

The NRC report urges that USGCRP agencies agree on a national set of goals, coordinate funding, and reorder the priorities of individual modeling groups to achieve them. It notes some encouraging developments along those lines. One is NCAR's "new-generation" model, which was developed and is being improved with outside assistance. After some rocky times, "we are working interactively" to improve model components, says Mahlman. "We're not there yet," adds Barnett, "but I'm very optimistic about the future." —RICHARD A. KERR

GENOME SEQUENCING

Fruit Fly Researchers Sign Pact With Celera

It may not be as dramatic as a Capulet-Montague marriage, but the announcement last week that experts from the private and public sectors are joining together to decode the fruit fly's genome could signal a new period of cooperation in genome research.

For years, private entrepreneurs and academics have clashed over how quickly genome data should be released. Now, aided by a huge investment from equipment manufacturer Perkin-Elmer of Norwalk, Connecticut, the two camps have agreed on a joint plan to sequence the DNA of the fruit fly *Drosophila melanogaster* and a timetable for making the sequence public. It could soon become the most complex organism completed; its genome, about 160 million bases, is two-thirds larger than that of the worm *Caenorhabditis elegans*, completed in 1998 (*Science*, 11 December 1998, p. 1972). Yet the partnership aims to finish in record time—by December 1999. The project could also pave the way for a similar collaboration to sequence the human genome.

The details of the fly project were released on 27 January by the National Human Genome Research Institute (NHGRI). It is bringing together a group of NHGRI-funded sequencers led by Gerald Rubin of the University of California (UC), Berkeley, with the staff of Celera Genomics of Rockville, Maryland, a company started last year by Perkin-

Elmer and DNA sequencer J. Craig Venter. A memorandum of understanding signed by Venter, Rubin, and UC officials says that by April, Rubin's group will supply 12,500 bacterial clones holding fragments of *Drosophila* DNA to Celera, which aims to do the sequencing by July. Finished data—in groups of 2000 or more bases of contiguous DNA (contigs)—will be released to the public by 1 January 2000 "at the latest."

Venter said he is "delighted" to join forces with the academics. And NHGRI director Francis Collins said last week that the agreement "marks the beginning of a productive collaboration ... that should give the research community the fruit fly sequence more rapidly than previously predicted." Collins also predicted a \$10 million savings.

Most of the difficult preparatory and finishing tasks will continue to be done by academics, Collins said. Rubin and his colleagues at the Lawrence Berkeley National Laboratory in California, the Baylor College of Medicine in Houston, and the Carnegie Institution of Washington have been identifying landmarks along the 160 million bases of the fly genome and tagging them for mapping purposes. They had hoped to sequence all the gene-rich regions—about 125 million bases long—by the end of 2001. Already, they've completed 20% of this work.

Instead of the conventional approach of serial sequencing and assembly that most academic groups have been using, Celera will use a battery of new Perkin-Elmer automated machines to sequence all the clones in parallel and fit the results together afterward. By July, the company plans to begin releasing contigs simultaneously to the public and to Rubin's consortium. Rubin's group will fit the puzzle together, relying in part on low-precision sequencing of the genome by a team headed by Richard Gibbs at Baylor. All this will require a "nimble" touch, says Rubin: "Our work will be much more like a scientific experiment" than a normal production job.

If successful, this effort could set the stage for collaboration on sequencing the 3 billion bases of the human genome. Venter last year announced that Celera hoped to do this on its own in 3 years. Federal research

officials then offered to collaborate.

Last week, Collins said he was moderately optimistic about the prospects for a broader agreement that might include Celera. In an interview with *Science*, he said that "active discussions are going on right now on how to put together a memorandum of understanding on the human genome" to include U.S. publicly funded scientists, those supported by the Wellcome Trust in Britain, and "any private entity that's interested." There is still "some tension," he said, over how data will be annotated and released, as nonprofit and private sponsors have different aims. Working out the details will be "complicated," because Celera clearly wants to stake a claim to human genomic data. —ELIZABETH PENNISI

ANIMAL RESEARCH

Groups Sue to Tighten Oversight of Rodents

A coalition of animal rights advocates—including three academic scientists and a biomedical supply company—announced this week that it will go to federal court to force the U.S. government to redefine mice, rats, and some birds as animals under a major animal protection law. The change is needed, they argue, to bring the country's most widely used experimental animals under federal regulations that require researchers to consider alternatives.

U.S. Department of Agriculture (USDA) officials say that the redefinition would stretch its cash-strapped enforcement program to the breaking point and could



Dealmaker. Venter teams up with fly experts to sequence the *Drosophila* genome.



Painless measures. This assay system measures skin and eye irritation without using lab animals.

also mean higher expenses for some research facilities. And some scientists see the pending legal battle as simply the latest tactic in a long campaign by activists to eliminate the use of all animals in research. But observers on both sides of the dispute agree that the lawsuit—announced Tuesday at a Washington, D.C., forum on the issue organized by the National Academy of Sciences*—represents the most serious legal challenge ever to the 27-year-old rules.

The controversy centers on a clause in the Animal Welfare Act (AWA), the nation's flagship animal protection law, which directs the Secretary of Agriculture to define as animals any "warm-blooded animal as the Secretary may determine is being used, or is intended for use, for research." Although the law specifically includes dogs, monkeys, hamsters, and other animals in the definition—and specifically excludes farm animals—it is silent on the status of rats, mice, and birds bred for research. In 1972, USDA declared the three creatures nonanimals. That definition exempted researchers from a host of AWA regulations, including annual facility inspections and the need to consider alternatives when designing experiments.

Over the last decade, however, animal rights activists have stepped up efforts to change the department's interpretation of the act. In 1994, the Washington-based Humane Society of the United States and the Petaluma, California-based Animal Legal Defense Fund (ALDF) won a federal court ruling that USDA's exclusion was legally "strained and unlikely." But that ruling was thrown out by an appeals court because the groups couldn't demonstrate that their members have been directly harmed by the regulations. This time, however, even some USDA officials concede that the plaintiffs are likely to vault over that hurdle because several have a financial stake in USDA's definition. The list includes a Pennsylvania group that funds the development of nonanimal research methods and the president of InVitro International, an Irvine, California, company that sells nonanimal lab tests.

Last April, the same parties had petitioned the USDA to change its animal definition. On 28 January, the agency signaled it was taking the request seriously by publishing the petition, along with its own comments, in the *Federal Register* (www.access.gpo.gov/su_docs/fedreg/a990128c.html) and requesting public comments by 29 March. But the next day the petitioners decided to sue. The move, says attorney Andrew Kimbrell of the Washington-based International Center for Technology Assessment, who is preparing the suit with the ALDF, was based on USDA's comments, which Kimbrell believes suggested that the agency was prepar-

ing to reject the petition. "They first need to acknowledge that they have this obligation—then we can discuss solving some of their funding problems," he says.

News of the suit surprised USDA officials. "It is unfair to suggest that we have already decided what we are going to do," says W. Ron DeHaven, deputy administrator for animal care with USDA's Animal and Plant Health Inspection Service. However, a 1990 study concluded that USDA would have to carve out an estimated \$3.5 million from its \$9 million enforcement budget to handle the additional oversight. DeHaven says the cost to researchers is unknown at this time.

Some scientists are worried that any change in the definition could doom animal use in smaller labs, particularly those involved in undergraduate education, by requiring costly new facilities. And they note that publicly funded biomedical scientists must already consider substitutes under guidelines issued by the Public Health Service. The coalition's "objective is to eliminate the use of animals in research; [the alternatives argument] is a pigtail," says L. Gabriel Navar, a physiologist at Tulane University in New Orleans, Louisiana, and president of the American Physiological Society.

Kimbrell disagrees and says researchers would be better off joining animal activists to seek the necessary resources for broader regulation. The sooner USDA "starts obeying the law," he argues, the sooner animal rights lobbyists can fight for the money USDA will need to regulate its newfound wards.

—DAVID MALAKOFF

PHYSICS

First Light for a Gamma Ray Flashbulb

The first laser had hardly beamed its world-changing needle of red light in 1961 when theorists began realizing just how far this new technology could conceivably go. One way was upward through the spectrum, from visible light to the higher energy ultraviolet and x-ray ranges and even into the territory of gamma radiation—the ultimate "light," energetic enough to blow missiles out of the sky or simulate conditions near stars.

More easily dreamed than done. But for nearly 40 years, a small research community has set its course toward that goal. And in the 25 January *Physical Review Letters*, a team of a dozen researchers from five different countries has moved a step closer by showing that a form of hafnium-178 extracted from accelerator waste can release energy stored in its nuclei as a blast of gamma photons, at energies more than 1.3 million times those of the red photons of the world's first laser.

The gamma rays that emerged from the

ScienceScope

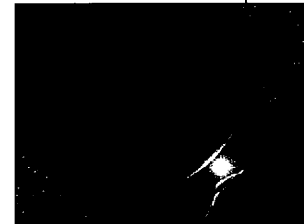
Pluto Plea Leave Pluto alone! That's the message astronomers all over the world are sending the International Astronomical Union (IAU). A recent discussion about whether Pluto should be cataloged as the 10,000th entry in the list of minor bodies in the solar system rather than the ninth planet (*Science*, 8 January, p. 157) has alarmed planetary researchers, who worry that the public would see the move as a demotion for Pluto.

The Committee of the Division for Planetary Sciences (DPS) of the American Astronomical Society joined the chorus last week in a statement forwarded to the IAU, arguing that there is no compelling reason for the celestial body's declassification. "For now at least, nothing should be done," says DPS chair Don Yeomans of NASA's Jet Propulsion Laboratory in Pasadena. Most solar system researchers agree, says Alan Stern of the Southwest Research Institute in Boulder, Colorado. Although Pluto is by strict definition a trans-Neptunian object, dozens of which have been found in the past decade, Stern sees no reason why it can't be called a planet, too.

The IAU isn't about to make a decision anytime soon. But it now knows how strongly some people feel about the subject. Says Yeomans: "There are nine planets, period."

Going Megaglobal Delegates to the Megascience Forum, a 6-year experiment in stimulating international cooperation among science policy-makers sponsored by the Paris-based Organization for Economic Cooperation and Development (OECD), have recommended extending the forum's shelf life past its expiration date. At their final meeting last week, delegates offered to reincarnate themselves as a Global Science Forum that would add a new voice to perennial debates over issues such as climate change, land use, and food production. OECD ministers will consider the proposal in June.

The forum gathers research officials and top scientists into working groups on international scientific issues; its successes include sounding an early alarm about the dangers posed by commercial encroachment into bandwidths of interest to radioastronomers and a pending proposal to set up a global biodiversity information facility.



* Regulation of the Care and Use of Rats, Mice, and Birds (2 February 1999).