

# JENNIFER SMITH

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## EDUCATION

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### University of California, Santa Barbara

Third Year Ph.D. Student

Department of Physics

*September 2018 - Present*

Overall GPA: 3.7

### Harvey Mudd College

Bachelor of Science (B.S.), Physics

Graduated with high distinction

*August 2014 - May 2018*

Overall GPA: 3.7

## RESEARCH EXPERIENCE

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### University of California, Santa Barbara Department of Physics

*Graduate Research*

*Microwave Kinetic Inductance Detector Readout*

July 2018 - present

*Santa Barbara, CA*

- Designing new Microwave Kinetic Inductance Device (MKID) array electrical readout incorporating Xilinx 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

*Harvey Mudd College Clinic Program*

*Surface Enhanced Raman Spectroscopy (SERS) for Breast Cancer Detection*

Aug 2017 - May 2018

*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)

*NSF Research Experience for Undergraduates (REU)*

*Axion Dark Matter eXperiment*

May 2017 - Aug 2017

*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 Laboratory 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**

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**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. 2, Jan. 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**

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**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 Spectroscopy” 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 Undergraduate 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.

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**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)

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**VOLUNTEER WORK****UCSB Physics GradLife - Social Officer**

June 2019 - Present

*University of California, Santa Barbara, Department of Physics*

- Planning 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 - 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**

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NASA Space Technology Research Fellowship, Fall 2019 - Present

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