Anthony Cortez

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RESEARCH INTERESTS

Superconducting Detectors, THz Detectors, Josephson Junction Devices, Quantum Materials, Technology as a tool in the classroom, and Women in STEM.

EDUCATION

PhD. Mechanical Engineering, 2021 – University of California, Riverside
M.S. Mechanical Engineering, 2018 – University of California, Riverside
B.S. Physics, 2017 – University of California, San Diego

TEACHING EXPERIENCE

Assistant Professor, Physics and Engineering Department, Point Loma Nazarene University, San Diego, CA, August 2021 – Present
Solid State Physics, Thermodynamics, Physical Science for Teachers, General Physics, Introduction to Engineering, Engineering Mechanics: Statics, Mechanics of Materials, and Circuit Analysis

Teaching Assistant, Introduction to Mechanical Engineering, UC Riverside, 2020 – 2021
Introduction to Mechanical Engineering, Machine Design, and Experimental Techniques

RESEARCH EXPERIENCE

Assistant Professor, Physics and Engineering Department, Point Loma Nazarene University, San Diego, CA, August 2021 – Present
Artificial Intelligence as a tool for the classroom.
Series Josephson Junction Simulation.
Leading undergraduate research students on resistivity measurement systems.

Visiting Researcher, Naval Information Warfare Center Pacific, San Diego, CA, May 2024 – August 2024
Developed a python program to investigate high temperature superconducting Josephson Junction arrays for GHz detectors.

Graduate Student Researcher, Bourns College of Engineering, Oxide Nano Electronics Laboratory at UC Riverside, April 2017 – June 2021
High temperature superconducting YBaCuO Josephson Junctions for use as THz heterodyne detectors.

Summer Intern, Superconducting Devices Group, California Institute of Technology NASA Jet Propulsion Laboratory, June 2020 – August 2020
Developed a Python program for simulation of superconducting Josephson junction properties.

Summer Intern, Superconducting Devices Group, California Institute of Technology NASA Jet Propulsion Laboratory, June 2019 – August 2019
Characterized Josephson Junction mixer performance from 90 GHz – 2.5 THz.

Visiting Student Researcher, Superconducting Devices Group, California Institute of Technology NASA Jet Propulsion Laboratory, December 2017 – June 2018
Modified existing Atomic Layer Deposition System for thin film growth of MgB_2.

Undergraduate Research Assistant, Department of Physics, Basov Infrared Laboratory at UC San Diego, Feb 2016 – March 2017
Updated existing magneto optics Instrumentation for Fourier transform infrared spectroscopy.

PUBLICATIONS

Cortez, Anthony and Paul Schmelzenbach. "Integrating ChatGPT in an Introductory Engineering Undergraduate Course as a Tool for Feedback" 2024 American Society for Engineering Education Conference (ASEE), Portland, OR, USA.

Cortez, Anthony. "THz Mixing Using Y-Ba-Cu-O Josephson Junctions Fabricated with Focused Helium Ion Beam Irradiation". Diss. University of California, Riverside, (2021).

Cortez, Anthony T., Ethan Y. Cho, Hao Li, Daniel Cunnane, Boris Karasik, and Shane A. Cybart. "Tuning Y-Ba-Cu-O Focused Helium Ion Beam Josephson Junctions for Use as THz Mixers" *IEEE Transactions on Applied Superconductivity*, 29, *no. 5* (2019).

Cortez, Anthony, Ethan Y. Cho, Hao Li, Daniel Cunnane, Boris Karasik, and Shane A. Cybart. "High Frequency Properties of Y-Ba-Cu-O Josephson Junctions" *2019 IEEE International Superconductive Electronics Conference (ISEC)*, pp. 1-3, (2019).

CONFERENCE TALKS / PRESENTATIONS

Cortez, Anthony and Marcio C. de Andrade. "Investigation of High Temperature Superconducting Josephson Junction Arrays for GHz Detectors" Office of Naval Research Summer Faculty Research Program at Naval Information Warfare Center Pacific (ONR SFRP NIWC PAC), San Diego, CA, USA, (2024).

Cortez, Anthony. "Integrating ChatGPT in an Introductory Engineering Undergraduate Course as a Tool for Feedback" *2024 American Society for Engineering Education Conference (ASEE)*, Portland, OR, USA, (2024).

Damron, Lily and **Anthony Cortez**. "Designing and Implementing an Electrical Transport Measurement System for Thin-Film Superconductors" *American Physical Society Conference for Undergraduate Women in Physics (CUWiP)*, San Diego, CA, USA, (2024).

Cortez, Anthony, Ethan Y. Cho, Daniel Cunnane, Boris Karasik, and Shane A. Cybart. "YBCO Focused Helium Ion Beam Josephson Junction Mixers" *2020 Applied Superconductivity Conference (ASC)*, Virtual, (2020).

Cortez, Anthony, Ethan Y. Cho, Hao Li, Daniel Cunnane, Boris Karasik, and Shane A. Cybart. "Mixing with Y-Ba-Cu-O Josephson Junctions Fabricated with Focused Helium Ion Beam Irradiation" *2020 IEEE International Symposium on Space Terahertz Technology (ISSTT)*, Tempe, AZ, USA, (2020).

Cortez, Anthony, Ethan Y. Cho, Hao Li, Daniel Cunnane, Boris Karasik, and Shane A. Cybart. "HTS Josephson Mixers for THz Frequencies" *NASA JPL Summer Internship Program (JPLSIP)*, Pasadena, CA, USA, (2019).

Cortez, Anthony, Ethan Y. Cho, Hao Li, Daniel Cunnane, Boris Karasik, and Shane A. Cybart. "High Frequency Properties of Y-Ba-Cu-O Josephson Junctions Fabricated with Helium Ion Beam Irradiation" *2019 IEEE International Superconductive Electronics Conference (ISEC)*, Riverside, CA, USA, (2019).

Cortez, Anthony, Ethan Y. Cho, Hao Li, Daniel Cunnane, Boris Karasik, and Shane A. Cybart. "MgB_2 and YBCO Josephson Junction THz Mixers" *2018 Applied Superconductivity Conference (ASC)*, Seattle, WA, USA (2018).

Cunnane, Daniel, **Anthony Cortez**, Shane Cybart, and Frank Greer. "Magnesium Diboride Thin Films by Thermal Evaporation Enhanced Atomic Layer Deposition" *2018 Applied Superconductivity Conference (ASC)*, Seattle, WA, USA (2018).

GRANTS / AWARDS / MEMBERSHIPS

- Office of Naval Research Summer Faculty Research Program (ONR SFRP), 2024
- PLNU Pedagogical Enrichment Grant: 3/01/2023 – 3/01/2024, Investigating how ChatGPT can be used in the classroom to promote inclusivity and overall engagement.
- American Physical Society (APS) Member 2024 - Present
- American Society for Engineering Education (ASEE) Member 2023 – Present
- Institute of Electrical and Electronics Engineers (IEEE) Member 2023 - Present