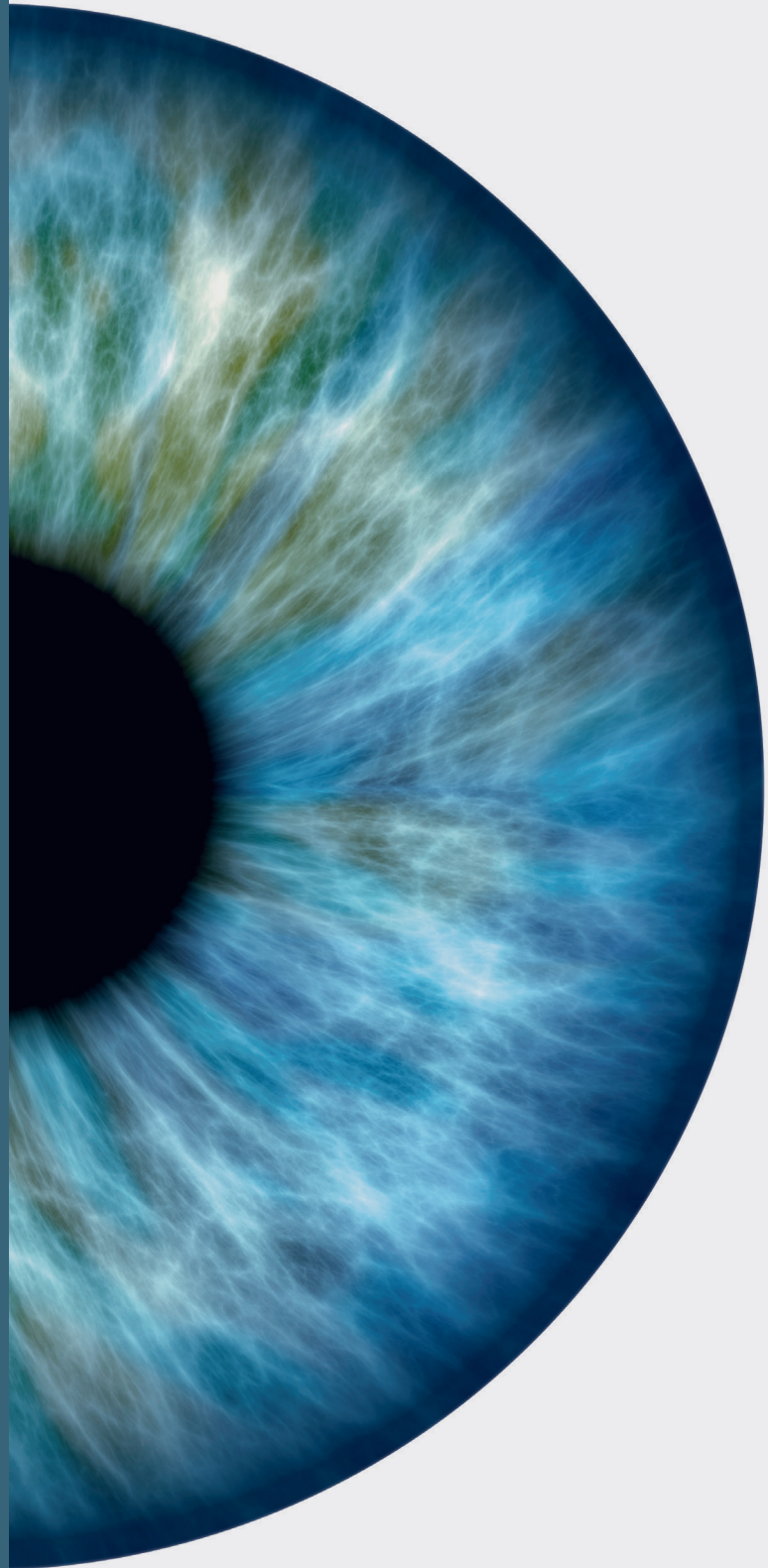


2020

—
**TECHNOLOGY TRANSFER:
LET'S DO IT!**







NINO SCHURTER, KATE COURTNEY

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Olivier Curty, State Councillor, Minister of Economic Affairs

TURBOCHARGED TECHNOLOGY TRANSFER

The countries with the strongest growth and the most robust, resilient economies are those that invest heavily in education and research. They also best appreciate the important role that the transfer of knowledge and technology plays in economic growth, business development and job creation, which is why they offer academia-industry partnerships generous public support.

In Fribourg, these partnerships take the form of a great many number of collaborative projects between companies and our cantonal university, our universities of applied sciences, and our centers of expertise on human health, buildings of the future and nanotechnology. As you will discover in this edition of Fribourg Network Freiburg, our cantonal economy is a dynamic and highly diversified ecosystem that can draw on a deep well of all kinds of knowledge and expertise.

This culture of reaching out to academia and forging successful partnerships is widespread among most of the large homegrown and international companies in our canton. The challenge today is democratizing this collaboration so that SMEs, the largest contributors to cantonal GDP, can also reap the benefits.

The canton of Fribourg has devised a series of funding instruments and targeted strategies to incentivize business and research to work together and boost technology transfer. Whether in the construction or agri-food industries, which are part of our economic DNA, a special effort is made to help every segment of these sectors to move up the value chain.

Stepping up the transfer of knowledge and technology is at the top of our agenda. The 2020 issue of Fribourg Network Freiburg is proof positive that we are well on the way to accomplishing our ambitious mission.

JERRY KRATTIGER

FOSTERING AN ENTREPRENEURIAL CULTURE



Jerry Krattiger in the blue hall of blueFACTORY.

Jerry Krattiger has been the Managing Director of the Fribourg Development Agency (FDA) since June 2019. At the age of 50, he can already look back on a varied and rich career that has included project management roles in the financial and insurance sectors, the creation of his own IT company, Operational Director of a non-profit association, as well as multiple economic development related assignments and his duties as a non-tenured associated professor at several Swiss higher education institutions. Proficient in five languages and an expert in business administration, the FDA Director, who is originally from Fribourg but living in Bern, has acquired deep and wide-ranging entrepreneurial experience and has a proven track record when it comes to people management and forging solid working relationships with local, national and international partners.



Given that you are not living in Fribourg, what struck you about the canton when you took over the reins at the FDA?

First of all, I was positively surprised by the ability of the canton to overcome difficulties and to turn setbacks into opportunities. When a number of companies moved their operations out of Fribourg during the first half of the 2010s, the cantonal government reacted with a determined and ambitious strategy that saw it acquiring several industrial sites which it planned to transform into sectoral development hubs. A good example is blueFACTORY, the innovation quarter in downtown Fribourg located on the former site of the Cardinal brewery. Today, it is home to a top-flight research and development center for the built environment of the future, as well as a number of other centers of expertise and several dozen start-ups and innovative SMEs. Other examples include the innovation centers AgriCo in Saint-Aubin, which focuses on agrifood and biomass, and La Maillarde in Romont, which is particularly well-suited to biotech firms. It is very encouraging to see a real willingness on the part of the canton's policy makers to take brave decisions, free up the resources needed to see these through to the end, and create additional value into the bargain.

During the early months of your tenure, you have met many Fribourg companies. What did you take away from these meetings?

It is important to listen to local businesses, no matter their size – from start-ups and SMEs to major international firms. We cannot effectively help them to succeed if

you do not fully understand what they need. I am very impressed with how well research and industry work together. It seems like the ties between academia and business are already quite strong in Fribourg. Of course, there is still room for improvement and we should continue to step up our efforts in this regard.

How?

By better aligning research with industry needs. While living in the United States, I absorbed the pragmatic approach the country takes toward the innovation ecosystem, whereby every actor involved must do whatever they can to ensure that the technology they develop is channeled into the economy. Many academic circles, both in Switzerland and elsewhere in Europe, need to adopt a more entrepreneurial approach if they are to successfully commercialize their innovations. As FDA director, I want this to become an automatic reflex, which will in turn boost the canton's economic base.

Are the right conditions already in place?

Yes. Fribourg has a dynamic university, excellent universities of applied sciences and a legion of top-flight centers of expertise and research institutes. The canton is well above the national average when it comes to the number of patent filings per capita. Fribourg has other advantages too, such as a young, well-educated population, the fact that it straddles German- and French-speaking Switzerland, not to mention the exceptional quality of life it offers. We also have effective support and funding instruments for innovative

industry-research projects, courtesy of the New Regional Policy program and Innosuisse (Swiss Innovation Agency). All the right ingredients are there, and as this issue of Fribourg Network Freiburg shows, many successful partnerships have been built already.

Is Fribourg's future looking bright?

I hope so! In any case, the energy that the cantonal government and the private sector have invested in developing innovation hubs over the last 10 years has made it possible to expand the reach of Fribourg's economic development activities. Our focus has widened to include strategic sectors like the bioeconomy and Industry 4.0, including high potential, high value-added niches such as human health, polymers, biopharmaceuticals, smart living, and even digital printing.

→ www.promfr.ch

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→ www.fribourgnetwork.ch



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ASCENSEURS MENÉTREY AN ELEVATOR THAT SCALES NEW HEIGHTS

"Although we have been in this business for nearly 100 years, we learned so much from the objective input from our university partners. It was a really beneficial experience... and we have the results to prove it!" Gil Menétrey, Managing Director of **Ascenseurs Menétrey SA**, is thrilled about the collaboration between his company and academia. With support from the cantonal government, they created the CelticLift, the latest jewel in the firm's crown. The specifications were extremely high. The SME wanted to create a technologically innovative elevator that had a lighter and more spacious cab, completely re-engineered ergonomics, was easier to maintain, and met all relevant safety norms. As Gil Menétrey explains, "It started with an informal discussion with Vincent Bourquin, a mechanical engineering professor at the Fribourg School of Engineering and Architecture (HEIA-FR). He assigned a group of students to study the elevator industry. Their work identified a number of potentially interesting opportunities. The detailed analysis of the market and our position in it convinced us to take the plunge. It was pretty clear that demand was there."

Three university partners

At the end of the promising exploratory phase, a network was created in 2017, as part of an Innosuisse project,

between Ascenseurs Menétrey, the HEIA-FR, the Swiss Federal Institute of Technology in Lausanne (EPFL) and the University of Applied Sciences in Neuchâtel (HE-ARC). "The mission of the EPFL's mechanical engineers was to condense all of the mechanical components so as to free up more usable space. The use of composites – made from recycled PET, fiberglass and polymerized resin – considerably reduced the weight of the cab. This provided even more space because the counterweight was correspondingly smaller", explains Benoît Schmutz, Deputy Director at the firm founded in 1924.

HE-ARC concentrated on the user experience side and analyzed the impact of new technologies on the assembly and manufacturing processes. As for the HEIA-FR, it conducted a series of comparative studies regarding the acoustics and vibrations. Thanks to a consistent and system-wide approach, their findings were incorporated into the project and the resulting innovations.

For Benoît Schmutz, one thing is sure: "Product development at Ascenseurs Menétrey will never be the same again. The success of this collaborative project is a great source of motivation for the company going forward."

→ www.menetrey-lift.ch



Gil Menétrey, Managing Director of Ascenseurs Menétrey SA.

ROVENSO

ROVÉO – THE HIGH-TECH SECURITY GUARD



Thanks to its on-board battery, the 50 kg, one-meter-long ROVéo can run for eight hours non-stop.

ROVéo is a land-based drone like no other. This technological masterpiece can spot intruders, detect fires, even at the incipient stage, and perform night-time security patrols. It is not surprising that major players in the Swiss and international security and safety industry have already expressed interest in this robot. According to Thomas Estier, the Managing Director of **Rovenso**, the Swiss Federal Institute of Technology in Lausanne (EPFL) spin-off which developed the prototype, "We are already working with several large-scale providers and we plan to launch it on the market by 2022."

With its articulated chassis, which was inspired by space exploration robotic vehicles, ROVéo has a huge edge over its competitors. Its four-wheel design allows it to negotiate stairs and steps with ease and travel over rough terrain. "The real innovation is the passive chassis. To put it simply, the robot is able to adapt to the given terrain without using artificial intelligence and with minimal computing resources. Many of our prospective customers really like this highly effective approach to solving a complex problem", notes the former space robotics researcher. "We hold an exclusive license to use this patented EPFL technology. It is the perfect example of technology transfer in practice."

Tapping into open source

The onboard system features a laser radar that maps the environment in the 3D, enabling the robotic security guard to find its way accurately and with no outside help. As Thomas Estier explains, "Our development work drew heavily on open source data, which is itself a form of tech transfer. We also plan to give back to the open source community by publishing a document on the subject in the very near future."

The machine learning capabilities related to the use of thermal and infrared cameras mounted on ROVéo for detecting anomalies could soon become a stand-alone Innosuisse project involving Rovenso and a number of academic partners. The start-up, which was founded in 2016, has been based at Le Vivier technology park since March 2019, a stone's throw away from its largest investor, the Nivalis Group. Rovenso's managing director is delighted that Le Vivier offers the right conditions for the company to grow, "As well as the synergies we have already forged with other companies, including several specializing in automation and artificial intelligence, we still have so much to learn from them when it comes to processes. It's a really rewarding experience."

→ www.rovenso.com

SWIBRACE A RICH AND DYNAMIC ECOSYSTEM



Frédéric Schuind, founder of Swibrace.

Wrist fractures are a common injury, with close to 1.5 million cases every year in Europe alone. Most patients are seniors, a group that is particularly vulnerable to the side-effects of surgery. The Fribourg start-up **Swibrace** decided to create a non-invasive alternative. "We have developed an orthopedic solution that is an effective substitute to plaster casts and can do away with invasive wrist surgery for simple fractures. This drastically reduces the risk of complications and loss of mobility", explains Frédéric Schuind, founder of Swibrace and a surgeon at the Université libre de Bruxelles hospital.

How does the Swibrace work? Within a matter of minutes, the start-up's patented technology creates a digital model of a splint based on a photo of the patient's uninjured wrist. The next step is to 3D print the brace. Within three days, the patient has a custom brace that is tailor-made to their specific injury. "Compared to conventional immobilization devices, our solution is superior in terms of design, comfort and weight – the brace weighs less than 300 grams", notes Charlotte Raemy, business developer at Swibrace.

Process automation

It was in Fribourg where Frédéric Schuind quickly found the support he needed to turn his idea into an actual product. "It was advice from Pascal Bovet, the director of Innosquare, which prompted me in early 2017 to launch Swibrace." The mechanical engineering department at the Fribourg School of Engineering and Architecture (HEIA-FR) set about examining the technical feasibility of the Belgian-Swiss surgeon's project.

Unfortunately, the prototype proved too expensive. "Although the raw material is relatively cheap, it was the labor costs that drove up the price tag. It was therefore imperative that we automated the process ", explains Prof. Schuind. He contacted Idiap, a research institute based in Martigny, and renowned for its bio-imaging and visual recognition expertise. A third partner, Bern University Hospital, tested the various prototypes, which were all produced by the HEIA-FR, on volunteer patients and clinically validated the results." Hand surgeon Prof. Esther Vögelin expressed a great deal of interest and enthusiasm for our technology, and gave us valuable, objective feedback."

The market launch of the Swibrace solution is scheduled for summer 2021. For Charlotte Raemy, "Fribourg has a rich and dynamic ecosystem which allowed us to tap into the expertise and knowledge of the HEIA-FR and financial support from the Fribourg Development Agency and Fri Up (see page 20). We are extremely fortunate."

→ www.swibrace.com

ADOLPHE MERKLE INSTITUTE BUILDING BRIDGES WITH INDUSTRY

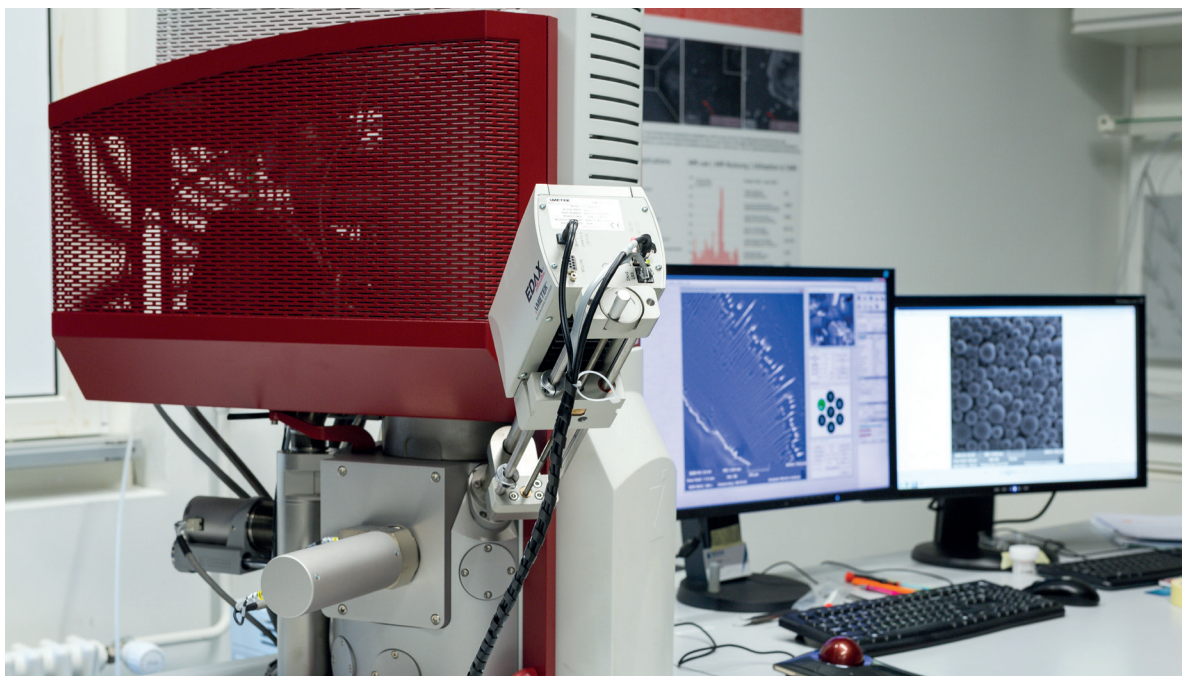
A whole host of everyday products like chewing gum, toothpaste, sun screen, spices and even powdered soup often contain nanomaterials to improve their properties. Consumers are not always aware of this, but that will change in May 2021 when manufacturers will have to start declaring the presence of these miniscule particles – no bigger than one millionth of a millimeter – in the cosmetic and food products they sell in Switzerland. To help firms meet this challenging new legal obligation, the Adolphe Merkle Institute (AMI) has created the Swiss NanoAnalytics platform (SNA). As Christoph Geers, the platform manager, explains, "Thanks to our cutting-edge instrumentation, which would be beyond the financial reach of SMEs and many research laboratories, our expert staff can carry out bespoke and extremely detailed analyses." As well as analyzing products for the presence of nanomaterials, the platform's services include particle characterization and the testing of nanomaterial stability in biological fluids such as blood serum. While Christoph Geers is delighted at the growing success of the SNA among companies and public bodies in sectors as varied as medicine, food, mobility and the environment, he is quick to praise the platform's collaborative approach, "To make sure that we can evaluate nanomaterials with the greatest possible accuracy, Swiss NanoAnalytics relies

on a vast nationwide network of experts from the public administration, industry and other research institutes."

The take-off of two start-ups

AMI is deeply committed to ensuring that the technologies it develops also meet the needs of industry. According to Valeria Mozzetti Rohrseitz, Technology Transfer and Innovation Manager at AMI, "In our pursuit of innovation, we always have in mind how the work we do could benefit the wider community, and who our partners should be." When it is unable to partner with the private sector, the acclaimed research institute is immediately there to support its researchers face the challenge of creating new companies. "After the success of our first spin-off NanoLockin, which developed an innovative novel nanoparticle screening method, our institute already has two new start-up projects on the go. The first is focused on creating a nanofertilizer to tackle the problem of environmental pesticide pollution, while the second (Hemolytics) is focused on developing a novel rapid malaria diagnostics tool. Both benefit from Innosuisse funding."

→ www.ami.swiss



Advanced microscopy techniques (pictured: a scanning electron microscope) are used to analyze nanoparticles.

JOHNSON ELECTRIC

"A WINNING STRATEGY"



This actuator component, used in automotive cooling systems, was the subject of multiple research projects between Johnson Electric and the HEIA-FR.

"The canton of Fribourg fully appreciates the importance of fostering public-private partnerships, and policy makers and university management are heavily invested in it." Enno de Lange, Senior Manager at Johnson Electric, is delighted that his company is able to operate in such an environment. "Over the last 10 years, **Johnson Electric** has worked with the Fribourg School of Engineering and Architecture (HEIA-FR) and other industrial players on 15 or so precompetitive research projects. I prefer to call them technology/product development projects, in other words the phase immediately before the actual tech transfer process. At Johnson Electric, being involved in this preliminary phase is crucial because it allows us to influence the direction that the research takes and ensure that the outcomes are commercially viable." The excellent working relationship between Johnson Electric, one of

the world's leading manufacturers of automotive sub-systems, with the HEIA-FR has already yielded several successes. "The MagPlast project, which was launched in 2010, developed a technology to produce magnets using magnetically charged injectable polymers. Our plant in Murten is still reaping the benefits of this research." Enno de Lange quickly singles out another partnership for praise, "In 2017, we put together a project with Innosuisse to develop a new-generation actuator – for on-board climate control systems – which not only offers better performance than our existing product but is also lighter and quieter. It was high risk and very ambitious because we were aiming to generate three innovations from one project. Happily, we pulled it off and today we are preparing to begin the mass production of 35 million actuators per year. This largely automated process has world-beating potential."

Tapping into the strengths of each partner

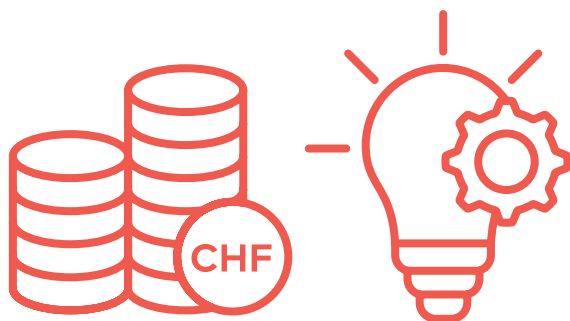
Johnson Electric is also an important player in ROSAS (Robust and Safe Systems Center Fribourg), a center of excellence that brings together the Institute of Smart and Secured Systems (iSIS) of the HEIA-FR and other top-flight companies based in the region, including Meggitt Sensing Systems and Liebherr Machines Bulle. Its mission is to create a cluster that taps into the strengths and expertise of each partner for applied research and development projects in the high-potential sector of safe and robust embedded systems. As Enno de Lange explains, "We have managed to generate really interesting results in a very short space of time. The creation of clusters and centers of expertise in Fribourg leads to more innovation. It's a winning strategy."

→ www.johnsonelectric.com

**8th
PLACE**

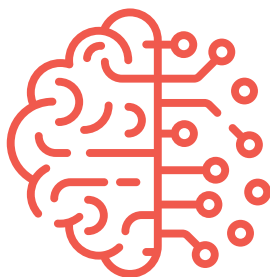


The canton of Fribourg is Switzerland's 8th most prolific filer of patent applications with the European Patent Office.



**2,6 BILLION
SWISS FRANCS**

The amount that the federal government has invested in R&D projects and programs since 2019. This is CHF 279 million more (+12%) than in 2017, the previous reporting year.



63

The number of projects that the canton of Fribourg has supported as part of its 2016–2019 New Regional Policy (NPR) program. A total of 52 companies were part of 13 collaborative projects in the *Innovation Business* category. The targets for the 2020–2023 program will be the most ambitious yet.

BEE VECTORING TECHNOLOGY CREATING A BUZZ

Weaponizing the natural pollination process of bees to combat pests and reduce the use of pesticides is the principle behind a major farming innovation developed by **Bee Vectoring Technology** (BVT). In February 2020 the Canadian company, which is now the global leader in its field, opened its European office at the AgriCo site in the canton of Fribourg. Christoph Lehnen, Managing Director of BVT in Switzerland explains how the technology works, "At the heart of our patented system is our proprietary inoculant which attaches itself to the feet and body of the bees as they leave the hive. As these industrious insects go about their work, they distribute the natural pesticide over the crops. This specific strain of fungus is not harmful to bees or future consumers but is highly effective against certain diseases like gray mold."

To optimize its distribution process, BVT works closely with Agroscope, the Swiss center of excellence for agricultural research. "Their genetic analyses enable us to determine the quantity of natural fungicide that is effectively present in treated fields. Our shared aim is to develop a rapid detection kit. Lehnen is very hopeful that the process will quickly take off in Europe. "Our solution has less impact on the environment than traditional crop spraying, delivers better quality and much larger crop yields. We are already in talks with several companies who are looking to adapt their existing pest control technology."

→ www.beevt.com



The tests, which were jointly carried out with Agroscope, focused on strawberry crops due to their high susceptibility to fungal diseases like gray mold.



"FOSTERING COLLABORATIVE INNOVATION"

**NADIA LACROIX OGGIER, DIRECTOR
OF THE FOOD & NUTRITION CLUSTER**

How did the Food & Nutrition Cluster come about?

The Fribourg-based Food & Nutrition Cluster was set up in 2015 to strengthen collaboration and enhance synergies across the regional and national agrifood chain. An academic research paper published the previous year concluded that given Fribourg's agricultural tradition and high concentration of local companies with links to the food industry, the canton was the ideal home for such a platform.

What is the platform's mission?

A cluster is only powerful as its network. One of our primary objectives is fostering collaborative innovation within our association. We now have almost 100 members and partners, including representatives of the academic community. Their involvement is particularly important for the transfer of technology. It means costs can be pooled, risks can be mitigated and the effectiveness of innovation activities can be enhanced.

Does the Cluster foster multidisciplinarity?

Absolutely. For example, the Cluster is working on the development of an ambitious project that applies the principles of the circular economy by taking agricultural byproducts and transforming them into something new, in this case plastic packaging. The project also benefits from the involvement and expertise of the plastics industry, another leading-edge sector of the region's economy.

BLOOM BIORENEWABLES

BIOMASS – AN ALTERNATIVE TO PETROLEUM



The raw material – a closely guarded secret mix of ingredients – is heated for three hours at 80 degrees Celsius.

So many of the products that we take for granted, like synthetic fibers, plastics, cosmetics and food additives, are made from petroleum. Despite growing calls around the world for more sustainable alternatives, the chemical industry has come up short. Until now, that is. The start-up **Bloom Biorenewables** has developed a patented procedure that separates the three main constituents of biomass (wood and agricultural waste). The process involves extracting lignin, the second largest constituent by volume after cellulose, in its native structure and converting it into molecules that provide a viable substitute to artificial polymers. A mini revolution with a potentially major reach!

"Although the range of applications is wide, we have decided to focus our energies on low volume, high value-added markets. Take the flavorings sector – only 1% of the vanillin produced worldwide is made from vanilla beans. The remaining 99% is the result of various chemical syntheses, most of which use guaiacol, a petroleum derivative. A number of large multinational food groups have already expressed an interest in our visionary, green solution", explains Remy Buser, Managing Director and co-founder of the start-up.

The stars are aligned

Bloom Biorenewables is an off-shoot of an EPFL (Swiss Federal Institute of Technology in Lausanne) working group,

making it a real product of technology transfer. Based at the Marly Innovation Center (MIC), the start-up works closely with various members of the Fribourg academic community on an Innosuisse project benefiting from a two-year research grant of CHF 800,000. Remy Buser could not be happier, "Thanks to the equipment and expertise of the ChemTech Institute of the Fribourg School of Engineering and Architecture (HEIA-FR), we will be able to complete the proof-of-concept phase and validate our formula by 2021. This support is invaluable and means that we do not have to make huge investments during the initial development phase. In two years, the start-up has racked up multiple prestigious awards, including the W. A. de Vigier Award and Venture Kick. With prize money totaling CHF 2.5 million, the young managing director is feeling buoyant about the future, "The stars are aligned, so we have scaled up our ambitions and plan to open our own pilot plant by 2023, which will be able to handle 10,000 metric tons of biomass every year. In terms of location, the MIC is particularly appealing because it offers good technical facilities, land for development, and an innovative environment."

→ www.bloombiorenewables.com

«FRIBOURG, SWITZERLAND'S BEST KEPT SECRET»*

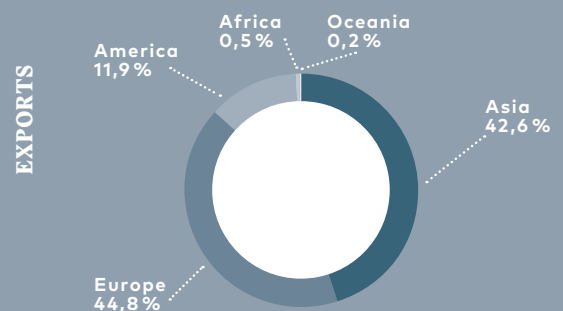
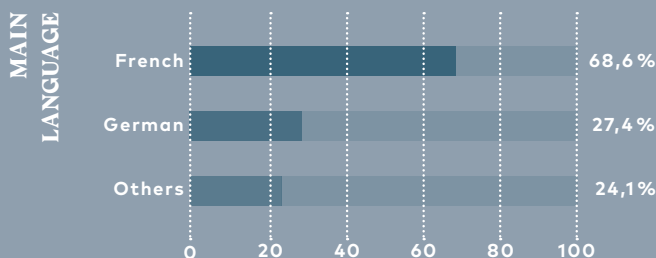
* Sheikhha Lubna Al Qasimi, Former Government Minister, United Arab Emirates

Fribourg offers the perfect environment in which to grow your business and gain access to Europe's major markets.

13,72 %
Income tax rate

1,5 million
Inhabitants within
a 45-minute radius

22,3 %
are under 20, making it
the youngest population
in Switzerland



"FRIBOURG HAPPY!"

Fribourg has so much to offer. First, there is its enviable central location that includes excellent transport links to the main Swiss and European road and rail networks. The country's main cities and airports – Basel, Bern, Geneva and Zurich – are only a 90-minute journey away.

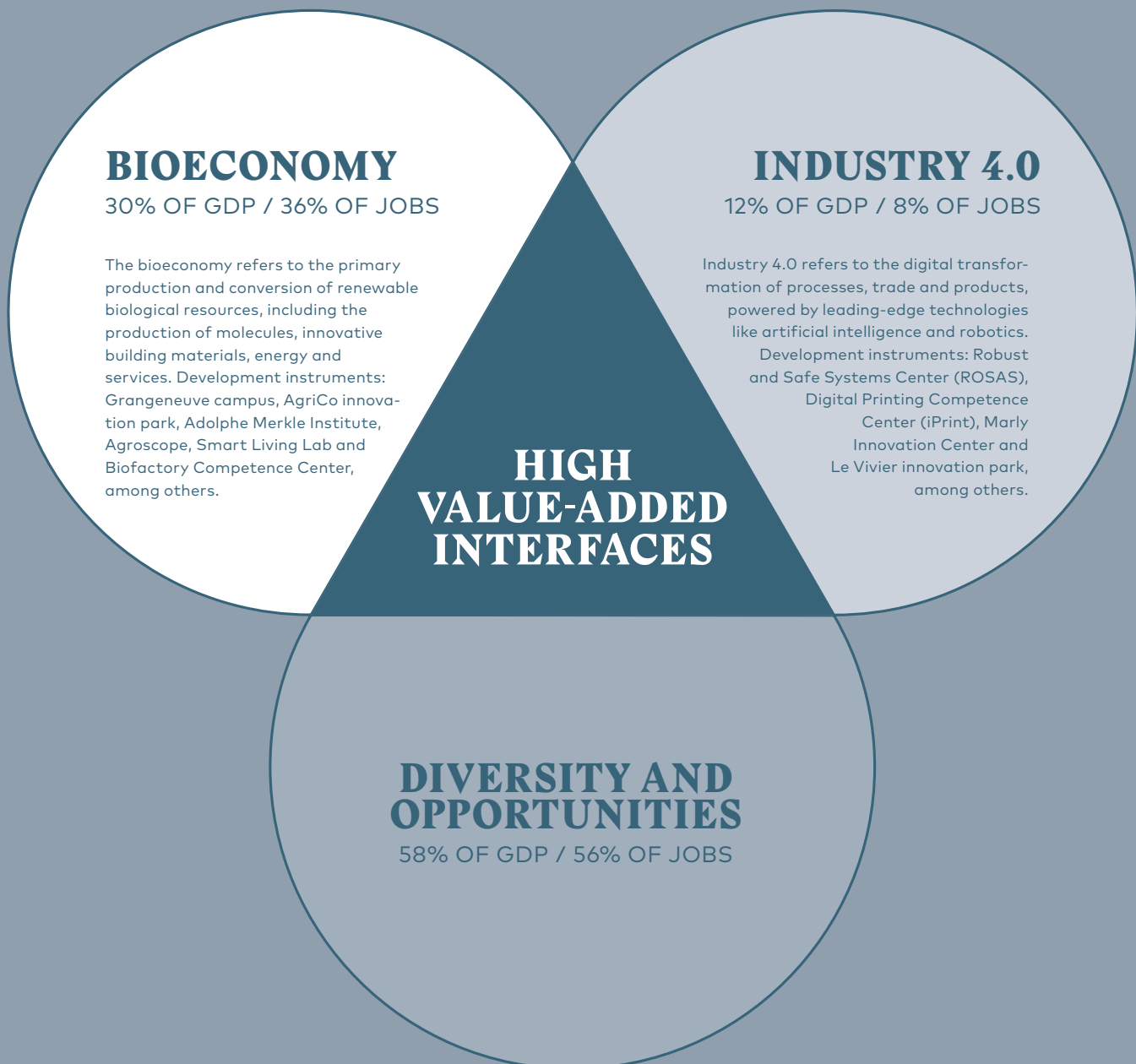
The canton's unspoiled nature, diverse landscapes, vibrant sporting and cultural life, rich history, and exceptional cultural and culinary heritage are some of the reasons why Fribourg is such a great place to live, work and study. The people of Fribourg are famed for their down-to-earth, open-minded, optimistic and friendly approach to life. At the same time, their drive has transformed the canton into a dynamic region and an ideal breeding ground for a host of innovative and exciting projects. Why not come see for yourself?



FRIBOURG – THE PLACE TO GROW

The canton of Fribourg has everything new companies need to get off the ground and established companies to grow: competitive tax rates, a highly educated and well-qualified workforce, bilingualism and an abundance of land ripe for development.

Fribourg has adopted a development strategy that capitalizes on the dynamism and diversity of the local economic ecosystem, and prioritizes the bioeconomy and Industry 4.0.



FRIBOURG – A HIVE OF INNOVATION

The Global Innovation Index has repeatedly ranked Switzerland among the most innovative countries in the world. It is fair to say that the canton of Fribourg has played its part in this designation thanks to a development strategy that is focused on promoting innovation and high value-added activities. Since 2011, five innovation hubs have sprung up across the canton. Offering first-rate infrastructures and superlative services, these technology centers are now home to dozens of high-tech start-ups.



AgriCo

- Specialization: agrifood and biomass
- Location: Saint-Aubin
- www.agrico.swiss



blueFACTORY

- Specialization: built environment of the future, circular economy, mobility and human health
- Location: Fribourg city center
- www.bluefactory.ch



La Maillarde

- Specialization: biopharmaceuticals and environmental technologies
- Location: Romont



Marly Innovation Center

- Specialization: fine chemicals and 3D printing
- Location: Marly
- www.marly-innovation-center.org



Le Vivier

- Specialization: automation and robotization
- Location: Villaz
- www.vivier.ch



blueFACTORY is a member of the Switzerland Innovation Park network.



Fribourg Innovation Award

The biennial Innovation Award, organized by the Fribourg Development Agency and the Fribourg Cantonal Bank (BCF), celebrates Fribourg's most pioneering and visionary companies. Since 1991 some 40 businesses have reaped the benefits of this showcase of Fribourg entrepreneurial creativity, raising the visibility of their company and their products in the process. The 15th edition will take place in 2020.

FRIBOURG – A TECHNOLOGY TRANSFER POWERHOUSE

The transfer of knowledge and technology is a core feature of Fribourg's economic ecosystem. It allows industry to remain innovative and competitive, fosters collaborative projects, and generates win-win outcomes. There is a wealth of resources and specialist services to help companies leverage technology transfer to grow their business.

They include three sectoral clusters, six centers of expertise, a material sciences research center (AMI), the technology platform INNOSQUARE and a dedicated technology transfer office.

On top of all this, the Fribourg School of Engineering and Architecture has 10 applied research institutes

in three distinct fields: information and communication technologies, construction and environment, and industrial technologies. They work hand in hand with companies to find novel solutions and develop innovative products and processes.

TECHTRANSFER FRIBOURG



TechTransfer Fribourg is the official technology transfer office of the University of Fribourg, the Adolphe Merkle Institute, the Fribourg School of Management and the Fribourg School of Engineering and Architecture. It offers advice on intellectual property issues and acts as a link between academic research and industry.

→ www.tt-fr.ch

INNOSQUARE



INNOSQUARE is a technology platform that helps companies develop and realize their innovative ideas, and facilitates collaborative single- and multisector projects that bring together industry, the public sector and academia.

→ www.innosquare.com

SECTORAL CLUSTERS

Building Innovation Cluster

→ www.building-innovation.ch

Food & Nutrition Cluster

→ www.clusterfoodnutrition.ch

Swiss Plastics Cluster

→ www.swissplastics-cluster.ch

CENTERS OF EXPERTISE

Biofactory Competence Center (BCC)

→ www.bcc.ch

Digital Printing Competence Center (iPrint)

→ www.iprint.center

Plastics Innovation Competence Center (PICC)

→ www.picc.center

Robust and Safe Systems Center (ROSAS)

→ www.rosas.center

Smart Living Lab

→ www.smartlivinglab.ch

Swiss Integrative Center for Human Health (SICHH)

→ www.sichh.ch



adolphe merkle institute
excellence in pure and applied nanoscience

The **Adolphe Merkle Institute (AMI)**, is a center of excellence in nanosciences and material sciences research and education. Through collaborations with industrial partners, AMI seeks to stimulate innovation and foster industrial competitiveness. The AMI is also home to the internationally respected Bio-Inspired Materials National Center of Competence in Research (NCCR).

→ www.ami.swiss

FRIBOURG – A BEACON OF EDUCATION AND SCIENCE

Fribourg has the youngest population in Switzerland and a higher education landscape that is as diverse as it is dense. Alongside its cosmopolitan university, where over 10,000 students are enrolled in a wide range of undergraduate and postgraduate programs, the canton has five specialist higher education institutes: the School of Engineering and Architecture, the School of Management, the School of Social Work, the School of Health Sciences and the School of Teacher Education. It is also home to the Adolphe Merkle Institute, Switzerland's leading research and teaching center in the field of nanosciences

and material sciences. The renowned EPFL (Swiss Federal Institute of Technology in Lausanne) has a satellite here. Added to these is a plethora of colleges specializing in fields such as business administration, agriculture, music, art, multimedia and hospitality. Of course, there is a broad host of primary, junior and senior high schools, as well as vocational training schools and colleges. Throughout the education system, classes are taught in French and German, while English is the language of choice for many postgraduate programs.



University of Fribourg

→ www.unifr.ch



Adolphe Merkle Institute

→ www.am-institute.ch



School of Management & Innovation Lab

→ www.heg-fr.ch



School of Engineering And Architecture

→ www.heia-fr.ch



EPFL Fribourg

→ fribourg.epfl.ch

FRIBOURG – A STAUNCH SUPPORTER OF BUSINESS

Since 1972, the Fribourg Development Agency has been helping local businesses get off the ground, outside companies to relocate to the region, and established companies to expand their operations. We are on hand to advise and guide you through the many support mechanisms and opportunities offered by the canton of Fribourg. A dedicated project manager will be appointed to assist and coordinate your project, and will take the lead and put you in touch with the right people for: financial assistance and tax incentives, finding the ideal site or premises for your business, staff recruitment, applying for and obtaining work and residence permits, apartment/house hunting, the social integration of your family and your personnel, contacting institutions of higher education, and any other issue that might arise. Get in touch. We're here to help!

→ www.promfr.ch



Neue Regionalpolitik **nrp**
Nouvelle politique régionale **npr**
Nuova politica regionale **npr**

The **New Regional Policy** is a stimulus program launched by the federal government with assistance from the cantons. Its mission is to foster innovation both in industry and tourism by providing financial support in the form of loans, non-repayable grants and subsidies.

Innosuisse is Switzerland's national innovation promotion agency. It provides consultancy, networking services and financial resources to help turn scientific research into economic results.

THE BEST PLACE FOR THE BEST COMPANIES

These companies, among many others, have chosen to locate in Fribourg: Alcon (Switzerland/USA), Cartier (France), Cailler/Nestlé (Switzerland), Covestro (Germany), Geberit (Switzerland), Ladurée (France), Johnson Electric (China), Liebherr (Germany), Mapei (Italy), Medion Grifols Diagnostics/Grifols, (Spain), Meggitt (UK), Michelin (France), Nespresso (Switzerland), Pall International (USA), Richemont International (Switzerland), Scott Sports (Switzerland), Sika (Switzerland), Spiro (Sweden), Tupperware (USA), UCB Farchim (Belgium), VeriSign (USA) and Wago Contact (Germany)

→ www.promfr.ch/en/establish/references



FRI UP

Fri Up is the canton of Fribourg's official business start-up support agency. It offers free support for new entrepreneurs and fosters innovation.

→ www.friup.ch



PLATINN

Based in Fribourg, Platinn is the Western Switzerland Innovation Platform. Its mission is to foster the innovation capabilities and competitiveness of start-ups and SMEs through its coaching services.

→ www.platinn.ch

MOBBOT

A WORLD FIRST FOR 3D CONCRETE PRINTING

Fribourg start-up **MOBBOT** ('mobile robot') has developed a unique 3D printing system that can produce all types of concrete components, as founder and CEO of MOBBOT Agnes Petit enthusiastically explains, "Our patented solution is the only one of its kind in the world. One of its many advantages is speed. It normally takes two to three days to produce a custom part but at MOBBOT we can have it ready in one hour." The MOBBOT 3D printing solution also performs much better than pre-cast systems because it sprays the concrete mix one layer at a time. That's not all: MOBBOT uses locally sourced, standard concrete which helps keep the carbon footprint to a minimum.

The extensive technological expertise Agnes Petit has acquired during her 13-year career in the construction industry means that her company is built on firm foundations. At the same time, the businesswoman tapped into the R&D prowess of the Fribourg School of Architecture and Engineering to fine-tune and optimize her technology, "The Institute of Construction and Environmental Technology (ITEC) lets us use its laboratory." Petit is delighted that the canton of Fribourg was on hand to help bring her project to fruition. "Infrastructure is a major global market, and given that every building project comes with its own set of particular needs, our high-speed 3D printing system represents an attractive proposition."

→ www.themobbot.com



Agnes Petit, founder and CEO of MOBBOT.



"FRIBOURG IS AT THE VANGUARD"

ALAIN LUNGI,
DIRECTOR REGIONAL POLICY

What is 'smart territory' exactly?

It refers to a multidimensional analysis of the advantages that a particular territory has to offer. The aim is to better promote innovative economic and social activities that boost the competitiveness of the regional economy and create attractive jobs. These activities will, in turn, help to safeguard economic prosperity, the well-being of the population and the sound management of natural resources.

Is the canton of Fribourg well-placed to rise to the challenge?

Leveraging public-private partnerships is vital for creating a 'smart territory'. With its high-quality industrial base and top-flight higher education providers, Fribourg has what it takes to succeed. Also, the excellent cooperation that the Fribourg Development Agency has nurtured over years with academia and industry associations will help fast track this transformation. One of the main beneficiaries will be SMEs, who tend to have limited, if any, in-house R&D resources.

So, tech transfer plays a key role in making territories smart?

Absolutely, and the canton of Fribourg is at the vanguard. Since 2016 there have been around 15 collaborative projects involving academia and over 50 companies. There is always at least one public research body, like a university, that is involved in the problem-solving process, and the project findings are shared with all participants. Thanks to this approach, 1+1=3!

SMART LIVING LAB

DESIGNING THE BUILT ENVIRONMENT OF THE FUTURE

When it comes to smart homes and buildings, the canton of Fribourg is leading the charge. This is due in no small part to the **Smart Living Lab**, an interdisciplinary research center based in the blueFACTORY innovation quarter since 2015. Through the combined expertise of the Swiss Federal Institute of Technology in Lausanne (EPFL), one of the 10 best universities in the world, the Fribourg School of Engineering and Architecture (HEIA-FR), and the University of Fribourg (UniFR), its mission is to develop innovative ideas to ensure that the built environment of tomorrow is more energy-efficient, maximizes the welfare of its users and fully exploits the potential of digital transformation.

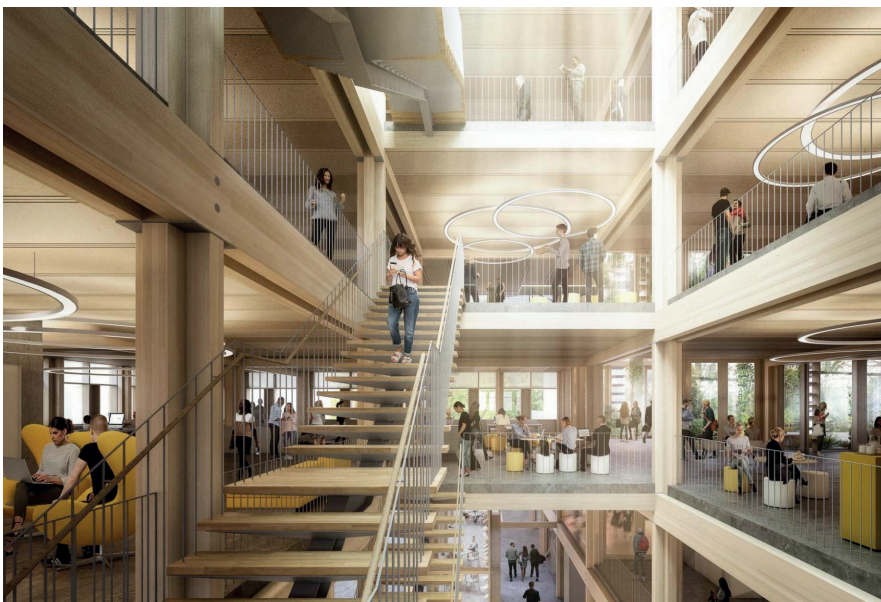
"We take a human-centered approach to all our research. The comfort, well-being and health of users are always at the forefront of everything we do", notes Martin Gonzenbach, Director of Operations at the Smart Living Lab. No element of the building is left unattended, from the heating and ventilation systems to lighting, indoor air quality and architectural design. Another core objective of this living laboratory is to harness the power of digital technologies to make buildings more energy-efficient and, in doing so, shrink their carbon footprint. As the Director of Operations explains, the Smart Living Lab passes on the technologies generated by its basic and applied research to local industry, "We work directly with Fribourg-based companies. They tell us what they need and road-test our discoveries."

Real-world solutions

One recent example is the 'Build-Unbuild-Repeat' project, conducted by the Structural Xploration Lab and led by Assistant Professor Corentin Fivet (EPFL), "We wanted to come up with a waste reduction solution, so we began developing extremely robust load-bearing structures which can be reused over a period of at least 200 years and generate virtually zero maintenance costs. Once we had found a solution that worked on paper, we set about transforming it into an actionable solution that met the needs of the construction industry." It was at this point the team asked the Institute of Construction and Environmental Technology (iTEC) of the HEIA-FR to come on board. As Dario Redaelli, a civil engineering specialist and professor at iTEC explains, "Our workshops add a more operational and practical focus to the project and make it possible to test out the ideas developed by the research team."

Given that tech transfer is a key part of the Smart Living Lab's mission, the team began their search for a private partner. With its detailed knowledge of every aspect of building project implementation and areas of expertise that cannot be found in a laboratory, JPF-Ducret was the ideal match. Thanks to feedback from the building company, the team was able to patent its system. Although there is no comparable solution on the market, the researchers continue to work on improving its unique system.

→ www.smartlivinglab.ch



This scale model provides a glimpse of the future Smart Living Lab facility. As well as offering an open, evolutive workspace, the new building has impressive environmental and energy efficiency credentials. Construction work will begin in 2021.

BLUEFACTORY MADE FOR INNOVATION



The NeighborHub (foreground), winner of the 2017 Solar Decathlon. Over the coming years, major development work is planned for the blueFACTORY site.

Imagine an innovation quarter in the heart of the city, accessible to all and constantly evolving. Dream no more because it is already here – **blueFACTORY**, which has been open for business since 2013, taps into the ready-made synergies offered by the companies and dense academic network right on its doorstep. The mission of this innovation hub is to advance sustainability by re-thinking the built environment, mobility, health, nutrition and culture of tomorrow. blueFACTORY is home to around 50 start-ups, established firms, centers of expertise and associations, all eager to share their knowledge,

needs and challenges. According to Managing Director Philippe Jemmely, "blueFACTORY offers the ideal conditions for boosting innovation. As a result, there is a steady transfer of technology via joint projects with companies, on- and off-site." Sometimes, this knowledge transfer flows inwards. The upcoming 'bâtiment B' (building B) project is a case in point. blueFACTORY called on external specialists to come up with a design for the new facility that reflected its broader 'sponge city' strategy. The central aim of this strategy, which is supported by the cantonal New Regional Policy (NPR) program, is

to use water resources more efficiently. Methods include power generation from the collection of rainwater, aquaponics (fish farming alongside the cultivation of plants in water), and the production of Aurin, a urine-based universal fertilizer. As Philippe Jemmely notes, "when it comes to cutting-edge construction techniques, Fribourg is up there with the best". Once finished, Bâtiment B will be a concrete reminder of the canton's building prowess.

→ www.bluefactory.ch

MEDION GRIFOLS/UCB FARCHIM

FIRST-RATE INSTRUMENTS FOR TECH TRANSFER



In 1996 the pharmaceutical giant UCB Farchim arrived in Bulle. Its Fribourg facility is the main producer of Cimzia, one of the group's most successful drugs which is used to treat rheumatoid arthritis and Crohn's disease.

"I have been in this industry for 25 years and I have to say that things have evolved considerably. Today, academia and industry communicate and understand one another much better than before." Peter Schwind, Chairman of the Board at **Medion Grifols Diagnostics**, is a keen observer of the Fribourg economy. The company, which is part of the powerful Spanish healthcare group Grifols and specializes in the manufacture of blood transfusion reagents, is experiencing a period of exceptional growth, "In the space of 10 years, we have doubled our workforce and tripled our turnover." As well as this upswing in business, Dr. Schwind is delighted at the cantonal government's proactive approach to fostering technology transfer and academia-industry collaboration. "It is extremely important for the business community to be able to tap into the expertise offered by Fribourg's higher education institutions. Examples include the HEIA-FR (Fribourg School of Engineering and

Architecture), which does incredible work, as well as cutting-edge research centers like the Adolphe Merkle Institute and the Swiss Integrative Center for Human Health (SICHH), which fully understand the importance of industry-research partnerships. We also need to consider incubators like blueFACTORY, the Marly Innovation Center and Le Vivier, all of whom benefit from real hands-on support from the Fribourg Development Agency. As a result, the canton now boasts an impressive set of first-rate technology transfer instruments."

Sincerity and pragmatism

At **UCB Farchim**, part of the Belgian biopharmaceuticals behemoth UCB, the same message comes across loud and clear. This specialist manufacturer and distributor of drugs that treat allergies, epilepsy and autoimmune diseases has invested over CHF 600 million in its plant in Bulle. As Nicolas Hug, Product Technical Lead at UCB Farchim, explains, "We are building a number of partnerships

with universities, research institutes and centers of expertise in Fribourg and the rest of Switzerland. They include the HEIA-FR, the Swiss Federal Institute of Technology and the Biofactory Competence Center, which is an invaluable source of expertise and advice. At UCB, our research is really focused on collaboration and pooling of knowledge to improve our productivity and process efficiency while minimizing the impact of our activities on the environment." The Product Technical Lead is also quick to single out the down-to-earth mindset of the Fribourgeois for praise, "Having lived and worked in Italy, Germany and Belgium, I was very moved by the genuine warmth of the welcome I've received, as well as the sincere desire to help, pragmatic outlook and readiness to seek out shared solutions."

→ www.grifols.com/en/switzerland

→ www.ucb.com

SICHH BRINGING INNOVATION TO MARKET

Technology transfer is at the heart of everything that the **Swiss Integrative Center for Human Health (SICHH)** does. Vincent Dessenne, Chair of the SICHH Board and managing director of a medical device manufacturer, is a strong advocate of generating economic value from research, "The SICHH is committed to bringing innovation and R&D to market. To this end, it has clearly positioned itself as a bridge between industry and academia, adopting an integrated approach that in turn fosters collaboration between different disciplines."

This innovative multidisciplinary and collaborative platform boasts first-rate facilities, which are fitted out with cutting-edge equipment and staffed by top experts in fields like biotech and medical technology. SICHH also runs several innovation programs, such as the 'Swiss Innovation Maker', a technology incubator that helps start-ups get off the ground (from helping them create a viable business plan right through to finding seed funding, and everything else in between), and the 'Swiss Company Maker', which lets research teams test the commercial potential of their ideas and develop a realistic business model.

However, Vincent Dessenne has set his sights on an even higher goal, "Given that our reach extends well beyond the canton of Fribourg, we want to become a national center of expertise, courtesy of our flagship smart diagnostic tests for personalized medicine applications."

→ www.sichh.ch



The SICHH, based in the blueFACTORY Innovation Quarter, recently hit the headlines when, in a matter of weeks, it managed to set up its P2 laboratory to handle the analysis of Covid-19 tests.



"PLAYING THE ROLE OF CATALYST"

**KATHARINA FROMM, VICE-RECTOR
OF RESEARCH AND INNOVATION
AT THE UNIVERSITY OF FRIBOURG**

Tech transfer activities are on the rise in Switzerland. How do you explain this cultural shift?

Switzerland is one of the most innovative nations in the world, but a number of countries are starting to nip at Switzerland's heels. If we are to stay at the front of the pack, we need to step up our efforts to promote closer links between the worlds of research and industry. Nurturing this entrepreneurial spirit and facilitating the uptake of industrial and commercial applications are high on the agendas of the public authorities, research institutes and education providers.

Can the canton of Fribourg rise to this challenge?

With the University of Fribourg, the Adolphe Merkle Institute, the EPFL outpost, other higher education providers and Agroscope, our canton has huge potential in this regard. But it's important to remember that we also have various clusters and platforms like TechTransfer Fribourg, Fri Up and the SICHH that play an important part in linking existing infrastructures and knowledge.

What is your technology transfer vision for Fribourg University?

I try to understand Fribourg in its entirety and not simply view through the university prism. By playing the role of catalyst and injecting the process with the University's expertise, it is my hope that local innovative start-up incubators will start springing up across the canton. This is the direction we're moving in.

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COLOPHON

FRIBOURG NETWORK ASSOCIATION,
c/o Fribourg Development Agency,
Bd de Pérolles 25, P.O. Box
CH-1701 Fribourg

EDITORIAL COMMITTEE

Jerry Krattiger,
President, Fribourg
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Christoph Aebischer,
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MANAGING EDITORS

Philippe Crausaz
Chrystel Domenjoz
furrerhugi.
CH-1700 Fribourg

CHIEF EDITOR

Frank-Olivier Baechler,
CH-1700 Fribourg

AUTHORS

Frank-Olivier Baechler
Alexandre Brodard

TRANSLATIONS

Barbara Horber and Elaine Sheerin
from Transit TXT SA

CONCEPT & DESIGN

INVENTAIRE Communication Visuelle Sàrl,
CH-1700 Fribourg

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