

# **7<sup>th</sup> Annual QuarkNet Workshop Report**

## **Purdue University QuarkNet Center**

### **June 21-25, 2021**

This is a brief report on the QuarkNet Workshop held at Purdue University Northwest, under the auspices of PNW QuarkNet Center. The week-long program had participation from 5 high school teachers and 5 high school students from Northwest Indiana and South Chicago. While the teachers were supported by the QuarkNet funding from University of Notre Dame, the students were paid stipends from support provided by PNW.

The workshop included a variety of activities every day. N. Parashar (QuarkNet mentor), presented an overview of the PNW High Energy Physics program, followed by J. Dolen (QuarkNet Coordinator) giving us a glimpse of what particle physicist do on CMS experiment. A. Pathak, the postdoc of the group gave a detailed study on the CMS experiment being the coolest experiment and walked the audience through the particle detection techniques, and the Pixel Detector Upgrade work being done at Fermilab. Several of our physics undergraduate students gave presentations on topics such as  $g-2$  results and anomalous magnetic moment of the muon (Kristin Swatz-Schultz), CMS and  $\mu 2e$  (Raul Garcia), and the Gravitational Wave Detection and the 2017 Nobel Prize in Physics (Yasmeen Odeh).

The teachers and students under the supervision of our lead teachers, L. Hautzinger and A. Erler, conducted experiments such as rolling the Rutherford, Workbench press and taking basic data with the Cosmic Ray Detector. They spent two extra days prepping for the workshop. They also devoted one full day to analyzing data from CMS, in the usual masterclass style with A. Pathak serving as the physicist moderator. For a sweet challenge and comparison with CMS data, we had Ms. Marla Glover, a QuarkNet fellow and a Purdue grad student who took the group on a journey of what an ATLAS masterclass is like. The entire group had fun doing data analysis.

We invited Dr. Matthew Jones, Professor of Physics at Purdue University, to speak on the CMS experiment and the Tracker Upgrade. Last but not the least Dr. Quamar Niyaz, Assistant Professor of Electrical Engineering at PNW enlightened us about online security threats and what could be done to prevent them.

All the teachers came up with the plan to execute seismic studies using cosmic ray detector at 3 locations, pertaining to 3 high schools. This is a work in progress and will continue the coming academic year.