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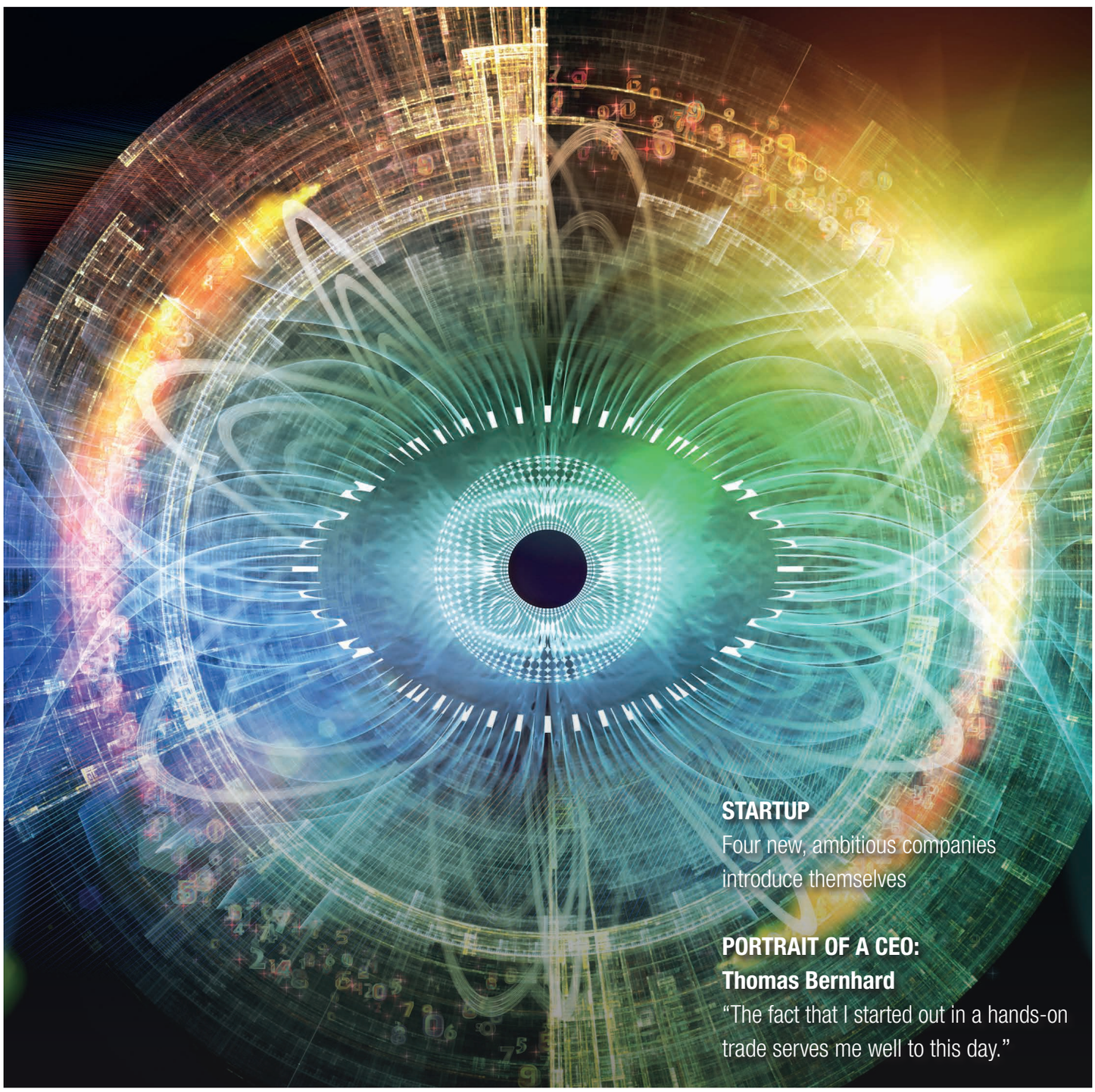

STARTUP
Four new, ambitious companies introduce themselves

PORTRAIT OF A CEO: Thomas Bernhard
“The fact that I started out in a hands-on trade serves me well to this day.”

There’s more to vision than meets the eye

HIDDEN CHAMPION: Ziemer Group
An eye for technology

DIGITALIS: RetinAI
Fighting eye diseases with artificial intelligence

How you keep your perspective and act with foresight

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Content

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Dear reader,

From high-precision eagle eyes to the simple eyes of mollusks, in the natural world eyes and vision come in a huge range of shapes and designs. Besides being an organ of perception and orientation, the eye serves as a symbol of knowledge, omniscience, and truth. Even so, the advent of AI makes us question things in a way we have never done before: is what we are seeing really real? In this issue, we introduce you to companies and projects in the *Canton* of Bern that focus on the eye.

Our cover story shines a light on the eye and vision.

In the CEO Portrait, Thomas Bernhard of the Haag-Streit Group reveals when he closes his eyes and is all ears.

In the Hidden Champion column, all eyes are on the Ziemer Group, which has developed a globally unique laser platform for eye surgery.

AI also gets a look-in, when we introduce you to RetinAI in the Digitalis column, a medtech startup that is using AI to revolutionize ophthalmology.

There's a feast for the eyes awaiting you in the Life/Culture/Tourism column, where we take you on a panoramic train trip in the GoldenPass Express.

In the Administration column, we make the invisible visible.

And last but not least, we invite you on a sensory journey in #cantonofbern.

Yours truly,
Dr. Sebastian Friess
Head of the Office of Economic Affairs
President, Bern Economic Development Agency

There's more to vision than meets the eye

The eye is a high-performance organ. It is constantly in motion and sends impulses non-stop to the brain. It is also our main sense organ that we use to perceive the world around us. At the same time, it plays an important role in social interaction. We asked experts in various fields questions about the eye and vision.

Professor Zinkernagel, why is the eye so important to humans?

"The eyes are our primary sense organs; our brain uses about 30 percent of its capacity to process visual information. That is a huge amount and shows how important the sense of sight is for our survival and our daily lives," explains Professor Martin Zinkernagel, Director of the Department of Ophthalmology at Inselspital Bern. Visual perception not only helps us to find our way in the world around us but also has a significant role to play in social interaction and communication between individuals, the expert reveals: "For example, by reading other people's body language and facial expressions we can understand their moods and emotions. At the same time, eyes can portray major emotions such as joy, sadness, fear, or affection. Eye contact helps us build trust and empathy."

How did our eyes develop?

Research suggests that eyes first began to develop about 500 million years ago. From then on they evolved in line with the needs of their owners. "The evolution of the human eye is fascinating. It shows how natural selection helps living things to adapt to their environment and how the complex structure of the eye has benefited our ability to survive and develop," Professor Zinkernagel explains. "The eyes of early precursors to humans were relatively simple, consisting of only a few light-sensitive cells that allowed them to distinguish light from dark. Over the course of evolution, however, ever more complex forms of eyes evolved that enabled animals to recognize objects in their environment and even track movements." Evolution can also be seen in the various eye diseases that exist: "In recent decades, myopia has been on the rise. This is partly due to the fact that in the modern world we spend much more time looking at objects up close, particularly screens, books, and other printed matter. This prolonged close-up work, especially at an early age, can cause the eye to elongate and become nearsighted." Increasing life expectancy also leads to more eye diseases. How does medicine respond to this, and what technologies can help? "I am convinced that systems such as AI will play a key role in making the healthcare system more efficient in the future."

Professor Sznitman, in what way can AI be used in ophthalmology?

Professor Sznitman, head of the ARTORG Center in Bern, is an expert in AI and computer vision. "In recent years we have been working very closely with the Department of Ophthalmology at Inselspital in Bern to develop a wide range of computer vision systems. These systems help doctors diagnose diseases and assist in predicting how well patients will respond to treatments." A major part of their joint work consists of combining the clinical understanding of eye diseases with the question of how AI can use this information to create systems that are highly efficient and can consistently evaluate images and data from ophthalmology, he says. A further benefit

"The eyes are our primary sense organs."

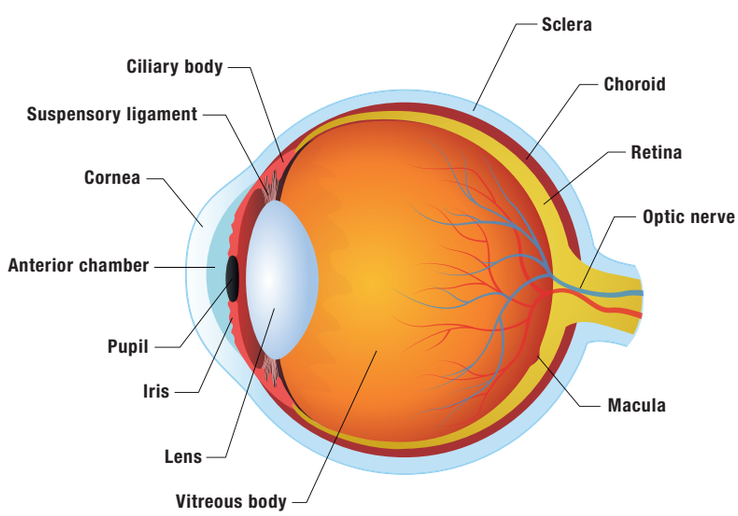
Professor Martin Zinkernagel,
Director of the Department of Ophthalmology,
Inselspital Bern

The University Hospital Department of Ophthalmology is one of the largest specialist eye hospitals in the country. It provides patient care at the highest level and also occupies a leading international position in eye-related research. In addition to its strong focus on clinical research, the hospital has a very active research laboratory which is embedded in the Department for Biomedical Research at the Inselcampus.

How does the eye work?

The eye works in a similar way to a camera: "The process of sight begins with the refraction of light on the cornea and lens, which focus the light onto the retina. The light signals are processed in the retina and then transmitted along the optic nerve to the brain, where the signals are assembled into an image," Professor Zinkernagel explains. To do this, the eye constantly moves back and forth – several hundred thousand times a day. To ensure that the images do not reach the brain blurred, there are image stabilizers built into the retina. "But the eye can do even more," says Professor Zinkernagel: "I find it so impressive that the eye can deliver a range of information on our health, including signs of diseases like diabetes and hypertension."

Eye anatomy



“AI can help doctors diagnose eye diseases.”

Professor Raphael Sznitman,
ARTORG Center, University of Bern

ARTORG is an engineering center embedded in the medical faculty of the University of Bern. Researchers at the center develop technologies that benefit both patients and doctors, for example in ophthalmology.

“Our focus is to get people to safety.”

Founder Frédéric Guerne,
Digger Foundation

The NGO Digger Foundation is well-known for its remote-controlled demining machines. The company is based in Tavannes in the Bernese Jura. Its peace-loving tanks will soon be helping to rid Ukraine of mines.

arises in the training of doctors: “AI can play a significant role in compiling and summarizing information. This could be crucial in the years ahead when medical knowledge is generated so rapidly that it could be overwhelming to try to keep up with it all.”

Can AI see, and what exactly is computer vision?
“I would say that the way computer vision works has much in common with powered flight. Birds were an early inspiration for humans taking to the air, but no aircraft today operates on the same principles as birds. Similarly, early AI and computer-generated images were strongly influenced by human perception,” Sznitman explains. “This no longer happens so much today, and modern AI methods for computer vision are based on mechanisms optimized for computers rather than human physiology.”

Mr. Guerne, how does remote vision work?
Remote vision is used by the SCRAPER remote control system from the Digger Foundation, an NGO based in the Bernese Jura. It enables construction machines of all kinds and makes to be transformed into remote-controlled vehicles. Founder Frédéric Guerne reveals why it is needed. “We develop demining machines. But our main goal has always been to get people out of the machines and into safety.” It all started with remote-controlled Digger machines: “These are ideal for use in rural terrain. The pilot navigates the machine from a close distance, similarly to a remote-controlled car. The cameras installed on the vehicle produce images that are displayed on the remote control to aid navigation,” Guerne explains. “The war in Syria showed us that we also need demining machines that can be used in urban areas. But that means the pilot must be able to operate the machine from a safe distance, as if they were sitting in the cabin.” This is made possible by the SCRAPER remote control system developed by Digger. It consists of a stereoscopic camera connected to a VR headset via a high-speed wireless connection that reacts in real time to the wearer’s head movements. The virtual reality environment reproduces the interior of the driver’s cab one-to-one. The system is complemented by professional power and shock absorption controls that enable maneuvering and perfect the sense of immersion. Developing the system was a challenge. “It took two to three years of experimentation by our team of engineers to figure out how to adjust the cameras to make their output feel like natural vision. At first we used only one camera, but that didn’t allow distances to be estimated accurately enough. So we installed two cameras, but that didn’t work out right away either. We then spent some time poring over various studies on vision to find the right settings, the right zoom.” Today, the system works so well that a trained construction machine operator can use the system with no extra instruction. “The operator only works around 20 percent less efficiently than if they were sitting in the driver’s cab itself,” Guerne says proudly.

One drawback for Guerne is that the SCRAPER has not yet been deployed in a war zone. There are both cultural and political reasons for this. But Guerne is committed to his mission: “The faces of the deminers who no longer have to risk their lives thanks to our vehicles are what keep me in this business.” Other uses have already been found for this system. “The SCRAPER is being used in France and Switzerland to work with hazardous materials. And we already have interest from the U.S. as well.”

Thanks to SCRAPER, all kinds of construction machines can be operated from a safe distance as if the operator is sitting in the cockpit.

"You can see with your nose or ears, too."

Carmelina Castellino,
Director, Zollikofen School for the Blind

The School for the Blind in Zollikofen is one of six institutions in Switzerland that provide education for blind and visually impaired people and people with multiple disabilities to prepare them to live independently despite their disability.

Blind and visually impaired people talk about their everyday lives in video portraits: what problems they face, what prejudices they encounter, and what is or isn't possible for them.

Ms. Castellino, can a person see without eyes?

Seeing differently is the credo of the Swiss Museum of the Blind in Zollikofen. But how does that work? "In blind people, the other senses – such as smell, hearing, and touch – are much keener. So they can see with their nose, ears, or fingers," Carmelina Castellino, director of the Zollikofen School for the Blind, explains. This different way of seeing is also partly in evidence in the language we use, Castellino says, quoting a blind student who describes snow thus: "Today it's as crunchy as a carrot." Switzerland officially has about 300,000 blind and visually impaired people. "But the number of unreported cases is much higher," Castellino adds. "Children with multiple disabilities or adults who lose their sight as they age are particularly likely to slip through the net." Carmelina Castellino wants to change that by raising awareness of the subject. At what point a person is considered blind or visually impaired depends on their visual acuity. The World Health Organization (WHO) defines blindness as 5 percent or less vision (visual acuity </= 0.05).

At the Swiss Museum of the Blind, which is located on the school's campus, visitors can experience what blindness or visual impairment feels like. In various activity rooms, they can solve different tasks blind or with glasses that simulate visual impairments. To complement this there is an exhibition room with objects from 200 years of education for the blind, along with video portraits of former and current pupils of the school. The Swiss Museum of the Blind was awarded a Special Commendation by the European Museum Forum in 2022.

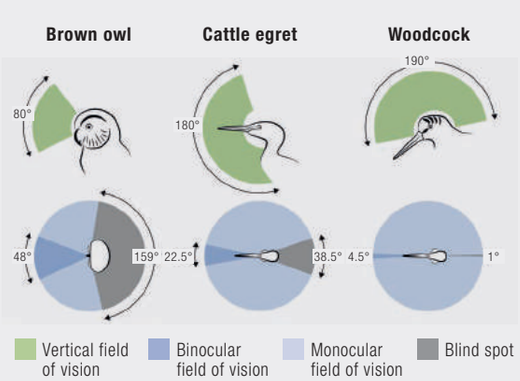
Do humans see differently than animals?

"Human vision differs to some extent from the vision of other living beings," Professor Zinkernagel explains. An important factor is the structure of the retina, which turns light into electrical signals and then transmits them to the brain. Light processing is done by specialized cells known as photoreceptors, and this is generally where the main difference lies: most mammals, including humans, have retinas with two different types of photoreceptors, rods and cones. The rods are particularly sensitive to low light and are therefore important for perception in low light conditions. The cones, on the other hand, are responsible for color perception in good light.

However, some animals have different numbers and types of photoreceptors. For example, birds and some species of fish have four types of cones and can therefore see a wider range of colors than humans.

Another difference is the position of the eyes on the head: humans have two eyes that face forward, allowing the field of vision to overlap. This allows us to more accurately estimate distances and perceive spatial depth. Other animals, such as birds, have eyes arranged on the sides of their heads, giving them a larger field of vision, but they are not as good at estimating distances. Eyes would have evolved in a way that serves the survival and lifestyle of each individual species.

Thus, it can be said that the vision of other animals differs in some respects from that of humans.



STARTUP

BREATH OF FRESH AIR

CIELOCAM

In Switzerland, several thousand fawns are killed every year by mowing machines during the mowing season. Emanuel Kipfer wanted to put an end to this and equipped a drone with a thermal imaging camera that can detect fawns in long grass, making him a pioneer in drone-based fawn rescue. To be able to offer his services nationwide, he developed the BAMBIKIT: a handmade EASYCHARGE carry case with a fully automatic charging function for the drone, a monitor, and various other useful features. This kit rapidly met with high demand and is now considered the gold standard among hunters and deer rescuers in Switzerland.

As the combination of the professional drone and the EASYCHARGE carry case is also suitable for many other industries, Emanuel Kipfer founded the drone imagery company CIELOCAM. In the near future, CIELOCAM will be launching special complete systems for fire services to support rescue operations and for farmers to assist with herd protection.

ExO

More than 12 million people worldwide suffer from an eye disease called keratoconus, in which the cornea becomes thinner and forms a cone-shaped bulge. This causes distorted and blurred vision. In excess of 250,000 new cases are diagnosed every year.

This type of vision impairment can be alleviated by various methods, including conventional laser treatments that remove tissue to correct vision. The Bern-based startup ExO is working on a new, promising method for individual treatment: an ophthalmic device that makes it possible to inject those affected with a hydrogel to correct their vision.

This medtech device originates from research carried out at the University of Bern and is currently supported by the Venture Fellowship, a collaboration between Inselspital, the Innovation Office and the ARTORG Center.

bambikit.ch

Ideas, new technologies and inquiring minds constantly inspire new business ideas that give rise to startups. We present four examples in our startup parade.

FACTS

Startup stage Consolidation	**Startup stage** Seed (We're working towards a prototype)
The inventor Emanuel Kipfer	**The inventors** Miguel Ariza und Philippe Büchler
Riggisberg	**Bern**

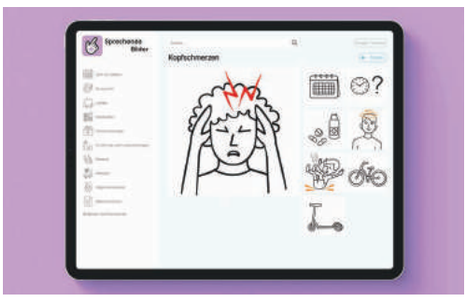
Aare Optometry Practice
This startup in Thun specializes in the prevention and diagnosis of eye problems. Using state-of-the-art diagnostic equipment, the practice offers customers eye exams performed by highly trained medical practitioners.

Optometrists have been permitted to perform full eye exams since 2020, under the Federal Healthcare Professions Act. Optometry is transformative for the patient and helps keep the federal government's high healthcare costs low with these self-paid examinations. The optometrist advises patients on eye health and issues eyeglass prescriptions, discusses how regularly eye exams should be performed, or refers the patient directly to an ophthalmologist if treatment is required.

The Aare Optometry Practice is the ideal point of contact for professional eye care.

optometrie-aare.ch

Startup stage
Up and running
The inventors
A lawyer and two optometrists
Thun



Talking Pictures
Language barriers between healthcare professionals and their patients occur on a daily basis in the Swiss healthcare system. In certain pediatric emergencies, up to half of all consultations face language barriers, taking up time and resources and negatively impacting on quality of care.

An interdisciplinary research team from the design, nursing research, and medical informatics departments at Bern University of Applied Sciences has developed a digital, image-based communication aid for patients and healthcare professionals. Offering safe and efficient communication in emergency situations, the Talking Pictures web-based app makes an important contribution to boosting the quality of treatment of patients who speak other languages and improves the working conditions of nurses in challenging situations.

The prototype serves as a starting point for establishing a spin-off in the area of image-based communication in healthcare.

sprechendebilder.ch

Startup stage
Planning phase
The inventors
Beatrice Kaufmann, Loraine Olalia, and François von Kaenel
Bern

The Startup Parade is presented by:
be-connected
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Make the most of these unique opportunities and give your young company an extra boost on your journey to success: www.be-connected.ch

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“When I hear Verdi’s *La Traviata,* I close my eyes, shut out everything else, and zero right in on the music.”

Thomas Bernhard is CEO of the Haag-Streit Group. The Köniz-based company develops, manufactures and distributes diagnostic equipment, surgical microscopes and training simulators for ophthalmologists and opticians all over the world.

The approachable boss

One of the first changes I made when I was appointed CEO of the Haag-Streit Group two years ago was to introduce the “Du” [the use of the familiar form of address instead of the formal form traditionally used in the German-speaking workplace]. A “Hey” here, a “How’s it going” there changes the company culture. And it has also made a difference for me too: I am a very approachable, affable boss. I love to be able to exchange ideas with my employees and benefit from their in-depth expertise in an easy, relaxed way. After all, it’s they who have that knowledge, not me. I’m always learning a lot from them. It’s important for me to be able to recognize broader perspectives in sufficient depth and use them as the basis for my decision-making.

Lucky

I work extremely hard. But when I think about my life, I consider myself lucky. Do you know the 10-20-70 formula? Ten percent substance, 20 percent appearance, 70 percent luck. This applies to me, and indeed to many of us: seventy percent is luck that we were born here, into this life. So it’s all the more important to also give back to society. For several years I have been a member of the Bern-Bantiger Lions Club, which is committed to improving the living conditions of visually impaired and blind people.

The music lover

I have made a lot of music myself and – time permitting – I am currently an active board member of the Friends of the Bern Conservatoire. I like almost every genre of music, but I’m a big Verdi fan. When I hear his music, I close my eyes, shut out everything else and zero right in on the music.

As CEO of the Haag-Streit Group, Thomas Bernhard employs around 1,000 people worldwide. The company, which is headquartered in Köniz, generates annual sales of CHF 228 million.

Thomas Bernhard is a big music lover. The pinnacle of emotion: experiencing Verdi’s operas live in the Arena in Verona.

“The fact that I started out in a hands-on trade serves me well to this day.”

Visionary

Vision provides us with around 80 percent of all the information from the world around us. That's a huge amount. So as a medical company we must always be one step ahead of developments. What environmental influences are becoming more prevalent, and what diseases are developing? With what consequences? Let's take the example of myopia, a form of pronounced refractive error that is becoming increasingly common in children. If it isn't genetically determined, it is due to the fact that children are spending more and more time looking at flat surfaces. As a result, the eye isn't forced to accommodate dynamically. This in turn affects the development of the eye and leads to myopia at a young age. But it is quite easy to counteract at an early stage: play outside more! It's a classic civilization disease, and this is where we come in: we develop devices that diagnose this refractive error as early as possible, so that its development can be anticipated, treated, and, ideally, stopped. But it takes a long time to get there. Even though it's a long-winded process, I love it. It always confronts us with big questions: What can we do with a finding? What consequences will it have? At what point can we determine whether the consequences are negative or positive?

Hands-on

To be quite honest, when I joined the company almost ten years ago, medical technology and ophthalmology were both completely uncharted territory for me. I originally qualified as a telecommunications technician, electrician, and apparatus fitter. Later I went to university to study electrical engineering and obtained a postgraduate degree in software engineering and one in business administration. I worked in IT for a long time, until quite by chance one day I spotted the Haag-Streit job ad and knew straight away that the job profile for the role of CEO of Haag-Streit Diagnostics was a more or less perfect fit for me. Today I consider myself lucky to be able to constantly input everything I have learned in my professional career here.

The fact that I started out in a hands-on trade serves me well to this day. I know exactly what it means to stand in front of a machine and carry out a process over and over again. Keeping everything in view. Paying meticulous attention to every detail. Always unfailingly the same, always unfailingly good. That may sound banal, but it is not to be underestimated and requires a lot of concentration and precision. And rightly so, as at the end of the day we at Haag-Streit are all about patient safety. We have to make 100 percent sure our devices do no harm to the patient. Electricity, paint, materials – all these are factors that could pose a risk to patients if they are not handled appropriately.

An eye for technology

Frank Ziemer had clear ideas about the direction in which ophthalmology would develop. He founded the Ziemer Group in 2000 and has been producing innovative laser instruments for ophthalmic surgery in Port near Biel/Bienne ever since. Today the Ziemer Group is one of the key players in ophthalmology worldwide. They operate internationally, working closely with the most renowned experts in the fields of medicine, research, and technology.

The overall ophthalmology sector is a multibillion-dollar market, covering everything from pharmaceuticals to diagnostics and implants through to complete surgical facilities. By comparison, the Ziemer Group operates its laser products in a niche that is just a couple of billion in size. But the Ziemer Group is right at the forefront of this segment, thanks to its innovative, high-tech FEMTO Z8 multipurpose laser platform for ophthalmic surgery. We spoke to Frank Ziemer, founder and CEO of the Ziemer Group.

How did your interest in the eye come about?
While I was at university I did some work on development projects at a company that made ophthalmology instruments. Even then I could see that there was huge potential in developing surgical instruments. My vision was to integrate much more software-based intelligence from optics, electronics, and laser technology into these products. After all, eye surgery has a close affinity with technology.

How have you implemented your vision?
We developed a completely different technical concept than all other companies. It is based on a laser platform that can be used for a range of surgeries. For this purpose we developed the Low Energy, High Repetition Rate. In this technology, the laser emits light pulses using far less energy, so it is very gentle on the eye tissue. However, to prevent surgeries from taking too long, the laser must operate at extreme speed and with a high repetition rate. This is the technology we invented.

FEMTO Z8
The FEMTO Z8 is the result of visionary design concepts and performance-oriented construction and engineering work. The integrated applications can be used for a wide range of surgeries:

- Refractive
- Cataract
- Therapeutic solutions for the complete spectrum of ophthalmological treatments

“We developed a completely different technical concept than all other companies.”

Frank Ziemer, founder and CEO Ziemer Group

How do you come up with an invention like this?
By working with the right people to examine a lot of technical options right from the start, but also by being willing to reject them if necessary. The process we went through with the experts was a very long, iterative one. Even today, we are constantly bringing expertise into the company. Not a month goes by without us exchanging ideas with institutions based in Germany, the USA, or Switzerland, particularly Bern University of Applied Sciences and the University of Bern.

What do you do differently than your competitors?
We started off by taking a close look at our competitors’ products. But by doing that you run the risk of being too close to the competition. So we were forced to break completely new ground in terms of technology, compactness, and the handling of the laser.

How important is it for you to be based in the Canton of Bern?
Actually, that’s almost impossible to overstate. We have a precision culture in Biel/Bienne that has developed over generations. The partner companies we work with here specialize in high precision and are highly competent in optics and electronics. Precision is crucial for us because the cornea is about 0.5 mm thick and if you want to accomplish something in that area you have to work in the thousandth of a millimeter range. Also, Zurich and Lausanne are easy to get to, of course, and the University of Bern is a short drive away. Plus it only takes me ten minutes to get to the University of Applied Sciences in Biel/Bienne, which we work very closely with.

Why would you describe yourself as a Hidden Champion?
Many people don’t even know that we bring innovative and technically advanced products to market. We hear that a lot, both at home and abroad. “Hidden Champion” is an accolade for me. Even though we are still a relatively young medtech company, our eye lasers are already in use in 75 countries worldwide.

What is the life span of a Femto laser?
We have devices in many countries, not least in Asia, that have been working away for 15 years now – something we never expected. We assumed clinics would be buying replacements after seven or eight years. Our devices are extremely robust and solidly built, which is also a quality feature: Swiss made, you see!

How do you see your industry and the Ziemer Group in ten years’ time?
We don’t want to grow at any price but rather in a qualitative, healthy, and sustainable way. We are currently thinking very carefully about how we expand going forward. After all, what we do is highly complex. Everything has to work together seamlessly, from the expertise to the wide range of technologies and regulatory requirements with all the clinical trials, right through to opening up a market. I firmly believe that in ten years’ time we will be even better positioned and more well-known in the market.

Design
For their first ever product, Frank Ziemer commissioned several industrial designers. It won the company the prestigious Red Dot Design Award. Today the Ziemer Group works with various design companies. The design has gained substantially in significance, with private clinics in particular attaching great value to aesthetics.

EU Medical Devices Regulation
The EU Medical Devices Regulation (MDR) has regulated the sale and use of medical devices in the EU since May 26, 2021. The regulation replaces the Medical Device Directives and lays down stricter requirements for the authorization of medical devices in order to guarantee their safety and performance. Ziemer has built up its own expertise in this new regulation and was the first company to certify a laser for use in ophthalmology to MDR standards.

About the Ziemer Group
- Established in 2000
- Headquarters: Port
- Around 300 employees
- Exports to 75 countries
- Sites in Germany, the USA, China, and Taiwan

ziemergroup.com

Fighting eye diseases with artificial intelligence

Bern-based medtech startup RetinAI develops software solutions based on machine learning and artificial intelligence (AI). Its digital tools help life science companies, hospitals, and doctors to gain the knowledge they need to make the right ophthalmic decisions for every patient.

The three founders, Stefanos Apostolopoulos, Carlos Ciller, and Sandro de Zanet, have known each other since they were students together at ARTORG, the center for biomedical engineering research at the University of Bern. Hailing from Greece, Spain, and Bern (with Italian roots) respectively, all three obtained their PhDs there at around the same time. In their doctoral theses they focused on machine learning and the use of AI in medicine, developing algorithms for digital image recognition in ophthalmology. "It would have been a pity to leave these algorithms gathering dust in the digital drawer," Carlos Ciller says. So in 2017 the three university friends set up RetinAI Medical AG. The name RetinAI says it all: using AI to analyze and examine the retina for diseases more quickly and more efficiently with the aim of accelerating innovation in ophthalmology in general.

RetinAI is a spin-off from the University of Bern, where the three company founders, Carlos Ciller, Stefanos Apostolopoulos, and Sandro de Zanet (from left to right), worked on AI as part of their dissertations.

New drugs and therapies

RetinAI uses the insights gained from data analysis to develop digital tools for faster research and more targeted treatment of eye diseases. Summarizing the startup's development since 2017, CEO Carlos Ciller explains: "Our smart software solutions are already in high demand, both in the production of new drugs and devices and in everyday clinical practice, where they enable new therapies to be created."

Immediately after it launched, the startup began building the RetinAI Discovery platform, a medical database that can be used among other things to efficiently manage image datasets. The actual treasure trove of knowledge is made up of tens of thousands of 3D retinal scans, which ophthalmologists carrying out examinations have been producing routinely for many years. RetinAI reprocesses these previously unstructured imaging data according to standardized criteria. "The data are the raw material from which we derive our insights," Ciller explains.

Of interest to all healthcare professionals

With its innovative technology and AI models, RetinAI undoubtedly helps all interested ophthalmology professionals to obtain valuable information and identify new therapeutic possibilities. The RetinAI Discovery platform and various AI models recently gained CE certification as medical devices and are thus approved for the European market. They are used in both medical research studies and everyday clinical practice, for example to interpret image data, calculate biomarkers, and track disease progressions. With its platform and smart tools, the startup now supports healthcare professionals in all areas of ophthalmology, from researchers and developers at universities and the pharmaceutical, bio, and medtech industries to specialists in hospitals and medical practices.

In light of their success and rapid development, the birth pangs of the early days have been all but forgotten: When they launched in 2017, the three founders initially worked without pay in modest, cramped attic offices on Bern's Spitalgasse. Supported by friends and family as well as their own savings, they scrimped their way through two lean years. The door to the world of venture capitalists was opened courtesy of their first major investment from a private individual and various grants. An initial round of financing in 2019 with two large professional investors ultimately raised CHF 2.3 million, enabling the startup to move into the new Sitem Insel building – the Swiss Institute for Translational and Entrepreneurial Medicine. Cofinanced by the Canton, the federal government and the private sector, this location provided them with

"Our technology is not only an option in ophthalmology but also in many other medical fields."

Carlos Ciller,
cofounder and CEO, RetinAI

the perfect environment, offering offices, labs, and a comprehensive range of technical equipment, as well as being in close proximity to the Inselspital. RetinAI currently employs some forty people, about two dozen of whom are based at its headquarters in Bern. “Attracting the right people is one of our biggest challenges,” Ciller notes.

Since RetinAI launched six years ago, a total of more than CHF 7 million has so far flowed into the young company’s coffers through further financing rounds. “At the moment we are still burning capital, but break-even is in sight,” Ciller says. The startup aims to reach the profitability threshold in two years’ time at the latest.

Milestones

One of RetinAI’s first partners and customers was the Inselspital in Bern. Since 2019 the startup and its AI tools and data management platform have also been involved in various European research projects and studies. Hospitals and private practices can already use the smart software on a subscription basis. “A highlight of our as yet brief history is our collaboration with Novartis,” Ciller points out. RetinAI signed a collaboration agreement with the pharmaceutical group in 2020. They are supporting Novartis in various pilot projects, as well as in a clinical trial involving patients with neovascular age-related macular degeneration (nAMD). Another milestone was obtaining FDA approval for RetinAI Discovery in the U.S. market in 2021. This led to their opening a branch in Boston.

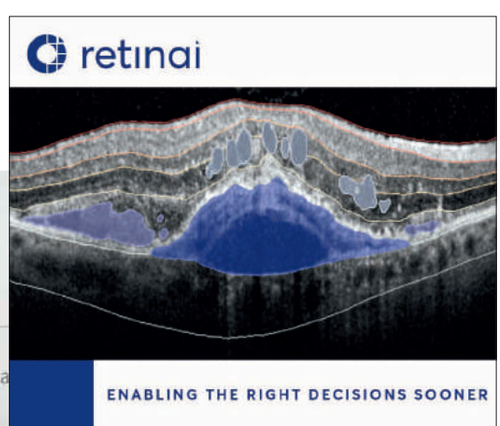
The startup, which is constantly refining its technology, still specializes in ophthalmology, especially the retina and the various forms of macular degeneration. “But in principle our technology is an option in all areas of medicine that use imaging processes for disease analysis,” says Ciller, highlighting the almost limitless opportunities it presents. Speculation has it that some major players have already cast a discerning eye over the successful young Bernese company. Ciller: “If we do actually get a concrete offer one day, we will think things over carefully and then decide on the most reasonable solution.”

How it works

Carlos Ciller gives a detailed demonstration on his laptop of how RetinAI’s technology works, using a specific form of macular degeneration as an example. The software detects this age-related eye disease based on certain patterns in the retinal scan. It segments the different layers of the retina in seconds and colors them differently, highlighting conspicuous fluids that are indicative of the disease. The AI tool can also automatically calculate the type and quantity of the fluid. This is crucial for determining the form of macular degeneration involved in each case. The RetinAI application is already able to analyze and diagnose around 30 different eye diseases.

retinai.com

Just one year after it was established, RetinAI made it onto the prestigious top 100 list of Switzerland’s best startups.



RetinAI’s software analyzes the different layers of the retina, enabling conditions such as macular degeneration to be treated more effectively.

From the palm trees straight to the Alps: a train ride with a view

After just the first few curves, Geneva's Riviera spreads out before you in all its splendor.

The three-and-a-half-hour journey from Montreux to Interlaken on the brand new Montreux Oberland Railway is a true delight: the trip takes in three different cantons and connects the hot spots of Lake Geneva with those of Lake Thun and Lake Brienz – and all without changing trains.

The railway meanders leisurely through the heart of Montreux's residential area, passing magnificent houses and *Jugendstil* villas and climbing high above the city – up and up until Switzerland's Riviera, the glittering lake, and the shores of France across the water spread out before you in all their splendor. It's not only the visitors from the USA and India who whip out their cellphones in awe of the panoramic view; two ladies from Western Switzerland who have treated themselves to the three-and-a-half-hour trip on a day out wax lyrical about it – and about being tourists in their own country.

And that's exactly how it should be. "We reckon that locals make up more than half of our passengers," says Jérôme Gachet of Montreux-Berner-Oberland-Bahn AG (MOB), the Swiss railway company that operates the GoldenPass Express. This is particularly evident in the winter months, he says, when there are very few foreign visitors traveling around the country. "We get a lot of Swiss tourists using this route because of the trains, but also because of the magnificent scenery."

Superb travel comfort for rail fans from home and abroad: the MOB fleet consists of 23 cars, all of which feature panoramic windows.

115.34 kilometers from palm trees to glaciers

A good five months ago, on December 11 last year, the GoldenPass Express made the 115.34 kilometer journey from the Mediterranean Lake Geneva via Château d'Oex, Gstaad, Zweisimmen, and Spiez to Interlaken Ost in the mountainous Bernese Oberland for the very first time. It accomplishes what until now seemed impossible: a direct train connection from the hot spots of the Swiss Riviera to the hot spots of the Alps, or – in marketing terms – from palm trees to glaciers.

An old idea reimagined

The idea for this spectacular route goes back a long way, with the first written record of it dating back to 1873, according to MOB. Even then – in the era of great railway projects – people dreamed of uniting the economic centers of Lake Geneva, Gstaad, Lake Thun, and Lake Brienz and of improving connections to the mountain regions. The first section of the MOB railway between Montreux and Les Avants was inaugurated as a meter-gauge track, adapted to the steep terrain, in 1901. At the same time, a train line was built between Interlaken and Zweisimmen, but with a standard-gauge track (1.435 m). From then on, a connection did effectively exist, although not a direct one, as passengers had to change trains in Zweisimmen and Interlaken.

The idea of a third rail was rejected several times for technical and financial reasons, until MOB announced in 2008 that they wanted to overcome the barrier between standard and meter gauge using trains with variable-gauge bogies. Just two years later, the company presented to the press the solution it had designed and developed, the EV09. Following further refinement and successful testing by rail manufacturer Alstom, it was ultimately unveiled as the EV18 in 2019. Thus the regauging was complete, paving the way for an idea that was over a hundred years old and would eventually be implemented with a CHF 89 million price tag.

Maximum comfort and regional enjoyment

For foreign visitors, the direct connection offers significant added value. "Eliminating the need to change trains is a must for travel groups and boosts travel convenience for all passengers," MOB notes. But at the same time, it has finally made a long-cherished dream of tourism professionals and rail fans come true. The fleet comprises 23 cars, all of which feature panoramic windows. Each formation offers second, first and prestige class travel. The latter boasts heated seats that all face in the direction of travel and

The three-and-a-half-hour journey that takes you through three cantons without changing trains not only attracts foreign visitors but also inspires Swiss tourists who take the train because of the beauty of the route.

During the journey, passengers are immersed in the diversity of the Swiss countryside and can enjoy a wide range of local delicacies.

are raised up by 40 cm. “This allows passengers to be even more immersed in the surroundings and makes them feel like they are sitting right in the middle of the landscape.” Along the route, the GoldenPass Express connects several attractions such as Chillon Castle near Montreux, Maison Cailler in Broc, Glacier 3000 in Gstaad, the Stockhorn in Erlenbach im Simmental, and, last but not least, the Queen of the Alps, the Jungfrau, in Interlaken.

To make the journey even more enjoyable, a choice of Swiss delicacies are available to sample. The on-board catering, which must be prebooked, features breakfast baskets, appetizer platters, and snacks, made with regional products. In addition to wines from Weinhaus Testuz, there are sausages from the Bernese Oberland butchery Buure Metzg and beers from the Interlaken brewery Rugenbräu. Oona caviar from Tropenhaus Frutigen is served in first and prestige class.

Offer being expanded

The GoldenPass Express currently runs once a day in each direction between Montreux and Interlaken Ost. Despite there being no figures available yet, MOB is more than satisfied with the occupancy rate. “The trains are often very full, both from Montreux and Interlaken,” Gachet says. From June 11, 2023, the service is being increased to four return trips per day, which will also extend the link between city, lakes, and mountains; between cultures and languages; but above all between French-speaking and German-speaking Switzerland.

mob.ch

Connecting Western Switzerland to Grisons with the Grimsel tunnel

A 22 km tunnel could make it happen: connecting an 850 km long network that spans the entire Swiss Alps, from Montreux to St. Moritz. How? By building a single-track, narrow-gauge railway tunnel alongside the new extra-high-voltage power line tunnel, through which the trains would be routed. This would connect Haslital (Innertkirchen BE) with Goms (Oberwald VS) and thus the Montreux-Berner-Oberland-Bahn (MOB) subnetwork with the Matterhorn-Gotthard and Rhaetian Railways, creating added value for foreign visitors and commuting locals alike. MOB welcomes the plans: “This is a topic we naturally follow very closely and support,” says spokesman Jérôme Gachet. The responsible National Council committee is currently examining the feasibility of this multifunctional Grimsel tunnel. Construction could begin in 2027 at the earliest. It would take about eight years to complete, at an estimated cost of CHF 600 million.

Switzerland Tourism commercial

The MOB Railway is being given a great honor: in Switzerland Tourism’s latest campaign, Roger Federer promotes the GoldenPass Express line between Montreux and Interlaken. Together with comedian Trevor Noah, the tennis star accidentally gets on the wrong train and travels through the beautiful Swiss countryside, only just escaping the ticket inspector.

Roger Federer rides the MOB

grimseltunnel.ch

Competition: win a trip on the GoldenPass Express

Experience an unforgettable journey from the Vaud Riviera via the Pays-d'Enhaut to the majestic peaks of the Bernese Alps. Sit back and marvel at the unparalleled landscape unfolding before you through your panoramic window.

The winner will receive a voucher for a first-class trip for two on board the GoldenPass Express from Montreux to Interlaken.

Included per person: train ticket (Montreux–Interlaken), seat reservation, snack platter, and a drink.

1 **Competition question 1:**
Who said, "The fact that I started out in a hands-on trade serves me well to this day"?

- ☐ **Frank Ziemer**
- ☐ **Carlos Ciller**
- ☐ **Thomas Bernhard**

2 **Competition question 2:**
How many kilometers does the GoldenPass Express cover between Montreux and Interlaken?

- ☐ **115.34 km**
- ☐ **215.34 km**
- ☐ **55.34 km**

3 **Competition question 3:**
Which picture shows the FEMTO Z8 multipurpose laser platform?

- ☐ **Image A**

- ☐ **Image B**

The winner will be drawn by lots and notified in writing. Employees of the Office of Economic Affairs are excluded from entering the competition. The judges' decision is final. There is no cash alternative to the prize.

Enter the draw at www.berninvest.be.ch/chance: the closing date for entries **is 31 July 2023**

Many congratulations to the winner of our competition in *berncapitalarea* 2/2022: Rolf Johner, Muntelier

Feel free to ask the Immission Protection

One of the things the Office of Environment and Energy's Immission Protection department deals with is the air we breathe and what goes on in it. Although we need air to live, we pay too little attention to its quality. Immission Protection's mission is therefore to shine a light on this topic and to work to ensure that the air we breathe is as clean as possible.

Question: *What exactly does Immission Protection do?*

Answer: Immission Protection consists of four units: Air Pollution Control, Noise, Non-Ionizing Radiation (NIR), and Light Immissions. Their experts are responsible for ensuring that the legal requirements are met. To do that they carry out measurements and checks, assess applications, impose measures, and provide information. The legal requirements themselves are not set by the canton but by the federal government.

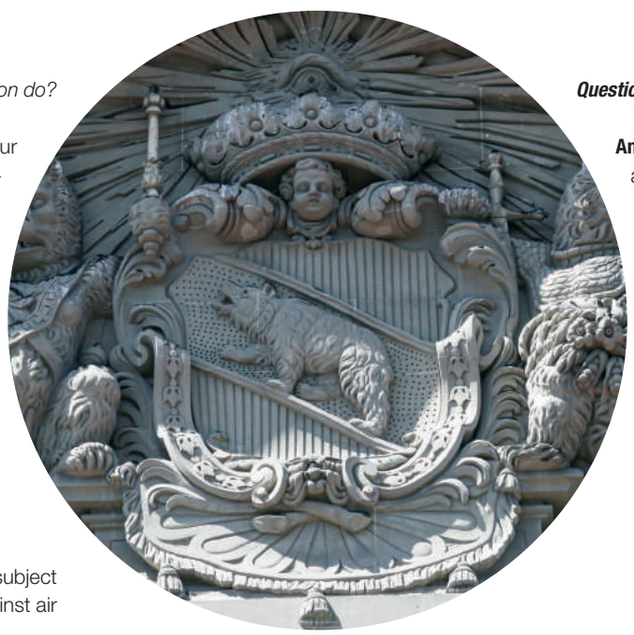
Question: *How do these measurements and checks work?*

Answer: That depends very much on the subject matter. Building applications are checked against air quality, noise, or NIR criteria, for example.

The air quality in the canton is monitored continuously: we have 13 stations providing data that are updated hourly and 146 passive samplers providing supplementary data. The results tell us about the impact of the measures taken. The hourly measurement updates and the pollutant maps modeled from them are available to the public online at www.be.ch/luft.

Question: *What do you look for in the checks you carry out?*

Answer: With building applications, we check whether the relevant regulations for limiting Immissions are being complied with and impose additional measures if necessary. This applies to industry and commerce, including agriculture. Basically, all Immissions must be kept within the statutory limits. Often an on-site inspection is required: the experts concerned are naturally aware of the implications of their decisions and are keen to find solutions – always within the scope of the law, of course.



KORNHAUS
The Kornhaus is a former grain storehouse and today a cultural center and restaurant on Kornhausplatz in the old town of Bern.

Question: *How does Immission Protection respond to reports from citizens?*

Answer: The Immission Protection often hears from people who are bothered by light, noise, or smells. We might receive questions like: "There is a smell or a lot of noise. Where is it coming from?" or "Is my neighbor allowed to do that?" Depending on the extent of the issue, the Immission Protection department can offer to take measurements and clarify the situation, occasionally coupled with an on-site inspection. If available, we will provide further information on studies or direct people to other points of contact such as a federal government department. However, our staff are limited in what they can do because Immission Protection cannot carry out research. So even though questions involving highly personal situations and emotions are taken seriously, it may be that no solution can be found.

Question: *How can citizens help?*

Answer: The Immission Protection department is always very pleased when citizens find out in advance whether they need a permit to carry out special actions such as burning waste construction timber. There is a section on air and air quality on our website www.be.ch/luft covering various topics, with lots of tips on avoiding Immissions.

be.ch/luft

Free airCHeck app
With the airCHeck app you can check the current air quality anywhere in Switzerland and Liechtenstein at any time, aided by maps and data from measuring stations. In addition, airCHeck notifies you about health effects and tells you what to watch out for when air pollution is high. The app also provides important background information on the origin and sources of individual air pollutants as well as on their potential health effects. The app is provided by Cercl'Air, the association of Swiss authorities and academics in the field of air quality and nonionizing radiation. In collaboration with Swiss TPH, Cercl'Air has developed an interactive map on the effects of air pollution on health.

swisstph.ch

cerclair.ch/aircheck

New arrivals in the Canton of Bern

The Bern Economic Development Agency (BEDA) helps innovative international companies and undertakings to relocate and settle in the Canton of Bern – such as Aseptuva AG and CSEM. BEDA works on this with the intercantonal partner Greater Geneva Bern area which has a network in selected target markets abroad.

Aseptuva AG

Aseptuva AG is developing new disinfection technology for medical devices based on ultraviolet radiation. Unlike commercial UV technologies, the application is harmless to human tissue, allowing infections to be prevented directly on the body – a solution that hospitals have been eagerly awaiting for a long time.

No wonder, then, that even before its market launch Aseptuva was able to win numerous hospitals in Switzerland and abroad as future customers of its product. Its location close to the Inselspital in Bern plays an essential role in progressing its research work.

This technology is expected to save thousands of patient lives a year and billions in healthcare costs worldwide. Aseptuva's long-term goal is to establish its technology as the standard for infection control in hospitals. In doing so it is making a major contribution to optimizing healthcare.

aseptuva.ch

CSEM AG

Another lighthouse of the innovation ecosystem of the Canton of Bern and Switzerland is being built on the Inselspital campus: the Swiss Center for Electronics and Microtechnology (CSEM), known worldwide for its applied research in the fields of microtechnology and nanotechnology, will launch a new unit, the Digital Health Center.

The unit is expected to employ up to 70 people in the medium term. The aim of the Digital Health Center will be to combine the expertise of the Inselspital and the University of Bern in the fields of medical and clinical research with CSEM's expertise in microelectronics and prototyping. The CSEM finances its activities within the framework of a public-private partnership: approximately one third of the funds come from public sector (the federal government and the Cantons), one third from research mandates put out to tender and one third from private industrial companies. The CSEM is regarded throughout Switzerland as a unique and highly efficient institution for the creation and spin-off of startup and spin-off companies.

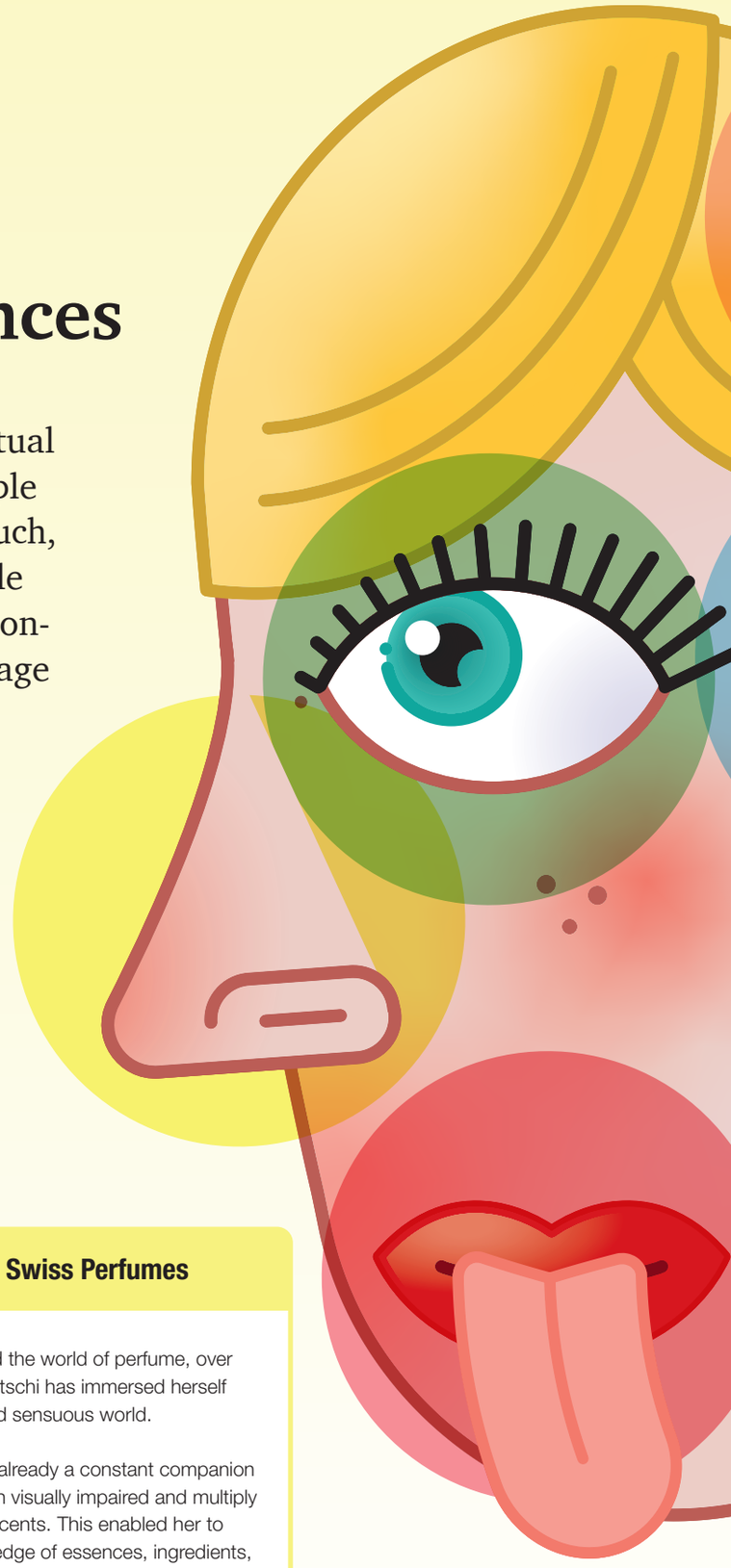
The Canton of Bern is making a substantial contribution to the establishment and expansion of the institution, and the Bern Economic Development Agency has already provided the startup contributions over the past two years. The corresponding new credit application for the years 2023-2025 will be dealt with by the Grand Council in the summer session 2023.

csem.ch

#cantonofbern

Sense-ational experiences

How many senses do we humans have? The actual number is a much debated issue, but most people can agree on six: vision, hearing, smell, taste, touch, and balance. It's thanks to them that we are able to perceive impressions and stimuli in our environment. There are plenty of opportunities to engage your senses in the Canton of Bern. Here is a small selection.



Taste and all the other senses – Sensorium Rüttihubelbad

The Sensorium at Rüttihubelbad is all about sensory perception. It provides a soothing respite from the visual sensations of our everyday lives. At 80 experience stations, visitors of all ages get to taste, hear, see, smell, and feel the familiar and the unknown. Marvel at optical phenomena on rotating discs; experience a plethora of different smells at the scent tree; and feel sounds and their vibrations with stones, wooden blocks, and large gongs.

And when the weather's good there are plenty more stations outside to discover. Allow at least two hours for your visit.

Tip:
The annual exhibition *"Farbe erleben"* [Experience Color] takes you into the world of color, light, and darkness and invites you to experiment with spectra, mirrors, and exciting equipment.

ruettihubelbad.ch

Smell – Art of Scent – Swiss Perfumes

Fascinated by fragrances and the world of perfume, over the past few years Brigitte Witschi has immersed herself completely in this creative and sensuous world.

The world of fragrances was already a constant companion in her work as a therapist with visually impaired and multiply disabled children and adolescents. This enabled her to deepen and refine her knowledge of essences, ingredients, and aromas and their effects on people.

Her vision of founding her own label has come true with "Art of Scent – Swiss Perfumes." In her studio in Bern's historic city center, Brigitte creates unique, personalized perfumes for customers. Not only can visitors gain an insight into the world of perfumers there; Brigitte also runs individual perfume workshops and gives talks on perfumes followed by perfume creation sessions at which there's a wealth of fascinating things to experience.

artofscent.ch

Balance – Seilpark Bern

Located at the heart of the Bernese Dählhölzli Forest, Seilpark Bern (Bern Rope Park) is one of the largest rope parks in Switzerland. Seven courses lead through the treetops at heights of between 4 and 23 meters, offering a unique perspective on the forest. Suspension bridges and zip lines take you across many different platforms.

With a range of levels of difficulty on offer, everyone will find a course that suits their preferences and abilities. The mixture of thrills and exercise in very special natural surroundings guarantees an unforgettable experience at Seilpark Bern. For youngsters, the rope park offers three kids' courses fully equipped with a safety system.

ropetech.ch

Vision – Gäggerstäg

December 1999 saw the storm of the century, called Lothar, sweep across large parts of Europe and Switzerland, destroying many forests in its path. The forest at Gägger was almost completely wiped out.

Today you can walk along a 250-meter-long wooden walkway and marvel at nature's impressive power of regeneration. There is nowhere else in Switzerland where a destroyed forest has been left untouched and yet made accessible to people – creating a unique nature experience. The Gäggersteg walkway also offers a breathtaking view of the Gantrisch mountains.

The trail is perfect for a walk with children. It is an easy circular route, and the accompanying story, *"Der wilde Türst – das stürmische Spiel am Gägger"* [The Wild Türst – The Stormy Game on the Gägger], leads past eight stations in an unspoilt natural setting.

gantrisch.ch

Hearing – Saanis sound adventure trail

On this walk you can discover different sounds and noises in a fun way at 18 experience stations. Besides musical notes, you'll get to hear the sound of wood through a tree trunk, animal voices at interactive consoles, and the sounds of nature through Saani's big ears.

The puzzle book accompanying the adventure trail gives young visitors a different task to complete at every station. Once they discover the answer code, they get to open the padlock on the treasure chest at the end!

The adventure trail can be started from Gstaad or Saanen.

gstaad.ch

Feel – Wiedlisbach Barefoot Trail

The Barefoot Trail is located in the forest above Wiedlisbach and can be easily combined with a walk along the Legend Trail at Jura-Bipperamt. The trail is signposted from Wiedlisbach station.

The walk starts off on gravel, which in itself is a challenge for inexperienced barefoot walkers. Next comes a soothing section consisting of tree trunks laid across the path. The trail continues with compartments containing wood chips, cobblestones, clay, pine cones, and much more. All the materials come from the surrounding natural environment.

Walking barefoot shapes and exercises our feet in an ideal way, with uneven natural ground the most beneficial surface to walk on. Although walking on the unfamiliar materials can be a little painful and unfamiliar to begin with, a barefoot walk is a pleasant experience. You can feel your feet getting used to the new challenge.

pro-jura-bipperamt.ch

Your success is launched here!

In the Canton of Bern, innovative businesses deliver top performances, especially in medical, energy and environmental technologies, in the precision engineering industry, in ICT and in services. Our efforts to develop the Canton of Bern as a business location are also intended to pave the way to your success. If you are looking for a site or have financing questions, we are happy to help you. Are you planning a project? Contact us!

www.berninvest.be.ch

Bern Economic
Development Agency