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Nuclear Options

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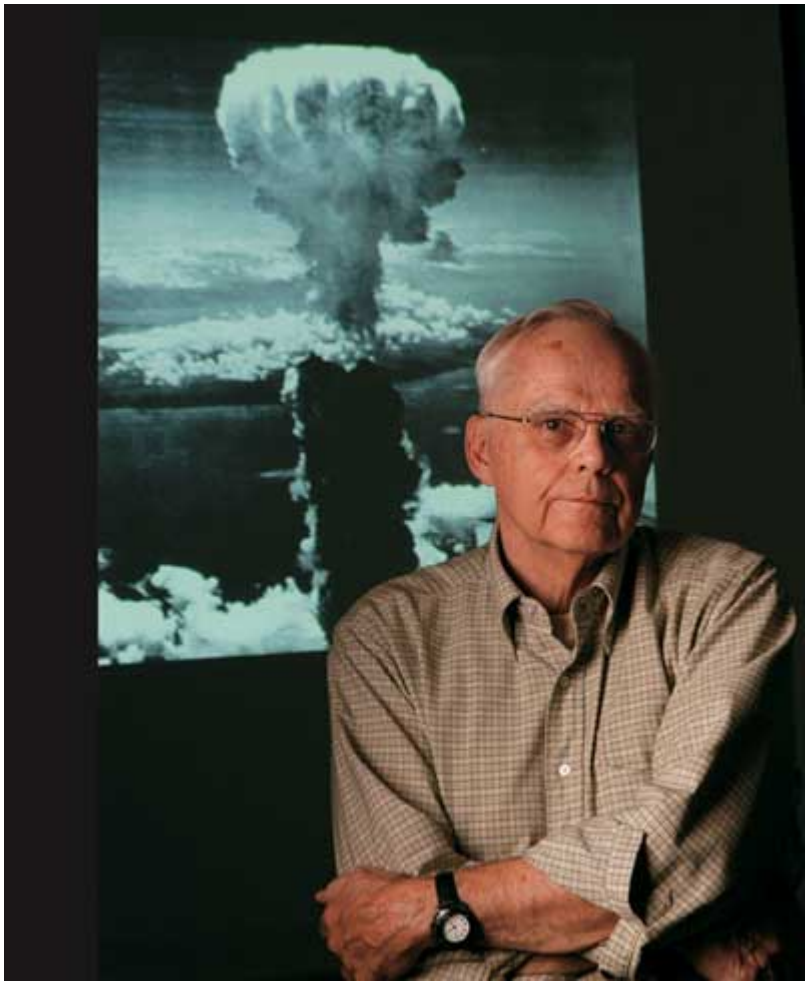


Physics Professor Ray Wilson guides students and teachers into careful consideration of a subject that he believes humanity ignores at its peril.

Story by Nancy Steele Brokaw ’71
Portrait photo by Marc Featherly

In 1959, Ray Wilson was conducting research in the library stacks at the University of Illinois when he came across something he wasn’t supposed to see.

Atomic Bomb Injuries, by Dr. Nobuo Kusano, published in 1953, included photos of horrifically injured victims of the nuclear bombs dropped by U.S. aircraft on the Japanese cities of Hiroshima and Nagasaki 60 years ago this past August.

“It was a rather unusual find,” says Wilson, associate professor emeritus of physics at IWU. “I didn’t realize it back in 1959 but all such photos and documentation were confiscated by U.S.

occupation forces in Japan, classified as ‘confidential’ by the U.S. government, and kept secure for some 22 to 30 years. Apparently Dr. Kusano did not volunteer his photos for confiscation.”

In post World War II-America, the atomic bombings on Japan were well-known, but what exactly happened to the scores of civilians killed or injured in the blasts remained something of a mystery. Kusano’s book — based on a presentation he made at a medical conference in Vienna in 1953 — showed what happened to them, in graphic detail.

The photos made an indelible impression on Wilson, who in the years since has spent much of his time and energy trying to raise awareness about the destruction a single exploded nuclear bomb can deliver — let alone the thousands of such weapons currently stockpiled in arsenals around the world. Wilson decided to create a May Term course that covered a range of nuclear issues but focused on the Hiroshima and Nagasaki bombings. Since he began teaching “Problems of Nuclear Disarmament” in 1979, hundreds of Illinois Wesleyan students have faced the question, posed in bold type in Wilson’s course syllabus: “Do you think this is something you should know about?”

Zach Hooper ’07, a business administration major who took Wilson’s class last May, thinks the content of Wilson’s course is something his generation should definitely know. He’s noticed a reckless posture among many his age about the prospect of launching a nuclear attack. “As young Americans, we have this idea after the terrorist attacks — there’s this mindset — that we should just go nuke ’em,” he says. “But that’s not really an option, nor was it ever.”

On August 6, 1945, it was not just an option, but reality, as troops aboard a U.S. Army plane detonated a single nuclear bomb, code-named Little Boy, 1,900 feet above the center of the Japanese city of Hiroshima. Three days later, on August 9, U.S. pilots dropped another bomb on nearby Nagasaki.

Estimates vary but most experts now say that within two weeks of the Hiroshima bomb, 126,000 Japanese died, about 95 percent of whom were civilians. Another 15,000 exposed to the blasts died by the end of the year. Tens of thousands more were irradiated, causing suffering and, often, eventual death from complications. The final death toll, according to Wilson, was well beyond 200,000.

Wilson takes an interdisciplinary approach in elucidating this event, which is forever seared into the consciousness of one generation, yet was practically ancient history to Hooper and his 71 classmates enrolled in “Problems of Nuclear Disarmament” this past May. To explain what happened in Hiroshima and Nagasaki, Wilson begins with the physics. Students are introduced to fundamental concepts regarding the four forces of nature, concepts of energy, conservation laws, and atomic and nuclear physics.

As Wilson writes in his course syllabus, “You will learn some very basic science which will then allow you to understand the physics and technology of nuclear explosions and nuclear war. You will be able to actually do atomic and nuclear physics problems.” Underlined and in bold type he adds, “This is a major ingredient of the course.”

While teaching basic physics (class completion earns students a general education requirement), Wilson also introduces such topics as the science and technology of nuclear war and the social, economic, ethical, and political implications of nuclear weapons policies among nations. Wilson, often employing characteristic humor, guides his students to a real understanding of Japanese culture and people. For this reason, the course also earns students a "flag" credit for the curricular requirement of Encountering Global Diversity.

"Now this isn't the kind of class where you want to live in a hole and not have kids, is it?" one mother asked her daughter after three days of Wilson's class.

While Kate Tombaugh '07 told her mother that it wasn't that kind of class, she says she can't deny it that the material made a strong impact. "What hit me," Tombaugh reports, "is that education and knowledge are everything. It's really neat having my eyes opened. I can't dwell on it, but I can't be too naïve, either."

Wilson uses a kaleidoscopic mix of classroom presentations and thought-provoking questions. Presentations are, by turns, scientific, biographical, or cultural. Wilson introduces his students to the larger world of Japanese society through videos (including a series of Sumo wrestling events), slides, and personal stories. Wilson spent eight summers studying in Hiroshima, where he was a visiting scholar at Hiroshima Jogakuin College, and returns there at least every three years. On those visits, he is accompanied by his wife, Akiko — who is from Japan and previously taught English in Hiroshima and worked at the Hiroshima Peace Park — and their two teenaged children, Taiyo and Aya.

While sharing his knowledge, Wilson also likes to ask questions that have no easy answers. A sample, printed on the classroom's dry eraser board: "If the U.S. totally eliminated ALL its nuclear weapons, guaranteed to make no more, would anything bad happen? Anything good?"

Wilson does not shy away from helping students understand the full effects of nuclear blasts. He shows them photos of bombing victims.

"The explosions were hotter than the surface of the sun," says Carrie Schmitt '07, who took Wilson's course. "I can't imagine. It melted the skin off people's bodies."

Wilson and his wife, Akiko (above) at the Peace Statue in Nagasaki Peace Park. The couple met in Hiroshima and make frequent visits to Japan with their two children.

“The victims,” Diana Lopez ’08 chimes in, “so many of them were children. I remember the charred bodies of women, crouched over, trying to protect their children, and I remember a child trying to nurse at his mother’s breast but the mother was already dead.”

Such photos made a similar impression on Wilson in 1959 when he discovered them at the University of Illinois, where he earned his bachelor’s and master’s degrees (his Ph.D. is from the University of Arizona). At the time, he was student teaching a physics class at Champaign Central High School taught by Nellie Bates. In that era of Civil Defense, the class was a recipient of a federal grant to teach the students about protecting themselves in the event of a nuclear exchange.

“But what was it like for the people?” Wilson remembers wondering. “All that had been mainly revealed by 1959 was what had happened to the cities of Hiroshima and Nagasaki . . . and incidentally — it almost seemed — a lot of people died. But, really, what had happened to the people?”

Discovering at least part of the answer to that question in Kusano’s book, *Atomic Bomb Injuries,* Wilson decided the information was too important not to share with others.

“From then on, when teaching about nuclear energy,” he says, “I decided to show my physics students the results of the largest singular releases of energy man has ever produced on Earth. We would do the physics, show the areas destroyed — but also include what happened to real people, the biophysics.”

In the summer, Wilson (above) leads a weeklong workshop at Illinois Wesleyan’s campus that gives college and high school instructors from across the country a “running start” on how to teach courses about nuclear weapons and their proliferation. (Photo by Marc Featherly)

Wilson — who joined Illinois Wesleyan’s faculty in 1962 and earned emeritus status in 1997 — has lately been passing along his methods of teaching about nuclear issues to a younger generation of teachers. Through his associations with officials in Hiroshima, he received funding in 2002 to teach a one-week workshop that, he says, gives other instructors “a running start” on teaching courses similar to “Problems of Nuclear Disarmament.” The workshop has continued every year since — although funding is running low and Wilson has contributed some of his own money to keep it going.

Greg Mason, an English/Peace Studies professor at Gustavus Adolphus College in St. Peter, Minn., attended the July 2005 workshop. “I’ve been teaching peace studies for about 10 years,” Mason says, “and I was interested in improving my knowledge of this particular area. Like others, I’ve been avoiding it somewhat because it was so horrific and unthinkable and I thought I needed to understand

it better and make my students more aware of it, rather than sort of just skimming over it as I had done in the past."

Another attendee, Joanne Izbicki, is an assistant professor at Ithaca College in Ithaca, N.Y., specializing in Modern East Asia. She's been to Hiroshima and read extensively on the subject. Still, Izbicki says of the content of Wilson's workshop, "There are some things from this week that I recoiled from — there's always something that seems more shocking.

"All of these issues are still very, very hot," Izbicki adds. "I think teaching about Hiroshima and Nagasaki gives people a very concrete grasp of what we're really talking about if we're still going to consider the use of nuclear weapons."

Penny Hanna, who teaches high school science in South Dakota, says she especially appreciated "all of the instruction on Japanese culture, how to talk and get around. That was real personal to him (Wilson). The family slides gave the course a human aspect. … It's not just what happened but who it happened to."

Mason also liked Wilson's approach to the material. "He connects in a personal as well as a physics way; it's a powerful combination of professional expertise and personal commitment." Adds Izbicki, "Ray has a very gentle personality. Often physics professors are 'up here,'" she says, motioning above her head, "but he's easy to understand. He doesn't preach to us."

Not preaching is an important part of Wilson's teaching style. "It's not my intention to create pacifists but to teach historical truth," he says. "We wrestle (in class) with several of the dilemmas related to the use of nuclear weapons."

One such dilemma is the fact that the nuclear bombs of today are much more destructive than the ones dropped on Japan in 1945. The Hiroshima nuclear explosion was the equivalent of 15,000 tons of conventional high explosive (TNT). In the year 2005, Wilson says, the yield of an average nuclear weapon worldwide is about 10 times greater than what he calls "the small and primitive Hiroshima bomb."

"Not too long ago," Wilson writes in his course guide, "world arsenals contained the equivalent of eighteen thousand million tons (18,000,000,000) of conventional high explosives. This is equivalent to 1,200,000 Hiroshimas."

"It is now possible to destroy all the major cities of the world and their people overnight, and simultaneously wreak devastating radioactive havoc everywhere else on the globe ... all with the simple push of a few buttons," Wilson concludes.

All of this raises questions, and it is Wilson's style to ask them: *Who threatens you? Who will you war against? Do world leaders understand what the problem is?*

He doesn't offer answers.

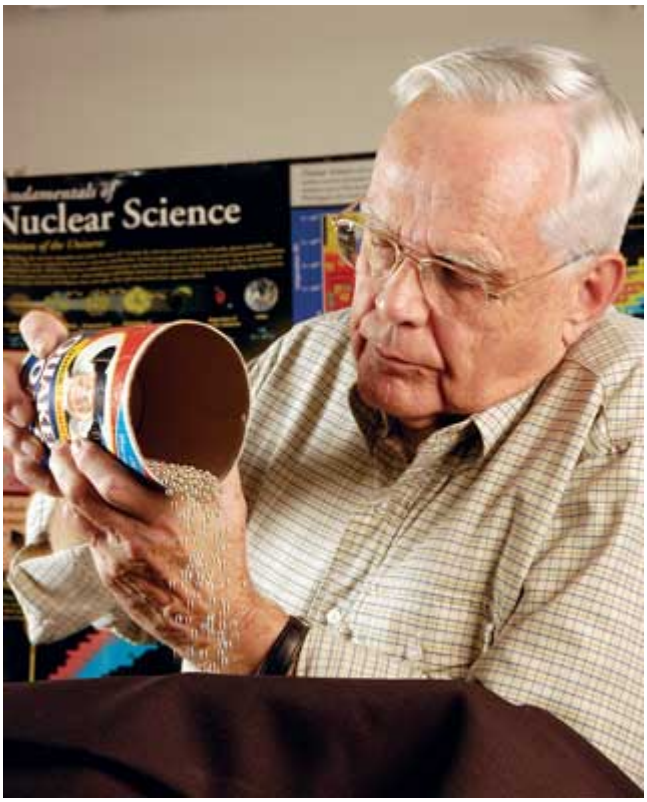
“Professor Wilson allows us a lot of thought,” Schmitt says, reflecting on her May Term experience.

“It’s true,” Lopez agrees. “He makes it easy for people to dissent; he doesn’t tell us how to think.”

Wilson urges his students to get alternative viewpoints by writing to relatives and sharing videos shown in class with others. “I interviewed my grandparents,” says Tombaugh. “I understand why they felt it was necessary (to bomb Hiroshima and Nagasaki) after Pearl Harbor.”

To see the problem through the eyes of world leaders who must decide whether or not to use their countries’ nuclear arsenals, Wilson designed a project that enables students to “bomb” either their hometowns or Bloomington/Normal — complete with graphs, concentric rings of radiation levels, and casualty projections.

“It’s interesting to put yourself in that place,” Tombaugh says.



Wilson provides a memorable visual demonstration, first pouring one BB into a waste can to represent the entire global firepower during World War II, followed by the pouring of 6,000 BBs, which symbolize the power of the world’s nuclear arsenal at the height of the Cold

War. (Photo by Marc Featherly)

For many students, the course's most memorable moment is the "wastebasket demonstration." As Rachel Halfpap '08 describes it, "Professor Wilson had a wastebasket rigged up where one BB pellet dropped in was equal to all the firepower of World War II. Then he had 6,000 BBs that represented the power of the nuclear bombs during the Cold War. He dropped the single pellet and that was loud. Then he started pouring in the 6,000 BBs. It went on forever, just for us to imagine how much destruction there is."

Another way to better visualize the destruction wrought by nuclear weapons is through literature and film. Students are assigned *Barefoot Gen*, an autobiographical graphic novel about the struggles of a 6-year-old boy and his family in the aftermath of the Hiroshima bombing. They also see *Black Rain,* a powerful movie depicting the horror of ravaged Hiroshima and the survivors' struggle to rebuild their shattered lives while coping with radiation sickness.

"All of this is painful to watch," says Zach Hooper, "but Professor Wilson balances it with humor."

Where does that humor come from?

"I could not continue to teach this course over this many years, repeatedly going over such disturbing material, if I was not an optimist," Wilson says, "and if in spite of it all, I didn't enjoy the classroom encounters and think that students have gained some valuable knowledge — and sometimes, believe it or not, had fun."

As for Wilson's optimism, it is solidly tempered with pragmatism. While knowing that the world is only a few button pushes away from an unimaginable nuclear catastrophe, he also realizes that most people will continue to remain oblivious to the danger unless a solid commitment among the world's nations emerges to deal with the problem. It is this very proposition that he addresses in *All Things Nuclear* by James C. Warf, a former Manhattan Project chemist and distinguished professor emeritus at the University of Southern California. Wilson's contribution to the book, "A New Way of Thinking About Achieving and Preserving Peace," summarizes his thoughts on world peace, "formulated, adjusted and changed over something like 25 years."

"If you know what kind of danger this is, then you can look at government policy and see: is this something we should be doing or is this something we should not be doing?" Wilson says. "I think I found a better way to do things, but it's a long distance from finding a better way to do things and getting the right people to think it's a better way to do things."

In his writing, Wilson concludes with a quote by the English statesman and philosopher Francis Bacon: "He that will not apply new remedies must expect new evils; for time is the greatest innovator." It's a chilling — and challenging — thought for IWU students to wrestle with.

But wrestle they do.

“Scientia et Sapentia,” meaning “Knowledge and Wisdom,” is Illinois Wesleyan’s oft-quoted motto. It’s the essence of a liberal arts education and the heart of Ray Wilson’s teaching style.

Knowledge, in this case, comes from understanding facts about dates and times and casualty figures; about isotopes, fission and fusion, plutonium, and enriched uranium.

But wisdom? That’s trickier.

How are today’s post-9/11 students to wrestle with this great nuclear instrument of war, exploded 60 years ago over Hiroshima and Nagasaki? What do they make of the nuclear bombs that ended the world’s worst war, saved and took lives, and brought peace? What, they all wonder, will happen if terrorists get their hands on nukes?

Perhaps, in this case, wisdom is the stuff born of wrestling with such difficult questions.