January to name an Asian-American ombudsman, Jeremy Wu, to handle diversity issues for the department. DOE also released a report on racial profiling that found widespread concern among Asian Americans about "insensitive and offensive" accusations of spying aimed at ethnic Asians, whether foreign or U.S. nationals.

Meanwhile, Domenici said that he would like to see the government drop its investigation of the loss and recovery of two computer disks at Los Alamos holding classified weapons information (*Science*, 23 June, p. 2109). In a fiery statement during a debate over DOE's funding bill, Domenici challenged the FBI, saying, "If you can't prove there is spying or espionage, you ought to get off their backs." The FBI hasn't responded.

–ANDREW LAWLER

With reporting by David Malakoff.

PLANETARY SCIENCE

'Spiders' Channel Mars Polar Ice Cap

REYKJAVIK, ICELAND—Scientists studying the latest high-resolution photos of the martian south polar ice cap think they may have found additional clues to its ebb and flow. These hints of the planet's bizarre atmosphere come from a new class of dramatic-looking terrain features whose dark, multilimbed, vaguely radial designs have earned them the moniker "black spiders," and another group of dusky, spreading features called "dark fans."

At a recent gathering of Mars researchers,* Hugh H. Kieffer, a planetary scientist at the U.S. Geological Survey in Flagstaff, Arizona, proposed that the spiders might be subsurface gas channels, visible through an unusually transparent section of the martian ice. Within the legs, he suggested, blow hurricane-speed jets of carbon dioxide generated as the spring sun vaporizes the CO_2 ice deposited at the poles each winter. The jets may carry dust, he added, which spreads in fanlike shapes over the ice.

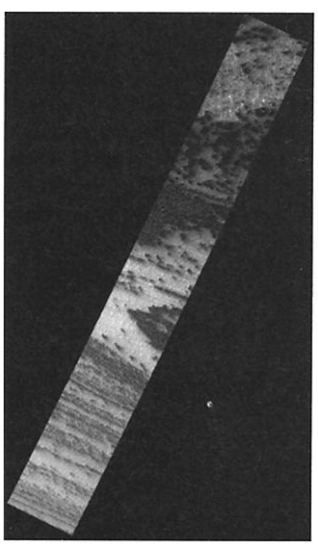
Steve Clifford, a planetary scientist at the Lunar and Planetary Institute in Houston, Texas, is excited by Kieffer's proposal, which he calls the first attempt to explain these features. Other scientists say the black spiders and the planet's other strange CO_2 features are critical to understanding the martian atmosphere, one-third of which is deposited each winter as CO_2 frost at the martian poles. Kieffer admits that his ideas are speculative but that the urge to interpret what he and others are seeing is irresistible. "I can make a wonderfully consistent story—which may or may not be what's going on," he says.

During the spring, solar heating vaporizes up to 10 kilograms of CO_2 per square meter per day, the equivalent of 1 cm of ice thickness. Kieffer proposes that black spiders, tens to hundreds of meters across, develop in regions where this vaporization happens not from the top down, but from the bottom up. The spider's legs collect gas from the transparent areas, conducting it beneath the surface to weak points, where it fountains free in roaring jets. Dust carried with the gas may then land atop the ice in spreading dark fans hundreds of meters in length. Although black spiders and dark fans have not yet been seen in tandem, Kieffer's theory suggests that they are linked, with the fans extending downwind from the vents of spiders that, for whatever reason, are not well enough defined to show up in satellite photos.

Kieffer's hypothesis requires the ice to be transparent, so that warm sunlight can penetrate deep enough for the resulting CO_2 gas to have trouble breaking through to the surface. This would be no problem with pure CO_2 ice, which is so clear that 75% of sunlight will penetrate at least a half-meter deep. But the CO_2 ice that condenses out of the martian atmosphere isn't pure. Instead, a heavy peppering of dust makes it opaque.

Kieffer also has proposed a mechanism by which spring sunlight can purge dust from the ice. Sun-warmed dust motes, he says, should easily become hot enough to evaporate adjacent CO_2. Near the surface, the vapor pressure may be enough to crack the ice, ejecting the dust in a puff of gas. Otherwise, gravity will cause the dust particles to tunnel ever deeper until they hit bottom, like a slow-falling rain. Because the martian polar atmosphere is predominantly CO_2 and cools each winter to the freezing point of CO_2, the microscopic tunnels are continuously reclosed with freshly deposited ice. The result is an increasingly transparent, self-sealing layer of CO_2 ice.

Meanwhile, enough sunlight reaches the dark sur-



CREDIT: MSS/NASA

Dark fans. Features that speckle the martian southern ice cap may be dusty fallout from CO_2 geysers.

* The Second International Conference on Mars Polar Science and Exploration, 21–25 August, Reykjavik, Iceland.

ScienceScope

At Long Last The research community's long push to raise science's profile at the State Department appears to have paid off. Secretary of State Madeleine Albright is set to appoint retired high-tech executive Norman Neureiter, 68, as the department's science adviser as early as this week, sources told *Science* as it went to press.

Two years ago, a National Academy of Sciences panel told Albright that the State Department needed to do more to involve technical talent in U.S. diplomacy (*Science*, 3 March, p. 1580). Officials agreed to create the position of science adviser, but the job search faltered over the past year.

Neither Neureiter nor State Department officials would confirm the choice. But Washington insiders say he is a good fit, with experience as a program officer for the National Science Foundation, a foreign service science attaché, and an executive at Texas Instruments. Since retiring 2 years ago, he has worked as a Dallas-based consultant and pro bono adviser to an array of groups involved in science, education, and foreign policy.

Gender Gap Energy Secretary Bill Richardson has thrown in the towel on his search for a female director of Argonne National Laboratory in Illinois, clearing the way for this week's appointment of nuclear physicist Hermann Grunder. But he's stepping up efforts to attract more women into science and senior DOE management jobs.

Last week at DOE headquarters, Richardson staged a gala "Women in Science" forum to tout the department's progress in the past 2 years and to announce several initiatives to keep the ball rolling. Surrounded by female senior R&D managers from around the country, Richardson noted that 80% of the department's $17.4 billion budget is "managed by women," including new Office of Science chief Mildred Dresselhaus. (DOE's top four slots, however, are held by men—Richardson, deputy director T. J. Glauthier, and undersecretaries Ernie Moniz and John Gordon.)

He also touted efforts to diversify leadership at DOE's labs. "We got the first one," he said, referring to Lura Powell's appointment earlier this year as head of Pacific Northwest National Laboratory in Washington state, "and I still think it's critically important to have more women as lab directors. But we couldn't make it happen" at Argonne. Grunder, the longtime director of the Thomas Jefferson National Accelerator Facility in Newport News, Virginia, assumes his new post on 1 November.

face beneath the ice—perhaps a meter down—to evaporate more ice, allowing the CO_2 gas to build up there. Kieffer predicts that small, branching gas channels will feed into larger ones, like merging raindrops on a windowpane. Where these big channels break through to the surface, he predicts that the gas could reach a velocity of 50 meters per second, fast enough to keep the jets open throughout the 150-day CO_2 evaporating season. Clifford calls Kieffer's hypothesis "interesting" and "reasonably coherent" but notes that important details remain to be filled in. They include whether the proposed mechanism can produce gas channels large enough to be seen from space, and whether the martian CO_2 ice is sufficiently clear for the bottom-up heating effect to occur. But he doubts that any of these will prove fatal to the basic theory.

Andrew Ingersoll, a planetary scientist at the California Institute of Technology in Pasadena, says black spiders and dark fans are just part of the "crazy stuff" that makes up the overall puzzle of the Red Planet's atmospheric dynamics. **–RICHARD A. LOVETT**

Richard A. Lovett is a science writer based in Portland, Oregon.

BIOMEDICINE

'Glue Grant' Boosts Cell Signaling Consortium

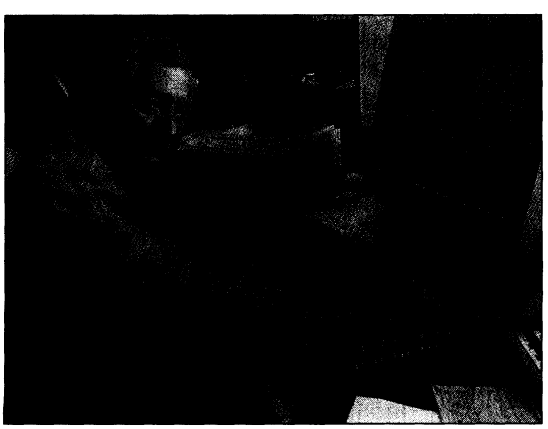
A "glue grant" may sound like financial support for a revolutionary adhesive, and in fact, that's not far off the mark. The National Institute of General Medical Sciences (NIGMS), in announcing its first glue grant last week, said it aims to use a novel funding approach to bind together researchers in cutting-edge fields at many institutions, allowing them to transcend their individual areas of expertise.

NIGMS has awarded $5 million a year for 5 years to a group of scientists studying cellular signaling. The project is headed by Alfred Gilman, chair of pharmacology at the University of Texas (UT) Southwestern Medical Center in Dallas and co-recipient of a Nobel Prize in 1994 for his work on "G proteins," which act as gatekeepers for information entering cells. To speed their findings into the public domain and make them available for use in drug testing, Gilman and members of the project have agreed to post new results in a public database and forgo some patent and authorship claims.

The group of 50 participating scientists at 20 universities, called the Alliance for Cellular Signaling (AFCS), expects to spend a total of $10 million a year on this work. They have raised half of this sum through pledges from individuals, institutions, and corporate backers, including Eli Lilly and Co., Johnson & Johnson, Merck, and Novartis, among others. The drug companies also have agreed to forfeit proprietary rights to alliance findings.

Researchers have identified thousands of cellular signaling molecules that carry information between and within cells. "The classic example is the fight-or-flight response," said Gilman, in which signals from the brain trigger responses in the heart, blood vessels, lungs, and gastrointestinal system. The AFCS plans to chart interactions among these signaling molecules to produce a model of how mouse heart muscle cells (cardiac myocytes) and immune cells (B cells) respond to stimuli. Gilman foresees pharmaceutical companies using it to develop "a treasure chest of very specific drugs."

Officials at NIGMS said that increased public funding, combined with Internet links that permit quick transfer of mammoth data sets, has made the time ripe for such huge cooperative studies. "This differs from anything else we're doing, or anything that we've done before, in that it doesn't supply underlying research support for investigators," said Marvin Cassman, director of NIGMS. It will enable researchers "to reach a goal they can achieve only by working together." Michael Rogers, director of NIGMS's Division of Pharmacology, Physiology, and Biological Chemistry, finds it "remarkable" that "traditionally independent-minded individuals" are now ready to join big collaborations.



Equal access. Alfred Gilman says the consortium will make findings immediately available on the Internet.

CREDIT: DAVID GRESHAM/UT SOUTHWESTERN MEDICAL CENTER

Scientists participating in the alliance will be asked "to steer, to guide, to hypothesize, and to design models," said Gilman. In addition, 250 "member" scientists around the world will host Web sites and augment the AFCS database. The glue grant will fund work in seven newly established labs. Stanford University will be in charge of microscopy; the California Institute of Technology, molecular biology. The San Francisco Veterans Affairs Medical Center will deal with signaling assays. The University of California's San Diego Supercomputer Center will be the hub of bioinformatics. UT Southwestern will have three new labs, one focusing on antibodies and one on each type of mouse cell under investigation.

Part of the glue that holds the alliance together is electronic. AFCS plans to communicate via Internet 2, a university-based system with enhanced bandwidth and speed. A virtual conferencing system will allow Gilman to meet simultaneously with 36 of his colleagues. Gilman said it was necessary to forfeit some intellectual property and first-time publication rights to allow "real-time" posting of group findings. "There will be publishing opportunities for the people employed in the labs," he explained, "but it will be higher level interpretation, not conventional findings." The community has "got to know that we're playing fair with them and that everybody's got an equal shot" at the alliance's data, he added.

Private donors may be sacrificing proprietary rights in the short run, but their investment may pay off later as their own researchers use the AFCS models to develop new drugs. Steven Paul, group vice president of Lilly Research Laboratories of Eli Lilly and Co., said his company made its $500,000-a-year pledge not out of philanthropy but because its scientists hope to glean immediately useful data. "This is a fantastic group of extraordinary scientists," said Paul. "We feel strongly that there will be enormous public ramifications." **–KATHLEEN FISHER**

Kathleen Fisher is a writer in Alexandria, Virginia.

U.S. POSTDOCS

Report Urges Better Treatment, Status

For years, U.S. postdocs have been complaining about paltry salaries, lack of benefits, and lowly status. This week, they won some high-level support. A committee of the National Academies of Sciences and Engineering and the Institute of Medicine has validated many of the complaints and lent its considerable weight to efforts to provide greater institutional support for postdocs. At the same time, however, the panel sidestepped two burning issues by explicitly declining to recommend a boost in postdoc salaries or take a position on whether to curtail the size of the postdoc workforce, which has more than doubled in the past 20 years to an estimated 52,000 (see graph).

The recommendations are contained in a guide* issued this week by the academies' Committee on Science, Engineering, and

* Web Guide to Enhancing the Postdoctoral Experience for Scientists and Engineers (nationalacademies.org/postdocs), 2000.