Another Giant Step Millions of television viewers are becoming familiar with the surface of Mars thanks to Pathfinder's little Sojourner rover that's bumping into rocks with names like Barnacle Bill, Yogi Bear, Scooby Doo and Calvin and Hobbes—all cartoon characters. It's somewhat playful on the part of NASA scientists and engineers at mission control in Pasadena and a radical departure from the tense, frontline atmosphere that pervaded Houston during the Apollo years of the cold war. Indeed, the space program suddenly is alive with sights and excitement, even with do-it-yourself cosmonauts and astronauts who are repairing the rickety 11-year-old Mir station with hardware that might have come from Home Depot. Space travel appears to be fun and games.

NASA chieftains are simply delighted that the paying public is once again in thrall of the costly space program. Among the wonders the agency continues to introduce is a web site that describes how to "Build Your Own Mars Pathfinder Spacecraft Model!" The site provides the spaced out with images of Sojourner that can be printed, cut out and pasted together. And a commercial spinoff will be available for Christmas. It is Mattel's Hot Wheels JPL Sojourner Mars Rover Action Pack Set, a toy that kids can actually ride, possibly to bump into objects with commonplace names. According to a press release from the Jet Propulsion Laboratory (JPL) in Pasadena, the new toy is "but one example of how the JPL Technology Affiliates Program works cooperatively with industry."

Academic Research and Tuition Costs Are undergraduate tuitions too high? That's the question before the newly appointed National Commission on the Cost of Higher Education, organized by Congress.

Increases in tuition and fees charged by the nation's colleges and universities from 1980 to 1994 averaged 225%, before adjusting for inflation—far steeper than the rise in median household income and the Consumer Price Index, which increased 82% and 74% respectively in the same period. This has led to accusations that undergraduate tuition is used to subsidize scientific research and other activities unrelated to undergrad education. Some critics contend that higher tuition is driven by the rising costs of scientific research, which are not fully covered by Federal grants. Such unreimbursed costs include charges for laboratory space originally built with Federal money and cost-sharing, sometimes a prerequisite for a Federal agency to make the grant in the first place.

But after examining the financial records of 1339 universities and four-year colleges, a National Science Foundation team, led by Rolf F. Lehming of the Division of Science Resources Studies, found that relative increases in tuition over the period were almost identical for all types of institutions, from the most to the least research-intensive and for public and private institutions of the same type. "The data strongly suggest that common underlying dynamics affecting all types of universities and colleges, rather than the presence or absence of organized research activity in some of them, are driving up tuitions and fees," wrote Lehming in an NSF issues brief.

Still, tuition and fees have historically been higher at public research universities than at other public institutions. In fact, in 1994 they were 14% more than those for other public doctoral institutions and 27% to 30% more than those for four-year colleges and universities.

Though the universities and colleges examined by NSF received about 60% of their total R&D funds from Federal agencies in 1994, they reported that $3.5 billion, or roughly 19%, came from their own unrestricted funds and, in the case of public institutions, from state funds for research. The amount included $1.85 billion, or about 9.5%, that was not reimbursed through overhead expenses to cover administration and maintenance, library costs and construction and renovation of research buildings and labs—all carefully monitored by the Office of Management and Budget, which is now revising the rates for overhead reimbursement on academic grants. Meanwhile, universities admit that some unrecoverable costs for research come from its own funds or from state sources, industry, private donors, campus stores, research royalties *and tuition*.

"It might be argued that, as growing research costs prompt research universities to increase their tuition charges, the other types of institutions follow suit—that is, that research costs in some institutions help drive up tuition in all of them," wrote Lehming. "However, it is equally conceivable that the research universities are merely responding to the latest increase in tuition charges of other institutions." So it's back to Congress's question.

No Ban on NIF On 8 August, Judge Stanley Sporkin of the US District Court in the District of Columbia denied the request by 39 environmental groups for a preliminary injunction to stop construction of the National Ignition Facility at Lawrence Livermore National Laboratory as well as two facilities at Los Alamos National Laboratory that will produce plutonium pits for the nation's nuclear weapons stockpile. The environmental groups, led by the Natural Resources Defense Council, had challenged the adequacy of the programmatic environmental impact statements (PEIS) prepared by the Department of Energy (DOE) for the facilities (see PHYSICS TODAY, August, page 46).

In his opinion, Judge Sporkin rejected the claim that DOE should have provided data on each element of its stockpile stewardship and management program in its environmental impact statement. Sporkin reasoned that DOE and its predecessor agencies have been producing and protecting nuclear weapons for more than 50 years, so that the stockpile program represents a continuing R&D enterprise. "The court cannot reasonably construe [the National Environmental Policy Act] or the [Council on Environmental Quality] regulations to require the DOE to prepare a single, comprehensive PEIS or that the scope adopted by the DOE in the PEIS was 'arbitrary and capricious,' " as the groups alleged, wrote Sporkin. "Indeed, if the court were to order that a PEIS be done with the comprehensiveness that plaintiffs request, it is very doubtful that any such document could be completed quickly enough and thoroughly enough to aid decision makers and the public before the politics and the technology changed. The only effect would be to strangle the [stockpile stewardship] program in its cradle."

Notwithstanding the thrust of his ruling, Sporkin granted the group's "reasonable request" for more information and justification as to why DOE chose not to examine other options for the program. He said "more disclosure is in order" and directed DOE to provide the groups with an explanation of why it dismissed an approach that would rely entirely on remanufacturing components of aging weapons and of why the department hadn't considered the option of consolidating the weapons labs and production facilities.

Sporkin also said the potential risks to the environment posed by NIF and the Los Alamos facilities were easily outweighed by the need to maintain a credible nuclear deterrent. He cited an assertion by Energy Secretary Federico Peña that a delay in implementing the stockpile stewardship program "may cause other countries to doubt or question the credibility of our nation's nuclear deterrent" and would result in "a significantly increased risk that the federal government would be forced to resume nuclear testing in order to ensure the safety and reliability of the stockpile." **IRWIN GOODWIN**