kindergarten teacher and first vice president of the Tennessee Breast Cancer Coalition. Jill Wagner of Lima, Ohio, a former General Dynamics Corp. supervisor, adds, "The most heartwarming thing for me about serving on the panel with all these esteemed scientists was to find out that they really, really wanted to be reminded that this disease is about people."

Virgil Simons of Secaucus, New Jersey, a textile industry executive and founder of The Prostate Net, says his view of researchers "absolutely" changed when he saw the constraints under which they operate. "You've got people who are going to ultimately save lives working for money that's far less than we pay garbagemen," he says. "We've seen some investigators whose salaries are around $35,000 a year. We've seen some senior people who are working for $50,000 or $60,000 a year. It's almost criminal."

Despite the obvious goodwill it fosters, the Army way of peer review isn't directly transferable to all that NIH does. Cell biologist Daniel Medina of Baylor College of Medicine in Houston notes that the Army panels concentrate on "very focused review areas, which is different from many NIH review panels, which cover a broad area of topics." But would the approach work on NIH study sections that are focused, such as those weighing responses to Requests for Proposals? "I don't know," says Medina. "I think you just have to try it."

That's what NIH is about to do.

–**BRUCE AGNEW**

Bruce Agnew is a writer in Bethesda, Maryland.

SCIENTIFIC COMMUNITY

EU Facilities Program Keeps Researchers on the Move

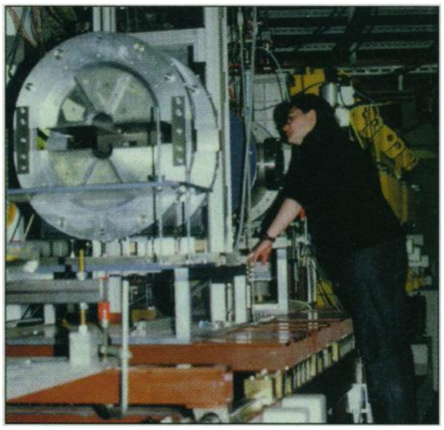
A European program to open up local facilities to scientists across the continent is winning plaudits from both young researchers and lab managers

DARMSTADT AND BAYREUTH, GERMANY— When Dolores Cortina-Gil was a physics postgrad at the University of Valencia in 1993, she faced a serious logistical problem: There were essentially no facilities in her native Spain for the kinds of nuclear physics experiments she hoped to conduct. So she packed her bags and moved to the GANIL heavy-ion research center at Caen in northern France to do her doctorate. After that, she moved on to a postdoc position at GSI, Germany's heavy-ion lab in Darmstadt, where she is now conducting her own nuclear structure studies with unstable nuclei.

Such scientific country-hopping is becoming more common in Europe, thanks to a European Union (EU) program called Access to Large-Scale Facilities (LSF). And it is about to get even easier: The EU's Framework 5 program, launched last month at a meeting in Essen, Germany, will spend $200 million on the LSF program over the next 4 years—a 50% increase over previous spending levels.

The program gives Europe's top researchers and young scientists an opportunity to work at the facility best equipped for their research, irrespective of who owns the facility or where it is located within the EU. The more than 100 facilities that are now part of the scheme get block grants to pay for travel, accommodation, and technical assistance for visiting researchers, and wear and tear. But much of the emphasis is on training and enabling young researchers to use top-notch facilities. "This is the easiest way to meet people and to make new collaborations," says Cortina-Gil, who is funded by the LSF program in part to provide technical help to visiting scientists using GSI's fragment separator. "To change from one European country to another would be very difficult without the financial support of the European Union."

Facility managers like the program too. Says Giorgio Margaritondo of Italy's ELETTRA synchrotron in Trieste: "The LSF program has been extremely effective and its impact very positive. … The travel support of users has effectively removed the most serious barrier preventing scientists from using top-level facilities." Wouter Los from the Zoological Museum at the University of Amsterdam agrees. "One of the strengths of the program is that it identifies and 'recognizes' large-scale facilities in Europe."



Hands-on experience. Postdoc Dolores Cortina-Gil works on GSI's fragment separator.

CREDIT: SABINE STECHAUS-KOVAC

LSF started out in 1989, during Framework 2, as a small program with a budget of $31 million. It was an immediate hit: 1600 researchers took the opportunity to visit the 17 participating physics facilities during the first 4 years. By the end of Framework 4 last year, it had mushroomed to encompass 116 facilities in a wide variety of fields, such as chemistry, engineering, and life and earth sciences, which were visited by more than 6000 researchers. The types of facilities have also evolved over the years. No longer are they just large, expensive pieces of equipment, but also collections of biological data, medical research facilities, or field study centers in ecosystems ranging from arctic to tropical.

The LSF program typically gives such a facility about $1 million for a period of 3 to 4 years to select and support visiting researchers. Often, facilities use the money to buy scientific equipment, computers, and materials, or to employ researchers to help the visiting scientists. Researchers submit applications directly to the facility, and from there they are passed to an independent international review committee. "The program is managed primarily at the facility level, eliminating needless and expensive duplications," says Margaritondo.

Although most facility managers who spoke with Science are enthusiastic about the LSF program, they have some gripes. From talking with other facility managers, Egil Sakshaug of Trondheim Marine Systems in Norway says "the most frequently mentioned complaints are financial, that the funds compensating for 'wear and tear' at the host institutes are not enough." Ross Angel of the Bavarian Geosciences Institute in Bayreuth, Germany, agrees: "We gain in the things we cannot quantify: new ideas and collaborations or teaching practice for our students. Purely financially we obviously lose."

Indeed, the opportunity to exchange ideas and techniques is the biggest draw for most facilities to participate in LSF. "Visitors bring their expertise here," says Angel. "Catherine Dupas, a postdoc from Lille [in France], came here with an LSF grant. She improved our technology in using transmission electron microscopy." According to Klaus-Dieter Gross, project manager at GSI, "the EU-funded researchers make a major impact on the research at our institute. It is hard to imagine the situation without them."

Many of the researchers who visit the facilities gain a lot more than just new ideas. For those like Cortina-Gil, who come from regions of the EU where major research facilities are rare, it is the only way they can conduct their research. And for many, it provides valuable early career experience. An EU study carried out last spring found that more than half of LSF-supported researchers are aged 35 or younger, and two-thirds are first-time users of the facility concerned.

Lorella Franzoni, an Italian biophysicist from the University of Parma, is a typical beneficiary. She investigated the structure of proteins at a powerful nuclear magnetic resonance (NMR) spectrometer at Frankfurt University in Germany. "When I arrived here, I was new to the field of multidimensional heteronuclear NMR of proteins," Franzoni says. "I consider myself very lucky to have benefited from the EU funding. It is also fortunate for the group in Parma, because I will transfer that knowledge." Cortina-Gil also hopes to spread her newfound skills back in her homeland. When her position at GSI expires at the end of this year, she hopes to secure an academic position in Spain. But, she adds, "to continue my research I will have to keep contact with my former collaborators at GANIL and GSI, because I have no facilities to do my experimental work in Spain."

–SABINE STEGHAUS-KOVAC

Sabine Steghaus-Kovac is a science writer in Frankfurt, Germany.

ASTRONOMY

Watching the Universe's Second Biggest Bang

On 23 January, astronomers witnessed a cataclysmic event in a distant galaxy. The observations hold many lessons about the mysterious nature of gamma ray bursts

It happened long, long ago, in a galaxy far, far away: the most violent event ever observed in the universe. For billions of years, the aftershock of that event—a titanic flash of high-energy radiation—has hurtled through space at the speed of light. It swept past Earth 2 months ago, in the early morning of Saturday, 23 January. Astronomers specializing in gamma ray bursts (GRBs)—high-energy flashes that have been a puzzle for decades—were watching and waiting. And thanks to a sophisticated alert system of orbiting telescopes and Earth-bound observatories across the globe, they were able to catch the whole light show: from the initial gamma flash through to radio waves crackling days later from the site of the burst. They also caught, for the first time, an optical flash simultaneous with the initial gamma ray burst.

Its power and visible-light display have now made the modestly named GRB 990123 an astrophysical celebrity, the subject of no fewer than six papers in today's *Science* and next week's *Nature*. "It's a great discovery," says Martin Rees of Cambridge University, a leading GRB theorist. "This is the very first time that optical emission has been observed during the burst itself," adds Titus Galama of the University of Amsterdam. In the case of GRB 990123, despite the enormous distance of the source, the optical flash was bright enough to be easily visible with an amateur telescope or even binoculars.

The observations combine to give a complete portrait of GRB 990123, which is yielding new clues to the nature of the cataclysmic events that give rise to these flashes. In the *Science* and *Nature* papers, along with others posted on the Internet, researchers describe what they have learned so far, including the tantalizing suggestion that GRBs may appear so powerful because their energy is focused into narrow beams that we only see when they are pointing more or less in our direction.

Gamma bursts themselves cannot be detected from the ground because of atmospheric absorption. They were first spotted in the 1970s by U.S. military satellites, which were looking for gamma rays from Soviet nuclear explosions. A systematic hunt for them began in 1991, when NASA's Compton Gamma Ray Observatory (CGRO) was launched and began detecting GRBs at a rate of about one per day. Even then their origin remained mysterious because gamma ray detectors have very low positional accuracy and the bursts fade very fast. That changed in 1996 with the launch of the Italian-Dutch satellite BeppoSAX, equipped with wide-field x-ray cameras that can pinpoint the position of certain bursts. Astronomers set up an alert system so that ground-based observers could quickly point their instruments at each burst. Soon they were picking up x-ray, optical, and radio afterglows of the bursts—data that eventually made it clear that GRBs originate in very distant galaxies.

Hot spot. GRB 990123's fading fireball snapped by the Hubble Space Telescope.

By this time, theorists had built up a picture in which GRBs result from the collision of two high-density neutron stars or from a "hypernova"—the total collapse of a very massive star. Both kinds of events would form a central black hole and eject matter at close to the speed of light. This matter would collide with the surrounding interstellar gas, creating shock waves that travel both inward through the ejecta and outward into the interstellar medium, heating it into a fireball that would expand and cool to create a lingering afterglow.

GRB 990123 hit the astronomical headlines because for the first time the alert system acted fast enough to capture an optical flash as well as a gamma ray one. Once the gamma ray burst triggered detectors on BeppoSAX and CGRO, they dispatched a message to the Robotic Optical Transient Search Experiment (ROTSE), an automated camera at Los Alamos National Laboratory in New Mexico, which within 10 seconds started snapping pictures of the constellation Bootes. Just 22 seconds after the initial flash, it captured an image of the optical burst.

In an article in next week's *Nature*, Galama and his colleagues combine observations of the flash with data from other wavelengths—gamma, x-ray, infrared, submillimeter, and millimeter—to conclude that they are seeing the effects of three kinds of shock waves within the fireball. "The initial gamma ray burst is believed to be caused by internal shocks in the ejecta," says Galama. "The optical flash recorded during the burst is probably due to the short-lived reverse shock, while the afterglow arises from the forward shock."

But although the popular fireball model for the afterglows of GRBs is supported by the new observations, the tremendous energy release of GRB 990123 is a real puzzle. On page 2075, Michael Andersen of the Nordic Optical Telescope on La Palma in the Canary Islands describes his team's analysis of the spectrum of the optical component of the afterglow.