



certain to receive more funding in coming years, given the White House focus on the moon. Horowitz's office will launch a lunar orbiter in 2008 to reconnoiter for possible landing sites, and Cleave hopes to include a bevy of scientific instruments on the flight. She told the council that supporting any more lunar research, however, would leave less for other areas of science.

Although Cleave is an ecologist by training, she has no oversight of NASA's biological and physical sciences. That portfolio belongs to Horowitz, who is drastically reducing funding for a host of experiments designed for the space station. He's already canceled at least half of NASA's current life sciences grants and contracts. Much of the research planned for the station has little connection with Bush's plan to return astronauts to the moon and continue to Mars, Horowitz told *Science*.

That view is at odds with a new report from the National Academies, which warns that abandoning fundamental biological and physical research "is likely to limit or impede" research into the impact of the space environment on astronauts. The panel notes that "once lost, neither the necessary research infrastructures nor the necessary communities of scientific investigators can survive or be easily replaced." The panel argues that NASA needs a detailed plan to



Stretched thin. NASA's Mary Cleave says space science is "overcommitted."

use the station for a host of research endeavors, including studies on the effects of radiation on biological systems, loss of bone and muscle mass during space flight, fire safety, and flow and heat-transfer issues. Several Democratic lawmakers are critical of the cuts in life sciences research, but staffers and lobbyists say that their voices are unlikely to rescue the projects.

Even if Horowitz were to reverse his decision, NASA's plans to halt shuttle flights by 2010 would make it difficult to carry out some research on the space station. William Gerstenmaier, head of NASA's space flight efforts, told the agency's advisory council that the shuttle is needed to return experiments and materials to Earth. Without those flights, he says, "you would have to do more in situ research." That research, in turn, would require more complex equipment and crew time.

NASA needs an additional \$1.4 billion to redesign space station parts and buy spares so that the station can keep operating without the shuttle, Gerstenmaier added. That money is part of an estimated \$6 billion in additional funding for space flight that is not yet included in NASA's future budgets. On top of that long-term fiscal crisis, the agency expects to receive from Congress less than half of the \$760 million in damages its facilities suffered from Hurricane Katrina. Congress may also impose an across-the-board cut to all agency budgets to cover hurricane costs, although that didn't stop it from inserting nearly \$300 million in pork-barrel projects into NASA's \$16.46 billion budget. Such external pressures spell additional trouble for a science effort already suffering from its own excesses. **—ANDREW LAWLER**

STEM CELLS

Landmark Paper Has an Image Problem

New questions about scientific validity are dogging South Korean cloning researcher Woo-Suk Hwang and his colleagues. On 4 December, Hwang notified *Science* editors that a figure in online material that accompanies his group's heralded 2005 paper on the derivation of stem cells from cloned human embryos contained duplicate images. The problem follows close on the heels of Hwang's admission that, despite his previous denials, two members of his lab had donated oocytes for his group's experiments and others had been paid for their donations (*Science*, 2 December, p. 1402).

Katrina Kelner, *Science* deputy editor for life sciences, says it appeared that the duplicate panels were not part of the original submission but had been sent in response to a request for high-resolution images after the paper had been received. "From the information that we have so far, it seems that it was an honest mistake," she

says. "We have no evidence that there was any intent to deceive."

In May 2005, Hwang and his colleagues reported that they had produced 11 new human embryonic stem (ES) cell lines that carried the genetic signature of patients with diabetes, spinal cord injury, or a genetic blood disorder (*Science*, 20 May, p. 1096). The paper not only seemed to validate the group's claim a year earlier that it had created a single cell line from a cloned human embryo, but it also reported a huge increase in efficiency for the technique. In the first paper, researchers said they produced one cell line from 230 tries, but in the second, they claimed they produced a cell line in about one of 15 attempts.

The figure in question is supposed to show patterns of expression for a range of ES cell markers in the 11 cell lines. But it contains four pairs of apparently duplicated images, even though they are labeled as showing different cell lines. Gerald Schatten

of the University of Pittsburgh in Pennsylvania, who was the corresponding author on the paper and provided the high-resolution images to *Science*, declined to comment. A university spokesperson said that the university's office of research integrity had begun an investigation. Schatten and his lab members are cooperating, she said, "and are carefully going through the data we have access to to determine how it could have happened." She said Schatten would not comment during the investigation, which might last 6 months.

Rudolf Jaenisch of the Whitehead Institute for Biomedical Research in Cambridge, Massachusetts, says he still has confidence in the reported results. "This is an extremely important study, and I have no reason whatsoever to question any of the published data," he says.

Kelner says the journal will issue a correction once the editors are satisfied they understand what had happened. **—GRETCHEN VOGEL**

CREDIT: MARTY KATZ