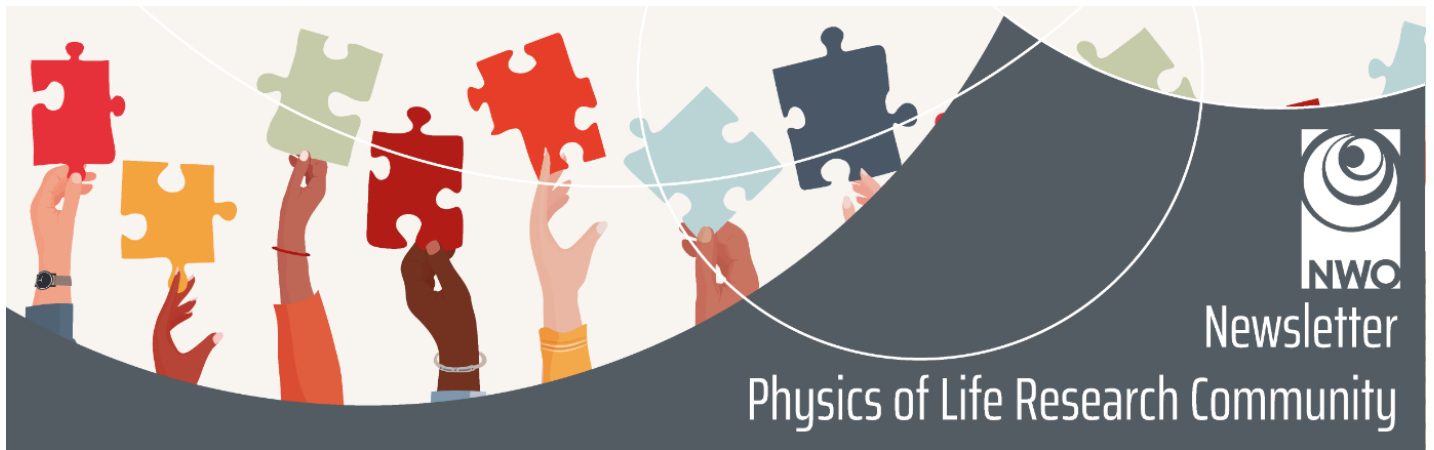




Newsletter Physics of Life Research Community
29 May 2024

Dear registered members of the research community physics of life,

Please find below our Q2 newsletter of 2024. It contains information on the upcoming events and includes some relevant updates on research policy. We are eager to hear about any suggestions you may have, and we look forward to meeting you at our assemblies.

Please spread the word about our community with all your POL colleagues! They will receive future newsletters and event invitations by registering, without any obligations, following this link:

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

Content of this newsletter:

- News from the advisory committee and the Round Table Physics
- New appointments, grants, prizes, and other news
- Physics of life calendar
- Projects granted by NWO
- Bio sketches by Nikolina Šoštarić (TUD) and Nicholas Kurniawan (TU/e)

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)
Dr. Johannes Hohlbein (WUR)
Dr. Kristin Größmayer (TUD)
Prof. Lukas Kapitein (UU)
Dr. Mattijs de Groot (LUMICKS)
Dr. Nicholas Kurniawan (TU/e)
Prof. Remus Dame (LEI)
Dr. Rifka Vlijm (RUG)
Secretary: Dr. Naomi Chrispijn (NWO)

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Team
NWO Domain Science

News from the advisory committee physics of life and the Round Table Physics

In the afternoon of 7 October 2024, the advisory committee will organise its annual group leader session including plenty of opportunity to network. We are currently shaping the programme, so if you have any suggestions, let us know before 1 July.

Our chair (Kristina Ganzinger) is a member of the Round Table Physics (RTP). Of course, there are many more stakeholders in the Dutch Physics landscape than the RTP (the Dutch Physics Council), and the role of each of these stakeholders and how they relate to each other can be not immediately obvious. To help people navigate this landscape, an infographic has been prepared to illustrate how the physics field is organised, who the relevant stakeholders are, and what their roles are including the relationship to each other. The infographic can be found [here](#) and [here](#). The physics advisory committees including us and the RTP have been asked by NWO for input for further improvement.

Further items discussed recently at the Round Table Physics (RTP) that are relevant to our community are listed in the section below under 'New appointments, grants, prizes, and other news'.

In general, we try to make sure you receive useful and, more importantly, relevant information from NWO in a timely and organized manner. However, we heard signals that the information exchange between NWO and 'the physics field' should be improved. We are wondering whether you as a physics of life community member experience it the same way and if yes, what you would like us to do as your representatives. Suggestions can be shared with one of the committee members e.g. via email or during one of the assemblies we are organising, including the NWO Physics of Life Seminars and the group leader session at NWO Biophysics.

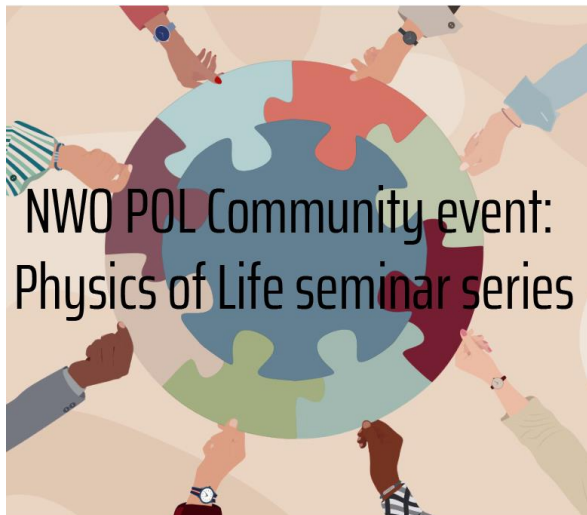
New appointments, grants, prizes, and other news

- Join the collaborative workshop for the NWA-ORC theme 'The quantum / nanorevolution' on **5 and 18 June** at the Jaarbeurs Utrecht. The workshops will introduce you to researchers and parties interested in a particular theme and give you a chance to explore opportunities to combine research ideas. [Read more >](#)
- Do you want to bring more physics of life research into the programme of NWO Physics? This is your chance! The call for focus session suggestions NWO Physics 2025 is open until Monday **10 June**. In a focus session, multiple invited speakers offer a cohesive overview of innovative and topical research on a focused (interdisciplinary) theme. The focus session should not be too specialised, but at the same time it should not span an entire research field. [Read more >](#)
- The Royal Netherlands Academy of Arts and Sciences (KNAW) has selected 17 new members in 2024. These include Gijsje Koenderink (TUD). The Academy's approximately 600 members are leading scientists and scholars active in every discipline. Membership is for life. The new members will be installed on Monday 30 September. [Read more >](#)
- The ERC has announced the names of the outstanding research leaders in Europe set to be awarded **ERC Advanced Grants**. The funding is amongst the EU's most prestigious and competitive, providing leading senior researchers with the opportunity to pursue ambitious, curiosity-driven projects that could lead to major scientific breakthroughs. Researchers based in the Netherlands who received this an ERC Advanced-grant include **Johannes de Boer** (VU), project: In vivo Immunofluorescence Optical Coherence Tomography, **Roberta Croce** (VU), Photosynthesis in far-red: from cyanobacteria to plants, **Jos Malda** (UMCU), project: Restoring the structural collagen network in the regeneration of cartilage, **Jan van Hest** (TU/e) project: Protein-regulated artificial cell populations and tissues, and **Albert Heck** (UU), project: REVisiting Antibody structures and repertoires through advances in Mass spectrometry and Proteomics. [Read more >](#)
- The Raymond and Beverly Sackler International Prize in Biophysics for the Year 2024 go to Cees Dekker (TUD), Leonid Mirny (MIT), and Petra Schille (MPI Biochemistry) [Read more >](#)
- Starting with the 2025 round, NWO is going to distribute the extra available budget (37.5 million euros) in the NWO Talent Programme differently across the domains than in previous rounds: From the new round on, the demand for research funding will determine the distribution of the money per science domain, in combination with the quality of research. [Read more >](#)

- NWO has assigned eight applications for Computing Time on the National Computer Facilities. RUG researchers Siewert-Jan Marrink and Patrick Onck both are granted time on Snellius for their projects 'Multiscale simulations of (bio)matter' and 'Ultrafast molecular dynamics of phase transitions in FG-Nup condensates' respectively. Are you also interested in using Computing Time on National Computing Facilities? [Read more >](#)
 - Interested in joining a selection committee/jury? NWO is always on the lookout for enthusiastic mid-level and senior researchers interested in joining a selection committee or jury. [Read more >](#)
 - A major change will be introduced to the set-up of the OC ENW M-invest for next round of Open Competition Domain Science-M (2024-2025). M-invest, the investment-only option, will no longer be available. Instead, researchers will have the opportunity to apply for a maximum investment of € 500,000 in addition to an M-1 application. The maximum budget for such a combined application (1 scientific position plus investment) will be € 800,000. [Read more >](#)
-

Register yourself for the NWO Physics of Life seminar series and the PI lunch with Erik van Nimwegen

In 4 weeks, the POL community will gather again for their seminar series. This time we will meet at **NWO Utrecht**. Make sure you register in time, as the capacity of the venue is limited. **For PIs there is the opportunity to join a lunch right before the seminar.**



26 June 2024

Talks by:

- [Erik van Nimwegen](#) (University of Basel)
- Maike Hansen (RU)
- Benjamin Planterose Jiminez (Tsingos/Ten Tusscher lab, UU)
- Age Tjalma (Ten Wolde lab, AMOLF)
- Carolien Bastiaansen (Choo lab, TUD)

More info and registration:

<https://www.nwobiophysics.nl/nwo-pol-community-event>

Organisation:

Marianne Bauer (TUD), Siddharth Deshpande (WUR), and Florian Berger (UU), Naomi Chrispijn (NWO).

We're also happy to announce that we already set a date and location for our next POL seminar in the autumn: **28 November 2024, at the KNAW, Trippenhuis, Amsterdam.**



Keynote speakers

- **Tanja Mittag** (St. Jude Children's Research Hospital, USA)
- **Rob Philips** (California Institute of Technology)

Plenary speakers

- **Adam Ezra Cohen** (Harvard)
- **Cees Dekker** (TU Delft)
- **Karen Alim** (Technical University of Munich)
- **Tzviya Zeev Ben Mordehai** (Utrecht University)
- **Uulke van der Heide** (Netherlands Cancer Institute)
- **Yasmine Meroz** (Tel Aviv University)

NWO Biophysics 2024 will take place at NH Koningshof Veldhoven on 7 & 8 October. Expect an exciting programme filled with various renowned speakers, interactive sessions and plenty of networking opportunities with other biophysicists. Please visit the website for information on the keynote and plenary speakers. <https://www.nwobiophysics.nl/>

Would you also like to contribute to NWO Biophysics? Abstract for oral presentations are accepted until **30 May**, the deadline for poster abstract submissions is **5 September**. More details: <https://www.nwobiophysics.nl/abstracts>.

The advisory committee physics of life will also organise their annual group leader session during NWO Biophysics. The committee is currently shaping the programme, so if you have any suggestions, please get in touch, preferably before 1 July, so we can try to incorporate it! We hope to see many of you there to connect with us.



Help your fellow biophysicists to be aware of the interesting conferences available.

Submit information on conferences, symposia, colloquiums etc. via <https://nwobiophysics.nl/calendar>

The picture is a screenshot of the longlist of calendar items listed on our website.

TheoryXperiment Meeting  (Utrecht)	7 June 2024	A meeting to cultivate and celebrate the collaboration between theoretical and experimental research.
3rd MOSBRI conference  (Ljubljana, Slovenia)	10 - 13 June 2024	Molecular-scale Biophysics Research Infrastructure: strengthen the connection within a wider community of researchers in structural biology, biochemistry, synthetic biology and biophysics.
European Joint Theory/Experiment Meeting on Membranes  (Debrecen, Hungary)	12 - 14 June 2024	Topical conference covering membrane-related problems from the standpoint of structural, computational and cell biological research.
Chromatin dynamics and nuclear organization in genome maintenance  (Leiden)	17 - 20 June 2024	EMBO Workshop
Han-sur-Lesse Winterschool  (in summer) on Soft Matter and Biological Physics	17 - 21 June 2024	The 32nd Han-sur-Lesse winterschool (in summer) on Soft Matter and Biological Physics has a long tradition of training PhD candidates/postdocs in the basics of statics and dynamical aspects of soft matter and biophysics theory and applications.
Diversity and Evolution in Cell Biology  (Spain)	24 - 27 June 2024	This meeting aims to bring together evolutionary biologists and cell biologists investigating diverse aspects of cellular physiology, traversing both spatial scales and evolutionary time.
EUROMAR 2024  (Bilbao, ES)	30 June - 4 July 2024	The 20th European Magnetic Resonance Congress.
Summer School on Molecular Dynamics for Material Science, Nanotechnology and Biophysics  (Sissa-Trieste, Italy)	8 - 19 July 2024	The School is *primarily intended for undergraduate students* in Physics or Chemistry who wish to become familiar with up-to-date Molecular Dynamics simulation techniques.
The physics of self-organising active matter  Higgs Centre, Edinburgh	8 - 10 July 2024	Higgs workshop combined with one of the international conferences under a JSPS-funded "core to core" program grant on the physics of self-organising active matter.

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.

Summit grant

[Read more >](#)

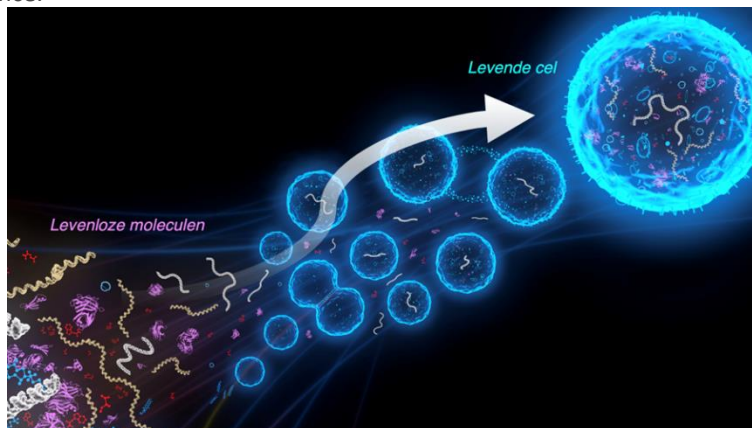
Five consortia of top scientists from various Dutch universities will receive a total of 174 million euros. The ten-year funding from the Summit grant will enable the research groups to start their research and also play a prominent role internationally. This will strengthen the long-term position of Dutch science.

Evolving living cells from lifeless molecules

Main applicant: *Prof. Dr. C (Cees) Dekker (TUD)*

Coapplicants: *Prof. Dr. G.H. (Gijsje) Koenderink (TUD)*, *Dr. K (Kristina) Ganzinger (AMOLF)*, *Prof. dr. S.J. (Siewert-Jan) Marrink (RUG)*, *Prof. dr. M. (Marileen) Dogterom (TUD)*, *Prof. dr. T.S. (Wilhelm) Huck (RU)*, *Prof. dr. M.J. (Jeroen) van den Hoven (TUD)*

What is life? To address this longstanding question, EVOLF will use lifeless biomolecules to build a living synthetic cell that has the attributes of living systems: autonomous growth, self-replication, communication, and evolution. To realize and integrate these complex cell functions, we will use laboratory evolution aided by artificial intelligence. In parallel, we will articulate ethical guidelines for responsible human control of synthetic life. Building a synthetic cell will yield an unprecedented deep understanding of biological life.



Picture from TUD website

<https://www.tudelft.nl/2024/tu-delft/leven-creeren-uit-levenloze-biomoleculen-met-ai-en-lab-evolutie>

Open Competition M

[Read more >](#)

Protein Detective: An Automated Pipeline for Identifying Unknown Proteins in Cryo-Electron Microscopy Densities

Prof. Dr. Alexandre Bonvin (UU)

Visualising proteins, ideally in their cellular environment, is a first step toward understanding their function. This can be done using cryo-electron microscopy. The resulting 3D images are, however, not always of sufficient quality to identify the proteins hidden in those. In this project the researchers will build an automated “protein detective” pipeline that will combine all available clues on the system, together with AI-generated protein models to build reliable 3D models of intricate molecular machine in which all components are identified.

Understanding the Collective Patterns of Active Polymer-like Matter

Dr. Sara Jabbari-Farouji (UvA)

Can we model the spectacular patterns of collective motion in birds and fishes? While simple statistical physics models successfully explain collective phenomena in some autonomous systems, real life is more complex. For example, biopolymers in the cell and blobs of entangled worms are not rigid, as assumed in models. We will develop new theoretical and computational methods to understand patterns of collective behavior of semiflexible active filaments. This will help us understand the biological function of collective self-organization and to uncover principles for designing smart filament-like materials with dynamic capabilities like shape-shifting or self-healing.

'Breaking the silence': understanding DNA repair in facultative heterochromatin

Dr. Aniek Janssen (UMCU)

This proposal aims to understand how cells repair damaged DNA. DNA damage can lead to diseases such as cancer, and understanding how our cells repair the damage could help develop new treatments. Sometimes damage occurs in a part of our DNA that is "switched off" and doesn't have any active genes, which is called "facultative heterochromatin." We want to understand how our cells repair damage in this specific part of the DNA. To do this, we will use fruit flies as a model to study how DNA repair is executed in heterochromatin.

How does a virus assemble itself

Prof. Dr Wouter Roos (RUG)

To make a simple viral particle, one only needs to mix the viral protein building blocks with the genome. By itself a viral nanoparticle will be formed in this solution. This sounds easy, however we still don't know why and how this functions. Using advanced microscopy approaches the researchers will now tackle this problem to try to understand how a virus forms itself.

Visualizing viral infection one virus at a time

Dr Marvin Tanenbaum (Hubrecht Institute)

When two people get infected by a virus, one might get very sick, while the other has no symptoms at all. The outcome of viral infection is equally heterogeneous at the cellular level. What causes this heterogeneity in infection outcome is poorly understood. Here, we will use innovative new microscopy techniques to study infection of host cells by single viruses to understand what determines the success of infection. The outcomes of this work will provide a better understanding of viral infection heterogeneity and can potentially contribute to the development of improved antiviral drugs.

The Travels of mRNAs in fungi

Dr Evelina Tutucci & Prof dr Han Wösten (VU/UU)

Fungal infections are on the rise worldwide. In addition, resistance to the antifungal drugs currently used in the clinic is increasing. Therefore, new antifungal agents need to be developed. In this project we will investigate the two main human fungal pathogens, *Candida albicans* and *Aspergillus fumigatus*. By using advanced microscopy, we will explore whether and how the localization of mRNA molecules impacts the growth of hyphae, elongated cells important for infection, as well as their ability to infect human cells. This work could therefore provide targets for the development of new antifungal agents.

Synthetic fuel cell from biomolecular components

Prof. Dr Bert Poolman (RUG)

Biological life is driven by fluxes of energy and matter in cellular systems that are hugely complex in their composition and structure. The exchange of molecules between cells and the environment requires well-balanced fluxes to support growth and homeostatic conditions. We design and study such 'out-of-equilibrium' systems, to resolve the minimal mechanisms that allow a living cell to sustain itself. We construct synthetic cells with dual membrane systems for sustainable production of ATP, generation of a proton motive force and pH homeostasis, using a bottom-up molecular systems approach.

Visualizing a memory

Prof Dr Helmut Kessels & Dr Ir Joachim Goedhart (UvA/UvA)

A wealth of memories is stored in our brain. How is it possible that we are able to bring one particular memory to our attention, while all other memories remain stored in our brain? This project studies the mechanisms that underlie the retrieval of a specific memory. We use advanced techniques that enable use to visualize the activation of a memory code. This research is important to understand what goes wrong when suffering from memory problems, as is seen in Alzheimer's disease.

Disassembling the morse code of our body

Dr Katharina Sonnen (Hubrecht Institute)

Cells within our body communicate with each other to orchestrate development and maintenance. Cells use something like a "morse code" to transfer information accurately and efficiently, but we do not understand the underlying mechanism. Here, we will disassemble the parts to reveal its functionality and enable future therapeutic targeting.

Getting in shape for neuronal health

Dr Ginny Farias Galdames (UU)

In our brain, neuronal cells have different organelles with specific tasks, essential for the development and function of our brain. In particular, the endoplasmic reticulum (ER) is a large organelle with multiple tasks, and its shape (tubule or sheet) determines what tasks are needed in a given moment. In several neurological disorders, the ER cannot get in the correct shape, causing neuronal death. By using imaging and proteomics techniques, this project will determine how the ER shape is regulated in neurons. This knowledge could help to re-shape the ER in neurological disorders.

Open Competition XS

[Read more >](#)

Controlling hormone-producing cells in the gut with transcription factor pulses

Dr. P.P. (Pascal) Ender (AMOLF)

Hormones produced in the gut play important roles in hard-to-address conditions like diabetes and obesity. It is still unclear how the specialized cells that synthesize these crucial hormones are generated. I have preliminary evidence that counting expression pulses of the gene *Neurogenin3* is central to this process. Here, I will investigate this novel mechanism, which could open the door to controlling gut hormones externally. This will be the first time that such a pulse-counting mechanism will be established in cell differentiation, with potential medical applications.

Three-dimensional Printing of Cell-Based Wood

Dr. K. (Kunal) Masania (Technische Universiteit Delft)

To establish sustainable engineering materials, we must follow nature's lead in architecting materials from the nanoscale upwards. Here, we focus on creating artificial plant tissues, and next, we induce wood formation by engineering the genetic master switches controlling this process. Both steps are a high-risk endeavour since such a feat has never been realised. Success would mark a high-gain project, since we will not only give scientists new ways to study the growth and development of plant tissues in a controlled environment, but also pave the way to revolutionise manufacturing with sustainable and renewable 3D-printed wood.

An optogenetic "traffic light" for synchronizing cell populations

Dr. A. (Andreas) Miliadis-Argeitis (Rijksuniversiteit Groningen)

The cell division cycle is a fundamental feature of living organisms. To efficiently study this complex biochemical process in large cell populations, we need to force cells to divide in a synchronous manner. However, our current synchronization protocols have severe drawbacks that limit their applicability and the degree of synchrony that can be achieved. We will develop a new, generally applicable cell synchronization method that overcomes these challenges using genetically encoded light-sensitive proteins. Synchronization of cells using light stimulation has not been tried before, and holds the potential to revolutionize cell cycle studies across many different cell types and organisms.

Stressed into crawling: the biophysics of confinement-induced cellular evolution

Dr. U. (Udo) Sen (Wageningen University & Research)

Crawling (amoeboid) cell motility is fundamental to several key functions in animal biology, but their evolutionary origin is unclear. The closest living relatives of animals, the choanoflagellates, exhibit swimming (flagellate) motility. However, they can undergo a swimming-to-crawling transition when subjected to confinement. We aim to study the biophysical principles of such confinement-induced motility transition of choanoflagellates by suspending the choanoflagellate cells in a gel medium with tunable degree of confinement. By observing the hydrodynamics during the confinement-induced motility transition, we aim to shed light on the biophysical conditions responsible for the evolution of crawling motility in animal cells.

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 in NL.

Nikolina Šoštarić (TUD)



Job title: Assistant professor, TU Delft, Faculty of Applied Sciences, Department of Bionanoscience

Subject area: Bioinformatics / Computational Biology

How did you get into science?

I guess it was a combination of curiosity and educational environment. As a kid, I remember digging holes in the ground of my parent's backyard, convinced that at some point I must find dinosaur bones (which would, of course, belong to a novel species and be named after me). However, no curiosity can truly flourish without proper support and, ultimately, we grow to love things that we understand and are good at. A large part of the credit should, therefore, also go to my teachers who made it easy to understand mathematics, chemistry, and more.

Where else have you worked/studied?

I obtained my undergraduate degree in Chemistry from University of Zagreb, Croatia. I then completed PhD in Bioscience Engineering at KU Leuven, Belgium, in the group of Vera van Noort. After that, I moved to The Netherlands for a postdoc position at Sanquin Institute, Amsterdam, in the group of Monika Wolkers. Last year I started my group at Bionanoscience department of TU Delft.

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

I love cooking, reading, and spending time in nature (either hiking or cycling). I also like to paint, which makes not only for some nice office art, but also great presents for friends.

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

I would say there are two important components: finding an area you find really exciting and want to learn more about, and finding a nice environment where you will have support and freedom to explore the thing that makes you tick. Talking to people and building a network is also very important for, if nothing else, learning about opportunities that are lying around.

Who are your scientific role models?

It's difficult to choose only one or a few. In general, because it feels like scientific achievements have become more incremental, I find people who think and achieve things that are completely out-of-the-box inspirational.

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

My working area is typically very clean and contains only the very essential things I need for work at any given moment (all other things are stashed in the bookshelf). I'm quite organized and find it easier to work when things around me are also clean and neat.

Nicholas Kurniawan (TU/e)

Job title: Associate Professor, Department of Biomedical Engineering, Eindhoven University of Technology (TU/e)

Subject area: Mechanobiology, cell–material interactions. I try to identify the cell- and tissue-level phenomena underlying physiological and pathological processes, and think of ways to exploit these for bioengineering and biomedical applications. It turns out that many of these fundamental phenomena are attributable to the biophysics and mechanobiology of cells and how cells interact physically with their environments.

How did you get into science?

By chance and rather gradually. I came from a mostly engineering background and was lucky to chance upon a particularly interesting research subject (on skin biomechanics) during my final-year bachelor project. Then I started to understand what scientific research was, got interested and started my PhD. But it took another couple of years, interactions with many bright scientists, and experience of actually doing science and answering challenging scientific questions for me to really appreciate what being “in science” really means.

Where else have you worked/studied?

I obtained my Bachelor (in Mechanical Engineering and Physics) and PhD degrees in the National University of Singapore. Then I did a postdoc in AMOLF (Amsterdam) with Gijsje Koenderink (before she moved to TU Delft) and in 2015 joined as an Assistant Professor at TU/e.

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

I like a lot of sports. Badminton (of course, I am an Indonesian!), swimming, and everything that involves a ball (basketball, table tennis, football, volleyball). A lot of people got surprised when I mentioned that I was a national team player of underwater hockey in Singapore.

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

Everyone's path is different. Focus on improving yourself. Comparing yourself to others is the quickest recipe to quitting.

Who are your scientific role models?

Difficult to say, but generally I admire those who are interdisciplinary and unafraid to let go of their comfort zone and try new approaches or fields. As for an academic role model, one persona stands out: my former PhD supervisor, Raj Rajagopalan. He is an exceptional mentor and incredibly creative scientist with amazing integrity, and at the same time also highly adept in diplomacy. He is now retired (our loss!), but is somehow still involved in shaping the world of higher education.

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

Things are where they are supposed to be, which is important to give a clear space of mind. There is a bit of clutter, like an old computer, box, or pump that I haven't had the time to put away yet for some time, but by now I don't 'see' them anymore. Minimal décor. Form follows function!



Contact

Dr. Naomi Chrispijn-Steenbeek, secretary of the advisory committee for the Physics of Life research community
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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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