

IN PROFILE

Arms Control Experts Blend Idealism and Technical Know-How

Peace on Earth? Sure. But how to get there? That question has haunted the physics community since the bombing of Hiroshima, a persistent reminder of its key role in unleashing a new weapon of unparalleled destructiveness. Over the decades, a number of prominent physicists have taken it upon themselves to offer independent technical critiques of defense policies, to try to reduce, if not remove, the threat of nuclear war.

In recent years, a small but growing corps of younger physicists have followed their lead, making arms control and disarmament their life's work. David Wright and Lisbeth Gronlund are two such individuals. Since 1992, they have worked as senior staff scientists at the Cambridge, Massachusetts-based Union of Concerned Scientists (UCS), a nonprofit organization dedicated to "public interest" science, and as research fellows with the Security Studies Program at MIT. Initially drawn to the work because of its social relevance, the couple has earned a reputation in arms control circles as excellent technical analysts and as willing mentors for other young scientists entering the field.

The physics of missiles

When *PHYSICS TODAY* visited Gronlund and Wright at the UCS offices overlooking Harvard Square, the staff was still adjusting to the recent death of Henry Kendall, the organization's co-founder and longtime chairman. "Henry was a wonderful person," says Gronlund. "He cared deeply about these issues."

Among UCS's stated missions is the abolition of weapons of mass destruction. "Part of what we do is to try to influence US policy to be consistent with that end goal," Gronlund says. For example, to help nonspecialists sort through the knottier technical questions and understand the possible implications for defense policy, they write up short background reports, which they send out to policy makers and the press.

They also do research on existing or proposed weapons, such as antiballistic missile systems and ABM countermeasures. "At a physics level, there are things you can figure out even without access to classified information," Gronlund says. "Missiles must obey

the laws of physics." Using technical data gleaned from the open literature, it is then possible to build a reasonably accurate computer model of, say, North Korea's long-range missile capabilities. "People who aren't scientists are floored by this," Wright says. "But to anybody with a physics background, it's not that surprising."

From such studies, they can then make policy recommendations. Wright points to the recent debate over President Clinton's \$10.6 billion missile defense system, intended to shield the US against a limited long-range missile attack by "rogue states" such as Iran and North Korea. Having studied the latter's missile program since the early nineties, Wright concludes that in several years North Korea may indeed be able to strike the US from afar. "But if North Korea wants to attack with, say, a biological weapon, they could certainly do it, now or in the near future," Wright points out. "There are other ways to deliver these things." What's more, the US plan is viewed as a threat by both China and Russia, and could thus stall efforts to scale back nuclear arsenals. Supporters of disarmament therefore see no point in erecting such an expensive missile shield that "will almost certainly be ineffective and unreliable," Wright says. Far more constructive, he argues, would be a policy of diplomatic engagement, to reduce the likelihood that North Korea will attack.

Student activism

Gronlund and Wright's interest in nuclear issues dates back to their student days, which coincided with the US military buildup under Ronald Reagan. As a physics undergraduate at the University of California, Santa Barbara, Gronlund joined up with a group of physics postdocs who were trying to educate themselves about the threat of nuclear weapons. In 1982, as she was preparing to enter graduate school at Cornell University, she says, "one of them told me, if you want to keep working on these issues, you should look up David Wright."

Wright was then in his last year of his PhD at Cornell, doing a thesis on liquid crystals under David Mermin.



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NUCLEAR MISSILES OUR SPECIALTY: Physicists Lisbeth Gronlund and David Wright apply their technical expertise to problems in international security and arms control.

"In 1981, I saw *The Day after Trinity*, a documentary about the Manhattan Project," Wright recalls. "It had a very strong effect on me. I started going to the library and reading things, trying to figure out what was going on."

The issue hit home when the Federal government began actively recruiting university researchers to work on the Strategic Defense Initiative. As a protest, Wright and Gronlund decided to draft a petition, "the bottom line of which was, We're explicitly rejecting the SDI money," Gronlund says. "It seemed obvious to us that we should do this." The Cornell physics department already had a reputation for outspokenness on military policy, thanks to the efforts of professors such as Hans Bethe, Kurt Gottfried and Robert Wilson. "There was a certain amount of acceptance for what we were doing," Wright says.

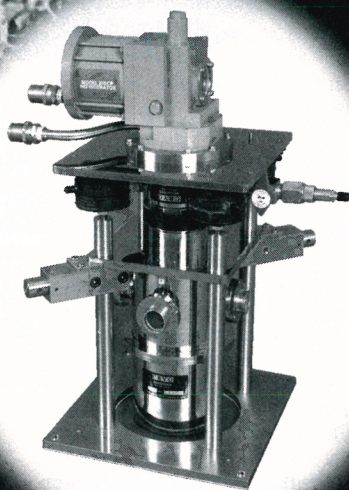
They began circulating the pledge to faculty and students at Cornell and at other campuses, too. They soon learned that two physicists at the University of Illinois, John Kogut and Michael Weissman, were sending around a similar document, so the four joined forces. Over the next year, they gathered signatures from some 7200 researchers, and their efforts drew national media attention. The experience of coordinating the pledge campaign, writing press releases and holding press conferences showed Wright and Gronlund what they as scientists could bring to public policy debate.

Making the transition

After receiving his PhD in 1983 and hoping to land an academic position, Wright went to work as a postdoc, first at Ohio State University, then at the

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University of Pennsylvania. But arms control questions continued to interest him, and led him to apply for a fellowship in international peace and security, sponsored jointly by the Social Science Research Council (SSRC) and the MacArthur Foundation. The fellowship was designed to retrain people from different disciplines to work on arms control and security issues. For the next two years, he did research at Harvard University's Center for Science and International Affairs, and then joined the Federation of American Scientists in Washington, DC.

Gronlund's career choice came sooner. "It became clear to me even before I finished my PhD. I didn't apply to traditional physics postdocs." Instead, she spent two years doing postdoctoral work in arms control at MIT, and then she too received an SSRC-MacArthur Foundation fellowship, which she decided to spend at the University of Maryland's Center for International Security Studies.

In the fall of 1992, a position for an arms control researcher at the Union of Concerned Scientists unexpectedly opened up. Recognizing that such openings in their field are rare, Wright and Gronlund applied for the job together, offering to split the position with the idea of finding another part-time position somewhere else. UCS agreed to hire them on a three-quarters-time basis, and the remaining one-quarter was furnished by MIT, where they had the added benefit of working closely with George Lewis, a physics friend from Cornell who had also made the leap to arms control work.

A good balance

Holding identical jobs has allowed Gronlund and Wright to avoid many of the competing demands faced by other working couples. That's been especially important since their daughter, Kirsten, was born four years ago. "If one of us has to stay home with her, the other can still go into work, if there's a meeting or a report that needs to get done," Wright says. Having their personal and professional lives so enmeshed requires some careful balancing, but it seems to suit the couple, although they both admit there is a tendency to take work home. "Sometimes I wish that one of us did something totally different," Wright allows. "But it's good to have somebody who knows your work very well and you can bounce ideas off." Gronlund adds, "And it's not like I get annoyed if he talks about work at the dinner table, because chances are I want to talk about it too."

Their shared idealism and commitment to their work is a strong bond.

"It's true this is our job, but it's more than that," Gronlund says. Adds Wright, "The work is an important part of our lives, it colors the way we view the world."

And Gronlund and Wright have done their best to recruit the next generation of arms control experts, much as they were encouraged early on by Frank von Hippel of Princeton University. Back in 1989, von Hippel and Russian physicist Roald Sagdeev organized a summer gathering in Moscow for young American and Soviet scientists interested, but not necessarily experienced, in arms control. "That meeting was so inspiring for us," Wright says. "There was a lot of camaraderie, and it was clear that there were high-caliber Soviet scientists who were interested in these issues." Gronlund, Wright and Lewis decided to make the symposium an annual event, and it now draws scientists not just from the US and Russia, but also from China, India, Pakistan and elsewhere. The environment for doing this kind of work varies widely from country to country, but the expectation is that participants will figure out a way to apply what they've learned when they return home. "Learning how to do this work is almost an apprenticeship," Wright notes. "You need to see how people think about the problems [and also] how to approach the foundations"—a major source of funding in their line of work.

Much work left to do

If Gronlund and Wright feel they've had some success in nourishing an international community of arms control experts, they also view current trends in defense policy with growing alarm. Indeed, the general mood among their peers these days is that "we have wasted an enormous opportunity following the end of the cold war," Gronlund says. They had expected the collapse of the Soviet Union to lead to deep cuts in nuclear arsenals. That hasn't happened: Between them, Russia and the US still maintain 30 000 strategic and tactical nuclear weapons.

And so, for the foreseeable future, Wright and Gronlund plan to keep doing what they're doing. "I could imagine making a switch to another technical policy area if I saw an issue that really jumped out as more important. Or if funding had dried up," Wright says.

"Or if nuclear weapons weren't a problem anymore," adds Gronlund. "I mean, we're not that old. It could happen."

"We'd love to be out of a job," Wright says, with a laugh.

"Yes," Gronlund agrees. "We would."

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