

# A source of knowhow for industry

In a globalized economy, the competitive ability of a high-tech country lacking in n like Switzerland depends on its innovative strength. To guarantee prosperity, research results from the labs have to be passed on to Swiss companies quickly to help them succeed on the market. The current "Focus" outlines Empa's role in the Swiss technology transfer scene.

TEXT: Gabriele Dobenecker / PICTURE: Optotune



Two Optotune employees during tests on a beam path: the start-up company was given a helping hand in Empa's business incubator, glaTec.



**A**s an application-oriented research institute for material science and technology, Empa is committed to bridging the gap between science and industry. Through individual collaborations and a broad range of services, Empa is able to offer its partners tailor-made solutions. Whether the idea is to develop new products, optimize existing technologies or solve specific problems – with 500-plus highly qualified scientists and engineers and its top-notch infrastructure, Empa is the number-one port of call.

#### **100 research projects with industry launched every year**

Last year alone, Empa initiated over 100 new R&D projects with various partners from industry, all supported by Empa's Technology Transfer Office, which was founded in 2005. Around the same time the institute also established the Empa Portal to facilitate the contact to potential customers and partners – a convenient drop-in center that enables interested companies to submit queries to Empa without having to go through the whole rigmarole of finding the “right” contact person first.

#### **From researcher to entrepreneur**

Economically speaking, spin-offs, i.e. new companies founded at Switzerland's universities and research institutes, are crucial. Empa helps its fledgling companies in the early stages by offering coaching, specialist advice, administrative support and infrastructure: Empa has been running the business incubator glaTec at its headquarters in Dübendorf for the last five years and is involved in Eastern Switzerland's STARTFELD initiative with its technology center

## Research Cooperation

With at least 100 new research projects every year, this is the most frequent form of cooperation with partners from industry. One example is the aerogel insulating plaster developed with the Fixit AG, a building materials company. This plaster combines the insulating properties of polystyrene (or styrofoam) with the easy application and water permeability of conventional mineral plaster. It is, therefore, particularly well suited for the energy refurbishment of historic buildings. The project was sponsored by the Commission for Technology and Innovation (CTI). After research spanning roughly two years, the insulating plaster was launched on the market in early 2013. In January 2014 the product won the Swiss Environment Award.

tebo in St. Gallen. The sale of the Tagblatt newspaper building right on Empa's doorsteps has opened up fresh prospects at the site: spearheaded by tebo, a technology park is currently under construction on the premises, where the idea is for companies that match Empa's competence profile to settle and create new possibilities for collaborative projects.

### Expert knowledge for the real world

Together with partners from industry and research, Empa is constructing a Coating Competence Center aimed at offering training in the field of coating technologies and "handing over" the latest research results from the lab to industrial partners as quickly and directly as possible so that they can turn them into innovative products.

Finally, with its wide range of courses and information events, the Empa Academy provides a lively platform for knowledge transfer and an open dialog with experts from science, industry, public authorities and politics and, last but not least, for the interested public. Around 5,000 participants flocked to roughly 90 Academy events last year.

### "Key to Switzerland's innovative success"

Empa's tech transfer activities do not go unnoticed; during one of his recent visits Federal Councilor Johann Schneider-Ammann, Head of the Federal Department of Economic Affairs, Education and Research, confirmed that Empa is on the right track: "As an entrepreneur, I have often looked to collaborate with Empa, having realized what extraordinary achievements the researchers record there. For me, Empa is the beating heart of Switzerland's knowledge and technology transfer network and a linchpin of our innovative success." //

# The ABC

## Strategic Cooperation

In select areas Empa enters into strategic partnerships with long-standing research partners, for instance in April 2010 with the company Hexis AG. The goal is to establish the solid oxide fuel cell (SOFC) on the market as a sustainable alternative to the overall energy supply of buildings. Partnerships of this kind extend beyond individual projects. The search is on for new project ideas, access to funding agencies in Switzerland and the EU, and broad interdisciplinary cooperation.

# of technology transfer

## Technology Offers

Patents frequently emerge from research projects, which Empa then offers to industry partners for licensing. **Two examples:**

- Wood combustion produces large volumes of fine particles. Empa has developed an electrostatic particle separator that can be retrofitted to small wood-burning units like fireplaces. It captures up to 90 percent of fine particles. The German manufacturer Kutzner + Weber distributes the system under the brand name "Zumikron".
- Empa engine experts have come up with a novel hydraulic valve control that requires no camshafts or valve springs. The valves are, therefore, lighter and their kinetic energy is not converted into heat but recuperated. This reduces fuel consumption. The patent is currently available for licensing.

The latest offers can be accessed on [www.empa.ch/technologieangebote](http://www.empa.ch/technologieangebote)  
Further information: +41 58 765 4444, [portal@empa.ch](mailto:portal@empa.ch)



1. **Idea** A municipal utility vehicle with a hydrogen fuel cell drive. Is that possible at all?
2. **Funding** Contractual negotiations with the Swiss Federal Office of Energy, Competence Centre for Energy and Mobility of the ETH Domain (CCEM), various industrial partners and potential pilot regions.
3. **Research partners** Empa draws together internal and external expertise: PSI and the CCEM competence center are now on board, too.
4. **Industrial partners** Who is interested and in a position to contribute components to the pilot vehicle? Bucher-Schoring, BRUSA Elektronik AG and Messer Schweiz AG join the team.
5. **Time** Research requires patience: The first exploratory talks about hy.muve were held in 2007. The vehicle was rolled out in 2009. It is now in its fifth year of test operation.
6. **"playground"** A prototype is sensitive and not immediately viable. The municipal utilities in Basel had the space, competence and patience for the first six months of technical fine-tuning. They were followed by St. Gallen, Bern and Geneva, each for three months.
7. **Optimization cycles** hy.muve is constantly being technically refined and retrofitted with the help of experience from practical operation is taken on board.
8. **Market survey** Visitors from several European cities inspect the prototype.
9. **Product development** Based on hy.muve's technology an eco-powered street sweeper tailored to customer requirements is developed.
10. **Marketable product** The first hy.muve street sweeper is delivered to the customer.

# The road to success

It's a long haul from an idea to a marketable product. Longer than many people may think. Empa has experience in pushing this kind of pioneering technological project through. Care about an example? The fuel cell-powered street sweeper "hy.muve" nicely illustrates the key ingredients to success.



of Empa –

7 There is interest in a small series.

8 Technology Bucher-Schörfling is able to develop a new drivetrain. requirements is possible.

9 The product series of diesel-powered street sweeper could be supplemented in some cars by a new product line: street sweepers with a fuel cell drive. A world innovation.

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# Springboard for neo-entrepreneurs

Empa's business incubator glaTec has already helped a number of young companies to sprout wings and go it on their own. One of these is Optotune. A spin-off from ETH Zurich, the team joined Empa in 2008 and, after an incubation period of nearly three years, ventured the leap onto the free market – successfully, as we can see today.

TEXT: Cornelia Zogg / PICTURES: Optotune

Over 30 employees currently work at Optotune's "new" headquarters in Dietikon in the outskirts of Zurich. Since leaving glaTec, the company has not stopped growing and has made a name for itself on the market. It all began with a project funded by the Commission for Technology and Innovation (CTI) aimed at developing a flexible lens with a focal length that could be altered electrically in a matter of milliseconds. Initially, the team headed by Manuel Aschwanden, an ETH Zurich physicist fresh from his doctorate, set their sights on applications for cell phones, cameras, scanners and lighting systems. From 2008 to 2010 the start-up took advantage of Empa's infrastructure. "Empa was a huge help. Its infrastructure is outstanding and the staff are very helpful," says Aschwanden. As Empa's own lab equipment was not always available and speed is crucial in industry, for instance, Optotune was often given priority.

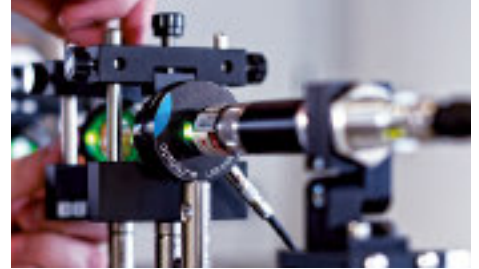
## Getting rid of the start-up label

Optotune has been in Dietikon for almost four years now. The time eventually came to leave the Empa nest when things started to get cramped as many other start-ups began to squeeze into glaTec. For the successful fledglings, it was high time they ventured out "into the big, wide world" – and not a moment too soon, either, as it transpired: a start-up should shed its image as quickly as possible if it wants to compete on the market. According to Aschwanden, customers were often hesitant as a start-up label is always associated with a certain degree of risk. Nevertheless, "it was the right decision to join Empa," the founder confirms.

## The secret to success? It's the team, stupid

Meanwhile, the company has ballooned to over 30 employees – twice as many as when it left Empa four years ago. All the technical "glitches" have been ironed out – the lenses work as intended and the interest from industry is tremendous, as Aschwanden explains. However, the young entrepreneur has never forgotten one of the principles from the Empa days: the right team and the right partners are the key to setting up a successful company. And this includes Empa with its business incubator.

Aschwanden also took another lesson to heart that does not solely apply to start-ups: "Everything takes twice as long as planned." For Optotune, the plan ultimately proved successful; business is flourishing. And other young companies that were given the opportunity to receive a kick-start from glaTec are about to "spread their wings", too. Nonetheless, Mario Jenni, glaTec's Managing Director, is confident that the coveted facilities at Empa will not stay empty for long: "The demand is huge – and unfortunately our space limited." //



Optotune products are manufactured in the cleanroom (top). High-precision optical devices are essential for the development work.



Optotune CEO Manuel Aschwanden took advantage of Empa's infrastructure from 2008 to 2010.

## glaTec

glaTec is a support organization backed by Empa, Eawag, the City of Dübendorf, the regional association glow.das Glatttal, the City of Zurich and Canton of Zurich's Business and Economic Development Division. Empa's business incubator currently hosts twelve young companies, which not only benefit from the facilities on campus, but also the contact with other researchers, help with market surveys and coaching. More information at [www.glatec.ch](http://www.glatec.ch)

# AKADEMIE

## Knowledge hub

The Empa Academy, the institute's platform for knowledge transfer and public dialog, is turning 15. What can the Academy offer? What does the future hold? An interview with Academy Director Anja Pauling.

INTERVIEW: Rainer Klose / PICTURE: Empa

**Ms. Pauling, the Empa Academy is supposed to disseminate the knowledge garnered here at Empa. How do you achieve this?**

A central element is the academy building on the Dübendorf campus with its flexible event rooms and state-of-the-art infrastructure. This is where the majority of our meetings, conferences, courses and public events take place. It also provides space for exhibitions, which is being used frequently in the scientific arena, but also in the exchange with industry. This enables us to live up to our role as a "center for knowledge transfer".

**You offer courses and other training events for science, industry and society. Where do the ideas for them come from? Is the Empa Academy also open to external input? Which wishes can be fulfilled?**

The Empa Academy is a service for and by the scientists who work at Empa. Consequently, the topics are rooted in Empa's research areas, but absolutely from outside, too. If topics are "hot" or controversial – such as nano-technology or alternative energies at the moment – they surely will figure on our planning. However, new contents for courses also often spring from our events. We distribute questionnaires among our participants and frequently happen upon fresh themes.

**The Academy is also responsible for bringing Empa scientists into contact with industrial partners. How do you go about this?**

Empa is known for its applications-oriented research and collaborates intensively with external partners, especially from industry. What many people don't know: our range of topics is vast. For instance Empa investigates wa-

ter-resistant wood, new materials for wound healing or cutter blades made of ceramics and much more. Some-times not even all the companies involved in these very fields are aware of this. And that's where the Academy comes in: organizing suitable events for the exchange with industry such as the newly established series of "Technology Briefings".

**Can people still use the Empa Academy even if they don't have much to do with materials science?**

Actually, we have also been renting out the Academy to externals for a while now. This is particularly interesting for companies or associations that are involved in similar fields to Empa as we can "enrich" their events with lab visits, tours or talks, which always goes down really well. And the Dübendorf campus is easily reachable by plane, train, tram or car, too.

**You have been heading the Academy since last fall. What are your plans? What programs and activities can we expect in the future?**

Next year, the Empa Academy is celebrating its 15th anniversary. My predecessor, Anne Satir, put together a top-class program over the years. I intend to build on this and take it to the next level. I am currently hatching a couple of new ideas concerning event forms or the use of the premises in Dübendorf and St. Gallen to make Empa's activities even more visible. The realization of the lighthouse project NEST will enable us to expand our possibilities noticeably as we will also have seminar rooms in NEST – right next door to the Academy – that will be available to the public. I'm really looking forward to watching the Empa Academy develop further and hope that many EmpaNews readers will find their way to our events.

The Empa Academy's current program is available at [www.empa-akademie.ch](http://www.empa-akademie.ch)

