FERMI NEWS

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Photos by Jenny Mullins

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AT URA MEETING:

Word from Washington

With trends showing increased funding for health sciences and decreased funding for physical sciences and engineering, Rita Colwell, director of NSF, commented, "…Society cannot live by biomedical bread alone."

by Sharon Butler

Washington, D.C.—On February 4, in the wood-paneled Lecture Room of the National Academy of Sciences, representatives of universities and research institutions gathered to hear officials of the Clinton administration discuss details of the President's $1.77-trillion budget for fiscal year 2000 and its designs for science.

The occasion was the annual meeting and policy forum of Universities Research Association, Inc., a not-for-profit consortium of research universities that serves as a contractor to the U.S. Department of Energy for the operation of Fermilab. Its annual day-long meeting of "shareholders," the URA Council of Presidents, covered the usual business items: the elections of new member universities and of regional trustees and trustees-at-large, and reports from the URA president and chief financial officer, the chair of the URA board of trustees, the vice-chair of the Fermilab Board of Overseers, and the director of Fermilab.

But the policy discussion was, as always, the main draw for members. President Clinton had just presented his budget for fiscal year 2000 hailing a new era in fiscal abundance, and the assembled physicists and university chancellors, deans, vice presidents and provosts were eager to hear how much of that new-found wealth the high-energy physics community would see.

While reaffirming a strong commitment to research in science and technology, and acknowledging its value to the nation, the speakers at the URA forum offered, for the most part, a sobering assessment of prospects for funding in the coming fiscal year.

Sobering assessments

Stumping for the President's budget proposal, Rita Colwell, director of the National Science Foundation since August, called this "an excellent budget at the starting gate in what was (and remains) a very difficult budget environment."

She said that the administration had produced "a strong package of investments in research," increasing funding for basic research across the government by $700 million and funding for academic R&D by over $350 million. Moreover, under the President's proposal, the budget for the National Science Foundation would increase by six percent over last year's level, with support for research projects up by eight percent.

"Taken all together, these increases—both for NSF and for research in general—provide one more reminder of the administration's commitment to investing in fundamental research," Colwell told the URA members. "They make for seven years in a row of supporting increases in research. It may not equal Cal Ripken's streak—but it's a solid record, and it's still going."

Despite this upbeat message, however, Colwell conceded that funding for physical sciences was down. "I know that's not news to many of you, but it's taken more than a few people by surprise," she said.

James Sensenbrenner, chair of the House Committee on Science, will be working on implementing the recommendations in the report “Toward a New National Science Policy.”

Neal Lane, scientific advisor to the White House, called on URA members to let their voices be heard in Washington.

Photos by Jenny Mullins

Under the gaze of Albert Einstein, at the National Academy of Science, Peter Rosen (left) and John O’Fallon, of DOE, discuss the budget for nuclear and particle physics.

Photo by Jenny Mullins

Martha Krebs, of DOE's Office of Science, unveiled the President's proposed budget figures for high-energy physics.

According to statistics gathered by NSF's Division of Science Resources Studies, the mix of funding for federal research across different fields of science and engineering has changed dramatically over the last 25-plus years. Engineering's share has declined by 12 percent, and physical sciences by five percent, while support for the life sciences has risen 14 percent.

Colwell said she was fully aware that "society cannot live by biomedical bread alone."

Like Colwell, Neal Lane, formerly the director of the National Science Foundation and now the assistant to the President for science and technology, said that spending caps implemented under the 1997 Balanced Budget Agreement placed severe constraints on the budget for fiscal year 2000 despite a projected multibillion-dollar surplus.

And while Lane acknowledged "strong bipartisan support in Congress for the whole fundamental research area," he said that making the case for the physical sciences was particularly difficult. A large biomedical industry keeps a close watch on the budget for health sciences, he said, but the constituency for the physical sciences was more diffuse and the arguments for support more difficult for the public to understand.

"Your voice is uniquely important and must be heard," Lane told the URA members.

Budget numbers

Martha Krebs, director of the Office of Science at the U.S. Department of Energy, and her staff have gone through a labor-intensive exercise of restating the office's goals, with a view to informing and even inspiring sponsors and the general public. The four goals, or themes, for "Science for America's Future" are: fueling the future, protecting our living planet, exploring matter and energy, and extraordinary tools for extraordinary science.

But the reformulation of the office's goals did not translate into better budget numbers for high-energy physics. While funding for the field increased from $668.6 million in fiscal year 1998 to $695.5 million in fiscal year 1999, the President's budget proposal asks for $697.1 million in fiscal year 2000.

The audience also heard from one congressional member, James Sensenbrenner (R–Wis.), the plain-spoken chairman of the House Science Committee, which is responsible for developing and overseeing the government's science policy.

"We in Congress recognize the strong correlation between scientific advancement and a growing economy, which is why R&D continues as a top priority," Sensenbrenner said. He cited statistics from the American Association for the Advancement of Science: total federal support for R&D reached $80.2 billion last year, an increase of 5.3 percent over the previous year.

He said that the Science Committee would pursue an ambitious legislative agenda, including items pertaining to education, external regulation of DOE laboratories and tax credits for R&D. He also said he would work with the sponsors of the Rockefeller-Frist authorization bill that proposed doubling R&D spending over the next 11 years. The legislation was passed in the Senate last year by acclamation, but no companion measure was introduced or passed in the House.

In Sensenbrenner's view, the bill "was not the best approach to achieving our shared goals of increasing federal scientific research funding and extracting the maximum benefit from our federal investments."

"The Rockefeller-Frist bill, as I've said in the past, is an empty promise," Sensenbrenner told the URA meeting, "and it is time for you folks … to get real."

The approach Sensenbrenner favors is embodied in a study he commissioned last year to "establish a road map on how money for science should be spent." That 74-page study, entitled "Toward a New National Science Policy" and released in September 1998, reaffirms the "irreplaceable role" of government in funding basic research and makes several recommendations for funding priorities.

Just what the road map looks like for fiscal year 2000, however, is not yet clear. The President's budget is one map, the Science Committee's recommendations another. If the frenzied last-minute bargaining of the last few years is any guide, the spending plan that emerges nine months hence may not look at all like the one on the table now.

The Way I See It

Alvin Tollestrup—Tevatron master builder, charter member and former spokesperson of the CDF collaboration, and muon collider maven—speaks out.

Photo by Reidar Hahn

Reading this may make you mad!

There is an impending disaster in high-energy physics, and physicists are ignoring both the cause and the solution. With uncharacteristic detachment, the experimental-physics community is avoiding involvement in the choice and development of the next accelerator for this country. The machine that became Fermilab's Main Ring was first proposed by a small group of physicists at Caltech; the university community invented Universities Research Association to build and operate this machine, an approach that followed from a history of university-developed machines.

I believe that the greatest challenge to our field over the next 50 years will be the development of affordable high-energy accelerators. It will take originality, a superb knowledge of physics, and the involvement of all of us. The problems are just as challenging to solve as those of detectors, and much more urgent!

Currently at Fermilab it is hard to get the whole physics community involved in R&D for the next step in accelerators. True, the work of preparing the detectors for the next collider run is very demanding. Work on the new detectors for CERN's Large Hadron Collider absorbs many physicists. But if we don't start now to work on the accelerators of the future, our opportunity in the U.S. will be lost.

I think the trouble in accelerator research lies in three places: the universities, the physics labs, and the funding agencies. Graduate students sit at terminals running PAW (a physics analysis program) so that they can get jobs at universities peopled by graduates from our large collaborations in which THEY learned PAW. Once, Maxwell's equations and Mechanics were the test. The universities should restore accelerator physics to its rightful place.

Second, the labs must involve the academic community in accelerator experiments. There are very interesting problems: cancellation of space charge effects in hadron colliders, muon cooling, stabilizing beams in linear colliders, superconducting rf, optical stochastic cooling... Why couldn't a student commute from Harvard to work on a large accelerator experiment at Fermilab? We need to think hard how to structure these experiments to accommodate such activity.

Finally, accelerator research must have more money: for hardware at the labs and for graduate students at universities. I would like to see some positions for postdocs to work half time on ongoing experiments and half on machine-related physics.

Our roots are in physics, but we must have tools. I was lucky. At Caltech, my professors taught that for cutting-edge measurements one must develop cutting-edge tools. I hear "We can't work on that...it will be 20 years to ...." When I came to Fermilab 24 years ago, Wilson had superconducting magnets 10 feet long that reached 1 Tesla, or one-foot magnets at 3 Tesla. But the dream was there for a 1 TeV machine, and for colliding-beam experiments that eventually became CDF and DZero. It has been great fun, and we now have a beautiful physics program at Fermilab: the top quark, sin(2beta), b physics—with the promise of the elusive Higgs and maybe even supersymmetry in the next run.

But the step after that won't happen if we all sit at our terminals running PAW!

Workshops might help...

The idea: Breathe life into the (inter)national discussion of future accelerators

The plan: A yearlong series of lively get-togethers on accelerator topics

The dramatis personae: A noteworthy speaker, a gimlet-eyed panel of experts, and a roomful of physicists and students

The first one: What's Up Worldwide with Linear Colliders?

The speaker: Dave Burke, of SLAC

The experts: Mel Shochet, U. Chicago; Hassan Padamsee, Cornell; and Norbert Holtkamp, Fermilab

The time and place: Thursday, February 25, 1999, 3:00 p.m., Fermilab

The script: The speaker speaks; the panel fires the hardest questions they can think of; the audience—well, we don't know yet what the audience will do, but dozing is discouraged.

The ambience: Somewhere between an average physics seminar and wrestling in mud

The food: Pizza and beer for all participants (Grad students take note!)

The moving spirits: Norbert Holtkamp and Alvin Tollestrup, of Fermilab. Call them with questions.

Design STUDENTS take a **fresh look** at PARTICLE PHYSICS.

A New Spin

Carrying the message of science to new audiences always represents a challenge for scientists, and sometimes a new outlook can offer intriguing results.

With a bow to Marshall McLuhan, the medium was the message for five students studying advanced graphic design at the University of Illinois-Chicago's Department of Biomedical Visualization.

Their project, with direction from adviser Donna Marie Hughes of Hughes Design/Communications in Chicago, was to design a multipage magazine advertisement for Fermilab, to capture the attention of a specific segment of the general public. Their approaches ranged from architecture to classical music to men's magazines—and beyond.

The students—Phil Rampulla, Sonal Saghani, Ling Yang, Tiffany Lange and Chris Dobson—have moved on to internships across the country, but their work is on display for the next month in the east side exhibit space on the first floor of Wilson Hall. You can view selections of their creativity on the following pages.

Photo provided by UIC

The Young and the Insightful: from left, Tiffany Lange, Baltimore, Maryland; Ling Yang, Ann Arbor, Michigan; Phil Rampulla, Long Beach, New Jersey; Chris Dobson, Rockford, Illinois; Sonal Saghani, Chicago.