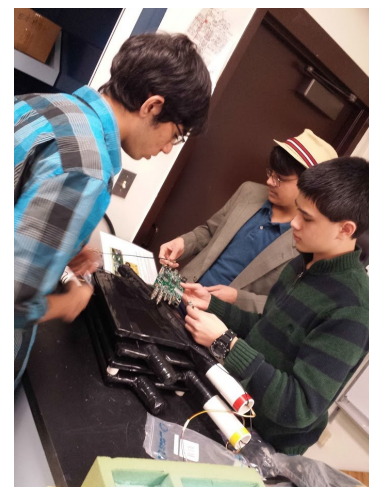


## PAN @ IMSA Intersession 2015

The Illinois Mathematics and Science Academy seeks to ignite and nurture creative, ethical, and scientific minds that advance the human condition. Instituted in the late 90s, intersessions are week-long intensive courses taught by IMSA alumni and faculty prior to the start of the spring semester. For the 4th year, the JINA-CEE Director of Outreach and education returned to her alma mater to teach a modified PAN during intersession. She was joined by two FRIB staff: Bec Shane (IMSA alumn) and Michael Syphers who had done outreach at IMSA during his time at Fermi Lab. 21 students signed up for the PAN course, choosing from a wide range of topics, many of which are non-academic.

Modeled after the PAN summer camps, interactive lectures on nuclear physics, theory, nucleosynthesis and experimental techniques were coupled with experiments using three different radiation detectors. Students learned to solder and built their own Geiger counters using kits from mightyohm.com to measure the relationship between radiation and the distance from source. Students used NSCL CRDs to measure the relationship between cosmic ray flux and the angle with respect to Earth's surface. The 3rd experiment used QuarkNet CRMDs and online resources to measure the lifetime of the muon. The last afternoon was reserved for student presentations in which they reported on a related topic of interest that they researched during the week. In the true spirit of IMSA, all experiments were discovery based, and students were given minimal instructions and background information. For example, before measuring the lifetime of the muon, they were encouraged to calculate how long it takes for a particle to travel through the atmosphere at the speed of light, but time dilation was not mentioned. The “answers” and importance of the experiments were provided during the last minutes of the 30 hr course.



Students figure out how to assemble a QuarkNet Cosmic Ray Muon Detector

Michael Syphers lectures on accelerators



Group Photo



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**Websites:** <http://www.jinaweb.org/html/events.html>  
<https://www3.imsa.edu/learning/Intersession>