lots of work often late into the night but not without breaks on the beach during the day, and closing down the bars (2) in town. In the meantime my Baltimore bound partner and I had broken up and I was looking for new surroundings. I also needed a program where I got paid instead of going into debt.

I decided that my best path to saving the world was to study fundamental molecular biology and worry about applications later. My search for new surroundings meant I applied to graduate programs (PhD) at five schools, all west of the Rocky Mountains. Although Univ. Calif. San Francisco was my first choice, I was eventually accepted to Univ. Colorado, Univ. of Calif. Berkeley and Univ. of Oregon. I chose Berkeley and can say this was one of the best choices I ever made. A spectacularly wonderful and interesting place and a transformative time of my life... not to mention too much fun to describe here.

It also required new life skills to adapt to living on the left coast, challenges in politics (S. Africa divestment movement), new social norms and establishing new friendships, at work and home.

“At one point I had been to the lab all but two days in an eight-month period.”

For this journey I offer you a guided tour of my PhD thesis. A history lesson, and more so a lesson in how fast science changes. I realize this was 30 years ago, but then again you will find yourself some 30 years from now looking back at your current research experiences. I basically got a PhD for sequencing >10kbp of tetrahymena DNA. This (cloning, sub-cloning, and sequencing both strands) took a year of more-or-less non-stop work (at one point I had been to the lab all but two days in an eight-month period - life was still good, I did live in Berkeley CA), so that I could finish experiments before my advisor moved her lab to another city.

This would all be done now by WAY more efficient methods by commercial companies, but not then. I trust you will also recognize this sentiment “...that posterity will read these statements with a feeling of proud and justified superiority.” - 1939 World’s Fair time-capsule.

As a guide to the thesis, see first the read me: Here the guide to the ancient texts of a UC Berkeley PhD thesis: or when I was a graduate student (“all we had was Earth, Air, Fire and Water. None of it pure!” Last line from a MolBio follies skit about kits and outsourced experimental work).

“Keep up enjoying your own journey and follow it where it takes you.”

Hope you enjoyed the read. If you are wondering, the path from PhD to where I am now was more direct and can be found in my CV. Keep up enjoying your own journey and follow it where it takes you. It may not necessarily be where you thought you were going.



The interview with Claire can be found on the mRNAudio podcast.



Scan this code to find the “read me” text and Claire’s thesis.

10 YEARS OF NANONEWS

NANONEWS

Over the past 10 years, there have been many tremendous note worthy discoveries and landmarks for the field of Nanobiology. Here are eight marking moments for the scientific progress of our study.

Quantum Dots (2013)

Quantum dots are semiconductor particles the size of a few nanometres. When illuminated by UV light, they enter an excited state and then release energy back by emitting light of a fixed wavelength. Their properties change as a function of both size and shape. The larger dots emit a longer wavelength, like orange or red, while the smaller dots emit a shorter wavelength, like blue or green.

The optical properties of quantum dots make them valuable to manufacturing high quality screens, allowing better colour accuracy and reducing energy consumption.

Source: nexdot.fr/en/history-of-quantum-dots/

2013

2017

2016

2014

Cryo-electron Microscopy (2017)

Cryo EM is a technique to help visualise extremely small molecules. The principle is that the samples are cooled down to cryogenic temperatures (around -150 °C) and embedded in vitreous water. The sample is then applied to a grid-mesh and plunge-frozen in liquid ethane or a mix of ethane and propane. Then a beam of electrons is transmitted through the sample to create an image. It has the potential to rival X-ray crystallography thanks to automatic sample production and advances in direct electron detectors.

Source: delmic.com/en/techniques/cryogenic-electron-microscopy

CRISPR-Cas9 for genome editing (2016)

This is a gene editing technique created by Emmanuelle Carpentier and Jennifer Doudna which enables researchers to edit a genome by removing, adding, or altering a DNA sequence. It is currently the most versatile and precise method to alter the genetic sequence of an organism. First, a guide RNA will signal the place of interest to Cas9, which will cut the two DNA strands to add the sequence of interest to the existing gene. After the molecular scissor nicks both strands, DNA recognises damage and uses DNA repair mechanisms to close the strands.

For now there is also the debate of using it on germline cells because the modifications could then be passed on to progeny. In the future, CRISPR could potentially be used to create new species or revive extinct species from closely related ones. It will be many years before we can fully treat human diseases with this technique, but it has a very bright future.

Source: yourgenome.org/facts/what-is-crispr-cas9

Xenobots (2018)

Self-replicating robots made from skin and heart muscle cells taken from a frog embryo. The skin provides a rigid support while the heart cells act like a motor to propel the organism forward. They can walk, swim, and perform some simple tasks. They can survive for weeks without food and heal themselves after lacerations. For now, they are used to understand the cooperativity of cells during morphogenesis. In the future, they could be used to capture microplastics in our oceans for recycling to combat climate change. They could also have clinical applications for drug delivery, unclogging arteries, and treating various diseases.

2020

Source: fox10phoenix.com/news/xenobots-worlds-first-living-robots-can-reproduce-scientists-say

2021

acidity of the clouds is thought to be the key to the presence of life on the planet. However, the discovery has faced a lot of controversy. Many argue that the gas' presence could be explained by a multitude of other things, like Venus' volcanoes.

Source: scitechdaily.com/what-is-phosphine-and-why-does-it-point-to-extra-terrestrial-life-floating-in-the-clouds-of-venus/

Lab grown embryo (2021)

This experiment successfully used human stem cells to imitate a blastocyst. A blastocyst implants in the wall of the uterus during pregnancy at around seven or eight days. However, these blastocyst structures are not expected to have the ability to develop into a complete embryo. It is still incredible progress to know more about the blastocysts so early as we do not have much information about these stages. Because of the improvements on these techniques, there is hope that we can learn more about human development, and explore the causes of birth defects. However, this also raises the discussion of the ethical side of growing embryos to the forefront.

Source: sciencedaily.com/releases/2021/09/210921172700.htm

Effects of parental genotypes (2020)

A study has shown that non transmitted alleles can affect a child through the fact that they often impact parents and other relatives. This phenomenon is called genetic nurture. Using a meta-analysis of the highest level of education that an individual has completed, the study showed that having at least one parent phenotype has an effect on the highest level of education an individual will get due to their genetic nurture. This phenomenon not only affects education but also nutrition, health, and many more factors. Notably, mothers contribute more to nutrition and health-related traits.

Kong et al. 2018. The nature of nurture: Effects of parental genotypes. *Science*, 359(6374), pp.424-428.

RATING STAIRS

10 YEARS OF NANO

What is more important, the journey or the destination? Over the past 10 years, a lot has changed... except for stairs. As a student of Nanobiology, the stairs in this article are likely one of the constants in your life. Let this text serve as a guide on taking pause and observing the world around you.

Stairs in the atrium of Applied Sciences

There are some mixed feelings about these stairs. Are they in the most beautiful building on campus? Yes. Are they appropriately laid out? Well, they may be on the steep side, but also yes. But try and take them two at a time, and the sound of your shin striking the stair edge will echo throughout the space almost as violently as the force with which your dignity has shattered.



Source: Scopio

Stairs in Applied Physics

Never before has a building that just continues in one straight line been so complex to navigate. As you find yourself walking along the main hall, these staircases seem the same, as if you are experiencing a glitch in the matrix, when there are in fact many. Top marks in steepness, length, uniformity, and traversability, bottom marks in charisma, uniqueness, nerve, and talent.

Library stairs

Long, horrible, no matter what angle you approach them at, or at what gait, you are bound to feel awkward on the steps of the UB. People sitting on the grass watching you as you flounder only makes it worse. Try not to trip in front of some distant person you recognise!



Source: iamap.tudelft.nl



Source: Nieuws item

Spiral stairs in the EMC education center

Never has there ever been a more beautiful set of stairs. Nestled in with the backdrop of a sprawling library wall, these staircases speak to us as Nanobiology students, the right-handed spiral mimicking that which resides in all of us. The most unfortunate thing about these stars is that we can only look, not touch, unless we want a blaring alarm to go off. Trust me, I have tried.

The stairs at Delft train station

We all know you will take the escalator anyways, so let's just stop right here.

The floating walkways above the EMC thoroughfare

Although these are not technically stairs, they are just so cool! 10/10. If you manage to find yourself on one, you've won.

DON'T LOOK UP

MRNA REVIEWS

Don't Look Up is a 2021 Netflix original movie that has stirred public debate in the past few months. Its provocative themes, caricatures, and satirical storytelling aroused polarising public opinions and reviews. We took it upon ourselves to inspect this from our point of view.

Story seems to be the hardest word

Will the world unite over an apocalyptic threat of a meteor, and can the protagonists convince the world of its doom before it is too late? Although a simple plot, the goal of this movie is unclear. Some mRNAers believed it provided us with a snapshot of current day crises. Trying to coherently capture so many aspects of society in one movie however, is like trying to hit a flock of birds with one stone, and plot holes inevitably develop, giving the movie a feeling of incompleteness. This could be an intentional meta-move, as incompleteness is one of the major themes of the movie.

Acting is just imitating authenticity

Acting is the strongest point of the movie. In our opinion the ensemble gave it their best shot at recreating these paper mache, 1D characters, and bringing them to life in an over-the-top, but still entertaining fashion. Their interactions were priceless, the chemistry was on point. Meryl Streep for example, who is notoriously good at creating depth for a character, does a perfect job of not giving this one any, which is why it works as a satire.



Source: alamy.com

Start every day with a smile and get over it

For us, the humour was either a hit or a miss, depending on who you ask. As one mRNAer described it, impactful movies can present themselves in one of three ways: a purely serious movie where the message is undiluted with humour (*Contagion*), one where there's a couple jokes to lighten the mood (*Trial of the Chicago 7*), or something that is a complete parody (*This Is the End*). Although for such a potentially upsetting movie, some humour could help make it more palatable, *Don't Look Up* seems to straddle the second and third, and as is, just makes the viewer frequently think: "what am I watching?".

Shooting yourself in the foot is not the greatest idea

The last point of note: a great time of the movie is spent mocking the superficiality of the media, so if you try to look up (or don't look up) other reviews, take them with a pinch of salt. For example, on Rotten Tomatoes the audience score is much higher than the critics score. This we believe is due to the subject matter and the critics' interest in defying the movie's tropes. The proof of the pudding will be in the eating, so just have a bite and enjoy.

Source (background): maxpixel.net



Sources: Wikimedia Commons

DALÍ INTERVIEWS WITH THE BOARD

INTERVIEW

"Intelligence without ambition is a bird without wings." Salvador Dalí possibly said. I have no clue, I personally have not met the guy. Nonetheless, in homage to his art and to his quote, we are going to channel him, and ambitiously try and ask the most relevant questions of our generation to the leaders of our community. For clarification, no intelligence was used during the creation of this article. We have no idea how this happened, we will make sure the author receives his necessary medications in time.

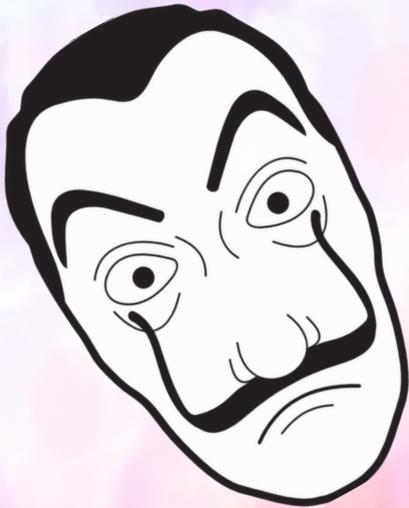


Tom - This year is going to be the 250th anniversary of the birth of Maximiliano de la Lucia, the widely renowned invisible pottery expert. What do you think of his craft, and are you planning to celebrate the anniversary?

What a great question. You must know that I am a huge Maximiliano fan myself. His understanding of the fine art that is invisible pottery is extraordinary. Never have I seen someone that is able to create such emotions in the patterns and shapes of coffee mugs, vases, and egg cups. Actually, I think no one has ever seen it. I also have some of his pieces at home. They seamlessly blend in with the surroundings. It is incredible. Naturally, I am going to celebrate the anniversary. I was thinking of a pilgrimage to his birthplace, Santa Lucía de Tirajana. This little town is situated on the island of Gran Canaria. Maybe I can visit Little Havana on the way there!

Minouk - Would you like to comment on the allegations about your connection to the infamous serial lab equipment breaker, who has been terrorising the EMC lately?

Well, would I like to? No, not really, but I get your curiosity so I will try to explain. I am also shocked by how quickly it escalated, I never anticipated this. I understand that not all people are gifted with two right hands and there's nothing wrong with a little clumsiness from time to time, but this is just absolute craziness. I mean, dropping a beaker or spilling a little agar happens to the best of us but breaking a \$2000 Erlenmeyer just minutes after starting the centrifuge without the lid, that's just too much. Not to mention all those micropipettes that have been suffering over the last few weeks. So, no wonder I am a little hesitant in admitting that I was the one advising this person to do their BEP in the labs of the EMC. I am deeply humiliated and would like to take this opportunity to apologise to all lab equipment that was affected.



Salvador Dalí

Source: Wikimedia Commons

Lucienne - What has being the president of the Swiss Cheeses for saving Alaska taught you personally? Were there any experiences that shaped your way of thinking?

Of course, there have been experiences that shaped my way of thinking. When your life revolves solely around cheese it's hard not to view everything in terms of cheese. Whenever I eat something, I can only compare it with the taste of different cheeses: does it taste like Berner Hobelkäse? Does it taste like Schabziger? Or more like Bleuchâtel... or maybe Sbrinz? Röthenbacher Bergkäse? You could say my way of thinking is cheese-shaped. Then again, I sometimes forget the point of my presidency is to save Alaska. Thank you for reminding me - I should shift my focus a bit. I tend to mainly concentrate on cheese.

Lianne - This year, there have been rumors that inclusivity week will have a large focus on the one-winged Lasagne-eating community. What made you come to this decision?

When talking about inclusivity, smaller communities are not always thought about. To give some more focus on the smaller communities that are not always included as they would prefer, we will focus more on the one-winged Lasagne-eating community. This gives them an opportunity to voice their opinion: "Everyone knows of course about the one-winged Lasagne-eaters, but a lot of people do not try to understand us and just make fun of the name not knowing our importance."

Source (background): pxhere.com

Source (Dalí face): Wikimedia Commons



Thanks to Fot
for the great





Fotosynthetic
eat pictures!



CURIOUS BEGINNINGS WITH SERGE DONKERS

INTERVIEW

First, for those of our readers who do not know you, who were you to the Nanobiology programme?

I was coordinator of the Nanobiology programme. I obviously started off with the bachelor's programme. I became coordinator around May 2012, when the programme was yet to be officially approved. I think that happened around June or July 2012. We would actually start in September.

It seems it was all very fast, but I have no frame of reference.

In the ideal world the approval is there much earlier. I'm currently involved in setting up a new master programme and we aim to have it approved in October this year (2022) so we can start next September (2023).

That must've been a busy summer!

Yeah, and I came from research, I was working in the department of Bionanoscience (although it wasn't called that yet) as a molecular biologist. I'd been working there for five years before I got the opportunity of programme coordinator, so apart from having followed an educational programme when I was young, I didn't have experience in education coordination and organisation, so that was a dive in the deep end. I just had to start, not knowing myself whether I would be capable of doing the kind of things that were asked of me.

"I just had to start, not knowing myself whether I would be capable of doing [this]."

And once you all started up, how did it progress from there?

We had a challenge every year. Something else



would always come up on top of the attention just for running the programme, mostly because we were doing each year for the first time. The years we did for the second or third time started to settle down, but every year challenges came up for

the new year that would start. And before we had the three years of the bachelor done, we already had to start with developing the master programme, in 2015. So it was a roller coaster for six years, maybe seven, before everything settled down.

What kind of highlights did you have? What are you most proud of?

I think not many programme coordinators actually have the possibility to start a new programme. I feel lucky. It was such a group effort, and I think we can be very proud of what it currently is. As for funny moments, I can remember that Claire, Fleur*, and I had a small joke that students obviously didn't know about - whenever we were meeting students, and something was going wrong behind the scenes we would look at each other and say "just smile and wave!" For example, a few months before the start of the first second year, I got a phone call from a teacher who said "Yeah listen, what about this Nanobiology programme? Some time ago I was asked if I wanted to be involved. Since then I haven't heard anything, and I'm sorry but we have a capacity problem." This teacher was just planned in for doing a course in the second year. I was shocked! That was the perfect moment to smile and wave. In the end, it ended up

*academic counselor at the time

fairly good, but it was not ideal. In the coming years it gradually changed into the course it is today. Undoubtedly, that was the Electronic Instrumentation course. Another example was that when the programme started, our first class was planned to be 30 students that we all already knew and had contact with. They were very well informed, like *“Ok, the programme is not yet officially approved, we should make sure we have a Plan B because it might not work out.”* Then in the summer of 2012 the communication team of Applied Sciences published a small article on Nanobiology, and the submissions exploded. Our first class size ended up being 75.

Do you think your time with Nanobiology gives you unique experience and knowledge that you can apply to other things now, like this new master's programme?

For sure. If you ask people who built their own house, they'll say you have to do it twice. Currently we are developing a master's programme that's a follow up of several bachelor's programmes. It's a different kind of challenge, but I can use the experience that I got from starting up the Nanobiology programmes.

Tell me more about this programme, and the other things you're working on!

I changed jobs just before the pandemic hit, and I am currently faculty coordinator education at Applied Sciences, which is a new role in our education department. So I'm the only coordinator who doesn't have his own programme, and I work closely with the other coordinators. I'm chair of our coordinators meetings, where we discuss things that are not related to one specific programme. But also I am indeed setting up the new master's programme, called Quantum Information Science and Technology. I think it's very cool and it's a big collaboration again - together with

Leiden University faculty, EWI faculty, Applied Sciences, and QuTech. I have two roles, one in the general organisation of the approval process and the other is that I'm a member of our education team, which includes learning developers, quality assurance officers, myself as coordinator, and in that role I also coordinate the development of three specific courses within the programme.

Are you enjoying it so far?

Yeah, because it's really a lot of different things that I'm involved in - it's very diverse, which is what I like. I'm a happy person!

Do you still keep in touch with the Nanobiology programme at all?

I see Johanna, Diane, Joris, and Timon on a regular basis. I also see some students that I knew from my time as coordinator, also in random interactions when we have the chance to go on campus.

“Follow your heart with what you want to do...”

Well, I think we are getting to the end of the interview, but do you have any advice or anything to say to our readers?

Well, the most current advice is stay healthy. Hopefully soon we can turn this into a situation where we can make corona a part of our lives and be able to function in a more regular way. For you as students, you should make your best use of this time. Follow your heart with what you want to do, and talk with other people about your ideas and the challenges that you encounter, as it can be very helpful! These days it can be hard to find someone to talk to, but they are definitely around. Either it's your peers, or people within your own programme, or others, since everyone is willing to help. And of course, try and enjoy your time too! That's what I try to do.

VOLUNTEERING IN DELFT AND ROTTERDAM

IN THE FIELD

Voluntary work is a wonderful thing to do, and not all of it needs to be done in a tropical land far far away. Not only does this help others, but you also help yourself in a variety of ways. Getting to know people, learning new skills, and boosting your CV are only a few of the perks that volunteering goes hand in hand with. Here are some examples of voluntary work nearby.

Since the start of the pandemic, many volunteering opportunities have been developed. New websites were created as part of national campaigns. You sign up and will be linked to a person who can use your help, for example by doing their groceries. Besides these national campaigns however, there are many local initiatives.

Most of the opportunities in Delft are found at delftvoorelkaar.nl. Even though the website is in Dutch, there are quite some functions for which no Dutch is required. By far the cutest is "animalbuddy". As an animalbuddy, you assist the elderly or the chronically ill with taking care of their pet. You will feed, walk, or otherwise look after their dog for one to eight hours per week, making this a flexible job. If you want some more information from this organisation, send an email to info@delftvoorelkaar.nl.

Rotterdam offers at least as many opportunities as Delft. Besides a lot of local work that can be found online (aafje.nl or uvvrotterdam.nl), you can also lend a helping hand at the EMC. For just two hours a week, you can help show people the way around this gigantic hospital.

Since the start of the Ukraine conflict, many initiatives have been set up. Numerous stores started collecting items that people can donate to help those that have suffered like blankets, toothbrushes, and more. Go to these places (Rataplan, Delta Office) and give them whatever you do not need anymore (assuming it is on their list), or offer them a helping hand to sort through all that they have received.

If we have made you excited about helping people, send us an email at mrna-hooke@tudelft.nl. We can provide you with a couple of links or organisations to find more information.



Adjusted from Vecteezy.com

RATING NANOPETS

EXPERT OPINION

Thanks to his recent success, we continued our collaboration with Tobias, the lower-level henchman of the Underworld. So, together with him we as experts of the field are going to rate the pets of Nanobiology.

mRNA's method: We are going to use a five element system, where we score each element from 0 to 2. The sum of these subscores will give the final grade of each animal. The elements are: cuteness (C), usefulness (U), reciprocating love (R), maintenance (M) and loyalty (L).

Tobias' method: "Well, I work in the Underworld. And it doesn't just end with humans. But again, I don't really know much about anything really."

Nematode

C: 1, As it is not visible, let's take the average.

U: 0, Unless you have a genetics lab at home...

R: 1, They do react to chemotaxis.

M: 2, Not that picky on eating.

L: 1, They won't run, though they are quite elusive.

Total: 5

Tobias: "Oh, it's a worm! It has a name that sounds like elegance, how funny. I really liked worms as a child... I'll give them a 5 as well."

Drosophila

C: 0, Would not enter it into a beauty contest.

U: 1, Composting is always useful.

R: 0, Their lifespan is a month, not much wiggle-room to love anyone.

M: 2, An apple a day.

L: 2, Use a net.

Total: 5

Tobias: "I hate those flies! Always buzzing around in the Underworld! It makes me go crazy! I'll give them a 0 with no regrets."

Axolotl

C: 2, It is basically a Pokémon.

U: 1, They can provide an infinite food source.

R: 2, They always seem happy and appreciative.

M: 0, Since it is almost extinct, some authorities are probably going to bother you.

L: 1, They can really suffer in captivity if it is not done right.

Total: 6

Tobias: "They're awesome! Like little superheroes that can regrow! And they look like Toothless from that Disney movie. That gives them a 10 for sure. Umh, yes... we get cable in the Underworld. And after death all day, can you blame me?"

Frogs

C: 1, Averaging out the cute poison dart frogs with toads, it deserves 1 point.

U: 2, It can poison and help with bug infestations.

R: 1, Some species were shown to exhibit behaviours of attachment to owners.

M: 2, They can live everywhere with water nearby.

L: 1, If there is a bug to be eaten they will stay.

Total: 7

Tobias: "Well, all frogs aren't Prince Charming. And they are slimy, but they make funny sounds. That's a 3."

Electric Fish

C: 0, Pretty dull in our opinion.

U: 1, It can probably run an airfryer if you ask nicely although I would not advise to put it on 220.

R: 0, Let us just say that its idea of love is shocking.

M: 0, Unless you have a really deep salty ocean in your back garden, this is going to be difficult.

L: 0, The best thing to say is that it does not bite.

Total: 1

Tobias: "Those fish are a nightmare, they get a 0."

NANO BEFORE AND AFTER

10 YEARS OF NANO

The year 2022 brings with it a major milestone: Nanobiology's 10th birthday! Our first cohort started their Nanobiology journey in the long-lost era of September 2012. Many things from back then would be unrecognisable to our modern point of view; would we even recognise our own programme?

We jest. The answer is obviously yes, mostly. The courses were very similar, even back then.

At first glance, some things might seem unfamiliar:

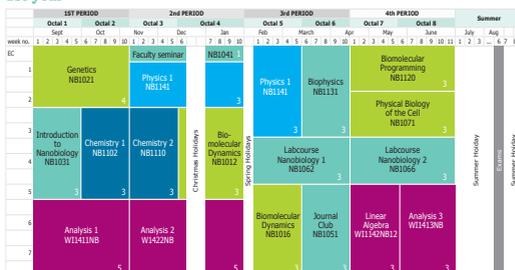
Year	2012/2013
Organization	Applied Sciences
Education	Bachelor Nanobiology

Code	Omschrijving	ECTS
Propedeuse NB 2012		
NB1011	Propedeutical Nanobiology 2012	9
NB1021	Biomolecular Dynamics(Biochemistry and Molecular Biology)	4
NB1031	Genetics	3
NB1041	Introduction to studying Nanobiology	3
NB1041	Faculty Seminar	2
NB1051	Journal Club	2
NB1061	Lab Course Nanobiology	6
NB1071	Physical Biology of the Cell	3
NB1101	Chemistry	6
NB1131	Biophysics	3
NB1141	Physics 1	6
WI1142TN	Linear Algebra Part 1	1
WI1411NB	Analysis 1	5
WI1412NB	Analysis 2	4
WI1413NB	Analysis 3	4
WI1414NB	Fourier Analysis	1

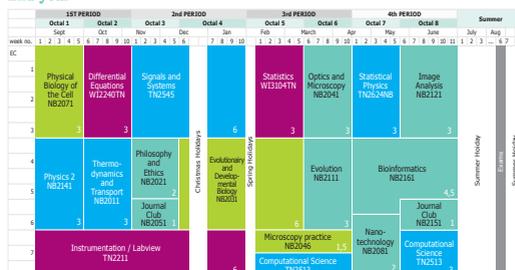
Biomolecular Dynamics, Physics being worth six credits, Fourier Analysis, and Faculty Seminar. These were just examples of early teething issues quickly fixed with student feedback; Biomolecular Dynamics was split apart into the more manageable Biochemistry, Molecular Biology, and Biomolecular Programming while Physics split into 1A and 1B. Fourier Analysis was absorbed by Analysis 2 and aspects of Faculty Seminar are now included in Introduction to Studying Nanobiology. There were some larger differences in assessment, for example 60% of your Physics grade coming from Mastering Physics assignments, but these also quickly evolved into what we know today.

By 2013, here is what the programme looked like in the first brochure; almost identical to what we are currently used to, with some shuffling. Biomolecular Dynamics and Fourier Analysis are both already gone. 2013 also saw the introduction of Nanobiology's first 2nd and 3rd years; again,

1st year



2nd year



aside from some slight shuffling, these were mostly the same as what we are used to today. The most exciting changes were Electronic Instrumentation being called Instrumentation/ Labview and having five instead of four electives.

The graduation of the first cohort in 2015 saw the introduction of the master's programme. Since then, little has changed, with the only differences being the removal of some electives in favour of some physics courses, the splitting in two of a maths course, and some shuffling in the 2nd year to elevate the final research project to 44 credits instead of 36.

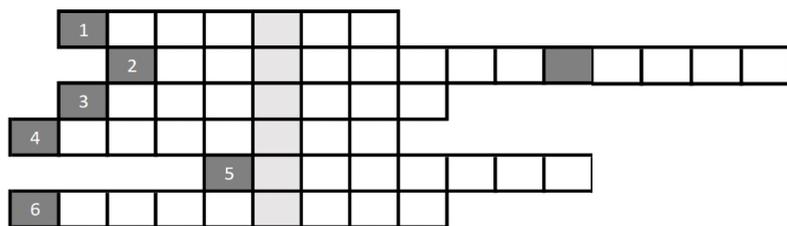
The most drastic change since 2012 is language. Nanobiology was a mixed language programme until 2017, when it finally became the international numerus fixus programme we know today. Lab Course and maths courses used to be taught in Dutch, limiting our first cohort to only bilinguals. Since then, only minor rearranging and an increase in the student cap have occurred; overall, as long as you speak Dutch, 2012's Nanobiology would feel more familiar to you than most other things from back then.

Nevertheless, with advancements in the field, change will eventually be inevitable. Aside from further shuffling, what else could we expect to see in the Nanobiology of 2032? Printing organs in Lab Course? Probably not, but our bold prediction is that Nanobiology in 2032 will apply the current theories behind gene editing with CRISPR, cryo-electron microscopy, and neural networks in some way. Of course, maths courses will also change; get ahead on learning Esperanto while you still can.

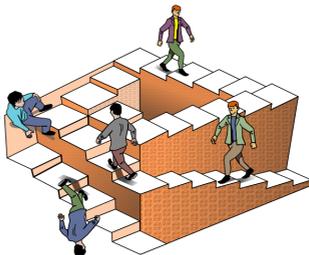
Puzzle Corner



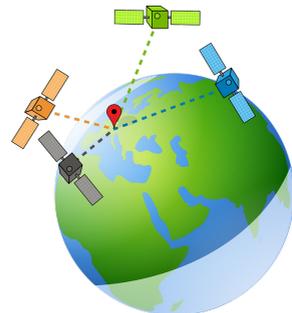
Source: Max Pixel



1. Inventor of the most famous gene editing technique
2. Can power an airfryer
3. Contains nanoscale GPS trackers
4. Building with the worst stairs ever made by mankind
5. Still confuses mass spectroscopy and spectrometry
6. University where Claire did her PhD



Source: Free SVG



Source: Max Pixel



NANOBOTS IN COVID-19 VACCINES

CONSPIRACY THEORY

Source: FreeSVG.com

The first vaccine shot contains all the necessary nanobots to gather all your personal data and alter your DNA. With the second shot, the required activation energy is slid into your unsuspecting arm. From now on, you are no longer a self-controlling human. Now you belong to Bill Gates' grand army of vaccinated, compliant sheeple.

Over the last 10 years of technological innovation, there have been inventions the likes of which have never been seen before. The dark side is that these big changes are often accompanied by a lot of mistrust, which caused a significant part of the world population to believe the wild stories around vaccines. In this article the origins and hypothetical feasibility of one of the more absurd theories is investigated.

The myth originates in an interview with Bill Gates, founder of Microsoft, where he mentioned the use of "digital certificates" to store recovery, testing, and vaccination data. However, Gates never even suggested using nanobots. Unfortunately, conspiracy theorists jumped on this and referenced one year before, when the Gates' foundation funded research into a special ink, developed to store vaccination information under the skin. Of course, nanobots were not used in this approach. Ana Jaklenec, one of the leading scientists on this project, said this ink can not give access to personal information or surveillance. It could nevertheless be of great help in developing countries, where the medical systems to store such vaccination information are barely functioning.

Even if the fourth richest person in the world was plotting to design nanobots to control the world's population, would he be able to do so? Recently, nanobots which autonomously propel through human blood vessels and can capture cancer cells have been designed. By changing the attaching antibody, other cells could be targeted. This makes it a very promising technique to separate and detect certain cells. However, this is not nearly enough to control the world's population yet.

"Recently, nanobots which autonomously propel through human blood vessels and can capture cancer cells have been designed."

So did we all secretly turn into Microsoft obeying robots? For now, it is luckily impossible that there really are nanobots in the corona vaccines, which also influence your behaviour. However, it is of crucial importance to bear in mind that there are also many people who did not enjoy the amazing education we did. For them, that which they simply do not understand is scary and they are not to blame. Bridging the great gaps in our society remains of vital importance, even to the degree of saving lives, so try to be tolerant to those who disagree with the scientific consensus. For now, go to sleep in peace, knowing that there are no nanobots in your arm (yet). Or maybe that is what the nanobots want us to think...

WHEN I GROW UP I WANT TO BE

10 YEARS OF NANO

Like everybody has, I am sure you have asked yourself this question once: "*what do I want to be when I grow up?*" I wanted to become the director of the LEGO factory. I suppose I turned in a very different direction, but if you ask me now what I want to become, I would not really be able to tell you. For all of you who feel the same, here is some information about the alumni of Nanobiology.

Something you might not know is that some people get a job straight after finishing their bachelor's in Nanobiology. These jobs vary quite a bit, but you can think of some projects within bioinformatics, for example. About 5% of the students get a job straight after graduation, so the overwhelming majority does not.

About 40% to 50% of the people that graduate move on to the master's degree in Nanobiology. Since the start of Nanobiology, about 20 different master's programmes have been pursued by alumni, with popular ones including Computer Sciences (bioinformatics) and Applied Physics in Delft, or the Research Masters in Rotterdam.

Whatever master's they did, half of all people finishing the bachelor's degree in Nanobiology end up pursuing a PhD, in a range of disciplines and all over the world. But what if you do not want to do a PhD? Most of the other alumni start working in industry, ending up in many different companies. Titles they gain include analyst, consultant, or data engineer.

One thing to note is that this analysis was done by the Nanobiology programme stalking people on LinkedIn. So this does not include all alumni, but it should give a very quick overview of what people have done thus far. The options are so amazingly broad, that you can basically do whatever you want after finishing a degree in Nanobiology.

Statistically, though, you are most likely to end up pursuing a PhD.

THIS IS LOVE

BEP/MEP

Some of the labs at the TU Delft and the EMC have created a BEP/MEP dating profile on *This Is Love*. Find your match!

Timon Idema

In a BEP/MEP student, I'm looking for

Someone who is curious about how biology works, and not afraid to go down rabbit holes to satisfy that curiosity.

How I would describe myself

As someone who is passionate about science, and firmly believes that we get the best results by working together, with everybody bringing what they do best.

A fun fact about myself

While I was trained as a theoretical physicist, my father insisted on teaching me practical life skills, so I can actually fix a bike.

Gert Jansen

In a BEP/MEP student, I'm looking for

A motivated student that wants to experience working in a wet lab on a project of his/her own, using molecular cell biology and genetics to find out how biological processes/mechanisms work at the molecular level.

How I would describe myself

I'm a cell biologist that likes to use molecular genetic and imaging tools to manipulate and visualise processes to unravel molecular mechanisms. I focus on fundamental science and curiosity driven research. I'm open to new ideas and like to give the people in my lab freedom and space to explore mechanisms that interest them (although this is of course limited by the possibilities that we have in the lab).

Dealbreaker(s) for me

Dishonesty, lack of interest, feeling of superiority.

A fun fact about myself

I like worms, but only very small ones, and only for research purposes.

Dimphna Meijer

In a BEP/MEP student, I'm looking for

A talented Nanobiology student with a keen interest in neuroscience.

How I would describe myself

We are interested in how neurons form networks, especially in the process of synapse formation. We use structural biology, biophysics and quantitative cell biology methods for our research. If you want to know more: www.dimphnameijerlab.org.

A fun fact about myself

We are organizing our first lab Hackathon this year to crack a particularly difficult dataset with the whole team.

Liedewij Laan

In a BEP/MEP student, I'm looking for

Curiosity, creativity and openness to try whatever method it takes to solve a problem.

How I would describe myself

My students describe me as high energy, overly enthusiastic and supportive, but if I have to do it myself, I would say: passionate scientist studying evolutionary cell biophysics, using yeast cell polarity as a model.

A fun fact about myself

I have a twin sister (not identical).

Dik van Gent

In a BEP/MEP student, I'm looking for

A fun person that still believes he/she could be a Nobel Prize winner, but without too much self-confidence.

How I would describe myself

A biochemist almost turned into a medical doctor.

Dealbreaker(s) for me

Dishonesty (messing up an experiment and trying to cover it up or making up data without doing the experiment).

A fun fact about myself

I often end up loving things that I originally thought I would hate (e.g. I thought that I did not like teaching and now I like it so much I spend a considerable amount of time teaching and I love it).



Christos Strydis

In a BEP/MEP student, I'm looking for
A sexy brain and a solid ethos.

How I would describe myself

Multidisciplinary lab of scientific misfits from all walks of life, packing a hippie attitude and diverse top-notch research interests ranging from high-performance scientific computing for the brain to brain functional dynamics to next-generation neural implants and live-brain imaging. We tango comfortably with academic as well as industrial partners and revel in international synergies. www.neurocomputinglab.com.

Dealbreaker(s) for me

Willingly ego-tripping.

A fun fact about myself

If I try hard, I can sneeze without blinking.

Jeroen Kalkman

In a BEP/MEP student, I'm looking for
Someone who is eager to learn about the physics of imaging systems and likes to work in a team.

How I would describe myself

I am a sociable associate professor with a passion for physics and numerical modelling.

Dealbreaker(s) for me

Not being able to communicate.

A fun fact about myself

Funny enough, I don't know any fun things about myself.

Kristin Grußmayer

In a BEP/MEP student, I'm looking for
Enthusiasm and curiosity for microscopy and image analysis!

How I would describe myself

A young and multidisciplinary lab keen to advance quantitative & super-resolution microscopy. We want to solve fundamental problems in cell biology like protein aggregation in neurodegenerative disease.

A fun fact about myself

We are 6 people and together speak 10 different languages. Want to throw another one in the mix?

Bernd Rieger

In a BEP/MEP student, I'm looking for

Someone who likes to work more on the physics side of Nanobiology. Students should like to puzzle out problems, be curious.

How I would describe myself

We offer 1) experimental work on optical table; designing, building and characterisation of microscope setups, 2) simulation work for single molecule localization microscopy & image analysis problems, 3) theoretical work; working out fundamental imaging limits and analyzing methods that circumvent these limits.

Dealbreaker(s) for me

Saying yes, yes, but either not agreeing or not understanding. Not being committed to your work/education.

A fun fact about myself

I am a funny German.

Jeroen Demmers

In a BEP/MEP student, I'm looking for

Someone who wants to join us on our journey to identify proteins in extremely small sample amounts like single cells. The ideal candidate should share our passion for proteins, mass spectrometers and data analysis. The candidate is nice and friendly, but if necessary should be able to exert some aggression and tear proteins apart in peptides or even individual amino acids. Sounds good to you? Swipe right!

How I would describe myself

The lab has a no-nonsense mentality, with no false romantic atmosphere. If you have a soft spot for nerdy guys & girls, you've come to the right place. We get really excited by the perfectly shaped Gaussian peak in a mass spectrum or the shiny steel rod of a quadrupole.

Dealbreaker(s) for me

Though we are protein aficionados, taking protein supplements in the gym is an absolute no-go. Also, if you have no pleasure in learning the amino acid residual masses by heart together late at night under fluorescent lights, we should split the bill and go our separate ways.

A fun fact about myself

I once said mass spectroscopy instead of mass spectrometry. That was so embarrassing...

NOT SO RANDI

NIGEL JANSEN

Do you have a GPA of 8.1? Thinking about joining the honours program? Do you think vanilla study life is actually rather boring? Would you rather become an archetype of alternative success? Then this is the right place for you! Here are the five dos and don'ts to completely mess up Nanobiology.

DOS



DON'TS



Visit the Buddha whenever you have ten minutes to spare (possibilities include: before a lecture, in the lunch break, and on your way home).

Fail Labcourse three years in a row. There are several ways to do this. If you need tips, or maybe have suggestions yourself, contact me!



Rage quit Electronic Instrumentation after finishing 70% of the practicals.

Tell yourself, at the start of each course you are taking for the Xth time: *"This time, I will actively follow the course and be well prepared for the exam"*.



Be the joker! Laugh all your struggles away, especially if someone offers you a helping hand. You have no problems! You are the light of the party and don't really care at all about your stalling progress in your study and life in general.

**Substance X is potassium permanganate*



Don't sleep more than five hours per day on average because you are too busy with the SOS. You can sleep during lectures anyway.

Don't plan anything. Better yet, don't even keep an agenda.



Don't take any exam you are "not well enough prepared for", since you are afraid of failure.

Don't actively follow courses and be well prepared for exams, as you are completely occupied with other "stuff". With the exam week approaching, refer to the third don't: fail the courses without any stress!



Don't hold yourself accountable for anything that goes wrong in your life. Especially don't reflect on the past times and think of a solution to break the downward spiral you are obviously finding yourself in. Better yet, make your current lifestyle even more extreme to ensure a maximum decay of ambitions, social contact and mental health!



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GETINGE 

With a strong belief that everyone should have access to the best possible healthcare, Getinge offers hospitals, life science companies and institutions, products and solutions to optimize their clinical outcomes and workflows. Getinge has more than 10,000 employees worldwide and sells its products in more than 135 countries.

The Getinge Applikon production site is located in Delft (NL), where advanced bioreactor systems from laboratory to pilot and production scale are developed and produced. We support the pharmaceutical industry (vaccines, regenerative drugs, antibodies, body tissues, biopharmaceuticals and biosimilars) as well as industrial microbiology (enzymes, food & beverage, nutraceuticals, biofuels, biochemicals and bio-plastics) in their upstream process. In doing so, we offer reliable solutions that make it possible to save lives.



Knowledge, skills, and experience

We are constantly looking for candidates with a completed education at the Dutch HBO, University Bachelor or Master level in the field of microbiology and/or bio or process technology, automation engineering or technical informatics. You also have a commercial attitude and affinity with biotechnology and its overall product range. You have good communication skills and excellent commercial resilience. Command of the English language is required in order to be able to perform this function properly. Finally, you are in possession of a Dutch B driving license and you are willing to travel.

Our offer

Working at Getinge means above all that you see yourself in our "Passion for Life" mission. It gives you the opportunity to make an active contribution to our core values: Passion, Collaboration, Openness, Excellence and Ownership. Our organization strives to develop our employees and offer them a career opportunity. The work culture is informal and transparent. You will work in a dynamic environment within a rapidly growing international organization with extensive room for ideas and initiatives. If you are interested, please send your application, internship or research request to hr.applikon@getinge.com or scan the QR code for our current vacancies and enter 'Delft' at the location field.



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GETINGE 



UPCOMING ACTIVITIES

HOOKE AGENDA

Applied Sciences Green Week	19-25 April
Clothes Swap	19 April
Vegan cooking class and dinner	20 April
Sustainability Symposium	21 April
Half Lustrum Gala	22 April
Green Team Pubquiz	25 April
GMA 4	28 April

Multiple Day Excursion	6-8 May
Wellbeing lunch lecture	9 May
Committee night	9 May
Wellbeing Day Rotterdam	22 May
LaTeX workshop	25 May
Kinecie rally weekend	26-28 May

For 3rd years and up: if you want to keep receiving the mRNA, scan the QR code.



