

NUCLEAR WATCHDOG SHARES THE NOBEL PRIZE

By Tori Peglar



Jim Navratil's search for weapons of mass destruction did not take him to the blistering deserts of Iraq nor to the sleepy, orchard town of Natanz, Iran, where International Atomic Energy Agency inspectors discovered potential evidence of nuclear weapons three years ago.

But the CU grad's meticulous work for the IAEA during the summers of 2004 and 2005 was equally vital. In a quiet suburb of Vienna, Austria, Navratil (Chem'70, MS'72, PhD'75) spent hours in a laboratory devising ways to detect lower levels of plutonium and americium in uranium – both considered smoking guns of nuclear weapons programs.

For helping stem the global proliferation of nuclear weapons, Navratil shared the prestigious 2005 Nobel Peace Prize with about 3,000 International Atomic Energy Agency scientists and Director General Mohamed ElBaradei. The year marked the 60th anniversary of the world's first and only atomic-bomb attacks, which killed an estimated 140,000 people in Japan.

"It was a very humbling thing to find out about the Prize," the former high school dropout says. "I was only part of a large team but it's still great to be associated with that."

Speaking with Navratil is like viewing the history of nuclear weapons through an intricate kaleidoscope. His extensive work at America's leading nuclear weapons factories, as well as his travels to places like Chernobyl in the former USSR, connect disparate historical pieces into one big picture of the Cold War and today. While intriguing stories about his work roll candidly off of his tongue, he can be downright vague when speaking of other projects, explaining they are classified.

"The expertise that first-rate scientists like Jim Navratil contributes to the work of the IAEA is absolutely essential to its role in assuring the peaceful uses of nuclear energy and preventing misuse in the ways that threaten global safety and security," says Carleton Stoiber (A&S'64, Law'69), who headed three nuclear offices in the U.S. Department of State and now consults for the IAEA.

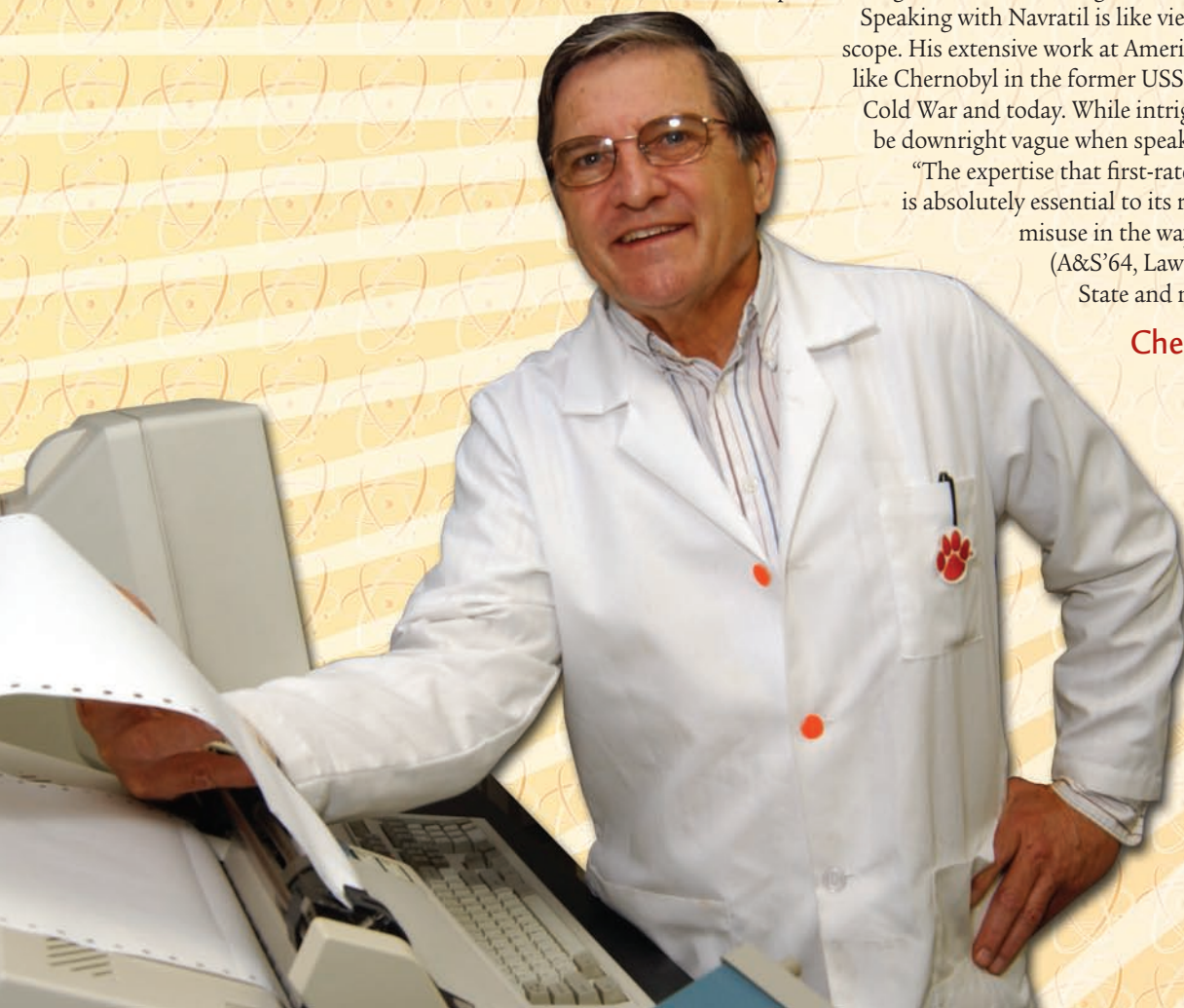
Chemistry drives curiosity

Born in 1941, one month before plutonium was discovered, Navratil grew up in a family of German immigrants in the windswept city of Denver. During his childhood in the 1940s and early 1950s, nuclear weapons were in their infancy. While the U.S. government pursued grand experiments in dry, relatively empty pockets of the West, the young Navratil found inspiration in Thomas Edison and his chemistry set.

Navratil and his brother built a two-room laboratory in their backyard with scrap lumber. Hooked on conducting experiments, the curious young scientist found work at a local drug store and collected samples of every chemical there.

When the International Atomic Energy Agency won the 2005 Nobel Peace Prize, CU alum Jim Navratil and his colleagues were recognized for preventing "nuclear energy from being used for military purposes" and "ensuring that nuclear energy for peaceful purposes is used in the safest way possible."

PAT WRIGHT PHOTO, CLEMSON UNIVERSITY



“It was a lot of fun back then, learning the hard way,” he says, referring to the time he made nitroglycerine, left his lab and returned to find it had exploded.

During his senior year in high school Navratil’s inherent curiosity steered him away from the lab to hot rods and girls. He dropped out of school, although he returned in the fall and graduated, becoming the first in his family to earn a high school degree.

Under the cloud of national security hanging over Rocky Flats, a nuclear weapons facility built in 1952, Navratil found work as a janitor. Located just south of Boulder, the understated facility offered some of the most competitive wages in the area. Cleaning the labs led Navratil to rediscover his love for chemistry. He enrolled at CU, eventually receiving a doctorate in chemistry. While in school and after graduation he continued working at Rocky Flats, becoming a researcher and lab leader.

Hazards at Rocky Flats

It was dangerous duty. The workers made components for nuclear weapons using plutonium and other hazardous materials. Often they would clean up plutonium spills by themselves. Navratil, who spent 20 years at Rocky Flats, still carries plutonium in his lungs.

One time he was working with plutonium in a glove box, a clear sealed box in which scientists worked with chemicals using safety gloves. As he tightened the glass top of a flask containing plutonium, it broke and a sharp end of the glass went through his glove.

“It was very highly concentrated plutonium and just a drop or so got on my hand — that’s a lot of plutonium,” he says, noting he gets called back to Denver every couple of years for free physical exams.



As a boy Jim Navratil conducts experiments in a lab he built in his backyard in Denver. The pastime led to a career in analytical chemistry and a Nobel Peace Prize.

Driving home from Rocky Flats alongside the jagged foothills at night, Navratil’s thoughts focused on his young family and his CU classes, which he squeezed in during the mornings. His wife, Sylvia Navratil, remembers saying to him, “One day wouldn’t it be great if you won the Nobel Prize?”

Navratil thrived on campus, developing a close friendship with the late CU professor Harold Walton, who served as his doctoral adviser. He was Walton’s last doctoral student as well as professor and entrepreneur Bob Sievers’ first postdoctoral student.

“I’m absolutely delighted that Jim has been recognized for his work,” says Sievers, referring to Navratil’s shared Nobel Prize. “He is a careful scientist — very thoughtful and hard-working.”

Inside the Iron Curtain and beyond

Inspired by Walton to explore the world, Navratil moved to Vienna, Austria, with his family from 1978 to 1981 to work for the IAEA. Known as the spy capital of the world during the Cold War, Vienna was officially “neutral,” serving as a United Nations headquarters.

Sponsored by the IAEA, Navratil made several trips to the Soviet Union to work on a book on chemical thermodynamics with scientists there. His continued work with scientists behind the Iron Curtain raised red flags at Rocky Flats and with the FBI after Navratil returned to the States.

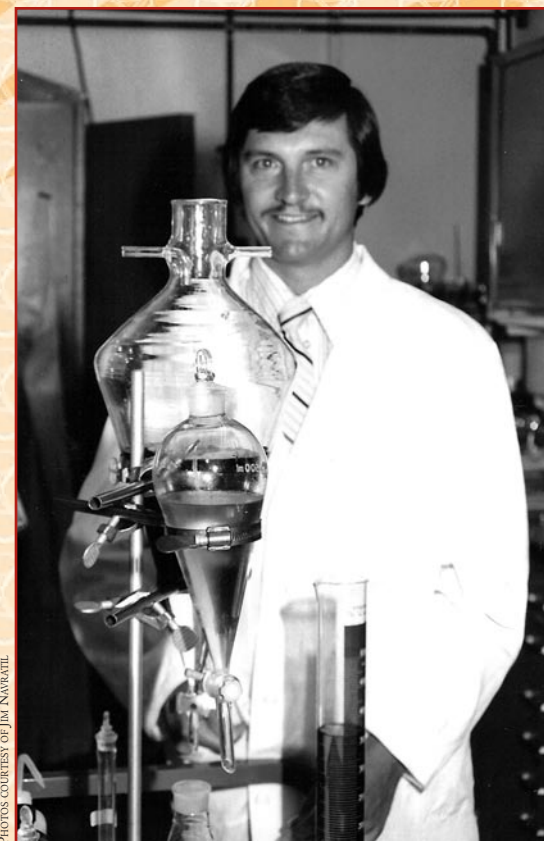
Navratil’s experiences in Vienna, wedged between former communist capitals Prague and Budapest, became fodder for his wife Sylvia Navratil’s novel *Bare Essentials* (Litarvan Literature) about a CU professor who takes a sabbatical in Vienna and ends up barely escaping with his life.

In the years since he has traveled to 150 countries as a consultant and conference lecturer and has taught at universities in Idaho and Australia.

Last year he visited Chernobyl, which on April 26, 1986, became the site of the world’s worst nuclear power accident. Twenty years later, scientists like Navratil continue to work in remote locations to clean up radioactive material, including household items like tea leaves and powdered milk that were contaminated in the blast. The goal is to keep nuclear material from being stolen.

Of great concern is the potential for extremists to obtain nuclear material and make dirty bombs, says Navratil, who retired from Clemson in May after seven years as professor of environmental engineering and science. The IAEA’s ElBaradei echoes his sentiments:

“I think the single most important issue today is to . . . absolutely make sure that none of these



PHOTOS COURTESY OF JIM NAVRATIL

Jim Navratil pauses in a Rocky Flats laboratory in 1968. The cleanup of the 6,200-acre site was completed last year at a cost of \$7 billion. The former nuclear weapons plant is to become a national wildlife refuge. Navratil still carries plutonium in his lungs from accidental spills while working there.

nuclear weapons or this nuclear material will fall into the hands of any extremist or terrorist group because, if they got hold of this material, they would use it,” ElBaradei said after winning the Nobel Prize. “That would be the beginning of the end for civilization as we know it.”

Despite the dangers of much of his work, Navratil does not mind the occupational hazards that come with chasing his life passion. He and the several thousands of Nobel Prize-winning IAEA scientists realize keeping the world safe from nuclear weapons comes with a price.

“There’s evidence that a little bit of radioactivity is good for you — if you don’t get too much,” he says good-naturedly. “It’s just like vitamins. There are a lot of toxic metals that are essential for life. For example, if you take too much selenium, it can kill you.” 🐷

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