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URA-Fermilab: Undergraduate Women in STEM Internship Program

Cooperative Research and Development Agreement Final Report

CRADA Number: FRA-2023-0057

Fermilab Technical Contact: Sandra Charles

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In accordance with Requirements set forth in Article XII of the CRADA document, this document is the final CRADA report, including a list of Subject Inventions, to be forwarded to the Office of Science and Technical Information as part of the commitment to the public to demonstrate results of federally funded research.

CRADA number: FRA-2023-0057

CRADA Title: URA-Fermilab: Undergraduate Women in STEM Internship Program

Parties to the Agreement: Universities Research Association, Inc.

Sponsoring DOE Program Office(s): Office of Science

DOE Funding Commitment: URA plans to provide \$85,000 to Fermilab for the Summer 2023 cohort and up to \$200,000 for the Summer 2024 cohort, including overhead, subject to available funding.

Abstract of CRADA work:

In collaboration with the Universities Research Association, Inc. (URA), establishment of the Undergraduate Women in STEM Internship pilot program assists Fermi Research Alliance, LLC (FRA) with honoring its commitment to increasing gender, racial and ethnic workforce diversity. This focused initiative is intended to invite, support and yield a qualified pipeline of alumnae underrepresented in FRA's science and technology management and technical staff positions.

Interns in this program spend 10-12 weeks at Fermilab working under the direct leadership, guidance and supervision of scientists, engineers, computing professionals, technicians and staff across all directorates performing hands-on research. In addition, the intern cohort meets with mentors and advisors to grow their professional networks, to take part in engaging and inclusive intellectual discussions, to directly benefit from workplace resources, and to participate in professional development and social engagement opportunities. The design of each research project and the supervision, mentorship and evaluation is conducted by a scientific, engineering, computing professional at Fermilab.

Summary of Research Results:

In its second year, a cohort of 5 interns spent 10 weeks at Fermilab beginning May 29 and departing August 4, 2024. Interns performed hands-on research under the direct leadership and guidance of Fermilab scientists, engineers, computing professionals, technicians and staff across various laboratory directorates and divisions. The cohort also met with mentors and advisors to grow their professional networks, take part in engaging and inclusive intellectual discussions -

directly benefitting from laboratory subject matter experts and participating in professional development and social engagement opportunities.

The design of each research project and the supervision, mentorship and evaluation of the interns was conducted by one of the following Fermilab experts:

- Alessandro Reineri, Research Assistant, Ph.D. Student, Superconducting Quantum Materials and Systems
- Joseph Zennamo, Scientist, Neutrino Physics Division
- Katsuya Yonehara, Ph.D Senior Scientist, Beams division, Target Systems Department
- Malvika Tripathi, Research Associate, Applied Physics and Superconducting Technology Directorate
- Michael White, Principal Engineer, Applied Physics and Superconducting Technology Directorate
- Sam Zeller, PhD, Neutrino Division, Particle Physics Directorate
- Travante Thompson, Engineering Physicist, Accelerator Directorate

The review and selection of applicants, research program oversight and mentorship of interns was executed by a committee of Fermilab professionals:

- Jennifer Raaf, PhD, Senior Scientist, Particle Physics Directorate, Neutrino Division
- Julia Yarba, PhD, Computational Physics Developer, Accelerator Directorate
- Geralyn “Sam” Zeller, PhD, Senior Scientist, LBNF/DUNE - US Division
- Silvia Zorzetti, PhD, Principal Engineer & Head, Quantum Computing Co-Design & Quantum Communication Department, SQMS

Alignment of the URA-Fermilab: Undergraduate Women in STEM Internship pilot program with other summer programs ensured URA interns were exposed to many of Fermilab’s internship and fellowship programs, participants, and offerings/activities.

URA Director of Programs & Partnerships, Claudette Rosado-Reyes, Ph.D. along with associated research supervisors and members of the Fermilab community attended the interns’ final oral presentations on the morning of July 31, 2024. During the afternoon, the interns showcased their research during the first of two summer internship poster sessions. The events invite the laboratory community to view, discuss, and learn from the interns’ research projects so critical to Fermilab’s science mission.

Related Reports, Publications, and Presentations:

Research Reports & Posters:

- Non-contact Real-time Target Health Monitor
FERMILAB-PUB-24-0406-STUDENT; (Fermilab-Poster-24-0177-Student)
- Monitoring Helium Cryogen Usage with iFix Software at IB1 Test Facility
FERMILAB-PUB- 24-0401-STUDENT; (Fermilab-Poster-24-0169-Student)
- Improving qubit coherence time through detailed materials analysis
FERMILAB-PUB-24-0405-STUDENT; (Fermilab-Poster-24-0168-Student)

- Exploring Interferometry Diagnostics for Optical Stochastic Cooling at FAST/IOTA FERMILAB-PUB-24-0403-STUDENT; (Fermilab-Poster-24-0173-Student)
- Implementing on-demand microwave coupling between superconducting rf cavities with a SNAIL-based three wave mixing component (Fermilab-Poster-24-0210-Student)
- Determining Optimal Running Conditions for Tiny TPC Detector (Fermilab-Poster-24-0180-Student)

Subject Inventions listing:

None.

Report Date: February 28, 2025

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