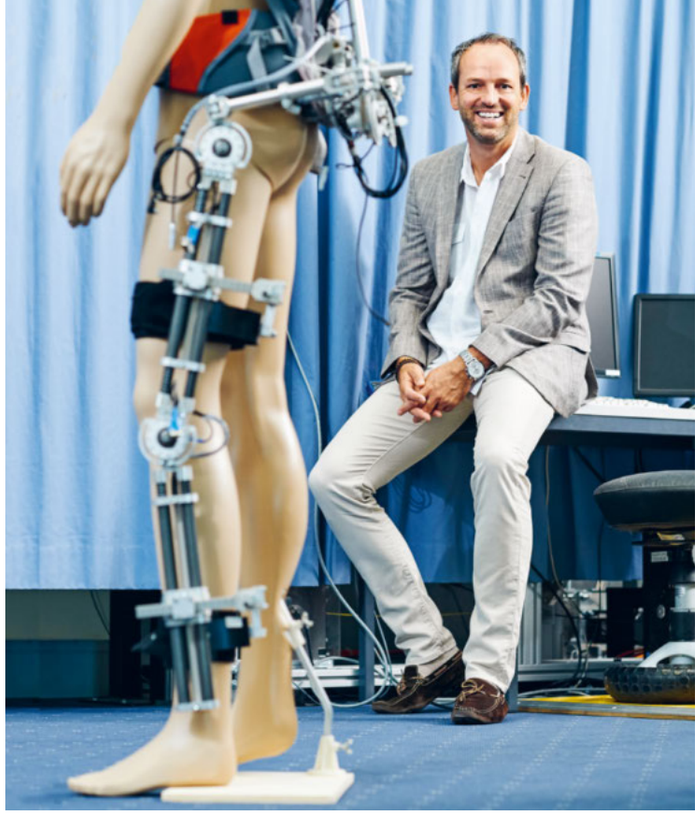


Robert Riener, Cybathlon founder

Robert Riener is a special kind of mechanical engineer: he develops unique therapeutic robots and exoskeletons that make everyday life easier for people who are paralysed. Riener, who grew up in Munich, is Full Professor and Director of Sensory-Motor Systems at the Department of Health Sciences and Technology, ETH Zurich. He is also a professor at the Spinal Cord Injury Centre of Balgrist University Hospital, Zurich, and deputy director of the NCCR in Robotics. In 2016, with the support of the SNSF, Riener organised the first Cybathlon, a highly regarded competition for people with motor disabilities.

“I reply: do whatever you want!”

An open society that does not erect any barriers between people with and people without physical disabilities: that is the goal which inspires mechanical engineer Robert Riener’s research.

After completing my mechanical engineering studies in Munich and Maryland, I did not find a university post at first. That was in the early 1990s. I nearly went into industry, like most of my colleagues, since I had two good job offers. But then things worked out with my research.

Now I’m really glad I pursued an academic career. As a professor I have much greater scope for getting closer to my goal: developing robots that make everyday life easier for people with paraplegia who are confined to wheelchairs. It would be great if one day physical disabilities are not regarded as a deficiency but rather as one human characteristic among many. At the moment my team and I are working on technical clothing that supports paralysed people, enabling them to walk and stand. These exoskeletons are not yet as powerful as we would like, and they run out of battery too quickly. We are setting up a company that will bring the first products to market in about three years.

I always wanted to be a researcher. My father was a car mechanic. Ever since I was little, I have been fascinated by machines and motors. My father helped me build Lego robots, and books of technical inventions engrossed me. I also drew organs and skeletons. Even at primary school, I was thinking about robotics, medicine and research, and I have never lost my enthusiasm for these subjects. Nobody wanted me to go to grammar school, but I managed it.

I don’t like it when one of my undergraduates or doctoral students asks me what they should do next. I reply: Do whatever you want! The important thing is to keep sight of your overall goal, make use of the resources provided by the laboratory and work as part of the team. Each person needs to find their own path. I still don’t know where mine is leading.

“Nobody wanted me to go to grammar school, but I managed it.”
Robert Riener

The pitfalls of multilingualism

In the humanities and social sciences, collaborating with a sizeable group is easier said than done. A Sinergia project on "Academic Knowledge" took up this challenge and overcame it.

It is nothing unusual for scientists to cooperate with each other in large groups – we only have to think of CERN, for example, with its hundreds of researchers working towards a common goal. This type of cooperation is less frequent – and more difficult – in the humanities and social sciences. Cultural scholars tend to select one particular subject and investigate it thoroughly using a particular methodology. They then publish their results in a monograph.

25 researchers from 5 universities

There are exceptions, of course, such as the research project on "The social construction of academic knowledge since 1830", which has been funded under the SNSF's Sinergia programme since 2013 and is now nearing completion. About 25 social scientists and humanities scholars from five universities (the Universities of Zurich and Geneva, and the teacher-training colleges in Zurich, north-western Switzerland and Ticino) are collaborating on this project in three languages. Does that actually work? "It is a big challenge," says education historian Lucien Criblez from the University of Zurich, who is running the project, "but the overall outcome is positive."

Translation problems…

The biggest challenge is language: as a means of comprehension, as a tool for analysis – and as an object of investigation. The group meets every six months, with each person speaking their own language. However, since not all the researchers understand every language, things are constantly having to be translated. For a project that looks at the history of syllabuses and teaching content in the German-, French- and Italian-speaking regions of Switzerland, using English as a *lingua franca* would not make much sense, because it would only create even more translation problems: "The integral importance of language to the research topic needs to be taken seriously," says Lucien Criblez. One example he mentions is that of "Heimatkunde", the study of local history and geography that has long been taught in the German-speaking part of Switzerland only. In fact, there isn't even an equivalent French word for the name of this subject. Paraphrasing the German term in French is therefore the recommended course of action. Translating it into English would make things unnecessarily complicated.

"Despite the challenges of diversity, collaboration is nevertheless worthwhile."
Lucien Criblez, education historian

A rewarding collaboration

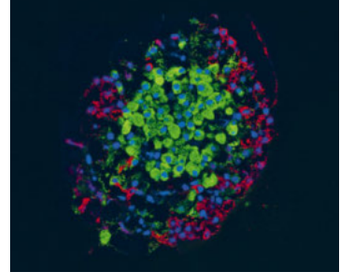
Collaboration is also made more complicated at times by the differing administrative and research cultures of the teacher-training colleges on the one hand and the universities on the other. In retrospect, Lucien Criblez would set up the project in a less complex, leaner way, and for a longer period. Despite the challenges presented by diversity, he feels that collaboration is nevertheless worthwhile. He points out that the researchers realised their findings could not be interpreted in isolation from the cultural and linguistic context. For example, the project has shown that the teaching of literature is valued differently in French-speaking and German-speaking Switzerland, and that Ticino is the only canton in which political education is taught as a subject. Until well into the 20th century, Ticino obtained its teaching materials from Italy, since it was not able to produce its own.

The forthcoming publication of the research results will be no simple matter. Contrary to current practice, the volume is scheduled to appear in two versions, German and French – thus necessitating expensive translation once again.

Sabine Huebner

The ancient world is close to her heart

Sabine Huebner is passionate about the life of ordinary people in the ancient world. The publications of the Associate Professor of Ancient History at the University of Basel deal with "ordinary people", rather than senators, commanders, emperors and kings. Since artisans, shepherds and farmers are rarely mentioned in ancient literature, papyri from the Egyptian desert are an important source. They provide insights – some of them very personal – into everyday life in ancient times. When editing the long-forgotten Basel Papyrus Collection, she stumbled on a letter that is probably the oldest evidence of Christians in Egypt. In it, two brothers discuss the best fish sauce and news of local politics, while offering an insight into the social milieu and the living faith of the first Christians.



Regenerating the pancreas

An unexpected transformation

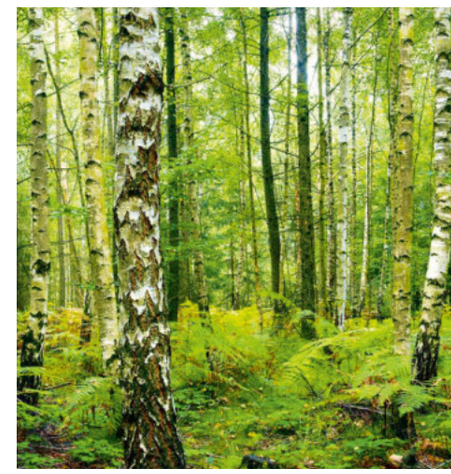
Certain diabetic patients do not have insulin-producing cells (beta cells) in their pancreas. All over the world, scientists are searching for suitable stem cells to act as a substitute. "We were looking for a different approach and wanted to investigate the ability of the pancreas to regenerate in living mice," says Pedro Herrera, a professor at the University of Geneva. In order to do this, they genetically modified mice so that their beta cells could be destroyed almost at the touch of a button. Insulin therapy kept the animals alive. To the researchers' surprise, other pancreatic cells (alpha cells) spontaneously transformed themselves into beta cells. "The pancreas regenerated within a few weeks of all the beta cells being destroyed, and all the mice were cured," says Herrera. The pharmaceutical industry is already showing an interest in this discovery.

"The pancreas regenerated within a few weeks of all the beta cells being destroyed"
Pedro Herrera, University of Geneva

Life-cycle assessment of wood

Capitalising on Switzerland's forests

Wood has a largely positive environmental impact and should be exploited to a greater extent, both as fuel and material, according to a study conducted by Stefanie Hellweg, a professor at the Institute of Environmental Engineering at ETH Zurich. This broad-based analysis of the environmental impact of Switzerland's forests examines the entire value chain, from felling trees through to recycling and burning wood. "The forests should be exploited more," stresses Stefanie Hellweg. "Timber stocks are increasing and their benefit to the climate is not being maximised. Wood is one of the very rare renewable materials." The study was carried out under the National Research Programme "Resource Wood" (NRP 66), which is establishing basic scientific knowledge and practical methods for increasing the availability of wood as a resource and expanding its use.



"The forests should be exploited more"
Stefanie Hellweg, ETH Zurich