

Universities warned on danger of new links to weapons labs

[WASHINGTON] US universities should reconsider their willingness to work closely with the nuclear weapons laboratories under the so-called 'strategic alliances' programme, according to the Natural Resources Defense Council (NRDC). The influential Washington-based lobby group says that such efforts could lead indirectly to the development of new nuclear weapons.

The programme, which started last summer, seeks to engage the universities' best brains on issues of interest to the weapons laboratories, without allowing the laboratories' secrets to leak out to the open environment of the universities.

But a report by the pressure group, which has been prominent in recent years in analysing and criticizing the US nuclear weapons programme, argues that the five major centres established under the programme are engaged in work that will help the United States to develop new and more powerful nuclear weapons in the future.

In particular, a draft of the report, obtained by *Nature*, says that work on shock physics at one of the centres — the California Institute of Technology (Caltech) — will pose a risk of proliferation, making it easier for aspiring nuclear powers to develop advanced nuclear weapons without having to test them.

In a move that reflects concern inside the weapons laboratories about the programme, foreign students and staff at the university centres have already been barred from having



Superbrain: universities will gain access to the world's most powerful supercomputers, such as this one recently installed at Sandia.

direct access to the laboratories' supercomputers (see below).

Critics say the unequal treatment of foreign students and staff reflects the ambiguous position of the whole strategic alliances pro-

gramme, and that the programme implicates the universities in the development of weapons of mass destruction.

But the programme's defenders argue that research at the centres is not nuclear weapons research as such, and that helping the weapons laboratories with their new Science-based Stockpile Stewardship programme for maintaining the weapons without testing will enable the United States to comply with the Comprehensive Test Ban Treaty (see *Nature* 387, 541; 1997).

The five centres were set up last summer after a fierce competition between teams at forty research universities. The winners — Caltech, Stanford University and the universities of Chicago, Utah and Illinois — will each receive \$25 million in research support over five years, with the strong prospect of a five-year extension.

They should also get access to the world's most powerful massively parallel supercomputers, now being developed and installed at the three weapons laboratories — Lawrence Livermore in California and Sandia and Los Alamos in New Mexico — under the Department of Energy's (DOE's) Advanced Strategic Computing Initiative (ASCI).

Although some universities originally drafted proposals which they considered of direct relevance to the weapons programme, the DOE has dissuaded them from this approach, asking them to simulate complex dynamic systems that are distinct from nuclear weapons. The energy department

Ban on access for foreign scientists poses a problem for partnership

[WASHINGTON] Whatever the ethical merits of the 'strategic alliances' programme (see above), a ban on the participation of foreigners — who make up as many as half of the hundreds of research students and staff working at the five university centres involved in the programme — indicates the practical challenges the DOE faces in operating it.

The partnership programme was conceived mainly to restore the supercomputing expertise of the weapons laboratories. Senior laboratory officials admit that their pre-eminence in this field in the 1970s and 1980s has waned with the development of the new, massively parallel computers, which are best understood by

young computer scientists outside the laboratories.

Staff and students at the university centres fall into three categories — US citizens, permanent residents and other foreigners. As in most US university computer science and engineering departments, about half the staff and students are non-citizens. Many of the faculty are permanent residents — holders of 'green cards' — and are protected by US law against being treated differently from US citizens. Most of the students are not permanent residents.

The DOE has introduced a short-term policy, to remain in force until April, under which no foreign national is allowed access

to the laboratory supercomputers or the codes that run on them. According to Michael Heath, head of the Illinois centre, the temporary policy "can't hold in the long run, or the DOE will be in violation of the law".

Heath says the current situation reflects a difference in perspective between technical staff in the laboratories, who want to open up access, and security officials, who are resisting change in their established procedures.

Matthew McKinzie, the main author of a report drawn up by the National Resources Defense Council, says that the ban on access by foreigners reflects resistance in the intelligence divisions at the

laboratories — especially Lawrence Livermore — to the partnership programme, which he says was "imposed on the laboratories" by the DOE.

The energy department is now reviewing the ban. "They understand that it is an issue for all of the centres, and are working hard to solve the problem," says Daniel Meiron, head of the Caltech centre.

Gilbert Weigand, the DOE's deputy assistant secretary for strategic computing, says the students may be accommodated by giving them access to an unclassified supercomputer facility, which he declined to specify, outside the weapons laboratories.

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hopes the universities' involvement will help scientists at the weapons laboratories to solve the central technical problem of stockpile stewardship — the full computer simulation of a thermonuclear weapon's operation.

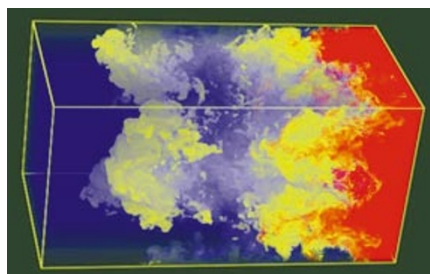
The University of Illinois centre, for example, will study solid-fuel rockets, while Chicago simulates astrophysical thermonuclear flashes. The Utah team will investigate accidental fires and explosions as these impinge on nuclear weapons safety, and Stanford will look at turbulence in gas-turbine engines.

But the Caltech centre will investigate the dynamic response of various materials to the detonation of high explosive — a problem of clear relevance to nuclear weapons design. According to the NRDC draft report, Caltech's proposal included the study of the behaviour of beryllium, uranium and actinide metals under shock from high explosives.

"If the Caltech program is permitted to continue for its five to ten year course, much of the work behind generating a bomb code will have been accomplished," says the NRDC.

Caltech officials now say that these materials will not be included in their study. "We will not be working on nuclear weapons materials, or on anything that is a heavy metal," says Daniel Meiron, head of the Caltech centre. Steve Koonin, provost and vice-president of research at Caltech, adds that he would "not allow research to be done at Caltech" for the nuclear weapons programme.

The NRDC argues, however, that the shock physics to be carried out at Caltech is exactly what proliferators would require if they wanted to advance from a primitive gun-



Dual use: simulations of explosions are relevant to both 'shock physics' and weapons design.

type nuclear device to an implosion-based device, or even a hydrogen bomb boosted by a thermonuclear secondary, without testing.

In contrast to the vehement criticism of research related to President Ronald Reagan's Star Wars initiative fifteen years ago, campus reaction to the arrival of money from the nuclear weapons programme has so far been subdued. David Pershing, the head of the Utah centre, says that despite strong anti-nuclear feeling in the state (which is downwind of the Nevada site where US weapons tests took place), critics have accepted that his team is working on safety, not on building nuclear weapons.

At Caltech, however, the 100-strong Southern California Federation of Scientists has attacked the partnership in local newspapers, and called on David Baltimore, the new president of Caltech, to take a public position on the issue. Baltimore declined to be interviewed for this story, referring questions to Koonin.

The NRDC wants a government review of the proliferation implications of the partner-

ships with the universities, and a debate within the universities on whether they should be involved. Its draft report says that the universities' acceptance of the programme "represents an obvious — but financially fortuitous — failure to comprehend the full scope of the current nuclear weapons programme".

The report argues that the \$4.5-billion-a-year stockpile stewardship programme is less concerned with complying with the test ban treaty than with circumventing it, by developing computer models so powerful that the United States will be able to improve its nuclear weapons without testing.

The DOE has consistently denied such charges. But it does accept that the stockpile stewardship programme will help the United States to maintain its nuclear weapons design capability indefinitely, in case new weapons are required in the future, and that part of the function of the partnerships is to help the laboratories recruit scientists for that purpose.

A spokesman for Livermore referred questions about the partnerships to the DOE. But Tom Adams, an ASCI project leader at Los Alamos, says that staff there are enthusiastic about partnerships. "There's a lot of excitement," he says. "People are most anxious to interact with the universities."

Gilbert Weigand, deputy assistant secretary for strategic computing at the DOE, declines to comment on the NRDC's criticisms until its final report is published. But he stresses that the partnerships "are completely unclassified projects", and adds: "They are things the universities wanted to do, in their own best interests."

Colin Macilwain

Switzerland seeks to head off ban on use of transgenic animals

[MUNICH] The Swiss government is trying to pre-empt the outcome of a national referendum calling for major restrictions on genetic engineering — including a ban on the use of transgenic animals — by presenting its own proposals for strengthening the rules governing the use of such techniques.

Known as the 'Gen-Lex' motion, the initiative aims to coordinate existing legislation covering a range of activities relating to genetic engineering, and to close any apparent gaps. Scientists, environmentalists and animal rights groups have been asked for their comments.

A national ethics committee is also to be set up in the next few months to address issues relating to the use of animals in genetics research. One of its tasks will be to assess whether proposed experiments using transgenic animals are ethically justified.

The referendum, scheduled for June, was initiated in 1992 by pressure groups opposed to biotechnology. Although widely supported by environmentalists and animal rights activists, it has been strongly opposed

by many scientists, who warn that its approval would seriously harm biomedical research in Switzerland, and could persuade pharmaceutical companies to relocate elsewhere (see *Nature* 388, 315; 1997).

"A general ban on the use of transgenic animals would be disastrous for many Swiss researchers," says Franco Cavallo, director of the Institute for Oncology in Bellinzona and a socialist member of the Swiss parliament.

Switzerland has no specific regulations on genetic engineering, as this is considered to be covered by a variety of laws in areas such as environmental and animal protection.

A recent survey has shown that three-quarters of the population are opposed to constitutional bans, such as that proposed on the use of transgenic animals. The Gen-Lex motion seeks to build on this aversion to bans by tightening laws designed to ensure that abuses cannot occur.

Although the referendum has firm support from many people, the outcome of the vote is still in doubt. To succeed, it requires the majority of the country's 26

cantons to vote in favour. This is unlikely, according to Cavallo, because there is relatively little opposition to genetic engineering in the French- and Italian-speaking parts of Switzerland.

Cavallo also argues that the Gen-Lex motion is too abstract and complex to persuade supporters of the referendum to change their minds. But Peter Mani, a microbiologist who heads the department of gene technology and society at the University of Zürich, is optimistic that the initiative will help to prevent approval of the measures being put to the referendum by reassuring the public that genetic engineering will be strictly controlled. "The opponents have gone too far in their demands," he says. "Complete bans make the public uneasy."

He believes that, barring a major accident or other event, time and national conservatism are on the scientists' side. "The Swiss are not likely to choose a radical solution unless some unpredicted scientific disaster happens shortly before the referendum," he says.

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