

and Technology Center for Molecular Biotechnology. Hood will chair the new University of Washington department, the university announced.

Although Hood's financial relationship with Bourke's company has not yet been decided, Bourke says he considers Hood a "co-founder". ABI will be a principal supplier of equipment for the operation. NSF has not decided if it will renew funding for his centre, which now gets about \$3.5 million a year from the agency. (Nine of the 11 Science and Technology centres were renewed last year, but a decision on the Caltech facility was delayed, pending resolution of Hood's status.) Mary Clutter, director of the NSF biology division, says that she expects Hood to submit an application for renewal this month. A Caltech official says that the university will not challenge Hood's intention to take the centre with him.

Some researchers are concerned that Hood's involvement with both the NSF centre and the company (which will presumably be competing for government contracts) could represent a conflict of interest. Bourke says he is aware of the concern and intends to avoid such a conflict. Hood declined to be interviewed.

Initially, Bourke is aiming to take a large slice of a contract sequencing market expected to be worth over \$100 million by the middle of the decade. But the eventual worth of a mapped and sequenced human genome is orders of magnitude beyond that. Isadore Edelman, who directs the human genome centre at Columbia University and is a principal collaborator with Bourke on the new company, says that the company's intention is ultimately to capitalize on the genetic information it obtains through sequencing, by producing gene-based diagnostic tools and therapeutics.

"I think that the ability to sequence DNA in the genome will become the next industrial revolution," says Bourke. "Being able to do something as basic as sequencing gives us a generic position in this revolution." He notes that Japan is well on its way to developing a gene sequencing effort as a collaboration between industry, government and academic institutions. That effort, now funded at about \$14 million, is also aimed at developing automated sequencing technology (see *Nature* 351, 593; 1991). "I'm concerned that we're being left behind," Bourke says.

Bourke expects start-up funding for his company to be around \$50 million. The company will eventually consist of at least three divisions: a large-scale sequencing effort operating on contract for the government and the pharmaceutical industry; a group developing database and computer technology to deal with the vast amounts of information the sequencing operation will generate; and a division to carry out company-initiative

genetic research. The last group, working with genetic mapping laboratories in academic institutions, will focus on finding genes and other genetic information that could be used in commercial products, such as diagnostics tests for genetic conditions and infectious disease such as AIDS.

Edelman hopes that within three to five years the company will be able to sequence as many as 200 million bases a year. Initial plans are for about 100 automated gene sequencing machines "about twice as good as the best now available," he says. Each would be able to sequence about 500,000 base a year, at a contract price of \$.25 to \$.50 each.

While most researchers agree that sequencing in academic institutions has generally not been working well, many are uneasy about Bourke's plans to move it to industry. Mostly, they worry that the company will sequence large parts of the human genome with the sole aim of finding genes and patenting them, thus claiming property rights to substantial portions.

Edelman says this will not be the case. "We're not trying to sequence the genome and dominate all of biology and medicine with a patent position." The company intends to publish its work, and only patent genes if their function has been determined and such patents are considered "acceptable practice", he says. Both Waterston and Sulston say they were adamant that the gene sequences the company finds remain in the public domain. "Rather to our surprise he [Bourke] was still interested," Sulston says.

Nevertheless, many researchers are taking a wait-and-see position. And it seems clear that, whatever the company does to change the commercial prospects of the genome, its impact on the genome project will be significant. If it can indeed sequence far more efficiently than an academic operation, the US genome project will be hard pressed to find an argument against giving it most of the sequencing work and retaining only genetic mapping and basic research for the universities. This is a blow for the project, which now must face the probability that the lion's share of its funding will probably soon go not to academic researchers, but to industrial operations like Bourke's.

UK officials take a more parochial view. Dai Rees, secretary of the UK Medical Research Council, says he would "be happy to contract out work to a British company," but not to Bourke's operation. "If the [worm] project goes to that company, then they can fund it," he says. Speaking in an unofficial capacity, Sir Walter Bodmer, president of the Human Genome Organisation, said he was personally concerned that if sequencing contracts start going to companies rather than academic institutions, then so will the spin-offs of technological development, which would presumably then be proprietary company

information.

For the worm genome community, which is now the most focused on sequencing of all the model-species genome projects, "this is going to be a major change in the power structure," says Christopher Fields, a NIH researcher. "I can imagine the *C. elegans* community being very threatened by this." Sulston says that even if he joins the company, he intends to maintain collaborations with his Cambridge colleagues on the worm genome, and the MRC is hoping to find extra money to encourage project researchers to stay in Britain (see page 483).

While the debate continues, Bourke is still recruiting. Among the researchers he has had meetings with are NIH researcher Craig Venter, David Lipman, who is a database expert at the NIH Library of Medicine, and C. Thomas Caskey, a Baylor College of Medicine geneticist, as well as members of Caskey's laboratory. "There's hardly a lab that he hasn't approached," says one researcher. So far, no one has signed on the dotted line. But if Waterston and Sulston do indeed make the move, others are expected to follow.

**Christopher Anderson & Peter Aldhous**

## INDIRECT COSTS

### Dingell probe expands

#### Washington

CONGRESS' continuing investigation into the overhead charges for federally-funded research has expanded to include contractors for Environmental Protection Agency (EPA) and the Department of Energy (DOE) weapons laboratories. Representative John Dingell (Democrat, Michigan) announced at a hearing last week that his investigations and oversight subcommittee was auditing some of the contractors and that "the initial results are starting to make the universities look like small potatoes." He has scheduled hearings on the new probe in March.

Officials from the two agencies — the Office of Naval Research and the Department of Health and Human Service — that monitor government research grants testified that they have now expanded their university investigations from a handful of high-profile institutions such as Stanford University and the Massachusetts Institute of Technology to virtually all of the 300 universities under their jurisdiction. They explained that even special agreements between certain universities and the government, that have been in effect for nearly a decade, are now under question. By law, the agreements (known as memoranda of understanding) must be "equitable". Many were not, said J. Dexter Peach of the congressional General Accounting Office, and cancelling them retroactively would not be a "changing of the rules", it would be a "shift in enforcement". **Christopher Anderson**