

crepit buildings and meager funding are at least partly responsible for the budget hike. Several years ago, the Treasury responded to such complaints by demanding stricter accountability at universities (see *PHYSICS TODAY*, August 1999, page 56). The results are bald figures that show that science and education have been on a starvation diet, says Cotgreave.

In its announcement of the budget hike, the Treasury stressed the need to boost the economy: "If UK manufacturers matched the productivity levels of France, Germany, and the US, and all else remained the same, the economy would be £70 billion a year better off, creating prosperity for all."

In other UK science spending news, oversight of the UK contribution to science at the European Space Agency will move to the research councils from more industry-oriented parts of their parent agency, the Department of Trade and Industry. As of 1 April, PPARC will manage an extra annual £8.2 million covering space science and the National Environment Research Council will take on the £40 million Earth observation program. In a similar transfer, EPSRC is gaining oversight of the country's roughly £15 million fusion physics program.

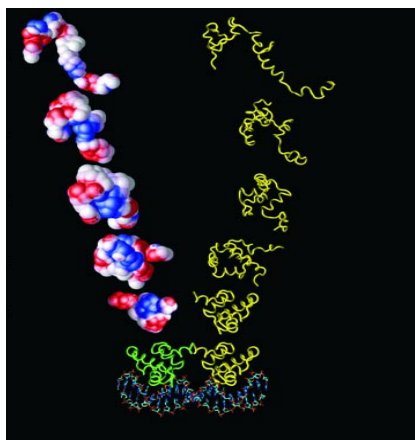
Toni Feder

San Diego Center Theorizes about the Physics of Biology

Applying the tools of theoretical physics to elucidate the mysteries of biology is the aim of the Center for Theoretical Biological Physics. Based at the University of California, San Diego, the CTBP kicked off this past fall with \$10.5 million as NSF's newest physics frontier center (see *PHYSICS TODAY*, November 2001, page 28).

Biology is in the process of switching from a descriptive to a quantitative science, says José Onuchic, a UCSD physicist who codirects the CTBP. "Bringing theoretical formalism to this open field is something physicists can do. I am not trying to find new physical laws, but to use a physics approach to ask what the underlying principles are that govern biology. That is where we want to move in." The CTBP partners are UCSD's division of physical sciences and supercomputer center, the Scripps Research Institute, and the Salk Institute for Biological Studies.

In one line of inquiry at the CTBP, scientists ask how molecular machines work, with protein synthesis



by ribosomes as a prototype. Another focus is genetic regulation. The center's third thrust is understanding the connections between spatial organization and signaling in cells. In heart cells, for example, an electric potential causes a calcium wave, which in turn leads to a biophysical force—muscle contraction. "It's a nonlinear, noisy process, and it has to function and have a reliable signal even in the presence of noise," says center codirector and UCSD physicist Herbert Levine. Common to all three projects is an approach that goes from the molecular level to the systems level and uses simulation and modeling with an eye on experimental results.

Also on the CTBP's agenda are education and training, in particular helping physicists from other subfields switch to biological physics. The center will run workshops and courses, and it will arrange for postdocs and students to have joint appointments with a physical scientist

Genetic switches. The role of protein binding to DNA in controlling genetic regulation, and hence protein production, is one area of research that scientists are pursuing at the Center for Theoretical Biological Physics. In this figure, two identical proteins (atomic and ribbon depictions) are shown as they progressively fold under the influence of electrostatic and many-body forces. They form a dimer and bind to a DNA segment. (Courtesy of Nathan Baker and Michael Prentiss, UCSD.)

and a biologist. "There is no better way to get them into both cultures," says Onuchic.

The CTBP adds to a growing investment in biology by NSF's physics division. It was also the only award last year under the agency's physics frontiers program, although two other proposals are in line should NSF find more money in 2003. NSF launched the frontiers program in 2001, and has since decided to call for proposals every three years instead of annually.

Toni Feder

News Notes

Name change for Gemini. One of the twin telescopes that make up the Gemini Observatory, the 8-meter Gemini North on Mauna Kea in Hawaii, was renamed the Frederick C. Gillett Gemini Telescope on 13 November in honor of the pioneer in infrared astronomy, who died in April 2001. The tribute was suggested by Gemini director Matt Mountain, who worked closely with

WEB WATCH

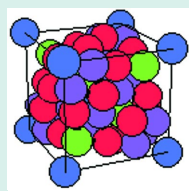
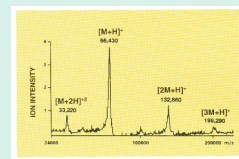


<http://www.science.org.au/nova>

Nova is an online collection of articles published by the Australian Academy of Science. The collection's aim is to provide high-school teachers with reliable and up-to-date information about newsworthy topics, such as synchrotrons, ethnomathematics, and noise pollution.

<http://www.asms.org/whatisms>

What Is Mass Spectrometry? is the question posed and answered by an eponymous online tutorial offered by the American Society of Mass Spectrometry. The illustrated tutorial describes the fundamentals of mass spectrometry and its many variations and applications.



<http://cst-www.nrl.navy.mil/lattice>

From the Naval Research Laboratory's center for computational materials science comes **Crystal Structures**. The computer-generated online database contains more than 200 different crystal structures indexed in four different ways.

To suggest topics or sites for Web Watch, please phone the editor at (301) 209-3036. *Compiled and Edited by Charles Day*