JENNIFER SMITH

Broida Hall University of California Santa Barbara ⋄ Santa Barbara, CA 93106
(+1) 206-715-4133 ⋄ jennifer_smith@ucsb.edu

EDUCATION

University of California, Santa Barbara *September 2018 - Present*
Third Year Ph.D. Student Overall GPA: 3.7
Department of Physics

Harvey Mudd College *August 2014 - May 2018*
Bachelor of Science (B.S.), Physics Overall GPA: 3.7
Graduated with high distinction

RESEARCH EXPERIENCE

University of California, Santa Barbara Department of Physics July 2018 - present
Graduate Research
Microwave Kinetic Inductance Detector Readout *Santa Barbara, CA*

- Designing new Microwave Kinetic Inductance Device (MKID) array electrical readout incorporating Xlinix Radio Frequency System-On-a-Chip (RFSoC) using MATLAB/Simulink and Vivado.
- Writing Python control program.
- Designing radio frequency packaging for integration of quantum-noise-limited parametric amplifier to improve detector performance.
- Designed, fabricated, and tested new superconducting cable yielding improved instrument performance.

City of Hope Cancer Research Hospital Aug 2017 - May 2018
Harvey Mudd College Clinic Program
Surface Enhanced Raman Spectroscopy (SERS) for Breast Cancer Detection *Claremont, CA*

- Worked with a team of four engineering students to design, simulate, and prototype a system capable of detecting breast cancer in real time during surgery.
- Used scanning electron microscope to characterize different SERS substrates.
- Tested SERS substrates on model tissue using 785nm raman system.
- Used sputter-coater and 3D printer to create gold coated fiber optic compatible with Raman system.
- Achieved enhancement on specific bonds associated with cancer-positive DNA signal (publication in process).

University of Washington Center for Experimental Nuclear Physics and Astrophysics (CENPA) May 2017 - Aug 2017
NSF Research Experience for Undergraduates (REU)
Axion Dark Matter eXperiment *Seattle, WA*

- Performed noise temperature calibration on ADMX receiver chain using the Y-factor (hot-load) method and spectrum analyzer.
- Set up Low Noise Factory (LNF) amplifier and measured S-parameters using a network analyzer.
- Machined mounting stages, wired liquid-He cryogenic test-dewar, and performed 4K LNF amplifier measurements with spectrum analyzer and network analyzer.
- Characterized and installed new radio frequency components in the Superconducting QUantum Interference Device (SQUID) housing

SLAC National Accelerator Laboratory May 2016 - Aug 2016
DOE Science Undergraduate Labortory Internship
Noise Characterization and Elimination in a Microwave SQUID Multiplexing CMB Readout System *Menlo Park, CA*

· Performed noise measurements and analysis on a microwave SQUID multiplexing system using homodyne setup and oscilloscope.
· Wrote code in MATLAB to create power spectral density plots and identify noise sources.
· Wrote code in python to remotely control function generator.
· Designed and manufactured magnetic shield for SQUID module and copper heat strap for cryogenic system.

Harvey Mudd College Department of Biochemistry May 2015 - Aug 2015
Summer Research Fellow
Human 8-Oxoguanine Glycosylase as a Risk Factor for Cancer *Claremont, CA*

· Optimized DNA Glycosylase biological assay with new laser imager and IR-Dye label.
· Discovered and corrected flaws in previous work through detailed sequence data analysis.
· Collected and analyzed protein kinetics data through biochemical laboratory procedure.
· Performed safety inspections as student lab safety officer.

WORK EXPERIENCE

Xilinx Inc. PYNQ Team May 2021 - August 2021
Internship
High-Speed Designs for Custom Scientific Instrumentation on RFSoC-PYNQ *Santa Barbara, CA*

· Created first open-source example demonstrating 100 Gigabit Ethernet internal and external loopback on an RFSoC.
· Tested and verified new memory allocation technique in preperation of upcoming image release.
· Served as technical advisor for PYNQ Bootcamp.

PEER-REVIEWED PUBLICATIONS

J. Smith, Bailey, J., Tuthill, J., Stefanazzi, L., Cancelo, G., Treptow, K., Mazin, B. "A High-Throughput Oversampled Polyphase Filter Bank using Vivado HLS and PYNQ on a RFSoC," in *IEEE Open Journal of Circuits and Systems*, vol. 1, no. 1, Feb. 2021, doi: 10.1109/OJCAS.2020.3041208.

J. Smith, Mazin, B., Walter, A., Daal, M., Bailey, J., Bockstiegel, C., Zobrist, N., Swimmer, N., Steiger, S., Fruitwala, N., "Flexible Coaxial Ribbon Cable for High-Density Superconducting Microwave Device Arrays," in *IEEE Transactions on Applied Superconductivity*, vol. 31, no. 1, pp. 1-5, Jan. 2021, doi: 10.1109/TASC.2020.3008591.

Walter, A., Fruitwala, N., Steiger, S., Bailey, J., Zobrist, N., Swimmer, N., Lipartito, I., **Smith, J.**, Meeker, S., Bockstiegel, C., Coiffard, G., Dodkins, R., Szypryt, P., Davis, K., Daal, M., Bumble, B., Collura, G., Guyon, O., Lozi, J., Vievard, S., Martinache, F., Currie, T., Mazin, B. "The MKID Exoplanet Camera for Subaru SCExAO," in *Publications of the Astronomical Society of the Pacific*, vol. 132, no. 1018, Dec. 2020, doi: 10.1088/1538-3873/abc60f.

Kothari, R., Jones, V., Mena, D., Bermudez, V., Shon, Y., **Smith, J.**, Schmolze, D., Cha, P., Fong, Y., Storrie-Lombardi, M. "Raman Spectroscopy and Artificial Intelligence to Predict the Bayesian Probability of Breast Cancer," in *Biophysical Journal*, vol. 118, no. 3, Feb. 2020, doi: 10.1016/j.bpj.2019.11.355.

CONFERENCE ATTENDANCE & PRESENTATIONS

Xilinx What's New in the Labs August 2021
Virtual

· Presented "RFSoC-PYNQ for Custom Scientific Instrumentation" to Xilinx technical executives.

CASPER Workshop May 2021
Virtual

· Presented "A High-Throughput Oversampled Polyphase Filter Bank on a RFSoC" to conference attendees.

Low Temperature Detectors July 2021
Virtual

· Presented "Designing the Next Generation UVOIR MKID Readout on RFSoC Devices" to conference attendees.

APS March Meeting March 2021
Virtual

· Presented "Flexible Coaxial Ribbon Cable for High-Density Superconducting Arrays" to conference attendees.

CASPER Workshop August 2019
Cambridge, MA

· Presented "Noise Calibration in the ADMX Receiver Chain" to members of the CASPER collaboration.

Xilinx Developer Forum Sept 2018
San Jose, CA

Harvey Mudd College Clinic Presentations May 2018
Claremont, CA

· Presented "In Situ Breast Cancer Discrimination using Raman Soectroscopy" to members of the City of Hope cancer research hospital and Harvey Mudd College Engineering and Physics Departments.

Conferences for Undergraduate Women in Physics May 2018
Claremont, CA

University of Washington Summer Research Presentations August 2017

· Presented "Noise Calibration in the ADMX Receiver Chain" to members of the University of Washington Center for Experimental Nuclear physics and Astrophysics and Department of Physics.

Science Undergrduate Laboratory Internship Research Presentations August 2016

· Presented "Noise Characterization in a Microwave SQUID Multiplexing Readout System" to members of SLAC National Accelerator Laboratory and Stanford University Department of Physics.

TEACHING EXPERIENCE

Center for Science and Engineering Partnerships - Instructor June 2019 - Sept. 2019
Summer Institute in Mathematics and Science Scholars Program

· Designed and taught highest level math and physics course to incoming UCSB freshmen to help prepare them for success in technical majors at UCSB.
· Presented my own research and mentored students on how to get involved with research opportunities on campus.

Center for Science and Engineering Partnerships - Instructor Oct. 2018 - Dec. 2018
School for Scientific Thought Program

- Designed summer physics program for advanced local high school students.
- Taught astrophysics and space mission engineering concepts culminating in egg drop challenge.

University of California, Santa Barbara - Teaching Assistant Sept. 2018 - June 2019
Physics

- Assisted students in programming and debugging a Raspberry Pi embedded system using Unix and Python.
- Helped students interface with their Raspberry Pi's using basic circuits including jumper cables, breadboards, and sensors.

Harvey Mudd College - Academic Excellence Facilitator May 2016 - May 2018
Physics

- Tutored Harvey Mudd College core physics classes (Special Relativity, Quantum Mechanics, and Electricity and Magnetism)

VOLUNTEER WORK

UCSB Women in Science and Engineering - Outreach Executive September 2021 - Present
University of California, Santa Barbara

- Coordinating and consolidating outreach opportunities for graduate women in science and engineering.

UCSB Physics GradLife - Social Officer June 2019 - Present
University of California, Santa Barbara, Department of Physics

- Planing and organizing department events to increase sense of community including game nights, Halloween costume contest, and department-wide talent show.
- Creating flyers and pamphlets for events and crafting creative department-wide emails.

University of California, Santa Barbara Women in Physics - Leader Oct. 2018 - Present
University of California, Santa Barbara, Department of Physics

- Organized Women in Physics visit day events including brunch with faculty members.
- Mentoring other younger members of the organization and helping to navigate issues related to research and academics.

AWARDS AND HONORS

Zonta International Amelia Earhart Fellowship, Spring 2021

NASA Space Technology Research Fellowship, Fall 2019

UCSB Physics Department Service Award, Spring 2019 - 2020

SCIAC All-Academic Team, Fall 2016-2017

Dean's List, Spring 2015-Spring 2018

HMC Department of Chemistry Stauffer Fellow, Summer 2015