Education and Laboratory Interactions

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LLNL Representative to the AST

PSAAP IV Pre-proposal Conference
August 8-9, 2023, Houston, TX

National Nuclear Security Administration

PSAAP IV

ASC™

LLNL-PRES-852838

PSAAP is a workforce development program

- **Program Goals:** Establishing validated, large-scale, multi-disciplinary, simulation-based "Predictive Science" as a major academic, applied research program
- **Collaborations with universities involve training, recruiting, and working with top researchers in key disciplines required by stockpile stewardship**
- Engaging U.S. academic community in making significant advances in predictive modeling and simulation technologies

Workforce Development (October 2021 – September 2022):

- ❑ 24 undergraduates participating in research
- ❑ 93 supported graduate students
- ❑ 38 supported Post Docs
- ❑ 60 peer reviewed journal publications accepted
- ❑ 76 invited talks
- ❑ 30 NNSA Lab internships completed
- ❑ 5 NNSA Lab/Site Hires

PSAAP has a long-term goal to cultivate the next generation of scientists and engineers to support the Advance Simulation and Computing and Directed Stockpile Work missions.

PSAAP support and obligations for graduate students and staff

- PSAAP Centers support graduate students, post-doctoral research associates, and research staff. **PSAAP funds may only be used for students, post-docs and research staff who are US citizens or who are non-US citizens from a non-sensitive country.***
  - All NNSA-funded graduate students are required to complete at least one 10-week (consecutive) visit to an NNSA National Laboratory.
  - All post-docs and research staff (i.e. research faculty and staff) are required to visit one or more of the NNSA labs for at least one week during each year they receive PSAAP funding)

* PSAAP requires a cost-share from the university. Cost-share university funds may be used to support non-US citizens from sensitive countries.

Successful PSAAP proposals will present a sound plan for attracting exceptional graduate students, educating and training students, and insuring that graduate students and post-docs are exposed to the research programs and staff at the NNSA National Laboratories.

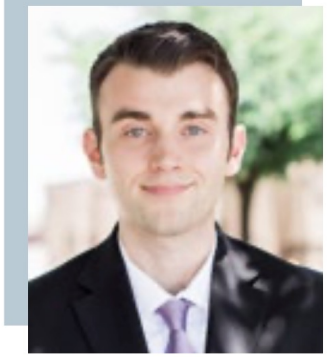
PSAAP Laboratory internships and visits

- The main purpose of these visits is to expose PSAAP personnel to the DOE lab environment and to give students, post-docs and research staff an opportunity to broaden their research interests. It's an opportunity to
  - Work in a team-based multi-disciplinary environment (similar in flavor to the PSAAP center)
  - Broaden student, post-doc, research staff and faculty networks by introducing Laboratory collaborations.
- Non-US citizens, particularly from sensitive countries, can be more difficult for the TriLabs to host for internships, visits, and for computing access. Additional lead time is required for administrative processing.

While the program promotes a 10-12 week visit for students, my academic advisor and LANL mentors allowed me to stay for almost 6 months. This gave me the opportunity to fully experience life at the laboratory and to meet and interact with many scientists.

– Abby Hunter (LANL, PSAAP-1 alum)

PSAAP Laboratory internships and visits



David Zwick
PSAAP-2 alum (University of Florida, 2015 – 2019)
Sandia National Laboratories (2019 - present)

Now an application software developer of the Sandia physics code Lagrangian Grid Reconnection (LGR), which simulates magnetohydrodynamic problems of problems of interest on modern GPU-based HPC systems.

[T]he PSAAP program helped me determine that a national laboratory would be a great fit. Through the PSAAP's required internship program, I was able to see what it was like to perform research and development in a national laboratory setting.

– David Zwick (SNL, PSAAP-2 alum)

PSAAP encourages Center collaborations with the TriLabs

- Other examples of collaborations between PSAAP-funded Center(s) and the TriLabs could include
  - Co-organization of workshops and symposia
  - Hosting of campus visits for TriLab collaborators
  - Supervising students (serving on doctoral committees)
  - Adjunct faculty appointments
  - Guest lectures and seminars at PSAAP universities and the TriLabs

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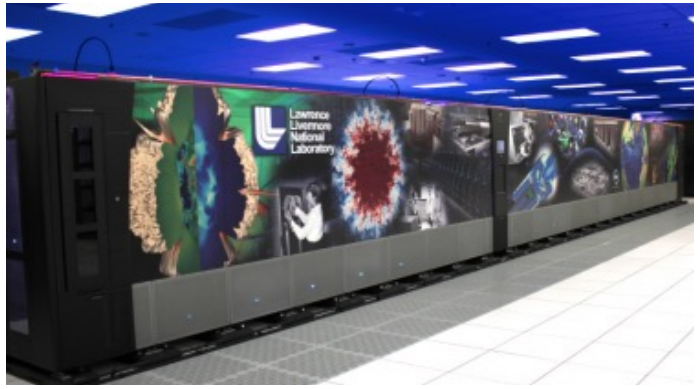
PSAAP provides TriLab Compute Resources

- The Computer Resource Team (CRT) is the component of the PSAAP program that connects center researchers with the TriLab High Performance Computing (HPC) resources required to perform their work.
  - The CRT hosts monthly webinars for the PSAAP centers to update centers with current happenings and announcements at the TriLab HPC centers.
  - The HPC centers offer training that may be beneficial to PSAAP personnel



TriLab CRT members

- Tim Fahey (LLNL)
- Giovanni Cone (LANL)
- Heidi Uphoff (SNL)

Descriptions of the current HPC resources available to PSAAP centers is at https://psaap.llnl.gov/computer-resource-team

PSAAP seeks to advance computational science and computer science as disciplines

- Examples of how PSAAP-funded universities could address this requirement* include
  - Creation of a computational science degree program or certificate at a PSAAP-funded university
  - Development of interdisciplinary undergraduate and/or graduate level courses on computational science topics
  - Mentoring and enlightening undergraduate, graduate, and postdoc research relevant to the PSAAP center research goals
  - Outreach to underrepresented communities in computational science through training, seminars or undergraduate summer experiences

* Commensurate with the size of the PSAAP center

Successful PSAAP proposals will present a credible education plan for advancing the computational and computer science disciplines at the PSAAP-funded universities.

While technical excellence is required for a successful PSAAP center, do not lose sight of the workforce development aspects of PSAAP.

The labs are very interested in collaborating with the PSAAP centers to ensure their success.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