University of Calgary in Alberta notes, paleontologists can put a cap on ecological questions such as how much territory a tyrannosaur could patrol in a day and how many top carnivores an area could support. Hutchinson says the technique of calculating minimum muscle mass could be used to answer other questions, such as whether sauropods or pterosaurs could walk bipedally and which early tetrapods had the strength to walk on land. –ERIK STOKSTAD

ASTRONOMY

Solar System Kicks Up Its Own Dust

An alien civilization might be able to deduce the existence of planets in our solar system by examining the infrared light emitted by a ring of dust around our sun. A team of astronomers argues that the telltale dust could not have formed without planets, and they propose that stars surrounded by similar rings may be a good place to search for extrasolar planets.

Dust beyond the orbit of Saturn was first detected in the 1970s by NASA's Pioneer 10 and Pioneer 11 spacecraft. But no one knew whether it came from inside or outside the solar system. One clue came from the realization that the dust must get replenished—otherwise, it would get sucked up by the sun or ejected from the solar system.

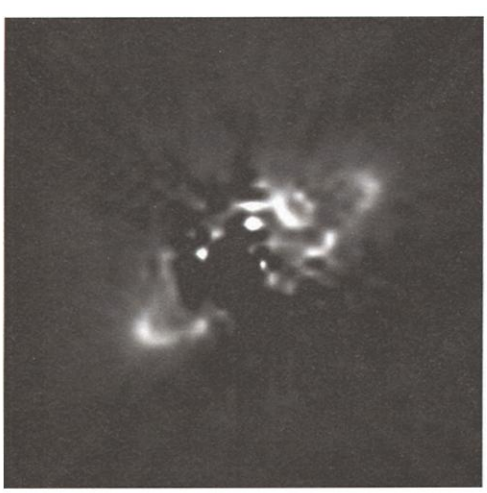
Markus Landgraf of the European Space Agency (ESA) and colleagues suspected that colliding objects in the Kuiper Belt—a flat cloud of debris in the outer solar system probably left over from planet formation—might be kicking up the dust. Using measurements of interstellar dust recorded by detectors aboard ESA's Ulysses spacecraft, the team determined that the grains the Pioneers had observed were too coarse to have come from outside the solar system. The only possible source is the Kuiper Belt, according to computer simulations to be published in *The Astrophysical Journal*. Landgraf's team calculates that about 50 tons of dust are created each second inside the belt—enough to maintain a dust ring that should be bright at infrared wavelengths when seen from afar. Another key signal of planets should be a distinctive pattern of gaps and edges in the dust cloud, carved out by gravitational resonances with Jupiter and other giant planets.

"It's a very interesting report," says David Trilling of the University of Pennsylvania in Philadelphia. "Looking for gaps or structures in dust disks [around other stars] is a very compelling way to look for planets." Rings of dust that emit infrared light have been discovered around a number of nearby stars, and Trilling's team has been searching for dust around more than 40 others. So far, though, no one has found stars that have both planets and a dust ring.

–GOVERT SCHILLING

Govert Schilling is an astronomy writer in Utrecht, Netherlands.

CREDITS: (TOP TO BOTTOM) JAN PITMAN/AP; ESA



Dusty disk. Seen from afar at infrared wavelengths, our solar system might resemble star HR4796A, which also sports a bright dust ring.

JAPAN'S UNIVERSITIES

Reforms Would Loosen Bonds, Cut Safety Net

TOKYO—Japanese academics appear set to win new freedoms that would allow closer collaborations with private companies and greater autonomy in spending research grants. But they may have to pay a steep price: an end to the security of jobs for life and, perhaps, stricter evaluations of the quality of their work.

Last week, an advisory panel to the Ministry of Education, Culture, Sports, Science, and Technology recommended abolishing civil servant status for academics. The recommendation, expected to appear in a final report later this month, would grant administrators flexibility in hiring, including the option of putting staff on fixed-term contracts. If the change applies to current employees—now subject to legal debate—it could affect 60,000 faculty members and 58,000 staff at 98 national universities and 15 institutes.

As civil servants, academics enjoy lifetime employment, and the vast majority of researchers remain at one institution for their entire careers. Reformers have argued that this leads to a stagnant scientific environment. "The biggest problem of the university system is the lack of mobility [among academics]," says Shinichi Nishikawa, a molecular geneticist at Kyoto University's Graduate School of Medicine, who serves on the advisory panel.

The employment issue is the last major

ScienceScope

Patent Fight, Round 2 French, Belgian, and Dutch groups are opposing the second of three European patents awarded last year to an American biotech company for a breast cancer test. The test, marketed by Myriad Genetics of Salt Lake City, Utah, detects mutations in the *BRCA1* gene, which are responsible for more than half of all hereditary breast cancers. Opponents argue that the patents are too broad and would block the development of alternative tests. The challenge, filed with the European Patent Office in Munich on 22 February, is supported by the governments of the three countries.

Last fall, many of the same organizations—including the Curie Institute in Paris and Belgian and Dutch human genetics societies—filed a challenge to the first patent, which covers use of the gene's sequence to create diagnostic tests (*Science*, 14 September 2001, p. 1971). The second patent covers a list of specific mutations in *BRCA1* implicated in breast and ovarian cancers. The patents give Myriad "a monopoly on genetic testing anywhere and anyhow," says molecular geneticist Dicky Halley of Erasmus University in Rotterdam. Greenpeace protesters hung a banner on the patent office in Munich (above).

Myriad officials were not available for comment, but they have said that the patents are justified.

Loka Lucre Supporters of the Loka Institute are scrambling to save the nonprofit organization from a severe cash crunch. Founded in 1987, the Amherst, Massachusetts–based Loka is devoted to increasing grassroots involvement in science and technology. It has pioneered the U.S. use of "science shops," workshops designed to address local issues and attract input from community groups.

But executive director Jill Chopyak resigned last month, and the funding climate for nonprofits "has been brutal," according to a recent board statement, forcing the group to suspend operations.

Still, Chopyak believes the problems won't be "the death of Loka. The board is really committed to expanding the donor base." Directors say they want to raise $100,000 by 1 August. For the time being, Khan Rahi, who coordinates Loka's Community Research Network, will oversee the institute.

Contributors: Elizabeth Finkel, David Malakoff, Michael Balter, Andrew Lawler

unresolved question in an ambitious effort to denationalize Japan's academic institutions. Moves along these lines grew out of efforts launched in the mid-1990s to slim the country's bureaucracy. The academic community at first resisted the reform push, seeing it primarily as an attempt to cut spending. But it has since warmed to the idea. Independence would in principle give universities a freer hand in structuring programs, setting research priorities, and handling budgets—functions now scrutinized by the education ministry (*Science*, 13 August 1999, p. 997).

Although the die is cast for the overall direction of the reforms, the ministry and its advisory councils will begin hammering out the details of implementation only after the recommendations are finalized. One thorny question is whether the new rules will apply to current employees or only to those hired after the institutions become independent. The consensus of the ministry's labor subcommittee is that it would be best to put existing faculty members on fixed-term contracts and make them earn reappointment.

It is unclear, however, whether the government has the legal right to alter the status of current employees. There are also practical matters to settle, including how to fund pensions for employees put on contract. "There could be a lot of problems during the transition phase," says Nishikawa. Resolving such issues could take "2 years or 3 years or longer," says Naokazu Odani, head of the ministry's university reform office. For many academics looking to break free of Japan's rigid bureaucracy, it may well be worth the wait. **–DENNIS NORMILE**

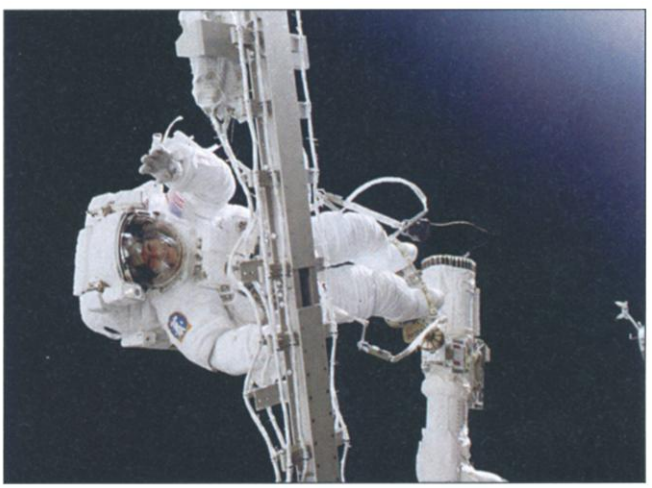
SPACE SCIENCE

NASA Decision Not Suited for Women

NASA has halted work on a $16 million program to develop a space suit designed for smaller women. The decision, which could make it harder for women to make it into space, comes at a time when only one female astronaut is slated to fly aboard the international space station in the next 3 years. Together, these developments raise concerns among some engineers and researchers that biomedical data gathered aboard the orbiting lab will be skewed toward men.

NASA officials blame budget pressures for the recent decision, saying they can't afford the $9 million needed to complete work on the new, smaller suit and that only a small percentage of women astronauts would be affected. But a recent internal report obtained by *Science* urged NASA to continue the program, arguing that a smaller suit would benefit some 20% of the astronaut corps—including smaller men. Critics of the decision, many of whom requested anonymity, also note that NASA in recent years has spent millions on an extra-large space suit and a redesigned Russian Soyuz capsule to accommodate bigger men. "The lack of a small suit precludes lots of women from flying," says Yvonne Brill, a retired engineer and former member of NASA's Aerospace Safety Advisory Panel.

Space suits are complex assemblages of arms, gloves, legs, and boots of varying length held together by a hard upper torso. And they are expensive, thanks to the custom design and batteries of tests required on the ground before flight. That upper torso now comes in three sizes: medium, large, and extra-large. They fit some 90% of all men but only approximately 60% of all females, who tend to have narrower chests and shorter arm spans, according to Paula Hay, deputy program manager at Hamilton Sundstrand, which builds the suits for NASA. The smaller size would have accommodated up to 95% of women, she adds. Almost one-third of the current corps of nearly 100 mission specialists—astronauts who are not pilots—are women.



CREDIT: NASA

Well suited? Anchored to a robotic arm, astronaut Susan Helms works in orbit during a March 2001 shuttle mission. Only one other woman is scheduled for a space station flight through 2004.

Until the late 1990s, NASA offered a different kind of space suit that came in five sizes, including small and extra-small. That model was gradually abandoned for one that allowed astronauts to perform more complex maneuvers, such as building the space station. The large and medium sizes first flew in 1998. The extra-large version, which fits about 20% of all astronauts, was added in 2001, and the smaller version was slated to debut in 2003.

The current suit puts some women at a disadvantage in qualifying tests, because it often is not a good fit. In order to fly, astronauts must demonstrate their maneuverability while in Houston's Johnson Space Center Neutral Buoyancy Lab (NBL), a large swimming pool that mimics zero gravity. Women who performed well during tests using the old suit have had trouble managing the hard upper torso version, according to the internal NASA study, "and therefore cannot perform well in the NBL." Low scores make it hard for astronauts to win coveted slots aboard space flights, says Brill. The small hard upper torso suit would have given smaller women a better fit.

The issue goes beyond gender balance, says Judith Swain, chair of the medicine department at Stanford University in Palo Alto, California, and a member of the National Research Council's space biology panel. "There's a big advantage in flying smaller people," she notes, because they consume fewer resources and take up less room on the cramped space station. "This decision seems a little bit shortsighted." And a 1999 workshop report by the National Space Biomedical Research Institute in Houston strongly urged NASA to increase data-gathering on women, given the differing effects that microgravity likely has on the sexes. The report added that "a space 'glass ceiling' should not exist based on size or gender."

Even with a new suit, however, getting more women into space may be difficult. NASA managers are considering significant cuts to the astronaut corps as another budget-saving measure, a move that some agency officials say could further reduce the number of women astronauts who make it into orbit.

Shannon Lucid, NASA's new chief scientist and a veteran astronaut, declined comment on both matters. Critics of the decision say they may seek out receptive members in Congress, who have repeatedly heard NASA officials describe how more data about women's health in space might lead to advances in solving Earth-bound problems such as osteoporosis. That audience, they note, includes Senator Barbara Mikulski (D–MD), chair of the panel that oversees NASA's budget. NASA officials have left themselves some room to maneuver, however, should the politics get hot. Agency spokesperson James Hartsfield called the decision a "deferral" rather than a cancellation. But with 2.5 more years of work needed to get the small suit ready, any delay decreases opportunities for women. **–ANDREW LAWLER**