

NWO
BIOPHYSICS

Programme BIOPHYSICS

9 & 10 OCTOBER

2023



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Programme **Monday 9 October**

09.00	– 10.00	Registration (Kempenzaal)
10.00	– 10.10	Opening ceremony (Brabantzaal)
10.10	– 10.40	Plenary lecture: Clemens Kaminski (Brabantzaal)
10.40	– 11.10	Plenary lecture: Tom Scheenen (Brabantzaal)
11.10	– 11.25	Poster pitches (Meijerijfoyer)
11.10	– 11.30	Coffee break (Kempenzaal)
11.30	– 12.30	Parallel sessions (page 6)
12.30	– 13.25	Lunch (Kempenzaal)
12.30	– 13.25	NVvM, NL-BI & NEMI meeting (Baroniezaal)
12.45	– 13.45	Interactive session – Scientific Storytelling (Room 56)
13.25	– 14.25	Poster session (Kempenzaal & Meijerijfoyer)
14.30	– 15.00	Plenary lecture: Ilaria Testa (Brabantzaal)
15.00	– 15.30	Plenary lecture: Marie-Eve Aubin-Tam (Brabantzaal)
15.30	– 16.00	Coffee break (Kempenzaal)
16.00	– 16.45	Parallel sessions (page 7)
16.50	– 17.55	Interactive sessions (page 8)
16.50	– 18.00	Group leader assembly Physics of Life
18.15	– 19.45	Dinner – Beneluxzaal
19.45	– 19.55	Thesis award ceremony (Brabantzaal)
19.55	– 20.40	Keynote lecture: Stephan Grill (Brabantzaal)
20:40	– 00.00	Festive evening (Baroniezaal)

Plenary lectures



10.10 – 10.40 Brabantzaal

Clemens Kaminski *University of Cambridge*

Visualising organelle dynamics at high speed with structured illumination microscopy



10.40 – 11.10 Brabantzaal

Tom Scheenen *RUMC*

Non-invasive imaging of cancer at high magnetic fields



14.30 – 15.00 Brabantzaal

Ilaria Testa *KTH Royal Institute of Technology*

4D sub-cellular dynamic at the nanoscale: from STARSS to optical nanoscopy



15.00 – 15.30 Brabantzaal

Marie-Eve Aubin-Tam *TUD*

From microalgae biophysics to photosynthetic living materials

Keynote lecture



19.55 – 20.40 Brabantzaal

Stephan Grill *Max Planck Institute of Molecular Cell Biology and Genetics*
Physics of Structure Formation in Living Systems



11.10 – 11.25 Meijerijfoyer

Pitch podium

Listen to some poster and sponsor pitches



Outside (gathering at information desk during lunch break)

Woodland walk

Bring your lunch outside and explore the wooded environment of NH Koningshof with a forester



20.40 – 00.00 Baroniezaal

DJ Mike

Grab a drink and dance your socks off with DJ Mike

Parallel sessions 11.30 - 12.30

Brabantzaal

D

Experimental techniques

Chair

Johannes Hohlbein [WUR]

Jeroen Kalkman [TUD]

In vivo 3D visualization of plant-pathogen interaction using dynamic optical coherence tomography

Mariska Brûls [WUR]

Quantification and localization of oxidation in plant-based emulsions

Sanne Giezen [TU/e]

Revealing the interfacial dynamics of antifreeze proteins at the ice-water interface

Corentin Bisot [AMOLF]

Dynamics of network architecture and flows reveal a traveling-wave strategy for mycorrhizal trade

Baroniezaal

E

Chromosomes and DNA packaging

Chair

Remus Dame [LEI]

Constantijn van der Smagt [VU]

Unravelling mitotic chromosome structure using optical tweezers

Xamanie Seymonson [VU]

Rok & roll: unravelling rok-mediated DNA bridges with force

Roman Barth [TUD]

Human cohesin is a unidirectional DNA loop extruder which can switch directions

Samuel Schwab [LEI]

Novel histones and histone variant families in prokaryotes

Boszaal

J

Organelles, cells and organs I

Chair

Huib Versnel [UMCU]

Hugo Markus [UT]

Unraveling crosstalk between neuroblastoma and bone marrow mesenchymal stromal cells

Willem Kasper Spoelstra [AMOLF]

Local tissue mechanics controls live-cell extrusion in the small intestine

Maaïke Bril [TU/e]

Focal-adhesion-mediated topographical conditioning of fibroblasts on dynamic hydrogels

Rhythm Shukla [AMOLF]

BioPM thesis award winner
New era of lipid-targeting peptide antibiotics

Room 65

K

Theory and numerics

Chair

Marianne Bauer [TUD]

Pim America [VU]

The coronavirus helicase boosts coronavirus polymerase RNA synthesis kinetics through duplex RNA

Tommaso Ristori [TU/e]

Integrating simulations and experiments to unravel angiogenesis

Age Tjalma [AMOLF]

Trade-offs between cost and information in cellular prediction

Avishek Das [AMOLF]

Performance benefit of information in chemotaxis

Parallel sessions 16.00 - 16.45

Brabantzaal D <i>Experimental techniques – single molecules</i> Chair Chirlmin Joo [TUD]	Baroniezaal E <i>Organelles, cells and organs II</i> Chair Louise Jawerth [LEI]	Boszaal J <i>Cancer and fungi</i> Chair Tom Shimizu [AMOLF]	Room 65 K <i>Engineering</i> Chair Erwin Peterman [VU]
Sergii Pud [UT] Dielectrophoresis as a new single-molecule tool to study protein properties Victor Yin [UU] Single molecule mass spectrometry enables mass determination of complex biomolecular assemblies Ivo Severins [TUD] SPARXS: Single-molecule parallel analysis for rapid exploration of sequence space	Johannes Flommersfeld [VU] Migrating cancer cells actively adapt their force production in confinement Joyce Meiring [UU] Illuminating the role of microtubules in 3D mesenchymal migration Beatrice Corci [RUG] Extending the analogy between intracellular motion in mammalian cells and glassy dynamics	Margherita Tavano [TUD] Mechanical properties of cancer spheroids in constricted microfluidic channels Zaid Rahman [TUD] Interstitial flow enhances TGF- β /Smad-signaling activity in cancer spheroids in 3D-microfluidic chip Loreto Oyarte Galvez [AMOLF] Liquid-liquid phase separation as a trading mechanism in arbuscular mycorrhizal fungi	Ketan Ganar [WUR] Accelerating protein engineering through on-chip directed evolution Louis Kuijpers [TUD] Beyond RNA: Alternative mechanisms for the stability and maturation of enterovirus-like particles Diana van der Ven [UT] Controlled needle-free delivery of insulin in ex vivo human skin for targeted skin-layer delivery

Interactive sessions

12.45 - 13.45

Room 56

Scientific Storytelling (invited participants only)

Gemma Venhuizen

16.50 - 17.55

Room 52

**Simulating life with beads and springs
(invited participants only)**

Andela Saric

Room 55

**Principles of structured illumination microscopy
(invited participants only)**

Clemens Kaminski

Room 58

Effective Communication (invited participants only)

Tini Studio

Room 65

How to make a thesis (open entry)

Gildeprint

Brabantzaal

Alternative career paths (open entry)

Jennifer Faber

Demonstrations Monday 9 & Tuesday 10 October



Kempenzaal

Culinair Cellulair

Enter the world of 'Culinair Cellulair', where science and art merge to explore the future of cell-based food.



Kempenzaal

Puzzling Proteins

A mini gameshow where participants compete in teams against each other to be the first to decipher a word from a DNA code.

Programme Tuesday 10 October

09.00	– 09.30	Plenary lecture: Andela Saric (Brabantzaal)
09.30	– 10.00	Plenary lecture: Gijs Wuite (Brabantzaal)
10.05	– 10.20	Poster pitches (Meijerijfoyer)
10.00	– 10.30	Coffee break (Kempenzaal)
10.30	– 11.45	Parallel sessions (page 12)
11.45	– 12.45	Lunch (Kempenzaal)
12.45	– 13.45	Poster session (Kempenzaal & Meijerijfoyer)
13.50	– 14.50	Parallel sessions (page 13)
14.50	– 15.15	Coffee break (Kempenzaal)
15.15	– 16.00	Keynote lecture: Nikta Fakhri (Brabantzaal)
16.00	– 16.15	Poster award ceremony and closing (Brabantzaal)

Plenary lectures



09.00 – 09.30 Brabantzaal

Andela Saric *Institute of Science and Technology Austria*

One becomes two: protein assemblies that reshape and cut cells across evolution



09.30 – 10.00 Brabantzaal

Gijs Wuite *VU*

Nonlinear Mechanics Of Human Mitotic Chromosomes

Keynote lecture



15.15 – 16.00 Brabantzaal

Nikta Fahkri *Massachusetts Institute of Technology*
Broken symmetries in living matter



10.0 – 10.20 Meijerijfoyer

Pitch podium

Listen to some poster and sponsor pitches



Outside (gathering at information desk during lunch break)

Woodland walk

Bring your lunch outside and explore the wooded environment of NH Koningshof with a forester

Parallel sessions 10.30 - 11.45

Brabantzaal

D

Experimental techniques II

Chair

Kristin Grußmayer [TUD]

Emma van Grinsven [UU]

Expansion and live-cell LLS microscopy reveals microtubule architecture in airway epithelial cells

Sietse J. Dijt [RUG]

Non-invasive live-cell STED imaging

Josiah Passmore [UU]

Automated feedback control of cellular activity using optogenetics

Chenyu Wen [TUD]

Monitoring dCas9-DNA dynamics with the nanopore electro-osmotic trap

Amanda van der Sijs [UU]

Role of nonspecific DNA in transcription regulation

Baroniezaal

E

Protein-protein interactions

Chair

Jorine Eeftens [RU]

Danny Sahtoe [Hubrecht Institute]

De novo design of protein-protein interactions

Chun Hei Li [UU]

Spatiotemporal mass spectrometry dissects neuronal biosynthetic endo-lysosomal protein interactome

Yuzhen Feng [RUG]

Reversible structural changes in human papillomavirus upon glycan binding

Christos Gogou [TUD]

Structural insight into Teneurin3 splicing-dependent complex formation in transcellular adhesion

Stefanie D. Pritzl [UU]

Multiplexed magnetic tweezers for single protein force spectroscopy

Boszaal

J

Organelles, cells and organs III

Chair

Armagan Kocer [UT]

Sanne van der Niet [AMC]

From electron microscope to a new treatment for mycobacterial infections

Dmitrii Linnik [RUG]

Bacterial cell aging: effect of protein aggregation on protein diffusion in Escherichia coli

Judith Schaart [RUMC]

Analyzing the role of serum-protein based mineral transport in bone formation

Ceri Richards [RUG]

Rapid desorption and internalization of nanoparticles by live cells at the single particle level

Burak Demirbas [AMOLF]

Stress-induced DAF-16 nuclear localization pulses control growth in developing worms

Room 65

K

Nucleic acid processing

Chair

David Dulin [VU]

Jos V.W. Meeussen [NKI]

The double-edged sword of transcription factor clustering

Christian Kaiser [UU]

Co-translational stabilization drives folding of a kinetically stable protein

Misha Klein [VU]

What makes the SARS-CoV-2 polymerase start RNA synthesis?

Zhaowei Liu [TUD]

Unravelling the dynamics of replisome progression and histone transfer in eukaryotic DNA replication

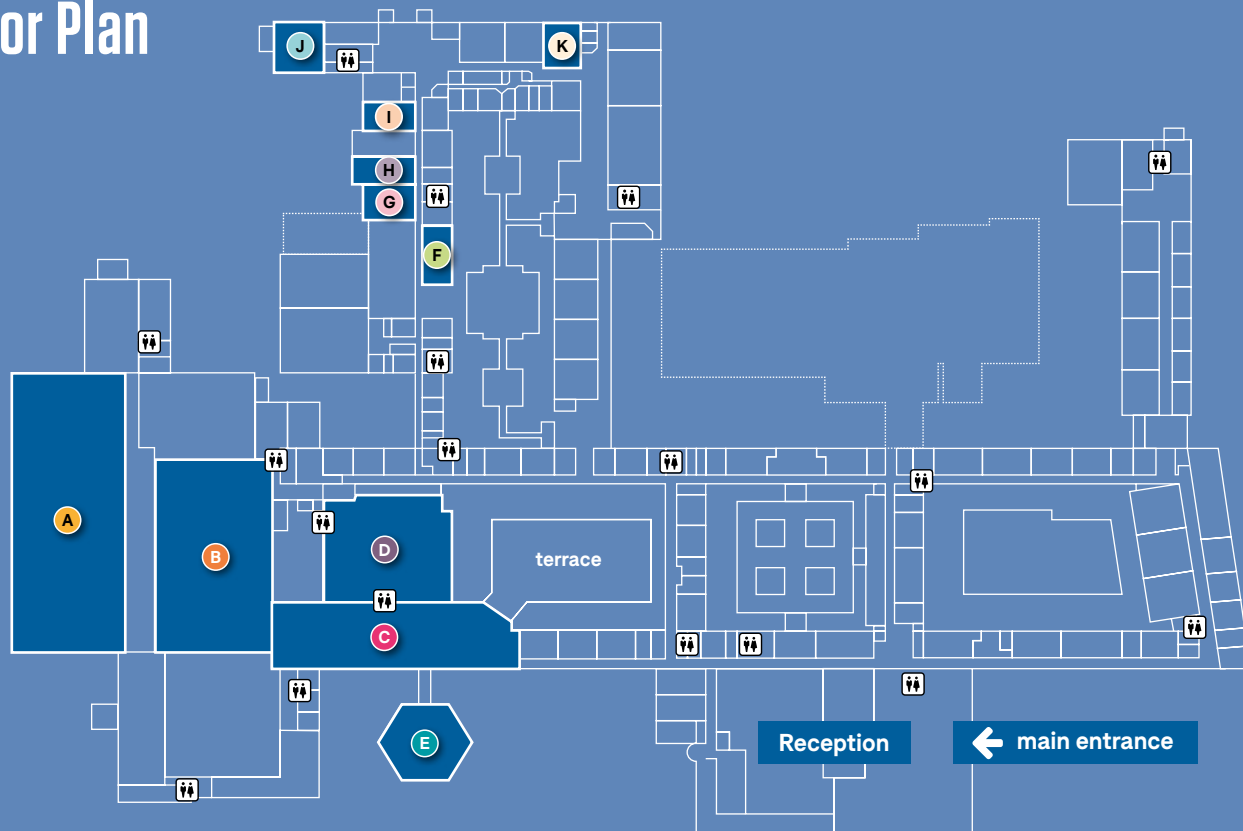
Bernadette Mohr [UvA]

Path sampling simulations of the Hoogsteen to Watson-Crick transition in a protein-DNA complex

Parallel sessions 13.50 - 14.50

Brabantzaal D <i>Experimental techniques - electron microscopy</i> Chair Nicole van der Wel [UvA]	Baroniezaal E <i>Recognition</i> Chair Kristina Ganzinger [AMOLF]	Boszaal J <i>Mechanics and membranes</i> Chair Louise Jawerth [LEI]	Room 65 K <i>Transport and mobility</i> Chair Erwin Peterman [VU]
Roman Koning [LUMC] Machine learning segmentation of organelles and tissues in electron microscopy slides of zebrafish Robin van der Meijden [RUMC] 3D correlative live-to-cryo microscopy shows collagen development in zebrafish scale Daan Boltje [TUD] A cryogenic, coincident fluorescence, electron and ion beam microscope Maarten Joosten [TUD] Roodmus: analysing heterogeneous reconstruction methods in cryo-EM single particle analysis	Lorenzo Olivi [WUR] Effect of PAM requirements on Cas9 and Cas12a target search elucidated through live-cell imaging David Fuentenebro Navas [WUR] Nanopores identify single type III CRISPR-Cas produced oligo-adenylates and their stoichiometries Salina Quack [VU] Understanding viral dsRNA recognition via MDA5 disease mutants at the single-molecule level Marco van den Noort [RUG] Interact to survive: the substrate-binding domains of the ABC importer OpuA physically interact	Daniela Kraft [LEI] Self-organization induced by lipid membrane deformations Martijn van Galen [WUR] De novo DNA-based catch bonds Jose Ruiz Franco [WUR] Cross-linker mobility governs fracture behavior of catch-bonded networks Stijn van der Ham [UT] Lipid membranes and particle shape: Surf or Engulf?	Humberto Sanchez [TUD] A chromatinized origin reduces ORC mobility and spatially constrains MCM Edwin de Jong [UT] Unravelling the molecular origin of an inherited channelopathy in the potassium channel Kv4.3 Harriet Saunders [UU] In vitro reconstitution of the protein complex controlling ciliary tip dynamics Solene Lefebvre [RUG] Single molecule fluorescence to monitor mechanisms of vitamin translocation by ECF transporters

Floor Plan



Locaties/locations & route/routes

- A Beneluxzaal
- B Kempenzaal
- C Meijerijfoyer
- D Brabantzaal
- E Baroniezaal
- F Room 52
- G Room 55
- H Room 56
- I Room 58
- J Boszaal
- K Room 65
- Toilets

Partners and Sponsors



Colophon

Thanks to the programme committee of NWO Biophysics 2023:

Rifka Vlijm (chair) [RUG]
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Marjolein Bulk [NWO]
Alessandra Cambi [DSCB/RUMC]
David Dulin [VU]
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Louise Jawerth [LEI]
Tim Marcus [BioPM/VUMC]
Markus Weingarth [UU]
Pieter Rein ten Wolde [AMOLF]

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Julia Bakx *Project leader*
Reneé Calon *Event assistant*
Eveline van de Putte *Event assistant*
Mirjam van Ooijen *Application manager*
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Steven Driessen *Communication*
Marjan Verest *Poster prizes*