



The NuSTEAM/NuPUMAS Program at BNL

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NuSTEAM - Nuclear Science in Texas to Enhance and Advance Minorities

This is a new collaborative effort by four Texas-based universities that will run an undergraduate traineeship project under the guidelines of the Department of Energy TBD-NP (Research Traineeships to Broaden and Diversify the Nuclear Physics community) program. The collaboration consists of the University of Houston (UH), University of Texas - Rio Grande Valley (UTRGV), University of Texas – El Paso (UTEP) and Prairie View A&M University (PVAMU).

The University of Houston will serve as a host for the summer program of the year-long traineeship. After completing a six-week summer course at UH, Brookhaven National Laboratory will host the students for a two-week hands-on experience in the laboratory environment. Upon returning to their home institutions, the students will continue to be supported for the Fall and Spring semesters for 15 hrs/week, while working on a research topic chosen through the traineeship program. Possible topics will include nuclear and high energy data analysis, neutrino and dark matter data analysis, phenomenological modeling of data from RHIC and LHC, radiation physics studies, machine learning applications in nuclear physics, detector calibration and electronics testing for new instruments.

http://nsmn1.uh.edu/cratti/NuSTEAM.html

Originally a two-year program

PI: Claudia Ratti from UH

BNL part of the NuSTEAM Program

Year 2021: fully remote; 2022: fully onsite

Unique advantage: hands on experiences on hardware and software, data acquisition etc.

Focused on the knowledge of detectors, hardwares, how scientists utilize the unique tools/detector hardware pieces to obtain interesting physics.

Two parts: one on STAR heavy ion program. the other on neutrino program, organized by Chao Zhang, Mary Bishai, and Steve Kettell at the EDG group

2022: July 5-15, 9 students, 12 lectures and 13 tours: <u>https://indico.bnl.gov/event/16202/</u>2021: Aug 9-20, 8 students, 12 lectures and 5 virtual tours: <u>https://indico.bnl.gov/event/12592/</u>



Thank Erica Lamar for helping all the logistics and making things as smooth as possible.

Thank all the teachers for giving the lectures and tours, engaging the students, and making science interesting and fun: Tim Camarda, Aihong Tang, Flemming Videbaek, Steve Kettell, Yichen Li, Chao Zhang, Shanshan Gao, Minfang Yeh, Richard Rosero, Xin Xiang, Nitish Nayak, Rongrong Ma, Christian Videbaek, Gene Van Buren, Jeff Landgraf, Prashanth Shanmuganathan, David Morrison, Isaac Upsal, James Daniel Brandenburg, Zhenyu Ye, Hongwei Ke, Mary Bishai, Diana Patricia Mendez, Andrea Scapelli

What did we learn from this program

Being onsite was absolutely necessary.

2022: teachers were impressed by students; students enjoyed the program.

They would like more intuitive hardware demonstrations

Quite a few out of 9 mentioned that they would pursue their Ph.D. Some said they would like to pursue nuclear physics after BNL program.









Now comes to 2023

NuSTEAM got renewed: 8 students in total

NuPUMAS: new program, 4 students in total

NuPUMAS (Neutrino Physics for Undergraduate Minority Advancement in Science)

NuPUMAS addresses the needs of URM students in several key ways. Since undergraduate research results in increased STEM retention rates, improved self-efficacy, enhanced content knowledge, and professional communication skills, NuPUMAS is designed around multiple research opportunities. The heart of the program is an eightweek long paid traineeship program hosted at the University of Houston (UH) for the first six weeks, followed by travel to Brookhaven National Lab and the Sanford Underground Research Facility for two week-long National Laboratory Experiences.

This traineeship program will give the students skills and knowledge that will aid them in their studies, an experience that will allow them to develop their own research interests, and provide ways to build their resumes so they can stand out amongst their peers. The eight-week traineeship is followed by a two-semester financially-supported research project to be completed at their home institution. This will create additional opportunities to gain skills and experience, as well as to enhance the resume for a career in academia or industry. This program is designed to develop a culture of inclusion, inquiry, achievement, and STEM identity.

https://nupumas.physics.uh.edu/index.html

PI: Daniel Cherdack from UH

BNL contact: Chao Zhang

Now comes to 2023

NuSTEAM got renewed: 8 students in total

NuPUMAS: new program, 4 students in total

BNL: got new volunteers, added a lecture on the Electron Ion Collider

STAR and sPHENIX are running through the summer, we tried our best to arrange relevant tours

2023: July 3-14, 12 students, 16 lectures and 10 tours: https://indico.bnl.gov/event/19789/



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What do we learn

Being onsite absolutely necessary.

Teachers were impressed by students; students enjoyed the program.

BNL needs to provide better food service to guests. We need to provide better information to our guests before they come to BNL





More pictures

Chao Zhang's NuSTEAM Pictures: <u>https://photos.google.com/share/AF1QipPX41kQAg-yEA7D-gZ-</u> <u>7_ntVjbGl9kWe-lnAWYS6hP9LEEVo-</u> <u>0YVlluq5wm9XpYpw?key=WTNqaWZKT1dsVkQ3cWVnYUhxdE9jQjB5TVgt</u> <u>S2d3</u>

https://photos.google.com/share/AF1QipMA1Dgw9CoTNjXcH_go pZY6GHhFePDFcQ-XeiGNTbkametGJHgs2bhCVt1x4HIVg?key=TjNQa3gwODVjMno1ZnRINkl3bTh MRkZUT1JtdUNR

I added a few here:

https://drive.google.com/drive/folders/187wDTEPjyf4bECau1kzeqg8Mrh U3tb26?usp=sharing

There is a pdf file which was presented by a NuSTEAM 2022 student Jeseleth, which basically described their experience at BNL.