JENNIFER SMITH

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EDUCATION

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

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

TECHNICAL SKILLS

Computer Languages	Python, C++, Tcl, Shell Scripting
Design Software	MATLAB, Vivado Design Suite, Simulink/System Generator, ADS, HFSS
Machining	3D Printing, Mill, Lathe

RESEARCH EXPERIENCE

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

- Designing and implementing Microwave Kinetic Inductance Device (MKID) array digital readout incorporating Xilinx Radio Frequency System-On-a-Chip (RFSoC) using MATLAB/Simulink and Vivado.
- Optimizing digital signal processing chain to minimize noise while balancing resource utilization and ensuring timing closure.
- Writing Python control program to manage and visualize data flow and system status.
- Designing radio frequency packaging for integration of superconducting 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 chemical bonds associated with cancer-positive DNA signal.

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.

PEER-REVIEWED PUBLICATIONS

Smith, J., 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. 2, Jan. 2021, doi: 10.1109/OJCAS.2020.3041208.

Smith, J., 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

APS March Meeting March 2021
Virtual

- Presented "Superconducting Flexible Coaxial Ribbon Cable for High-Density Superconducting Arrays".

Applied Superconductivity Conference Nov 2020
Virtual

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)

COMMUNITY WORK

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, trivia, 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 - Senior Officer Oct. 2018 - Present
University of California, Santa Barbara, Department of Physics

- Planned and organized Women in Physics visit day events.
- Planned and organized Women in Physics brunch to raise issues around women in physics to the UCSB physics department.

AWARDS AND HONORS

NASA Space Technology Research Fellowship, Fall 2019 - Present

UCSB Physics Department Service Award, Spring 2019 - 2020

NCAA DIII Volleyball National Champion, Fall 2017

SCIAC Volleyball All-Academic Team, Fall 2016-2017

Harvey Mudd College Dean's List, Spring 2015-Spring 2018

Harvey Mudd College Department of Chemistry Stauffer Fellow, Summer 2015