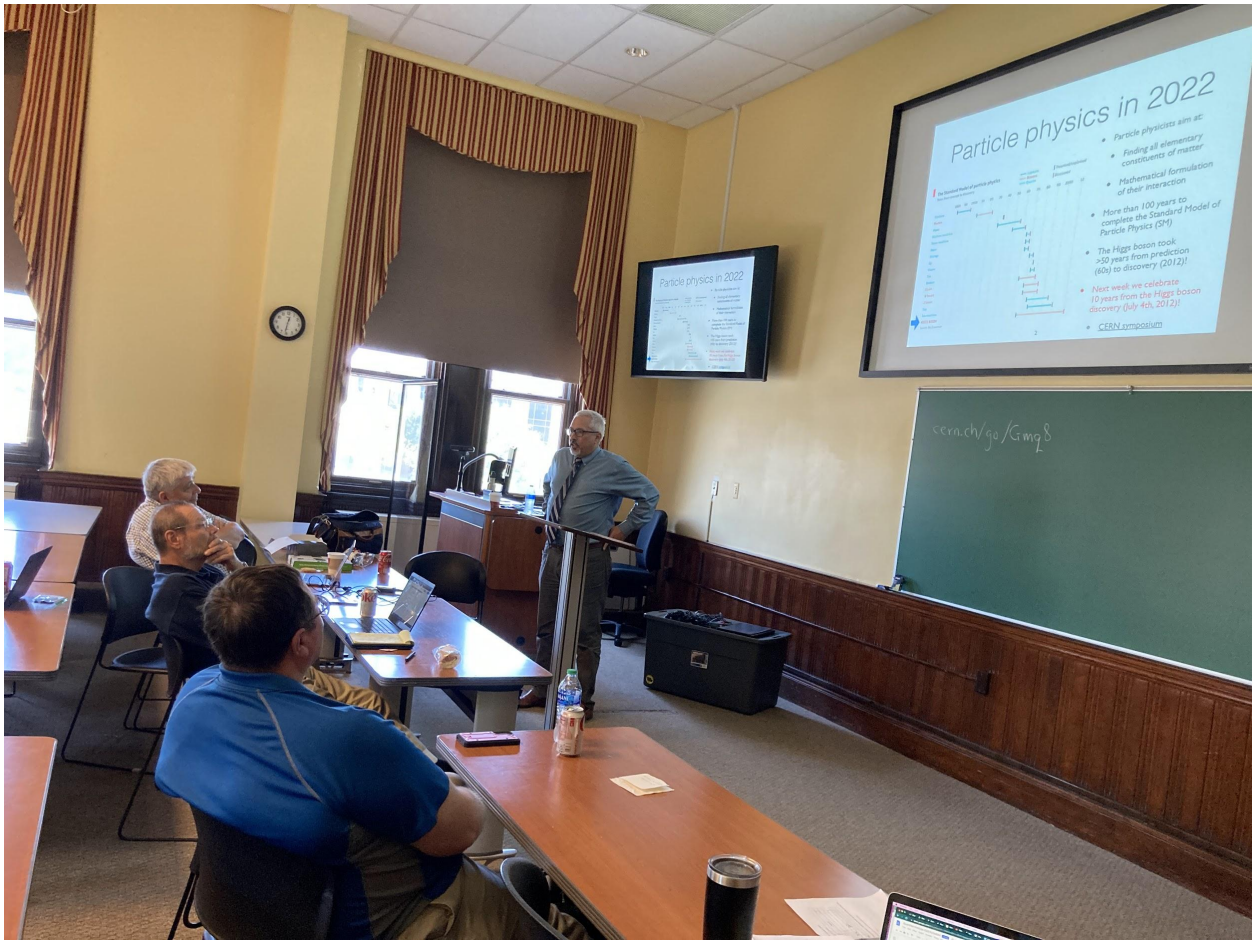
The Catholic University of America QuarkNet Center
2022 Summer Institute Report

The Catholic University of America QuarkNet Summer Institute was conducted on July 19-22, 2022 at the university's campus in Washington, DC. There were a total of six participants, including secondary teachers from private schools, Catholic schools, and public schools in the Washington, DC area; two of the participants attended previous summer institutes with our Center. There were also graduate students from Catholic University's Physics Department attending. Kenneth Cecire (QuarkNet staff at the University of Notre Dame), Martin Shaffer (QuarkNet fellow), and Aaron Dominguez (Provost and physics professor at Catholic University), delivered the physics content, and Angela McRae (Director, Catholic University Center for Teaching Excellence) and Katryna Andrusik (Instructional Coach, Catholic University Center for Teaching Excellence) provided the classroom implementation presentations. There were also presentations by Allison Hall (faculty member at the United States Naval Academy), and Rachel Bartek (Catholic University physics professor), who joined virtually from CERN.

The schedule for the institute included presentations on cosmic rays and an overview of particle physics, as well as presentations on classroom implementation and inquiry-focused curriculum planning. The classroom implementation presentations outlined how teachers could align NGSS standards with interactive projects (e.g., an E-lab), as well as student engagement and motivation. The participants built a cosmic ray detector, learned how to calibrate it, took data, learned about the e-lab, and visited the university's physics lab. There was also a special presentation by Dr. Dominguez titled 'Higgs - what have we learned?' which engaged the participants in learning about the discovery of the Higgs boson and its implications.

Below is a statement from one of the participants, teacher Kelley Puglisi, followed by pictures from the institute:
"This summer's Quarknet session at Catholic University was an amazing experience. We covered basics of subatomic particles, classification of such particles, how the particles are detected and current research happening at CERN. An activity that we worked on as a group was setting up the Cosmic Ray Detectors and collecting data for a Time of Flight measurement of Muons. This was a hands-on, fully immersive experience, where we worked as a team to set up the detector, design the experiment and analyze the data. We needed to troubleshoot, engineer and collaborate to achieve our end goal. As the teacher who received the Cosmic Ray Detector for use at Yorktown High School, I plan to use the detector to collect data for a kinematics lab for my AP Physics class and students who are working on Science Projects now have a new, and reliable source of data. Thank you so much for the experience!"



Dr. Aaron Dominguez presenting on the Higgs boson

Participants at the university’s physics lab

Dr. Rachel Bartek presenting from CERN