

## Rutgers 2024 Annual QuarkNet Program Report



In July 2024, the Rutgers QuarkNet Center held our 12th annual [Summer Program on Fundamental Physics](#) for New Jersey High School students. In this acclaimed two-week program, twenty-three students representing a diverse array of backgrounds participated in daily sessions covering neutrino physics, collider physics, cosmic ray detection, instrumentation electronics, quantum computing, and astrophysics. These sessions included hands-on work with instrumentation and analysis of real data from particle physics experiments. In the cosmic ray sessions, students used the cosmic ray detection kits provided by QuarkNet to perform measurements including a high-precision characterization of the muon lifetime. In data analysis sessions, students worked with our custom-developed cloud-hosted Python tools to understand data analysis workflows and event selection. Throughout the program, students also heard daily talks from current undergraduate and graduate students on their day-to-day research, giving a unique insight into college and graduate school experiences. We also hosted a career panel discussion including undergraduate, graduate, postdoc, and faculty perspectives, as well as tours of several active research laboratories on our campus. The program culminated in a special event on the final evening, in which groups of students gave presentations to an audience of family, friends, and teachers on what they had learned during the program. These presentations were uniformly excellent and all attendees were impressed by the students' accomplishments and knowledge in advanced areas of physics.

Mentors: Andrew Mastbaum, Amit Lath

Rutgers University is one of the oldest QuarkNet centers, having been established in 2000 the second year of the NSF funded QuarkNet program. Our center has trained over twenty high school physics teachers from throughout New Jersey in leading edge particle physics and have involved them in the construction, operation, and classroom use of cosmic ray detector kits. For over a decade, we have run a highly successful two-week summer program for high school teachers and students.

