

## Univ. of Md. professor prepares to send project to International Space Station

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Physics professor and research scientist Eun-Suk Seo used to play ping-pong in her free time for enjoyment and exercise.

But now, spare time is a foreign concept to Seo as she prepares to launch her latest project to the International Space Station next year.

Her project, ISS-CREAM (pronounced “ice cream”) is a collaboration with NASA’s Goddard Space Flight Center that will construct an experiment to directly measure cosmic rays, particles from space that bombard the Earth.

“By doing that, we can identify these particles, event by event, what they are, and measure their energy to understand the origin, acceleration and propagation of cosmic rays,” said Seo, the project’s principal investigator

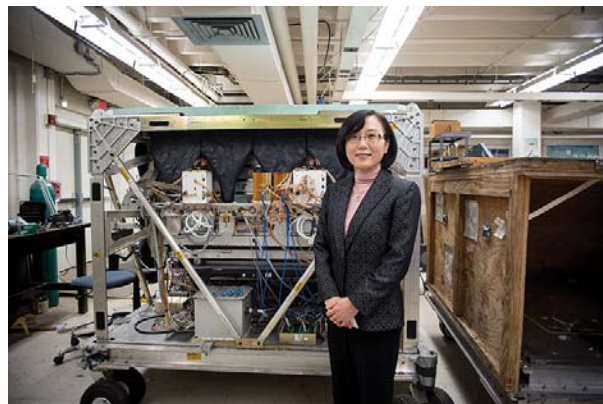
ISS-CREAM will launch a payload containing the experiment. Researchers will map an oddity at the upper end of the cosmic rays over a broad energy spectrum found in Seo’s previous experiments, while also reducing statistical uncertainties. With the results, the researchers will aim to solve one of science’s biggest mysteries: the source of cosmic ray energy and its impact on the universe.

Seo began working at this university as a post-doctorate research associate in 1991. She specializes in cosmic rays and has studied them through space-based and balloon-borne experiments, which observe the rays before they break up in the atmosphere.

“What we’ve been trying to do was to extend these measurements to the highest energy possible,” Seo said. “That has been our quest. My project kind of evolved over the years.”

This project started in 1998 with a concept study for Cosmic Rays Energetics and Mass experiment, which aimed to collect data through a balloon-borne payload over Antarctica. Construction of CREAM began in 2000, and the first balloon flight was in 2004, setting a duration record as it flew for almost 42 days.

Seo oversaw six successful balloon flights over Antarctica for a record 161 days of exposure for CREAM. The success of this version led to the opportunity with the International Space Station, which



Eun-Suk Seo

University professor Eun-Suk Seo standing in front of the payload that flew over Antarctica in the CREAM (Cosmic Ray Energetics and Mass) Balloon Experiment.

will transform CREAM.

“Students are involved in this project in all aspects,” said Seo. “I take this mix-and-match approach for manpower — that is, combining experienced professional experts and students with no experience.”

Seo said most students who get involved with the project have no prior experience in this kind of research, but gain hands-on proficiency in the process. She estimates she has seen about 100 students take part in the project.

“[Students’] eyes become sparkling once they get involved with this,” Seo said. “They tell me when they exit that they gained so much.”

And in an age in which textbooks and lectures are accessible online, this kind of lab research can be invaluable for educating future scientists. Seo calls this “creating knowledge:” discovering new things as opposed to learning about what is already known.

“The advantage to being on the ISS rather than on a balloon is that the atmosphere is significantly thinner at the distance of the ISS orbit, allowing for cleaner data,” said Paul King, a senior physics major who assisted in the research. “Being in space, however, there are many new factors that must be accounted for when designing the experiment.”

Kevin Cheriyan, a senior geographical sciences major, has been involved with the project for two and a half years and said Seo values nothing more than giving students the chance to learn from an active physics experiment.

“Most professors and researchers I know turn a blind eye to everyone who isn’t an immediate benefit to their work,” Cheriyan said. “But in my experience, Dr. Seo is dedicated to the undergraduate student experience.”

Beyond her extensive work on ISS-CREAM, Seo also teaches and serves as president of Korean-American Women in Science and Engineering and the local chapter of the Korean-American Scientists and Engineers Association. She attended a global network forum in Korea earlier this month and visited Antarctica to work on CREAM. Because the window to experiment in Antarctica is limited to December and January, Seo sacrificed five holiday seasons for the project.

So for Seo, there’s little time for relaxation. But she said she doesn’t see science as a job — she sees it as enjoyment.

Seo’s work will not be over once ISS-CREAM launches, however. The payload on the space station will operate 24/7 to collect data, and students will be able to communicate with the space station to send control the instrument.

Although next year’s launch of ISS-CREAM will be a major step in her research to answer questions about the universe, it also means something else for Seo: At some point, she will be able to play ping-pong again.