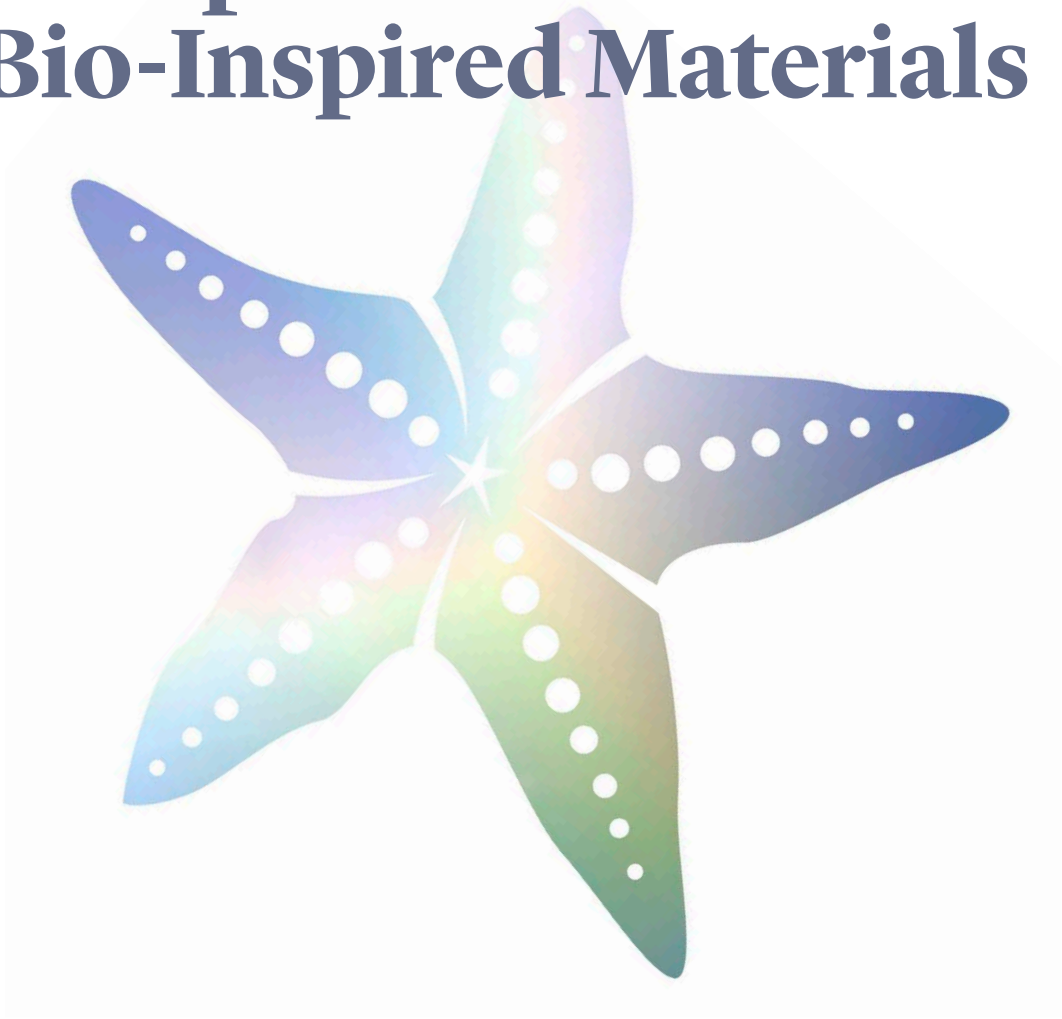
Activities report 2024 – 2025

National Center of Competence in Research Bio-Inspired Materials



Swiss National Science Foundation

BIO-INSPIRED MATERIALS
NATIONAL CENTER OF COMPETENCE IN RESEARCH

Who we are

The National Center of Competence in Research (NCCR) Bio-Inspired Materials was launched in June 2014 with the vision of becoming an internationally recognized interdisciplinary hub for research, education, and innovation in the domain of "smart" bio-inspired materials.

We draw inspiration from natural materials to establish design rules and strategies for creating macromolecular and nanomaterial-based building blocks and assembling them into complex, hierarchically ordered, stimuli-responsive materials with new and interesting properties. We seek to develop a predictive understanding of the interactions between these materials and living cells and to apply this knowledge to innovative applications, particularly in the biomedical field.

For the third and final phase of our activities, our research is organized into four modules: mechanically responsive materials, photonic materials, responsive bio-interfaces, and translation-focused projects. Each of these modules tackles major unsolved problems, offers opportunities for significant scientific advances, and requires an interdisciplinary research approach.

Our research activities are complemented by many programs that integrate research and education, support structured knowledge and technology transfer, and promote equal opportunities in science.

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Boosting academic innovation, delivering equal opportunities, and creating global impact through our programs.

Content

Message from the directors

Readying our legacy

Over the past year, the NCCR Bio-Inspired Materials advanced its stabilization plan with the University of Fribourg and the SNSF amid challenging cantonal and national budget contexts.

To secure continuity beyond the NCCR's official end on May 31, 2026, we have adapted our approach and will establish an NCCR Legacy Center hosted at the Adolphe Merkle Institute (AMI), where our headquarters are located. This plan is supported by the Faculty of Science and Medicine and the Rectorate and endorsed by the SNSF. The AMI recognizes bioinspired materials as one of its core research themes and will ensure the long-term visibility of the NCCR's research and sustain key activities initiated during its tenure.

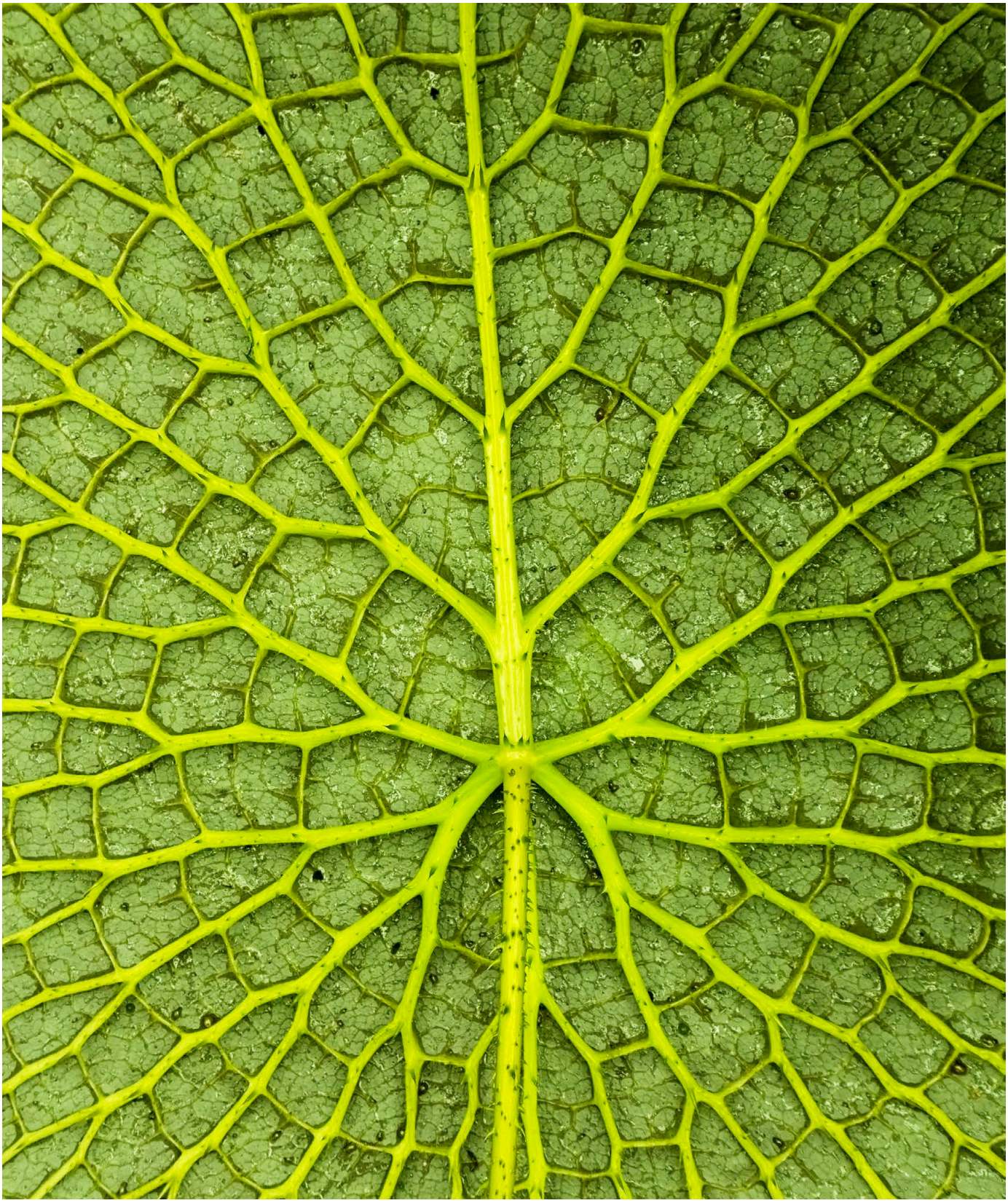
We have started planning a comprehensive program for our final year. In addition to a communication campaign and an arts and science collaboration with Fribourg's Collèges, we are organizing a two-day final conference on June 19–20, 2026, at the University of Fribourg. On the opening morning, we will provide an overview of the Center's achievements and future plans, featuring our institutional partners. The remainder of the first day and the second day will consist of an open international scientific conference on the topic of the NCCR. This conference will offer networking opportunities for our researchers, alumni, partners, and external researchers interested in bioinspired materials research. Overall, this event will provide an opportunity to reflect on and celebrate our accomplishments, as well as consider our community's future.

Professor Hans Jörg Limbach has recently joined AMI as Chair of Food Science and Technology and the NCCR as an Associate PI. With two decades of industry experience at Nestlé, Prof. Limbach will study food from a soft-matter perspective and establish connections with the NCCR's research landscape. His appointment is one of the structural measures supported by the NCCR to strengthen the materials science profile of the Faculty of Science and Medicine at the University of Fribourg. It will also help boost food research and the recently established Food Research and Innovation Center at our home institution.

Over the past year, our researchers have made significant progress on projects involving mechanoresponsive materials, structural color, and biointerfaces. We invite you to explore the highlights featured in this report. Beyond research, our community has remained vibrant and outward-looking. Xemperia, a startup emerging from PI Rüegg's lab that uses NCCR technology for cancer detection, won multiple awards last year. The third internal conference for young researchers took place at EPFL in February 2025, gathering 30 NCCR members. We also helped found the Swiss Academic Innovation & Entrepreneurship Forum (SAIEF), the successor to the Swiss Forum for University and Student Innovation, launched by the NCCR. And at AMI, we hosted the Falling Walls Lab for the third time and welcomed around 80 attendees.

Thank you for your continued interest in the NCCR Bio-inspired Materials. We look forward to future engagement and collaboration as we transition toward the Legacy Center at AMI.

Ullrich Steiner & Esther Amstad
Directors NCCR Bio-Inspired Materials



Research

What we do

The overarching research theme of the NCCR Bio-Inspired Materials is to use inspiration from nature for the design of artificial materials that can change their properties on command, so to speak, or, in other words, in response to an external stimulus. These materials, sometimes referred to as “smart” or “intelligent”, are of fundamental scientific interest and potentially useful in countless applications that range from climate control for buildings to drug delivery systems in the body.

In the recent past, scientists have begun to consider nature’s principles as inspiration for the design of artificial materials with intriguing stimuli-responsive properties. Previous examples of materials studied by individual research groups that belong to the Center include mechanically adaptive nanocomposites inspired by sea cucumbers, drug-delivery nanoparticles that mimic the structure and stealth behavior of viruses, and optical elements that emulate the nanoscale patterns found in butterfly wings.

With the aim of carrying out paradigm-changing scientific breakthroughs and harnessing the enormous innovation potential in this domain, the Center has developed into a large-scale interdisciplinary effort that merges competences in chemistry, physics, materials science, biology, and medicine.

Smart delivery

Decoding the "molecular rulebook" of RNA–lipid binding

Computer models reveal how RNA's structure and chemistry control its binding to lipid membranes, offering new insights for RNA-based technologies and clues about the origin of life.

NCCR Bio-Inspired Materials researchers have uncovered how RNA molecules naturally interact with lipid membranes. Their findings not only shed light on a fundamental process in biology but also open the door to smarter RNA delivery systems for vaccines, gene therapy, and cancer treatment.

RNA, a close relative of DNA, carries genetic instructions and regulates countless cellular processes. It is also the foundation of new medical technologies such as RNA-based vaccines. But delivering RNA into cells remains a major challenge. In nature, RNA can float freely in water, but it also interacts with lipids – the fatty molecules that form cellular membranes – if they are present.

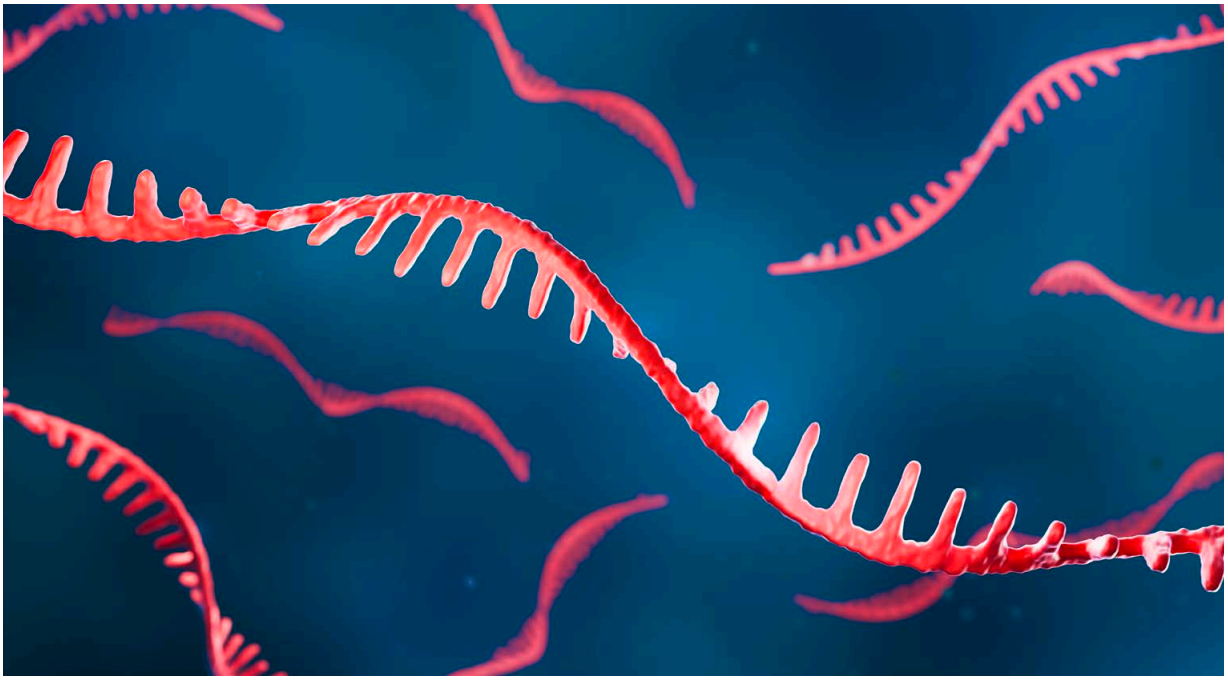
Until now, scientists knew these interactions existed but lacked a clear picture of how they worked at a molecular level, says NCCR principal investigator Stefano Vanni, professor of biochemistry at the University of Fribourg, who led the study.

Vanni and his team used molecular simulations to mimic RNA binding to lipid bilayers, focusing on different RNA sequences and shapes. They discovered that RNA molecules rich in the base guanine bind more strongly to gel-like lipid membranes, thanks to guanine's ability to form multiple hydrogen bonds and adopt a stable structure that fits the membrane's 'pattern'.

> "Because RNA is more ancient than DNA, understanding how RNA and lipids interact could help explain how life began."
>
> Prof. Stefano Vanni, University of Fribourg

Double-stranded RNA, which naturally forms a rigid ladder-like structure, bound to lipids almost instantly. Single-stranded RNA bound more slowly – unless it folded into ordered shapes similar to double-stranded RNA.

"There were a couple of papers suggesting that certain RNA bases prefer certain lipids, but it was not clear why," Vanni says. "We characterized this for the first time and found it is driven mostly by hydrogen bonding and the RNA's secondary structure. These are two important parameters



RNA regulates countless cellular processes

that can be tuned to improve or decrease RNA's affinity for membranes."

Beyond its biomedical implications, the work touches on a deeper question about life's origins. "Before proteins, you needed nucleic acids and lipids for compartmentalization – like cell membranes," Vanni says. "Because RNA is more ancient than DNA, understanding how RNA and lipids interact could help explain how life began."

The study, conducted entirely with computer models, matched experimental observations and revealed a "molecular rulebook" for RNA-lipid binding. While the researchers worked with small RNA fragments, scaling up to larger RNAs remains an important future step.

As a physicist in a biology department, Vanni says he benefited from the interdisciplinary environment of the NCCR. "This project emerged from discussions within the NCCR, and it's exactly the type of riskier project worth pursuing."

Reference

Singh, A. P.; Prabhu, J.; Vanni, S. RNA Order Regulates Its Interactions with Zwitterionic Lipid Bilayers. Nano Lett. 2025, 25 (1), 77–83.

22
Research Projects

CHF 6.8 mill.

of funding including CHF 3.0 million from the SNSF

Partners

University of Fribourg (home institution), Federal Institutes of Technology Lausanne and Zürich, Cornell, TU Darmstadt, Paris-Lodron-University Salzburg, KU Leuven, Turku University, CSEM, Empa

26
Research groups

at seven universities

3
national cooperation

projects with industry

2
industrial associates

3

soft-skills workshops

for researchers

6
national and international conferences

supported by the NCCR Bio-Inspired Materials

Note: All figures between June 1, 2024 – May 31, 2025

Photonics

Inspiring new color technologies

An African longhorn beetle uses two different tricks – disordered nanostructures and fin-shaped light diffusers – to create vivid, angle-independent colors.

The dazzling green-and-orange patterns of an African longhorn beetle are more than just beautiful – they show nature's mastery over light. A study led by NCCR Bio-Inspired Materials researchers reveals how the beetle generates its bold, non-iridescent colors, and what that could mean for future technology.

Unlike most other beetles, whose colors shimmer and shift with the viewing angle, *Sternotomis amabilis sylvia* keeps its vivid hues constant from every perspective. To understand why, NCCR principal investigator Bodo Wilts, professor of materials physics at the University of Salzburg, and his colleagues dug deep into the beetle's microscopic scales, combining imaging techniques with light-scattering experiments. What they found was a natural trick that scientists have yet to replicate in the lab.

"Nanostructures being responsible for color in insects may not sound new, but it's still astonishing to see nature craft such intricate 3D structures at the exact length scales that reflect visible light," Wilts says. "These beetles can make colors we cannot replicate in the lab, and they do it at room temperature, in just a few days, tens of thousands of times over – because each scale grows out of a single cell."

Inside each scale lies a microscopic lattice, known as a photonic network, that interacts with pigments to produce the beetle's vibrant colors. The green scales contain an ordered network,

> "Sometimes you want iridescence, sometimes you don't, and this system shows us how to achieve both."
>
> Prof. Bodo Wilts, University of Salzburg

while the orange scales use a disordered version of the same design. Both would normally produce very different effects – ordered structures should look iridescent, while disordered ones should appear matte. But surprisingly, both green and orange look the same from every angle.

Nature crafts intricate nanostructures that reflect dazzling colors

The secret lies in the beetle's scale geometry. Each scale extends into a fin-like structure, which acts as a natural diffuser, scattering light and canceling out the shine of the ordered network beneath. "In this beetle, evolution found a different way to create angle-independent color," Wilts says.

For Wilts, the discovery was unexpected. "From an evolutionary point of view, it looks like a waste of resources, as the disordered network alone could do the job," he says. But the beetle gives us two tricks for achieving the same effect – ordered or disordered networks, both leading to angle-independent color. The researchers published their findings in Materials Today Advances.

By copying these natural designs, engineers could create coatings, fabrics, or display materials with vivid, non-fading colors that look the same from all angles. "Sometimes you want iridescence, sometimes you don't, and this system shows us how to achieve both," Wilts says.

He and his team are now expanding their research to examine dozens of related beetle species to understand how these nanostructures evolved. "The million-dollar question is: how are these things formed?" he says. "Nature is still much better than anything we can do."

Reference

Bauernfeind, V.; Saranathan, V.; Djeghdi, K.; Longo, E.; Flenner, S.; Greving, I.; Steiner, U.; Wilts, B. D. Not Only a Matter of Disorder in I-WP Minimal Surface-Based Photonic Networks: Diffusive Structural Color in Sternotomis Amabilis Longhorn Beetles. Materials Today Advances 2024, 23, 100524.

Self-reporting

Observing polymers in real time

A fluorescent tag lets scientists directly track how reversible bonds form and break inside polymers, opening the door to smarter materials.

Until now, material scientists struggled to measure, in real time, how many dynamic bonds were formed or broken inside a polymer—a material composed of long chain-like molecules built from repeating smaller units.

Inspired by nature's ability to build itself, NCCR Bio-Inspired Materials researchers have now developed polymers that can light up to reveal what's happening inside them. These self-reporting materials may help scientists understand the dynamics of specific bonds that hold them together and, ultimately, design smarter plastics that warn of damage before failure.

"We've been working with supramolecular polymers for a long time," says NCCR principal investigator Christoph Weder, professor of Polymer Chemistry and Materials at the Adolphe Merkle Institute of the University of Fribourg. "These materials are held together by dynamic supramolecular bonds—the same types of interactions that nature uses in DNA, for example."

What makes these bonds special is that they can break and re-form. Weder and his colleagues focused on a widely used supramolecular motif called UPy, which naturally forms pairs through hydrogen bonding. However, a challenge remained: "One naively would say, if you have these supramolecular motifs in a polymer, they should dimerize," Weder says. "But it's really hard to say what fraction of the motifs assemble and what fraction disassemble as you apply a stimulus, such as heat or mechanical force."

> "The goal is to monitor defects before you have a catastrophic failure."
>
> Prof. Christoph Weder, Adolphe Merkle Institute

The solution came from lead study author Derek Kiebala, a former PhD student in Weder's lab, who modified the UPy motif by attaching fluorescent tags, creating a 'binding indicator'. When two motifs dimerize, the resulting change in fluorescence provides a precise readout of how many bonds are formed or broken. "This is the first time this was done," Weder says. "Based on the color, we can calculate what fraction of UPy motifs is bound or unbound."

New polymers could warn of eminent failure

The tool revealed surprising details: in materials in which the UPy motifs were used to connect, or "cross-link", many polymer chains, the fraction of motifs that dimerized was surprisingly low, and those that did dimerize were often within the same polymer chain rather than between chains. When the materials were stretched, a small fraction of bonds broke, and the fluorescence tracked this molecular "damage" to the polymer structure in real time.

The findings, published in the journal Angewandte Chemie, offer critical insights for developing polymers that reveal damage as it occurs. "The goal is to monitor defects before you have a catastrophic failure," Weder says.

The project also reflects the collaborative and career-building nature of the NCCR. Co-author Stephen Schrettl, once a group leader with Weder, is now a professor at the Technical University of Munich, while Kiebala has gone on to a postdoctoral position at Johannes Gutenberg University of Mainz and then a research position at the Helmholtz Institute Erlangen-Nürnberg for Renewable Energy. "It's very nice to see so many NCCR alumni go places," Weder says. Another co-author, Andrea Dodero, came from the group of NCCR principal investigator Ulli Steiner and brought expertise in rheology.

Recently, Dodero, Kiebala, Weder and others used the 'binding indicator' in a follow-up study, where they developed polymers that can be taken apart on demand. They built in a molecular 'switch' that turns the binding motifs on or off in response to light. When exposed to UV light, the switch produces an acid that breaks apart the UPy bonds. Using the new indicator motif, the researchers were able to track this process in real time at the molecular level, giving them a clear picture of how the material disassembles.

Reference

Kiebala, D. J.; Dodero, A.; Weder, C.; Schrettl, S. Optical Monitoring of Supramolecular Interactions in Polymers. Angew Chem Int Ed 2024, 63 (36), e202405922.

Different by design

Bioprinting reveals how cell crowding influences nanoparticle uptake

Controlled cell-density gradients generated by bioprinting offer a powerful tool for investigating nanoparticle uptake, with implications for drug delivery.

In the human body, cells are rarely arranged in a uniform manner. In healthy tissues, cell density varies by organ and function; in tumors, this variability can become even more pronounced. These natural differences in cell crowding influence how cells behave, and a NCCR Bio-Inspired Materials study suggests they also affect how cells take up nanoparticles, with potential implications for drug delivery and cancer treatment.

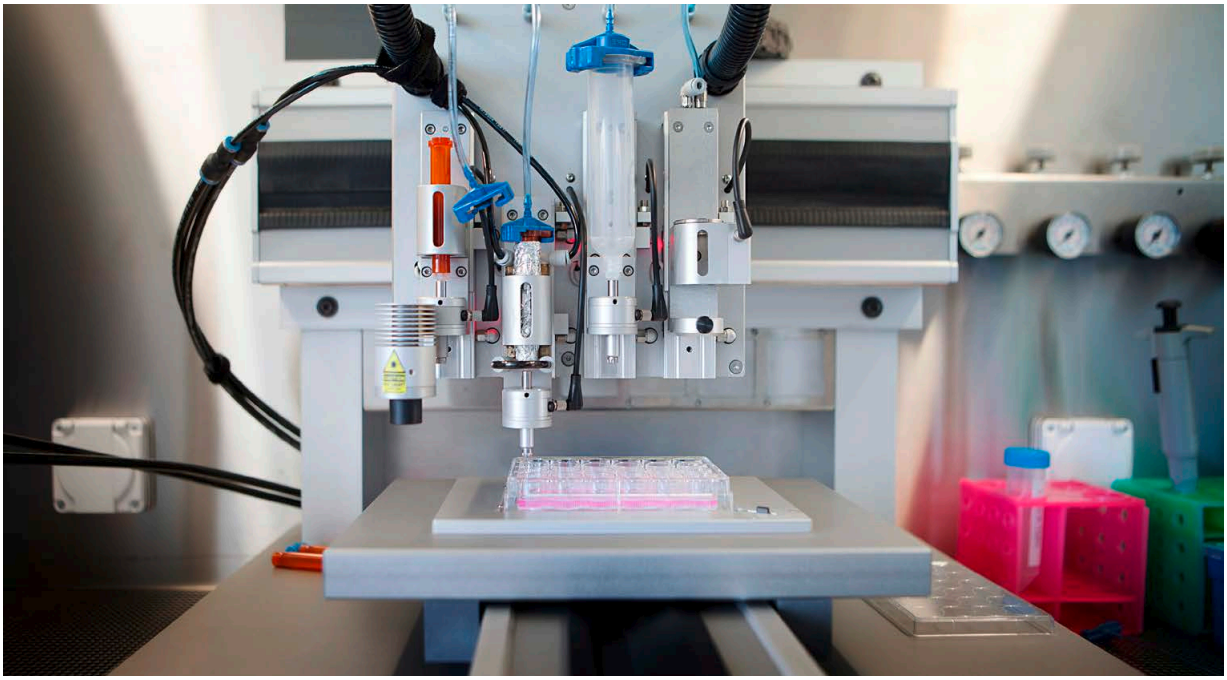
"Scientists usually study nanoparticle-cell interactions in cultures where cells are evenly distributed, and then make general assumptions," says NCCR principal investigator Barbara Rothen-Rutishauser, professor of BioNanomaterials at the Adolphe Merkle Institute, who co-led the study. "But in nature, cell gradients are common, so we wanted to mimic these gradients in the lab to better understand their effect on cell behavior in the presence of nanoparticles."

To do this, Rothen-Rutishauser's group teamed up with the team of NCCR principal investigator Alke Fink, also a professor and co-chair of the BioNanomaterials group, in a project that blends expertise in cell biology and nanoparticle engineering.

Luigi Di Stolfo, a PhD student with Rothen-Rutishauser, optimized a method that uses bioprinting to generate cell density gradients of lung epithelial cells within a single culture dish – a task that remains challenging with traditional methods. He then exposed these cells to silica nanoparticles incorporating a fluorescent dye to track their uptake using advanced fluorescence imaging.

> "In nature, cell gradients are common, so we wanted to mimic these gradients in the lab to better understand their effect on cell behavior in the presence of nanoparticles."
>
> Prof. Barbara Rothen-Rutishauser

Cells in lower-density regions took up about 50% more nanoparticles than those in higher-density areas, even 48 hours after exposure, the researchers found. This difference was not due to



Bioprinters allow researchers to work with differentiated cell gradients

cell growth rates but rather linked to changes in cell shape and surface contact.

"If you have lower density, you have a bigger surface in contact with particles," Rothen-Rutishauser says. "The cell density influences both cell behavior and nanoparticle interaction." The researchers published their findings in Frontiers of Bioengineering and Biotechnology.

The work opens exciting possibilities. While the team began with a two-dimensional cell gradient, their next goal is to explore three-dimensional models. Because tumors often have high cell density in the center and lower density at the edges, this pattern could influence how nanoparticle drug carriers behave. This aspect, Rothen-Rutishauser says, could help advance cancer therapy.

While the method is powerful, Rothen-Rutishauser notes that not every laboratory has access to a bioprinter because of the cost and technical challenges. However, once a protocol is established, the bioprinting approach is reproducible and could be adapted to print different cell types in defined densities and with spatial control. This flexibility could make it relevant for studies on inflammation, wound healing, or tumor growth, Rothen-Rutishauser says.

The project reflects the collaborative spirit of the NCCR. "This idea emerged through discussions with different people in the network – without the NCCR, we would not have thought of it," Rothen-Rutishauser says. The work, she adds, has already attracted attention from other researchers. "We have already got a lot of emails saying, 'this is interesting, we'll follow up on this.'"

Reference

Di Stolfo, L.; Lee, W. S.; Vanhecke, D.; Balog, S.; Taladriz-Blanco, P.; Petri-Fink, A.; Rothen-Rutishauser, B. The Impact of Cell Density Variations on Nanoparticle Uptake across Bioprinted A549 Gradients. Front. Bioeng. Biotechnol. 2025, 13.

Reducing stress

Uncovering amino acids' role in protein stability

Amino acids can stabilize proteins by weakening protein–protein interactions, offering a natural way to control some stress-related effects in cells.

A collaborative study between two NCCR Bio-Inspired Materials research groups has uncovered how the simplest building blocks of life – amino acids – protect our cells from harmful stress. Amino acids can keep proteins from sticking together under stress by making their interactions weaker and more repulsive. In doing so, they help prevent the formation of stress granules – clumps of proteins and RNA that appear when cells are under stress.

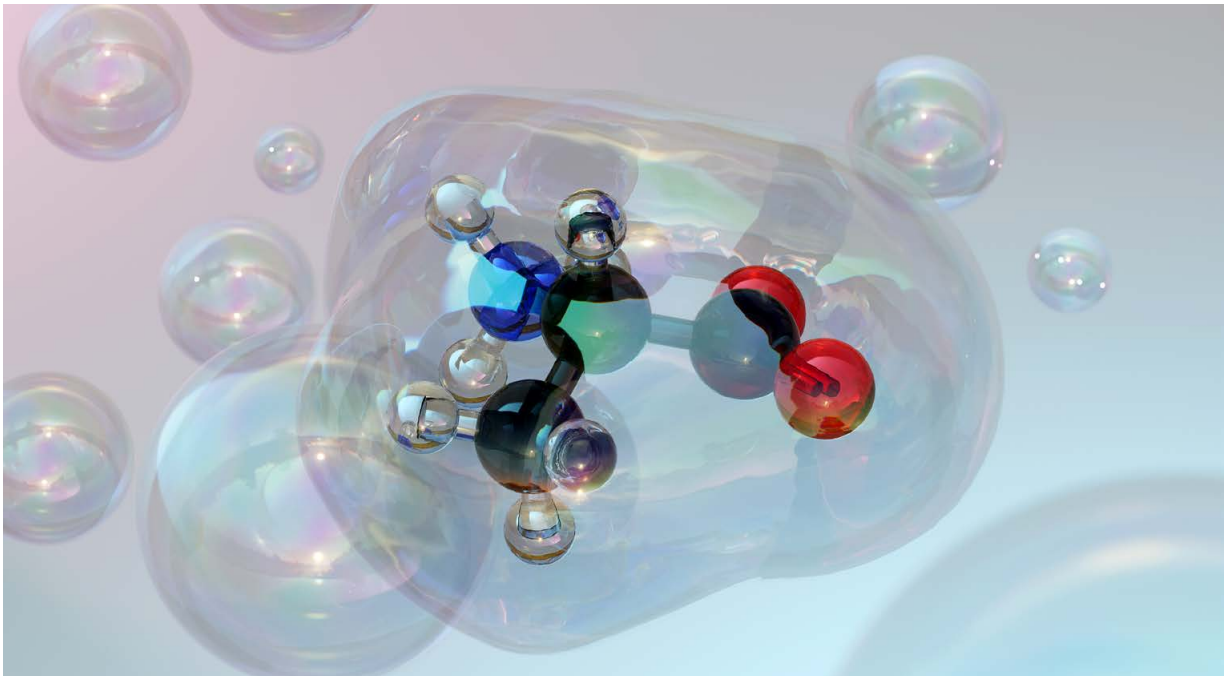
Stress granules are usually protective, but they can become harmful if they grow too large or linger too long, interfering with normal cell function. The researchers showed that adding amino acids such as proline, glutamine, and glycine can weaken the sticky interactions that drive stress granules, leading to fewer and smaller droplets.

"This project starts from a basic observation in nature that inside a cell, there's a very high concentration of proteins, all interacting yet staying soluble," says NCCR principal investigator Francesco Stellacci, who co-led the research at EPFL's School of Engineering. "But outside the cell, the proteins would just aggregate and precipitate, so we asked ourselves – how is this possible?"

The answer, Stellacci says, lies in the cell's arsenal of free amino acids. Cells not only store amino acids to build new proteins, but they also ramp up amino acid production when under stress, particularly when that stress – for example, high concentrations of salt – might cause proteins to clump and lose function. "We realized that nature counters the destabilizing effects of salt or stress with amino acid production," Stellacci says.

> "We can protect cells from some stress-related effects by simply adding amino acids."
>
> Prof. Francesco Stellacci, EPFL

The researchers showed that amino acids act as molecular buffers, making proteins slightly less repulsive to one another and preventing them from sticking together. "If we add amino acids, stress granules disappear or shrink," Stellacci says. "In



Amino acids such as alanine serve as the fundamental building blocks of protein

other words, we can protect cells from some stress-related effects by simply adding amino acids." The researchers published their findings in PNAS.

The work was made possible by a collaboration with NCCR principal investigator Eric Dufresne, professor of Materials Science and Engineering at Cornell University, who brought crucial expertise in protein-protein interaction. "This project really started as a corridor conversation at an NCCR annual conference, and from there it grew into a full collaboration."

Beyond advancing fundamental biology, the findings open new possibilities for stabilizing proteins in biotechnology and medicine. Amino acids are already used in protein formulations to stabilize drugs. "Now, we think we can rationally design formulations and make them into something therapeutic," Stellacci says.

Although clinical applications may still be years away, the study identifies a key regulator of stress granules and highlights how inspiration from nature can guide new approaches to help cells stay healthy. A follow-up study by Stellacci and Alfredo Alexander-Katz at MIT, published in Nature, has since clarified the mechanisms underlying this effect, strengthening the idea that amino acids play a central role in maintaining protein stability and solubility.

"We found something very fundamental in biology, and that often opens the door to many new discoveries," Stellacci says. "I think this study will inspire others to explore and build on these findings."

References

Xu, X.; Rebane, A. A.; Roset Julia, L.; Rosowski, K. A.; Dufresne, E. R.; Stellacci, F. Amino Acids Modulate Liquid–Liquid Phase Separation in Vitro and in Vivo by Regulating Protein–Protein Interactions. Proceedings of the National Academy of Sciences 2024, 121 (50), e2407633121.

111

Researchers

incl. PhD students, postdocs, senior researchers and professors

Gender balance

55% of the NCCR Ph.D. students were women

48% of the postdocs and senior researchers were women

38 Nationalities

including Switzerland, Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Croatia, Egypt, Ethiopia, France, Germany, Greece, Hungary, India, Ireland, Italy, Japan, Netherlands, Pakistan, Poland, Portugal, Romania, Russia, Serbia, Slovenia, South Korea, Spain, Thailand, Tunisia, Turkey, UK, Ukraine, USA, Vietnam

49

oral presentations at conferences (including 24 keynote and plenary lectures at international conferences)

47

Publications

including 45 original contributions, 1 review, and 1 letter

74%

of open access publications

following the Gold or Green roads and through institutional agreements

Note: All figures between June 1, 2024 – May 31, 2025

In brief

Innovation recognized

The NCCR-supported start-up Xemperia was the recipient of multiple awards in 2024 and 2025.

Former NCCR PI Prof. Curzio Rüegg and his team were recognized with the Innovation Fribourg Freiburg Start-up Prize, worth CHF 30,000, for developing a non-invasive blood test for breast cancer screening. Xemperia received the most votes in a selection process combining the jury's choices (one-third) and the public's (two-thirds). In January 2025, the University of Fribourg spin-off also finished second at the Ypsomed

Xemperia's innovation has impressed beyond academia

Innovation Award, taking home CHF 25,000. Xemperia's work was also recognized with its selection for the Tech4Eva 2025 accelerator program. Tech4Eva is a global Femtech community with a 6-month equity-free start-up acceleration program for companies developing innovative women's health solutions, managed by the non-profit Foundation EPFL Innovation Park.

Ambizione

NCCR member Viola Vogler-Neuling (AMI) was awarded an Ambizione fellowship from the Swiss National Science Foundation (SNSF) – one of Switzerland's most competitive research grants.

Over the coming years, her team will investigate how nature creates some of its most dazzling colors and explore ways to reproduce them sustainably in the lab. If successful, the research could lead to biodegradable photonic pigments inspired by nature, offering brilliant, long-lasting colors without toxic chemicals or fading. Such materials could be used in displays, optical devices, and many other technologies, while advancing our fundamental understanding of how nature creates long-lasting colors. The funding from the SNSF's Ambizione program is specifically designed to enhance the scientific profile of researchers from Switzerland and abroad and help them become scientifically independent early in their careers with a project of their own.

Young researchers gather

EPFL hosted the NCCR young researchers' third internal conference in February 2025.

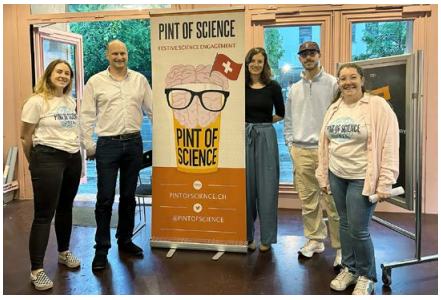
Organized by PhD students Rocio Garci-Montero, Maja Lopandic, and Helena Miljkovic, with the support of the NCCR management team, it included talks, a poster session, an invited AI talk, and a workshop on responding to unconscious bias.

The NCCR's young researchers met at EPFL

Pint of science 2025

The Pint of Science festival returned to Fribourg in May 2025 as part of a global event.

The local organizing team included NCCR PhD students Carolina Pierucci and Iulia Scarlat (both Adolphe Merkle Institute). Our Center was one of the



Pint of Science has proven popular in Fribourg

sponsors of the events held in Fribourg, while two of its researchers gave presentations about the materials of tomorrow. PI Prof. Marco Lattuada gave a talk about nanoparticles and their use in the preparation of novel materials and the formulation of new medicines. NCCR WINS Fellow Dr. Manon Guivier presented how, by drawing inspiration from natural materials such as wood or leaves, it will be possible to create bio-based, high-performance, and more environmentally friendly "super" materials.

Pint of Science is an international science festival that takes place annually in cities worldwide, over the same three evenings. In Switzerland, the festival was hosted in 12 cities, including Fribourg, where presentations in English, French, and German ranged from biology and medicine to literature, history, and law.

Outreach

NCCR members participated in a variety of outreach programs and school visits, including the KidsUni program sponsored by our Center at the University of Fribourg, the national Science for You(th) program, Fribourg's Passport Vacances (holiday passport) activities, and the National Future Career Day.

The NCCR additionally hosted visits from different organizations and institutions including the Swiss Engineering association, Fribourg's

Teachers from Etoy high school in canton Vaud learned about STEM activities

Collège St-Michel, Collège de Gambach, and Institut St-Joseph, as well as teachers from the Etoy high school in canton Vaud.

The Bioinspired 2025 conference brought leading specialists in the field to Switzerland

Conference

In August 2025, NCCR PI Prof. Esther Amstad (EPFL) and NCCR alum Prof. Stephen Schrettl organized the Bio-inspired 2025 conference in Emmetten, Switzerland. This was the third conference in the series, primarily sponsored by the NCCR.

As in previous editions, the five-day conference brought together world-leading scientists in the field of bioinspiration.

NCCR PIs Prof. Barbara Rothen-Rutishauser (AMI) and Prof. Nico Bruns (TU Darmstadt) were invited speakers, and several NCCR members and alumni gave talks. Along with the upcoming Gordon Research Conference on Bio-inspired Materials, which NCCR PI Prof. Ullrich Steiner will co-chair in 2026, these events strengthen Switzerland's international profile in the Center's domain of competence.

Swiss Nano-convention 2024

As part of our Center's outreach, NCCR PI Prof. Barbara Rothen-Rutishauser (AMI) participated in the Swiss Academy of Engineering Sciences TecDay organised at the Swiss Nanoconvention in Basel in June.

This event, aimed at students working towards their Matura, the diploma required to enter university, was a collaboration between the Swiss Nanoscience Institute (SNI) and the Swiss Academy of Engineering Sciences (SATW), supported by the Swiss MNT Network. Focusing on nanoscience, the TecDay offered a glimpse of an international conference and

The SATW TecDay in Basel

exciting insights into wide-ranging research and applications. Rothen-Rutishauser led one of the day's modules.

The SATW TecDays, organized since 2007 in collaboration with Swiss secondary schools, offer a full day dedicated to STEM subjects. These interactive events give students the opportunity to explore the world of technology and engage directly with professionals in the field through a wide range of modules. Since its inception, more than 90,000 students have participated in the program, which is regularly supported by NCCR PIs.

Amith Kamath of the University of Bern was the winner of the Falling Walls Lab Fribourg

Falling Walls Lab

As part of its outreach activities, our Center organized the second edition of the Falling Walls Lab (FWL) Fribourg pitching competition at the Adolphe Merkle Institute in June 2024.

The winner was Dr. Amith Kamath of the University of Bern's ARTORG Center for Biomedical Engineering Research. His pitch "Breaking the wall of radiotherapy with AI" convinced the jury he was worthy of stating his case at the global final in Berlin in November. Also selected for the international final was Dr. Wachara Chanakul (Adolphe Merkle Institute), who placed second with his pitch focusing on novel early diagnosis of Alzheimer's Disease. Third place went to AMI PhD student Isidora Loncarevic, who presented solutions to replace animal experimentation in laboratories.

The FWL is organized as part of a global pitch competition that provides a stage for an interdisciplinary pool of students and early-career professionals to present their breakthrough ideas in just three minutes. In 2024, more than 2,500 applicants vied for a place in Berlin.

Christmas cheer

Our Center produced a new science-themed advent calendar for the holiday season. The calendar is designed to foster interest in bio-inspired science among both children and adults and can be shared in family, social, or professional settings.

The calendar was designed by Colin Montet

Publication highlights

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Francesco Stellacci is the recipient of multiple ERC grants

ERC grant

NCCR PI Prof. Francesco Stellacci (EPFL) was awarded in 2025 a highly coveted ERC Advanced Grant for the second time.

The grant recognizes his groundbreaking project, "Engineering Protein Interactions Using Small Molecules," which aims to advance the understanding and manipulation of protein interactions – a key area in biotechnology and medical research.

Stellacci previously received an ERC Advanced Grant in 2020, securing over €3 million in funding for his ongoing project, "Nature-inspired Circular Recycling for Polymers."

Award-winning

NCCR PI Prof. Barbara Rothen-Rutishauser (AMI) was recognized in 2025 with the International Society for Aerosols in Medicine (ISAM) Juraj Ferin Award at the organization's congress in Washington, DC.

Barbara Rothen-Rutishauser has been in recent years one of the driving forces of ISAM

Named after Juraj Ferin, a scientist and medical professional recognized for his contributions to the field of aerosols in medicine, the prize is given to society members who have made outstanding contributions to ISAM. The award also highlights excellence in medicinal aerosols and inhalable materials, as well as commitment to advancing the ISAM's mission and goals.

Prizes and honors

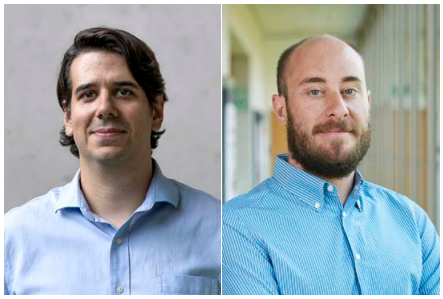
Early-career researchers affiliated with the NCCR have continued to distinguish themselves through outstanding scholarly achievements and recognition at national and international scientific events. The following distinctions highlight their excellence and dedication.

Ivana Domljanovic (University of Fribourg) was awarded the Moses Schanfield Young Investigator Award at the 2024 conference of the International Society for Applied Biological Sciences in Split, Croatia. She was recognized for her work on breast cancer diagnostic tools.

Iulia Scarlat won the poster prize at the Swiss Soft Days at EPFL

NCCR PhD student Iulia Scarlat (AMI) was the winner of the poster prize at the Swiss Soft Days held at EPFL in October 2024. Another of our PhD students, Meron Debas (University of Fribourg), was the recipient of a poster prize at the 2024 conference of the European Colloid and Interface Society in Copenhagen.

NCCR postdoctoral researchers Deepika Sardana (EPFL) and Gözde Deveci (TU Darmstadt) were among the 600 young scientists selected for the 74th Lindau Nobel Laureate Meeting in Chemistry in June 2025.



Georges Formon and Andrea Dodero

Novel ideas

The NCCR opened an internal call for "NCCR Independent Projects" in the first semester of 2025.

This was a one-time call to offer current Center researchers below the Principal Investigator level the opportunity to independently develop and test new research ideas in the domain of bio-inspired materials. A total of 14 proposals were submitted by researchers from nine NCCR groups. A two-step evaluation of the projects was carried out first internally to create a shortlist, followed by an external review. Two projects were awarded CHF 100,000 each to researchers at the Adolphe Merkle Institute – Georges Formon (Collagen-inspired hard and tough materials) and Andrea Dodero (Magnetically reconfigurable photonic gels for adaptive camouflage). Dodero was also the recipient in 2025 of a Spark grant from the Swiss National Science Foundation to investigate a new generation of lasers based on spherical polymer microcavities that emit light radially with high efficiency.

Viola Vogler-Neuling (AMI) was awarded an Innocheque worth CHF 15,000 from Innosuisse, the Swiss Innovation Agency. The funding was to develop a proof of concept for a more sustainable cheesemark in collaboration with the Interprofession du Gruyère, the body that represents the interests of Gruyère cheese producers operating under the Protected Designation of Origin. Another Center postdoc, Anasua Mukhopadhyay (AMI), was the recipient of a Young Investigator Award from the Novartis Foundation for Medical-Biological Research in April of the same year, worth up to CHF 80,000.

Gender equity

NCCR PI Prof. Barbara Rothen-Rutishauser (AMI) co-chaired the Women's Networking Lunch at the 25th International Society of Aerosol Medicine (ISAM) Congress, held in Washington, DC, in June 2025.

The event brought together early-career and senior researchers in aerosol science to share experiences, reflect on how professional societies like ISAM can advance gender equity, and discuss ways to support women scientists at all career stages while fostering strong, inclusive networks. First launched in 2019 in Montreux, Switzerland, this initiative has since evolved into a valued forum for mentoring, exchange, and inspiration.

Attendees of the Women's Networking Lunch


Antonia
Georgopoulou
EPF Lausanne
Institute of Materials

Research equality

Offering better opportunities to female scientists

Since its launch, the NCCR Bio-Inspired Materials has actively promoted equal opportunities (EO) through its activities.

The Women in Science (WINS) Postdoctoral Fellowship is the flagship of the NCCR's EO program, designed to support the professional advancement of exceptional female researchers and promote gender parity in academia.

The WINS fellowship's primary goal was to attract excellent scientists committed to pursuing an academic career. It did so by funding the fellow's original research ideas and integrating them into a strong international network. The package they received was also extremely attractive, providing a full researcher's salary for two years and generous allowances for research-related expenses and travel. The program was open to female applicants of all nationalities who had completed their first doctoral degree within the past five years. Successful WINS grantees were (and still are) hosted by one of the Center's groups.

One of the latest WINS grantees, Dr. Antonia Georgopoulou recently completed her WINS Fellowship at EPFL in NCCR PI Esther Amstad's group, focusing on the development of an electronic skin (e-skin) inspired by how human skin senses the world - capable of detecting touch, temperature, humidity, and even chemical signals like acidity. Potential uses for e-skin include prosthetics, wearable health devices, and robots that interact safely and intuitively with people.

Antonia Georgopoulou was among the WINS recipients whose career was boosted by the fellowship

"The WINS fellowship provided the resources to pursue a high-risk project," she explains, "while supporting the development of a collaborative network essential to the project's success, including partnerships with robotics groups at EPFL such as the CREATE Lab and the Laboratory of Intelligent Systems."

According to Georgopoulou, these collaborations were critical for achieving the project's goals. The fellowship also allowed her to develop skills and confidence in planning and executing her research project, while boosting her professional profile, helping her broaden her network and form meaningful collaborations.

The program provided additional benefits. "I particularly enjoyed participating in internal NCCR events, especially the skills workshops and opportunities to interact with PIs," said Georgopoulou. "These sessions provided practical insights on grant writing, faculty interviews, and launching my own lab, which were incredibly valuable for my professional development and future career planning."

With funding comes freedom

Dr. Khay Fong, the first WINS recipient, had highlighted the system's advantages early on. "During the fellowship, I was afforded the freedom and funding to run my projects independently as well as tap into the expertise of the group

and contribute to their projects in turn," she said shortly after completing fellowship.

Another of the first WINS Fellows, Dr. Yendry Corrales, also noted that the fellowship gave her the resources and time to develop a topic she was passionate about while working in an intellectually stimulating, multidisciplinary environment. At the Adolphe Merkle Institute, she investigated the unique properties of the slime secreted by a carnivorous velvet worm (Epiperipatus biolleyi), revealing that it is a biodegradable composite material with strength comparable to that of petroleum-derived polymers such as nylon.

Lack of parity

The main driver of the WINS project was the lack of parity in academia, especially in the fields of natural and life sciences. Female researchers are for example less likely to be offered a professorship. Data has shown that science has been traditionally biased in favor of male researchers. In this context, the WINS program could be seen as a measure to plug the leaky pipeline that sees female researchers fall by the wayside after completing their PhDs. The goal was to level the playing field and create a gender-balanced academic system.

For Fong, who investigated lipid-based drug delivery systems for on-demand diagnostics and treatments, the fellowship led to a lectureship at the University of Newcastle in Australia. For Corrales, her career led her back to Costa Rica, where she is a researcher at the National Laboratory for Nanotechnology (Lanotec).

For Georgopoulou, the fellowship allowed her to remain in academia and pursue a project she was deeply passionate about, helped her develop new perspectives in bioinspired materials, and refine her research vision and long-term goals. "The experience has also prepared me to take on leadership roles in academia, equipping me with practical insights for managing a lab, mentoring students, and securing future funding," she adds. The successful outcome of this was her appointment to a group leader position at Germany's Max Planck Institute for Intelligent Systems.

For the NCCR's Faculty Delegate for the Advancement of Young Researchers and Women, Prof. Barbara Rothen-Rutishauser, the program's strength was that it tackled an issue that was prevalent at a critical phase for female researchers, at the senior postdoc level. "By offering them a two-year timeframe to establish their independent research niche and the network that the NCCR has, they had the optimal environment to perform excellent science and to look for their next position," she explained. Her own group hosted three Fellows that went on to senior positions in research.

Rothen-Rutishauser believes that universities, when necessary, should consider programs such as WINS to redress important imbalances between senior male and female researchers.

"Funding agencies, which have begun in many cases to address the issue, also need to be aware and implement clear guidelines to improve the rate of successful female applications for career programs," she added.

Current WINS projects

Bio-inspired cellulosic materials mimicking the hierarchical architecture of wood – Manon Guivier, University of Fribourg

Co-assembly of biomolecular nanocages with nanoparticles and proteins to synthesize hybrid functional materials for biomedical applications – Sakshi Schmid, EPFL

Hybrid photonic nanostructures applied to the development of highly sensitive biosensors for multiplexed miRNA detection – Milagros Montemurro, University of Fribourg

Equal opportunities impact

The NCCR has advanced equal opportunities at the University of Fribourg through a comprehensive Gender Equality Policy. Key initiatives:

– Women in Science (WINS) Postdoctoral Fellowship
– Reserved daycare spots
– The Pregnancy Support Grant for experimental scientists

The Center has fostered an equal opportunities culture through mentorship, as well as professional development workshops on negotiation and gender bias. It has also integrated its expertise into the University's institutional structures through the Faculty of Science and Medicine's Equal Opportunity Committee.

The first SAEIF meeting was successful enough to launch further events

SAIEF

Driving academic innovation in Switzerland

Knowledge and technology transfer have gradually gained momentum at Switzerland's universities for the past quarter-century. Yet there is much room for improvement, the Swiss Academic Innovation and Entrepreneurship Forum (SAEIF) launch in 2025 demonstrated.

The SAIEF was established by a broad group of institutions, including the Universities of Zurich, Bern, Basel, and ETH Zurich, EPFL, along with the NCCR, to enhance exchange and knowledge transfer about academic innovation and entrepreneurship support. This initiative aims to fill a void where inter-institutional exchange was largely informal and unstructured. The SAEIF incorporates the Swiss Forum for University and Student Innovation conferences, helmed by the NCCR Bio-Inspired Materials and organized in 2017, 2019, and 2021.

"We were planning another conference, but when the first discussions on the SAIEF began in early 2024, it was agreed to merge our events and build a new, larger consortium of universities, with the conference held as the SAIEF," explains Dr. Eliav Haskal, the NCCR's Knowledge and Technology Transfer manager.

"This was a logical step, considering the broad approval of the perceived importance of the forum, and the impending end of the NCCR in 2026 – and we thus ensured that the innovation event would have traction for years to come."

The SAEIF's first full-day event, hosted at the Swiss Center for Design & Health in Biel, tackled key questions such as creating an ecosystem and culture that truly nurture innovation. "The encouragement of innovation and entrepreneurship at Swiss universities remains an important issue; while the federal universities are building many companies and their reputations as entrepreneurship hubs in Switzerland, the cantonal universities are more or less succeeding, while the universities of applied sciences are not yet really present at all," says Haskal.

Discussions emphasized that current university incentive structures are not quite adequate for entrepreneurship as compared to research. To address this, recommendations from attendees included awarding ECTS credits for entrepreneurial projects and showcasing accessible role models for entrepreneurship, including current students and professors.

Universities were also urged by participants to strategically prioritize innovation institutionally, foster inter- and transdisciplinary collaboration, and diversify career paths beyond traditional publication metrics. Furthermore, institutions should function as innovation hubs by educating about investment opportunities, promoting a fundraising mindset beyond grants, and actively attracting investors through mapping and building the ecosystem.

"This has been shown to be possible, with direct influence from directors – especially at the Universities of Basel, Geneva, Bern, and Zurich – who have emphasized the importance of building universities on three pillars: Research, Education, and Innovation," says Haskal. "The universities have invested in new innovation offices, allocated funding for new programs to support entrepreneurship training and innovations such as fellowships, proof-of-concept funding, and mentoring programs, all of which are responsible for encouraging and boosting innovation."

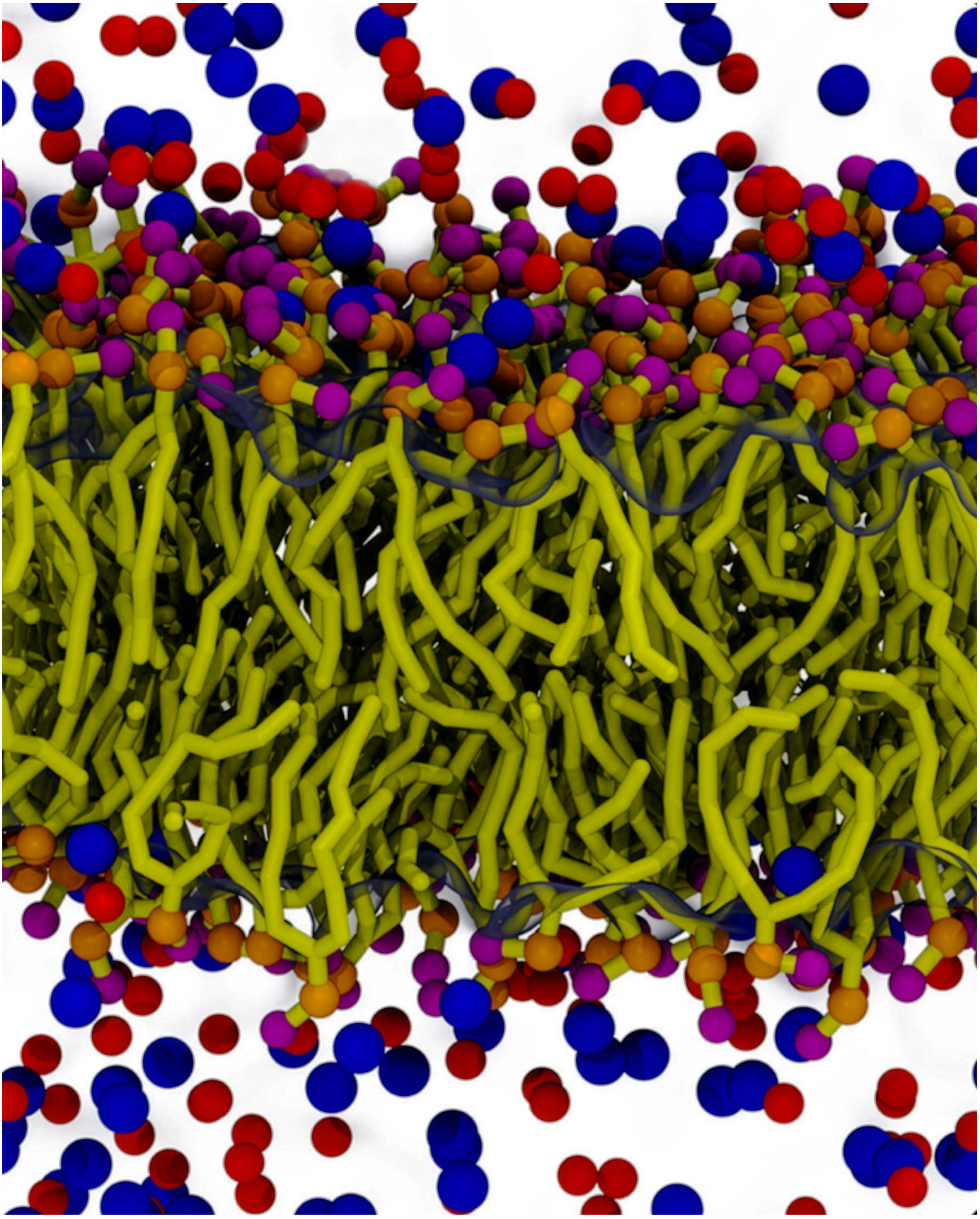
The conference also highlighted the need for differentiated entrepreneurship education, with bachelor's students requiring inspiration and structure, master's students seeking real-world challenges, and PhD students needing training to unlearn and relearn skills to truly address entrepreneurial practices.

A significant challenge identified within the event's different workshops concerned the "transfer" phase of startup support. Experts noted a substantial lack of transparency in the licensing process between technology transfer offices and future founders, resulting in power imbalances and issues of distrust.

Participants recommended implementing clear fast-track models to remedy this, citing examples from the Technical University of Munich and Cornell University. These models offer structured elements, including detailed steps, predefined timelines, and template agreements, to enhance transparency and fairness. Another recommendation was that universities should better educate and prepare future founders before they enter negotiations with potential partners.

The inaugural SAIEF meeting was well received by participants, according to the organizers. Attendees particularly valued the unique networking opportunities with innovation and entrepreneurship experts from the academic ecosystem. For future conferences, the aim is to provide more dedicated networking time and longer workshops for in-depth discussions, explore the benefits of better collaboration between universities, and promote mindset and structural change within academia.

"Competition with Switzerland as the most innovative country on Earth does not stand still, and if we are to remain competitive globally, we must also share experience, build ecosystems, and create interdisciplinary programs with all the Swiss universities," concludes Haskal.



Education

Internship program boosts NCCR profile

The NCCR Bio-Inspired Materials Undergraduate Research Internship is the Center's flagship education program, bringing bachelor students from around the world to work on the Center's ongoing projects.

Since its creation in 2014, the program has provided more than 180 students with new skills and perspectives, and has increased the Center's global impact through an ever-widening network.

Every summer, the NCCR welcomes up to 20 undergraduate students from around the world, including countries like the USA, the United Kingdom, Canada, Germany, and Korea. With over 100 applicants each year, the Center makes rigorous selections based on the best potential fits for the available projects. "Over the years since our NCCR was launched, we have succeeded in establishing an excellent reputation for our summer internships," explains Dr. Barbara Drasler, who manages the URI program. "The quality of all the applicants means choosing interns who are the best fit for a project is not a simple process, but we know that whoever is chosen, we can be confident in their skills."

Many students are drawn to the program by personal recommendations from alumni and professors who highlight the unique experiences and opportunities for global connection. The chosen URIs spend 8 to 12 weeks in one of the NCCR's laboratories, working on research projects and gaining hands-on experience. This includes learning specific lab techniques, physics skills, and analysis methods that they might not acquire during their studies. Participants also learn about the process of research, from establishing a theory to testing it, and develop an appreciation for scientific material and knowledge.

The internships also help students develop transferable skills and explore various career options. Many students have found that the experience helps them confirm earlier choices about their field of interest and decide their next career steps, and they note that it could be beneficial for future job or PhD applications.

The program was designed to help students clarify their career paths. For instance, Nicole Mortensen from the University of Utah found that the program solidified her desire for a Master's degree and that she enjoyed full-time research more than she anticipated. Molly Sun, a chemistry student at the University of Chicago, discovered a passion for materials and later completed a PhD in chemistry at Northwestern University. Similarly, another student, Minji Han from University College London, narrowed her desired field of study for a

Over 180 students have taken part in the URI program since its launch

Master's to lithium-ion batteries based on her project. She now works in the industry sector in South Korea in this specific field. The URI experience also makes students more receptive to living and working abroad, with some expressing interest in pursuing a PhD in Switzerland or other countries.

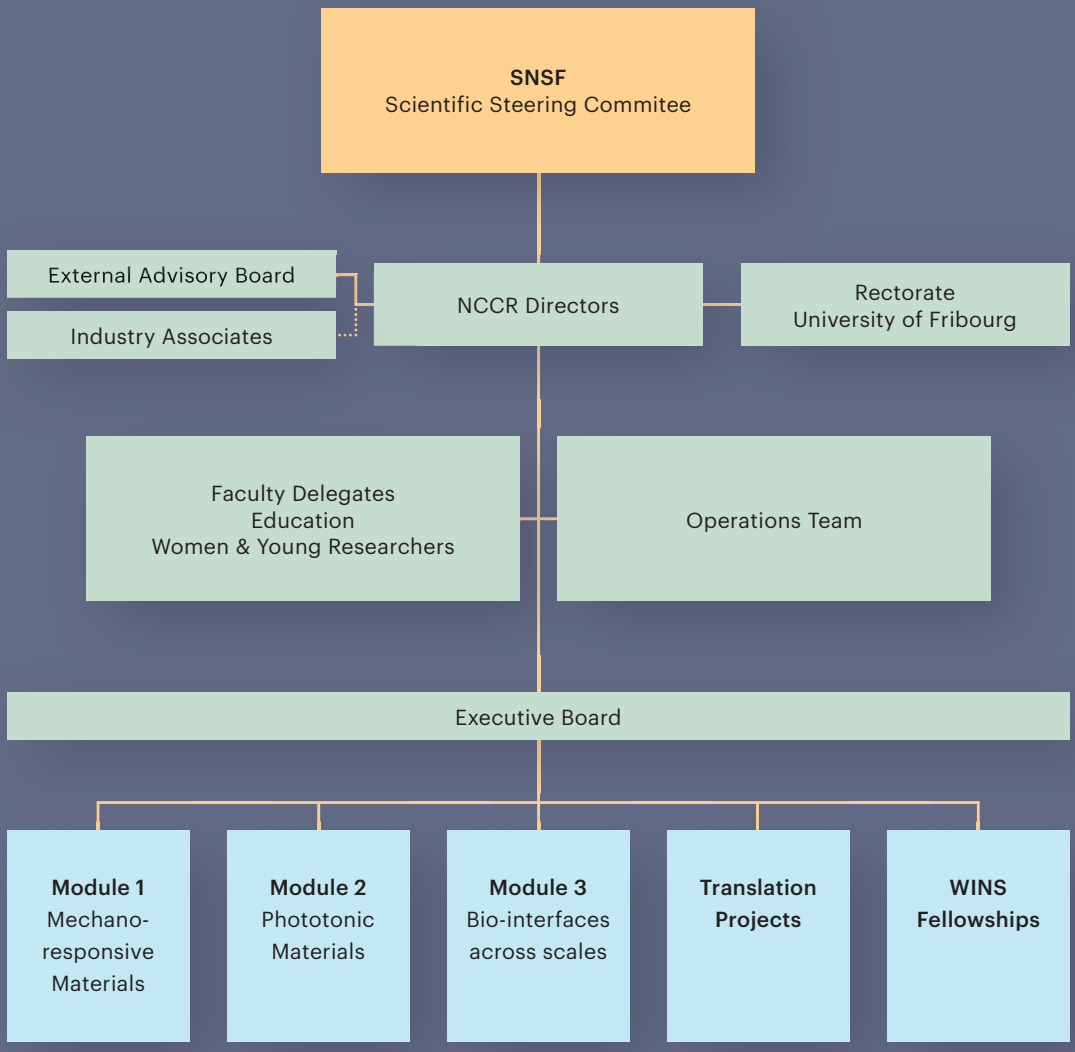
During the summer program, participants can interact with leading experts in their fields and with their fellow students. This has helped create a new scientific community with an international perspective. Students frequently highlight the benefits of working with people from diverse backgrounds, experiences, and perspectives, and appreciate the opportunity to connect with researchers from around the world. The program actively promotes global scientific collaboration by bringing together students and researchers from diverse international backgrounds. It creates new networking opportunities not only for the undergraduates but also for the NCCR's Principal Investigators, postdoctoral researchers, and PhD students. Interns have also actively contributed to scientific publications, showcasing the quality of research and experience provided. The program also provides development opportunities for the PhD students and postdoctoral researchers who mentor the undergraduates.

Beyond laboratory research, students attend scientific lectures, social and networking events, which further facilitate interaction. For example, they get to present their work at a poster session towards the end of their stay. The URI experience also makes students more receptive to living and working abroad, with some expressing interest in pursuing a PhD in Switzerland or other countries at a later time.

By the numbers

The URI program has hosted 184 undergraduate students over an 11-year period from 2015 to 2025. The initiative has resulted in 21 peer-reviewed publications spanning from 2019 to 2025, demonstrating significant research productivity. Students so far represent 21 countries and come from 63 universities worldwide. The United States and the United Kingdom sent the most students, representing over three-quarters of the total intake.

Organization Phase III



Swiss National Science Foundation

The National Centers of Competence in Research (NCCR) are a research instrument of the Swiss National Science Foundation

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- Prof. Stefan Salentinig (UniFR), Leader Module 3
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- Thomas Kainz, Doctoral student
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- Sneha Agarwal
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- Joanna Nowicka
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- Braden Bradford
  (Texas A&M University)
- Andrei-Mircea Top
  (University of Sheffield)
- Avery Tran
  (University of Delaware)
- Šime Demo
  (University of Split)
- Klea Sinjari
  (Western Balkans University)
- Carina Lin
  (Cornell University)
- Isabella Zastrow
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- Benjamin Cave Calland
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- Jayli Day
  (California Polytechnic State University San Luis Obispo)
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Abbreviations:

AMI: Adolphe Merkle Institute;
UniFR: University of Fribourg;
EPFL: Federal Institute of Technology Lausanne;
ETHZ: Federal Institute of Technology Zurich

Projects

Module 1: Mechano-responsive materials

1. Transiently pulsating materials inspired by the heart (Boesel, Bruns, Studart)
2. Mechanochromic force transducers for biosystems and synthetic hydrogels (Clough, Klok, Mayer, Milic, Weder)
3. Atomically thin mechanosensitive membranes for water treatment (Radenovic, Vanni)

Module 2: Photonic materials

4. New opportunities for tuning colloidal crystals using nanorattles (Acuna, Fromm, Salentinig, Scheffold)
5. Complete photonic band gaps materials by self-assembly of ABC bottlebrush block polymers (Dufresne, Kilbinger, Steiner, Wilts)
6. Enhancing structural colour through absorption (Dufresne, Lattuada, Steiner, Wilts)
7. Complex disordered photonic architectures by self-assembly (Acuna, Scheffold)
8. Bottom up meets top down: Controlling assembly from mm to nm (Acuna, Fink)

Module 3: Bio-interfaces across scales

9. Dynamic surfaces for tissue engineering and tissue remodeling (Fink, Rothen-Rutishauser)
10. 3D printing of functional organoids using viscoelastic capsules (Amstad, Lütolf)
11. Increasing dispersion stability with biocompatible small molecules (Dufresne, Ianiro, Stellacci, Vanni)
12. Antimicrobial surfaces (Kilbinger, Klok, Rothen-Rutishauser, Salentinig, Stellacci)
13. DNA Origami-based sensor for the multiplex detection of mRNA in cancer (Acuna, Rüegg)

Translation projects

14. Bright white scatterers beyond titania (Scheffold, Steiner, Pugin)
15. Healable Polymer Coatings (Weder)
16. Fabrication of load bearing, soft actuators (Amstad, Dufresne)
17. Bioinspired 3D printed porous ceramics for carbon capture (Studart)

WINS Fellowships projects

18. Next generation of polymeric nanovaccine for brain cancer immunotherapy (Sousa)
19. Electronic skin with selective multi-sensing capabilities inspired by natural sensory neuro-receptors (Georgopoulou)
20. Hybrid functional material for biomedical applications (Schmid)
21. Bio-inspired cellulosic materials mimicking the hierarchical architecture of wood (Guivier)
22. Hybrid photonic nanostructures applied to the development of highly sensitive biosensors for multiplexed miRNA detection (Montemurro)

Publications

Module 1

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Module 2

Adamczyk, A.K.; Zhu, F.; Schäfer, D.; Kanehira,Y.; Kogikoski Jr., S.; Bald, I.; Schlücker, S.; Kołątaj, K.; Stefani, F.D.; Acuna, G.P., Coupling single molecules to DNA-based optical antennas with position and orientation control, ACS Photonics, 2024, 11, 5267–5272.

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Module 4 (Phase 2)

Meier, Y.A.; Duhr, P.; Mordarski, M.; Vergne, C.; Poloni, E.; Studart, A.R.; Pascal, J.; Demirörs, A.F., Magnetic hair tactile sensor for directional pressure detection, Adv. Intell. Syst., 2024, 6, 2400106.

Translation projects

Bono, F.; Strässle Zuniga, S.H.; Esther Amstad, E., 3D printable κ-Carrageenan-based granular hydrogels, Adv. Funct. Mater., 2024, 35, 2413368.

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Headquarters

Adolphe Merkle Institute, University of Fribourg. AMI is an independent competence center that focuses on research and education in the domain of soft nanomaterials

2

round tables

on topics related to equal opportunities and personal and professional development

5

start-up companies

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Over

340

children

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9

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with research institutions

Note: All figures between June 1, 2024 – May 31, 2025

Seminars

Speaker	Talk	Home Institution	Date
Dr. Sakshi Schmid	Symmetry breaking drives protein assembly into a forbidden liquid-crystal phase	EPFL, Switzerland	June 13, 2024
Dr. Nicole Kleger	Where Medtech and Food Science Meet - A Startup Journey	Sallea, Switzerland	July 4, 2024
Prof. Mark Tibbitt	Engineering dynamic polymer networks with reversible bonds	ETHZ, Switzerland	October 17, 2024
Prof. Walter Richtering	Microgels: Soft matter where softness matters	RWTH Aachen University, Germany	October 29, 2024
Prof. Sonja Schmid	The timing of life at the nanoscale – new tools for new insights	University of Basel, Switzerland	November 7, 2024
Prof. Gregor Kozlowski	Mushrooms, snails and edelweiss: Nature as an endless source of bio-inspiration	University of Fribourg, Switzerland	November 21, 2024
Prof. Ursula Keller	Navigating governance challenges in academia: Addressing increasing hostility towards excellent women in leadership	ETHZ, Switzerland	December 12, 2024
Dr. Ana Hakobyan	The unstoppable power of AI	Pyxis Tech, Switzerland	May 8, 2025

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