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Courtney Kaita Profile
Princeton Plasma Physics Laboratory
Summer 2010

Many interns pass through the halls of PPPL, but none except Courtney Kaita has played the cello in China's Shanghai Arts Center.

Kaita, 20, daughter of PPPL staff member Robert Kaita and current PPPL intern, has not only played in Shanghai, but also at Lincoln Center and Carnegie Weill Recital Hall. Her music career began when she was seven years old, and her mother – the conductor and director of New Jersey's Bravura Philharmonic Orchestra – tried to persuade Courtney to take up the violin. But the instrument's "high-pitched timbre" compelled Courtney to look for other musical outlets. After watching a documentary about Jacqueline du Pre, one of the most accomplished cellists in history, Kaita decided to learn the cello.

"The way [du Pre] moved with the cello just seemed so natural," Kaita says. "I guess at even a very young age, I knew that was the instrument I wanted to play."

Kaita's teachers have included Katrina Jones, Qiang Tu (an associate principal cellist at the New York Philharmonic), Irene Sharp, Marine Kaller, and Julie Albers, a performer who helped Kaita prepare for auditions.

Currently, Kaita is a rising junior at the University of Michigan, Ann Arbor, where she is pursuing a double major in cello and numerical and applied analysis, as well as a minor in physics. "Science is something I really like to do, and am good at," says Kaita, "but music is my passion." In general, she is a woman of many interests. She is considering going to graduate school for applied math "to see where that goes," but also wouldn't mind pursuing an MBA some time in the future. Another option would be playing in a Hollywood-area symphonic orchestra, where she would be exposed to new music and movie soundtracks.

Kaita started interning at PPPL last summer after searching for a summer activity not related to music. She had conducted physics research in high school, and enjoyed the experience, so she applied for admittance to the SULI program. She was accepted and began working with Hantao Ji. Says Kaita, “It was very satisfying, going through the entire process of doing the research, writing a paper about it, and then presenting it. It’s definitely one of the best academic experiences I could have asked for.”

This summer, Kaita is working with Charlie Gentile through the Engineering Apprentice program. With other students she is learning how to use lasers to clean mirrors inside a plasma chamber. After a plasma run, the diagnostic mirrors on the inside of a fusion reactor can become covered with carbon and beryllium. This dust and debris would affect future plasma runs, but taking apart the entire reactor is out of the question. So researchers want to see if they can use a laser beam to burn off the residue and not harm

the mirrors in the process. The laser they are using is a Nd:YAG laser, which is considered a Class IV, high-powered device.

This research also has implications for ITER. "The mirrors that we'll be using are identical to the ones that will be in ITER," says Kaita, "to reduce any concerns that [the process] may not work on the actual ITER machine."

Kaita is also part of a team using new methods to create a medical isotope. The isotope, technetium-99m, is slightly radioactive; when it is injected into a person's body, the radiation is detected by hospital MRI machines, letting physicians glimpse the inner workings of the patient's body. Usually, technetium-99m is produced from the decay of molybdenum-99, which itself is produced when atoms of uranium-235 fall apart. Unfortunately for the medical community, molybdenum-99 is only manufactured by four facilities around the world; what's more, only 7% of the products of uranium-235 decay is molybdenum-99. To address this shortage, Kaita and her colleagues are bombarding molybdenum-98 with neutrons from a neutron generator. When one of those extra neutrons lodges itself in the molybdenum nucleus, the atom becomes molybdenum-99, which then decays into technetium-99m.

Some people are music virtuosi. Some people are expert researchers. Very few people, like Kaita, are both.