



The exodus of scientists from Italy reflects problems several European countries are trying to tackle. Are their efforts too little, too late? asks Alexander Helleman.

Discouraged by his efforts to find a job in his native Italy, astronomer Marco Bruni left the country in 1992 and took a job in London. He has remained abroad ever since, and now works at Portsmouth University in England. He feels much more secure about his scientific career since he left and doesn't anticipate returning. "There is nothing like the Italian situation here that forces people to go abroad," Bruni says. "In Italy, many people can't find a job at all."

The scientific brain drain is by no means limited to Italy. It's a problem faced to varying degrees by other European countries including Spain, France and Germany. Each country is taking its own approach to turning the tide, but Italy's situation encapsulates the problems that other states are hoping to escape. The shortage of secure jobs isn't caused by crowds of researchers competing for a place — far from it.

According to Sveva Avveduto, who researches science and education policy at Italy's National Research Council (CNR), the population of active scientists in Italy is now quite old, with about 30% expected to retire by 2005.

To keep numbers steady, Italy's universities should be producing 12,000 new researchers every year instead of the current 4,000. On top of this, several hundred scientists leave the country each year, says Avveduto, and the chances that they will return are slim.

ITALIAN DEFICIT

Many factors contribute to a scientist's decision to leave Italy, including the relatively low level of investment in science, a cumbersome bureaucracy and an advancement system that many say has more to do with cronyism than quality (see *Nature* **412**, 264–265; 2001).

These factors often lead to low pay and an uncertain future, especially for young scientists. Even 10 years into their career, some Italian researchers have to get by on 1,000 euros (US\$886) a month, says astronomer Sandra Savaglio of Johns Hopkins University in Baltimore, Maryland. Bruni adds that the pay differential in Italy is wider than in other European states, with young researchers earning as little as a quarter of a more senior staff member's salary.

The problem is so profound that even scientists who land secure jobs sometimes leave Italy for better opportunities. Savaglio, for example, recently accepted

her current position at Johns Hopkins after a year in a permanent position at the Rome Observatory.

The differences become more noticeable when Italian scientists spend time in new posts abroad. Higher salaries aren't the only incentive to move, says Bruni. "I found myself treated as a full staff member, and not like an aged student," he says.

Mara Lorenzi, an endocrinologist at Harvard Medical School who left Italy to do medical research in the United States some 25 years ago, says that Italy did not seem to keep pace with the revolution in the life sciences that happened in the past 50 years. "The universities did not actively create opportunities for research," she remembers. Italian biomedical researchers still head for the United States, she says, although no longer in such great numbers.

CULTURAL DIVIDE

Perhaps most galling to young Italian researchers is what many describe as an anachronistic system of distributing jobs in research. It's who you know, not what you know, that counts, say several who have left the country. Applying for research positions abroad comes like a breath of fresh air.

"The most important thing here is that you are considered a good researcher," Bruni says of Britain. If you want to find a position in Italy, he says, you have to take a different approach and adapt to the hierarchical structure. That often means garnering support from a single research director who can make or break a younger scientist's career.

Italy's problem with patronage is a warning to other countries where a similar culture contributes to the brain drain, especially Spain. "The typical way to make your career is to be next to a professor who is active," says Enric Banda, Spain's former secretary of state for universities and research, now secretary general of the European Science Foundation (ESF). "You are in his or her shadow, and if you wait long enough, eventually you will get a position. As we say in Spain, you have to 'keep your seat warmed'."

Many are not prepared to wait. Italians form the largest group of foreign scientists at the Space Telescope Science Institute, the Baltimore-based centre of operations for the Hubble Telescope, says Massimo Stiavelli, who joined the institute six years ago. Large Italian research communities also exist at the European

Sandra Savaglio left a permanent position in Rome for better opportunities in the United States.





Cash for southern comfort

Southern Observatory in Garching, Germany, and CERN, the European Laboratory for Particle Physics near Geneva. Some 200 Italian researchers work in the United States for the National Institutes of Health.

Although many young European scientists spend some time abroad as part of their career, in most places the numbers arriving and leaving stay roughly even. Sami Mahroum, an associate of the Dublin-based CIRCA Group Europe, a research and technology policy consultancy that has studied Europe's brain drain, says that the United Kingdom and Ireland, for example, participate more actively in the international circulation of scientists and academics than Italy.

Overall, though, Europe is less attractive for scientists than the United States, says Banda. "One of the main reasons is flexibility, which we don't have," he says. When he was a hands-on scientist in Spain, he sent a few of his students to the United States as postdocs. "Because they were good, they never came back."

The problem isn't only in southern Europe: even traditionally robust countries such as Germany are feeling the pinch. Wilhelm Krull, secretary general of the Hannover-based Volkswagen Foundation, estimates that about 60% of German scientists doing postdocs abroad don't return. Meanwhile, he says, a sharp decline in the number of students taking up science compounded with a brain drain is already causing a shortage of scientists.

EFFORTS TO REVERSE THE TIDE

Individual countries are making their own attempts to reverse the tide. Some, such as France, are increasing research budgets. Spain launched the Ramón y Cajal programme earlier this year, hoping to lure scientists back from abroad by offering five-year contracts with attractive salaries and the chance of managing their own projects (see *Nature* **413**, 556; 2001). Italy is setting up a similar programme offering four-year contracts, reports Avveduto. In addition, private foundations, such as the Wellcome Trust in Britain and the Volkswagen Foundation, can fund young scientists, as Krull points out, in competition with the financially powerful US foundations.

But more reforms will almost certainly be necessary to reverse Italy's brain drain. Recent developments, such as the planned reduction of science funding, which at 0.6% of GNP of public funding is among the

lowest in Europe, will not help matters. And the recent turmoil surrounding the nomination of directors for new institutes under the CNR shows that Italy is still slow to lose its old habits (see *Nature* **414**, 133; 2001) — the first 22 selected had all been CNR directors, and well-qualified applicants were passed over for reasons that were not made clear.

Although public funding of science in Italy has been largely stagnant, the government is pumping lire into targeted regions. Naples, with its history of hosting genetics research, is gaining funds for post-genomic research. Recently, the government granted 40 billion lire (\$18.2 million) to the research consortium BioGeM, of which half is tagged for a new institute to be built south of Avellino. The institute, scheduled for completion in 2004, will house up to 200 researchers.

This funding has helped Emilia De Santis leave her veterinary practice and join a team at BioGeM working on mice to investigate the genetic component of human thyroid disorders. "For the south

of Italy, this is a new possibility," she says.

But because of the way public funding is distributed — money is allocated for different programmes every year, without continuity for a specific programme — ensuring continued support for BioGeM will be problematic, says BioGeM president Roberto Di Lauro. "What Italy needs is a secure source of money which is reliable," he says.

Private initiatives, such as Italy's Telethon Foundation and the Italian Association for Cancer Research are both providing such a source. "Perhaps the best Italian research is done on cancer and on genetic diseases because there are these two foundations," Di Lauro suggests. A.H.

◆ biogem.iigb.na.cnr.it

Mara Lorenzi believes that Italy failed to keep pace with scientific developments, which means that other European institutes, such as CERN (left), prove an attractive draw.

As a step in the right direction, a law allowing the appointment of non-Italians for positions with the CNR or in public research was passed last year — appointment of non-nationals has long been routine in other countries, for example with the French national research agency CNRS or Germany's Max Planck Institutes. For Avveduto, the influx of non-Italian scientists would be a healthy 'brain gain'.

Alexander Hellemans is a science writer based in Naples.



Emilia De Santis sees hope for Italy's south.