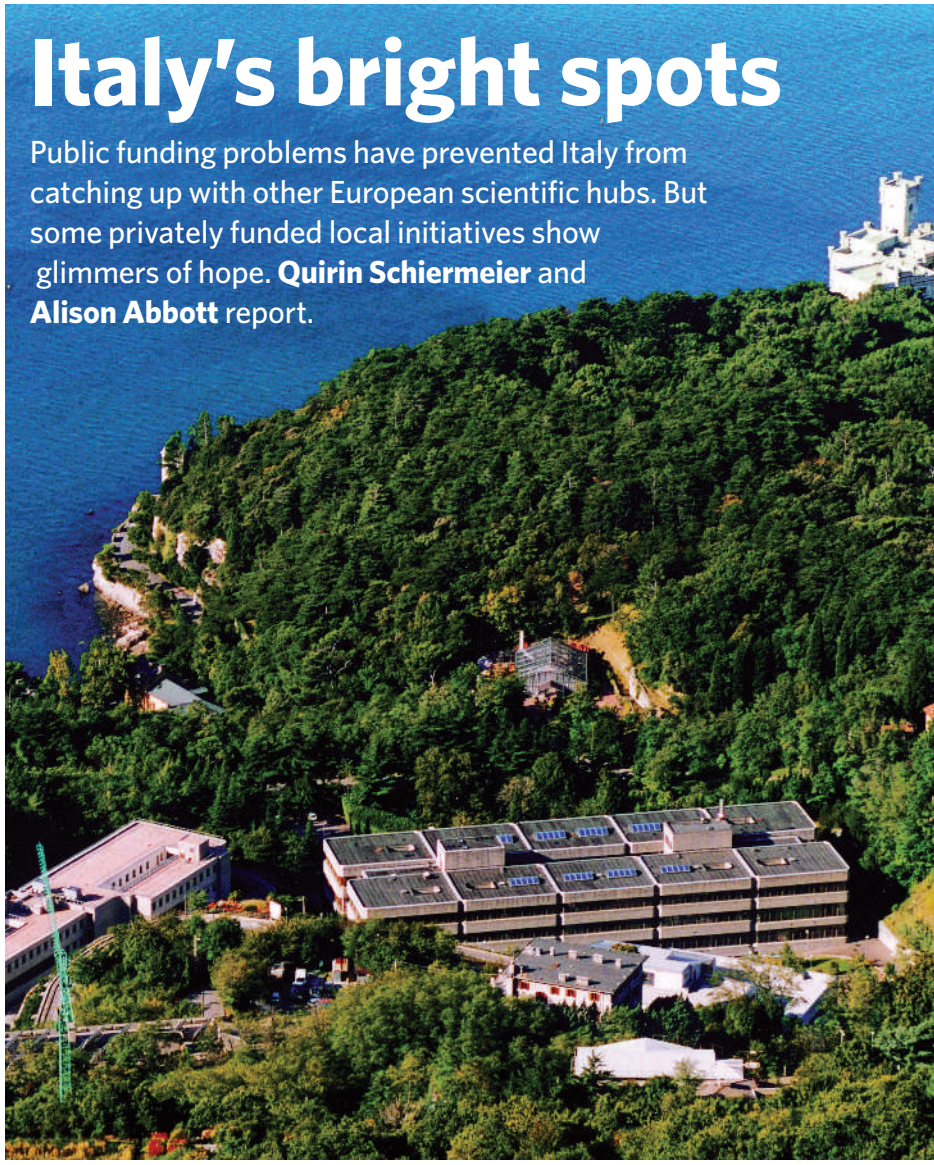
Italy's bright spots

Public funding problems have prevented Italy from catching up with other European scientific hubs. But some privately funded local initiatives show glimmers of hope. **Quirin Schiermeier** and **Alison Abbott** report.

SISSA



High-fliers: SISSA (bottom left) and ICTP (right) share a view of the Adriatic with Miramare castle.

Historically, Italy is recognized as the heart of the Roman Empire. Culturally, the country that produced Michelangelo, Leonardo da Vinci and Raphael is known for launching the Renaissance. But scientifically, ever since the Second World War, Italy has struggled to find its feet.

Numbers bear this out. The country has about half as many researchers per head of population as other major European countries and ranks 12th in Europe in terms of the number of biotech companies. Promises by prime minister Silvio Berlusconi to increase science funding have not come to fruition, and without more funding, prospects for growth in state-funded positions are slim. Even when positions at state-funded universities do open, the competition system to fill them, known as *concorsi*, sometimes bogs the process down, taking months or years to fill empty slots (see 'Slow progress', opposite).

But despite these problems, the job market is more conventional and in some centres outside the state system, recruitment is relatively strong. The labs run by the Telethon charity in Naples or the Department of Biological and Technological Research labs at the private San Raffaele Hospital in Milan, for example, are expanding their infrastructure and research staff, and forgoing the *concorsi* (see 'Beating the system', opposite).

Perhaps the largest experiment in how science can be done differently in Italy — in terms of recruitment, openness and international interaction — is in Trieste in the northeastern corner of the country. At first glance, Trieste — squeezed between the Adriatic Sea and the foothills of the Alps near the Slovenian border — seems an unlikely scientific hotspot. It's not a major political or cultural centre such as Rome, Milan or Florence. But the town hosts an astounding 37 scientists per 1,000 of its population, compared with five in Italy as a whole, and six in the European Union. In addition, thousands of scientists from developing countries come to Trieste each year to participate in schools, courses and training programmes offered by the city's two large international research centres. When they leave, they take home state-of-the-art knowledge in fields from AIDS virology and drug discovery to string theory.

Just a two-hour drive from the tourist madness of Venice, Trieste hardly fulfils the Italian stereotype, for good or bad. The Adriatic setting is picturesque, but the bora — a gusty, northeasterly wind that blows down this coast — can strike so furiously here that pedestrians have to cling to ropes fixed to the pavements. Before the First World War, Trieste was the prosperous main seaport for the Austro-Hungarian Empire. After the war it became part of Italy and fell into relative obscurity. Its facades and cafés are, even now, more reminiscent of Vienna or Budapest than of Rome or Naples.

Scientific hub

Science came to Trieste at the height of the cold war, when the United Nations established bonds with this forlorn spot in the shadow of the Iron Curtain. The Abdus Salam International Centre for Theoretical Physics (ICTP) opened its doors in 1964 and became a door for scientists from poorer countries to enter some of the most advanced areas of fundamental science, from mathematics to astrophysics and from condensed-matter physics to climate modelling.

More than 6,000 scientists participate each year in seminars and schools held at the ICTP. A worldwide network of 400 alumni is associated with the centre, about 50 of whom are present in Trieste at any given time. Visiting scientists, postdocs and 28 permanent researchers complete the ICTP's staff.

"There's scientific capital in each country that deserves to be supported," says Katepalli Sreenivasan, the Indian-born director of the ICTP. But the centre has also become an integral part of the Italian and European science landscape, he adds. High-profile guests and speakers are continually coming and going — including Nobel laureate Carlo Rubbia, who last month gave a talk about the future of nuclear energy.

"You can meet everybody here without going anywhere," says Sam Carr, a Scottish postdoc at the ICTP. "In terms of meeting other scientists, this is one of the best places in the world."

Scientists and PhD students at the nearby International School for Advanced Studies of Trieste (SISSA) are likewise benefiting from talks and lectures at the ICTP. When it was founded in 1978, SISSA only offered PhD programmes in mathematics and theoretical physics. Since then it has expanded to include courses in neurobiology and cognitive neuroscience. The latest addition is a curriculum in

SLOW PROGRESS

In Italy, lack of money means lack of jobs. But some young Italian scientists say that the poverty of career opportunities is worsened by the way the country's universities fill them: via infrequent competitions called *concorsi*. In these national competitions, academic jobs are advertised en bloc nationally. Applicants winning a *concorso* for, say, three jobs in immunology in different institutes, are then assigned, through negotiation, to one of the three institutes with the openings.

The infrequency of *concorsi* can be a problem. For example, at the CNR, Italy's largest research agency, one *concorso* for 162 positions, including promotions to the most senior level, was launched in June 2004, a full five years after the conclusion of the previous *concorso* for this level. The *concorso*, according to internal rules, should have taken place before 2001. To compensate for the delay, applicants were instructed to restrict their publication list to papers published before 2001. An evaluation committee for this *concorso* has not yet been nominated, and a timetable for the evaluation has not been announced. **A.A.**

astroparticle physics, where classical astrophysics and high-energy physics converge with the ultimate goal of shedding light on elusive cosmic phenomena such as dark energy and dark matter.

Each year, some 60 students are accepted at SISSA, following a demanding selection process. To date, the school has awarded PhDs to 650 students, a third of whom came from outside Italy. Once they get their PhD, almost all are forced to continue a research career abroad. "There is no market for them in the static Italian university system, which doesn't reward mobility," says Stefano Fantoni, the director of SISSA.

The third, and youngest, pillar of Trieste's science base is the International Centre for Genetic Engineering and Biotechnology (ICGEB), founded in 1987. The centre provides grants and fellowships in molecular biotechnology and applied biomedical research to scientists from some 50 countries worldwide which support the ICGEB's mandate.

Practical courses have been held this year in 30 places from Santiago de Chile to Hyderabad, India. But rather than doing research for developing countries, the ICGEB helps Asian, African and Latin American scientists become competitive in advanced fields of molecular biology. This often proves beneficial for the centre's 15 Trieste-based research groups.

"The skills and motivation of many applicants from developing countries are outstanding," says Laurence Banks, a British tumour virologist based at the ICGEB. "Many of them are better than anything I have ever seen in Britain."

Trieste's small size, says Fantoni, is an advantage in that it is much easier to start something new there than in the traditional Italian science cities of Rome, Milan, Padua and Pisa. "In a way we're all outsiders here," adds Erio Tosatti, head of SISSA's condensed-matter section. "Although Italian universities are usually very much inbred, all of us have moved to Trieste because somebody judged us to be excellent."

Trieste shows that Italian science can work, despite problems in funding and recruitment. And there are signs that it can succeed beyond Trieste; the country's scientific publications boast the seventh highest impact factor in the world, according to the Thomson ISI in Philadelphia. Such statistics hint that Italy could be a scientific oasis, given the right political climate. ■

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M. SILVANO/ ICTP

SISSA

World-beaters: Katepalli Sreenivasan (top) and Stefano Fantoni have many talented Italians among their students, but most of these will have to continue their work abroad.

BEATING THE SYSTEM

Most Italian scientists will roll their eyes when you ask them about recruitment and career opportunities at public universities and research institutes in their home country. Government funding has been flat for years, and the few positions that are available have to go through the cumbersome *concorsi* system (see 'Slow progress', left). As a result, foreign scientists and expatriates who want to secure a position within the Italian science system often face a number of difficulties.

But there are some noteworthy exceptions outside the government system. Opportunities for scientists at all levels of experience are being offered by a number of private or semi-private institutes that have recently been set up or are expanding. What is more, these institutes can offer jobs without having to wait for a public *concorso*.

Trento

The Centre for Computational and Systems Biology, a joint venture between Microsoft and the University of Trento, officially opened on 7 December in Trento. Set up with provincial and central government support, the centre specializes in bioinformatics and the development of computational models for biological systems. It is now recruiting for PhD students, postdocs and senior researchers with a solid background in biology or informatics. Some 30 positions are to be filled in the near future.

http://dit.unitn.it/~bioinfo

Milan

The San Raffaele Scientific Institute is part of Italy's largest biomedical science park, the Science Park Raf, which also includes the San Raffaele Hospital. The institute's Department of Biological and Technological Research (DIBIT) is privately funded and focuses on molecular biology, genomics and neuroscience.

A second unit, DIBIT 2, is under construction and will host up to 20 new groups in three new lab buildings. Existing areas of science will be expanded and new activities launched in quantitative biology, proteomics, functional genomics, molecular medicine and experimental neurology. In total, 500–600 new positions, including fixed-term jobs for postdocs and PhD students, will be available by 2008. Recruitment for DIBIT 2 begins next year.

In addition, the San Raffaele Telethon Institute for Gene Therapy, which is a joint venture between the San Raffaele Scientific Institute and the non-profit Italian Telethon Foundation, is also currently looking to recruit postdocs.

www.sanraffaele.org/EN_Home/index.html

Genoa

The Italian Institute of Technology in Genoa, founded by the Italian government in 2004, focuses on neuroscience, nanobiotechnology and robotics. The directors of these three departments will be appointed within the next few weeks, and the first groups are scheduled to begin work early in 2006.

Once all of the research groups are established, the institute is expected to play host to up to 300 scientists. Some 100 positions, from PhD student to group leader, will become available as early as next year. **Q.S.**

www.iit.it/index.php?language=en