

# PAN (Physics of Atomic Nuclei)

August 8-12, 2010

## Audience

24 science-focused high school students nationally/internationally. Demographics: 12 male, 12 female; 1 graduate, 10 in 12th grade, 10 in 11th grade, 1 in 10th grade. Participants were selected based on interest in science demonstrated through their applications.

## Funding

Program expenses (~\$15,000) are provided by a National Science Foundation grant to the Joint Institute for Nuclear Astrophysics (JINA), making PAN free to accepted applicants. The National Superconducting Cyclotron Laboratory (NSCL) also supports PAN by donating facilities and faculty/staff volunteers in kind.

## Objectives

JINA's goals for PAN are as follows:

- Teach students about the discipline and current topics of nuclear astrophysics.
- Promote the importance of nuclear research as a worthy investment.
- Introduce students to undergraduate/graduate life and research careers at MSU.
- Increase interest in nuclear physics/astrophysics.

## Description

PAN participants stay on campus. Program hours (45 intentional contact hours) are an intensive mix of faculty lectures, activities, and training sessions introducing students to experimentation methods, equipment, and results. These prepare students to conduct research using the \$1 million Modular Neutron Array. Students complete the program with a poster session to report their findings. Optional activities each evening allow students to learn more about MSU, research, and the college experience. PAN involved 5 MSU faculty, 7 MSU graduate students, and 3 MSU staff members.

## Impacts

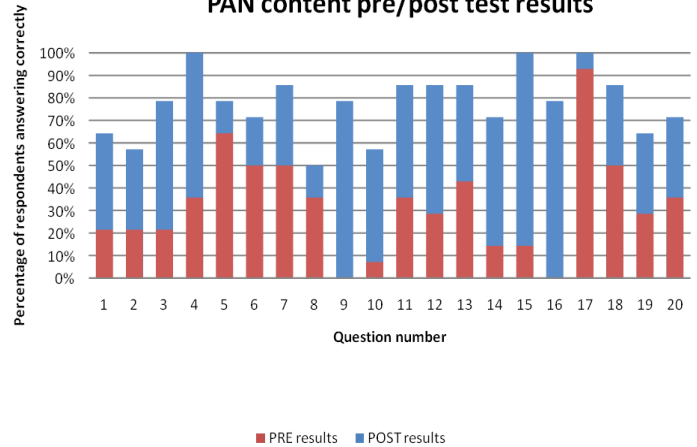
Students' content knowledge was measured with a pre/post test. Questions involved the motivations behind rare isotope research, the importance of accelerator and superconducting technologies, and detector design.

Students averaged 36% correct answers before PAN, and 71% correct after PAN.

Surveys given before and after the program showed:

- High satisfaction with faculty lectures and hands-on experiment time, and an impression of learning much
- Improved opinions of MSU

PAN content pre/post test results



- 100% enjoyed the program and would recommend it to a fellow student or science teacher
- 100% indicated that PAN probably or definitely increased their interest in science
- 79% indicated that PAN would influence their career plans

Students also provided comments on the program, commonly requesting more of everything (lectures, days, topics, evening activities, time with faculty, etc.).

One student took the time to send a note weeks after the program: "I just wanted to thank you again for the opportunity to attend the PAN program. It was a great week. I had an amazing time at NSCL, met some great people, learned a lot in the fascinating lectures, and gained some insight on physics and attending MSU."

Surveys of PAN alumni indicate that approximately 75% pursue a college degree in physics or engineering, while 100% remain in the STEM disciplines. Several individuals have enrolled at MSU to major in astronomy.

## Additional Significant Information

David McCreight, a physics teacher at Lansing Eastern High School, has co-directed the program for many years. As a partner, he brings a teacher's knowledge and perspective to help connect with participants and focus the curriculum on secondary education.

## Contact Information

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