Texas A&M Cyclotron Institute and CENTAUR as generators of nuclear talent
Mission:
Provide the research experience necessary to develop the next generation of leaders in stewardship science in the area of low-energy nuclear science in support of the workforce and research needs relevant to the NNSA mission.

Objectives:

1. Basic research relevant to stockpile stewardship
2. Train workforce to support DOE/NNSA labs
3. Partnership use of university accelerators
NNSSA Stewardship Science Academic Alliances Center for Excellence in Low Energy Nuclear Science

Academic Partners:
- Florida State University
- Louisiana State University
- Texas A&M University
- University of Notre Dame
- University of Washington
- Washington University in St. Louis

NNSSA Lab Collaborators
- 17 Graduate Students
- 3 Post-doctoral Researchers
Discovery
Science
Workforce development
Tools

Hoyle state
What students gain from participation in research

- Technical skills
- Creative problem solving
- Scientific communication skills
- Dealing with frustrations / perseverance
- Self confidence
- Time management
- Project planning
- Working within a collaboration
- Leadership development
Nuclear Physics Summer Camp

High School Students
FSU+Local High School Physics Teachers
Summer 2018, 2019, 2020 (virtual)
Expansion to other sites
• Build relationships with students
• Visit to nuclear cardiology facility at local hospital
• Campus-wide radiation hunt
• Tour of Fox Laboratory
• Tour of National High Magnetic Field Laboratory
Inaugural Nuclear Medicine and Science Camp:
July 23-27, 2018, Panama City, FL campus of FSU

Supported by CENTAUR and Florida State University
Teacher Workshop at WUSTL

4 High School Teachers (Chemistry & Physics)

Day long program
Intro Lectures
Hands On Activity
September 2019
Phys and Chem HS teachers http://www.slapt.org

teachin” is on the WU-STL campus. (Limit to 12 in first year).

Anthony Thomas (retired – after 30 years – HS teacher) will be convener.

CENTUAR will provide: wall charts and some equipment that the teachers can borrow from WU.

PROGRAM (9:00-1:30)

1. Lecture over treats (lgs, 9:00-10:20)

2. Build scintillator detector and test with our sources (including $^{22}$Na) and K-salt (TT, 10:30 – 12:20)

   25mm dia x 40 mm long BaF$_2$ - from old PET $\rightarrow$ SiPM $\rightarrow$ WU-amp $\leftarrow$ bias supply

   *Other than the WU amp, which will be provided, teachers will assemble the scintillator and test.*

   511-511 coincidence will be shown with two of the manufactured detectors.

   *To use in HS, HS will have to provide oscilloscope and K-salt source.*

3. Lunch Lecture – Nuclear science in St. Louis (lgs, 12:30-1:30):

   *Manhattan project* (Mallinckrodt U processing) to PET to *isotope production* to p-therapy.)
NUCLEAR ASTROPHYSICS

Diagram showing a sun-like star and the core of a star.
REU program

Since 2004 ~12 students /yr

- Largely from PUI

- Individual research projects
- Structured educational activities
- Faculty lectures
- Educational field trips
- Outreach activity
- Group experiment
- Machine shop class
- Scientific communication
- Poster presentations
- Oral presentations
- Written presentation
- Professional Development
- Career day
- Lunch discussions
- Social events
Street Science
Kassie Marble
DNP Women in Physics Social Division of Nuclear Physics of American Physical Society at Washington, DC

Sponsored dinner for undergraduate students.
Planned Workshops (Dates TBD)

Neutron Detectors, with UTK & ORNL
Target making, with ANL
Optical Models
CENTAUR Group Meetings

Zoom meetings so far (April, May, June, July)
students/postdocs present, ~10 min
Time for Discussion
4 attendees, on average

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<th>Presenter</th>
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<td>Fission of $^{236}$U</td>
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<td>Recent Results from Neutron Detector Testing</td>
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<td>Thomas Onyango</td>
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