had terminated. But an OMB official warned on 15 November that the White House is unlikely to support Pluto funding in 2003 and that there is barely enough money to fund a mission to Jupiter's moon Europa, slated for launch around 2008. "The bottom line is we have no good options for planetary science in '03," OMB examiner Brant Sponberg told a National Research Council panel. As a result, he warned, "you guys are likely to lose money [for 2003 planetary efforts], not gain it." That would put the Europa mission, already estimated to cost about $1.1 billion, in jeopardy.

O'Keefe, who has been a defense appropriations aide in the Senate and more recently taught business and government at Syracuse University in New York state, has unusually strong connections to senior Administration officials for a NASA chief. "The Bush Administration clearly didn't want a space cadet," says John Logsdon, a political science professor at George Washington University in Washington, D.C. And that, after 10 years of a strong visionary with limited political clout, could work to NASA's advantage. **–ANDREW LAWLER**

ASTRONOMY

Dusty Young Star Gets New Birth Mates

Astronomers craving their first image of a giant planet beyond our solar system now have fresh targets to explore: newly identified siblings of Beta Pictoris, the most famous dust-shrouded star in the sky. A survey of the motions of nearby stars suggests that more than two dozen stars were conceived in the same womb as Beta Pic, thus exposing the closest and youngest stellar group yet known. Their youth and proximity to Earth make these stars "fantastically suitable for direct searches for warm, newborn planets," says astronomer Ray Jayawardhana of the University of California (UC), Berkeley.

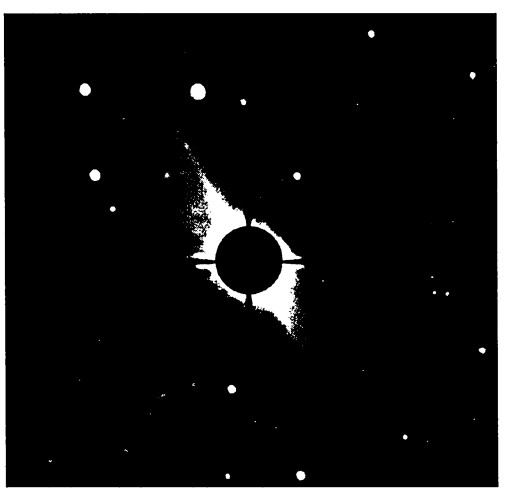
Beta Pic's fame dates to 1983, when the Infrared Astronomical Satellite photographed its vast cocoon of dust—the first glimpse of a suspected planetary system in the making. Theories predict that most stars arise in groups, so astronomers expected the apparently juvenile Beta Pic to have nearby companions hatched in a cluster from the same gaseous nursery. However, the first confirmed nest mates didn't turn up until 1999, when a team analyzed two youthful dwarf stars with trajectories that closely mimicked Beta Pic's path in space. The dwarfs raised hopes that more siblings were out there.

The family has indeed grown, according to a report in the 20 November issue of *Astrophysical Journal Letters*. Astronomers Ben Zuckerman and Inseok Song of UC Los Angeles and their colleagues describe 17 single and multiple star systems moving through space with Beta Pic. The stars were known before, but the team determined that the three spatial components of their velocities all match Beta Pic's three-dimensional motion to within 2 kilometers per second—an expected rate of drift from a dispersing cluster. Each star also exhibits at least one hallmark of adolescence, such as copious x-rays, rapid spin, or a dusty disk of its own. "Used together, the velocities and ages are powerful tools," says Song. "The chance that we have misidentified random stars as members of the Beta Pic group is extremely small."

The clan may hold the most promise for studies of emerging planetary systems, because young planets should be warm enough to shine brightly at infrared wavelengths. Although the stars have wandered to span one-quarter of the sky in the Southern Hemisphere, their average distance from Earth is a mere 100 light-years—the next town over, in cosmic terms. At about 12 million years old, they are younger than stars in the 30-million-year-old Tucana-Horologium association, which along with the Beta Pic group is the closest assemblage known. Another group, TW Hydrae, has the same age as Beta Pic's stars but is twice as far away.

Moreover, Beta Pic's group has the widest cross section of stellar types, including massive stars, dwarfs, and many stars like our sun. "These are the optimal stars to watch the evolution of dusty disks and to look for forming planets, especially if we're trying to make an analogy to our own solar system," Zuckerman says.

Others agree that the group is a boon for attempts to see planets directly. Adaptive-



CREDIT: PAUL KALAS/UC BERKELEY

Nuclear family. Dust-shrouded Beta Pictoris is the most visible member of a newly identified group of nearby young stars.

ScienceScope

Northern Exposure South Korean researchers are preparing to lift the lid on North Korean science with a Web site featuring research from their ultrareclusive neighbor. This month the Korea Institute of Science and Technology Information (KISTI) will begin uploading papers from North Korean scientists onto a Web site. The goal, says Choi Hyun-Kyoo, a researcher at KISTI, is "to improve communication and contacts with the North." The project, which has no formal input from North Korean researchers, will cost $55,000 for the first year.

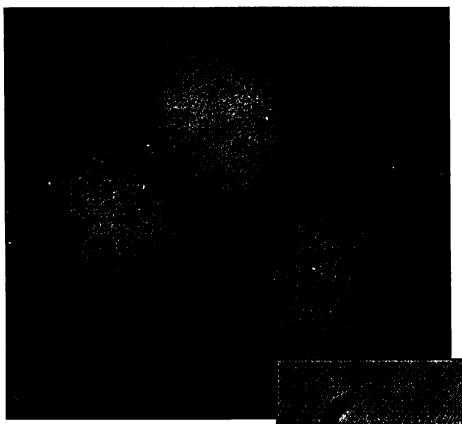
The bulk of the North's research is defense-related, but Hahn Sun-Hwa, a KISTI senior researcher, says it also claims to do world-class work in chemistry and mathematics. A contingent of North Korean students has twice in recent years won an international "Go" tournament held in Japan, he notes.

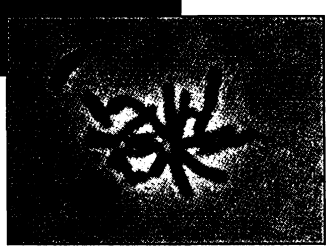
Because North and South Koreans often use very different words for the same science, Hahn plans on building a North-South dictionary for the Web site. The content initially will be in Korean, but KISTI hopes to start posting English abstracts as soon as early next year.

Smallpox Lives Health officials have been debating for a decade whether to destroy or preserve the last remaining samples of smallpox—held in secure vaults in the United States and Russia. The U.S. government this week ended the dithering: It will save its stocks for research, says Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases, who participated in Administration discussions.

Fauci says he's argued "for a couple of years that we should retain smallpox" for purely scientific reasons. "We need it to develop animal models of the disease, to conduct in vitro assays of new drug therapies and diagnostic tests, and to completely sequence various strains" for defense against potential variant forms, as well as a new vaccine. It was "verging on naïve," Fauci thinks, to assume—as a World Health Organization (WHO) plan for smallpox destruction did—that the only extant samples were those in official U.S. and Russian labs. He fears some Russian stocks may have fallen into "nefarious" hands.

The WHO's plan called for destruction of official smallpox samples by 2002. That agenda has now been nixed by U.S. bioterrorism concerns. Ironically, a chief designer of the defunct WHO plan is D.A. Henderson, a former smallpox fighter who recently became the top bioterrorism expert for the U.S. Department of Health and Human Services. Henderson could not be reached.





Genetic pack rats. *M. mazei* (*left*) and *R. palustris* both borrowed lots of genes from other organisms.

lution control, and better recycling of both natural and human-made products—which is why DOE funds microbial genetics in the first place.

One newly deciphered microbe is *Methanosarcina mazei*, a methane-generating archaea. Unlike most of its brethren that live in thermal vents and other hot environments, *M. mazei* thrives in freshwater sediments worldwide. Versatile in other ways as well, it can harvest the carbon it needs from acetate and so-called methylamines—and not just carbon dioxide. That makes *M. mazei* a "really major player" in the production of methane, a greenhouse gas, says Gerhard Gottschalk, a microbiologist at the University of Göttingen in Germany.

When Gottschalk and his colleagues started sequencing *M. mazei*'s genome 3 years ago, they expected it to be a tidy 3 million bases or less, as are the genomes of two other methanogens sequenced to date. Instead, Gottschalk reported at the meeting, *M. mazei*'s single circular chromosome proved to be 4.1 million bases long, about the size of the bacterium *Escherichia coli*. Its chromosome contains several sets of the same genes, apparently providing unanticipated redundancy for particular functions.

But it's the source of many of its genes that has researchers excited. "The amazing thing is that there were so many eubacterial genes," comments James Lake, an evolutionary biologist at the University of California, Los Angeles. Often microbial genomes reveal instances of horizontal gene transfer from one organism to another. "But it's never happened quite like this," says Lake. Of the 3300 predicted genes, about 1100 look like they used to belong to bacteria, Gottschalk reported. No one understands why this happened, but these numbers drive home "how little we understand about species' definitions," adds Judy Wall, a biochemist at the University of Missouri, Columbia.

The other microbe, *Rhodopseudomonas palustris*, a so-called purple nonsulfur bacterium, also comes with a panoply of unexpected genes. "The biggest surprise," says Lake, "is that it carries circadian rhythm genes." These genes were not thought to be part of the repertoire of bacteria or archaea, with the exception of an unusual group called the cyanobacteria, says Caroline Harwood, the microbiologist at the University of Iowa, Iowa City, who has been analyzing this microbe's gene content for the past year. Their presence suggests that these organisms are more sophisticated than microbiologists had suspected.

Another surprise is that this bacterium's genome more closely resembles the genomes of rhizobium bacteria that fix nitrogen for plants than those of other purple nonsulfur bacteria, Harwood reported. In particular, it has an unusual cluster of photosynthetic genes that are very similar to those in a rhizobium that infects soybean stems. Either this microbe borrowed a lot of genes from the rhizobium, or else the two are closely related. Finally, its genome revealed a plethora of genes that enable this microbe to break down complex organic matter—something other purple nonsulfur bacteria don't do—as well as fix nitrogen and produce hydrogen gas. "It's just an amazing collection of pathways," says Drell. But one would expect nothing less of a genetic pack rat. **–ELIZABETH PENNISI**

CREDITS: (TOP TO BOTTOM) SEBASTIAN BÄUMER; CAROLINE S. HARWOOD/UNIVERSITY OF IOWA

SELF-ASSEMBLING MATERIALS

Coated Nanofibers Copy What's Bred in the Bone

If imitation is flattery, Sam Stupp has just paid nature a high compliment. On page 1684, Stupp, a materials scientist at Northwestern University in Evanston, Illinois, and his postdocs Jeffrey Hartgerink and Elia Beniash report creating a self-assembling material, made from organic molecules with a mineral coat, that closely mimics bone. The feat opens the door to making a synthetic replacement for bone. And because the chemistry of the self-assembling molecules is simple to change, it also gives researchers a general strategy for forming a wide array of organic-inorganic fibers.

"It's a major step forward" for the field of self-assembled materials, says Ulrich Wiesner, a chemist at Cornell University in Ithaca, New York. The new work, Wiesner says, distills the essential lessons that have been learned about how bone forms and incorporates them into a synthetic molecule that is simple to produce. "It connects the

ScienceScope

U.K. Cloning Controversy A legal ruling on a law governing embryo research might allow Italian fertility doctor Severino Antinori to attempt human reproductive cloning in Britain. On 15 November, Britain's High Court ruled that the Human Fertilisation and Embryology Act, passed in 1990 and amended last year, covers only embryos created by the union of sperm and egg and not those created by nuclear transfer procedures—i.e., cloning. A day later, Antinori told BBC television he planned to exploit the loophole by setting up a baby-cloning program in Britain, an idea the government opposes.

Some scientists, however, would like to create genetically matched pluripotent stem cells from cloned embryos, and last year Parliament voted to allow such limited cloning. Last week's ruling—in response to a lawsuit by British abortion opponents—apparently nullifies that vote and calls into question the government's ability to allow just certain types of cloning. After their victory, antiabortion groups called for quick legislation outlawing all forms of human cloning, but the government said it will appeal the decision.

The ruling does not end the government's ability to regulate stem cell research. Studies on cells derived from embryos not created by cloning are still overseen by the government.

Sound Bites It's pretty hard to argue with a commitment to research excellence. Or more interdisciplinary collaborations, or helping underserved populations. So the Canadian Institutes of Health Research (CIHR) won't need to spend much time defending its new suggestions for strengthening the country's health research.

But CIHR president Alan Bernstein warns scientists that these fuzzy generalities may take on a harder edge when used for judging funding proposals. "If someone puts forward a large initiative that doesn't fall into these [categories], they'll have to articulate a clear reason why it should be considered," Bernstein says.

In particular, Bernstein suggests that biomedical scientists figure out how to take advantage of hot areas such as bioinformatics and combinatorial chemistry. "This is, to some extent, my own view of where the action is going to be," he says. Whatever idea they pitch, he adds, researchers should spell out how it will "build Canada's international leadership through national excellence in health research."

Contributors: Mark Russell, Eliot Marshall, Gretchen Vogel and Aude Sonneville, Wayne Kondro