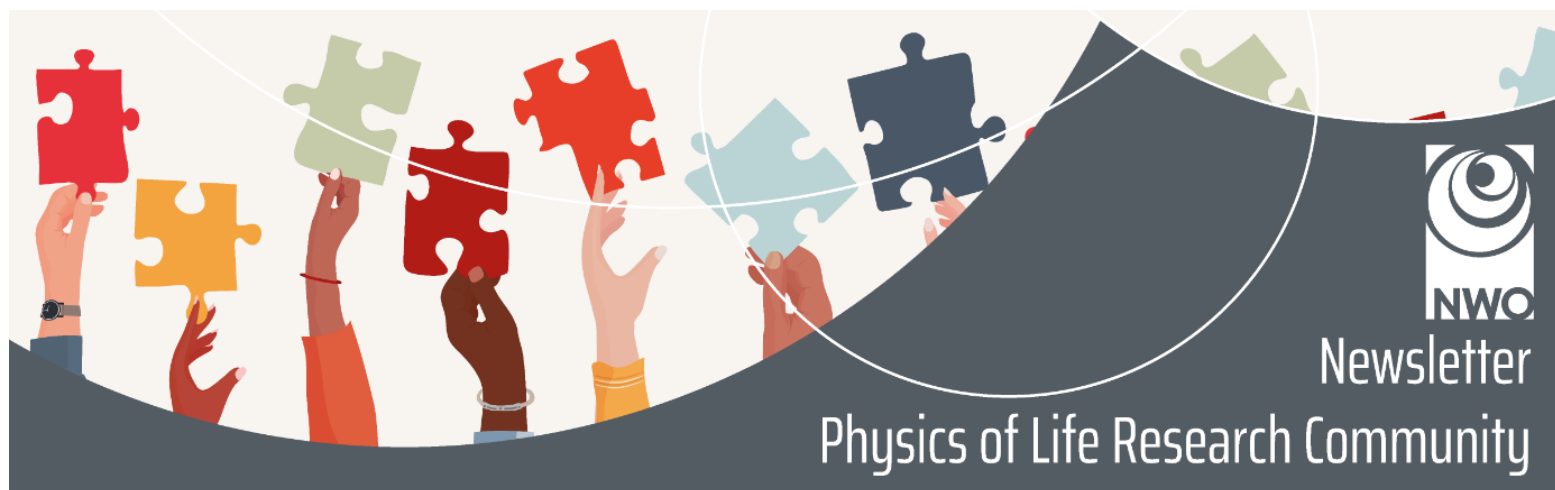




Newsletter Physics of Life Research Community

15 December 2023

Dear registered members of the research community physics of life,  
Please find below our December newsletter. We look back at a successful group leader meeting during NWO Biophysics and our first community event: the PoL seminar series. For you POL colleagues to receive future newsletters and event invitations please point out to them that this community exists and that they can register, without further obligations, here:

<https://www.nwo.nl/en/register-for-research-community-for-physics>

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Best regards,

on behalf of the PoL advisory committee,

Kristina Ganzinger (AMOLF) and Naomi Chrispijn (NWO, Dutch Research Council)



#### NWO Physics of Life advisory committee:

Chair: Dr. Kristina Ganzinger (AMOLF)

Vice-chair: Dr. Greg Stephens (VU)

Prof. Alessandra Cambi (RUMC)

Prof. Lukas Kapitein (UU)

Dr. Mattijs de Groot (LUMICKS)

Dr. Nicholas Kurniawan (TU/e)

Prof. Peter Peters (MU)

Dr. Sonja Schmid (WUR)

Dr. Rifka Vlijm (RUG)

Secretary: Dr. Naomi Chrispijn (NWO)



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**Team**  
NWO Domain Science

## Physics of life group leader meeting at NWO Biophysics

During NWO Biophysics, the physics of life (PoL) advisory committee has organised its yearly assembly for group leaders.

We got information about the advisory structure of NWO, explained by the Domain Science Board member Ferdinand Grozema and new PIs got the opportunity to introduce themselves.



During the group leader session at NWO Biophysics, we asked you, the community members, for input on what to act upon in the upcoming year(s). As advisory committee, we can give unsolicited advice to the Round Table Physics, which could bring it forward to the NWO Domain Science (ENW). We received a plethora of suggestions and also compliments, and would like to thank all of you who take part in the lively discussion. Below, we will give you a summary including our priorities and where your additional feedback can be of great use.

### Funding

Budget at NWO has increased over the last years (inflation corrected) and at the moment, for future calls discussions are still ongoing on how to further increase the budget. Recently the amounts of Veni and Vidi grants were increased ([link to news item](#)). Note that majority of the ENW budget is earmarked for specific programs, and we are neither in the position to e.g. suggest changes regarding how the money is distributed amongst different research fields nor across the different types of projects. In our community, a sense exists that too much money goes to grants related to PPP (public-private partnerships: collaborations with industry) and that there are too many PIs applying for the same grants, more so than in the past. We will look into this in further detail and try to get more insight whether this statement is well-founded before taking any action. As a committee though, we do share the impression that the number of PIs is out of balance to the available budget in the 2nd money stream. We intent to raise this issue (e.g. at the Round Table Physics), whenever there will be an opportunity to do so. Budget wise WGC-PoL also questions the current way our government divides the available budget for science (e.g. via EZK/OCW). If you have a well-founded opinion on this matter, we would be very happy to hear about it.

Another suggestion was to organise a workshop about (collaborative) funding opportunities and potentially with a focus on junior PIs. We would be happy to hear more opinions on this suggestions: what exactly could be useful for the community, and to what extent would such a workshop be specifically for our research field?

### Community building

It was indicated that the NWO Biophysics conference, the PoL newsletter, the PoL group leader session and the re-initiation of the seminar series was very much appreciated. The community also indicated that over the last years, many key aspects have more or less remained and that is great! We would like to stress, as advisory committee, that if you have any suggestions, you can always contact us.

### Recognition and reward

Concerns were raised regarding the narrative CV. At this stage we would like to wait as the evidence-based CV is currently further developed. A working group with chairs of different Round Tables, thus different disciplines, is also giving advice to the executive board of NWO. We will keep you updated on any evaluation and further developments.

Slides of the presentation, 9 October 2023, can be found [here](#)

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## Physics of life seminar series 30 November, De Waag Amsterdam

30 November the first edition after the re-initiation of the seminar series took place in the Waag Amsterdam. We were very happy that Marianne Bauer (TUD) and Siddharth Deshpande (WUR) volunteered to be involved in the organisation of this seminar.

Before the seminar PIs had the opportunity to attend the joint lunch at the restaurant next door and we received many positive responses to the seminar. We had talks by Ray Goldstein (Cambridge University) and Jorine Eeftens (RU) and by PhD students from the Jalaal lab, Tans lab, Deshpande lab. The talks spanned a wide spectrum of interesting science: The three PhDs beautifully showcased the biophysics efforts across the country, from chloroplast dynamics in response to light, single molecule studies to understand protein folding, to phase transitions of proteins from tick saliva. Jorine delivered an engaging story on how her lab wishes to capture chromosome-condensate dynamics *in vivo*. Ray's plenary lecture was a true masterclass in every sense, from understanding the evolution of multicellularity with *Volvox* as the model system, his philosophical take on how to do science and the sheer humour that made the talk so entertaining. With 50 participants, lots of networking took place and there was a great atmosphere to discuss science. The next edition of the seminar series will take place in Utrecht. More information will follow.



## Changes in the composition of the advisory committee physics of life (2024 onwards)

Sonja Schmid and Peter Peters will resign from the advisory committee at the end of this month. We are happy to announce that three colleagues have accepted our invitation to join the committee: Dr. Kristin Größmayer (TUD), Dr. Johannes Hohlbein (WUR), Prof. Dr. Remus Dame (LEI). In selecting these new members, the committee paid attention to both a good balance between the various institutes and universities and a good balance between gender, seniority, and the representation of the entire POL field.

## News from the advisory committee physics of life

The PoL advisory committee ("werkgemeenschapcommissie") has the formal role of advising the Round Table Physics (RTP) on aspects of the NWO research landscape related to physics of life. One of our primary tasks is to act as an interface to those working in fields related to PoL: engaging you, listening to how things are going with you, and on the basis of this, make recommendations to the RTP, who then can make recommendations to the Board of NWO Domain Science. The RTP expects us to have an overview of what is going on in the field of PoL and be able to advise them on things that come down from the NWO organization on what is important for our field. At the same time, we can provide advice to the RTP based on what we hear from you.

Kristina Ganzinger, chair of the advisory committee POL, has a seat in the RTP. The RTP meets six times a year. Relevant news from the RTP and the strategy day in November include NWO's planned pilot participation in WEAVE. WEAVE is a bottom-up, cross-European initiative developed by European research funders to support excellent collaborative research projects across borders. It aims to simplify the submission and selection procedures of collaborative research proposals that involve researchers from up to three European countries or regions. It does this by making proposals go through a single evaluation procedure while in the end, each researcher is funded by their own national funding agency (see also <https://weave-research.net/>). This pilot would enable bilateral international collaborations with researchers eligible to submit to FWO (Flanders) and DFG (Germany). The Open Competition M seems to be the most appropriate ENW instrument for this pilot. NWO has recently started the first phase of the project in which an exploration of open competition instruments at FWO and DFG is being carried out.

We also want to highlight that there is already the possibility to use the module "Money follow Cooperation" in NWO-proposals. The Money Follows Cooperation option has been implemented as a budget module in almost all NWO funding instruments. Especially OC ENW XL and M2-proposals could be of interest to you if you want to set-up a cross-border collaboration with someone who has expertise that is not available in the Netherlands. The requested budget in the Money Follows Cooperation module may be up to fifty per cent of the total requested budget. [Read more >](#)

## New appointments, grants, prizes, and other news

- Oncode Institute expands with ten talented Junior Investigators, amongst which are physics of life community members Kristina Ganzinger (AMOLF), Maïke Hansen (Radboud University), Danny Sahtoe (Hubrecht Institute) [Read more >](#)
- Chase Broedersz (VU) received an ERC consolidator grant for the project Learn4D: Chromosome Learning the dynamic statistical folding of bacterial chromosomes.
- The European ERA4Health partnership has published its call for proposals for research into nano and advanced technologies for disease prevention, diagnostic and therapy (NANOTECMEC). A total budget of 2.6 million euros is available for Dutch researchers at universities or academic hospitals working in international consortia. [Read more >](#)
- As of January 1, 2024, Gary Steele (TUD) will become the new chair of the Round Table Physics. He is already a member of this advisory table. Two new members will join the Round Table: Koenraad Schalm (LEI) and Peter Thüne (Fontys University of Applied Sciences/ DIFFER). [Read more >](#)
- The report 'Analysis of the Dutch participation in international research infrastructures' prepared by NWO, in cooperation with the field has recently been published. The report was produced through fact finding and after extensive consultation with the Dutch scientific community. The Advisory committee physics of life has also provided input for this in 2022 and during the Round Table strategy day (6 Nov 2023) the members of the different Round Tables were informed about the report. [Read more >](#)

## Physics of life website

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|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>Vacancies</b><br>Looking for a job in biophysics or want to advertise your vacancies? Fill out the data and we will include it on the online vacancy board <a href="https://nwobiophysics.nl/vacancies">here: https://nwobiophysics.nl/vacancies</a>                                                                                              |
|  | <b>Calendar</b><br>Looking for an interesting conference or talks at local colloquium? Check out the calendar. Are you organising a meeting of interest for the PoL community and would you like to have it included in the PoL calendar? Submit the details <a href="https://nwobiophysics.nl/calendar">here: https://nwobiophysics.nl/calendar</a> |

## Projects granted by NWO



The projects listed are the projects granted by NWO that have a connection with Physics of Life. Please follow the links for full granting information.

### Open Competition M

[Read more >](#)

#### Location, location, location - how inhibitory immune receptors initiate and relay their signals to dampen activation

*Prof. dr. Linde Meyaard & Dr Kristina Ganzinger (UMCU/AMOLF)*

A healthy immune system clears microbes without damaging the body. For this purpose, immune cells are regulated by inhibitory receptors that serve as a break on activation. The exact mechanism of how inhibitory signals are sensed by immune cells and how this can dampen many different activation signals is not understood. In this project, immunologists team up with biophysicists to visualize and follow individual receptors in immune cells using a very powerful microscope. In this way, the fundamentals of inhibitory signalling will be resolved, which will support development of drugs that target inhibitory receptors in cancer and inflammation.

## Open Competition XS

[Read more >](#)

### **Shape-shifters: DNA nanoactuators to identify circulating tumor DNA via nanomotion imaging.**

*Dr. Sabina Caneva (TUD)*

The exquisite programmability and precise self-assembly of DNA origami nanostructures gives this class of materials excellent nanoscale functionality. We will design a novel type of DNA origami nanoactuators that change shape in response to specifically binding circulating tumor DNA (ctDNA) molecules. Using super-resolution imaging techniques we will track the motions of the DNA origami arrays with ultrahigh spatial resolution (<10 nm) and visualize the 'open' (ctDNA not attached) or 'closed' (ctDNA attached) state of the origami structures. Automated screening of such large DNA origami arrays can be of high clinical importance in monitoring cancer treatment and progression.

### **Controlling and Visualising Protein-protein Interactions in Real-time.**

*Prof. dr. A.I. Guskov (RUG)*

The interaction of cell receptors with certain proteins provides essential information to the cell about how to respond when faced with environmental changes. The malfunction of these interactions and the regulatory abilities of receptors can result in cancers, chronic pain and tumor recurrence. Relatively little is known about the structure of cell receptors interacting with other proteins - gaining such information would enable control over when and which signals are transmitted to the cell. Using molecular "glue" and a synthetic cell, we will force these receptor-protein interactions to occur and capture the structures responsible for cellular life and death.

### **Surface-roaming ligands for biomimetic shape modulation.**

*Dr. Wei Li (RU)*

Cells, the fundamental unit of life, need to constantly modulate their shapes for movement, growth, and reproduction. The precise modulation relies on the dynamic recruitment and organization of numerous proteins on the cellular membrane, making it a great challenge to emulate in artificial systems. Here, we aim to mimic this shape modulation using synthetic surface-roaming ligands (SRL), instead of intricate proteins, by exploring their triggerable aggregation behavior on the vesicular membrane. This research will take us a step closer to synthetic cells that can move and forage and contribute to the design of next-generation drug carriers for precise therapy.

### **Molecular-level screening of the killing mechanism of membrane-active antibiotics.** *Dr. Sourav Maity ( RUG)*

Antimicrobial resistance (AMR) is one of the highest concerns in modern health care. While potential new drugs are reported regularly, only a few reach the clinical trial state after years of preclinical testing. Therefore, increasing the preclinical screening efficiency and designing more efficient drugs are of utmost importance to combat AMR. One way to deal with this is to understand the fundamental mode of action of these potential drugs at the molecular level. In the present proposal, I will build a methodology that will provide such information and help pharmaceutical research in screening and designing more efficient drugs.

### **Tighten the link: Targeting inter-macrophage junctions to fight tuberculosis.**

*Dr. Alireza Mashaghi Tabari (LEI)*

In tuberculosis, immune cells known as macrophages encircle the infection site, creating a granuloma—a localized "prison" that traps bacteria and prevents their escape. However, these immune cells fail to eliminate the bacteria. This leaves room for potential escape: if bacteria kill macrophages, creating a hole in the granuloma, or if a macrophage turns into a traitor by carrying live bacteria out of the granuloma, infecting the body. Considering this, we speculate whether strengthening the adhesive between macrophages could halt these escapes. This novel approach could revolutionize tuberculosis management.

### **3D printing of building materials produced by bacteria.**

*Dr. Kui Yu (TUD)*

The houses we live in are generally made of rebar reinforced cement, which requires extremely high temperatures and complicated steps to produce. To better control the energy consumption and reduce environmental pollution, a sustainable processing method for the production of next-generation building materials is needed. For inspiration we turn to bacteria, which secrete various enzymes that promote chemical reactions in mild conditions, producing organic fibers and inorganic materials at lower, sustainable temperatures. We aim to use a combination of 3D printing techniques and bacterially-induced biomineralization methods to produce strong, tough, and sustainable building materials.

## Take Off

[Read more >](#)

## ARTIC – Magnetic artificial cilia integrated modules enhancing life science applications

prof. dr. ir. Jaap den Toonder (TU/e)

Currently, 90% of drugs fail to pass clinical trials. Organ-on-a-chip (OoC) is an approach where microfluidic chips are used to test drugs on human tissues. OoC has proven to predict drug safety and efficacy better than animals and other traditional preclinical models. However, industry adoption of OoCs is still very limited. One main reason is that scientists have to choose between either a system with physiologically relevant flow but not fit for pharmaceutical procedures (e.g. automation, reliability, and reproducibility), or the other way around. To accelerate industry adoption of OoC, we introduce a new pumping technology that meets both criteria.

## Bio sketches

This publication is a combined publication with the mini-profiles of the Tych lab blog: <https://www.ktsinglemolecule.com/blog>  
Do you want to introduce yourself? Contact us via [email](#). We aim to put every newsletter two PIs in the spotlight, of which one is (relatively) new and one more established.

### Agathe Chaigne (UU)

**Job title:** Assistant Professor

**Subject area:** I study the diversity of cell division mechanisms, with a particular focus on cytokinesis, during development.



#### How did you get into science?

I liked science so that was my main focus in high school. When I was a kid, I read a series of books about doctors without borders, but at that some point I realized that I was not sure I could emotionally handle being a doctor so I went towards fundamental scientific training instead.

#### Where else have you worked/studied?

I did my PhD in Paris and my postdoc in London. Throughout my studies I wanted to explore various aspects of science, so I have a journalism degree and a teaching degree on top of my PhD. Because I like languages, I got a bachelor in Chinese language and literature during my second year of PhD (I studied mandarin in high school).

#### What are your hobbies/what do you do for fun?

I play ice hockey! I started that during my postdoc in London, so I am fairly terrible at it but it's extremely fun and it's a great way to exercise and disconnect from work. I have two young kids so the rest of my free time is very much around them.

#### Could you share some tips and tricks for someone thinking about pursuing a career in science in academia?

I don't think there is one path to science or academia, so I tend to cater my advice to specific situations. In my experience, people tend to project their individual success as the ultimate tip to success. But if I had to give general advice, it would be to surround yourself with people you are excited to work with, scientifically and personally.

#### Who are your scientific role models?

I'm not a huge fan of the concept of role models. I don't think science is made by one smarter individual; I think science is made by the sum of the hard works of thousands of people. So, I think my role models are all my colleagues that work hard every day in the face of failed PCRs and dead cells.

#### What does your working area (desk, office) look like and what does it say about you?

I think my office reflects that I think personal connections are important in and out of the lab. It is full of presents, jokes and memories from various people (from the big fluffy croissant with a beret that my lab got me for my birthday to tea and plants offered by friends).

### Cees Dekker (TUD)

**Job title:** Distinguished University Professor (Universiteitshoogleraar) at Delft University of Technology

**Subject area:** Nanobiology and single-molecule biophysics

**How did you get into science?** I am by nature very curious and interested in just about everything. I was that teenager boy who would ponder the big philosophical questions, puzzling about those in his attic room at night. Studying science was a great way to learn much more about the natural world, which is why I embarked on studying physics. That path led to more and more experimental physics and a PhD in solid-state physics (on spin glasses). At the end of my PhD, I had the luxury of various options to work in industry or academia. I chose the latter because of the wonderful opportunities to further explore the world.

**Where else have you worked/studied?** I studied at Utrecht where I also did my PhD. Right after that I started an assistant professorship at the same University, working on quantum effects in semiconductors, but soon thereafter I spent 1.5 years on a sabbatical in IBM Yorktown Heights, just above New York City. Together with Bell Labs, this was one of the most vibrant scientific places at that time, and I worked here with leading scientists on superconductors. In 1993, I moved to TU Delft as an associate professor. Here I started entirely new research lines in molecular electronics. One of these lines, on carbon nanotubes, was hugely successful, as we became the first in the world to measure electrical conduction through a single molecule, and to even develop a single-molecule transistor from that. At the end of the 1990s this work had yielded a range of interesting discoveries, and I became full professor.

At the point in time, I was 40 years old and was thinking about next challenges. I decided that I didn't want to develop a longer-term research program in molecular electronics, but instead wanted to explore new fields. I had become intrigued by molecular motor proteins - peptide wires that fold themselves into a protein that can perform mechanical work (walk, rotate,...) by burning fuel molecules. And nanotechnology - with which I was already working - provided tools to measure on such individual proteins. So I quite radically changed my research to single-molecule biophysics, starting to read standard textbooks on molecular biology and changing the lab infrastructure from mK electronic devices in UHV to room-temperature scanning probe setups and lasers. Since then, I have greatly enjoyed working in biophysics, learning so many new things. Currently we develop nanopore technology to sequence single proteins, we discover the basic motors that shape our chromosomes, and we are making first steps to build synthetic cells from molecular components.

**What are your hobbies/what do you do for fun?** I have a lot of energy and do a zillion things outside science as well. I spend time with friends and with my family, my wife, children and even grandchildren now. I am active in a church, as part of the leadership of a new church in Rotterdam (now with 700 members after 1.5 years), where I also play guitar and electric bass on Sundays. For all my life I have played music, mostly bluegrass music where I play contrabass, dobro, and guitar. I was part of various bands but nowadays mostly play this music at a number of festivals where you will see me playing music continuously in jam sessions. I also read a lot of books. Given that I am christian and a scientist, people do wonder how I combine that (I actually feel that faith and science go together harmoniously), so I also wrote a number of books on that relationship (even a children book!), and occasionally get interviewed on that in newspapers.



**Could you share some tips and tricks for someone thinking about pursuing a career in science in academia?** It's a bit cliché but I'd like to say: follow your heart. There will always be more or less funding opportunities, but I would advise to not set your agenda based on that but to pursue in the first place what really excites you. A career in academia can be very fulfilling in many aspects - the joy of the intellectual challenges, the freedom of independently making your own choices, the international network, and the daily contacts with students which keeps you young (even if you yourself become 60+).

**Who are your scientific role models?** I met (and meet) many inspiring people in the sciences. One of the most impressive scientists that I met was Rick Smalley, a chemist at Rice who I collaborated with on carbon nanotubes. What particularly impressed me was his critical questions and his sharp eye for what was the most important science to explore. A few years after we met, he

won the Nobel Prize. In the Netherlands I like to mention Hans Mooij as a scientific role model. Quite on his own, in a modest place (the Technische Hogeschool Delft), he built a very original line of research (mesoscopic physics) that became the international top. And in doing so, he attracted and mentored young talent. What I learned from him was to think about the questions of tomorrow, or actually the day after tomorrow. Don't follow the trends but set and define a field if necessary.

**What does your working area (desk, office) look like and what does it say about you?** Nice question. Here's a few thing I notice in my office: a colorful large book cabinet, plants in the windows, a central table with red chairs and a screen for all the zooms, a large white wall that is fully covered in scribbles, a desk (okay-ishly clean but with some paper piles here and there) with a large screen for those 100+ emails every day. What does that say about me? Don't know, but perhaps that I am quite organized but open to colors and surprises. And that much of my understanding comes from visualizing things in scribbles on a whiteboard during discussions with my lab members.

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## Contact

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Do you have a news flash or research highlight interesting for the Dutch PoL community that you would like to add to the PoL newsletter? Send us an email.

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