

in licensing, said Ditzel, has compounded the problem.

According to Don Jarad of Oak Ridge's technology transfer staff, the laboratory sometimes has to choose which companies will get rights to Oak Ridge's technology. "The name of the game is success," said Jarad. "We select them on the basis of who we think will be a success." Oak Ridge, in fact, has been particularly aggressive in transferring its technology to the private sector (see box).

Rivers of the Federal Laboratory Consortium says "the battle will go to the more aggressive, and the first one in the door." At least one firm has threatened to sue Martin Marietta, which operates Oak Ridge, over a license that was not granted, but so far no suits have been filed.

Laboratory administrators walk a fine line in promoting commercial spin-offs, yet keeping research within bounds of the laboratory's mission. "You're not going to allow a researcher to go off and work with some company if that's going to detract from the overall mission of the lab," said Ditzel. Supporters of the technology transfer effort, however, maintain that cooperation with industry is far from any danger of interfering with ongoing research. "I'll be retired by the time technology transfer starts seriously impeding defense work," laughed one DOE weapons laboratory official.

According to officials at a DOE nuclear weapons laboratory, a proposal now circulating within DOE headquarters would open the doors of the weapons labs to far more extensive cooperation with industry. Details of the proposal remain to be worked out, said one official familiar with it, but it would represent a sharp turn in DOE policy toward the weapons labs.

The lab official said that promoting commercial spin-off might reinforce political support for the labs in Congress. Arms control success "doesn't bode well for continued funding of DOE weapons labs," he said. "But our national security has to be tied to our economic competitiveness," and the labs could contribute to that goal.

According to the weapons lab official, greater cooperation with industry need not compromise national security controls over technology. In fact, he said, commercialization might make the export control task easier. If technology was licensed to a single firm, he said, commercial secrecy during development of a product may aid in the task of restricting its export. "Computer source code licensed to a private company for resale [in machine readable form] isn't going to be freely available from Argonne National Laboratory," he said.

For many labs, however, classification re-

mains a touchy issue. "One of the toughest things is making sure you don't cross the line into national security information," said La Grone. DOE officials say that manufacturing technology developed at the Y-12 weapons plant would be valuable for industry, but it is off limits because of classification.

No matter how faltering the progress toward formal cooperation, changing attitudes within both labs and industry contain the seeds of a bright future for collaboration, said Jon Soderstrom of Oak Ridge's technology applications staff. "People are interested, much more than before, in making people on the outside aware of their technology," said Soderstrom. "Our best leads on licensing come from our technical staff."

Contacts between industry and federal laboratories can break down the "cultural barrier" that divides government and corpo-

rate scientists and engineers, said Rivers. "Look, we send people back to school or to other federal labs, and there's an awful lot of smart researchers out in industry; our researchers can learn a heck of a lot from those people," said Ditzel.

Domenici agreed. "There's no question there's an enclave mentality in the DOE labs," he said, that hinders the transfer of technology into the commercial marketplace. "They were closed institutions for a long time."

"We've tried to remove the statutory barriers, we're trying to remove the regulatory barriers, but just to change the culture, that is a people problem, and that's not easily done," said Bill Carpenter, vice president for technology application at Oak Ridge. ■

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Crafoord Prize Winner Abstains

Paris

One of France's most distinguished—and most controversial—mathematicians, Alexandre Grothendieck, announced last week that he was turning down his share in the prestigious Crafoord Prize of the Royal Swedish Academy of Sciences, an award introduced in 1982 for scientists working in disciplines not covered by the Nobel Prize.

The academy had announced 2 weeks previously that the \$270,000 prize for 1988 was to be divided between Grothendieck and his former pupil, the Belgian-born mathematician, Pierre Deligne, of the Institute for Advanced Studies in Princeton, New Jersey, for their pioneering work in algebraic geometry.

However, in a letter to the academy published in the French press last week, Grothendieck said he had no need for his share of the prize money, since his salary as a professor at the University of Montpellier was already "much more than sufficient for the material needs of myself and those I am responsible for." He added that one of his reasons for turning down the award was his conviction that the only decisive test for the fertility of ideas or new visions was the test of time. "Fertility is recognized by its offspring, and not by honors."

Although he has made substantial contributions to a number of fields of pure mathematics—in 1966 he won mathematics' top award, the Fields Medal of the International Mathematics Union—the work for which the 60-year-old, German-born mathematician is perhaps most widely known involved

the development of a set of mathematical techniques needed to prove a key conjecture proposed by one of the fathers of algebraic geometry, André Weil.

Since his days as a postgraduate student, Grothendieck has also been known for his ascetic habits, for example, insisting to colleagues that one could live adequately off a diet of little more than milk and vegetables. In 1970, shortly after the work that led to the proof of Weil's conjecture, he resigned his research post at the Institut des Hautes Etudes at Bures-sur-Yvette, outside Paris, claiming that his move was a protest against increasing military sponsorship of mathematics research.

He became a militant supporter of the ecology movement, and moved to a farm in the south of France where he now lives, later accepting a post at Montpellier.

In his letter to the Swedish Academy, Grothendieck, whose parents fought as anarchists against the fascists in the Spanish Civil War, says that top-level scientists who receive prestigious awards such as the Crafoord prize already tend to enjoy a high level of material well-being and scientific prestige, as well as the power and perquisites that go with both.

"But is it not obvious that the excesses enjoyed by some can only come about at the expense of the needs of others?" Grothendieck said, adding that he was also concerned about declining ethical standards in the mathematical community which he did not want to condone by accepting the prize. ■ DAVID DICKSON