

# NINa-News

North German Initiative  
Nanotechnology SH

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[www.nina-sh.de](http://www.nina-sh.de)

## Dear Reader

we are shaping research on energy, health and information technology - from materials that better regulate power grids, to implants that deliver medicines on demand and novel sensors for medical technology, to quantum materials that lay the foundation for the next generation of electronics.

Since 2014, [KiNSIS \(Kiel Nano, Surface and Interface Science\)](#), one of the research foci at Kiel University, has provided a platform for researchers in the fields of nanoscience and interface science. Our more than 120 members from Kiel University and partners such as non-university research centers and networks in Schleswig-Holstein are renowned scientists as well as young talents with fresh ideas, unconventional approaches and interdisciplinary questions. Here, scientific curiosity from chemistry, electrical engineering, materials science, life sciences and physics come together.

New things are created in exchange with others. We see KiNSIS as an „incubator“ with an open and dynamic climate in which special research areas, industrial projects and start-ups have already emerged and are emerging. To this end, we promote professional dialogue, scientific cooperation projects and technology transfer. We want to bring fundamental findings from basic research into application and thus enable real innovations.

NINa SH e.V. has been a key partner for us in this for many years, whether at joint parliamentary evenings,



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*KiNSIS Speaker Group (from left): Prof. Dr. Jeffrey McCord (Materials Science), Prof. Dr. Kai Rosnagel (Physics), Prof. Dr. Malte Behrens (Chemistry), Prof. Dr. Regina Scherließ (Pharmacy)*

trade fair presentations or in strategic discussions. As a member of our first board of directors, NINa chairman Franz Faupel helped establish KiNSIS and played a key role in shaping it.

We want to further intensify this cooperation and advance nanotechnology together with industry and politics. In order to master current challenges, basic research and transfer must go hand in hand - supported by appropriate political framework conditions.

I look forward to a lively exchange with the NINa network and hope you enjoy reading!

*Regina Scherließ*

Prof. Dr. Regina Scherließ  
Member of the KiNSIS Speaker Group and the extended NINa SH Board of Directors

Wir fördern Wirtschaft



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Landesprogramm Wirtschaft: Gefördert durch die Europäische Union - Europäischer Fonds für regionale Entwicklung (EFRE), den Bund und das Land Schleswig-Holstein

**Schleswig-Holstein. Der echte Norden.**

# Bioscience in the service of society

[Zeynep Altintas](#) recently received an appointment as full professor at Kiel University. After moving her group from Berlin to Kiel, she has set herself an ambitious goal: to make an important contribution to society with her bioinspired materials and biosensors.

Infectious diseases, cancer, cardiovascular diseases and neurodegenerative disorders are the major health problems worldwide. Certain diseases can be detected by specific molecules in body fluids or tumors, known as biomarkers. There are many defined biomarkers that are used for disease diagnosis, prognosis, and treatment. Accordingly, biosensors have become very important in clinical diagnostics. However, crucial for the diagnosis of diseases by biosensors is the availability of receptors with very good specificity for the respective biomarkers.

The new interdisciplinary Chair for [Bioinspired Materials and Biosensors](#) at Kiel University aims to contribute to modern theranostics: „We mimic natural antibodies to provide tailored receptors for diagnosis and therapy,“ Altintas explains. The synthetic receptors offer several advantages over their natural counterparts. They have a shelf life of one to two years, as opposed to a few months for stabilized natural antibodies. Synthesis takes minutes to days, while non-synthetic production takes months.



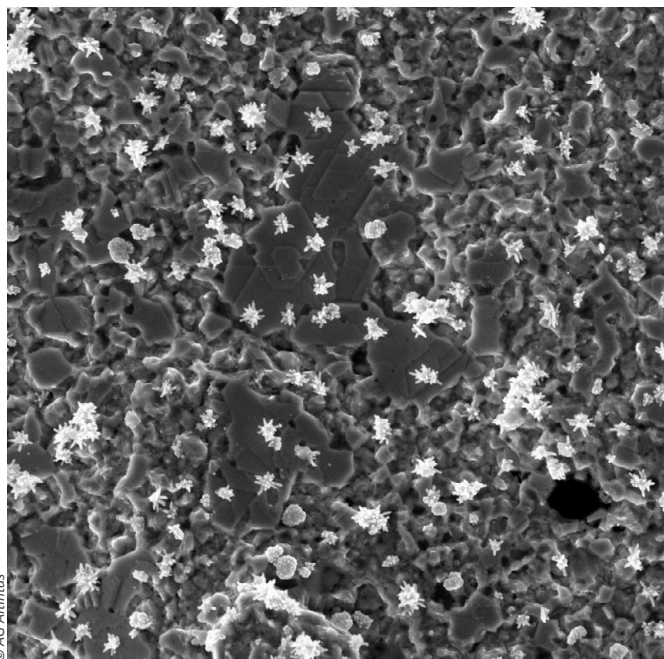
© Zeynep Altintas

*Professor Dr. Zeynep Altintas was recently appointed as a full professor at Kiel University*

Finally, synthetic receptors can be tailored without losing their affinity for target molecules.

Because of their versatility, biosensors are widely used in clinical diagnostics, environmental monitoring, food technology and defense. „About two-thirds of our research is aimed at biomedical applications, with the remainder focused on food and environmental aspects. Overall, biosensors are my life,“ Altintas laughs.

„After three years, my research is now starting to leave the lab and reach society,“ Altintas says, „It’s a dream come true for me.“ She emphasizes that the close cooperation between the Faculty of Engineering and the University Medical Center Schleswig-Holstein (UKSH) is particularly valuable for transferring research results into application, identifying unknown disease patterns and developing new therapies. Altintas is certain: „I have no doubt that innovative applications of nanotechnology will be a game changer in healthcare in the near future.“



© AG Altintas

*Image of a polymer layer, the surface of which is formed in a way that it captures specific biomarkers.*





## Setting the pace for an electrified future

**Whether on the road, in the air, at sea or in industry: high-performance battery cells are the power sources of a world which is undergoing a fundamental technological change.**

“As one of the leading developers and manufacturers of application-specific battery cells, [CUSTOMCELLS](#) is setting the pace for this electrified future,” explains Dr. Daniela Werlich, CTO at [CUSTOMCELLS](#). “Artificial intelligence (AI), Big Data and nanotechnology are also playing an increasing role in achieving this goal.”

For example, the company, which has sites in Itzehoe and Tübingen, is working on the optimization of production processes with the help of machine learning. In combination with digital twins, AI can be used in the development of special battery cells in the future. In the joint project [HiQ-CARB](#), the spin-off of the Fraunhofer Institute for Silicon Technology (ISIT) is working with partners to test whether combinations of carbon nanotubes and acetylene black particles can be used as additives for the conductivity of battery cathodes.

[CUSTOMCELLS](#) has remained committed to its research roots and cooperates with Kiel University of Applied Sciences, West Coast University of Applied Sciences and institutions of the Fraunhofer-Gesellschaft, among others.

Application examples and more information about the technology at [CUSTOMCELLS](#) can be found at [medium.com/master-of-batteries](https://medium.com/master-of-batteries).

The full-service provider in the field of cell development and manufacturing sees itself as “powered by people.” The company offers interested people of all genders with technical expertise and doer mentalities a wide range of development opportunities in an industry of the future - [from internships to master’s theses to job entry](#).



# New ground-breaking concept for laboratories wins competition within technology and innovation

cphnano is a Danish spin-off company founded by the Technical University of Denmark in 2015. It is known today as the Danish labtech company that develops digital laboratory analysis and next-generation UV-VIS for the lab 4.0. cphnano has been named the first winner of the KPMG Global Tech Innovator Denmark 2022, beating many other fast-growing companies. They will now represent Denmark at the KPMG Global Tech Innovator in November in Lisbon.



*SpectroLink™ connects to a spectrophotometer and acquires, analyzes, and extracts results in one easy workflow via the online platform SpectroWorks™*

[cphnano](#) expand the use and increase the value of existing spectrophotometers around the world, enabling next generation laboratory analysis and tests with an award-winning technology.

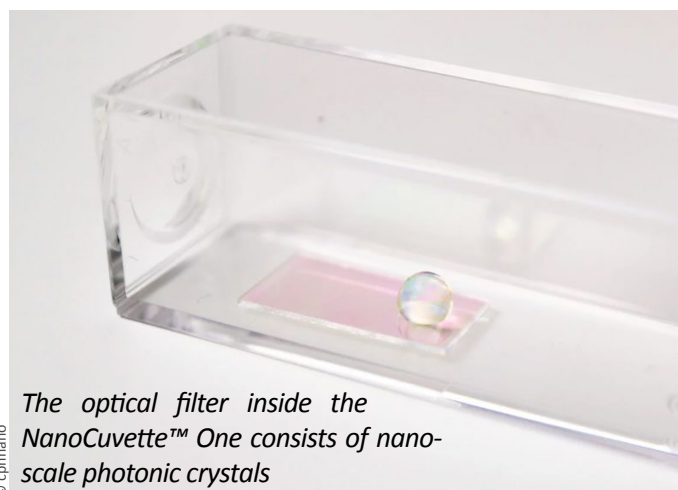
One of [cphnano's](#) core products is NanoCuvette™ One, which enables regular spectrophotometers to replace dedicated micro-volume instruments such as biophotometers. A disadvantage of these instruments is that the sample is in direct contact with the instrument, and this typically leads to problems with mechanics, optics, and biofilm over time. The format of [cphnano's](#) cuvette solution means that the nano-optics in the UV-Vis instrument are not in contact

with the sample and therefore last longer. [cphnano's](#) cuvettes have a large dynamic range and are calibrated from the factory.

Over the past 35 years one of the big challenges for Danish drinking water supply has been pollution with toxic materials from factories, insecticides and pesticides and nitrates from farming and waste dumps. Over recent decades many waterworks have been closed, forced to drill deeper or to buy their water from neighboring supplies. Therefore, it is important for the modern society to monitor the groundwater quality on a regular basis. However, cost and lengthy analysis time limits the frequent analysis of drinking water.

[cphnano](#) conduct easy, fast, and reliable real time water monitoring near landfills together with Watercare Guard and University of Southern Denmark. For this purpose a stationary unit with nanosensor technology and the advanced cloud-based software SpectroWorks™ will be build up to continuously perform water monitoring within a few minutes.

[cphnano](#) have established, together with their partners, an affordable and portable water quality assaying platform to ensure the quality of drinking water through analysis for the current and coming generations.



*The optical filter inside the NanoCuvette™ One consists of nano-scale photonic crystals*



# Save the date: International Workshop on Functional Nanocomposites 2023

The 11th Nanoworkshop „[International Workshop on Functional Nanocomposites](https://nanoworkshop2023.nina-sh.de)“ will again be held near Kiel in 2023, having been held in many countries around the world for the past 20 years. The goal of the workshop is to bring together materials scientists, physicists, chemists and engineers from academia and industry to discuss the latest developments in the field of functional nanocomposites. Topics range from advanced preparation techniques and new material properties to industrial applications and include both computer simulations and theoretical work. The venue is the beautiful Plön Castle. For more information, visit [nanoworkshop2023.nina-sh.de](https://nanoworkshop2023.nina-sh.de).

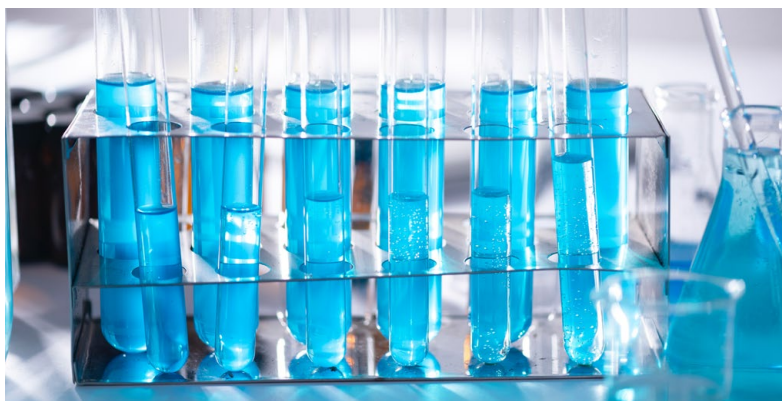


## New Baltic Sea Teaching Network Catalysis

A new [joint Catalysis Institute](#) in the Baltic Sea region was founded to expand the training of doctoral students in the field of catalysis and provide a platform for networking. The training network is an initiative of working groups of the Baltic Sea universities in Kiel, Rostock and Greifswald together with the Leibniz Institute for Catalysis in Rostock and the Leibniz Institute for Plasma Research and Technology e.V. in Greifswald. The institute offers block seminars for free to interested PhD and master students. Institutes from North Germany are invited to join the teaching network. Further information on the joint institute and its events can be found [on the website of Kiel University](#).

## Fraunhofer Workshop for Nanotechnology in Medicine

The application potential of nanotechnology in medicine is very high and ranges from therapeutics to targeted drug delivery and diagnostics. NINA SH and the [Fraunhofer Center for Applied Nanotechnology CAN](#) invited to the workshop „[Exploring the clinical translation of Nanotechnology for diagnosis and therapeutics](#)“ in Hamburg on August 18, 2022, to provide an overview of the latest applications of nanotechnology in medicine. Renowned participants from industry and research used the platform to discuss current technical solutions and clinical implementations and to find suitable cooperation partners.



### Imprint

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