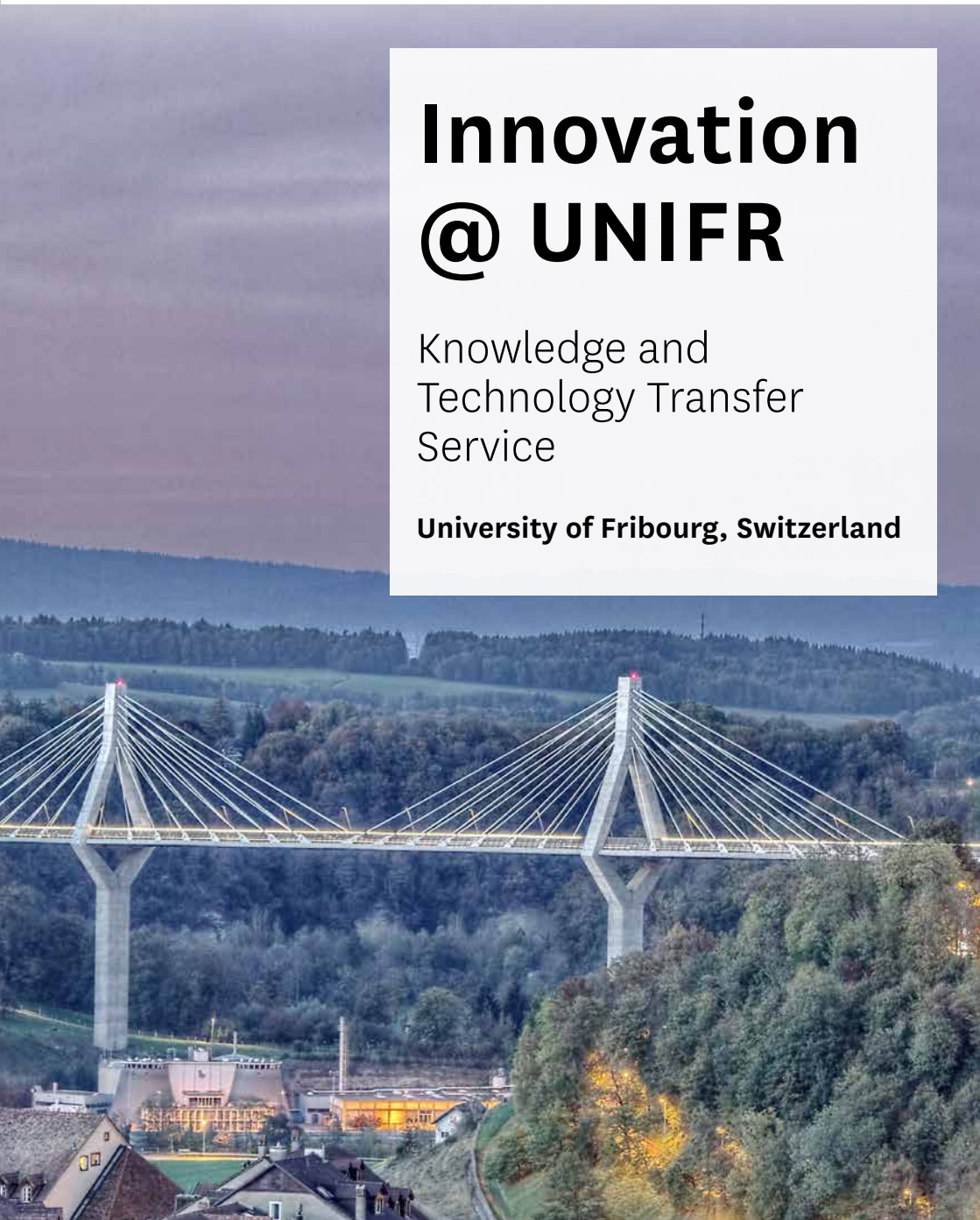
UNIVERSITÉ DE FRIBOURG
UNIVERSITÄT FREIBURG

Innovation @ UNIFR

Knowledge and Technology Transfer Service

University of Fribourg, Switzerland



Innovation @ UNIFR

Knowledge and Technology
Transfer Service
https://www.unifr.ch/research
/en/innovation/

University of Fribourg c/o
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Examples

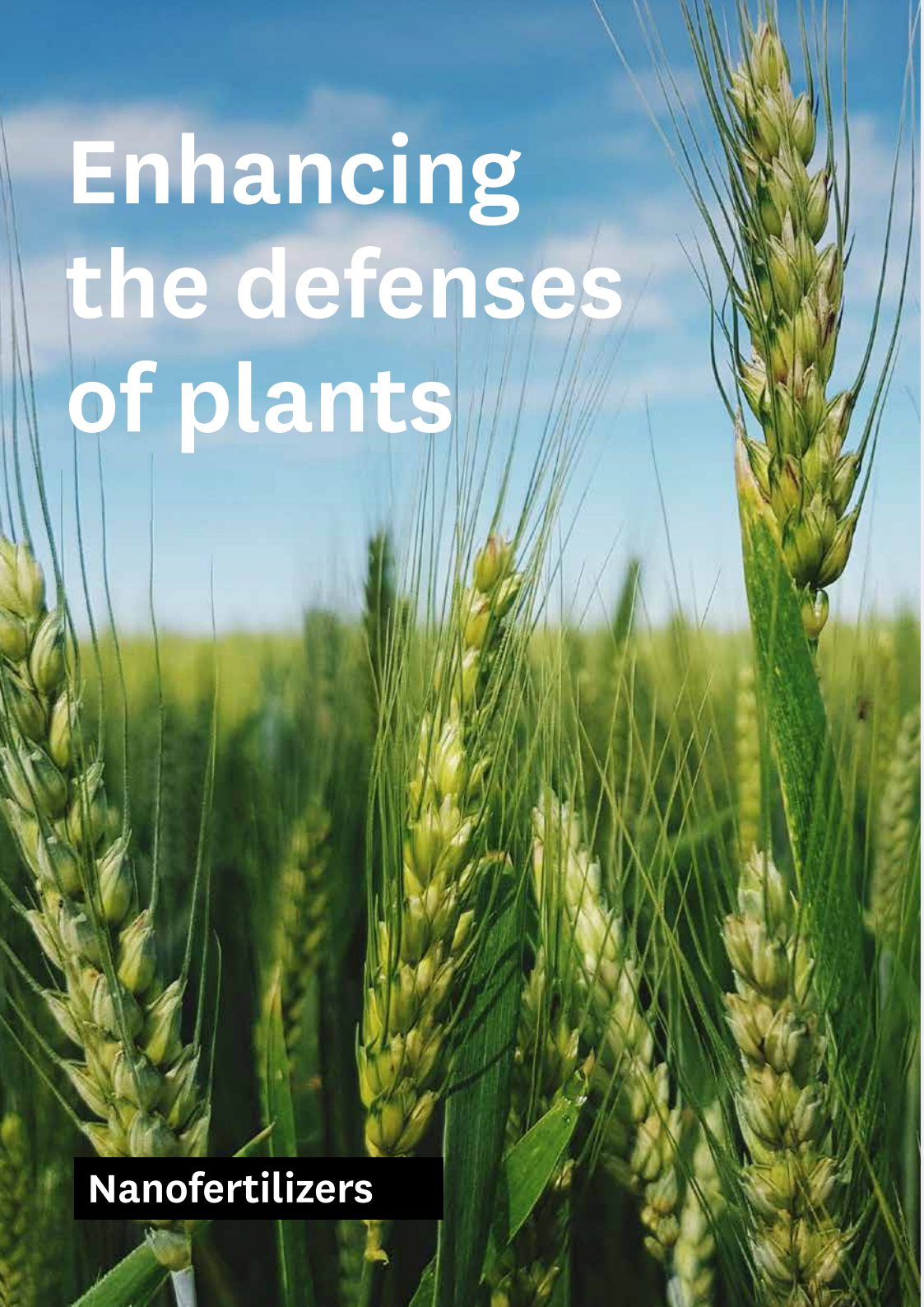
UNIFR researchers collaborate with academia and industry and are successful in applying for innovation funds, like the Swiss Innovation Agency Innosuisse, the BRIDGE program, or Eurostars. The University provides support in the application process and by protecting the intellectual property.

Support

The Knowledge and Technology Transfer (KTT) Service helps to transform research results into benefits for society. Be it through a start-up or a collaboration with an established company, the KTT Service supports you in understanding and forging a path, as well as with the drafting, negotiation and approval of research contracts and patent applications. The KTT Service manages all the intellectual property of UNIFR.

Funding

The KTT Service supports you in setting up collaborations with industrial partners by identifying funding and by providing and negotiating the appropriate agreements. Collaborations can be directly financed by the industrial partners or co-financed with funds from Innosuisse.



Enhancing the defenses of plants

Nanofertilizers

WHAT IS THIS ABOUT?

We have developed a patented, environmentally benign fertilizer based on silica. Our nanofertilizer enhances the defense of plants and makes them more resistant to disease, water, and drought stress. It can also be used as a delivery system for other ingredients.

WHAT'S THE INNOVATION?

The nanofertilizer reliably delivers beneficial orthosilicic acid to seeds and plants, thereby strengthening the plant through a variety of mechanisms. At the same time, the nanofertilizer can deliver other ingredients (including pesticides), reducing the amount of the ingredient needed for plant protection. The nanofertilizer degrades tracelessly in the environment.

WHAT ARE OUR PLANS?

We have scaled-up this technology with Innosuisse funding. Negotiations are in progress with some companies interested in licensing or supporting a start-up. If funding becomes available, we will partner with distributors, run screenings with more different crop plants, pathogens, and active ingredients, and register the product for sales on the market.

WHO WE ARE?

Dr. Fabienne Schwab is a Senior Scientist and trained Environmental Chemist (ETH Zurich) with a track record in environmental nanotechnology and plant science. She has conceived, developed, and patented the nanofertilizer, developed a business concept, and published the research in Nature Nanotechnology.

The scale-up partners are Prof. Roger Marti and Oliver Erni at HEFR (chemical engineering), and Prof. Bernhard Streit at BFH-HAFL (field trials). The project is also backed by the research group BioNanomaterials headed by Prof. Barbara Rothen-Rutishauser and Prof. Alke Fink at the AMI.

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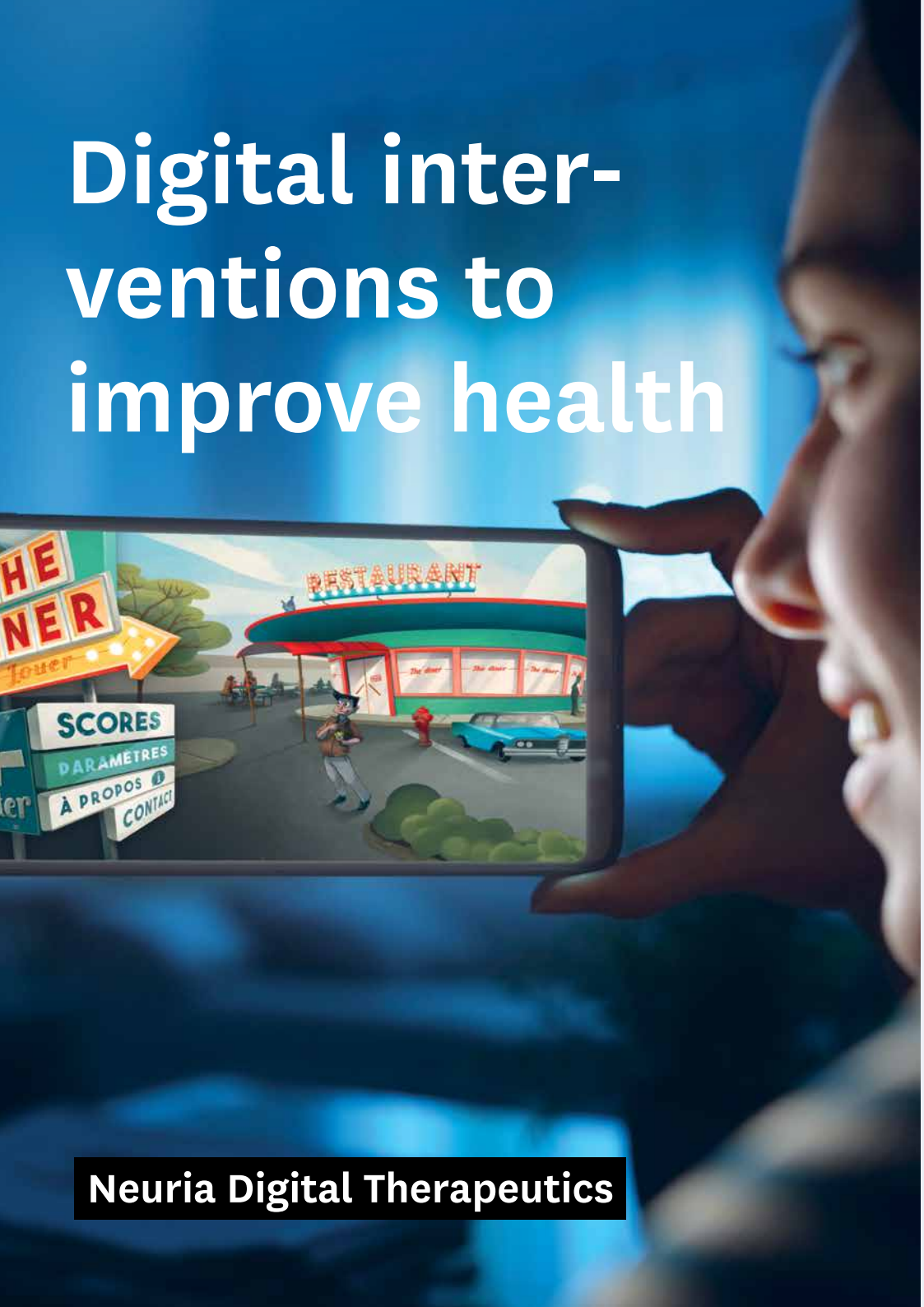
DEPARTMENT: Adolphe Merkle Institute, BioNanomaterials

Digital interventions to improve health



Neuria Digital Therapeutics

WHAT IS THIS ABOUT?

We propose digital interventions to improve health by reducing unhealthy food consumption behaviors. We design professional-level videogames that incorporate new, patented, brain training mechanisms of action allowing to reduce how much individuals like and want attractive but unhealthy food items.

WHAT'S THE INNOVATION?

In contrast to conventional effortful dieting approaches based on maintaining self-control, our interventions improve eating habits without even being aware of it. In our digital interventions, the game rules inducing the targeted brain changes are controlled by a patented human-machine interface, itself embedded in enjoyable videogames.

WHAT ARE OUR PLANS?

We first plan to propose our technology to insurances, to reduce overweight and related health costs. Additionally, we aim at providers of conventional dieting programs to potentialize their interventions. As second step, we will develop new modules focusing on smoking cessation and alcohol consumption. Educational modules will also be added to target younger populations.

WHO WE ARE?

We are a complementary team of five young co-founders, with backgrounds in neurosciences, psychology, programming, and arts. As a spinoff of the Neurology laboratory of the Medicine Section of the University of Fribourg, our core value is to improve populations health at a large scale, with evidence-based digital therapeutics interventions. We are committed to provide high-quality swiss-made software and services. We are supported by FriUp since 2021 and the Swiss Game Center.

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DEPARTMENT: Medicine Section, Faculty of Sciences and Medicine,
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The Digital Cooperative

Handling user data for the future

WHAT IS THIS ABOUT?

We aim to create a concept and implement a Minimum Viable Product to incentivize user to share their personal data with a company. We would like to do so by providing virtual shares of the business to those contributing to it with their data. There is almost an unlimited number of use cases but we expect the creation of a digital twin of traffic flows as being a good one to start with.

WHAT'S THE INNOVATION?

Current approaches using customer data (e.g. google maps) do not incentivize users to share their data. The importance for companies to gather qualitative data might be a key supplement in smaller scale business models, as the ones expected to be present in the relatively small Swiss market. We plan to provide this incentive by providing virtual shares of the business model to those contributing to it with their data.

WHAT ARE OUR PLANS?

Jointly with Swisscom, BBV AG and the city of Lucerne, we are currently developing the concept for the «Digital Cooperative» The project is Innosuisse funded and is expected to end with a minimum viable product. In case of a successful test results, we are planning to roll-out across whole Switzerland.

WHO WE ARE?

The project involves five parties: University of Fribourg and University of Lucerne are doing the integrative design research work. Swisscom provides the infrastructure and is an important implementation partner in case of a swiss-wide rollout. BBV is responsible for user testing and any potential software development. And City of Lucerne provides know-how and the playing field for the tests. Also, we would like to thank Innosuisse for the funding!

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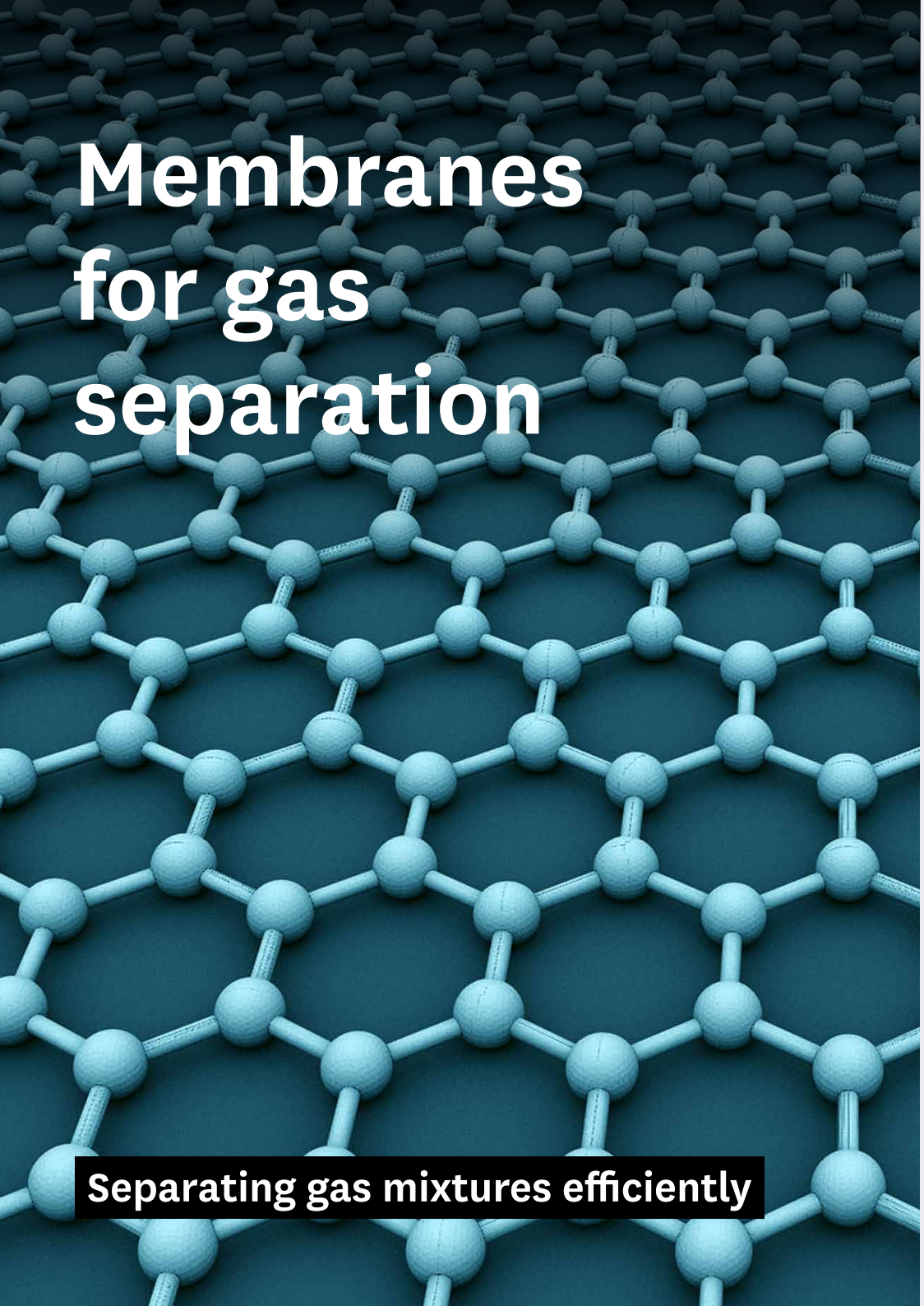
DEPARTMENT: Department of Informatics



Membranes for gas separation

Separating gas mixtures efficiently

WHAT IS THIS ABOUT?

We have developed graphene-based membranes that allow separating gas mixtures. Our first prototype allows separating hydrogen from helium at room temperature and with 100% helium purity. Our membranes can be adapted for any gas.

WHAT'S THE INNOVATION?

Traditionally, helium/hydrogen separation is achieved either by burning hydrogen and subsequent cryogenic cooling or using membranes at elevated temperatures (400–600 °C). These processes are highly energy intensive and bear the risk of helium contamination. Our patented technology (Patent application: PCT/EP2021/087114) reduces the energy needs for this process at least 100 times and reduces the size requirements for the membranes.

WHAT ARE OUR PLANS?

Our plan is to develop a membrane unit for helium/hydrogen separation that can operate for weeks without intervention. For this, we need to develop a scalable fabrication of the membranes. Once we optimized this step, we will establish a start-up company and start field tests with industrial partners.

WHO WE ARE?

I am Timur Ashirov, Ph.D. candidate at University of Fribourg, Department of Chemistry. I have developed this project under guidance of Prof. Ali Coskun. The results of this project were published in one of the highly prestigious materials science and chemistry journal, Chem and was also highlighted as a front cover for the September 2021 issue. To protect our invention, we filed an international patent application and submitted a BRIDGE proof of concept grant application.

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DEPARTMENT: Department of Chemistry

Impossible Materials

Replacing harmful white pigments with cellulose

WHAT IS THIS ABOUT?

Nowadays, white materials are present everywhere. Examples range from food, pharma, cosmetics, printing, paint, paper to coating industries. Current white enhancers are often metal-based, non-degrading materials and have recently raised serious health and environmental concerns leading to an EU wide ban.

WHAT'S THE INNOVATION?

We have developed a process to extract cellulose that can be used as white pigments or opacifiers. Cellulose is widely available, biocompatible and easy to process. Our patented, brilliantly white pigments from cellulose can be scaled with industry-proven processes and are safe to humans.

WHAT ARE OUR PLANS?

Currently we characterize our material properties, scale the production from milligram to kilogram scale in collaboration with HEIA. We are funded by Innosuisse and BRIDGE. In the future we want to start a company in Switzerland. Initially the spinout company will be selling cellulose-based white pigments to health sensitive industries, focusing on food, pharma and personal care, where biocompatibility drives buying decision, and will thereafter expand into mass-market segments.

WHO WE ARE?

Our technology has been developed by cellulose expert Prof. Silvia Vignolini at the University of Cambridge and was taken towards an innovation project by Dr. Lukas Schertel. He moved to the UNIFR through an SNSF BRIDGE project in the group of Prof. Frank Scheffold, an expert in optical materials. The team further includes a cellulose chemist and a chemical engineer.

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DEPARTMENT: Department of Physics

A blood test for breast cancer detection and monitoring

Exploiting the inflammatory response of the body to detect cancer

WHAT IS THIS ABOUT?

Breast cancer is the most frequent cause of cancer-related mortality in women. Nowadays, detection relies on mammography screening, which, however, has major limitations. Furthermore, no test to monitor patients after therapy and actively detect metastasis development is available. This lack leads to overtreatment, and loss of time to adapt therapy with negative consequences for patients, physicians, and the health system. To fill these gaps, we propose a first-in-class blood test for the early detection of breast cancer and active monitoring after treatment.

WHAT'S THE INNOVATION?

Our test exploits patient's systemic immune/inflammatory response to the tumor. The response is detected by monitoring changes in protein and gene expression the white blood cells (leukocytes). This strategy permits to create a test that is more sensitive and specific, compared to traditional tumor-derived biomarkers.

WHAT ARE OUR PLANS?

At UNIFR, we are conducting a clinical validation study (funded by ISREC foundation and Innosuisse) in collaboration with CHUV, HFR, HNe, and two more centers. A diagnostic algorithm is under development. We plan to start a company to develop and commercialize the test.

WHO WE ARE?

Project team members are: Curzio Rüegg, MD, UniFR, with 25+ years experience in translational cancer research and biomarker discovery, cofounder of 2 Start-Ups; Sarah Cattin, MSci, UniFR, with 10+ years experience in cellular and molecular analytics; Marie Betrand, MA in finances, UniFR, 5+ years experience in StartUps, business strategy and Frederic Fer, MSci biostatistician, informatician with 10+ years experience in bio- marker discovery, algorythm development and artificial intelligence.

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DEPARTMENT: Department of Oncology, Microbiology, Immunology