

## NEWS

# Planet hunters lose out to Hubble rescue

**A**stronomers' elation at the prospect of a rescue for the Hubble Space Telescope is turning to dismay as the price of saving the venerable observatory becomes clear.

Last week, NASA turned in a revised budget plan to Congress that includes cuts and delays to several programmes, including the roving Mars Science Laboratory and searches for planets like Earth. The proposed cuts would also lead to belt-tightening in the Hubble project itself, where grants for guest observers would be reduced by an average of 13%.

Two planet-hunting projects — the Space Interferometry Mission (SIM) and the Terrestrial Planet Finder (TPF) — have been deferred until as yet unspecified dates. SIM would orbit the Sun, measuring stars' positions and trying to detect planets similar to Earth. The TPF, which consists of two space-based observatories, would follow up SIM's findings between 2014 and 2020 with detailed spectral analyses.

Both projects have been scaled back before. SIM is currently undergoing another redesign in an attempt to keep its cost below \$1.2 billion. One possibility, says Charles Beichman of the Jet Propulsion Laboratory in Pasadena, California, who is on the SIM and TPF teams, is to advance its launch to 2010, because

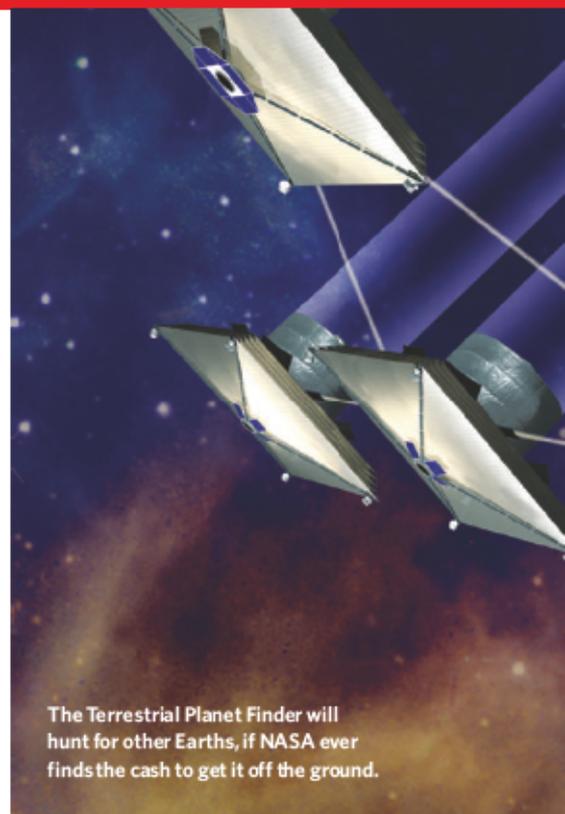
shorter development times often reduce costs. But that now looks unlikely.

The TPF was among the top recommendations of a National Research Council panel that set priorities in 2000 for the next decade of astronomy. But it is fraught with technical challenges — the panel called it “the most ambitious science mission ever attempted by NASA”.

Deferring SIM and the TPF would be a blow to NASA's planetary search programme, which is already struggling with near-term projects. A plan to supplement the 10-metre ground-based optical Keck Telescopes, on Mauna Kea in Hawaii, with small ‘outrigger’ telescopes to detect Uranus-sized planets has been bogged down for years by battles with local cultural-rights groups (see *Nature* 417, 5; 2002). And recent budget cuts have delayed the launch of the Kepler mission to look for very distant planets by eight months to June 2008.

Ground-based telescopes have found 155 planets around other stars and the European Space Agency lists the search for such ‘extra-solar’ planets among its priorities for the next decade. This leaves Beichman and others worried that NASA is neglecting a promising field.

Some are also anxious that the cost of a shuttle rescue mission to Hubble is squeezing



The Terrestrial Planet Finder will hunt for other Earths, if NASA ever finds the cash to get it off the ground.

— or giving NASA an excuse to squeeze — other projects. Most astronomers would support saving Hubble if money were no object. But an increasing number agree with Nobel laureate and astrophysicist Joseph Taylor of Princeton University, New Jersey, who told a congressional committee: “I do not favour such a plan if it would require major delays or reordering of NASA's present science priorities.”

David Black, chairman of the American Astronomical Society's public-policy committee, says the balance of opinion has shifted towards the idea that Hubble isn't worth the sacrifice of future missions. Yet he says the telescope is only one of NASA's financial

## Large genomic differences explain our little quirks

### COLD SPRING HARBOR, NEW YORK

When the finished sequence of the human genome was unveiled last year, biologists said that it told a story of harmony for the human family. Every one of us, it turns out, shares 99% of our DNA with all the other

people on Earth. But it's our differences that really fascinate us. And at last week's annual genome meeting in Cold Spring Harbor, New York, scientists revealed a wealth of data indicating a surprising conclusion about human diversity — much of it might be explained by large structural differences between individual genomes, not by tiny differences in individual genes.

Biologists used to think that our genomes all had the same basic structure — the same number of genes, in roughly the same order, with a few minor differences here and there in the sequence of DNA bases. Now, technologies comparing whole human genomes show that this picture is incomplete.

Two years ago, a group of researchers led by Michael Wigler at Cold Spring Harbor

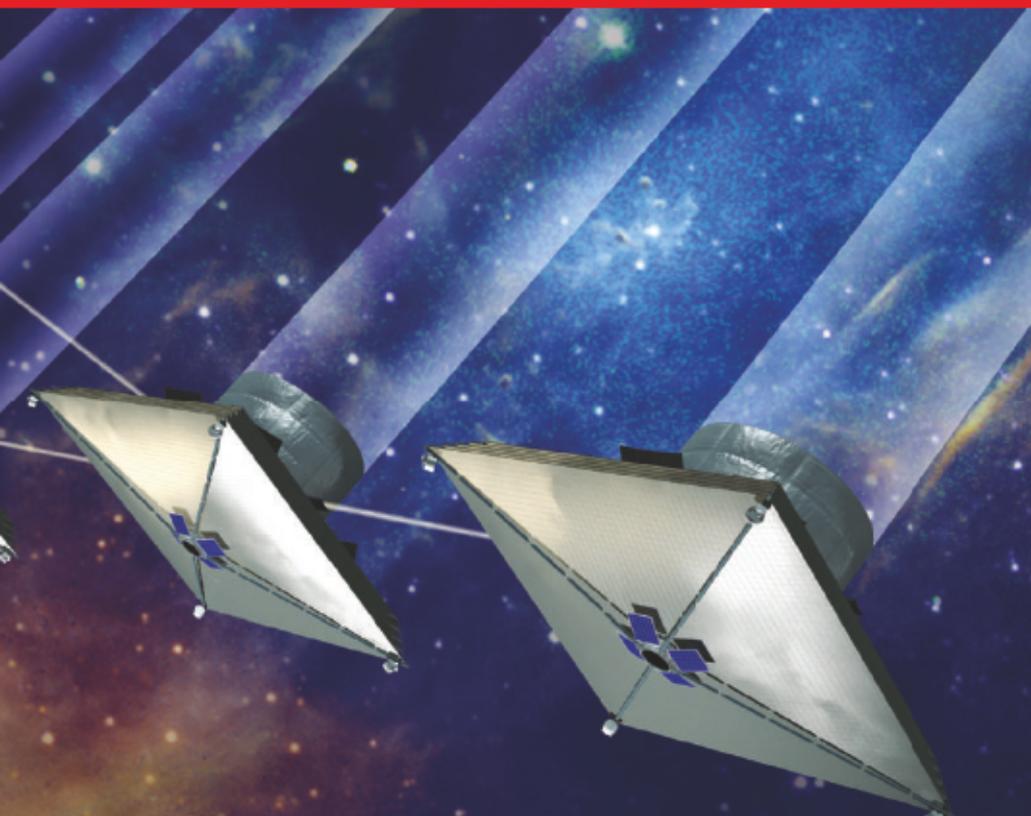
Laboratory found the first evidence that some of us have more copies of certain genes than do others (R. Lucito *et al. Genome Res.* 13, 2291–2305; 2003). And at last week's meeting, Evan Eichler of the University of Washington in Seattle reported that this is just the beginning: not only do we carry different copy numbers of parts of our DNA, we also have varying numbers of deletions, insertions and other major rearrangements in our genomes.

In fact, Eichler found at least 297 places in the genome where different individuals have different forms of these major structural variations. At these spots, some of us might carry a major deletion, for example, or an extra hundred bases of DNA.

But do such differences mean anything?

IMAGE  
UNAVAILABLE  
FOR COPYRIGHT  
REASONS

People's genomes just don't line up.



NASA

headaches. Equally to blame are congressional 'earmarks' for pet projects, and cost overruns in many of its science programmes.

The latest example of that is the James Webb Space Telescope, due to launch in 2011. In early May, project managers learned of a \$1-billion overrun that has raised its price to a whopping \$3.5 billion. No obvious solution is in sight, says project scientist John Mather of the Goddard Space Flight Center, based just outside Washington DC. Shrinking the telescope is not acceptable to astronomers. "What comes next we don't know," says Mather.

The new NASA administrator Michael Griffin presented the revised budget to a Senate

appropriations panel last week. "NASA cannot afford everything that is on its plate," he says.

Griffin's solution is to cut projects in the early stages of development. He also made it clear that: "In order to service the Hubble Space Telescope and provide for a safe deorbit, NASA will need to defer work on more advanced space telescopes."

He did have some good news — a NASA team thinks it can cut the number of missions required to complete the International Space Station from 28 to 18, and it is still trimming. At half a billion dollars per shuttle flight, such savings are very welcome. ■

Tony Reichhardt

Here, too, fresh evidence paints an intriguing picture. In January, scientists at the Iceland-based company deCODE Genetics found a long inversion — a stretch of DNA that is flipped around backwards — that is common in Europeans, but not in Asians and Africans (H. Stefánsson *et al.* *Nature Genet.* 37, 129–137; 2005). They also found that women who have this inversion bear more children than those who don't — a classic sign that the inversion confers an evolutionary advantage.

At the Cold Spring Harbor meeting, scientists presented more evidence that structural differences are important in human evolution. Duc-Quang Nguyen, a postdoctoral fellow in Chris Ponting's laboratory at the University of Oxford, UK, reported an analysis of areas where there are different numbers of copies of DNA stretches. Nguyen found that natural

selection is actively working on these genes.

What's more, he found that many of these genes belong to groups that seem to help us interact with our environment. For instance, many work in the immune system, and affect how we fight off disease. These are exactly the sort of genes that could explain our diversity — why some of us get asthma when exposed to air pollution, or why some of us can eat plenty of cheeseburgers without gaining weight.

"We knew these variations existed, but this year we're asking, do they matter?" says Ewan Birney, head of bioinformatics for the European Molecular Biology Laboratory, based in Cambridge, UK. "The answer seems to be yes."

We're still one human family, of course; but our DNA landscapes are a lot more varied than we had thought. ■

Erika Check

## ON THE RECORD

**"We decided we could alter the discovery date for the opening of the movie."**

Paleontologist John Horner explains how he misled the press about his *Tyrannosaurus rex* discovery in order to promote *Jurassic Park III*.

**"Antiretroviral drugs are expanding the AIDS epidemic."**

South African maverick Matthias Rath takes out an outrageous full-page advert in *The New York Times* to accuse drug companies and the United Nations of genocide.

**"'Because it's there' was reason enough to conquer Everest, but is it enough for scientific projects?"**

Australian health minister Tony Abbott calls for heavier regulation of scientists.

## SCORECARD



**Orbiting tourists**  
Dennis Tito's travel agents open a Tokyo office — so those with a yen for space should head for Japan.



**Mars Express**  
Don't expect the next 'Water on Mars'

headline just yet. The first of the orbiter's three water-divining radar booms has unfurled, but snags delay the next two.



**Fusion project**  
Negotiators discussing where to build the ITER fusion reactor vehemently deny reports of an agreement. That July deadline is looming.

## NUMBER CRUNCH

**\$4 million** What USAID spends on bednets, drugs and insecticides to combat malaria.

**\$10.5 million** What USAID spends on research into possible malaria vaccines.

**\$65.5 million** What USAID spends on other costs, such as technical advice and consultants.

*Estimates from Roger Bate, US director of Africa Fighting Malaria, in his Senate testimony (see page 257).*