tries, which have been encouraged by the academy to foster commercially relevant research.

So far 6000 researchers have left their labs to carry out developmental research and formed 217 technology corporations, Zhou said in a speech at the U.S. Academy meeting. In fact, so many researchers have begun moonlighting to earn more money that the quality of teaching has been seriously impaired, a professor of Qinghua University, Mei Zuyan, said last month in *Beijing Review*.

The allure of earning extra money is not surprising. Scientists and academics are still near the bottom of the pay scale in China. Zhou said that academics receive about the same pay as government workers whereas farmers and factory laborers under the new economic reforms are making much more money. "Scientists who work for industry earn a lot more than others. It creates problems," Zhou said in the interview.

He noted that 40 "open" laboratories have been established with a special fund to revitalize Chinese research and provide modern equipment. Unlike the institutes, which have not been open to outsiders, half of the researchers of the open labs are visiting scholars from other Chinese institutes and abroad. The labs are governed by a board of directors of which two-thirds of the members are outsiders. To conduct research at the labs, individual scientists must submit a grant proposal to a peer-review committee. "Peer review has been emphasized in the past 3 to 4 years," Zhou said.

To invigorate Chinese research, the government has set a mandatory retirement age of 60 for researchers and academicians who hold rank below full professor. The mandatory retirement age for a full professor is 65. If the researcher is an academy member, however, "he can stay on," Zhou said.

The academy's plans for reforms are handicapped by a lack of funds. The budget of the academy, which is the chief source of research funds in China, has been decreasing in constant dollars over the past few years and this year is $25 million, Zhou said. Most of the money is spent on applied research. Grants for basic research, excluding salaries, accounts for only a quarter of the academy's research budget. "The first priority of China's science and technology must be to serve the national economy," although "basic research cannot be ignored," Zhou said in his speech.

■ **Particle accelerator.** Despite the academy's tight budget and limitations on basic research, particle physics has been treated well. Completion of a new electron-positron collider in Beijing is expected by the end of the year. T. D. Lee of Columbia University and Wolfgang Panofsky of Stanford University participated heavily in the design of the collider. The two beams of the collider are each 2.8 gigaelectron volts.

Similar to the debate among American scientists over the proposed superconducting supercollider, the Chinese project has been very controversial among Chinese researchers because of its expense and apprehension that the collider will not do anything different from machines in other countries.

The collider was ultimately paid for by a special fund separate from the academy's annual budget. It cost the equivalent of one quarter of the annual budget, Zhou said. "High energy physicists have wanted to build something since the 1950s. They have many powerful friends. This was the main driving force." Lee said that the collider will fill a narrow, but significant niche in physics research.

■ **Fang Lizhi.** Fang, an astrophysicist, became a cause celebre last year in China when he was fired from his post as vice president of the University of Science and Technology in Hefei and stripped of his party membership for proclaiming the need for democratic reforms. Massive student demonstrations in China ensued to support him.

Zhou said that "there are no limitations on Fang Lizhi. He is allowed to travel abroad and he is still working at a laboratory."

Goldman of Boston University said, however, that the state has imposed restrictions on Fang, pointing out that he was allowed to travel to Italy last summer for a scientific conference, but was not allowed to go to Britain. Since then Fang has received many invitations to go abroad, but he has not been allowed to accept them, Goldman says.

Zhou said in his speech at the Academy meeting, "Reform in China is just beginning. It is a course full of difficulties and complexities. . . . The traditional concepts of living and working habits of millions of people have to be changed." The Chinese people "are accustomed to their slow paced life, a life that is not of high standard, but which ensures social security. . . . We cannot expect the reform to be completed overnight." ■ MARJORIE SUN

Big Flap Over a Small Space Station

Last week, in a step that muddled an already murky agenda, Congress withdrew its blessing for a small, private space station known as the Industrial Space Facility. A start-up grant of $25 million has been withdrawn, and the Senate now says the idea must be analyzed by the National Research Council for at least 9 months—well into the next administration—before any commitment can be made.

Only 4 months ago, Congress forced this lab into the 1989 budget against the wishes of the National Aeronautics and Space Administration (NASA). Advocates said it could be leased for just $700 million, a piddling amount as compared with the $16-billion to $30-billion price tag of NASA's big station. They said the automated lab could serve as a form of insurance, a way to keep up with Soviet, European, and Japanese microgravity research while NASA struggles to get its big, manned station under way. It could also serve as a test bed for equipment to be used on the big station, they said.

But the project set off a furor out of proportion to its size. As one expert on Capitol Hill says, it became the focus of a symbolic battle, more volatile than a battle over substance. The larger issues it stirred up were (i) questions about the wisdom of NASA's commitment to a big manned station and (ii) a contest between NASA and those who want to liberate and "privatize" parts of NASA's turf.

While NASA had no use for the lab, it found itself confronted by some allies of opportunity who did. These were the space station skeptics and promoters of space commerce. Working through the appropriations committees, they overrode NASA's objections and added a clause to the omnibus budget bill last December, promising $25 million for a "workable leased [Industrial Space Facility] vehicle." At the time, only one company, Space Industries Inc. of Houston, wanted to build such a vehicle.

NASA continued to resist. At this point, the appropriations committees threatened to withhold money for NASA's own space station if it would not cooperate.

In February, the President went along. He added the ministation to his own agenda, bowing to pressure from space business advocates in the departments of Commerce and Transportation (*Science*, 19 February, p. 856). Then NASA bowed, too, promising to issue a contract for the little station within 150 days.

In March, the other side retaliated. In this camp are NASA's old congressional friends and backers of the manned space station. Members of the authorization committees led by Senator Ernest Hollings (D–SC) and

Representative William Nelson (D–FL) pointed out that Congress had not authorized the little space lab, much less studied it in hearings. No one seemed to have a good fix on its cost or contents.

Meanwhile, a competing company joined the fray, pointing out that Space Industries Inc. was getting favored treatment. James Beggs, the former head of NASA who now runs a company called Spacehab, Inc., wrote to Nelson on 1 April saying that the proposed ministation "threatened the viability" of his own company. If the government committed $700-million worth of experiments to Space Industries' vehicle, "this might significantly reduce or eliminate any government usage for Spacehab, even though Spacehab could accommodate these experiments at greatly reduced cost. . . ."

By this time, Representative Edward Boland (D–MA), chairman of the space appropriations subcommittee in the House, had written to Nelson to confess that an error had been made. "Upon reflection, from a procedural point of view. . .perhaps we did have the cart before the horse" in committing funds to a project that was not authorized, he wrote on 16 March. Boland said he would ask to have the offending $25 million cut from the budget.

On 28 April, four senior members of the Senate authorization committee led by Hollings asked NASA to stop work on the Industrial Space Facility, which now bears a new generic name—the Commercially Developed Space Facility (CDSF). Hollings and company insist that the project must undergo a 9-month review, preferably at the National Research Council. They want to know what it will cost, what purpose it will serve, and what cheaper alternatives might be available.

The outlook for the little space station worsened last week. On 4 May, the chairman of House Science Committee, Robert Roe (D–NJ), estimated that the project would cost $2 billion if transportation fees were included, indicating he was not in favor of rushing forward. On the same day, Nelson's subcommittee voted to let NASA proceed with a request for proposals, but not to let NASA issue a contract without approval from Congress. The object is to see if companies can come up with "innovative financing" arrangements. In addition, the project cannot go forward unless NASA receives at least two "good faith" competitive proposals.

It is not clear whether the CDSF can survive this barrage of second thoughts. But it is clear, as one executive says, that all this "waffling. . .is going to make it very difficult for commercial space operations to attract investors." ■ **ELIOT MARSHALL**

Duke, NSF Reach Accord

An unusual dispute involving the National Science Foundation, Duke University, and the National Institutes of Health apparently has been resolved with a nudge from Congress. NSF has agreed to give Duke $1.2 million for a new engineering research center at Duke that the foundation originally, and unilaterally, said was contingent on additional funds from NIH.

Last 1 October, NSF advanced $667,000 to begin the Duke–North Carolina Engineering Research Center (ERC) in Emerging Cardiovascular Technologies, based at Duke's Durham, North Carolina, campus. But that figure was only about one-third of the $2 million that Duke could have expected from NSF during the first fiscal year.

To get more NSF money, Duke officials were told they would have to obtain new matching grants from NIH. Existing NIH funds could not be counted toward the match, NSF insisted (*Science*, 13 November 1987, p. 882). Duke has now received three new NIH grants that are acceptable to NSF, a foundation spokesman said last week, adding that future NSF funding is now likely.

Duke's predicament began in March 1987 when the National Science Board conditionally approved the center with some unique strings attached. Although engineering research centers are an NSF program, the board stipulated that NIH should provide one-third of the anticipated $14-million federal support for this project over the first 5 years.

The demand apparently stemmed from the Duke center's marriage of engineering and medical research. But NIH Director James B. Wyngaarden, a former chief of staff at the Duke Medical Center, had not agreed to any such arrangement, though the idea did have some support at the White House. Negotiations continued during the spring and summer of 1987, culminating in NSF's reduced funding award in October.

The resolution of the dispute was announced recently by Senator Terry Sanford and Representatives I. T. "Tim" Valentine, Jr., and David E. Price—all North Carolina Democrats. Their announcement noted that during a 23 March congressional hearing, Price and Valentine had "questioned NSF Director Erich Bloch extensively about NSF's treatment of Duke."

Sources told *Science* that NSF officials balked at accepting the three new NIH grants as appropriate matches during most stages of the negotiations with Duke. NSF officials apparently wanted NIH to provide a large grant for research in cardiovascular technologies. The three grants were smaller ones, for related work.

In a letter to Bloch, Representatives Robert A. Roe (D–NJ) Manuel Lujan, Jr. (R–NM), and Doug Walgren (D–PA) suggested that NSF agree to recognize such "individual and multiinvestigator NIH grants that relate directly to research to be conducted at the ERC." The new NIH grants, totaling $465,000 a year, were reportedly applied for after Duke had sent in its proposal for an engineering research center; and none had been awarded when the National Science Board acted.

Duke now expects to get about $1 million a year from NSF for the first 2 years. If it is awarded additional center-related NIH research funds that are currently under application, NSF support could grow to $2 million by the third year, according to a current scenario.

Because of the protracted impasse, NSF officials have reportedly agreed to extend the initial 5-year engineering research center project to 6 years. By the end of the 6 years, NSF could have awarded close to two-thirds of the $14 million that had been initially anticipated, with the rest of the federal money coming from NIH.

Duke officials were careful last week to accent the positive. "We naturally are very pleased that 12½ months of extensive effort by NSF, NIH, key congressional members, and Duke University have produced an excellent and fair solution," said Theo C. Pilkington, a Duke professor of biomedical and electrical engineering who is the center's director. "Over the next 5 years the Duke [ERC] will earn about $15 million to $20 million of federal support: $10 [million] from NSF and $5 to $10 [million] from NIH. And it will receive an additional $5 million to $10 million from industry and private foundations." ■ **MONTE BASGALL**

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