

# Attention, Class: A Departing NAS President Speaks His Mind

Bruce Alberts may be stepping down as president of the U.S. National Academy of Sciences. But he's a long way from retiring

Bruce Alberts came to the National Academy of Sciences (NAS) hell-bent on improving U.S. science and math education. Twelve years later, as he wraps up his second term as the academy's 20th president, Alberts admits that the country's educational system is still broken. But he hasn't stopped trying to fix it.

Along the way, he's also strengthened the academy's position as a respected, independent source of advice to the U.S. government by reducing the turnaround time on many of the 200-odd reports churned out every year by the National Research Council (NRC) that he heads. Says presidential science adviser John Marburger about NRC's 2001 report on climate change, "It gave them credibility with the Bush Administration and increased their inclination to use the academy more often." Former Clinton science adviser Neal Lane says the country "is indebted to Bruce ... for his dogged determination to improve American science and math education, and for his commitment to international cooperation in science."

On 1 July, Alberts will return to his beloved University of California, San Francisco (UCSF), where he'll reclaim his old job as professor of biochemistry and biophysics, sans department chair. And in case anyone thinks that the 67-year-old biochemist has lost any of the spark that brought him to the nation's capital in 1993, his official portrait unveiled last week (p. 1109) should put such notions to rest. Its most prominent feature is a tie festooned with bright yellow pie faces with protruding tongues that depict a range of moods. The neckwear pokes fun at the people in this town who take themselves far too seriously. It's also a sign that Alberts is leaving NAS older and wiser—but with his spirit intact.

On 6 May, on the heels of his final annual NAS meeting, Alberts sat down with *Science* to discuss his accomplishments and failures as head of the self-elected meritocracy that stands as the country's most prestigious scientific organization. He spoke of the threat to science from advocates of intel-

ligent design, of the need to better manage the U.S. scientific enterprise, and of the prospects for China and India becoming the next great scientific superpowers. Here are



**Table talk.** Alberts, shown here during a 1996 visit to the lab school at Smith College in Northampton, Massachusetts, enjoys spreading the gospel of hands-on science.

excerpts from that interview with Deputy News Editor Jeffrey Mervis.

**• On the debate over teaching evolution:** "It says we've failed as scientists and science educators to convey the nature of science and its values to the American public, despite our world leadership in science and technology. ... We've got to pay more attention to the education of young people and completely transform the way we teach introductory science at the college level. We are failing to make people understand what science is, or why they should care about it. ... We all fear that this movement toward a biblical interpretation of scientific facts will eventually make us look like some of the countries in the Middle East. If we're going to remain a world leader, we're going to need all the scientific rationality that we can muster."

**• On why education reform is so difficult:** "We all think we understand education because we did well ourselves. It worked for us, and we think it should work for everybody else. But that's a big mistake. Half the brilliant students who come to Harvard planning to major in science drop out in the first year or two, because they don't get real sci-

ence in their intro courses. Instead, they get huge amounts of knowledge that they must memorize before they can get to the good stuff, the hands-on and interactive courses.

We know what to do, and many of the small liberal arts colleges are doing it. But many of the large universities, with some notable exceptions, are not taking it seriously. ... The incentives are wrong. Someone has to tell the department chairs that getting the resources they want—for equipment, graduate students, and so on—is going to depend on how they teach undergraduates. If you take away the money, the faculty will respond. I've learned that from spending 30 years in academia."

**• On advising the government:** "The Bush Administration [in 2001] asked us 14 specific questions about climate change, and I give them credit for asking. They didn't have to. ... There are other problems that have arisen, and we're trying to help with them. For example, people keep saying that climate change isn't real, and that the science isn't there. We've answered that question, and we're going to continue to insist on those answers, whether they like it or not. ... There are many things we'd like to do that we haven't been able to. We'd like to do a major study on nuclear power—the safety issues and where we as a country should go. But none of us have been successful, over four administrations [two for Clinton, two for Bush], in getting anybody to ask us to do that. And I don't know why they're not interested. ... It's obvious that the Department of Energy has to ask us to do it. Otherwise, it doesn't make any sense because they won't listen to what we've come up with.

One big mistake I made as NAS president was to hold a competition within the academy for topics that we should study. We came up with lots of good ideas. But there was no client for them, so they had little effect. Getting an agency to put up even a little money for a study makes a big difference in their interest."

**• On recreating an Office of Technology Assessment (OTA):** "After Congress abolished OTA, we became the only show in town. We didn't like it, and we've tried to fill the gap, but we can't do everything. [At the same time], the idea of recreating it doesn't seem to have any political capital around here. We're not opposed to it, but you want to fight the battles that you think you can win."

**• On open access to journals:** "I think that the community should push for access to scientific information as quickly as possible. We tried [with the *Proceedings of the*

*National Academy of Sciences*] to see how short we could make it. We actually tried only a 2-month delay. But the next year a number of librarians told us that they would wait the 2 months and not subscribe, saving the money for other journals. And so with regrets, our publication committee decided to let it slip to 6 months. It's an experiment, and maybe someday we'll move it ahead to 5 months. But 6 months has allowed us to maintain our subscription base. In fact, for 146 countries it's free immediately. But for scientists in the countries that can afford it—U.S. and Europe and Japan—we ask them to pay.”

• **On changing the way the academy does business:** “We’ve tried to experiment, including some studies where the committees didn’t even meet. But it doesn’t work. The kind of thing we do needs that personal interaction. We get people together

can work out their differences. People want to see body language. ... We’ve been pushing the envelope to do things faster, and we’re going to keep trying.”

• **On the impact of 9/11 on scientific openness:** “I think it’s been a disaster. We’ve hurt security by not giving visas to leading foreign scientists, insulting our friends, and sending their students to other countries. Our tremendous scientific vitality is based on mixing the best talent from around the world. Twenty-five percent of the NAS members were born in another country, and they are our best diplomats. We’re jeopardizing that by creating barriers that make no sense, like requiring students to promise that they won’t stay here. It should be the reverse.

We have this broken system, and after 9/11 we’re enforcing these rules in the name of national security. But what we’re doing is

young people are hungry to learn it, and they have such large numbers of people. But as we all know, there are many ways to make a mess of it. My favorite example is the recent science strike in France. They want more resources for science, which is good. But at the same time, you’d hope that they could adjust their system to make it more merit-based. Now, after your Ph.D., the first job gives you lifetime tenure. That’s nuts. That’s the perfect way not to run a scientific system. So I think the countries that will lead the world in science and technology are not just those with the most people. That’s important. But you also need a system that allows the most talented people to have access to what they need to function effectively. Encourage the collision of ideas, and reward risk-taking and innovation. The United States is trying to do those things, too, but not well enough.”



**The ties have it.** Bruce Alberts and his portraitist, Jon Friedman, during last week’s unveiling at NAS’s Keck Center.

• **On his future:** “My first year here was really hard. It was overwhelming. It was only after 4 years that I even started to think about staying. I hoped that in my second term I could do a lot, including fixing education. But I ended up spending most of my second term on international science. Now I hope to remedy that, starting in July, when I go back to UCSF. I’ll be paid to focus on educational issues. One thing I want to do is stimulate better science by mixing people up, exposing them to new ideas, and helping them make new connections. As a young scientist, you have to be dragged out of your hole. But at the academy we’ve been doing that with our *Frontiers of Science* program and Keck Futures Initiative. I don’t see why that sort of thing can’t be done on the UCSF campus, or in the Bay Area.

I’m also trying to think of new models for scientists at the end of their careers. Continuing to run a lab and competing for

who don’t know each other, and we create something different. For example, we did a report on the future of developmental toxicology, and we had scientists from both camps. <sup>2</sup> The first meeting was like Greeks talking to Romans. They didn’t have a common language. It takes a couple of meetings, and some meals, before people get comfortable. And in the end they produced something unique. But you can’t do that on the Internet.

There are a lot of tricks to the trade. A good chair knows how to call a coffee break when things aren’t going well so that people

the opposite of national security. I can’t imagine a more effective way of losing our scientific leadership than closing down this country to scientific exchange. ... And if and when we do get the problem straightened out, all our university presidents will have to go to India and China and solicit students, and tell them that they are now welcome. That’s crazy.”

• **On the rise of science in Asia:** “It seems likely to me that China or India will become the dominant scientific power. They take science and technology seriously, their

grants until my third renewal is turned down and I have to leave in disgrace is not the way to go. We can’t maintain an innovative system unless the old scientists become mentors and make way for the next generation. How do I get credit for this? I was president of the academy, so I don’t need the credit. The worse way is to put your name on their paper. But why can’t there be a second way, that also goes into the database, for people who really helped make things happen? I’d be proud if, after 10 years, you could find 30 papers that I had helped people to do good science.”