

# Small is beautiful

**U**rsula Röthlisberger is in a minority at the Swiss Federal Institute of Technology in Lausanne (EPFL). That she is a woman and a young scientist leading her own independent group is not unusual. Rather, what makes her stand out is that she is Swiss.

The institute in the French-speaking part of Switzerland is one of the most international universities in the world. Its staff of 3,200 scientists and technicians encompass more than 80 nationalities, and almost 60% of its 250-strong faculty are not Swiss. "I like the very young and international spirit here," says Röthlisberger, "but I also like the charming French atmosphere."

Röthlisberger, a biochemist, began her career at the IBM Zurich Research Laboratory. After postdoctoral stays at the University of Pennsylvania in Philadelphia and the Max Planck Institute of Solid State Research in Stuttgart, Germany, she had to choose between offers from the EPFL and Princeton University in New Jersey.

"Key was that the EPFL had just switched to a tenure-track system," she says. Just a few weeks ago, she was promoted to associate professor.

Together with its counterpart in Zurich (the ETHZ), the EPFL is one of the anchors of a strong Swiss science base that covers disciplines from architecture to fusion research. Both institutes are constantly listed among the top-ten European universities in all major rankings. And even if the ETHZ's output and reputation outshine those of its French-speaking sister institute, the EPFL has its unique charms.

The spacious, modern campus overlooking Lake Geneva and the towering alpine ranges at its distant French shore make for one of the most spectacular academic settings in the world. Researchers tap into this setting for inspiration for high-flying projects such as the design of the Alinghi yacht that earned a Swiss team first place in the 2003 America's Cup, and the plans for the Solar Impulse, a solar-powered ultralight aircraft that the Swiss adventurer

Switzerland is proving that small countries can make a big impression in science. It is recruiting some of the brightest young researchers from all over the world and convincing them to stay, says **Quirin Schiermeier**.



Bertrand Piccard hopes to use to circumnavigate the globe in 2007.

For Henry Markram, a South African neuroscientist formerly at the Weizmann Institute of Science in Israel, the EPFL site was ideal for a new state-of-the-art neuroscience institute. Three years ago, Markram became the founding director of the Brain Mind Institute, and encourages its researchers to take advantage of everything the campus has to offer, such as virtual reality, robot engineering and data processing.

## Rich pickings

The EPFL's commitment to strengthen life sciences and neurosciences was the decisive factor for Markram. Once all 18 groups are fully established, the institute will receive federal funds of up to SFr30 million (US\$24.5 million) per year. Other bonuses include the general research-friendliness of the Lake Geneva region, and its thrilling mix of universities, small biotech companies and large research infrastructures that attract scientists from all over the world. CERN, the world's largest particle physics laboratory in Geneva, for example, is only half an hour's drive away.

Generous salaries also help EPFL and ETHZ to attract high-profile researchers, many from top US universities. A full professor in Switzerland can earn up to SFr270,000 and an assistant professor around SFr120,000. Even a 32-year-old postdoc can expect between SFr75,000 and SFr100,000 per year.

But what many young researchers here say they appreciate most is the clear career path laid out for them. Like everywhere else, only a fraction of postdocs will find permanent positions in academia, but Switzerland is doing a lot to reduce the risk of research careers going down blind alleys.

Promoting young scientists is a goal of the Swiss National Science Foundation (SNF), Switzerland's main funding agency, which provides SFr450 million per year in individual research grants, large

## REGIONAL INDICATORS: SWITZERLAND

### Funding

Domestic R&D funding: SFr10 billion (US\$8 billion) — 2.7% of GDP  
International R&D funding: SFr250 million (including European Union funding).

Publicly funded applied research: SFr96 million.

Basic research: The Swiss National Science Foundation is the main body for the promotion of research and management training in the fundamental sciences, providing SFr450 million per year.

### Biotechnology

No. of biotech companies: 133 (ranked by number: 6 in Europe, 9 worldwide).

No. of biotech suppliers: 90

No. of clusters: 3 — Basel, Zurich, Geneva/Lausanne

### Employment

For every 1,000 employees, 14 work in research and development. Twelve colleges and universities, together with countless private-sector research facilities, form the backbone of Switzerland as a research centre, employing 50,000 people.

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collaborative grants and for strategic research projects. More than three-quarters of the budget for non-strategic research is spent on scientists under 35 years of age who, among other things, can apply for special five-year grants to bridge the time between their last postdoctoral and first permanent position.

### Brain gain

The SNF is keen for tenure-track programmes to become the main model of scientific recruiting in Switzerland. “We need to make sure that the brightest minds stay in research,” says Dieter Imboden, president of the National Research Council, which evaluates grant proposals submitted to the SNF.

In the past five years, 35 scientists have been employed at the EPFL on a tenure-track basis. “We hire someone on the assumption that he or she will succeed,” says Giorgio Margaritondo, EPFL’s vice-president for academic affairs. “In cases of failure, which we hope will be less than 25%, there is a phase-out period of one to two years.”

One selling point of the Swiss science base is the coming together of academic and industrial research, in particular in the life sciences. The Basel region, for example, hosts some of the world’s leading pharmaceutical companies, including Novartis and Roche, which support and interact with local universities and research institutes.

One such interface is the Friedrich Miescher Institute (FMI), a centre for fundamental biomedical research that is part of the global Novartis Research Foundation. In its Basel labs, 24 groups, including some 100 PhD students and 70 postdocs, explore novel areas of biology with a view to medical applications. The FMI has become an important springboard for careers in industry, but is also a training ground for Novartis’ staff researchers who need to become familiar with the latest techniques in molecular and cell biology.

In addition, the FMI offers one of the most sought-

**Swiss roles:** Thomas Schlange (top), a postdoc from Germany working at the Friedrich Miescher Institute in Basel, and Ursula Röthlisberger (above), a biochemist at the Swiss Federal Institute of Technology in Lausanne (above left).

after international PhD programmes in Switzerland. Only 20 out of 500 or so applicants each year are accepted. The few who are can look forward to a lively student culture, says Susan Gasser, director of the FMI. Students regularly organize career-guidance days and high-profile scientific seminars with some of the most outstanding scientists in the field. In January, for example, Nobel prizewinners Tim Hunt and Avram Hershko gave talks in a seminar on cell-cycle control.

But in recent years, Novartis has transferred considerable parts of its research activities to the United States. Also, the closure in 2001 of Roche’s prestigious Basel Institute of Immunology has weakened the region’s research portfolio. However, Gasser hopes that the opening in autumn of the new Center for Biosystems Science and Engineering, an institute jointly run by the ETHZ and the universities of Zurich and Basel, will compensate.

Recruitment for the new institute, sited next door to the FMI, is under way. Its researchers will use molecular imaging and advanced computational tools to develop a holistic understanding of complex biological systems. The centre is actually just one node of an emerging systems-biology network known as SystemsX. This could help to raise the country’s profile in the emerging field — especially as one of the discipline’s pioneers, Ruedi Aebersold, a Swiss native, has left the Institute for Systems Biology in Seattle, Washington, to launch it.

The University of Zurich and ETHZ are the other two nodes, but Aebersold believes the project will expand further. The EPFL, which is building up its own systems-biology institute, “will definitely be involved”, says Aebersold. And he envisages these early nodes as the nucleus of an initiative that will expand beyond Switzerland’s borders.

An international graduate programme called Molecular Life Sciences should help the vision become reality. This programme takes a similar approach to recruitment as the European Molecular Biology Laboratory — flying in candidates, matching them up with potential mentors, and interviewing them extensively before making a selection. When it begins this autumn, the programme will take ten new students every six months.

Another way to advance your career is to gain experience in both academia and industry, says Silvia Arber, a young neurobiologist employed by the FMI and Biozentrum, the life-sciences department of the University of Basel. “Many people believe that a research job in industry might be less stressful and not as competitive, but that’s a myth,” she says.

Just a one-hour train ride away, researchers at the IBM Zurich Research Laboratory have found a comfortable and well-paid niche between the two worlds. Amid the hills bordering Lake Zurich, a multinational team of scientists is developing next-generation technologies for the global IT giant, which 50 years ago chose Switzerland to host its first research lab outside the United States.

The development of the raster tunnel microscope in the 1980s by Gerd Binnig and Heinrich Rohrer catapulted the institute to world fame, becoming perhaps the most visible symbol of how a small country can make a big mark in science. Young scientists such as Röthlisberger and many others offer hope of continuing success.

**Quirin Schiermeier is Nature’s German correspondent.**

### WEB LINKS

Brain Mind Institute  
 ♦ [bmi.epfl.ch/index.html](http://bmi.epfl.ch/index.html)  
 Swiss Publication record  
 ♦ [www.in-cites.com/countries/switzerland.html](http://www.in-cites.com/countries/switzerland.html)  
 SNF  
 ♦ [www.snf.ch/default\\_en.asp](http://www.snf.ch/default_en.asp)  
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