

NBIA NEWSLETTER



A MESSAGE FROM THE DIRECTOR

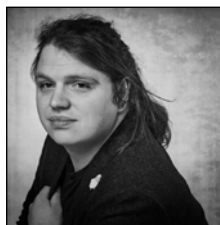
Poul Henrik Damgaard

Biological physics has a big presence at NBIA: the study of what goes under the heading 'active matter' gives a broad theme but it does not do justice to the numerous activities among different junior research groups. In this Newsletter's research focus you can read about NBIA Assistant Professor Kristian Thijssen's research program which is supported by a generous grant from the Novo Nordisk Foundation. The emergence of collective behavior in biological systems from many individual underlying motions at smaller scales is explored by Kristian Thijssen and his group. This is the domain of classical mechanics. Moving down towards even smaller length scales we eventually hit the molecular level and then physics may again play a big role in living organisms, now at the quantum mechanical level. Some consider this subject, dubbed Quantum Biology, controversial. But it is an almost trivial fact that at the atomic level quantum mechanical laws rule processes involving biomolecules as well. The big question is rather whether such quantum mechanical processes can play direct roles in macroscopic phenomena in living systems. Examples could be tunneling processes that are classically forbidden or discrete quantum 'jumps' that could trigger a cascade at larger scales. It has been suggested that such quantum processes could explain how birds apparently succeed in navigating on the basis of the earth's magnetic field, how the olfactory system possibly may exploit the vibrational spectrum of molecules, and many other examples. In the spring of 2026 NBIA is organizing a workshop that critically will assess these questions. What better place to host such a workshop could there be? The famous Auditorium A will again be the venue for heated discussions about quantum mechanics!

RESEARCH HIGHLIGHT on Biological Physics

Kristian Thijssen

Swimming microorganisms are found everywhere, from biofilms, within humans, soils, and in industrial installations. Their presence has a tremendous impact on their environment, as their interactions facilitate responses to and from their surrounding medium, ranging from beneficial to detrimental effects. Besides individual motility, many small swimming organisms are interesting for their ability to create collective motions, resulting in kinetics across large length and time scales. The environment often sets the collective behaviours, affecting their mechanical and biological relevance, but organisms also alter their environments. These interactions result in complex feedback loops, e.g. mechanoreciprocity, a bi-directional relationship between organisms' motility and their adaptable material surroundings that affect the biological properties of the organisms/medium. At NBIA, we are developing models that we use to study the complex behaviour of many swimmers and their adaptable surroundings, finding out how microswimmers affect their material surroundings as active "ecosystem engineers".



NEWS IN BRIEF

Charlotte Fløe Kristjansen receives Villum Investigator Grant

Professor Charlotte Fløe Kristjansen, currently the Deputy Head of Institute for Research at the Niels Bohr Institute has been awarded a Villum Investigator grant of 20Mkr from the Villum Foundation to explore how quantum systems react to sudden disturbances with a research program entitled "Quantum Quenches from Quantum Fields." With earlier support from a DFF Sapere Aude Top Researcher grant Charlotte Fløe Kristjansen has built a research group which works at the interface of theoretical high energy physics, condensed matter physics and quantum information theory. The Villum Investigator research program will start in the Fall of 2025 and run for six years.

Hoffmann & Husmans Foundation supports Visitors Program at NBIA

Thanks to the generous support of the Hoffmann & Husmans Foundation, NBIA is launching a five-year program for Visiting Scientists. This financial support will enable a broad range of scientific activities - from assistance for sabbatical visits and one-month stays related to scientific collaborations or workshops, to shorter visits that include support for an active seminar program across all research areas relevant to NBIA members. The ongoing NBIA Colloquia program will also benefit significantly from this new grant. The first Hoffmann & Husmans Foundation Visiting Scientist was Prof. Richard D. Ball (University of Edinburgh) in July, followed by Prof. James Cline (McGill University) during September and October.

NEW NBIA MEMBERS

This fall, NBIA welcomes a new staff member and several new PhD students: **Noah Roux**, **Niels de Graaf Sousa**, **Jakob Trzaska** and **Michella Rochetti**.

Farzan Vafa is a new Assistant Professor in the Biophysics and Active Matter group, arriving from Massachusetts Institute of Technology. He has broad interests at the interface of soft matter and biophysics, with particular emphasis in active matter, liquid crystals on curved surfaces, topological defects, morphogenesis, and the interplay between geometry and topology.



UPCOMING WORKSHOPS AND SCHOOLS

Please visit our [NBIA web page](#) for details and updates.

- Nordic Winter School on Gravitational Astrophysics (Jan. 25-30)
- Frontiers and Challenges in Quantum Biology (Apr. 16-17)

NBIA PICTURE

On Wednesday October 8, 2025 at 12 o'clock sharp, we took an old style NBIA picture in front of building K.



Coordinator: Gosia Dekempe (Tel. +45 35 33 78 70)

Email: malgorzata.dekempe@nbi.ku.dk

Niels Bohr International Academy - www.nbia.dk

Niels Bohr Institute, Blegdamsvej 17, 2100, Copenhagen, DK

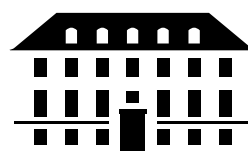
NEWS IN BRIEF (continued)

Firuz Foundation Fellowship to NBIA

Thanks to generous support from the Firuz Foundation, NBIA has been able to dedicate a 3-year Fellowship to new theoretical developments in Quantum Sciences. The initiative aims at capitalizing on new opportunities at NBIA in the light of major efforts to build a Quantum Computer at the neighboring Novo Nordisk Foundation Quantum Computing Program in Blegdamsvej. The recipient of the Firuz Foundation Fellowship will be Fan Yang, who currently holds a postdoctoral position at the University of Innsbruck.

Memorandum of Understanding with ICISE in Vietnam

The International Center for Interdisciplinary Science and Education (ICISE) in Quy Nhon, Vietnam, serves as a unique institution in science and education, welcoming national and international conferences, specialized workshops, as well as thematic schools for PhD-students. The Memorandum of Understanding focuses on exchanges of scientists, joint organization of research programs, conferences, workshops, symposia, seminars, and PhD-schools. This strengthens NBIA's ties with scientists in Southeast Asia and surrounding regions. Work is underway to organize a first joint scientific meeting at ICISE during 2026.



The Niels Bohr
International Academy