Career strategies for young European scientists (XX)

Forza Italia!

Italy is world-famous for its rich art, history, culture, cuisine and fashion. Forty million tourists a year highly appreciate the Italian life style. But is Italy also an attractive destination for the international researcher? Are foreign scientists as welcome as foreign soccer players or Formula One drivers?

Governmental budget cuts, hiring freezes as well as an estimated 6,000 Italian scientists abandoning their home country each year are no good publicity. Ongoing reforms introducing, to some extent, performance-related research funding, merit-based salary bonuses as well as transparent evaluation and recruitment procedures may improve the overall situation but are not accompanied by additional monetary flows. Here, *Lab Times* reports on the latest developments in Italy and also introduces a few exceptional biomedical research institutes.

Italian Inventory

With 60 million citizens, Italy is the fourth largest economy in Europe. It is divided into 20 regions, which, alongside national policies, adopt their own policies for science and research. However, governance structures such as regional research councils do not yet exist. Research activities in Italy are mainly concentrated in the Northern regions of Lombardy (capital Milan) and Piedmont (capital Turin) as well as in Lazio's capital, Rome. The Italian expenditure on Research and Development is 1.1% of the gross domestic product, which is below the European average of 1.8%. Also, the contribution of the industrial sector to these costs is quite low at 40%.

Research cooperation between the private and public sectors is scarce. To counteract these developments 24 Technological Districts have been established throughout Italy with a total investment of €370 million. An additional effort to foster collaboration has been initiated with the INDUSTRIA 2015 programme. Further money to boost innovation comes from Europe's structural and cohesion funds. A figure of €29 billion for the period 2007-2013 makes Italy the third largest beneficiary after Poland and Spain. About one-third of the money is for research and innovation. The less developed regions in the South, namely Campania, Puglia, Calabria, Basilicata and Sicily will receive the lion's share.

In comparison to other major European countries, Italy employs only half as many researchers in relation to its population size. With 90% hired in permanent tenured positions, it has the highest rate of scientists with permanent contracts. Italian scientists are also quite productive. According to SCIMAGO, Italy is the eighth leading nation worldwide when it comes to total number of publications. In several subject categories, including ageing, cancer research, endocrinology, molecular medicine, cardiology and certain areas of neuroscience, Italy is among the top five. It is, however, less successful when it comes to patenting: it has the lowest number of patents per capita among the G7 countries.

Despite the financial crisis the biotech sector in Italy is still growing. At the end of 2008, there were more than 250 biotech companies in Italy, about three-quarters focusing on health topics. Multinational companies rarely consider Italy as a place to set up new subsidiaries. This may be due to long waits for drug approvals and lack of support and venture capital for novel companies. To strengthen activities in the biotech and biomedical sector, the Ri.MED Foundation was recently established by the Italian Council of Ministers. Ri.MED Partners are Sicily, the Italian National Research Council and the University of Pittsburgh Medi-

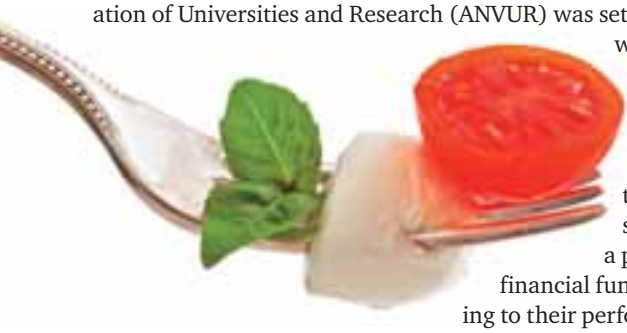
cal Center. Ri.MED is focused on biotech and biomedical research projects aimed at quickly transforming findings into clinical practice. It will establish a novel Center for Biomedical Research and Biotechnologies in Palermo, which is scheduled to open in 2014 with about 600 employees.

Italian Research System

National research priorities are laid down in multi-annual research programmes. A key feature of the Italian research system is the prevalent role of public funding. Two ministries are primarily handling research and funding activities. The Ministry of Education, University and Research (MIUR) coordinates national and international research activities and distributes funds to universities and 15 large research agencies. The Ministry for Economic Development takes care of industrial innovation policies. Other ministries, such as the Ministry of Health, are in charge of non-university public research institutes under their control.

Funding instruments of MIUR include the Ordinary Fund for Higher Education, which covers expenditures for teaching and research at universities, and the Ordinary Fund for R&D, which provides core funding of public non-university institutes. Project funding is realised by several programmes including COFIN, the fund for co-financing of research activities at universities, FIRB, the basic research investment fund, or FRA, the fund for applied research. The budget for all instruments is established each year by financial law. In 2008, MIUR's overall budget was close to €6 billion.

In the last two years, a couple of highly disputed reforms and laws have been approved, bringing about a major impact on the Italian system. For example, the National Agency for the Evaluation of Universities and Research (ANVUR) was set up. ANVUR will evaluate universities and research organisations. In future, they shall receive a part of their financial funds according to their performance. Law 1/2009 modified the rules for recruitments at universities where, in the past, local candidates have been preferentially recruited by effecting non-transparent selection processes. The same law also foresees that scientists receive a bonus on top of their salaries in reward for productivity. Within the reform package there is also a clause reserving a certain amount of budget specifically for the recruitment of young researchers at the beginning of their career.



In the following, two larger governmental agencies with relevance for biomedical researchers will be introduced in more detail. The National Research Council (CNR) is the largest Italian public research institution. Major tasks are research, coordination, training, promotion, internationalisation and governmental advice. The CNR was founded in 1923 and is organised into 11 departments, e.g. Life Sciences, Medicine or Molecular Design. Each department has its own research strategy. The CNR operates its own 108 autonomous institutes. They are mainly financed by the Government; in 2007 this amounted to €550 million in 2007. An additional €300 million are provided by local authorities, international sources or are revenues from contract research. Research is planned in three-year intervals and funding is provided for three major activities: curiosity-driven research, development of new research capabilities and collaborative research projects on pre-defined national strategic themes. About 3,000 of the 8,000 people directly employed at the CNR are scientists. Career stages at CNR are Researcher (riceratore), First Researcher (primo riceratore) and Director of Research (dirigente di ricerca). New researchers often get only temporary contracts and many tenured researchers are currently not promoted. A short-term mobility programme is in place for scientists from CNR institutes to go abroad as well as for foreign researchers to work for a couple of days at a CNR institute. Exchange of scientists is also possible within keeping of bilateral agreements with a couple of foreign countries. The CNR plans to extend its future efforts in the Monterotondo area near Rome by realising a novel Biosciences Centre, which will be set up together with the Lazio region and help from the energy company, ENI.

The Italian Institute of Technology (IIT) was established as a private foundation by MIUR and the Ministry of Economy and Finance. Its three-year start-up phase ended in 2008. Its mission is to promote excellent basic as well as applied research. Governmental funding is close to €100 million. Research is performed in seven departments including Drug Discovery, Neurosciences and Advanced Robotics. The Central Research Lab with 450 employees is in Genoa. Nine additional institutes are located in Milan, Turin, Pisa, Trento, Parma, Naples and Lecce. The principles of IIT organisation are autonomy of research, operational flexibility, and constant and independent evaluation. The Scientific Technical Committee is the evaluation and advice body. It consists of international scientists and representatives from industry. Current members include the Nobel Laureates Robert Horvitz from MIT and Paul Greengard from Rockefeller University.

According to Roberto Cingolani, the Scientific Director of IIT, they currently have 300 scientists at the PhD student/fellowship/postdoc level. About one-third is foreigners from 38 different countries, another third is Italians returning from abroad. Within the next 18 months 200 open positions will be filled, 50% for life scientists. Scientists are hired through international calls and receive start-up money for three years. A fifth of their income is performance-dependent. Positions are initially for five years and renewable. A tenure track model is envisaged for the future.

Higher Education

Universities have a long tradition in Italy. The University of Bologna, founded in 1088, claims to be the oldest degree-granting European university in continuous operation. Additional universities were established in Padua, Naples and Siena in the 13th century. Nowadays, there are about 85 universities in Italy, of which three quarters are public. More than 80% of the money spent on research and innovation by the Italian Government ends up in the university system. Teaching and research activities ▶▶

Internet Resources

- Mobility Portal Italy – *www.euraxess.it*
- Research in Italy – *www.ricercaitaliana.it*
- Ministry for Education, University and Research – *www.miur.it*
- Italian Research Council – *www.cnr.it*
- Telethon Foundation – *www.telethon.it*

▸▸ are financed by FFO, the Ordinary Fund for Research, currently providing about €7 billion. In 2008, the Government announced a stepwise budget cut, which should reduce the FFO by €1.5 billion by 2013.

About 1.8 million students are enrolled in the university system. Italy's share of foreign students is relatively small and accounts for less than 2% of all students worldwide enrolled at a university outside their country of citizenship. In 2007, the personnel at universities included more than 60,000 positions filled by researchers and associate (professore associato) or full professors (professore ordinario). Progression along the career ladder is still not meritocratic. The Italian academia is quite a closed system with full professors sometimes referred to as "Mafia of Barons".

In the recent THE - QS World University Rankings, four Italian universities made it into the top 300 in the subject ranking "Biomedicine and Life Sciences": the University of Bologna at rank 142, followed by the University of Padua at 191, the Sapienza University of Rome at 229 and the University of Pisa at 249. A 2008 survey on the overall quality of the university system by the Lisbon Council for Economic Competitiveness and Social Renewal, revealed that Italy is only middle-class. Weak points mentioned were the very slow implementation of Bologna measures and the lacking attractiveness for foreign students. Additional evaluations carried out primarily by Italian bodies revealed that the preferential recruitment of local scientists and the in-ability to reform syllabuses are major drawbacks of the Italian system. Recommendations made include the creation of graduate schools to improve the quality of doctoral courses and the participation in European research initiatives to enhance internationalisation.

Biomedical Research at its Best

Italy hosts several outstanding research institutions in life sciences and biomedicine. Just to name a few: the European Institute of Oncology and the San Raffaele Institute in Milan, the Venetian Institute of Molecular Medicine in Padua, the Telethon Institute of Genetics and Medicine in Naples, and the EMBL outstation in Monterotondo. You may be able to find a few open positions on their web sites. Otherwise, I suggest you take up direct contact with the lab head or institute's director of your choice and find out if there are some mutual interests. If no Italian money is available, but you are still interested in working there, try to

Interview I: Marie-Louise Bang, Denmark

"Italian Is Crucial For Your Integration"

After receiving a chemical engineering degree in Denmark, **Marie-Louise Bang** joined the group of Siegfried Labeit at the EMBL in Heidelberg to do her doctorate. She spent six years as postdoc in San Diego in the labs of Kenneth Chien and Ju Chen, supported by fellowships from the Danish National Research Council and the American Heart Association. In April 2008 she became Assistant Telethon Scientist at the Institute for Biomedical Technologies (ITB) of the National Research Council (CNR) in Milan but also has a contract with the private hospital MultiMedica. Marie-Louise is working on neuromuscular disorders.

Why did you choose the ITB?

Bang: After more than five years in the US I wanted to return to Europe. In San Diego I got acquainted with Gianluigi Condorelli, the Director of the Department of Medicine at the CNR. He was setting up an international group focusing on cardiac research in collaboration with the private MultiMedica hospital, a centre of excellence for cardiovascular research. I accepted his offer to start my own independent lab.

How are you funded?

Bang: A few months after moving to Italy, I was fortunate to receive a Telethon career grant, which gives me an appointment as Assistant Telethon Scientist. The grant includes my salary, which is above the average in Italy, as well as a research grant for five years. Subsequently, I might get promoted to Associate Scientist for another five years with an increase in salary and research grant. In addition, I have obtained funding from the Caripolo Foundation and the Italian Ministry of Health.

How strong is the competition for the Telethon grant?

Bang: One has to write a traditional grant application, which is peer-reviewed. In addition, you need a strong letter of support from your host institution stating that you will perform independent research. After the initial review, a Telethon representative makes a site visit to your institution. Thereafter, short-listed candidates are interviewed by the scientific board. When I applied, there were two open positions but I do not know the number of applicants.

Why is the number of foreign Telethon Scientists quite low?

Bang: I do not think that Italians are favoured. However, since not many foreign scientists consider Italy very few of them apply or are aware of this programme.

Do you feel integrated?

Bang: There are many nice and charming aspects of Italy. I was cordially received by the scientific community. Socially, the Italians are very open and friendly. However, it was not easy to move to Italy. First of all, the bureaucracy is a big problem. Many administrators do not speak English, so I was very dependent on help from my colleagues in the beginning. Even now, with the lab in operation, we continue to have difficulties with ordering and unnecessary bureaucracy. Thus, learning Italian is absolutely crucial for your full integration. As my Italian is improving, I feel better integrated both socially and in regard to handling practical matters.

"Socially, the Italians are very open and friendly."

How is the current spirit of Italian researchers?

Bang: The salaries for researchers are unreasonably low and I often hear that the funding situation is difficult. But as long as you produce good results and publish well, I think it is possible to get funding.

Italy has a long tradition of lending a helping hand...

get an international fellowship or grant that suits your needs and may also pay more.

▸ ***IFOM-IEO***

If you are interested in oncology you may know the IFOM-IEO campus in Milan, a place that claims to be the largest European pole in this area of research. The campus opened just three years ago with state-of-the-art support facilities providing lab space for the FIRC Institute of Molecular Oncology Foundation (IFOM), the European Institute of Oncology (IEO), the European School of Molecular Medicine (SEMM) and several biotech companies. Altogether, the campus is home to 40 research groups with 500 scientists, one-third being of non-Italian origin. IFOM addresses molecular mechanisms underlying tumour formation. IFOM was inaugurated in 2003 and nowadays has about 300 scientists. By cooperative agreements it provides lab space for several other institutions from Milan and beyond. The European Institute of Oncology (IEO) is an independent, non-profit biomedical research institution. It is one of the eight Italian comprehensive cancer centres providing patient care and performing oncology research from basic research to clinical trials.

▸ ***SEMM***

The European School of Molecular Medicine was established in 2001 as a private foundation for higher education in biomedicine. Major supporters of SEMM are the Italian Ministry of Health and the Umberto Veronesi Foundation. SEMM promotes research and training within emerging fields of biomedicine with three PhD programmes: Molecular Medicine, Medical Nanotechnology and Foundations and Ethics of Life Sciences. About 120 students are enrolled in these programmes, a fifth being from abroad. The SIPOD postdoc programme is co-funded by funds from the European Commission within the scope of the Marie-Curie People programme. SIPOD stands for Structured International Postdoc Programme. It offers two-year renewable stipends - also open to foreign scientists. There are two calls per year. Applicants may apply within four years of obtaining a doctorate and after contacting a group leader offering a fellowship. Short-listed candidates are invited to an interview. Sixteen fellowships were offered in summer 2009. The next call will be published early this year.

▸ ***TIGEM***

The Telethon Institute of Genetics and Medicine (TIGEM) was established in 1994 by one of the major non-profit organisations of Italy, the Telethon foundation. It is located in Naples and hosted by the Italian National Research Council in a complex together with two other CNR institutes, the Institute of Genetics and Biophysics and the Institute of Protein Biochemistry. TIGEM is a smaller institute with 13 independent research groups and about 170 employees in total. It focuses on genetic principles underlying human diseases and on novel ways of disease therapy and prevention. Research is performed in four areas: developmental disorders, inherited eye diseases, inborn errors of metabolism, and functional genomics and systems biology. Funds provided by Telethon cover running and research costs in five-year cycles. As part of 13 consortia, five of which it manages alone, TIGEM plays a leading role in mouse genomics projects funded by the European Union.

TIGEM offers several training opportunities for doctoral students and postdocs. These include participation in two international programmes: the Open University - OU, and the European School of Molecular Medicine - SEMM at the University of Naples. A novel initiative is the Biology for Medicine (BioforMe) Foundation, a joint venture between Telethon, CNR and regional funds of Campania. BioforMe wants to accelerate the transition from basic discoveries into clinical applications.

▸ ***EMBL***

If you are into mouse genetics and interested in molecular mechanisms of human diseases in mice, the EMBL Mouse Bio- ▸▸

Careers in Italy

Interview II: Annemarie Wehenkel, Luxembourg

"You Should Learn To Relax"

Annemarie Wehenkel was born in Luxembourg. She received a Bachelor degree in Biochemistry at the University of Edinburgh, a Master's degree from the University Paris VI and a doctorate in Structural Biology for work at the Institute Pasteur. In 2008, she started as postdoc in the Mussachio lab at the European Institute of Oncology (IEO) in Milan, financed by EMBO and Marie Curie fellowships. Annemarie is working on structure-function relationships of protein complexes involved in mitosis.

Why did you choose the IEO?

Wehenkel: The lab at the IEO provided exactly the scientific environment I was looking for. Moreover, the IEO is a very well funded institute.

Do you already feel integrated?

Wehenkel: The scientific integration was quite fast and easy as well as the social life within the lab context. I still do not speak fluent Italian, although I understand more or less everything. This is, in part, due to the fact that the working language is English. The social life is centred on work, so you are not confronted much with the native language. In fact, the science here is much the same as in the places I have been previously. Sometimes there seems to be a lack of discipline, which might reflect a more general attitude towards life in Italy.

"For science, it is like any other place."

Are there special measurements for the integration of foreign scientists at the IEO?

Wehenkel: Not really, but as there are quite a few foreigners at the campus, it is easy to get advice and help.

How is the current spirit of younger Italian researchers?

Wehenkel: Quite downbeat. In general, when we talk about career perspectives they tell you that there are none.

What is your current feeling about work and life in Italy?

Wehenkel: For science, it is like any other place. For life, you have to be willing to struggle a bit with the Italian system. This is true, especially for non-EU scientists. The administration can be very unpleasant and sometimes reveals a greater challenge than most of the scientific experiments we do. But once you get over the initial hurdles and learn to relax, you will enjoy the Italian way of life, the weather, the food and the people. Not to mention the great escapes you can enjoy away from the lab on the weekends!

▸▸ logy Unit in Monterotondo is one of the best places to be. The EMBL outstation is located close to Rome and has just celebrated its 10th anniversary. It shares the campus with the Institute of Cell Biology and the International Centre for Genetic Engineering and Biotechnology as well as the European mouse mutant archive EMMA. Still geared up for expansion, it currently hosts six research groups with about 80 employees. It provides a couple of excellent core facilities and services, which are extensively used by the EMBL community and cooperating Italian institutions. Highly competitive fellowships are offered by the EMBL International PhD Programme or the Postdoc Programme. A quite recent activity is EIPOD, the EMBL Interdisciplinary Postdoc initiative, in which your project has to be supported by two labs from different EMBL research units. Twenty fellowships were announced in the 2009 call. The EMBL visitor programme also offers PhD students and postdocs the opportunity to work there for a limited period.

▸ ***San Raffaele Institute***

The motto of the San Raffaele Scientific Institute (SRSI) in Milan is "Science for Life". Since its establishment as a fully independent private hospital by the San Raffaele del Monte Tabor Foundation in 1971, it has made rapid progress and expanded all its activities in clinical care, biomedical research and teaching. It is part of the Science Park Raf, the largest science park in Italy. An investment of €125 million recently almost doubled the park space for fundamental and industrial biomedical research. This will allow the further expansion of the SRSI as well as parts of the Vita-Salute San Raffaele University. Currently, about 660 scientists and technicians are working on campus, with an additional 670 physicians pursuing clinical research projects. SRSI PhD students may participate either in an international PhD programme in Cellular and Molecular Biology or in the International Graduate School in Molecular Medicine. Within the SRSI, three major research institutes continue to operate: the San Raffaele Telethon Institute for Gene Therapy of Genetic Diseases, the Institute for Experimental Neurology and the Diabetes Research Institute.

Foundations

There are more than 4,700 Italian foundations, which act locally, nationwide or internationally. It is beyond the scope of this article to give a systematic overview on the Italian foundation system. As in other countries, there are many foundations, in particular in the biomedical field, providing research grants and fellowships. Unfortunately, many Italian foundations do not have an English homepage. Three prominent foundations are covered below.

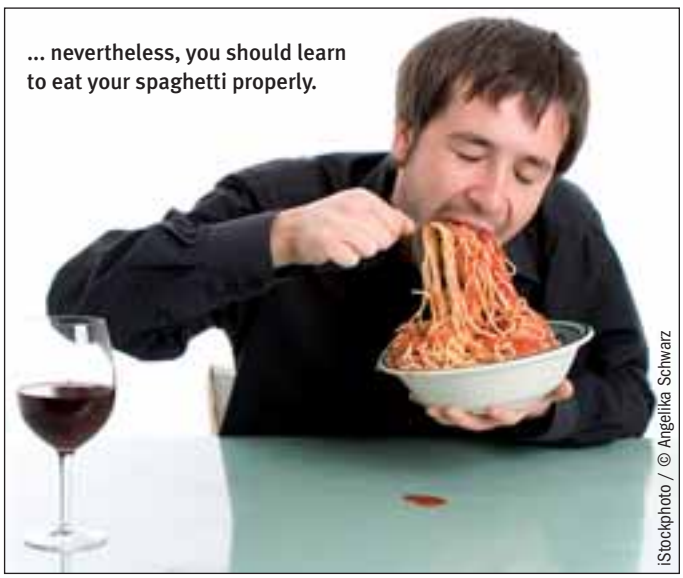
▸ ***Caripolo Foundation***

The Caripolo Foundation is one of 90 Italian banking foundations. The foundation approves about 1,000 projects and spends €200 million each year, thereof roughly 20% for scientif-

ic research. The foundation is primarily active in Northern Italy. Grants are provided to private or public research organisations and not to individuals. The foundation also funds programmes attracting foreign postgraduates to Italy. In addition, there is a special programme to recruit international scientists in the areas of material science, non-medical biotechnology and regenerative medicine. Biomedical basic research is supported by three funding lines: research grants, financing of equipment in the "Project Nobel" and research projects in the "Vaccine" programme.

▸ ***AIRC***

Another major research funder is the Italian Association for Cancer Research (AIRC), which was established at the Istituto Tumori in Milan in 1965. The AIRC has expanded into 17 regional committees and two million supporting members. AIRC raises funds and gives out grants for cancer research. AIRC also set up the independent cancer research foundation FIRC, which complements its activities. For research and study grants, AIRC and FIRC spent more than €55 million last year, which accounts for 40% of Italy's research effort to combat cancer. The AIRC's Scientific



... nevertheless, you should learn to eat your spaghetti properly.

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Committee makes recommendations for allocating funds and is made up of 24 rotating oncology experts from Italy supported by more than 250 European and American reviewers.

▸ ***Telethon Foundation***

Telethon Italy is one of the largest biomedical non-for-profit foundations in Italy. It was established in 1990 by the Italian's Union for Muscular Dystrophy. Nowadays, it focuses on genetic diseases in general. Income depends on private donations, reaching €33 million in 2009. About 40% of the funds are used to run three institutes: TIGEM at Naples, the San Raffaele-Telethon Institute for Gene Therapy in Milan and the Dulbecco Telethon Institute. Another 40% is used for financing competitive research grants and services. Integration of outstanding scientists without a permanent position into the Italian academic system is the aim of the virtual Dulbecco Telethon Institute (DTI). It is named after Renato Dulbecco, the first sponsor of the programme. The current 25 DTI investigators are called Dulbecco-Telethon Scientists. They are hosted by leading Italian institutions, which are able to provide the necessary environment and infrastructure. There are three Telethon Scientists levels: assistant, associate and senior. The call to hire two new assistant scientists in 2009 was suspended due to the lack of financing.

Outlook

Research never was a top priority for the Italian Government, irrespective of the political power structure in office. This is most evident by the poor allocation of funds but also by the motivation not to lose too much momentum in an area of low public attention. The Italian Government is definitely aware of the challenges of a modern and competitive university and research system but it doesn't always seem happy with the way given problems are handled. Many Italian scientists are quite ambitious and ready to accept their share of responsibilities, when it comes to the necessary reforms. There is a considerable number of outstanding Italian biomedical research institutions. They have, to some extent, adapted international standards of research management and funding, are internationally competitive and quite productive. Thus, there seems to be no real argument for the young research talent from abroad against spending a couple of years in Italy. But if Italy is not able to provide real career perspectives in the near future, it will not be able to attract the best international talent and will continue to lose whole generations of Italian scientists.

Ralf Schreck

(For a further interview on science in Italy go to *www.labtimes.org*)