



Exceptional service in the national interest

# Examples of Sandia/NSSC3 Projects

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# NSSC Collaborations w/ Sandia: Project on Nuclear Gaming (PoNG)

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- **What is it?:** Development of new wargaming frameworks for understanding the impact of emerging technologies on strategic stability and nuclear risk reduction.
  - Students built an online experimental wargame, SIGNAL, using commercial game development tools and cloud services.
  - Students assisted in the analysis of data collected from ~1100 SIGNAL players.
  - Website for PoNG: <http://pong.berkeley.edu>
- **How did Sandia collaborate?**
  - Sandia software engineers mentored students in SIGNAL production: teaching them best practices for SW development and demonstrating how to conduct usability testing.
  - Sandians co-authored publications with students on methodology and analysis results.
- **Notable achievements:**
  - SIGNAL featured in news publications as groundbreaking use of video games for tackling nuclear security issues (Bulletin of Atomic Scientists, Vice).
  - SIGNAL won Best Student Game at 2019 Interservice/Industry Training, Simulation, and Education Conference (IITSEC).
  - Undergraduate NSSC students from PoNG went on to national security careers (Jake Tibbetts), internships at National Labs (Vamshi Balanaga, Sandia), or pursuing graduate studies (Roshni Iyer, PhD @ UCLA).



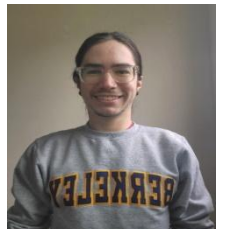
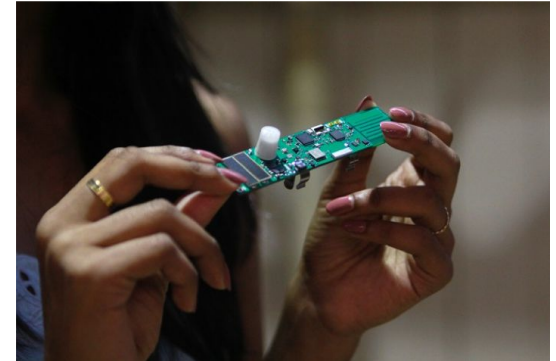


# NSSC Collaborations w/ Sandia: Complexity Science for Nuclear Security

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- **What is it?:** Research group at UC Berkeley interested in applying machine learning / data science techniques for problems associated with nonproliferation and nuclear site security.
  - Students currently working on NA-22 sponsored effort developing transferable models of reactor operations based upon data collected from multimodal sensors distributed at nuclear sites.
  - Website for Complexity: <http://complexity.berkeley.edu>
- **How did Sandia collaborate?**
  - Sandia software engineers mentored students in SW engineering best practices to construct high quality, production-grade code to release outside of the research group.
  - Sandia experts in machine learning aided students on how to apply leading-edge work to this problem domain, helping them achieve their research goals.
- **Notable achievements:**
  - Publication forthcoming from former NSSC graduate student (Jake Tibbetts) on spatial importance for sensor networks.
  - Current NSSC graduate student (Zachary McGuire) will have summer internship this year at Lawrence Livermore National Lab.
  - Codebase for research, STITCHES, will be released to DOE research community along with accompanying datasets. STITCHES is being supported by current NSSC undergraduate students (Nicholas Nolte & Lucy Liu).

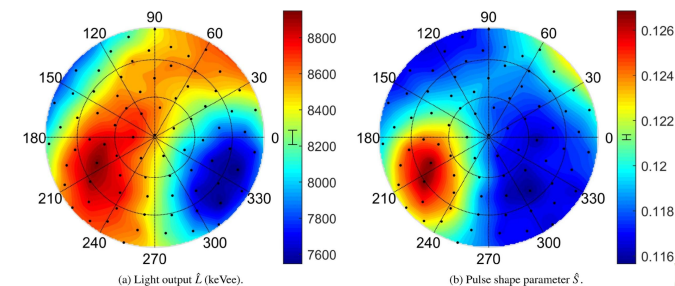




# Radiation detection: Past/Present NSSC Engagement

**Patricia Schuster**, UCB (Stan Prussin & Kai Vetter)

- PhD Nucl. Eng., Anisotropic response of crystalline organic scintillators

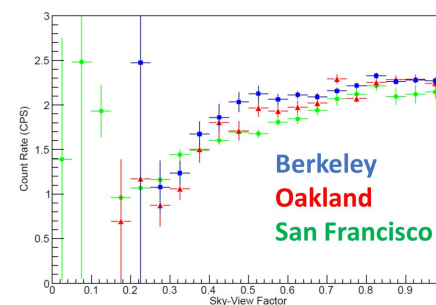


**John Davis**, UCB (Vetter)

- Masters Nucl. Eng., RadMAP neutron background measurements

**Josh Brown**, UCB (Bethany Goldblum)

- Side R&D, Hi-res scintillator pulse shape measurements



**Micah Folsom**, UTK (Jason Hayward)

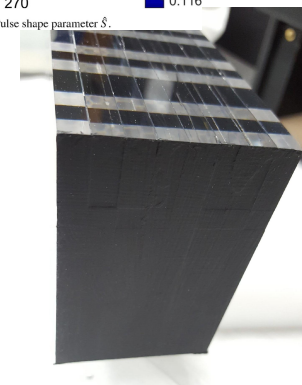
- PhD Nucl. Eng., Single Volume Scatter Camera project (Ziock @ORNL primary)

**Adam Glick**, UCB (Vetter)

- PhD Nucl. Eng., Novel system for neutron background characterization

**Jacob Sebastian**, UCB (Goldblum)

- Ongoing! More scintillator pulse shape measurements



Wide range of types!

- **Funded/unfunded** (at SNL) projects
- **Short/long** term R&D
- Act as **primary/secondary** adviser