Interview: Prof. Robert Riener – Head of the Department of Health Sciences & Technology, ETH Zurich, Switzerland



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Professor Dr. Robert Riener speaks about the much anticipated Cybathlon event and its importance to technology transfer, the Swiss education system's ability to attract international talent, and his goals for the future.

You have been leading the Department of Health Sciences and Technology at ETH Zurich since February 2016. Could you start by introducing yourself and the Department of Health Sciences and Technology to our readers?

I am a professor of sensory-motor systems at ETH Zurich. I develop robotic solutions to improve the rehabilitation and daily life of people with disabilities. My background is in engineering, but I am also an elected professor of the medical faculty at the University of Zurich. Since February, I have been the head of the Department of Health Sciences and Technology, which means I am the coordinator for various professors – a total of 28 elected and 6 adjunct professors. Our department has 4 main areas of research and teaching. The largest, where almost half the professors are working, is in food research. The second largest is biomedical engineering, followed by movement science and neuroscience. We have two curriculums, one in food and one in health sciences and technology, which includes four different majors.

We will also shortly be starting a medical bachelor curriculum at ETH Zurich. This is noteworthy because we are a public university. There is currently a law that says that any student with a matura, the college entrance exam, that starts at a public university in Switzerland can study whatever they like, without admission limitations. There is also a law that says that there are limitations for studying medicine offered at cantonal universities only. Now that one of our public universities is adding medicine, we will need to make changes to these laws. I will be responsible for introducing this new curriculum in our department.

One of the main aims of the Department of Health Sciences and Technology is to accelerate the transfer of knowledge and technology in clinics, industry and society. How are you breaking down communication barriers between industry, research and the community to enable technology transfers to take place?

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We have three important sectors: teaching, research and technology transfer. This signifies that technology transfer is as important as teaching and research for the university. We have different ways of conducting technology transfers, which we also refer to as knowledge transfers. This includes traditional methods such as intellectual property and framing the research in terms of patents, or software. We then make it available for existing or new companies through licensing contracts. This assures that the information passes from research to the industry, or the whole society.

We are also active in the formation of spinoff companies. ETH Zurich is very successful in this regard. We have on average 25 spinoff companies per year, and these companies have very high life expectancies. After five years, most of our companies still exist. Our specific department is doing well too. Many groups are conducting basic science in biology, medicine, and animal experimental research. Since 2012, we have had ten spinoff companies, which is a large number for just one out of the 16 departments at ETH Zurich. Licensing and spinoffs are traditional ways for knowledge transfers, but we are also active in other areas. We organize events that make research available to the general public. Over three Sundays in March we organized lectures and exhibitions to the general public about our research – a series of events that we called “Treffpunkt Science City”, held at ETH’s Hönggerberg campus.

For the last three years, we have also been organizing an event called Cybathlon, a competition for assistive medical technology for people with disabilities. It is a one-day event that will be held on October 8th 2016 where 80 teams from 24 countries will send their best robotics allowing “pilots”

with physical disabilities to complete daily life tasks. There will be racetracks with common and normal tasks such as opening a door, walking up a ramp, and cutting bread. The Cybathlon is being organized by ETH Zurich in collaboration with the Swiss National Center of Competence in Robotics Research. Whereas other international competitions for disabled athletes, such as the Paralympics, only permit competitors to use unpowered assistive technology, the Cybathlon encourages the use of performance-enhancing technology. We are hoping to turn this into a reoccurring event and are in talks with international partners in this regard.

Speaking of developing new technologies, Switzerland excels in this regard, with the Swiss research community occupying second place in the world ranking by impact. What you think explains the county's high rankings in terms of research impact?

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Switzerland is not a country blessed with natural resources. What it does have, and also imports, are brains and technically skilled people that can provide leading services. The effect this has had on the educational sector is considerable. Not everyone in Switzerland goes on to study at a university. Only 20 per cent of people get the matura. The other 80 per cent are still able to achieve great things. With apprenticeships they develop, through intensive practical work, a particular skill over a three or four-year period. Such apprenticeships are very successful. Indeed, the CEO of the third largest Swiss bank did not attend a university, but instead underwent an apprenticeship. What this system means for Switzerland is that the country is made up of not just academics, but also people that have the skillset to produce things. What makes the Swiss watch famous is not only driven by intellectual skills, but also by the technical know-how when it comes to production. This holds true for the quality of our houses, streets, and infrastructure and even our healthcare services, with well-educated therapists, specialists and nurses.

We have a particularly international student body. At the master's level almost 40 percent of our students are from abroad, and at the PhD level that number rises to 70 percent. This is similar to the United Kingdom and the United States, but not in most European countries. In Switzerland, we are able to attract the best intellectuals in the world.

What attracts such international talents to Zurich in particular?

We attract international talent in part due to the amount of funding we have available for research. This funding allows researchers to pursue even high-risk ideas, and have continuous support from

technicians and secretaries. Now a counter argument is that if there is so much funding then the research will no longer be competitive. We have large labs, about 30 including the PhD students, and in terms of competitive funding we have, on average, even more than in the United States. With large teams, it is still competitive, and people want to come here because of the attractive and healthy funding schemes. We also have one of the highest living qualities in the world, and that can only help in increasing our appeal.

We have heard that the perception of failure is viewed differently in the United States and Switzerland. In the United States a failed spinoff is not seen as a major setback, whereas in Switzerland it is to be avoided at all costs. What is your view on this cultural stereotype regarding risk aversion?

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We have noted that it is more difficult to find young entrepreneurs that are interested or prepared to take research to the market. Sometimes we have even had an idea for a spinoff company, but did not have anyone who was prepared to invest in it and take the necessary risks. Such risk aversion is evident in the lack of seed funding for spinoffs, though the situation is fast changing. In fact, there are now more seed funders willing to invest up to 1 million Swiss Francs (1.01 million USD), but there is still a gap for projects in the 2 million Swiss Francs (2.03 million USD) range and above.

What are some of your key goals to assure the international stature of the Department of Health Sciences and Technology over the next few years?

The position as head of the department is different from being a dean. It is a rather decentralized position more focused on maintaining the serenity of the professors. Each professor is responsible for technology transfers themselves. They work with the ETH technology transfer office and they negotiate with companies. My job is more to address any challenges they might face in doing this.

One initiative that we have started in order to help this process is the creation of an industrial advisory board. The board includes high level managers within food, health and life science industries, including the likes of Roche, Novartis, Siemens, and Nestlé. The first meeting will be in September 2016 where we will discuss the curriculums to assure the students are gaining industry skills, and we will look at the types of research that will benefit industry as well.

My personal goal is to find more synergies with other departments and medical experts. I want to increase communication with the hospitals and my colleagues. We already have 118 collaborative projects between our professors and medical facilities in the university hospital, the medical faculty

and other hospitals. This is a great start but there is more to do.

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