

## SPOTLIGHT ON AUSTRIA

# Maintaining research momentum in Austria

How a decade of investment in Austrian science has bolstered the country's international standing

*"We have a unique concentration of truly world-class physicists here in Austria."*

*Rudolf Grimm, Austrian Academy of Sciences' Institute for Quantum Optics and Quantum Information.*

IN 2009, cell biologist Michael Sixt was considering his next career move as he approached the end of his term as junior group leader at a Max Planck research institute in Germany. He was applying to established research institutes in the UK and Switzerland when a colleague suggested the Institute of Science and Technology (IST) Austria. Sixt had never heard of it, but took a look anyway. Within weeks, he had withdrawn his other applications. "I wanted to go to a research institute where I could do just science, all the time," he says. "I was immediately convinced that IST Austria would offer me that freedom."

IST Austria, which is based 15km north of Vienna, had opened its laboratory just four weeks before Sixt started work in November 2010. He is now one of 18 tenure-track group leaders at the institute, and there are plans to increase the number of groups to up to 50 by 2016. Sixt's wife, evolutionary biologist Silvia Cramer, leads her own group down the hall, and their daughter

attends the institute's childcare facility. With his laboratory now firmly established, Sixt is convinced that joining IST Austria was the right decision. "This is a new place with no politics, great administration and exciting science. And because there is actually a position for everyone who is put on tenure track, there's no internal competition. It's very refreshing."

## Thoughtful investment

Sixt's experience illustrates the advantages of a decade of investment in Austrian science. As well as IST Austria, several other new research institutes have opened and high-tech industry has grown rapidly, particularly in the biotechnology and pharmaceutical sectors. National spending on research and development (R&D) has more than doubled since 2000 and this year will top €8 billion for the first time — an increase of 5% from 2010 and accounting for 2.79% of gross domestic product (GDP). Of the €8 billion, 44.6% is financed by private sector business.

"Austrian research is awakening from its beauty sleep," says Giulio Superti-Furga, director of the Austrian Academy of Sciences' Centre for Molecular Medicine (CeMM), which opened in March 2011. "Politicians have become more mindful of research innovation as an economic driving force."

## An international environment

The rest of the world has also become aware of Austria's scientific prowess. Scientists from across eastern Europe have flocked to the country since the early 1990s and

it remains an attractive destination for researchers from countries such as Serbia, the Czech Republic, Slovakia, Hungary and Slovenia, where science receives less support. Austria is also recruiting from countries with a strong research tradition, and the opportunity to help build a buzzing Austrian research community has lured several leading scientists from abroad. Three new life-science institutes created by the federally funded Austrian Academy of Sciences have all attracted external directors: Superti-Furga came from Italy to lead the CeMM; Magnus Nordberg, science director of the Gregor Mendel Institute of Molecular Plant Biology (GMI), is a Swede who moved to Vienna from the United States; and the Institute of Molecular Biotechnology Austria (IMBA) is run by Austrian Joseph Penninger, who returned home for the position after 13 years in Canada. IST Austria's president, Tom Henzinger, is also a returning Austrian. He left his homeland in 1985 to work in the United States, but more than 20 years later was enticed back to perform his current role. "This was an opportunity too exciting to turn down," he says.

Austria's institutes also provide a rich learning arena and are attracting international scientists at all levels. Of the 32 students enrolled at IST Austria's graduate school, only six are Austrian; the others represent 18 countries and the institute's working language is English. CeMM, based at Vienna General Hospital, also maintains a balance of Austrian and international scientists, which helps to overcome language





# Ce-M-M-

## The New Center for Molecular Medicine in Vienna

of the Austrian Academy of Sciences • in a new building with a landmark art facade by artist Peter Kogler • in the center of Vienna's General Hospital and Medical University Campus • integrates basic research and clinical expertise to pursue innovative diagnostic and therapeutic approaches • 14 faculty with average age 36 years, 120 people, 31 nationalities, mix PhDs/MDs, top SAB, English language • inclusive, open culture • state-of-the-art infrastructure • works towards predictive, preventive and patient-oriented medicine of the 21st century • cancer, inflammation, immune disorders • systems biology, functional genomics and proteomics, high-throughput genetics and epigenetics, mechanisms of action of drugs, infection models • stream of highly-cited papers • international PhD/postdoc/PI mentoring programs • conferences, lectures, science & art

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barriers between researchers, medical staff and patients during clinical research projects. And a recent recruitment round at the University of Vienna led to the appointment of 60 new professors, of whom only around 10% are Austrian. Heinz Engl, the university's vice-rector for research and career development, says the university is minimizing potential obstacles to international researchers: "We don't require academics to speak German before they come, and we have support programmes to help them integrate."

### A cluster of innovation

GMI and IMBA are located at Campus Vienna Biocenter, a life-sciences cluster in central Vienna that hosts around 1,400 scientists. The campus grew up around the Institute for Molecular Pathology (IMP), a basic-science research hub of biotechnology company Boehringer Ingelheim, which first put Vienna on the biomedical map 25 years ago. "The government modelled many elements of their new institutes on the IMP, and now there is a great critical mass of science on the campus," says IMP director Barry Dickson.

The campus is also home to 10 science-based companies, including the bioscience research arm of pharmaceutical giant Baxter. The company employs more than 3,900 people in Austria, including more than 900 scientists, making it one of the country's biggest employers. Researchers in the bioscience division lead Baxter's push into vaccine development; their first product, an influenza vaccine, was approved for use in September 2010.

In 2010, the Austrian Ministry of Science and Research announced a €56-million joint initiative with Vienna's city council to improve core facilities at the campus, including imaging, next-generation sequencing and one of the world's largest transgenic *Drosophila* libraries. The funding will also support the Vienna Open Lab — an interactive life-sciences laboratory for the general public.

The molecular-biology focused Max F. Perutz Laboratories (MFPL) — a joint initiative of the University of Vienna and the Medical University of Vienna — is

also located at Campus Vienna Biocenter. "The most important shared resource on the campus is the central cafeteria," jokes Alwin Köhler, a tenure-track group leader at the MFPL. It's a reference to a key advantage of the campus: an open and informal atmosphere that is highly conducive to forming novel collaborations.

### Networks inside and out

As well as clustering researchers together, Austria is building virtual networks, an approach that has received an enthusiastic response. "IST Austria's recruits have been swamped by existing Austrian researchers looking to establish collaborations," says Henzinger. An initial development from such collaboration has been the RiSE (Rigorous Systems Engineering) network, funded by national science agency the Austrian Science Fund, which brings together computer scientists from five institutes in Salzburg, Linz, Graz and Vienna. Another example of a virtual network is the Ludwig Boltzmann Cluster for Translational Oncology, a research partnership between four hospitals in Vienna that investigates minimal residue disease — a condition that arises when small numbers of cancerous cells survive apparently successful treatment, sometimes leading to relapse.

Austrian research networks go well beyond the country's borders. At the International Institute for Applied Systems Analysis (IIASA), based near Vienna, mathematicians, engineers, social scientists, economists and life scientists from more than 40 countries collaborate on policy-related research into global issues such as population aging, energy security and climate change. IIASA is sponsored by member organizations in 19 countries across Africa, Asia, Europe and North and South America, including national academies and research councils, and it receives funding from international organizations such as the United Nations and the World Bank.

### Maintaining momentum

Austria is currently ranked seventh in the European Commission's Innovation Union Scoreboard and the government wants to boost the



The Institute for Molecular Pathology (IMP) was the first member of the Campus Vienna Biocenter, a cluster of life-sciences institutions in Vienna.

country's rating from 'Innovation Follower' to 'Innovation Leader' — a label which currently only applies to Denmark, Finland,

Germany and Sweden. The science and research minister Karlheinz Töchterle said this year that the government's aim is to increase



The Max F. Perutz Laboratories ([www.mfpl.ac.at](http://www.mfpl.ac.at)) are seeking to hire a faculty member in each of the above-mentioned areas. **PREFERENCE** will be given to candidates who are already running their own group, and so will have experience of raising third party funding, mentoring and teaching students. These positions are tenure track and come with a generous start-up package.

**APPLICATIONS** should include a CV, a brief summary of past research and future plans, up to three representative publications, and the contact addresses of three referees. The area should be indicated in the cover letter. Please email your application (preferably as a single PDF) to [facultyopenings@mfpl.ac.at](mailto:facultyopenings@mfpl.ac.at), c/o Graham Warren. Closing date for applications is the 25<sup>th</sup> September, 2011.

MFPL is part of the Vienna Biocenter Campus, a center for world-class research. Successful applicants will have access to PhDs and PostDocs through several highly successful International PhD Programs and the Vienna International Postdoctoral Program (VIPS).

MFPL wishes to increase its share of female researchers and we explicitly encourage women to apply for these faculty positions. The campus hosts an international kindergarten and applications from couples are encouraged. The working language of the Institute is English.



MFPL is a joint venture of



investment in basic research to the expenditure level of leading research nations by 2020.

The academic sector's contribution to basic research will be limited by constraints in the funding environment. "Spending on universities hasn't increased since 2008," says Christoph Kratky, president of the Austrian Science Fund. Engl of University of Vienna says that the flat funding, combined with burgeoning student enrolments, will reduce the university's budget by 10% in real terms. The Austrian government hopes that further expansion in basic research will be driven by even greater investment from business. There are early indicators that this could be the case: business R&D funding is predicted to grow by 6% in 2011. To encourage business investment, service companies such as Techkonnex offer economic analysis of new technologies and can act as a conduit between scientists in the private and public sector.

Spending may increase further when companies who benefited from start-up funding in the 2000s start bringing their products to market. Lexogen, a biotechnology firm based at Campus Vienna Biocenter, is launching its transcriptomics platform, SQUARE (Selective Quantitative Amplification of RNA), at the end of 2011. The first pharmaceutical candidate of Zytotec, a spin-off company from the Medical University of Vienna, entered clinical trials in February 2011. "Our product is global, but Austria was the right place for us to build it," says Lexogen chief executive Alexander Seitz. "If you have a good project, you will find funding to start it in Austria."

#### Attracting investment

The Austrian government is also planning to increase the proportion of R&D spending that comes from international funding sources, which currently stands at 16% of the total expenditure. Rudolf >>



The Austrian Academy of Sciences' Centre for Molecular Medicine (CeMM) in central Vienna maintains a balance of Austrian and international scientists.



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MAX F. PERUTZ  
LABORATORIES



City of Vienna

MOLECULES AND MECHANISMS  
IN THE LIFE SCIENCES

Institute	Number of European Research Council (ERC) grants*
University of Vienna	11 (+2)
Technical University of Vienna	4 (+1)
University of Innsbruck	4
Research Institute of Molecular Pathology	3
Institute of Science and Technology Austria (IST Austria)	3 (+1)
Austrian Academy of Sciences	9 (-1)
International Institute for Applied Systems Analysis (IIASA)	2
Innsbruck Medical University	2
Medical University of Vienna	1
Austrian Archaeological Institute	1
University of Natural Resources and Life Sciences, Vienna	1
University of Graz	1
University of Klagenfurt	1
University of Veterinary Medicine Vienna	1
University of Linz	1 (+1)

\* Number of advanced and starting grants as of February 2011

Numbers in brackets are projects that have moved into or out of an institute during the grant application process.

Source: European Commission; collated by PROVISIO

Grimm, co-director of the Austrian Academy of Sciences' Institute for Quantum Optics and Quantum Information, which has bases in Innsbruck and Vienna, says that Austria's domestic funding agencies all require international referees, which ensures research is of high quality and well placed to compete for external funding. "We have a unique concentration of truly world-class physicists here in Austria," he says.

In February 2011, Austrian research institutes had 49 European Research Council (ERC) grants (see table), and between 2007 and 2010 they received more ERC grants per population head than those in Germany and France. Innovative strategies are being introduced to keep the funding flowing in. A third of the government's funding pledge for IST Austria between 2010 and 2016 (€95 million) comes with the proviso that it is matched by third-party funds generated by institute scientists. At the

University of Vienna, an internal funding scheme is based around cross-faculty 'research platforms' that combine disciplines to improve their funding prospects. A platform for cognitive science, for example, includes academics from computer science, psychology and even art history. "We aim to fund a smaller number of very high-quality projects well, to give them a real chance to compete at an international level," says Engl.

From this sound foundation, the outlook for Austrian research is bright. Scientists say they hope the close dialogue they have had with the government during these fruitful decades will continue. "Austria is small, so there are fewer layers of bureaucracy, and many scientists have direct connections with politicians," says Köhler from the MFPL. "If you can bump into the science minister in one of Vienna's famous coffee houses and talk about your science, it really helps." ■  
*Nature editorial staff have no responsibility for content*

## A Very Brief History of the Institute of Science and Technology Austria

**IST AUSTRIA**  
Institute of Science and Technology

**2007** Approval of € 400+ m public funds for first decade

**2006** Decision to establish IST as independent research institute on basic science

**2009** Campus opening; start of theoretical research

**2008** Development of 18 ha campus in the Vienna Woods

**2011** 18 professors; 8 ERC Grants\*; scientists from 30 countries

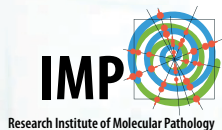
**2010** Start of PhD program; start of experimental research

**2016** Up to 50 professors; up to 500 scientists

Applications for Professors, Assistant Professors, Postdocs and PhD Students are welcome. To learn more: [www.ist.ac.at](http://www.ist.ac.at)

\*) August 2011

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## Group Leader Position at the IMP

We invite applications for a group leader position at the Research Institute of Molecular Pathology (IMP).

The IMP is one of the world's leading basic biomedical research institutes, located in the thriving and interdisciplinary Vienna Biocenter Campus (VBC). Researchers at the IMP conduct curiosity-driven research across a wide range of topics, broadly organised into 4 thematic areas: molecular and cell biology, differentiation and disease, circuit neuroscience, and computation and bioengineering.

We aim to recruit a group leader with a strong and innovative research programme in any of these or related areas.

Group leader positions are fully independent positions similar to assistant professorships. The IMP offers internationally competitive salaries and generous funds for student, postdoc and technician positions, investments and running costs. Research groups enjoy full access to state-of-the-art core services including mass spectrometry and proteomics, Sanger and next generation sequencing, biooptics, bioinformatics, histology, electron microscopy, and a 2000m<sup>2</sup> mouse house with core funding of all associated costs.

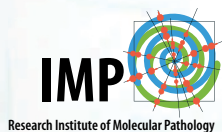
The IMP participates in the VBC International PhD programme and VBC summer school, which are amongst the most competitive graduate and undergraduate research programmes in Europe.

**Applications, including a CV, a summary of research achievements and future research plans, and the contact details for 3 referees, should be submitted to [robinson@imp.ac.at](mailto:robinson@imp.ac.at) by October 31, 2011.**

The IMP is home to scientists from over 30 different nationalities. Vienna offers a lively multicultural environment with high living standards, consistently ranking in the top 5 cities worldwide for the quality of living. Child care facilities are available on campus.

**For further information, see our website:**

**[www.imp.ac.at](http://www.imp.ac.at)**



## PhD and Postdoc Positions at the IMP

The Research Institute of Molecular Pathology (IMP) invites applications for research positions at the graduate and postdoctoral levels.

The IMP offers an outstanding scientific and cultural environment. Sixteen independent research groups conduct interdisciplinary research across a broad range of topics in the life sciences, seeking to elucidate the fundamental operating principles of biological systems from the molecular to the organismal levels. Our 200 scientists come from 38 different countries, yet all share a passion for scientific discovery and the excitement of conducting biological research at the highest level. Structured training programmes provide students and postdocs with the diverse knowledge base and skill set needed to pursue a successful independent career in scientific research. English is the working language throughout the institute. Child-care facilities are available.

Research at the IMP is focused in 4 broadly-defined themes: molecular and cell biology, differentiation and disease, circuit neuroscience, and computation and bioengineering. The research groups in each of these areas are:

### Molecular and cell biology

Tim Clausen | Protein quality control  
 Carrie Cowan | Cell polarity  
 Thomas Marlovits | Molecular machines  
 Jan-Michael Peters | Mitosis and chromosome biology  
 Stefan Westermann | Kinetochore function

### Differentiation and disease

Meinrad Busslinger | Hematopoiesis  
 Johannes Zuber | Cancer drug target discovery  
 David Keays | Neuronal migration

### Circuit neuroscience

Barry Dickson | Neural circuits in *Drosophila*  
 Wulf Haubensak | Neural circuits for emotions  
 Krystyna Keleman | Learning and memory in *Drosophila*  
 Simon Rumpel | Circuit mechanisms of memory formation  
 Andrew Straw | Visual guidance of locomotion  
 Manuel Zimmer | Chemosensory circuits in *C. elegans*

### Computation and Bioengineering

Alex Stark | Regulatory genomics  
 Alipasha Vaziri | Quantum biology and optogenetics

See [www.imp.ac.at](http://www.imp.ac.at) for further information on the IMP and research interests of each group.

Enquiries regarding postdoctoral positions should be addressed directly to the group leader of interest. Applications for PhD positions should be made through the Vienna Biocenter International PhD Programme ([www.imp.ac.at/students/international-phd-programme](http://www.imp.ac.at/students/international-phd-programme)).

The next deadline for PhD applications is November 15, 2011.



The Vienna Center for Quantum Science and Technology (VCQ) invites applications for the

## Vienna Quantum Fellowships

These newly established Fellowships in Experimental or Theoretical Quantum Science will be awarded both on the PhD- and the postdoc-level on the basis of an international competition. The appointments are for a three-year duration. Postdoctoral Fellowships carry a competitive annual salary, and offer an annual research expense fund. PhD Fellowships will participate in the Vienna graduate program CoQuS.

The Vienna Quantum Fellowship program has been established with the support from the Austrian Ministry of Science and Research to offer young scientists the best possible opportunity to develop their talents in the environment of the Vienna Center for Quantum Science and Technology (VCQ).

The VCQ faculty provides a broad variety of research opportunities in the areas of Experimental and Theoretical Quantum Science (see <http://vcq.quantum.at>):

- Matter-wave interferometry and quantum atom optics
- Micro- and nanoscale quantum optics and quantum optomechanics
- Microoptics and novel quantum states of light
- Cold atoms and degenerate quantum gases
- Many-body quantum physics and quantum simulations
- Entanglement-based quantum communication on Earth and via satellites
- Quantum information and foundations of physics

Application material should be sent to [vcq@quantum.at](mailto:vcq@quantum.at)

Copies of the curriculum vitae with email address, publications list and statement of research interests are required. The application should be accompanied by at least two letters of recommendation.

Additional information can be obtained from <http://vcq.quantum.at/fellowships>

Deadline for the application is **December 1, 2011**. Fellowship candidates will automatically be considered for other available postdoctoral positions in their fields of interest.



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# LEXOGEN

Lexogen is a biotechnology start-up based in Vienna, Austria, that is developing powerful proprietary technologies for transcriptome research. Lexogen employs 25 scientists and staff. For more information see [www.lexogen.com](http://www.lexogen.com).

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