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The magazine of ETH Zurich and ETH Alumni

No. 3, September 2014

Focus Spatial planning

New urban models

page 16

Dear readers

Switzerland is growing. Not only is the population increasing, but so is the demand for housing and work space. The consequences are palpable wherever new buildings sprout up or existing structures get more crowded. In international terms, Switzerland is nowhere near as densely populated as the Netherlands or Singapore, for instance, but there is still mounting unease among the population regarding this development, as the results of a number of recent referendums have revealed. People often forget that urban sprawl does not come from the population boom alone: the development of transport infrastructure also plays a role. For example, our outstanding public transport networks are leading to ever greater distances between home and the workplace.

This situation begs the fundamental question as to how Switzerland's urban areas will develop in future – an issue examined by the recently completed National Research Programme NRP 65 "New Urban Quality", in which researchers from ETH Zurich played an instrumental role. From Zurich's city centre to more rural communities such as Arbon, the scientists studied what actually constitutes urban quality and which factors promote good planning.

The results reveal that urban quality has to be redefined at every location. And we need more dialogue between planners, owners, investors, authorities and the population, since all these groups are crucial to creating an urban structure that is conducive to a high quality of life. The NRP 65 researchers have developed tools to support this dialogue effectively. Although these tools do not provide any concrete answers as such, they highlight conflicts of interest and indicate possible actions and potential for improvement. For this reason, they have a high degree of practical relevance.

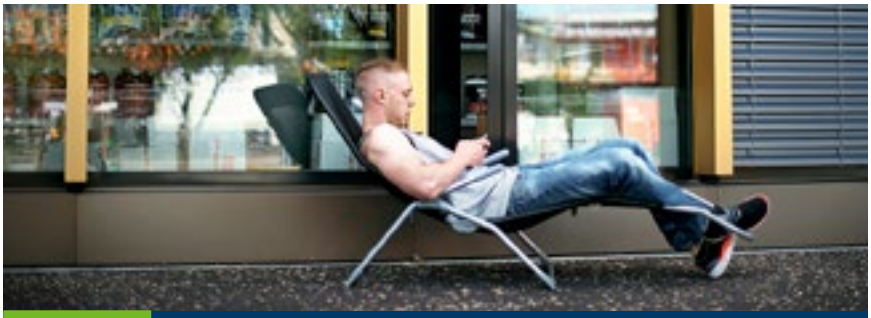
While the researchers conducted the majority of their studies in the Zurich metropolitan area, the results of the individual sub-projects can also be applied to other places – not just in Switzerland, but also in Asian cities, for instance, which are growing at a far quicker rate than their Swiss counterparts. The researchers involved in NRP 65 thus offer a link to the Future Cities Laboratory at the Singapore-ETH Centre for Global Environmental Sustainability, where researchers from ETH Zurich are also seeking answers to the question as to how sustainable, resilient urban areas can be created for a booming population.

The Focus article in this issue presents you with some ideas about what urban quality means here in Switzerland. Happy reading!

Ralph Eichler
President of ETH Zurich

Contents

Talented young people from all over the world investigated technology developments in the healthcare sector at the ETH Sustainability Summer School. Globe followed their progress.



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Flashlight

Research in a nature reserve

"This valley … has a wealth of Swiss pine, larch and spruce forests … beautiful Alpine flora and, if you include a bit of the adjoining Ofengebiet, sprawling stocks of mountain pines where bears still roam about. This would be … a majestic sanctuary for the last survivors of Alpine fauna, and might also be suitable for the repatriation of the ibex." This is how ETH Zurich professor and botanist Carl Schröter campaigned for a national park in the Lower Engadine in 1905. Together with Steivan Brunies from the Engadine and two private scholars from Basel, Fritz and Paul Sarasin, he was the driving force behind the project. And in 1914, his hard work finally paid off: the Swiss National Park was founded by federal decree as a "natural space protected from every human influence."

Today, a century on, the Swiss National Park in the Lower Engadine is not just a popular tourist destination and a major factor in the region's economy; it also offers an interesting environment for research. Scientists from ETH Zurich, for instance, have been studying how soil properties affect the regeneration of larch forests, how mountain pines and larches survive dry spells, and how molecular markers from conifers can be used to reconstruct the development of vegetation.

The Swiss National Park website:
www.nationalpark.ch/go/en →

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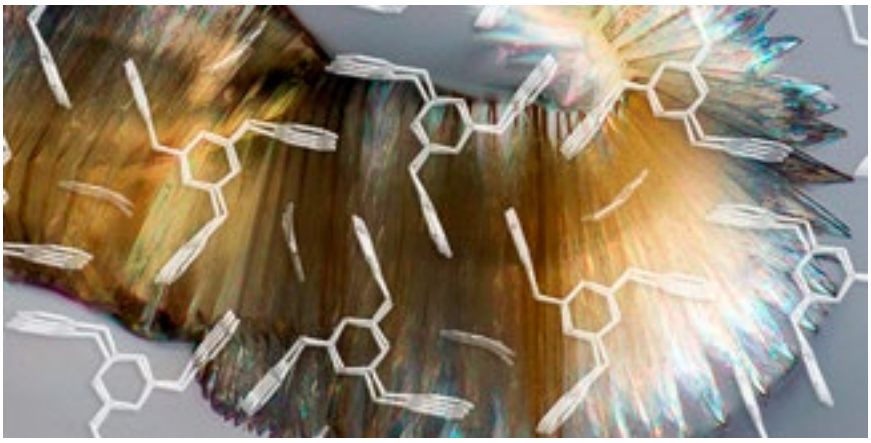
Google project

Navigating around interiors

In Project Tango, Google teamed up with ETH professors Marc Pollefeys and Roland Siegwart to develop mobile devices that record their surroundings three-dimensionally, in detail and in real time. Nowadays, every smartphone has a camera and acceleration and rotation sensors. These newly developed devices also have a second integrated camera and an infrared source. The latter projects a pattern onto the surrounding area that is invisible to the human eye and is recorded by one of the two cameras. This data can then be used to generate detailed, three-dimensional information about the room, which enables interiors to be navigated. The first of these devices should be available on the market next year.



The unpolymerised material (in the foreground) and individual layers of a polymerised crystal

Materials science

Nanometre-thick polymers

Materials scientists from ETH Zurich have been working on the development of planar polymers for a number of years. Two years ago, the group headed by Dieter Schlüter, a professor at the Institute of Polymers, succeeded in producing a synthetic planar polymer for the first time ever. However, it was not possible to clarify its structure fully with x-ray crystallography. Now, at the same time as an independent US research group, the ETH researchers have managed to make another planar polymer in which structural clarification was possible. The researchers have thus found the elusive direct evidence that synthetic two-dimensional polymers actually exist.

Scientists anticipate interesting applications for planar polymers. They could be used to produce synthetic, nanometre-thick graphene, the hot topic of the hour. The ETH researchers are currently in the process of characterising the properties of the planar polymer more precisely.

Bridge inspector "C2D2"

Transport infrastructure

Robot detects bridge damage

A new robot developed by scientists at ETH Zurich can already spot corrosion damage on bridges at a very early stage. Moreover, it can also check the condition of a bridge in places that are inaccessible or difficult to reach for humans. This remote-controlled robot, called C2D2, is sucked onto the bridge thanks to a propeller, which turns so quickly that a vacuum is created. This also lets it look for damaged spots even while upside down.

Prize-winning ETH spin-off

The ETH Zurich spin-off Selfnation, which sells made-to-measure jeans online, won the judges over at the young entrepreneur competition Venture Kick: it took home one of two awards with CHF 130,000 in prize money. The company was founded by Andreas Guggenbühl, who completed his Master's degree in mechanical engineering at ETH Zurich this year, and Michael Berli, who is doing a degree in computer science at ETH Zurich.

Ticker

Development aid

Student invents water filter

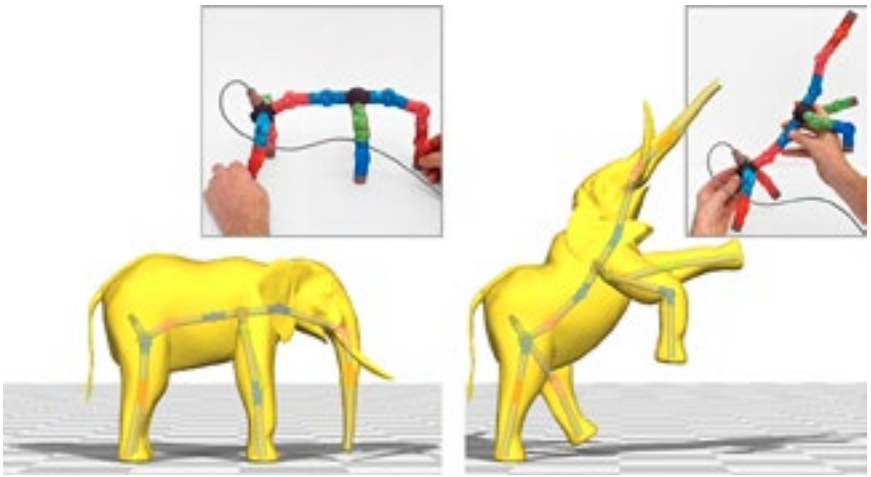
A new filter developed by a student at ETH Zurich enables water to be filtered faster, more easily and more affordably than ever before. DrinkPure removes larger components, odours and chemical impurities step by step, allowing users to simply attach it to a bottle of contaminated water and take a drink straight away. Thanks to a polymer membrane, it even removes bacteria. ETH scientists would like to use the filter in development aid and are on the lookout for investors.

Elected ETH-Zurich Rector Sarah Springman

Executive Board

Sarah Springman elected rector

Sarah Springman, a professor of geotechnical engineering, will become the new rector of ETH Zurich. Together with her predecessor Lino Guzzella, who will be taking over as president, she will be shaping the future of ETH Zurich as part of the Executive Board from January 2015. As rector, Springman will be in charge of the teaching division and is looking to maintain or even improve ETH Zurich's high level of education.



Animated elephant: the variable joystick can be assembled into any shape.

Virtual world

Joystick brings characters to life

ETH professor Olga Sorkine-Hornung and her team have been researching methods to animate characters as realistically as possible. They have developed a novel joystick made of components which the user can assemble into a shape similar to the animated character – whether it be an elephant or a human. The sensors in every joint measure the angle of the bending or turning movement and communicate this information to a software programme, which calculates and performs the corresponding movement of the virtual character. The system can also bridge differences in proportion, which means that the distances between the joints in the real and virtual space do not need to be identical. The researchers have now made their plans for the components publicly available as "open hardware" in the hope that this will trigger more research.

Therapy

Cure for arthritis

Researchers at ETH Zurich have developed a treatment that they have used successfully to cure chronic polyarthritis in a mouse model. Previous drugs had only been able to slow or stabilise the progress of the disease.

The new biotechnological agent is composed of interleukin-4, the messenger substance of the body's own immune system, which, as earlier studies revealed, protects against cartilage and bone defects in mice suffering from polyarthritis. The ETH scientists coupled the messenger substance to an antibody that carries it to the inflamed areas based on the lock-and-key principle. When the researchers injected the new agent with Dexamethasone, a cortisone-like drug, they were able to cure the animals. On their own, the substances could only manage to slow the progress of the disease. The researchers now want to test the efficacy of the treatment in humans.

Report

Eryn, Alex, Camilla and Farooque (from left) have been putting together the disciplines for the Cybathlon 2016 at this year's ETH Sustainability Summer School. A Lego model provides the four students with a template for the sporting competition.

ETH Sustainability Summer School

A winning team

Corinne Hodel

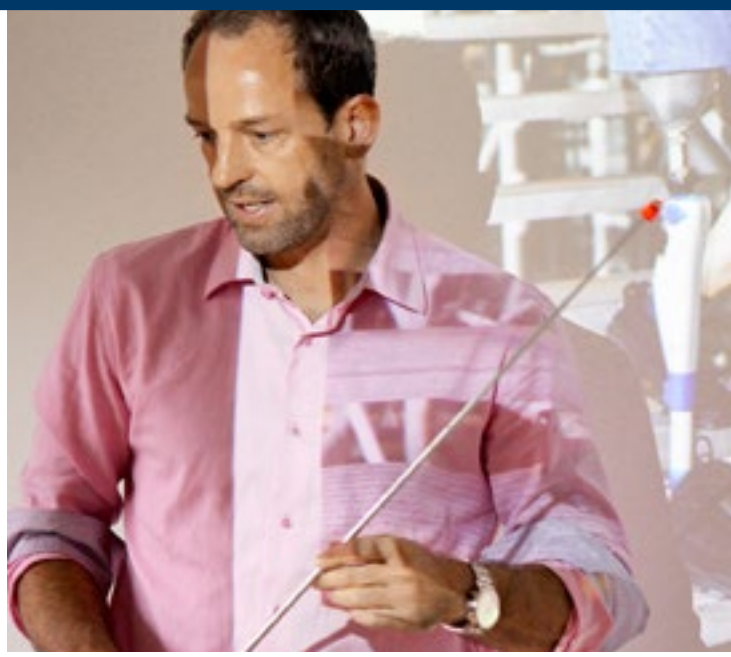
At the ETH Sustainability Summer School, talented young people from all over the world have been engaged with the development of technology in the healthcare sector. The wealth of experience that the students take away with them extends far beyond the expertise they get from their degree courses.

They shuffle around the breakfast buffet in silence. Some of them still look as if they are half asleep; probably the aftermath of last night. One of them had been strumming a guitar in the garden and singing Indian songs. Eventually, they all joined in before settling on some Lady Gaga numbers. It's hard to imagine that these students will be engaged in an animated discussion in half an hour when Robert Riener, a professor at ETH Zurich and Balgrist University Hospital, will be presenting his idea at this year's ETH Sustainability Summer School: a sports competition for people with a physical disability, who are permitted to go for gold using technical aids.

The 31 participants in the summer school here in Emmental have already been lodged in a seminar hotel above Grosshöchstetten for several days. They have been listening to talks by experts, attending workshops and sharing experiences with each other – all centred on the topic of health. Alex, Camilla, Eryn and Farooque belong to the group that is developing the championship course on which the athletes will be competing. The four of them met at the summer school. Now they are eagerly awaiting Robert Riener's presentation. They want to find out more about his idea.

Riener begins. The competition is called Cybathlon and the physically challenged athletes are referred to as pilots.

Report



The participants in the ETH Sustainability Summer School spend their first week in Emmental, where they attend workshops, share experiences and listen to talks by experts on the topic of future health. One of the speakers is Professor Robert Riener from ETH Zurich (right), whose lab develops prostheses for people with physical disabilities.

In contrast to the Paralympics, power-driven mechanical and electric aids are allowed. Consequently, besides the pilot, a technology provider will also emerge victorious in each of the six disciplines. In the electric wheelchair steeplechase, for instance, the company or research group which developed the vehicle also joins the driver on the podium. Within the scope of the summer school, Alex, Camilla, Eryn, Farooque and their colleagues are now supposed to develop a course. The important thing is that the pilots have to perform everyday tasks while they compete. During a wheelchair race, for instance, negotiating a doorstep might be conceivable.

The audience tap away on their laptops and scribble in their notebooks. The interest in Riener's project is intense. "The idea is impressive", finds Alex, a chemistry student from Yale University, who will be developing the wheelchair course. Eryn, who was born in the Philippines and is doing a Master's in climate change at the Australian National University, is no less enthusiastic. "The competition draws attention to the topic of disability", she says. "People with physical disabilities are often hidden away in society. The Cybathlon brings them to the fore."

Lunchtime is long overdue and stomachs are rumbling. But the questions keep coming thick and fast. Farooque, an Indian postdoc at the Paul Scherrer Institute, stands up and sketches a lower leg on the flipchart. He is interested in the shape of the shinbone compared to that of a prosthetic leg. Riener explains which components have to mimic nature as closely as possible and where the engineers have got a certain amount of wiggle room. A lively discussion ensues.

Shortly afterwards, they all enjoy a welcome lunch break in the scenic garden. For these students from all over the world, the setting must be quite unusual. Typical Emmental farmhouses, hilly model railway landscapes and cattle grazing for as far as the eye can see – one of the WLAN networks is even called "cowshed". Yesterday, they all left the rural idyll to visit the WHO in Geneva.

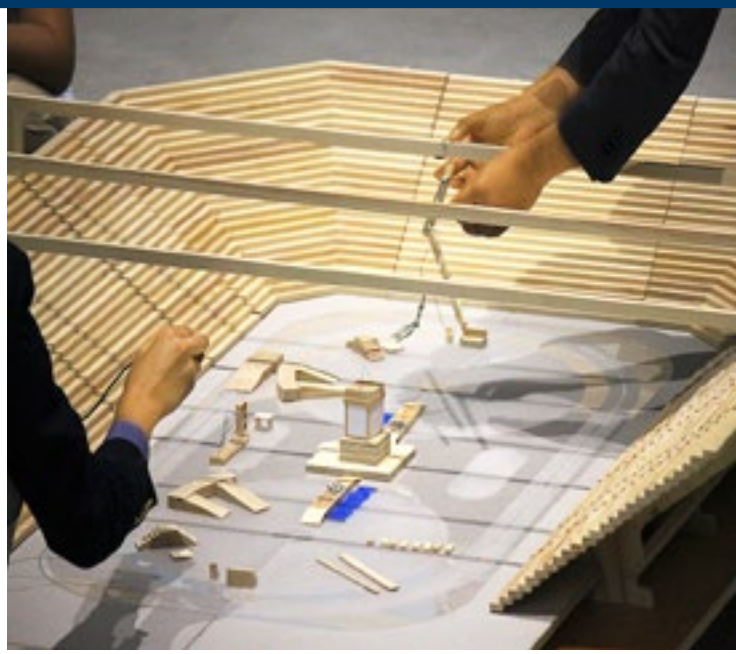
Over lunch, Riener is delighted with the students' interest, the collaboration with ETH Sustainability and the fact that his idea has received such a positive response. And not only within ETH Zurich, either: teams all over the world have already signed up. And journalists around the globe are reporting on the Cybathlon. The US television channel CNN, for instance, has broadcast a video interview with Riener.

Challenging collaboration

One week later, in the architecture drafting room at ETH Zurich: it is time to build the arena out of wood. The aim is to produce a 1:50 scale model of the course. The makeshift Lego model is already done and dusted. Some students are sitting in front of the computer and are giving the planned construction a final once-over. Others are bringing timber, glue and plans to the workshop. Small groups are beavering away all over the place. "The summer school is very interactive and dynamic", finds Farooque. "We do a lot of group work and have interesting discussions."

Farooque is also developing the safety concept. "I like being responsible for something", he says. He is one of the most experienced at the summer school. Bachelor's degree student Alex finds the varying academic levels of the participants a real asset. But the mix is also a challenge. "People's diverse technical and cultural background leads to different approaches, which makes the collaboration challenging", says the young American. And Eryn and Camilla agree. "We're learning a lot here but more about social skills than specialist knowledge in our own fields."





Although the construction of a wooden model is uncharted territory for Farooque, Camilla and Alex (from left), they get stuck right in. And the result is quite impressive (right). During the final presentation, the students navigate through their work with a mini camera so that all the participants can admire the intricacies of the arena they've built.

That is precisely the goal of the ETH Sustainability Summer School. The students are supposed to acquire skills here that are difficult to teach in the lecture theatre. These talented students hail from 17 different nations and rank among the best at their universities. The number of participants is limited and the competition for places is stiff. This year, they are divided into three teams with one thing in common: the topic of "Future health: technology and innovation". Two teams are focusing on the Cybathlon. Apart from the course team, which includes Alex, Camilla, Eryn and Farooque, a second team is working on a sponsorship film – all the way from the script to the editing. The third group is studying health gadgets, looking into how sensors could contribute to maintaining health and the issue of who owns the data these sensors record.

Today is a somewhat chaotic day for the course team. There has been a hold-up in the delivery of more wood. They should have been at work long already. However, no one seems stressed – not yet, at least. What the young scientists don't yet realise is that they will have to put in a night shift in the end.

Not at all what they'd expected

Another week on, with their night shift behind them, they've put away their workshop clothes. Farooque and Alex have even slipped on a blazer for the closing presentation. The group stands in a huddle and runs through their presentation one last time. The atmosphere is buzzing but focused.

Soon, it will be their turn to present what they have created in the last few weeks. At last, the electronic curtains go up and the lights are dimmed. Bright-eyed, the students take their seats. The room falls silent. And the groups begin their presentations.

Alex, Camilla, Eryn, Farooque and the other group members are visibly proud of their wooden model. They have come up with an interesting idea to give the audience an impression of how the competition will eventually take place. The model is standing in the middle of the stage. Alex kneels down beside it and walks a mini camera through the arena. Thanks to a live feed, the obstacles, steps and other intricate elements of the course appear on the big screen. In the meantime, Eryn guides a model pilot, who is attached to a stick, around the course. The audience likes the performance and rewards the speakers with generous applause.

"I'm very pleased – after all, we worked on it all night!" says Farooque with a grin. Camilla can only agree: "It was very stressful at the end." But she is also proud of the outcome. For her, model-making was a completely new experience. "I had the opportunity to do things here that I've never done before", beams the Dane. "The summer school was different from what I had been expecting."

Tomorrow, all the participants of this year's ETH Sustainability Summer School will be heading home, with a wealth of experience under their belts – and no doubt plenty of new-found friendships. ■

ETH Sustainability:
https://www.ethz.ch/en/the-eth-zurich/sustainability.html →

Focus Spatial planning

New urban models

What actually makes an urban area worth living in? And what do you need to consider during the planning process if you want to end up with structures that meet these demands? In the National Research Programme 65 "New Urban Quality", researchers from ETH Zurich set out in search of answers to these questions. They have developed instruments that help planners in their everyday work – not just in Switzerland, but wherever cities and villages are changing.

Creating spaces worth living in

If different players act separately in urban design, the result often leaves a lot to be desired. In order to counter such a one-dimensional approach, architects from ETH Zurich have developed a tool that measures the complexity of an urban area.

Corinne Hodel

High-rises, terraced houses, replacement buildings: structures are sprouting up left, right and centre in Switzerland. Urbanisation is in full swing in this country – and has been for some time now, stretching beyond the city limits. However, this process often involves an encroachment on the countryside because infrastructure doesn't just take up space, it also carves up land. In the research project "Urban Potentials and Strategies in Metropolitan Territories – For Example in the Metropolitan Area of Zurich", scientists from ETH Zurich have studied how urbanisation processes affect urban quality. They have also developed a tool which helps to discern and boost urban qualities. This interdisciplinary project was spearheaded by ETH architecture professor Marc Angélil and his colleague Lukas Kueng. "It's astonishing how many obstacles you come up against as you walk through the agglomeration", says Kueng. "While that might sound very trivial, there is a great need for optimisation in this field."

For three years, a team comprising architects, urban planners, social scientists and landscape architects has examined urbanisation processes based on three case studies, each of which represented an urban planning prototype. The Langstrasse embodies an extremely diverse inner-city neighbourhood with a high level of interaction; the airport region in the Glatttal represents a suburban zone with an international reach; and finally the region around the upper Zurich Lake from Richterswil to Freienbach constitutes an area on the outskirts of the city with a high-income population. These three regions from the Zurich metropolitan area are all regarded as urbanised, but the manifestations of this urban character differ greatly – making the case study locations representative of other regions and thus making the results transferable.

From adaptability to accessibility

Based on these three case studies, the scientists have identified characteristics of urban areas. Their interdisciplinary team also made a point of including ideas about urban living drawn from the social sciences. "This collaboration was very challenging", reflects Angélil. "There was a clash of different ideologies." Vittorio Magnago Lampugnani, a professor of the history of urban design at ETH and himself an architect, can only agree: "The search for the characteristics of urban areas was very intensive but also extremely fruitful." He was in charge of one of the research modules.

The analysis resulted in determining seven urban qualities: centrality, accessibility, usability, adaptability, appropriation, diversity and interaction. Kueng provides an example of the last of these: "Zurich West was built up in a short space of time architecturally, but not socially. Here, the level of diversity and interaction has actually decreased of late." Angélil adds an example from Wollerau in the municipality of Schwyz, where a roundabout was constructed right where the village square used to be, between the church,


Perla-Mode

the village shop and the pub. "Accessibility for pedestrians is severely restricted and usability is limited to road traffic", explains Angélil. "If Wollerau wants to regain its urban quality, then the roundabout needs to go."

Holistic, not one-dimensional

In order to prevent such one-dimensional building projects in future, the researchers have developed a tool for analysing urban areas based on the seven urban qualities. Moreover, they have also refined the qualities themselves. Centrality, for instance, can be symbolic, functional or logistical in character. These 21 characteristics in all can be rated from low to high for a particular urban area, creating an urban profile which highlights where there is potential for improvement. However, the aim isn't to achieve top scores across the board. The Josefwiese in Zurich's District 5, for instance, has a very high social diversity level but only an average score when it comes to structural, spatial diversity. "But that doesn't have to be a bad thing for a large, green space", stresses Kueng. While the urban profile does not provide any ready-made solutions or prevent conflicts of interest, it encourages discussion and raises awareness – a key ingredient for a successful collaboration between the parties involved.

Lampugnani does not regard this tool as a simple checklist for ticking off the seven qualities. "It is more about not forgetting the complexity", explains the scientist. From his longstanding experience as an architect, however, he knows just how hard it is to get the various factions around one table. "The one-dimensional approach to certain building projects is staggering", says Lampugnani. He is currently channelling the insights gained from the study into a project in Pfäffikon in the region of upper Lake Zurich, where the municipality has asked him and other experts to develop ideas as to how this small town might be improved. "Infrastructure has badly damaged Pfäffikon", says Lampugnani, though he adds: "Of course it needs infrastructure. But in thoughtful, careful doses." The key to successful urban development is holistic thinking.

This is also what the students working on the case studies learnt, as their scientific analysis simultaneously served an educational purpose. These future architects and urban planners formed part of the team that identified the seven urban qualities, and they were also involved in collecting the data onsite. By talking to the local population, they learnt what makes an area worth living in for those affected, and what identity means. And they monitored, documented and measured urban areas. For Lampugnani, it is important for the students to get a feel for proportions and surfaces: Are the trees large or small, is the ground made of asphalt or cobblestone? Developing a keener eye like this is good practice for the students for future research projects, but also for their later everyday working lives as architects. Ultimately, it is the little things that create identity and acceptance among the population and transform a place into a space worth living in.

For other regions and cultures as well

Although the tool for creating urban profiles was developed based on case studies in the Zurich metropolitan area, it can also be applied to other regions – "at least in other industrialised countries", says Kueng. "However, its principle can also be adapted to other regions and cultures – with the assistance of the people there." Marc Angélil has a wealth of experience in projects in Africa and South America. For instance, he co-founded the Ethiopian Institute of Architecture, Building Construction and City Development, where over 3,000 students are currently enrolled. And he was also involved in urban design in Brazil, where was confronted with the segregation of the rich and the poor, the drugs scenes and the mafia. This experience has influenced his work in Europe. "Even if there is undoubtedly room for improvement in many urbanisation processes in Switzerland", Angélil explains, "we're complaining on a very, very high level here." ■

Chair of Architecture and Design:
www.angelil.arch.ethz.ch →

Chair for the History of Urban Design:
www.lampugnani.arch.ethz.ch/home-en/home_en →

Urban diversity, not cookie-cutter cities

Growth and landscape conservation, urban habitats and rural nostalgia – spatial and urban planners have their hands full. Wilhelm Natrup, Director of the Zurich Cantonal Office of Spatial Planning, and Professors Kees Christiaanse and Christian Schmid from the ETH Department of Architecture talk about how to handle these contradictions.

Interview: Martina Märki and Corinne Hodel

We have seen many discussions about population growth and immigration recently. Is Switzerland bursting at the seams?

Wilhelm Natrup: No, in the Canton of Zurich alone we could easily accommodate an influx of up to 400,000 people. On paper, we have sufficient reserves in built-up areas. But we have to handle these areas and zoning districts differently than we have in the past.

Kees Christiaanse: I come from Holland. Compared with my country, Switzerland is not densely populated at all. But you do see instances of urban sprawl. Above an altitude of 1,000 metres there is natural protection against this phenomenon, because it's difficult to build any higher up. In the valleys, however, for instance in the Rhine valley, it's getting very crowded. This leads to a populated landscape which is, in fact, an urban landscape. It's important to shape this development by means of spatial planning measures.

Christian Schmid: When I take international guests up the Uetliberg mountain and tell them how built-up the region of Zurich is, they are completely dumbfounded. All they see is hills, forests and lakes. From an international perspective, we can't really say that Switzerland is overly urbanised. But if we take a closer look, we see that some landscapes are no longer attractive, for instance the Zurich Oberland or upper Lake Zurich in the Canton of Schwyz. There's a great deal of urban sprawl in these landscapes, not because there's been too much construction, but because it's in the wrong locations. That's the main problem.

Can these mistakes be reversed or rectified?

Christiaanse: The tools for making construction work more or less acceptable are, in my experience, far better in Switzerland than in Germany or Holland, for instance. One problem is how prominent the buildings are: for example, if you place a chimney stack in an empty landscape, then you can really see it and it "pollutes" the entire landscape. But if you were to erect the same chimney stack in the city, you wouldn't even notice it. This means that in some situations, development in specific landscape segments will be perceived as urbanisation even if this is not the case in terms of density or social interaction. We have to be very careful here.

So you are calling for inward densification as envisaged in the new Spatial Planning Act (SPA)?

Natrup: This concept is not new to the SPA; it was already written into law, but we have had enforcement problems. The law was not consistently implemented on all state levels. That's what led to this divergent development. The research by Kees Christiaanse and Christian

Schmid highlights the problem: the wrong locations and urban sprawl. And now we see a counter-reaction from the people, who will no longer accept deteriorating landscape quality. The adoption of the new Spatial Planning Act shows that we are 30 years behind.

Christiaanse: Inward densification is a must. But inward densification doesn't mean that we only build in towns, just that we only build on sites that have already been developed.

Schmid: In principle, I agree. But we have to be careful that we don't densify the wrong sites. Densification is often just a buzzword. In conjunction with the zoning plan review in the city of Zurich, you often read comments at the moment that we should more or less zone the entire city. If you engage in densification on this scale, then you need to be aware of what this means. If, for instance, you let people erect buildings with an additional storey in an inner-city district, ultimately you will destroy the entire district.

It will take on a different character anyway.

Schmid: You will destroy the existing urban fabric because zoning leads to massive increases in land prices and rents. This results in gentrification, and sooner or later the existing buildings are replaced by new buildings. So densification doesn't automatically lead to cheaper prices, as many people think – it means that we can use land differently. Depending on the situation, that can also trigger land-price spikes. I am deliberately saying this so pointedly because we have to be very careful here. But outside of city centres, there are very many areas in which good densification can markedly increase urban quality if it is done carefully.

Participants:

Kees Christiaanse is Professor of Architecture and Urban Development at ETH Zurich and Director of the Institute for Urban Design. He is investigating current urbanisation processes around the globe.

Wilhelm Natrup in his capacity as Director of the Zurich Cantonal Office of Spatial Planning, is responsible for cantonal housing development and construction philosophy. He studied urban development and regional planning at the TU Berlin.

Christian Schmid is Adjunct Professor of Sociology in the Department of Architecture of ETH Zurich and a researcher at the ETH Studio Basel. He examines social processes in urban development and global urbanisation processes from a comparative perspective.

Against this backdrop, what do you think of Europaallee, the big construction project at the main railway station in Zurich?

Natrup: The Europaallee on the Swiss Federal Railway (SBB) site is one of the straightforward projects. But we are seeing fewer and fewer of those. There is only one landowner, the site was almost clear, and SBB developed the project in accordance with Kees Christiaanse's master plan. What's far more typical is a situation where you have 20 landowners on the same site who have different strategies and different profit expectations or even different stakeholders, i.e. private individuals and companies. It becomes so complex that you need more time and end up with more diverse or more fragmented solutions – which isn't necessarily a bad thing.

> **"We have to treat areas and zoning districts differently than we have in the past."**
>
> Wilhelm Natrup

A solution which is good from the expert's point of view won't necessarily meet with the approval of the population at large…

Natrup: As a cantonal planner, I am sometimes disillusioned when, for example, a community rejects revised construction and zoning regulations that envisage densification – on the grounds that they want to remain a village.

Is spatial planning here affected by a "not in my back yard" mentality? On the one hand, people are in favour of protecting the natural landscape, but on the other hand they don't like the measures required to protect it.

Schmid: That's how people function. Our everyday consciousness is neither logical nor coherent. We, the planners and scientists, arrive on the scene and say: densification would be the logical answer. But often people don't care. We have to offer something that will win them over. We shouldn't resort to slogans or false promises; we have to make concrete offers. And then you have to work hard to convince people as well.

Natrup: One of the tasks in spatial planning is to balance interests. Right now, there is major acceptance of landscape conservation, nature conservation and crop rotation

areas. I believe this has to do with fears of loss, including loss of identity. I see this as a mentality issue for Switzerland, where many people still have strong ties to the countryside.

Schmid: In my opinion it's not just about protecting "green areas" or "crop rotation areas". "Green" is not a value in itself. These green areas are also always social areas that people use in many different ways. Which areas are important for people, where do they like to go? Which are the valuable natural and farming landscapes or the important local recreational areas and open spaces? We simply must protect these areas.

Christiaanse: I see the ties between the Swiss and their landscapes as a very positive thing. As an urban planner, I don't just want to build all the time. My task as an urban planner involves rather establishing a qualitative balance between built-up space and undeveloped space. I only want to build when it's really necessary. My main task it to take a critical look at these aspects and then find the right balance Stakeholder management and a participatory approach account for at least half of my work. To put it bluntly, as an urban planner I have to coordinate everyone's bad taste, and then carve something good out of it.

> **"Urban doesn't have to mean high-rise."**
>
> Kees Christiaanse

How do you feel about the large, newly built areas in the Zurich region that look like entire urban districts, for instance Zurich-Affoltern or Glattpark?

Christiaanse: I am a bit perplexed by them. Affoltern and Glattpark are, in my opinion, urban expansions like we might have planned in the 1980s, but not anymore today. We have since learned that they resulted in a poor social mix, insufficient activity on the ground floor, and too few small businesses. This leads to the impoverishment of districts.

Natrup: Urban expansions in Berlin or in Frankfurt are much bigger, of course. Fortunately for us here in Switzerland, our topography already imposes limits. The compartmentalisation of Switzerland also has its advantages. The Swiss processes and political system likewise mean we have to adopt a successive approach and not indulge in any grand gestures. Many people are initially overwhelmed and pleasantly surprised when they see the urban expansions in Spain or HafenCity in Hamburg. These are great locations, and it often takes a great deal of courage to do something unconventional. But when you walk through these cookie-cutter city districts, they quickly lose their appeal.

What, then, are the qualities of a liveable space in your opinion?

Natrup: The problem with the above examples is that there is little diversity. And diversity is what makes Switzerland stand out, on every level.

Christiaanse: Diversity is a really decisive criterion.

Schmid: We can find positive qualities where people feel at ease. We can look at built-up areas that seem very ordinary, but where people really feel at home and are happy to spend their time. That's good architecture. It may be dense or less dense. It's more important for it to be on a small scale and for people to be able to change things themselves. The problem with many of these larger developments is not only that they are so uniform; it's also that people can't appropriate these spaces. It starts with the smooth surfaces you can't carve anything into, benches screwed tight so that you can't move them around. Everything is smooth and sterile, and people don't like that. Often it's the little things that are important to people.

Densification has to be more than a buzzword, according to Kees Christiaanse, Christian Schmid and Wilhelm Natrup.

Natrup: This can also be done on a larger scale. We need diversity for demographic reasons, too. Not every form of construction is suitable for every lifestyle or every age. I have nothing against detached houses despite the large amount of space they take up. We have them and we should keep them because they are appropriate for specific life phases and groups of people. But this shouldn't become an ideology. Diversity is also expressed in society and not just in the built-up reality.

Christiaanse: I think that places like London are interesting. The city has very dense districts with townhouses. These are multi-storey terraced houses which can be used very flexibly, also for commercial purposes. In Holland, we are seeing a re-emergence of this typology because it suits current social developments. They offer space for the start-ups subsidised by the government to help unemployed people, for instance. Urban doesn't have to mean high-rise.

So developments in urban design are closely linked to social developments?

Schmid: Yes, but you need to know that social developments are often unpredictable and cannot be clearly anticipated. A town is an on-going process. A town constantly changes. People's needs change, too, as does the social make-up of the districts. So in fact we can only start from the basic principle of openness. We have to plan and build in such a way that existing urban structures can meet these changing requirements, too. That's why diversity is so important, as is a building environment that can change without us having to tear everything down. Openness also means that we don't fill in every available space. When we have an empty space in front of us, we always think we need to build on it. But we could consider leaving part of it free and saying: we won't build on this area for the next 10 years, because by then we may have different needs. We might need a school or a restaurant or new housing options for older people.

Isn't this often simply a question of financial returns?

Natrup: No, this is more a strategic question. And it can be taken fully into account in planning. We do have these larger areas that are being completely built up. The good thing in our case is that they're not even bigger than they are. This means that another project with different qualities can take shape next to them. This, too, can lead to diversity. In other countries it's not that simple.

Christiaanse: Planning for a future that we don't yet know will be easier if we don't have oversized areas and the plots are developed at different times. This makes planning far more robust than in grandiose projects because we can react more readily to changes.

The criticism is often levied that Switzerland is like a patchwork quilt. Presumably you don't see this as a problem?

Christiaanse: No, on the contrary, this is one of Switzerland's strengths – and so is the distribution of ownership.

Natrup: But this leads to a different problem. The execution of large infrastructure projects like airports, logistic centres and the like is difficult in our system. Facilities of this kind are often built at locations which are less than ideal. This is easier in other systems.

Christiaanse: : I would like to qualify that statement. When I compare Switzerland with other countries, then I have to say that we have the best urban quality here. I'm not just talking about cities and inner-city areas, but also about the surrounding areas.

Natrup: I often hear German or Dutch guests saying, "My goodness, that really is urban sprawl. Where's the overall order?" But when you talk to the residents who use the space, then the lived-in reality here in Switzerland is on a very high level. The attention to detail, the compartmentalisation but also the short distances: these are all very special qualities of Switzerland.

But commuter journeys are getting longer and longer.

Natrup: The problem is that we sometimes offer the wrong incentives. We invest in the railways and say that railways have to remain cheap. This leads, for instance, to a situation where a one-year season ticket between Bern and Zurich has often paid for itself in around two months. So this means I can live in the centre of the country and still work at Zurich Airport. We make long-distance commuting possible and don't offer enough incentives to encourage people to live and work within a smaller radius. When we align housing and transport developments and wish to engage in inward development, then we have to create the conditions for it to actually work.

High diversity, small plots, good transport infrastructure – Switzerland has a great deal to offer, but by no means is everyone happy.

Schmid: Yes, you can see this clearly when you look at the results of the most recent referenda. If you are fortunate enough that you can afford to live in the city, then the satisfaction level is generally high. In agglomerations and in outer-lying areas, the situation is different. There, urbanisation is often seen as a threat. In some cases, though, the communities are themselves at fault because they ultimately decide on the zoning plan and the tax rate. In many areas it is the municipalities who have built up and obstructed their landscapes. On the one hand, people want to be close to natural beauty. But on the other hand, they want growth and higher tax revenues. In the areas we discussed earlier with their large uniform buildings, people are not particularly happy, either. But it is in these very locations that we could perhaps set a good example and show the value of a successful village or neighbourhood centre that can be used by the public, open spaces, a park – or even smaller facilities like a community centre, which can already make a big difference.

Natrup: There are national fears of loss, disparities between economic centres and peripheral areas. Then we have the issue of foreigners – the referenda reflect very diverse topics and sensitivities. And then we have the people who demand self-sufficiency. These emotional currents are very difficult to handle. This is about more than just spatial planning. We shouldn't exaggerate the importance of spatial planning when it comes to the national mood.

> "Good architecture is where people feel at ease."
>
> Christian Schmid

Christiaanse: I have the impression that Switzerland has changed dramatically over the last 15 years. More than other countries around it, Switzerland has evolved from a rather quiet, small country into a global village. This change has taken place at breakneck speed. That's why I understand only too well that questions of orientation play a major role, even if spatial planning applies to only a small part of these problems.

Natrup: Or to turn it around, we can also say that many spatial planning questions are simultaneously questions of values and not just of urban design. ■

Diagonal planning

From large zone plans to detailed building layouts, nowadays planners use a variety of instruments. However, they often find it difficult to gain a holistic view, which is precisely where the instruments developed by the SUPat project come in.

Felix Würsten

Schlieren, Dietikon, Spreitenbach – like so many other suburban communities in Switzerland, these once peaceful villages in the Limmat Valley have changed dramatically in recent decades. And this development is set to continue in years to come: as the population keeps on rising, so does the demand for housing and work space. How should a region like the Limmat Valley develop in future so as to create an urban area with a high quality of life and not simply an unstructured sprawl?

Reinforcing identity

For Gerhard Schmitt, a professor of information architecture, it is clear: "If we want a high quality of life, then the villages need to develop in a sustainable, resilient way." And by resilient, he means that if a region is hit by an internal or external event, then it emerges from it stronger than before. New York is a resilient city, for instance: not only did the metropolis survive virtual bankruptcy in the 1970s; it also successfully overcame the 9/11 terrorist attacks and Hurricane Sandy. According to Schmitt, however, truly resilient towns do not just survive for a few centuries like New York, but for millennia. Take Cairo, Alexandria, Rome and Peking, for example. Or Zurich, which has been inhabited at least since Roman times and has kept on developing ever since. So the question is: how can the communities on the doorstep of Switzerland's largest city become resilient?

A good way is to use all the means and methods available that are already deployed in the planning phase. "We mustn't abandon the very methods that have proved themselves in practice", states Schmitt.

For him, this especially includes the direct involvement of the population, the various stakeholders and the planners concerned. "If we include these groups in the development process, this reinforces their identification with the region. And identity is a key prerequisite for resilience."

However, the planning instruments we have known up to now have to be expanded. There is no shortage of well-engineered technical instruments: from spatial and traffic planning to architecture, from ecology and sociology to economics, every discipline has tools to use on different spatial and temporal levels. But Schmitt feels that there is a lack of "diagonal vision", i.e. a better understanding of the intersections between various disciplines and standards. What impact does a change in zone planning have on the construction possibilities of individual plots of land? How do individual buildings or building projects influence spatial planning and air quality in a town? How do traffic flows change if a particular neighbourhood becomes denser? And what social effects does this have on the population? Questions like these increasingly need to be addressed. With today's instruments, however, it is very hard to find the answers.

Automatic calculation

For the project "Sustainable Urban Patterns" (SUPat), Schmitt's group joined forces with a broad-based project team involving other professors from ETH Zurich and numerous experts from the practical field to develop new instruments designed to help planners broaden their horizons. "For a spatial planner, for instance, it is important to know how altering occupancy figures can change both the buildings and open spaces", explains Schmitt. "This can now be calculated automatically with the help of our tools, and this in turn enables the experts in the individual disciplines to concentrate on their core work but still know exactly what is happening on the other levels."

Focus Spatial planning

Another advantage is the fact that contexts can be displayed in different ways. For one individual, an abstract plan is the right format to envisage a situation; others find it easier if they have numbers or a three-dimensional visualisation in front of them. This versatility enables scenarios and options to be discussed with the population and the individual pros and cons to be weighed up.

The feedback from the practical field about the new instruments has been positive. "In one case, this has already led to the founding of an ETH spin-off", explains Schmitt. The company SmarterBetterCities offers a tool that enables urban development to be visualised intuitively – even directly onsite with a tablet. For instance, the application allows you to see directly what impact a planned development will have – not just on the neighbourhood design, but also with regard to important parameters such as energy consumption and traffic congestion. And users who want to change something on an existing building immediately receive an answer as to whether the planned project is in line with current building regulations.

Facilitating dialogue

And there is another aspect: the new instruments also enable a relatively simple calculation of the social costs. What does it mean for the community if a large company relocates? What impact would it have on traffic flows and noise levels? Such questions can now also be answered easily. "When I was ETH Zurich's Vice-President of Planning and Logistics, I would have loved a programme like this", reflects Schmitt. "I used to discuss university building projects with the city and the people living in the neighbourhood, and with this tool we could have demonstrated far more easily what the advantages were for the town if we built halls of residence on the Hönggerberg. Or that it makes absolute sense to replace the Laboratory of Hydraulics in Gloriastrasse because a new building means we can create numerous jobs at an extremely convenient location. As it happened, we were able to convince our partners about our projects anyway. But the discussions would probably have been less time-consuming with a planning tool like this."

The instruments were developed based on the model region of the Limmat Valley. "We chose this region because it is a typical case for Switzerland: a series of communities in the commuter belt of a larger city, which have changed dramatically but retained their independence", explains Schmitt. Within the project, the researchers designed four scenarios based on conversations with the population that highlight potential development paths. "We are now able to show what will happen right down to individual plots of land if the Limmat Valley develops in accordance with these scenarios."

Important to have a say

One important finding is that people want to be involved in the planning process: "citizen design science", as Schmitt calls the concept of including local people in the planning process. "If people are able to voice their ideas, this boosts their identification with the region", explains Schmitt. He would now like to pursue this approach in other research projects. His aim is to develop instruments that enable the design ideas of the people affected to be factored into the planning.

For Schmitt, SUPat paved the way for other projects, such as the "big-data-informed urban design" project, which he wants to realise at the Future Cities Laboratory in Singapore, or "Future Cities", the new massive open online course which gets underway at the end of September. And what's next in the Limmat Valley? "The region will be studied by other ETH professors with our instruments at their disposal", reports Schmitt. "We, on the other hand, now want to use the tools in other regions, too." Besides Switzerland, there have also been requests from abroad, including from the city of Shenzhen near Hong Kong, which ballooned from a town the size of Lucerne to a metropolis with a population of over 10 million in the space of a few years. The aim there is not just to get the planning phase on the right track; it is also about the tricky issue of how an identity can be created in a major city where over 90 per cent of the population has moved there only recently. ■

Chair of Information Architecture:
www.ia.arch.ethz.ch →

Urban design in practice

Is our environment a haphazard collection of buildings? There's now a study that counters this widespread criticism with a decidedly different view. The researchers claim that our environment has taken shape anything but haphazardly, and they've taken a closer look at actual planning processes.

Martina Märki

The image of the urban planner or architect as a super-star, capable of solving all problems with a stroke of genius if people would just let him, is an outdated and misguided idea, stresses Professor Joris Van Wezemael. He is a senior lecturer in the Department of Architecture of ETH Zurich and was in charge of the project "Urban ruptures – local interventions".

"Today, you no longer draw up plans for the open countryside but for sites right in the heart of built-up areas where many things are already available", he explains. New construction projects are happening at locations where people live and where established infrastructures and a complex ownership situation are the rule. So with their study, Van Wezemael and his team wanted to get to the bottom of this very normality.

Hard on the heels of the stakeholders

The researchers did not concentrate on the large urban centres but on the towns and communities that make up most of the Swiss residential landscape. The common denominator of the 11 selected locations was that they all face new challenges because of external changes, and their responses include construction measures. The researchers call these situations urban ruptures. New transport routes like the NEAT in the case of Visp in Canton Valais, or the suburban railway for Wetzikon and Uster, can lead to these communities suddenly finding themselves within commuting distance of the large urban centres. By contrast, St. Margrethen on Lake Constance was looking for innovative ways of using a recently formed industrial wasteland. The researchers dedicated in-depth case studies to these locations. Their research also took other locations into consideration, such as neighbouring communities.

Over a period of two years, the doctoral students, a geographer from the University of Fribourg, a political scientist from the University of Zurich and an ethnographer from the ETH Department of Architecture visited the selected communities and looked over the shoulder of the stakeholders as they went about their business. They paid visits to the planners, municipal architects and municipal presidents who were in charge, asked for explanations in meeting rooms about what they were doing and then donned their weather-proof gear to go and visit the sites together with the stakeholders. They conducted hundreds of interviews. They followed entire competitions as active observers, right from the preparatory phase down to the implementation of the chosen projects.

Process competence in demand

"We didn't go to Arbon or Affoltern to tell people there what good urban quality would be, but rather to understand how they tackle spatial development with the situations and resources they have", is how Van Wezemael explains the research approach. They were particularly interested in the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"process line", the way planning and construction projects take shape from the initial idea through the most varied committees in an exchange with experts, departments, investors and, ideally, the people affected on the ground.

Against this backdrop, the research project placed one aspect centre stage that Van Wezemael believes does not receive enough attention, neither in urban research nor in the training of architects and urban planners. The tools available for shaping planning processes are very diverse today. This presents both an opportunity and a problem, as the study findings confirmed. This is because the expertise needed to successfully shape and implement these processes is not always available.

"Smaller communities with a far from professional administrative infrastructure are sometimes out of their depth", says Van Wezemael. The researchers observed that even those communities with professional administrations have difficulties in achieving continuity in local development and planning when well-trained staff move on. They also noted that the political planning processes in the various communities are organised in very different ways.

Filing cabinet and townscape committee

The researchers analysed the impact of various process steps, too. They came up with an impressive symbol – the filing cabinet. "Once a building project has found its way into the hanging files of the department of planning and building control, it has taken a decisive step forward in the overall process", explains Van Wezemael. It has already covered the long distance from the initial idea, through the planning stage, to the correct submission. The filing cabinet follows fixed, purely formal criteria. According to the researchers, local authority building committees also tend to tick their way down formal lists that emphasise standards, guidelines and rules.

These are offset by open fora like townscape committees where the public administration, architects, investors and politicians hold round table discussions to negotiate over the qualities of the construction projects. In the opinion of the researchers, fora like townscape committees provide ideal opportunities for placing quality discussions on a broader basis. "The major challenge here is to reconcile the different points of view", comments Van Wezemael. As townscape committees bring experts and stakeholders together in a single forum, this also has its advantages. Open fora can lead to greater conceptual freedom and more satisfactory solutions.

From the perspective of project developers, clients and investors, open fora are risky, however, because you never know which way the debate is going to go. People therefore tend to avoid them during this process. The researchers likewise observed that under certain circumstances the same parties prefer to hide behind standard construction methods in order to speed things up. Potentially controversial topics are avoided or de-emotionalised by reducing them to purely technical questions that non-experts are less well-equipped to comment on. This is also a way of getting round political discussions, for instance about whether a community sees itself more as having an urban or a rural identity.

New self-image

The researchers believe that the key to viable long-term planning is to be found in those very questions about identity. They advocate giving more space to these issues and integrating both open and closed fora to a greater degree in the planning process, alternating them in turn. "This flies in the face of what is often still the conventional school of thought advocating a linear planning process", stresses Van Wezemael. But the results would have a more secure footing and greater legitimacy. In the longer term, carefully led discussions on identity can simplify further planning because they convey an overarching target image which doesn't have to be re-discussed every time, he suggests.

This leads to a new emphasis for planners and architects. Communication with non-experts takes on greater importance. Planning also means shaping and facilitating the diverse processes upstream of the construction project and letting people have their say. "Of course, the processes can and should be controlled", says Van Wezemael, "but the naive preconception that a planner or architect implements his great idea in its exact form – because experts always know best – is no longer tenable today." He would also like to make short shrift of another preconceived idea: improved planning will not fundamentally change our built-up landscape. "The widespread higgledy-piggledy constructs on individual plots and urban sprawl are here to stay: they are the result of planning processes and our lifestyle." His motto is therefore: "Sprawl better!" ■

Link to the study:
http://vanwezemael.wordpress.com →

Zoom

Adrian Perrig is looking to protect online data transfer more effectively from unwelcome manipulation.

New internet architecture

Simple, safe, reliable

Felix Würsten

At first glance, the internet seems to work reliably. A closer inspection, however, reveals some serious flaws, including large-scale breakdowns and unwelcome data redirections. Computer science professor Adrian Perrig now proposes a new internal architecture to remedy these discrepancies.

Is it even possible? Rebuilding from scratch the mighty data machine we call the internet, where nobody really knows how big it is anymore? Especially at a time when perceptions of what the network of the future should look like are worlds apart and fierce debates are raging over basic values such as security and freedom? There are also many experts who simply believe that such a realignment is no longer possible. Adrian Perrig, who has been a professor of information security at ETH Zurich since 2012, isn't one of them. Quite the contrary, in fact. What he has in mind is a total "internet reboot", as the NZZ am Sonntag aptly put it.

Seriously flawed

Talking to Perrig, it soon becomes clear that a reboot would make sense. For the normal user, the internet might seem to work flawlessly. But behind the smooth façade of the browser windows, a number of flaws lie hidden that urgently need to be remedied. One of these shortcomings, for instance, is the fact that every user does not have access to certain networks for around ninety seconds per day. This might seem a negligible amount of time at first glance. But if you consider that a growing number of time-critical applications are processed online, these blips no longer seem quite so insignificant. Especially as even more serious breakdowns can occur. There are many internet routers – the accounts via which data traffic is processed – and it is perfectly possible that a misconfiguration in one of them can cause turbulence that is palpable on the other side of the world. In 2008, for example, an attempt by the Pakistani government to block certain YouTube videos in its own country brought the video platform to its knees worldwide for two hours.

The situation becomes even more awkward if you bear in mind that no internet users know in advance how their data will reach the recipient. Only afterwards can the routes taken by data packages through the network be determined – and some of them

are quite risky. Tricky situations frequently occur here, too. At times, for instance, data from US companies and authorities has been redirected via Iceland, Belarus or China.

The internet's Achilles heel

The current structure of the internet is responsible for these drawbacks. Physically, the network is composed of around 60,000 autonomous systems that are operated by internet service providers such as Swisscom or other institutions and companies. Within every autonomous system, the respective operator controls how data is exchanged between computers. If data is to be exchanged between autonomous systems, however, this occurs in accordance with a common set of rules: the Border Gateway Protocol (BGP). These guidelines determine the paths which path is used when data is transferred, and they were originally developed in the 1980s at a time when relatively few networks had to be connected with each other. This very protocol is one of the internet's Achilles heels today. It makes the network both error-prone and unsafe because it can easily be manipulated – to redirect data in a targeted fashion, for instance.

Perrig has now developed a network architecture with his team that may enable all these drawbacks to be remedied. This concept, called Scion, is not only supposed to make the internet safer, but also more straightforward and efficient. The central idea is to divide the internet into several independent units, so-called "isolation domains". In every domain, the autonomous systems themselves control the paths along which they exchange data. Therefore, autonomous systems in Domain 1 no longer have an influence on the data traffic in Domain 2 and vice versa.

Of course, a global data exchange is also possible with this new structure – via so-called edge routers at the boundaries of the individual domains. Anyone who wishes to send a data packet from Domain 1 to a recipient in Domain 2 can stipulate how the data reaches the edge router, but no longer has any influence on how the information is subsequently processed in Domain 2. This enables every domain to be protected against hostile attacks or problems from another domain. Perrig is convinced that this means Scion can boost both the security and the reliability of the internet.

The Scion project is not without its critics, however. For example, some claim that while the idea is clever, it is almost impossible to implement. There is also talk of a "balkanisation of the internet" and even an abandonment of one of its fundamental principles, namely free access to information all over the world. But the doubters don't faze Perrig: "Those who really know the ropes and have examined the subject in any detail are enthusiastic about our proposal", he explains. "And Scion wouldn't betray the basic idea of the internet. Quite the contrary, in fact: with our system, it would actually be even easier to combat state censorship laws or spying by foreign services."

Concrete evidence

A growing number of researchers and companies who collaborate with Perrig's group evidently believe that his "reboot" is possible. Not only do they include various universities in Asia and the second-largest Japanese telecommunications company, KDDI, but also Swisscom, which made Perrig's chair at ETH Zurich possible with a donation. "The beauty is that you could introduce the new system bit by bit", explains Perrig. "It would even be possible to run the two systems in parallel." Scion is attractive to companies because they could save money with Perrig's approach. For the new protocol makes it easier and less CPU-intensive to control data traffic. Moreover, Scion also enables firms to offer new services. For instance, a network operator could issue its customers with a guarantee that sensitive data will no longer make a detour abroad.

Together with his partners, Perrig has set up a test environment to demonstrate the feasibility of the new approach. But he doesn't want to shout his idea from the rooftops just yet: "We still need to finalise some technical details within the next year. If we want to realise our idea, we need the help of numerous partners. And we can only get them on board if our concept is ironclad." ■

Network Security Group:
www.netsec.ethz.ch →

Inside

Researchers and representatives of industry convene to exchange knowledge at a meeting of the Partnership Council.

Electrical Energy Initiative

Teamwork: the faster road to success

Martina Märki

Electrical energy research is booming at ETH Zurich. An initiative by the university has enabled this research and teaching area to expand substantially in recent years, together with industry. Now the third newly planned chair has been filled.

ETH Zurich has successfully filled a new chair for power semiconductors in recent days, funded by ABB with a donation of CHF 5 million to the ETH Zurich Foundation. When the person selected for the new chair starts at ETH Zurich, he or she will enter an environment that has developed at breakneck speed in the last six years, not least thanks to donations from industry and utility companies in the energy sector.

A total of three new chairs have been created within the scope of the Electrical Energy Initiative. They join three existing chairs in the Department of Information Technology and Electrical Engineering, two of which were recently re-filled by ETH Zurich. The chairs cover a broad range of topics, with a lot centred on the sustainable power grid of the future.

Expertise for Switzerland

ETH Zurich launched the Electrical Energy Initiative in 2008. "The idea wasn't just to maintain the electrical energy field, but also to give it a boost – with a helping hand from industry, too", explains Ralph Eichler, the president of ETH Zurich. ABB's involvement just goes to show how the idea has caught on. Remo Lütolf, the head of ABB Schweiz, is convinced that there are plenty of good reasons to support the new chair for power semiconductors: "First and foremost, we want to promote education in this important field of energy and automation engineering – ideally in Switzerland and with one of the best universities in the world, of course." ETH Zurich's proximity to the ABB Corporate Research Centre in Baden-Dättwil and the semiconductor factory in Lenzburg is important for ABB Schweiz. "We rely on well-educated, motivated people in both fields, and we are glad when we find them in Switzerland." The situation hasn't always looked good. Barely 10 years ago, while the life sciences were hugely successful, other sectors were in danger of fading from the spotlight. Ueli Betschart was director of the Swiss electronics industry trade association Electrosuisse at the time, and he recalls that "the members of our industry and the power supply companies clearly feared that a possible cut in the number of chairs in the energy sector would lead to a loss of expertise. So it was in our interest for me to join the Electrical Energy Initiative." The aim was also to "nudge research projects

towards renewable energies in order to approach Switzerland's energy future with innovative solutions."

Energy solutions of the future

Jürgen Biela is one of the researchers working on these solutions. He was appointed to a newly created chair in high-performance electronics under the Electrical Energy Initiative. "The nice thing about the initiative is that several younger minds could be brought on board at ETH Zurich in a relatively short space of time, which has presented many new and interesting opportunities for collaboration", he says. His chair is also funded by donations. "The donations enabled us to set up our lab, which is quite unique in this form. Here, we can test our ideas on prototypes on a very realistic scale, which is also interesting for our industrial partners", explains Biela. And it is also beneficial from an educational perspective: "Our doctoral students know what they're talking about when they head off into industry. When they leave ETH Zurich, they have more than a good theoretical education."

Biela and his team develop converter systems that connect new energy sources to the power grid. Another important topic is chemical energy storage systems, which are able to compensate for fluctuations in energy production on a large scale. He is collaborating with ABB on the project. A prototype system should be ready by the end of next year and could be ready for the market in five years, he reckons.

By the end of this year, he would like to have the electrical charging stations in place which his team is working on with other research institutions in Switzerland. Thanks to innovative charging technology, electrical vehicles could then be charged within minutes instead of being plugged in for hours on end.

Biela and his team collaborate with around 10 different industrial partners. Like every ETH professor, he stresses, he is completely at liberty in his choice of topics and research partners. But he understands the public discussion surrounding research funding from the private sector. "It all depends on how it is done", says Biela. "In my view, sponsorship from industry is very good, but the university needs to call the shots and resist compromises."

Research freedom and exchange

In his experience, ETH Zurich guarantees this independence. "Chairs that are funded through donations are also filled via ETH Zurich's normal appointment process", explains Donald Tillman, the managing director of the ETH Zurich Foundation. ETH Zurich defines the profile of the chair and assembles an appointment committee comprising 10 to 15 members, which also includes a representative from industry. The committee proposes its choice to the president of ETH Zurich, who then makes the final decision. "A sponsor thus has a say within the scope of the appointment committee, but no veto or similar rights", says Tillman, nor is the donor mentioned in the employment contract. Moreover, a code of conduct stipulates how the donations the ETH Zurich Foundation handles donations. Tillman is convinced that a good set of rules to safeguard research freedom is also in the donors' interests.

"Freedom in research is a cornerstone of university work. It's essential if you want to attract the top professors and students and give their ideas enough breathing space. As a technological company, we are extremely interested in working with attractive and successful universities", confirms Remo Lütolf. He also values another element of the Electrical Energy Initiative: the biannual meetings of the Partnership Council, where representatives from industry and researchers at ETH Zurich gather to exchange ideas on current energy topics. "This gives industry a better understanding of what kind of new technical solutions can develop from basic research. And the universities learn which technologies are needed by industry and society." ■

Opportunities for creative minds

The goal of establishing three new chairs has been achieved. Within the scope of the new project funding in the energy field, it will now be possible to support innovative research projects by postdocs quickly and easily. This should give high-risk ideas a chance – even those that traditional funding programmes would consider too undeveloped. The project fund also offers small and medium-size enterprises and private individuals an opportunity to get involved in the Electrical Energy Initiative.

Further information:
www.ethz-foundation.ch/index.php/?lang=en →

Critical Thinking Initiative

Thinking outside the box

Roland Baumann

Year after year, hundreds of ETH Zurich graduates take their expertise onto the global market. Those who are able to think critically are the ones who succeed.

Are graduates of ETH Zurich sufficiently prepared for the complex issues they encounter in their careers and in society? Can they relate problems to the bigger picture? And how can you get all your students interested in these matters? These are questions that Lino Guzzella posed at ETH Day in 2012 as the newly appointed rector of ETH Zurich. He promised to enter into a dialogue with students and lecturers over the coming years so as to gain further insight into these issues. This was the birth of the Critical Thinking Initiative, which he entrusted to Anita Buchli from his staff and Prorector Andreas Vaterlaus.

Key skills

First, a group of ETH experts brainstormed key skills in the three fields of "analysing and reflecting", "finding a voice" and "communicating and acting responsibly". These skills were then discussed at a workshop with around a dozen representatives from various branches of industry in April of this year. "We soon realised that our analyses concurred", explains Vaterlaus. "At the same time, we gained valuable stimuli from those in the practical field", adds Buchli.

For instance, the industrial representatives commented that science graduates often come with a faith in science that makes it impossible for them to question their own explanatory approaches. "Thinking outside the box" and reflecting on one's own theoretical attitudes, however, is crucial for teamwork in a company. If nothing else, it is a prerequisite for differentiated communication on all levels.

Managers expect all employees to possess the ability to form their own opinions and also to defend their independent standpoints in the face of resistance. This also includes the ability to question authority. Only in this way can employees make a contribution towards the development of innovative strategies.

Anchoring critical thinking

Against this backdrop, ETH Zurich conducted a workshop in June with around 80 lecturers, students and administrative staff members. First, the participants were given an overview of what ideas, measures and projects already exist in the field of critical thinking at ETH Zurich. These include the courses offered by the Department of Humanities and Social Sciences and the interdisciplinary summer schools, as well as teaching methods that use interactive elements to promote both the critical analysis of course content and conceptual understanding.

In a second step, the participants developed ideas as to how existing approaches might be incorporated more effectively into everyday university life.However, new projects were also discussed, such as a study week where students are divided into mixed teams to come up with creative ideas to solve complex problems.

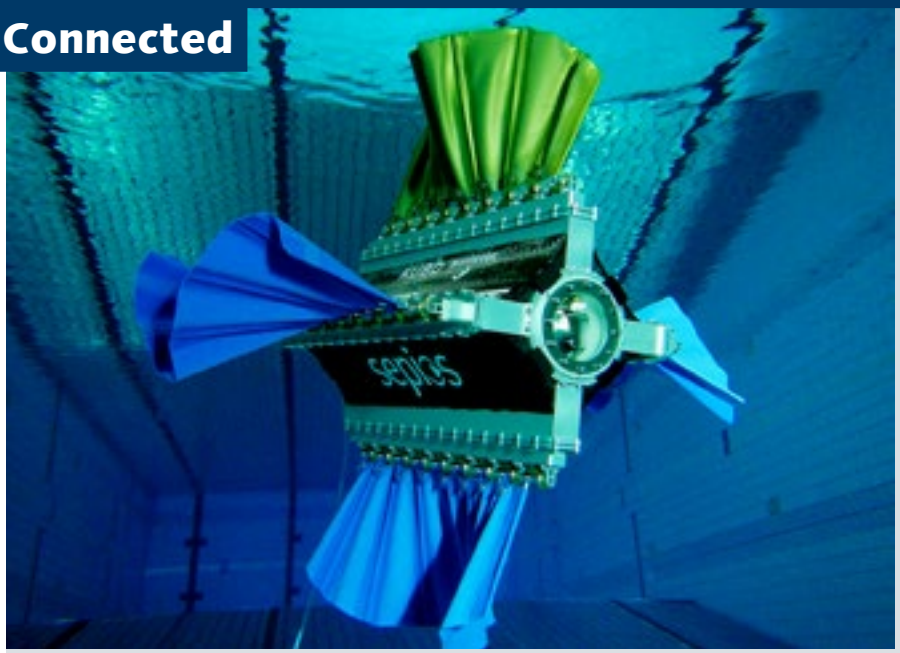
Concrete projects

"The commitment at the workshops was fantastic", reports Buchli, adding that the initiative has attracted a great deal of interest from lecturers and students alike. "We now want to make the most of this momentum and implement the first concrete measures as quickly as possible so that we can offer ETH students more opportunities to work on interdisciplinary and system-oriented problems", stresses Vaterlaus. The next step, for instance, will be to compile an annual programme listing all the events, courses, classes and student initiatives that promote critical thinking skills.

The first so-called ETH Week has been scheduled for September 2015, when third-year Bachelor's degree students from all disciplines will team up with lecturers and partners from industry, politics and society to work on problems concerning global nutrition.

While the launch of the initiative seems to have been a success, the topic of critical thinking will keep ETH Zurich busy for many years to come. In the medium term, all degree programmes will be designed in such a way that students can acquire the key skills in this area. ■

Connected



Focus project Sepios

Cuttlefish robot makes a splash

He was already a real crowd-puller outside the main entrance of ETH Zurich at the rollout of this year's focus projects by Bachelor's degree students from the Department of Mechanical Engineering: Sepios, the nautical robot whose fins let him dive and swim like *sepiidae* – the sea creatures he is named for. Now he has become an international sensation.

The student team that developed Sepios has won a prize in the US. James Truchard, the CEO of National Instruments, presented the Engineering Impact Award in Texas in front of around 4,000 guests. It was accepted by students Alessandro Schäppi and Antoine Seewer from ETH Zurich on behalf of the entire Sepios team.

Swiss delegation

Good relations with MIT

During a trip to the US, a Swiss delegation including Federal Councillor Doris Leuthard visited the Massachusetts Institute of Technology (MIT) in Boston. Also among the party was Lino Guzzella (left), the rector of ETH Zurich, who took the opportunity to further solidify relations between MIT and ETH Zurich. He and MIT Vice President Claude Canizares (right) signed an agreement on a student exchange programme. The ties between ETH Zurich's Energy Science Center and MIT's Energy Initiative were also strengthened.

Rössler Prize

Research to combat obesity

This year's CHF 200,000 Rössler Prize has gone to the nutritional biologist Christian Wolfrum, professor in the Department of Health Sciences and Technology at ETH Zurich, pictured above with Dr Max Rössler (left), the prize donor and ETH-educated mathematician, and ETH President Ralph Eichler (right). Wolfrum and his team research how adipocytes are formed and how metabolism regulates adipose tissue. His findings could help obese people lose weight or avoid related conditions.

American Statistical Association

Honour for ETH mathematician

The American Statistical Association (ASA), the world's largest association of statisticians, has appointed ETH Professor and RiskLab Director Paul Embrechts as a fellow. The ASA is honouring the mathematician for his contribution to extreme value statistics and quantitative risk management in the insurance and financial industry, for promoting international cooperation, and for excellence in keeping and disseminating statistics.

Society in Science

Two ETH researchers are new Branco Weiss fellows

Daniele Foresti (right) and Marco Hutter, two ETH researchers, will receive annual funding of CHF 100,000 over the next five years from the Society in Science fellowship programme. Foresti, who has a doctorate in mechanical engineering, has invented a new printing technology that can be used in applications like 3D printing. He will now continue his work on this concept at Harvard University. Hutter, who also has a doctorate in mechanical engineering, will continue to develop walking robots as a Branco Weiss fellow at ETH Zurich. The robots are to be used for transport tasks on industrial sites or in search and rescue operations.

ETH Zurich alumnus Patrick Anquetil

Bitten by the business bug

Roland Baumann

Following his degree at ETH Zurich, Patrick Anquetil set off for Cambridge, Massachusetts to do a PhD. Having settled on the US East Coast, he is currently launching his second start-up business. And he has big plans for it.

Patrick Anquetil – already a serial entrepreneur at the age of 40 and vice president of the New England Chapter of ETH Alumni – exudes an infectious energy. Even if he modestly mentions luck and coincidence when asked about his career so far, he epitomises the good fortune of the brave. He is currently working hard to set up his second company, Portal Instruments, where he is looking to market a revolutionary device that enables users to inject medication without needles.

"It's incredible!" begins Anquetil. "At 160 years old, the hypodermic needle is probably one of the oldest technologies still in use today." The simple needle works well for administering drugs. But it can also be dangerous: every year tens of millions of people die worldwide because they use needles incorrectly. And there are also accidents in hospitals, as Anquetil explains: "Although doctors and nurses are perfectly trained in handling needles, they prick themselves once every decade." These accidents could soon be a thing of the past.

However, the new device, which already works extremely well as a prototype, should also be capable of far more than "merely" injecting active substances into the body. It permits personalised medication and reminds the patients to take their drugs. The device's sensors also recognise whether the right patient wants to inject the right medication in the right part of the body at the right time.

How did the CEO of Portal Instruments, who studied mechanical engineering at ETH Zurich, come up with the idea? "It was just one of those coincidences", says Anquetil. In the summer of 2012 his PhD supervisor from MIT, Ian Hunter, contacted him and showed him the needle-free injection technique: "Have a look, and if you like the idea, we'll start a company." The graduate leapt at the chance, especially since he "didn't really have anything more to do" at the first company he had cofounded, as he notes with a wry grin.

When Hunter contacted him, Anquetil was the strategic planning director at SynapDx, a start-up which he had helped to found four years earlier.

This company had developed a molecular diagnostic method that detects genetic markers for autism based on blood tests. It was an instant success: "We raised 45 million dollars in venture capital in the space of three years", explains Anquetil with pride. Meanwhile, the largest clinical study ever to be conducted in the field of autism diagnostics is currently underway with 800 patients. The company founders and investors hope that relevant data will be found next year that can be used in everyday clinical practice. And now that the study is underway, Anquetil is setting up his second company.

> "We raised 45 million dollars in venture capital in the space of three years."
>
> Patrick Anquetil

Injecting medication without needles: Patrick Anquetil presents the first model of the device, which his company is currently working at full stretch to develop.

It was always the Frenchman's dream to become a businessman. Even as a student at ETH Zurich he wrote business plans and submitted them in 1998 to Venture, the business plan competition launched by consulting company McKinsey and ETH Zurich. However, it wasn't until he joined MIT to do a PhD in 1999 that he was finally bitten by the business bug. "Those were the days when engineers were held in extremely high regard", says Anquetil, and any kind of research conducted at MIT could have spurred the foundation of a company. "In Ian Hunter's group, every student was a potential entrepreneur."

> "If it hadn't been for ETH Zurich, none of what I've achieved would have happened."
>
> Patrick Anquetil

After his PhD, however, Anquetil initially set off on another path. It was a time when investors were interested in nanotechnology. "There was a demand for people like me, who could explain the scientific background to them." And the then-30-year-old already had eight years of experience in the field: he had attended lectures on the subject in his student days at ETH Zurich. "The fact that ETH Zurich was already offering courses on nanotechnology back in 1996 was really cutting-edge", he recalls enthusiastically. "When I tell people that here, they don't believe me!"

With his in-depth knowledge of nanotechnology, he headed to Wall Street for two years. However, he still had a burning desire to start his own company. In order to acquire the basics of business management, he enrolled for an MBA at Harvard University. And while his registration was still being processed, he founded his first company, albeit without much success. Looking back, he describes the endeavour as an instructive experiment.

He then turned his full attention to the MBA degree, where another coincidence would prompt him to found SynapDx. During the second year of the degree, he and two fellow students examined where the best investment opportunities lay in the field of autism and settled on diagnostics. About a year after they had submitted the project, a venture capital company got in touch with Anquetil to inform him that Stanley Lapidus, an authority on diagnostics, had reached the same conclusion. "The investors set up a meeting; we hit it off straight away and founded SynapDx."

Anquetil can also count on influential partners at Portal Instruments. The pharmaceutical concern Sanofi, which funded the successful research project at MIT, was willing to participate in the start-up. The fledgling company has thus had a financially powerful partner on board from the outset. "But what's almost uncanny: as it turns out, we have also found the client for the product we're developing", reveals Anquetil. After all, in order to be able to inject the substances without a needle, you not only need the device, but also new drugs – which Sanofi is developing in parallel, like a kind of Nespresso system. Seeing as the drug and the device are so closely linked, Sanofi will also sell the devices. "This is a unique launch pad for a start-up company", says the delighted CEO.

There is still a long way to go before the device can be used. Investors are needed and the American health authorities have to give this novel technology the green light first. But anyone who talks to Anquetil comes away convinced that he will win people over with the product.

As if all that weren't enough, this serial entrepreneur still finds the time to be involved in ETH Alumni. And he is passionate about his post as vice president of the New England Chapter – because he wants to give something back: "If it hadn't been for ETH Zurich, none of what I've achieved would have happened. I'm absolutely convinced of that." As he explains, the university taught him the basic principles that enable him to analyse a business idea today. "For that, I will be eternally grateful to ETH Zurich and ultimately to the Swiss people, who paid for my education", he says. ■

About Patrick Anquetil

Born in 1973, Patrick Anquetil grew up in Paris. He joined ETH Zurich in 1993, where he earned a degree in mechanical engineering, specialising in robotics. This was followed by a PhD at MIT and an MBA at Harvard Business School. In 2009 Anquetil teamed up with Stanley Lapidus to found a successful start-up company in the autism diagnostics sector. Since 2013 he has been setting up his second company as CEO, developing a device for the needle-free injection of medication. Anquetil is also vice president of the New England Chapter of ETH Alumni.

Anno

At the very first SOLA relay race back in 1974, 252 runners ran the course together from St. Gallen back to Zurich.

1939

Sportier than ever at 75

Corinne Hodel

Compulsory morning exercise, segregated gymnastics for men and women, and kit regulations: the history of the Academic Sports Association Zurich has no shortage of anecdotes. Above all, however, it is an impressive success story.

"Gym shorts with a shirt and rubber gym shoes" read the dress code for anyone who wanted to do sport at ETH Zurich 75 years ago. Special shoes for climbing, dancing or yachting were unheard of. After all, only a handful of disciplines, such as general physical training and games, featured on the programme in 1939, the year the Academic Sports Association Zurich (ASVZ) was founded. Nowadays, 128 kinds of sport, from African dance to Zumba, draw in 1.5 million visits per year. The four initial weekly lessons have ballooned to over 600 in the intervening years, and men and women have long been working out together.

The ASVZ has given a lot of thought to its 75th anniversary celebrations. One of the highlights of the year so far has been the university duel: the amount of time members of ETH Zurich and the University of Zurich spent moving was recorded for a week, with ETH Zurich emerging as the proud victors. The University of Zurich now has to fork out for a new training room.

However, there will be a rematch next year. What might sound like fierce rivalry is actually friendly sportsmanship. What's more: ASVZ Director Lorenz Ursprung attributes the success of Zurich university sport to the close collaboration between ETH Zurich and the University of Zurich – a cooperation that looks back on a long tradition. Twenty years before the ASVZ was born, students from both universities founded the Academic Sport Commission. As a student-run organisation without the necessary infrastructure it was unable to achieve its goal of providing high-class sports facilities. But since constructing a university sports ground was the stated aim of the Sportplatzkommission (Sports Ground Commission), which was an association comprising professors and executive members of the two universities, merging the two organisations to create the ASVZ seemed the obvious thing to do.

At the founding meeting on 23 June 1939, these pioneers still believed that they would be able to start building sports facilities in the autumn of the same year. In actual fact, it would be another 35 long years before the first drops of sweat were eventually shed on the premises of the university sports centre in 1974. After that, however, things happened fast. Only three years later, the Polyterrasse sports centre was opened after the Executive Board

The Swiss University Championships were held in Zurich in 1937.

In 1949 the ASVZ competed against Liège in a swimming competition.

changed its mind at the last minute and decided to build a gym instead of a large auditorium. In 1979 the centre on ETH Zurich's Hönggerberg campus opened its doors to sports enthusiasts, and the sports complex on the University of Zurich's Irchel campus eventually followed in 1984. "Hardly any other factor has shaped our organisation's history quite as much as the construction of sports facilities", reflects Ursprung. "After all, the closer the sports centre is to the lecture theatres, the more sport people do." Indeed, the number of participants has jumped with the opening of every new facility.

But even without any new sports centres, the number of ASVZ members has climbed steeply in recent times. Although new, smaller sports centres keep springing up, especially following the inclusion of the Zurich universities of applied sciences in the ASVZ, the facilities are still bursting at the seams. "At lunchtime and in the evenings, we are almost always overcrowded," says Ursprung. "But it's virtually impossible to cushion these peak times." He nevertheless aims to expand capacity further, since the location and number of sports centres will also help shape the history of the ASVZ in the future.

No character-building

However, minds also shaped the history of the ASVZ. In 2012 Ursprung became only its fourth director, succeeding Kaspar Egger, who had initiated the collaboration with the Zurich-based universities of applied sciences and extended the range of sporting activities to the weekend. He also initiated the ASVZ "Relax" programme and made sure that quiet rooms were available for ASVZ members – in keeping with the ASVZ motto: For brain, body and soul. Urs Freudiger paved the way for this expansion. It was under his direction that the three university sports centres Polyterrasse, Hönggerberg and Irchel were opened. His predecessor Carl (Tscharly) Schneiter had fought tirelessly for the Fluntern sport centre.

It was on Schneiter's watch that the sports fee was increased from three to four francs per student in 1961, which enabled a tape recorder to be purchased and saw double the number of visitors for general workouts to music compared to the previous year. Fitness training remains the most popular event on the ASVZ's extensive programme. Yoga is also high up on the popularity scale, even though the Indian discipline only made it onto the sports programme in 1981 after its inclusion had been rejected by the board back in 1955. The reason: yoga was regarded more as character-building than physical exercise.

The SOLA relay race is certainly an annual highlight. The team competition was launched by university physical education teacher Walter Hiemeyer in 1974, with 21 teams racing from St. Gallen to Zurich. Not only has the course changed since then, today the registration window has to be closed early once 900 teams have signed up. Ursprung is delighted that the ASVZ is able to get so many people interested in sport. But he doesn't merely rely on the ASVZ classics: He feels an obligation to offer as broad a range as possible so that there is something for everyone. After all, the semester fee is obligatory for students. And while no one is forced to do sports nowadays, it was a different story in the early days of the ASVZ, when the theology students had to turn up at 6:20 a.m. three times a week for an early morning workout. ■

Information on the ASVZ anniversary celebrations::
www.asvz.ch/75jahre →

B360 experts also help train skilled employees in the food technology sector in southern Africa.

A commitment to Africa

Sharing knowledge

Felix Würsten

As Sabina Balmer has seen for herself time and again, there is a shortage of skilled professionals in Africa. So this ETH Zurich alumna founded a non-profit organisation that offers placements for volunteer experts at African partner universities – a great opportunity for a stimulating exchange of ideas on both sides.

"It was a great experience that brought me so much on a personal level, too", says Janine Rother, who is still exhilarated by her placement in Namibia. She studied mechanical engineering at ETH Zurich and currently works as an engineer for the energy company Alstom. But some three years ago she was in southern Africa, working for the non-profit organisation B360, which sends volunteers to Africa to offer their expertise. "My job was to teach thermodynamics and mechanics to students in the second and fourth semesters at the Polytechnic of Namibia", she reports.

The six-month sojourn wasn't easy. "When I arrived in the Namibian capital Windhoek, I didn't even know which subjects I was supposed to be teaching for the next few months", she chuckles. "I was thrown in right at the deep end. Fortunately, the people there go easy on you if things don't quite go to plan straight away!" She was only given five topics for the lesson planning. The rest she had to work out for herself – from preparing the lectures to designing the practicals and the exams. Although she ended up putting in around 60 hours a week in Namibia, she would do it all over again in a heartbeat: "I was happy to work so hard – the people in Namibia are very appreciative. And if I hadn't been there, the courses would simply have been cancelled – in two important basic subjects."

Major discrepancy

It isn't actually the norm for a B360 expert to spend six months in Namibia teaching basic subjects straight off the bat, says Sabina Balmer. "We usually organise placements for experts who teach special courses at our three partner universities and stay in Africa for about a month each." The managing director of B360 spent two years working in Africa herself: initially as a teacher at a high school in Namibia and later as part of the NADEL postgraduate programme at ETH Zurich for the Swiss Agency for Development and Cooperation (SDC) in western Africa. She then returned to Switzerland, where she worked for Credit Suisse for 13 years. However, she always maintained her ties with

southern Africa. "I knew that I'd set up my own organisation one day", she explains. In all her conversations with NGOs, authorities, companies and universities, she couldn't help noticing that the shortage of qualified professionals was a central problem in Africa: "There's a major discrepancy: here in Europe, we've got a tremendous amount of knowhow – and not just at the universities, either, but also in companies. And in Africa there are not enough specialists."

Shortage of engineers

Since the organisation was founded five years ago, over 100 experts have signed up for stints in Africa, many of whom have already been several times. "Relevance to the concrete world of work is extremely important for us", explains Balmer. "That's why we give priority to people who already have practical experience." The feedback from the experts, partner universities and students has been very positive. Only in one case did the placement not go particularly well, as the lecturer expected too much from the students. "As a lecturer, you have to realise that the level of education isn't always as high as it is in this country", finds Rother, who still supports the organisation as a member of the advisory board. Recruiting volunteers can also be tricky, depending on the subject. "While we're well on the way in food safety, it isn't as easy to find volunteers in the classic engineering disciplines", Balmer explains. "When we approach companies in Switzerland, they tend to like the idea but are usually reluctant to release their staff. And retired engineers often haven't got the time, either, because they are very busy sitting on various committees."

Moreover, the organisation doesn't want to send just anyone to Africa. "First of all, we clarify what expertise is needed, and then we look for candidates with the appropriate skills", explains Balmer. "And we check whether the candidate is really ready to embark on this adventure. People who can't accept last-minute changes or make do with simple accommodation aren't really right for the job." What's more, the experts need to realise that they will be on an equal footing with the local teachers. "You often teach in tandem with a teacher from the country as this encourages a fruitful exchange of ideas", finds Balmer. "It is crucial for the volunteers to be curious about the other culture and want to learn something themselves."

Communication is key

Beat Gerber is a prime example of someone who brings this curiosity to the table. A civil engineer, he has a degree from ETH Zurich and spent a long time working as a science journalist and, most recently, on the president's staff at ETH Zurich. This summer, he completed a one-month volunteer placement at the Polytechnic of Namibia. The polytechnic is in the process of transforming into a university and communication is one of the central responsibilities of the new Namibian University of Science and Technology (NUST), as it will be called from next year. "The communication of scientific content is a key task for the technical university", Gerber is convinced. Only then can NUST show industry, politicians, the media and the local population the skills it has. Together with the rector's office of the polytechnic and representatives of its various departments, Gerber developed a communication concept for how the university might present itself in future. "Currently, its communications are still very much geared towards presenting the big names in the hierarchy", he explains. "Now the aim is increasingly to showcase scientific subject matter, too."

However, drawing up a communications concept was only one part of Gerber's work in Namibia. He also worked with another B360 expert to organise a workshop for students. "We brainstormed current topics connected to science and then looked for ways to convey them journalistically." The social impact of AIDS, the harassment of women in shared taxis, the development of the transport infrastructure or the link between food and lifestyle are just some of the issues that the students tackled. "We adopted a bottom-up approach", says Gerber. "If we experts merely fly in from Europe and talk down to people, it doesn't help anyone. We have to stay focussed on the needs of the local population. Or to put it another way: it's not about bringing innovation to Africa, it's about creating innovation with Africa." ■

B360 education partnerships:

http://www.b360-education-partnerships.org/pages/en/home.php?lang=EN →

Agenda

Alumni business events

Suzanne Thoma
CEO BKW Gruppe
2 October 2014

Susanne Ruoff
CEO, Die Post
23 October 2014

Networking reception from 6:00 p.m.
Event begins at 6:45 p.m.
ETH Zurich Main Building, Dozentenfoyer

Register at:
www.alumni.ethz.ch →

Alumni Ball

Autumn Leaves
At the 8th ETH Alumni Ball we can look forward to an elegant and colourful dinner dance, with plenty of fun and excitement for the non-dancers among us, too.

27 September 2014
The Dolder Grand

www.alumni.ethz.ch/events/alumniball_2014 →

Events

Health 2020
Public discussion on the role of science in healthcare.

Part 1 (3:00 p.m.): New findings on prevention, diagnostics and therapy

Part 2 (6:30 p.m.): Critical dialogue between science and society

1 October 2014
ETH Zurich Main Building

https://www.ethz.ch/en/the-eth-zurich/sustainability/dialogue/eth-talks.html →

While earthquakes can't currently be predicted, the exhibition unforeSeeable – Earthquakes in Switzerland reveals how much we know about where, why and how often they occur. It is organised by the Swiss Seismological Service to mark its 100th anniversary.

Quantum cryptography

Math Phys Lecture 2014
Speakers: Grégoire Ribordy, ID Quantique; Renato Renner, ETH Zurich

30 October 2014, 6:30 p.m.
ETH Zurich Main Building, Semper Aula G60

ETH Zurich climate debate 2014
"Innovations for the climate": what does it take for us to be able to act? Table talks, lectures, panel discussions.

5 November 2014, 3:30–7:00 p.m.
ETH Zurich, Main building

www.c2sm.ethz.ch/klimarunde2014 →

Exhibitions

unforeSeeable
Earthquakes in Switzerland

6 September–30 November 2014
focusTerra
Sonneggstrasse 5, Zurich

www.focusterra.ethz.ch/index_EN →

Future Cities Laboratory
Research, outcomes and prospects

24 September–9 November 2014
ETH Zurich Main Building, main hall

www.arch.ethz.ch/en →

Alumni Symphony Orchestra

Autumn concert 2014

Ludwig van Beethoven
Symphony No. 9 in D minor, op. 125

9 November 2014, 7:30 p.m.
Casino Basel

11 November 2014, 7:30 p.m.
Kultur- und Kongresszentrum, Lucerne

www.alumniorchester.ch →

High performance

When makes something "high performance"? How does an outstanding performance come about? How does ETH Zurich contribute to excellent performance in research? The autumn edition of the science programme "Treffpunkt Science City", which takes place from 26 October to 30 November 2014, is dedicated to answering these questions. These popular Sunday events with a children's programme will focus on the topics of "human high performance" (26 October), "high performance in nature" (16 November) and "high performance in technology" (30 November).

The full programme is available at:
www.ethz.ch/en/news-and-events/events/treffpunkt.html →

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Lust auf Probleme?

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