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# science stories

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ETH zürich

University of Zurich[UZH]

# European Science Stories

## Dear Reader

Detlef Günther, Sofia Karakostas, Agatha Keller and Christoph Hock.

The keyword is Dissemination. The dissemination of knowledge, data, technologies and fascination – welcome to the third European Science Stories. We are enthusiastic about sharing with you the stories of three outstanding researchers from science and the humanities.

The ERC project 'Film Colors. An Interdisciplinary Approach' by Barbara Flückiger, Professor of Film Studies at the University of Zurich, is a shining example of interdisciplinarity, as it not only emphasises on aesthetic and historical aspects but also on deliberations regarding the physical, chemical and mechanical foundations of film production. By means of a specially designed software, the project analyses a large number of films, roughly spanning an entire century, summarising how filmmakers have been dealing with the different possibilities of the time. Not least, the project shall develop novel digital techniques for film restoration. The ERC Advanced Grant awarded to Barbara Flückiger will certainly open innovative and internationally visible possibilities for the students and researchers at the highly versatile Department of Film Studies at the University of Zurich.

The beginning of October 2016 saw the 1st Cybathlon (organised by ETH Zurich) being held near Zurich. This playful competition highlights the importance of novel assistive technologies that improve the daily lives of people with disabilities. Thousands of spectators watched the 66 international teams compete and media coverage went well beyond Switzerland. Together with his colleague Andreas Luft of the University Hospital Zurich, ETH Zurich's Associate Professor of Rehabilitation Engineering, Roger Gassert, is one of the leading scientists of the SoftPro project, coordinated by an Italian institution. The project systematically pursues the message of the Cybathlon. The cumulative effects of different technologies for prosthetics and upper limb rehabilitation are analysed; research focuses on user-friendliness for patients suffering from strokes or injuries of the spinal cord. This project further strengthens Zurich's standing as a centre for research with its specific combination of technology and medicine due to the close collaboration between ETH Zurich and the University of Zurich with all its Clinics.

Certain faculties, such as the ones dealing with issues of our environment, naturally rely on international collaborations, as shared fundamental problems have no regard for national boundaries, namely not the borders of small countries such as Switzerland. This holds particularly true for seismology, especially considering that – unlike our southern neighbour, Italy – Switzerland has so far been spared the devastating impacts of an earthquake. Owing to an outstanding infrastructure registering exact data even of faraway occurrences, the Swiss Seismological Service (SED), located at ETH Zurich, is a premium partner in international research cooperations. The SED, headed by Stefan Wiemer, Professor at the Department of Earth Sciences, plays a leading role in several EU projects for geophysics, earthquakes, volcanology and plate tectonics. Apart from the basic research, these projects also discuss issues such as the exploitation of geothermal resources or earthquake safety for infrastructures.

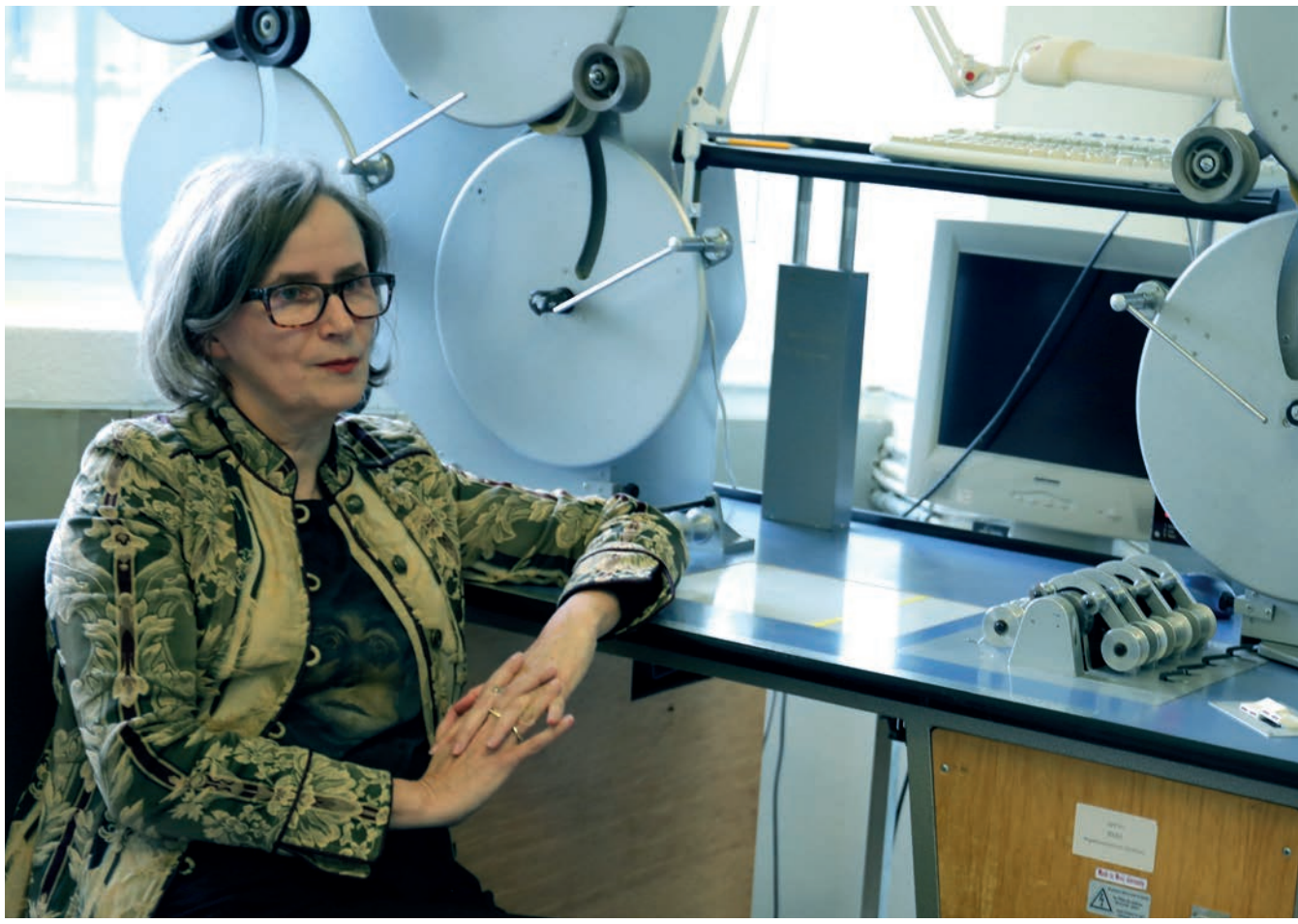
An integral component of every proposal of EU-funded projects is the description of dissemination, i.e. the distribution of the results of the project's most relevant key research objectives, significant also in terms of societal impact. We believe that these Science Stories contribute greatly to dissemination and we are proud to see our readership and international appreciation increase steadily. We would like to thank you, dear Reader, for your sustained and possibly newfound interest and trust that you enjoy reading this third edition of the European Science Stories from Zurich.

Detlef Günther
Vice President Research
and Corporate Relations, ETH Zurich

Christoph Hock
Vice President for Medicine
and Science, University of Zurich

Sofia Karakostas and Agatha Keller
Co-Heads EU GrantsAccess

Cover: Visualisation of a complex financial network (team Stefano Battiston)



# A Passion for Film Colors

## An interview with Barbara Flückiger, Professor of Film Studies at the University of Zurich

What fascinates Barbara Flückiger about film color, what research she intends to carry out with her ERC Advanced Grant and what special challenges she faces as a humanities scholar.

**What was your first reaction when you got the message that you had received an ERC Advanced Grant?**

(Laughing). I was walking around with a big smile on my face for weeks. To receive an ERC Advanced Grant is a great honour and it is a huge amount of money that allows you to assemble a team and to work for several years on one specific topic that you are most passionate about.

**Your project is about film colors. What does it mean?**

What you see on the cinema screen are first of all colors. This is what my research is about, the color appearance on the screen. In the course of film history, there have been many different approaches to capture and to project these film colors. So basically what I do is historical research into the development of film colors, from the technological side as well as from the aesthetic side; the patterns emerging, how aesthetics and technology interact. We look deeply into technology including chemistry, physics and mechanics of film colors and try to figure out how these properties are connected to specific aesthetic and narrative aims, how film directors, set designers as well as costume designers have been working with these colors to achieve the desired effects.

**Please tell us more about the objectives of the project.**

First, we are doing an aesthetic analysis of a huge group of films from all decades of cinema history, starting in the late 19th century to the 1990s. Then we are connecting this analysis to an online tool that we are going to develop so that people all around the world can use it for their own film color analyses. In addition, we do material studies, chemical and physical analyses of film stocks. We investigate how the dyes were configured, what spectral properties they have, what kind of chemistry was applied. Moreover, a fourth objective is to digitise and restore historical color films. In summary, the key elements of the project are technology, aesthetics and restoration.

**It is common to investigate also the technical and material-related aspects of historical paintings in arts. Yet, in film, such an approach still seems to be unique?**

Yes, but I see a change. Today we have a digital pipeline in cinemas and in film production. As a result, the analogue film material and processing are disappearing. For me it is not a surprise that at this very moment there is a growing awareness of the materiality and the material properties of films. However, to investigate and understand


these properties requires different kinds of knowledge and this is basically where our project comes in.

**What will be the impact of your project?**

Film historians, scholars, students, archives, and technical service providers will benefit from our project. We publish our results and the sources on the "Timeline of Historical Film Colors" where they will be available for other researchers or film restoration projects. In addition, we are cooperating with manufacturers of film scanners. Thus, our experience and suggestions will flow back to these producers and users. Our research, therefore, will also have an immediate practical value.

**It is not very often that a researcher from the field of the humanities receives an ERC Advanced Grant. What have been the specific challenges you were facing when you applied for the grant?**

When you look at the grant application procedure, you see instantly that it is mainly designed for science rather than for the humanities. All the output of an applicant's research is measured with the usual impact factors, which are very common in science but not so much in the field of humanities. Scholars from the humanities usually write books and not primarily many publications in high-ranked impact factor journals. As a result, it is much harder to display your achievements. The required description of the planned project is also very science-oriented, since it has to be very brief. It has to address a very broad audience of scholars from the humanities and social sciences while still being very specific and that is quite a challenge. In science disciplines, it is easier to boil your project down to a few pages, whereas in the humanities you have to describe your methods and topics in more detail.

**So language is a topic?**

Language is certainly a topic because you have to be very specific. The language and the terms you use have to be very precise. Therefore, I think people who are not English native speakers are facing greater obstacles to write this sort of applications. I publish numerous papers in English, but I still write many publications including my books in German - exactly because language is so important in the humanities.

**Which were the specific challenges you were facing in your institution?**

In my case, I have a specific position, as I am a professor ad personam - which means that I do not have the benefit of assistants. As a result, I have to overcome all the managerial challenges of the ERC project by myself, down to the minute detail, including the purchase and installation of the technical equipment we need, which is huge. In contrast, scientists very often have a lab and their research group. They can rely on a lab manager who is a scientist but also a professional in organising infrastructure and executive processes of projects. However, people from the humanities, even if they are head of a department, usually do not have such infrastructures and expertise in their team. And then of course it is also about money.

**What do you mean by money?**

The corresponding university receives a significant amount from an EU grant to cover the cost of its infrastructure. The University of Zurich is given an additional 25% of the direct project costs of an EU project as overhead, which might be fair in the case of science projects where labs and expensive equipment financed by the university are needed. Nevertheless, regarding projects in the humanities, the university has to deliberate whether it is appropriate to apply the same overhead percentage as for science. Humanities are much cheaper. We usually need rooms, IT infrastructure, laptops and books. So

## Barbara Flückiger

Barbara Flückiger has been Professor of Film Studies at the Faculty of Arts and Social Sciences of the University of Zurich since 2014. She studied German language and literature, film and media at the Universities of Zurich and Berlin and graduated with a master degree in 1995 and a PhD in film studies in 2001. In 2007, her habilitation thesis on computer-generated visual effects was accepted at the Freie Universität Berlin. Barbara Flückiger developed and executed several research projects on film technologies financed by the Swiss National Science Foundation and the Federal Commission for Technology and Innovation CTI. Before her academic career, she was a film professional working on productions in Europe and the USA. She collaborated with renowned film directors such as Markus Imhoof, Lea Pool, Daniel Schmid and Claude Goretta. In May 2015, she was awarded the European Union's top research award, the Advanced Grant of the European Research Council (ERC) for her project "Film Colors".

## ERC project “Film Colors. An Interdisciplinary Approach.”

Barbara Flückiger and her research team will systematically investigate the relationship between technological processes and the aesthetics of film colors through a new interdisciplinary approach and with a novel methodology. The project will develop software to analyse a large number of color films from each decade since the invention of film itself. Aesthetic analyses in film history will be supplemented with measurement methods from the natural sciences to investigate the chemical and physical characteristics of film colors. Fields of application for the aesthetic and technical analyses include digitisation and restoration of historic films in the framework of the research project. In addition, research findings will continuously contribute  to a digital humanities platform developed by Barbara Flückiger called the “Timeline of Historical Film Colors”.
http://zauberklang.ch/filmcolors/

The EU supports this project with 2.9 million Euros.
http://cordis.europa.eu/project/rcn/198481_en.html

## ERC Advanced Grants

ERC Advanced Grants are awarded by the European Research Council to leading European researchers who have shown outstanding achievement in their field over the last ten years and to support excellent and ground-breaking research projects to advance the frontiers of knowledge.

Source: University of Zurich, News release, 1 June 2015

in order to motivate more researchers from the humanities to apply for an ERC Advanced Grant, it might be helpful if the University of Zurich would reconsider its practice.

**Did you get any support from the University when you applied for the grant?**

Absolutely. I received great support from EU GrantsAccess and also from the National Contact Point of the European Research Council. This help was very instrumental to successfully apply for this kind of highly competitive grant.

**Would you recommend applying for an ERC grant to your colleagues from the humanities?**

Of course. Actually, I even offered a workshop for my colleagues from our faculty to support them in understanding how they can meet the requirements of such an application process. In this workshop, I provided insights for project development from the point of view of a humanities person on how we can translate our topics into this kind of content management system.

**Let us return to film. In which way has digitisation changed the film world?**

It has changed the whole film production process. Today, there is a very crucial pre-production stage for the planning of how one combines elements that are created on the computer and elements that are captured with actors on location. Then, there is a very important post-production stage where one assembles all these elements. Let us consider a film with a typical computer-generated dinosaur. You have to do much planning to figure out how big the dinosaur is going to be, where it is being placed, how actors interact with it, where they are looking at as the dinosaur is not on the set but exists only virtually in the computer. More and more of these productions are comparable to theatre projects as actors are performing on an empty green screen stage. They do not have anything or anyone to interact with. They are in a completely virtual environment. Hence, we are also facing greatly different notions about acting and directing films.

**And what may we expect next in film production?**

What is coming next is very much on my horizon because I have been developing another research project this year with other partners. We were looking into new technologies that are emerging in the near future. Thanks to these novel technologies, there will be a broader range of colors, higher contrast, different kinds of audio systems, higher frame rates and stereoscopic 3D cinema. There are many sophisticated technologies emerging and some are already in place in specific cinemas around the world. They will certainly be seen in our cinemas in a few years. Before these developments will be put into practice, we are planning to investigate how said technologies again affect the creative process of filmmaking as a whole and the audience's perception of movies.

● Interview Rolf Probala

Interview clip:
www.grantsaccess.ethz.ch/en/sciencestories

## The ERC Expert Group of EU GrantsAccess

The European Research Council (ERC) Expert Group of EU GrantsAccess deals with the submission particularities and guidelines of ERC project proposals. Together with their colleagues from the corresponding central administration, they compile the necessary procedures that apply to the University of Zurich and ETH Zurich. The ERC Expert Group keeps informed about the latest developments and regulations and organises ERC workshops and information events. The constant exchange of information with the National Contact Point for ERC at the Euresearch Head Office in Bern ensures that the latest developments are identified timely and may thus be considered by the entire counselling team of EU GrantsAccess.

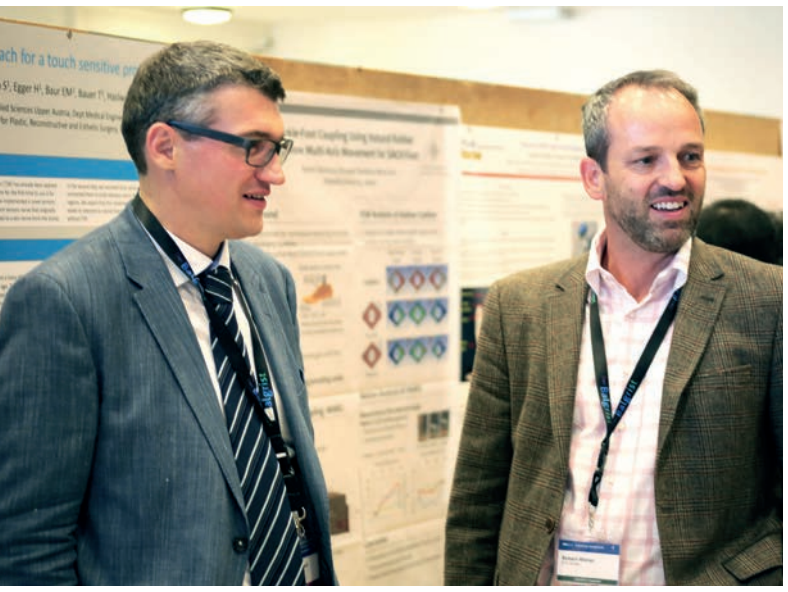
An experienced member of the EU GrantsAccess team personally advises and supports every ERC project from the proposal to the implementation phase. The principal investigators are thus somewhat exempt from administrative tasks and may focus on the scientific aspects of their project.

**Members of EU GrantsAccess' ERC Expert Group**
Jonas Oehler (Lead), Regina Notz, Nicolas Schulthess, Alexandra Zingg.

# With a Little Help from Your Robot

## Smart technologies for better therapies and prostheses

How Roger Gassert's research could change the daily life of people with motor disabilities, why he considers it worthwhile to participate in a collaborative EU project and what impressed him most at the first Cybathlon Symposium.




There is an expectant silence when Roger Gassert steps onto the stage of the conference hall to open the Cybathlon Symposium. More than 300 researchers in rehabilitation engineering and assistive technologies have followed the invitation to join this scientific conference on assistive technology in Switzerland, among them many of the key players from the US, Japan and Europe.

One way to reduce complexity might be to learn from the body.

An intensive day of keynote speeches, short talks, poster sessions and a panel discussion lies before them when the participants gather at the SWISS Arena in Kloten on this foggy morning in October 2016. The Cybathlon Symposium is the scientific preceding programme to the Cybathlon itself, the first championship for pilots with disabilities organised by ETH Zurich, which will take place two days later. Roger Gassert, Professor of Rehabilitation Engineering at ETH Zurich, together with his team, has been very much engaged in setting up the Cybathlon championship and is also in charge of the Cybathlon Symposium. He already had a busy time prior to opening the conference: Two days before, he and his team hosted the progress meeting of the SoftPro consortium, a collaborative Horizon 2020 project on rehabilitation technologies in which both ETH Zurich and the University of Zurich are participating. "We wanted to connect the Cybathlon competition with a scientific conference and also add the SoftPro meeting as there are strong links between the three events and several of the SoftPro groups presenting at the conference will also participate in the Cybathlon with a team," Roger Gassert told us just before the conference started.

### An interdisciplinary approach

In his lab for Rehabilitation Engineering, Roger Gassert and his team run a number of projects to promote the rehabilitation of patients affected by sensory-motor impairments due to a stroke or a spinal cord injury. His activities reach from basic research to understanding how we move our body and how this is affected by a stroke, to measurements of improvements in therapies up to the development of new therapeutic and assistive technologies. His team consists of engineers, psychologists and neuroscientists and he cooperates very closely with Andreas Luft, Co-Chair of the Clinic for Neurology and Professor of the University of Zurich at the University Hospital Zurich. The innovative measurement techniques Roger Gassert and his team have developed can be applied on Andreas Luft's patients and the outcome of these measurements helps to develop new therapies and technologies. Therefore, when Roger Gassert was asked to join the SoftPro project, he suggested also including Andreas Luft, as he and his team fitted perfectly into the ambitious consortium of rehabilitation technology researchers, clinics and industry, and as the two groups look back on a long-lasting and successful translational collaboration.

### Simpler, cheaper, smarter

SoftPro has the overall vision to make rehabilitation technology simpler, extra user-friendly, cheaper and more widely available to people who need it.

For the progress of our research it has been an enormous advantage to have the main clinical collaborator, the group of Andreas Luft, just around the corner.

There are already many sophisticated technologies but often patients or therapists hesitate to adopt them because the functions are too complex or not sufficiently robust. "One way to reduce complexity might be to learn from the body," Roger Gassert tells us during the coffee break. "With our hand we can perform 30 or more grasps to manipulate objects. But when we analyse these movements in detail, there are only two or three basic

## Cybathlon

Cybathlon is a novel championship for pilots with disabilities that took place for the first time on 8 October 2016 at the SWISS Arena near Zurich. The pilots had to overcome challenges of daily life using novel assistive technologies in six different disciplines. In these first bionic Paralympics, 66 teams from various countries competed. They were observed by scientists, assistant technology developers, company representatives as well as a public audience of almost 5000 people and 150 journalists from national and international media. Swiss television broadcasted the event. The Cybathlon was initiated by Robert Riener, Professor of Sensory-Motor Systems at ETH Zurich, and organised by him and his colleagues and their teams from ETH Zurich. The event aimed for a better understanding of the challenges that people with disabilities face in their daily lives and for demonstrating how novel assistive technologies can improve their independence. The next Cybathlon will take place in four years.

http://www.cybathlon.ethz.ch/en/

Impressions from
the Cybathlon Symposium

## Roger Gassert

Roger Gassert received the M.Sc. degree in microengineering and the PhD degree in neuroscience robotics from the École polytechnique fédérale de Lausanne (EPFL) in 2002 and 2006, respectively. His PhD was partially carried out at the ATR Computational Neuroscience Laboratories in Kyoto, Japan. He was a postdoctoral fellow at the Imperial College London and the Simon Fraser University in Vancouver, Canada, supported by the Swiss National Science Foundation. Since 2014, Roger Gassert is Associate Professor of Rehabilitation Engineering at the Department of Health Sciences and Technology at ETH Zurich.

patterns, which we modify slightly to adapt to the individual objects. We call these patterns synergies. Using this knowledge, we can build a hand prosthesis that performs only one of these basic patterns but can pick up different objects with only one movement, adapting to the object through a soft structure. That is what my colleagues from the University of Pisa and the IIT Genova have done." To detect such synergies of movement, measurement plays a key role. And measurement is exactly Roger Gassert's contribution to the SoftPro project. He and his team have developed a virtual version combining two standard clinical tests to assess how well a stroke-affected patient can perform movements by placing nine pegs in nine holes. In this virtual test version, the patient sits in front of a screen and inserts the pegs into the holes by manipulating a sophisticated computer mouse. With this device, the researchers can measure the position and the orientation of the hand as well as the grasping force 1000 times per second. The result is a comprehensive picture of the movements of the patient's arm and hand, which permits to assess the effects of the therapies, to improve them but also to identify so-called synergies by testing healthy persons as well as "abnormal" synergies in patients. "For the progress of our research it has been an enormous advantage to have the main clinical collaborator, the group of Andreas Luft, just around the corner," Roger Gassert says. "So we are already at the point when we can do measurements in patients. We can test our tools and hopefully pass them on to the other partners as the project progresses." However, Roger Gassert explains the main benefit of participating in SoftPro as follows: "As we provide our assessment tests to the different partners of the project, we experience the excellent opportunity of collaborating with even more groups to establish our assessment and collect data from different clinics in multiple countries. We can thus enlarge our dataset, learn more about the pathologies and compare datasets from different clinics. This will greatly advance our efforts." As the coffee break is over, Roger Gassert rushes back to the stage to prepare for the next session.

### A felt part of the body

In the meantime, we have a look at the posters presented by several research groups. It is like glancing through a window at the future of rehabilitation and prosthetics. Robotics technologies are increasingly integrated into the body, linked to the nervous system and controlled by the brain. Thus, prostheses become a part of the body. Roger Gassert's project on a wearable hand exoskeleton is very much in line with this trend. Later in the day, we ask him what impressed him most during this first Cybathlon Symposium. "Clearly some of the recent work of Hugh Herr," he answers.

> I hope that some of the technologies we develop will make it to the patients and improve their lives.

Hugh Herr, head of the Biomechatronics research group at the MIT Media Lab, lost both his legs below the knee as a teenager but thanks to the sophisticated prostheses he developed, he can walk and move almost naturally. "What fascinated me about his work was the broad approach he presented," Roger Gassert continues. "Hugh Herr not only looks at the technological aspects, but also at how to optimise the interface and control of the device, e.g. by developing novel amputation techniques together with surgeons. They shape the surface of the bone and tie the muscles in a way that the brain can move the muscles but also receive feedback from them which makes the prosthesis feel as a movable part of the body." At the end of the Symposium, we ask Roger Gassert what he hopes to achieve by his own research. "I hope that some of the technologies we develop will make it to the patients and improve their lives," he answers and leaves the conference hall to prepare for the Cybathlon.

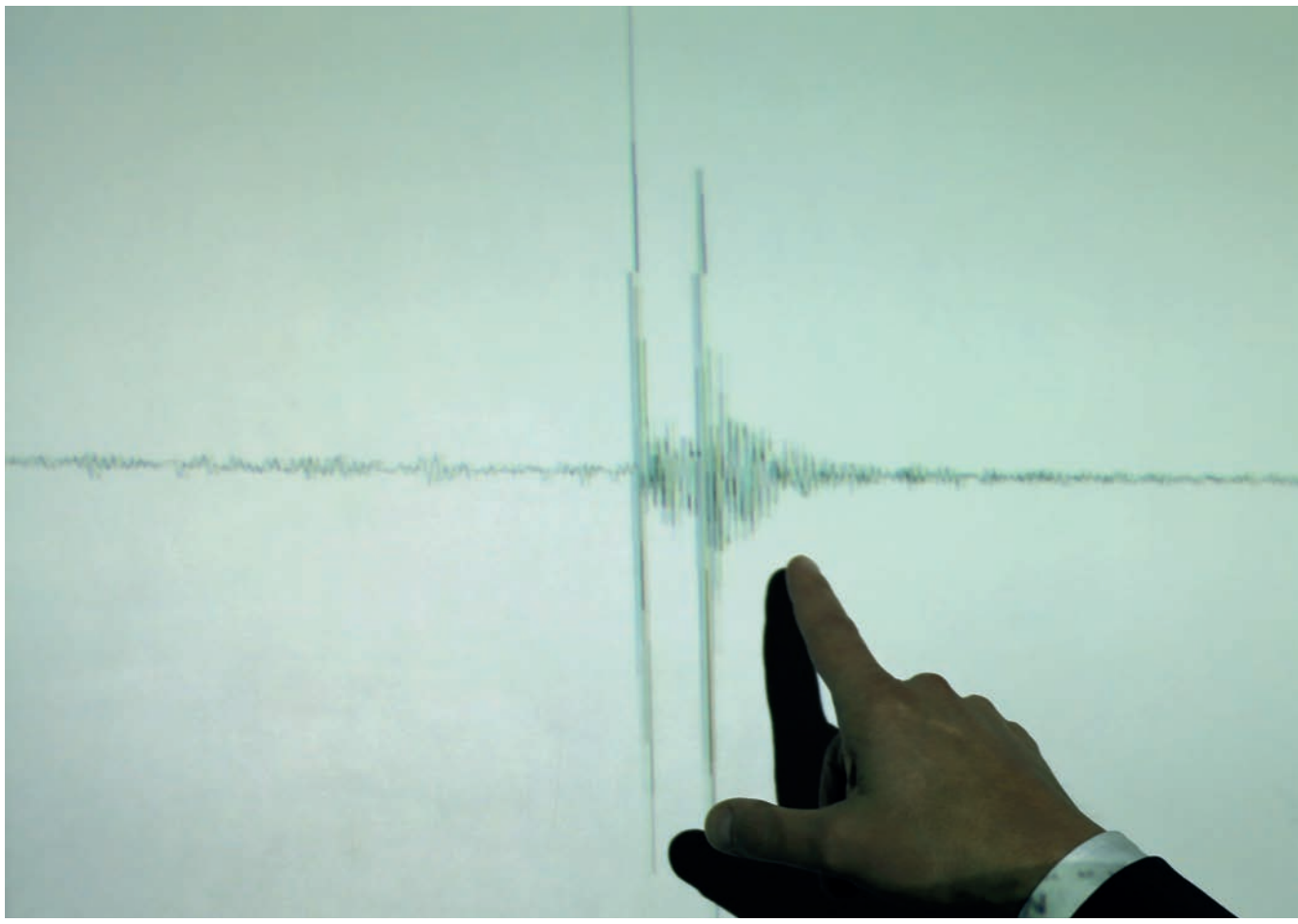
● Rolf Probala

Interview clip:
www.grantsaccess.ethz.ch/en/sciencestories

## SoftPro: Synergy-based Open-source Foundations and Technologies for Prosthetics and RehabilitatiOn.

Objective: to increase the cumulative benefits of assistive robotic technologies using synergy models and soft robotics to develop novel user-friendly prostheses, exoskeletons and assistive devices for upper limb rehabilitation.

Coordinator: Fondazione Istituto Italiano di Tecnologia (IIT) Genoa, Italy
http://www.softpro.eu/



# When the Earth Shakes

## Understanding natural and man-made earthquakes

What fascinates Stefan Wiemer about earthquakes and his job as Director of the Swiss Seismological Service and why he wanted to be engaged in a collaborative EU project on geothermal energy.

It was a quiet Sunday morning in October 2016 up until the moment when Stefan Wiemer received the alert announcing an earthquake with a magnitude of 1.9, five kilometres beneath Basel; a small earthquake most likely not felt by the population. As the Director of the Swiss Seismological Service SED, earthquake alerts reach him quite often at any given time. More than 150 seismic stations all over Switzerland measure the slightest movements in the underground and immediately send the data to the central analysis computer in Zurich.

> For me earthquakes are the most interesting topic. They are so little understood and may yet be so devastating.

The computer screens the data for a possible earthquake and automatically generates alerts to the authorities, media and public within about 45 seconds. The computer also alerts a team of two scientists and an IT specialist who are on a 24/7 duty to oversee the monitoring of the seismic activities in Switzerland and around the world. Stefan Wiemer is informed but not always actively involved in communications, except if there is a larger earthquake like the one in central Italy in August 2016 that killed nearly 300 people. After this seismic disaster, the SED had to handle more than 40 media inquiries and the Director and members of his team gave dozens of interviews. “Media and authorities usually want to know exactly what has happened and all about the relevance the incidents have in relation to Switzerland,” Stefan Wiemer says when we meet him in his office at the Department of Earth Science at ETH Zurich.

### Understanding earthquakes

Stefan Wiemer has been a passionate seismologist since his days as a student of geophysics at the Ruhr-Universität Bochum, Germany. “I became more and more fascinated by seismology because for me, earthquakes are the most interesting topic. They are so little understood and may yet be so devastating,” he says. So he devoted his research career to a deeper understanding of the mechanisms of earthquakes; why they occur, when they occur, where they occur and if they could be predicted at all. But apart from the

### Swiss Seismological Service (SED)

Swiss Seismological Service (SED) is the federal agency for earthquakes. The SED is responsible for monitoring earthquakes in Switzerland and neighbouring countries as well as for assessing Switzerland’s seismic hazard. When an earthquake occurs, the SED informs the public, authorities, and the media about the earthquake’s location, magnitude, and possible consequences. The SED was founded in April 1914 and has been hosted at ETH Zurich since March 1957. The team of the SED consists of about sixty scientists, engineers, IT specialists, technicians, as well as communication and administrative officers. Zurich and Director of the Swiss Seismological Service.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SZUZ
COGEAR
EMBD
CH.EMBD..HHZ
LAUCH
HHZ (Std: 132)
SIMPL
HHZ (Std: 115)
SVIL
HGZ (Std: 364)
SVIO
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SVISP
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scientific challenge he also likes the practical implications of his research field. He often sees himself as a mediator between science and the public. “What we do in research and by monitoring the underground matters greatly to people. They are fascinated by and at the same time worried about earthquakes.

Buildings kill people, not earthquakes. The best protection is to make our constructions more resistant.

We try to communicate what happens beneath the surface of the Earth in an understandable way. We also evaluate and publish the seismic hazards and give advice on how we can protect ourselves, which has a very practical meaning. I like this combination of research and service to the society very much,” Stefan Wiemer states.

The link between science and public service was reinforced after a so-called man-made earthquake that shocked Basel in December 2006. This earthquake, with a magnitude of 3.4 along with thousands of smaller ones, was induced by the Deep Heat Mining Basel project during the creation of an underground heat exchanger at a depth of five kilometres. At that time, there was great optimism in the community of Earth scientists to harvest clean geothermal energy by pumping water into the deep and heat it up down below. However, after the Basel incident and a similar one in St. Gallen many of these projects were put on hold. Ever since, the public has been reacting rather sensitively on any plans to exploit deep geothermal energy. That small earthquake near Basel on that quiet Sunday morning in October turned out to be a late reaction to the pilot drilling in 2006 - this is why Stefan Wiemer got involved personally when he received the alert and contacted several people from the local authorities.

## Soft technologies for geothermal energy

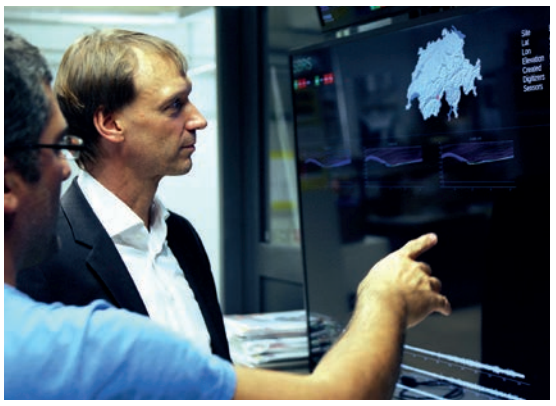
Nevertheless, also in Switzerland geothermal energy has a great potential as part of the future energy mix, as it is clean and abundant. The challenge is to find technologies able to harvest the heat under our feet in a safe and sustainable way. “We are looking for soft stimulation techniques that make the heat exchange in the underground environmentally friendly, safe and sustainable in the long term,” Stefan Wiemer explains. This is precisely the objective of the EU project called DESTRESS, in which Stefan Wiemer and his team play a crucial role. Actually, he has been one of the initiators. When the call was published by the EU, he took action immediately. “I always felt it is important that Switzerland is part of such a project. We had geothermal experience in the past; we have plans for the future and are relevant players in this field. So eventually, I picked up the phone and talked to my colleagues at the Helmholtz Centre Potsdam and to Geo-Energie Suisse AG, a company focused on realising geothermal projects in Switzerland. We invited additional partners to a preliminary meeting, then we wrote a proposal and that is how the initial idea matured and became an EU project,” Stefan Wiemer recalls. DESTRESS is a large collaborative consortium that brings together science and industry on a large scale. As the focus lies much on testing and demonstrating new soft stimulation techniques at various sites, the industry assumes a strong part and communication beyond borders is quite a challenge for all of the project’s participants, as Stefan Wiemer illustrates: “When we as scientists talk about exploiting geothermal energy, we talk about induced seismicity and about risks. Industry likes to emphasise much more on the potential benefits and the costs.” Within the consortium, he and his SED communication team lead the working group “Dissemination and Communication”, ensuring that the different perceptions of operators and scientists are openly discussed and evaluated.

When we as scientists talk about exploiting geothermal energy, we talk about induced seismicity and about risks.

Based on this information, society and authorities will weight risks against benefits and ultimately decide on new technologies. Regardless of the result thereof, DESTRESS offers a great opportunity: It enables scientists and operators to apply and closely monitor soft geothermal energy harvesting technologies, which are safe,

## Stefan Wiemer

Stefan Wiemer attained a diploma in geophysics from the German Ruhr-Universität Bochum in 1992. In 1999, after his PhD at the University of Alaska Fairbanks and his postdoc studies in Tsukuba (Japan), he joined the SED as a research associate, where he set up and led two research groups. In May 2013, Stefan Wiemer was appointed Full Professor of Seismology at ETH Zurich and Director of the Swiss Seismological Service.



economically liable and sustainable. "Today, we are missing a common baseline dealing with the best possible way to approach reservoir stimulation. At the closure of this project, one can at least decide whether these technologies may work. So DESTRESS is part of the solution," Stefan Wiemer concludes.

### Managing earthquake hazard

Whatever the outcome of DESTRESS, Stefan Wiemer and his team are profiting now already from participating in this project. Three additional postdocs and one communication specialist financed by DESTRESS allow Stefan Wiemer to pursue his research and to contribute meaningfully to the project. These resources would not have been sponsored by any other funding agency in Switzerland. But the true value is beyond money, as Stefan Wiemer states. "The real worth is the cooperation with partners in Europe and Asia. It enables us to exchange views and to bring our ideas and equipment to their sites and vice versa. This hopefully will accelerate the development of novel techniques and better solutions." In future, the danger of earthquakes induced by geothermal energy projects may disappear or at least be under control. But what about the hazards of natural earthquakes? "Buildings kill people, not earthquakes," Stefan Wiemer states. "The best protection is to make our constructions more resistant. When constructing new buildings, just a small additional investment significantly enhances earthquake safety. We just have to do it!"

● Rolf Probala

Interview clip:
www.grantsaccess.ethz.ch/en/sciencestories

## HORIZON 2020

The SED has been participating in several EU projects for more than ten years. Within the framework programme Horizon 2020, it contributes to the following projects:

**DESTRESS** – Demonstration of Soft Stimulation Treatments of Geothermal Reservoirs.
Objective: To test and demonstrate soft stimulation techniques that enable building a heat exchanger in the deep underground which is environmentally friendly, safe and sustainable in the long term.
Coordinator: Helmholtz Centre Potsdam, German Research Centre for Geosciences.
http://www.destress-h2020.eu/home/

**ENVRIplus** – Environmental Research Infrastructures Providing Shared Solutions for Science and Society
Objective: To bring together Environmental and Earth System Research Infrastructures, projects and networks as well as technical specialist partners to create a more coherent, interdisciplinary and interoperable cluster of Environmental Research Infrastructures across Europe.
Coordinator: University of Helsinki, Finland.
http://www.envriplus.eu

**EPOS IP** – Implementation Phase of the European Plate Observing System
Objective: To create a pan-European infrastructure for solid Earth science to support a safe and sustainable society. EPOS will enable innovative multidisciplinary research for a better understanding of the Earth's physical and chemical processes that control earthquakes, volcanic eruptions, ground instability, tsunami, and all those processes driving tectonics and Earth's surface dynamics.
Coordinator: Istituto Nazionale di Geofisica e Vulcanologia, Italy.
https://www.epos-ip.org

# EU GrantsAccess – Public stakeholder consultation - Interim evaluation of Horizon 2020

Would you like to shape the next EU research and innovation framework programme? Participate in the public consultation for the interim evaluation of Horizon 2020 and contribute by sharing your experiences.

The closing of 2016 will see Horizon 2020 at half time. It is the most significant pan-European programme for research and innovation, running over seven years (2014 to 2020) and with an overall budget of 77 billion Euros. This impressive money supply, however, is not the only outstanding feature of the current programme. What is more, it convinces namely by promoting academic and scientific excellence and collaboration on an interdisciplinary, intersectoral and international level.

The interim evaluation of Horizon 2020 assesses the past implementation of the programme in terms of achievements, efficiency, relevance as well as the European added value of the programme, among other aspects. The results of this consultation will have an immediate influence on the work programmes 2018 to 2020 and, above all, on setting the scene for the next EU research and innovation framework programme, known provisionally as ‚FP9'.

All individuals and organisations are welcome to participate in the consultation. We would like to encourage you to share your experiences within Horizon 2020 and contribute to the consultation and therefore the future of this extraordinary research and innovation programme.

Your EU GrantsAccess Team

## Public stakeholder consultation – Interim evaluation of Horizon 2020

The questionnaire is available for download:
http://ec.europa.eu/research/consultations/interim_h2020_2016/questionnaire.pdf

All contributions to the consultation must be returned by 15 January 2017.

The European Commission will publish a summary of the consultation's results by mid-2017.

Agatha Keller (l.) and Sofia Karakostas, Co-Heads EU GrantsAccess

When it comes to participation and funding regulations, special conditions apply for Swiss partners, depending on the individual call.

EU GrantsAccess is always up to date regarding the latest information concerning Switzerland's status within Horizon 2020. We therefore encourage you to contact us if you are planning to submit a proposal or were contacted to become a partner within a consortium.

EU GrantsAccess will gladly support and guide you through the application process.

Contact: www.grantsaccess.ethz.ch

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