



# Informal PHYSICS

Professor and Ph.D. Brett DePaola's knack for explaining physics without resorting to math is helping him clarify technology topics for the U.S. Department of State. But that's about the only parallel between his K-State role and his yearlong stint as a Jefferson Science Fellow.

The program brings professors to Washington, D.C., to advise policymakers on science, technology and engineering.

What DePaola has encountered there is a tireless corps of civil servants who truly rely on him and the other Fellows.

*Fellow and physics professor simplifies science for U.S. officials*



## FUNDING FOR PHYSICS

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## In Demand

“I didn’t expect they would be so happy to have scientists around to explain things to them,” DePaola said. “Usually, if someone at a party asks me what I do and I tell them, ‘I’m a physics professor,’ they run for the hills. At the State Department, on the first day, I had a line of people outside my door.

“And it’s tied to their dedication, that they need this information to do their jobs,” he added. “If anything, I’m more impressed every day.”

At K-State, DePaola’s research involves atomic, optical and molecular physics, a subspecies of quantum physics. At the State Department, he’s more a generalist, answering emails and phone calls while writing assessments of the technology that arises in CIA reports and the president’s daily brief.

DePaola’s most recent assessment, for instance, was taken straight to Secretary Hillary Clinton’s office.

“Not by me!” he added. “Did she read it? Probably. Did it make an impression? I don’t know. But it was cool.”

And no, he can’t tell you what it was about. The free exchange of ideas among colleagues is limited to those with security clearances.

## A Reputation for Research

Back home, DePaola spends much of his time at K-State’s James R. Macdonald Laboratory, which is among the elite atomic, optical and molecular facilities in the world. DePaola says he, like the rest of the physics faculty, is always looking for ways to involve undergraduates in lab research.

“As students gain skills and knowledge, they really contribute,” DePaola said. “For example, I needed a new laser, so I had a student design and build a laser that we used in a project.”

As do many optical physicists, DePaola deep-chills bits of matter with narrow-spectrum lasers. A cold molecule is a slow molecule: “about the speed of a bicycle instead of the speed of sound.” And cold, slow atoms interact differently with each other and with light than warmer atoms do.

What separates DePaola’s work from the pack is that he goes on to use ultra-fast, broad-spectrum lasers to control the chilled atoms. Only two or three labs

in the world are combining these very different laser technologies, he said.

“Our lab is in the top 11 nationally,” said DePaola, who is keen to see K-State join the country’s top 50 research universities, a priority set by President Kirk Schulz. “The department overall is already around 50. The entire mindset that goes with such a push is very beneficial.”

## Making Science Personal

DePaola’s brand of physics is far removed from the classical physics that left many high school students scratching their heads. Which means he can sympathize.

“Quite frankly, I didn’t enjoy high school physics, either,” he said. Although skilled at math, when he went to college, he chose to major in history — until he took a physics course.

“The instructor was very relaxed but very accomplished. And it was largely because of his attitude that he convinced me to switch to physics.”

This undergraduate experience helped form DePaola’s theory of education: Personalities, rather than subjects, often determine the path a student takes.

How Camp, who earned his physics doctorate from K-State in 2005, said DePaola reaches students outside the lab by hosting dinners and arranging canoe trips, or even bocce ball games in front of Cardwell Hall.

“This personal relationship makes for a more enjoyable learning environment,” Camp said, “and it creates mentoring moments that have nothing to do with physics.”

“Dr. DePaola allows students to explore their own answers,” Camp added. “He can sense when a student needs to struggle a bit through a problem, and when it might be necessary for some subtle mentoring to put students back on the right path.”

## Hands-On Physics

DePaola’s informality can work especially well in no-math courses for non-majors. But avoiding the white coat and equation-packed chalkboard is about more than image.

“Physicists get their hands dirty, too. I wear jeans to work because I could find myself kneeling in a pool of pump oil.”

DePaola has reluctantly adopted the State Department’s suit-and-tie dress code. More difficult has been the separation from his wife and daughter, who remain in Manhattan. “I miss them terribly.”

In the meantime, he has to size up some hardware. The State Department has recruited him for a trip to Jordan, to see an X-ray-producing particle accelerator — the only one of its kind in the Middle East.

Maybe he’ll get to wear those jeans after all.



*DePaola and fellow K-State physicists replace an acceleration tube in an accelerator on campus. Left: Brett DePaola at the Jefferson Memorial in Washington, D.C.*