Chevy Chase, Maryland. The idea is to have NIH underwrite the salaries of the "crème de la crème" as Hughes does, says Hugli. These awards would reduce paperwork and allow researchers to concentrate on science, says Goldstein—"get them away from the word processor and into the lab."

In FASEB's proposal, outstanding young scientists at the end of a postdoc would be eligible to receive what FASEB calls an "NIH scholar" award, and senior scientists could get an "NIH professor" position. These awards would convey not just special honor, but a guaranteed salary—in the case of a senior scientist, for up to 7 years. The junior award would differ from the existing grants for young scientists in that it would go directly to the postdoc, not to a mentor or host institution, enabling that young person to break free rapidly and launch an independent career. Hugli said he would like to see NIH support 500 or more awards in the junior category.

FASEB also urges NIH to offer small grants to scientists who want to develop untested ideas or who make an interesting discovery in an ongoing project and need extra money to explore it. It also backs some less specific ideas for encouraging interdisciplinary studies, collaborating with industry, expanding animal care facilities, and rebuilding research facilities.

A wish list from the Association of American Medical Colleges (AAMC) puts a greater stress on the needs of research institutions. In its 38-page, footnoted report,* the AAMC calls on Congress and NIH to "revisit" or eliminate a series of cost controls imposed in recent years—including caps on investigators' salaries, limits on reimbursement of indirect costs at institutions like medical schools, and caps on tuition reimbursement for trainees.

The report also proposes a new Research Innovation Opportunity program. This would provide "flexible funds to biomedical research institutions," giving them ready money to pay for "new, promising lines of research, procure critically needed instrumentation, and respond to new staffing requirements." Because research on genetically engineered mice is growing rapidly, AAMC urges the government to build regional animal facilities to be shared by academic institutions. And it asks Congress to approve an "NIH construction authority," which would have a 10-year mandate to spend $5 billion on new facilities.

Like FASEB, the AAMC voices support for peer review and investigator-initiated research, especially clinical and interdisciplinary work. It also suggests that NIH grants be extended from the current average term of 4 years to 5 years.

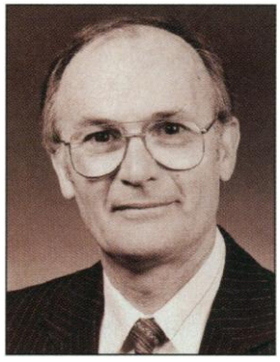
All these ideas have been forwarded to NIH and Congress. NIH has not yet responded, and Congress is still in the early stages of debating broad spending allocations. Republican leaders have endorsed potentially incompatible goals this year—including tax reduction and highway building as well as doubling biomedicine and science funding. It will take months to sort out the real winners. But if NIH does receive the new money it has been promised, the clamor of advice is sure to grow.

–Eliot Marshall

GENOME RESEARCH

Private Help for a Public Database?

When a group of scientists urged the National Institutes of Health (NIH) last fall to create a public database of genome markers called single nucleotide polymorphisms (SNPs), they evidently struck a chord. NIH promptly pledged $30 million for the effort, grant applications are flooding in, and the National Center for Biotechnology Information (NCBI) is gearing up to receive deposits of SNP data later this year. That's lightning speed for a government program. But there's still one big unknown about this venture: Will private companies, which are likely to generate vast quantities of SNPs, also join in?



"The capacity exists to create a standard set of about 100,000 SNPs in 12 to 18 months."

—Alan Williamson

An indication could come within weeks, thanks to an initiative launched by Alan Williamson, retired vice president for research strategy at the pharmaceutical firm Merck & Co. Inc. of Whitehouse Station, New Jersey. Worried that NIH's $30 million planned expenditure for SNPs collection may not be adequate to move the field forward as rapidly as possible, Williamson organized a private meeting of drug company executives on 8 April in New York City to try to interest them in contributing "in cash or in kind" to a public SNPs database. Private contributions of $10 million to $20 million (or equivalent) would make it possible to put together a usable data set within 18 months, he has concluded. How well his plea is succeeding may be evident at a second meeting he is planning later this month.*

If Williamson is successful in persuading his colleagues in industry to go along, it would provide a big boost to a venture that many researchers believe could greatly speed a variety of genome studies. SNPs—single-base variations in the genetic code—may soon become important as location markers for use in high-volume, automated scanning of human genomes. SNPs may be incorporated into electronic chips to decipher genetic patterns of disease, assist in the development of targeted drugs, and identify high-risk individuals for therapy (*Science*, 19 September 1997, p. 1752).

Indeed, that promise convinced Francis Collins, director of the National Human Genome Research Institute (NHGRI), to move NIH's effort into high gear last fall. On 9 January, NHGRI invited researchers to submit proposals for 3-year grants to support both technology development and data gathering, due by 7 May. Already, at least 75 letters have been received, says Lisa Brooks, the NHGRI program officer in charge. Grant winners will be reviewed this summer and selected for funding in October.

Williamson says that the New York meeting heard from NIH officials about its proposed SNP database and from scientists about what it would take to build a SNP collection within a few years. "It became clear that the capacity exists to create a standard set of about 100,000 SNPs in 12 to 18 months," says Williamson. "The quicker you generate a large set, the quicker you can start to do all sorts of studies on a population basis."

Industrial contributions of cash and SNPs would speed the database along, but one big issue may still entangle the venture: intellectual property claims. Williamson says private donors to his SNP support effort will not be asked to completely forswear patenting their SNPs, although they

* "Maximizing the Investment: Principles to Guide the Federal Academic Partnership in Biomedical Sciences Research," Association of American Medical Colleges, Stephen Heinig (sheinig@aamc.org).

* Companies interested in attending should contact Williamson at alan-williamson@home.com

will be expected to support rapid sharing of data. And Brooks says that even NHGRI cannot demand that grantees avoid filing for patents. The intellectual property issues, Brooks says, are "not clear yet," although NHGRI may end up "strongly encouraging" those who win grants not to lay commercial claim to the SNPs they discover.

Some technical issues also remain to be resolved. The task of designing the computer database will be more complex than it seemed at first, according to James Ostell of NCBI, the home of GenBank, which is hoping to begin receiving data this fall. For example, the SNPs must be defined according to the context in which they are found and the methods used to find them. Because investigators are using many different methods, Ostell explains that NCBI is trying to devise a flexible format that will accommodate all. It won't be easy.

And geneticists are debating whether it is necessary to pretest each SNP for heritability before adding it to the database. Some argue that this should be done; others say it isn't necessary. As these "emotional" discussions go on, the format for describing each SNP in the database has gone through several revisions, Ostell says. The final version will be approved this summer. Right now, "nobody knows for sure" that the SNP database will function as everyone hopes, Ostell says. But he adds, "it wouldn't be science ... if we could guarantee in advance that it would work."

–Eliot Marshall

SOLAR PHYSICS

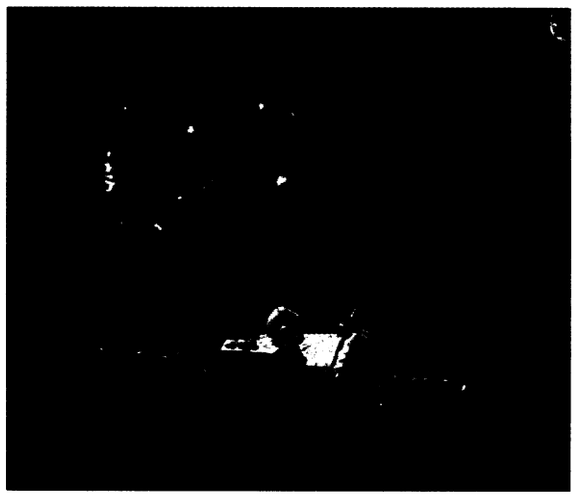
Ulysses Laps Sun, Inspires New Missions

As one major mission to the sun passes a milestone, solar physicists are laying plans for a new assault on the sun's secrets. Last month the European-built Ulysses spacecraft finished its first complete orbit of the sun, a 7-year reconnaissance of particles and magnetic fields high over the sun's north and south poles. Now researchers are hoping to extend Ulysses's operations into a second orbit, and they are proposing a flotilla of other missions, including one probe that would venture to within two solar diameters of the sun's surface.

All these proposals are aimed at observing peaks in the 11-year cycle of solar activity, the next of which is due early next century. Ulysses's exploration of the sun's wind of particles and its magnetic fields took place when solar activity was at low ebb. Now researchers hope Ulysses will make comparable observations as the sun's magnetic activity crescendos. They would also like to complement its long-range view of the sun with images and measurements "closer to the region where the solar wind is actually heated and gains its maximum energy," says Richard Marsden, the European Space Agency's (ESA's) project scientist for Ulysses. At a March meeting in Tenerife, solar astronomers discussed possible missions.

Launched in October 1990 and operated jointly by ESA and NASA, Ulysses "went into totally new, unexplored territory," says Peter Wenzel, head of ESA's Solar System Division. It swung past Jupiter in February 1992 and headed down toward the sun's south pole, passing close to it in September 1994 (*Science*, 16 September 1994, p. 1659) and over the north pole a year later. Throughout its circuit, Ulysses's nine instruments sampled the magnetic field and the stream of electrons, protons, and other particles in the solar wind. "Ulysses has provided us with a map of the solar wind at all latitudes," says Marsden.

Each kind of observation turned up surprises. Researchers already knew that the solar wind has both a slow, gusty component and a weaker, fast component. The fast wind was thought to blow only from the poles, but Ulysses found that it dominates most of the space around the sun, Wenzel says. Similarly, researchers thought the sun's magnetic field would be much stronger over its poles, because the field is largely a dipole, like a giant bar magnet. "We find that this is not the case," says André Balogh of Imperial College in London. And although the splayed field lines above the poles were expected to act as a funnel for cosmic rays, says Balogh, "Ulysses discovered that there was not a large [cosmic-ray] increase" over the poles. Solar scientists now believe that this is because ripples in the magnetic field, called Alfvén waves, scatter the incoming cosmic rays, says Wenzel.



ESA/NASA

Solar explorer. In a composite image, Ulysses samples the particles and magnetic fields that stream from the sun.

Now researchers would like to see how this picture changes during the next solar maximum. The key event in the solar cycle is the reversal of the solar magnetic field shortly after the maximum, in 2001 or 2002, which is still a mystery to astronomers. "This is going to be a very exciting period," says Marsden. At the moment, however, ESA only has guaranteed funding for the Ulysses mission until 2001. Balogh says it is crucial that the spacecraft be able to witness this event. "Without Ulysses," he says, understanding the reversal "doesn't stand a hope." Marsden says that constraints on ESA's science budget may make operation beyond 2001 difficult, but his team will try to save money up to 2001 in an effort to extend the mission for 1 or 2 years.

Solar physicists are already drawing up other plans to observe the next solar cycle. At the meeting in Tenerife, about 100 mainly European astronomers hammered out plans for a closer look at the sun. "Before the meeting there was a great deal of disagreement," says Eric Priest from St. Andrews University in the United Kingdom, who initiated the meeting. Three projects were under discussion: a Solar Orbiter imaging mission, which would be launched by ESA around 2007 and orbit the sun closer than Mercury; the Stereo mission, consisting of multiple spacecraft that would combine their images to form a three-dimensional picture of gas movements and magnetic fields close to the sun; and the Probe mission, which would approach the sun to a distance of two solar diameters to measure its magnetic field and sample the solar wind.

Although NASA is supporting preliminary studies into both Stereo and Probe, with a view to launching them in 2004, European astronomers at the Tenerife meeting came down firmly on the side of the Solar Orbiter. "The European solar physicists would like to have Orbiter as their main mission, but would also like to be part of a wider program," Priest says, perhaps by contributing instruments to Stereo and Probe.

–Alexander Hellemans

Alexander Hellemans is a writer in Naples, Italy.