

TNNN newsletter.



NTNU

Annual Conference - 6th to 8th of May in Trondheim!

SIGN UP for the conference here: <https://nettskjema.no/a/tnnn2026#/page/1>

Important dates

- Registration deadline - **6th of March 2026.**
- Deadline for submission of abstracts for oral presentation - **27th of March 2026**
- Poster abstracts can be submitted after this deadline, but not later than the **15th of April**

Program is published on the website: <https://www.ntnu.edu/tnnn/tnnn-conference-2026>

Program highlights

Inspiring invited speakers

See abstract below.

Industry in focus

Networking with industry collaborations of TNNN.

Poster session and dinner at Lager TI

Your opportunity to share your research.

Social program

The PhD council is arranging a social gathering.

Conference dinner at Rockheim Panorama

Enjoy a dinner with a panoramic view over Trondheim.

Conference Participation for Master's Students

Master's students are also welcome to attend the conference. They cannot participate in the conference dinner and will not have accommodation covered. Registration is completed as usual via the registration form - Supervisors must ensure that the newsletter is forwarded to their master's students.





Meet the invited speakers



Prof. Dr. Dr. Twan Lammers

Title: Next-Generation Concepts in Cancer Nanomedicine

Abstract:

Nanomedicines are extensively used for cancer therapy. By delivering drug molecules more effectively and more selectively to pathological sites, nanomedicines assist in improving the balance between drug efficacy and toxicity. The tumor accumulation of nanomedicines is traditionally ascribed to the EPR effect, which is highly variable, both in animal models and in patients. To address issues associated with tumor targeting heterogeneity, and to promote cancer nanomedicine clinical performance and translation, we are working on tools and technologies to modulate, monitor and predict tumor-targeted drug delivery.

In this TNNN lecture, several of these strategies will be highlighted, including physical (ultrasound), pharmacological and physiological interventions to prime the tumor microenvironment, and the use of imaging and histopathology biomarkers for patient selection and personalized medicine. Altogether, our efforts aim to establish rational and realistic ways forward to improve the clinical impact of cancer nanomedicines.

Assoc. Prof. Mattias Borg

Title: Towards in-memory computing using ferroelectric memristors



Abstract:

Recent advances in AI are driving a surge in energy demand, highlighting the need for new hardware concepts for efficient computation. In-memory computing with memristive devices is a promising approach, and ferroelectric memristors stand out for their low operating currents and stable, nonvolatile switching.

We present recent progress on reliable in-memory computing using ferroelectric tunnel junction (FTJ) memristors. With improved programming schemes, we increase analog resistance precision from 5 to 7.5 effective bits, enabling more accurate analog computation for neuromorphic and AI-accelerated workloads. Evaluations across tasks such as image segmentation and natural language processing show particularly strong alignment with NLP-type computations.

We also demonstrate materials advances that improve scalability, including nanosecond-pulse laser annealing to reduce tunnel barrier thickness to 3.4nm while enhancing interface quality—an important step toward back-end-of-line integration. Together, these developments move ferroelectric memristive technologies closer to practical, energy-efficient in-memory computing platforms.



Prof. Anja Boisen

Title: Medical Micro & Nanotechnologies – fast blood analysis and ‘swallow your doctor’

Abstract:

Our ability to shape materials at the nanoscale opens new possibilities for, among other things, rapid diagnostics and smart medication. I will give examples from our research that encompass both new discoveries and startup stories.

In the treatment of leukemia and sepsis, there is a need for therapeutic monitoring of drug concentrations in patients’ blood. Silicon structures at the nanometer scale can have surprising optical properties. For example, they can enhance the so-called Raman scattering more than a million times. This effect can be used to perform very sensitive measurements of small molecules in a complex blood sample.

Our vision is that in the future we can ‘swallow our doctor’. Ingestible capsules can be made smart so that they can eventually measure, take samples, and perform local repairs/medication in the stomach and intestines. Can this be done without also having to swallow a battery, and how do you take a sample from the intestines?

Univ.-Prof. Dr. Jani Kotakoski



Title: Atomically precise structures tailored into 2D materials

Abstract:

Transmission electron microscopy (TEM) is often carried out separate from other experimental steps, allowing only “post mortem” analysis. This is a significant disadvantage compared to, for example, scanning tunneling microscopy, where the microscopic investigation is directly integrated as part of the same experimental setup where the samples are grown and manipulated. There is, however, no fundamental reason why TEM and scanning TEM (STEM) could not be similarly integrated into a more comprehensive system.

In this contribution, I will present the experimental setup that we have established at the University of Vienna over the past decade to overcome this disadvantage. I will further show how this setup and other advances made in the group in manipulation of 2D materials have enabled research toward truly atomically precise structures that can be tailored into 2D materials for applications ranging from catalysis to quantum information technology.



Prof. Balpreet S. Ahluwalia

Further details will be announced shortly.

Balpreet S. Ahluwalia is Professor at the Department of Physics and Technology, UiT The Arctic University of Norway and Professor-II at the Department of Physics, University of Oslo Norway. He is also affiliated as a Researcher at the Department of Clinical Sciences, Intervention and Technology (CLINTEC), Karolinska Institute in Sweden. Ahluwalia has a PhD in Electrical Engineering (Photonics) in 2007 from Nanyang Technological University, Singapore. Ahluwalia's cross-disciplinary research group develops multi-modality microscopy and spectroscopy platform and translates its impact in life sciences. Ahluwalia is inventor of several patents, co-founder of university spin-off and has published over 100+ peer-reviewed scientific articles and receipts of several EU/RCN funded projects including several ERC/EIC competitive grants.

Industry in focus

We plan industry presentations, short company pitch talks and stands at the TNNN conference. We have set aside **Wednesday 6th of May from 1430-1600** for the industry-focused part of the conference.

A great chance for PhD candidates to connect with industry, learn about their research needs, and explore collaboration. The program includes dedicated time for networking.

Take a look at our new tab on the TNNN homepage:

<https://www.ntnu.edu/tnnn/industry-collaboration>



Photo: NTNU/Maren Agdestein

Any new colleagues?

make sure that they sign up for TNNN membership:

<https://nettskjema.no/a/tnnn>

Stay updated!

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Find updated upcoming events on our [webpage](#).

Not a member anymore or changed position?

Send us an email.

Upcoming events and activities

Bioscopy conference 2026 - UiT The Arctic University of Norway

Bioscopy Conference 2026 (**15-17 June**, Tromsø, Norway) is an international meeting focused on advances in microscopy, biology, computational imaging, and quantitative life sciences.

Organized entirely by early-career researchers, the conference brings together scientists across physics, biology, medicine, and computation to spark interdisciplinary collaboration and methodological innovation.

A hallmark of Bioscopy is its commitment to scientific transparency, including the open presentation of rigorous negative or null results. The program features internationally recognized invited speakers and a vibrant community of researchers pushing the boundaries of imaging science.

Join us in Tromsø to connect, exchange ideas, and help shape the future of biological imaging.

Registration deadline: 1st of March

Courses for PhD students

TNNN offers travel grants of up to 10,000 NOK to PhD students enrolled at Norwegian universities who wish to attend an intensive or hybrid course at another Norwegian institution. See our course database at:

<https://www.ntnu.edu/web/tnnn/phd-courses>



Best regards,

Pawel Sikorski
Leader TNNN



Julie Tetlimo
Coordinator TNNN