JINA Outreach at NSCL
The Goals for Outreach

- **Rising Above the Gathering Storm:**
  A Report by the National Academies of Science
  - “Summer research programs stimulate student interest and achievement in science…”
  - “…the committee recommends a summer education program for 50,000 classroom teachers each year.”
  - “Professional development for teachers increases student achievement in science.”
  - “The system of national laboratories ... can be tapped for continuing education of K-12 teachers.”

Website: [http://www.nap.edu/catalog.php?record_id=11463](http://www.nap.edu/catalog.php?record_id=11463)
The 2-week PAN program, now in its 14th year, features:

- Faculty lectures on nuclear science and cutting-edge research
- Radiation laboratory experience
- Building a cosmic ray detector and conducting self-designed experiments
- Experience and tools for teachers to use in the classroom
- A taste of research at a large institution for students

Website: meetings.nscl.msu.edu/PAN
JINA Art-to-Science

Organization: JINA  Grade Level: K-6th grades

- Young students learn about astronomy through creativity
  - Grants to classrooms provide:
    - Elementary-level books on stars, planets, observing, etc.
    - Art supplies
  - After reading the books, the students paint astronomical phenomena that inspire them
  - Their artwork is displayed at JINA frontier centers and on the JINA website

Website: www.jinaweb.org/outreach/detect_cover.html
Putting technology in the classroom

- Teachers may apply for any equipment/materials they could use to teach subjects related to Nuclear Astrophysics
- JINA has provided:
  - Cameras for spectrosopes
  - Telescope eyepieces
  - Geiger counters
  - Mini planetaria
  - Cloud chambers
  - CPEP Nuclear Science Charts
  - And much more...
Mini-PAN

Organization: JINA/NSCL  Grade Level: High School

- A day at a world-class nuclear research laboratory
  - Tour NSCL
  - Hear faculty lecture on the nature of cosmic rays and cutting edge research
  - Learn to operate a cosmic ray detector
  - Conduct small-group experiments on cosmic rays
  - Return to school with data for further analysis and discussion
This introduction to isotopes lets groups:

- Explore nuclear properties by building a model nucleus with magnetic marbles and then smash it
- Touch on subjects such as unstable isotopes, decay modes, nuclear reactions...
- Learn how NSCL creates and studies rare isotopes
Looking ahead for outreach

Through current programs and more to come, we will continue to provide what the teachers and students need most

- For teachers: access to new equipment and continuing education to help them bring nuclear science to the classroom
- For students: a chance to experience science in action, find inspiration, and discover new careers