Christian Pratt

Physics Ph.D. Candidate
University of California, Davis

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Education

2021 —	Ph.D. *Physics*, University of California, Davis Advisor: Prof. James P. Crutchfield — Expected graduation date: Spring 2026
2022	M.Sc. *Physics*, University of California, Davis
2021	B.Sc. *Physics*, University of California, Davis
2019	A.A. *Mathematics*, San Diego Community College District

Research positions

2022 — Graduate student researcher
Complexity Sciences Center and Department of Physics and Astronomy
University of California, Davis
Advisor: Prof. James P. Crutchfield

Investigating the fundamental physics of computing by combining dynamical-systems theory, stochastic thermodynamics, and superconducting circuit theory. Applications include developing energy-efficient superconducting computers.

Software skills: Python, SPICE/JoSIM, C++, JAX, PyTorch

2019 - 2021 Undergraduate student researcher
Experimental high energy physics
University of California, Davis
Advisor: Prof. Michael Mulhearn

Re-purposed smartphone camera sensors for detecting cosmic ray muons in table top experiments.

Publications

Peer reviewed

2025 **C. Z. Pratt**, K. J. Ray, and J. P. Crutchfield. Controlled erasure as a building block for universal thermodynamically-robust superconducting computing. *Chaos*. 10.1063/5.0227130

2025 **C. Z. Pratt**, K. J. Ray, and J. P. Crutchfield. Extracting equations of motion from superconducting circuits. *Physical Review Research*. 10.1103/PhysRevResearch.7.013014

Under review

2026 **C. Z. Pratt**, K. J. Ray, and J. P. Crutchfield. Metastable Dynamical Computing with Energy Landscapes: A Primer. arXiv:2602.11390

In prep

C. Z. Pratt, K. J. Ray and J. P. Crutchfield. Comparing Langevin and SPICE Simulations of Dynamical Energy Landscape Computations in Superconducting Circuits.

Presentations

Comparing Langevin and SPICE Simulations of Dynamical Landscape Computations in Superconducting Circuits

2026 **Invited postdoc job talk**. National University of Singapore.

2025 Information Engines at the Frontiers of Nanoscale Thermodynamics workshop. Telluride, Colorado.

Controlled Erasure as a Building Block for Universal Thermodynamically-Robust Superconducting Computing

2025 Society for Industrial and Applied Mathematics (SIAM) Conference on Applications of Dynamical Systems (DS25). Denver, Colorado.

2025 **Invited technical seminar**. Molecular Foundry, Lawrence Berkeley National Laboratory.

2025 APS March Meeting 2025. Anaheim, California.

2025	**Invited poster**. Interdisciplinary Graduate Research Exhibition. University of California, Davis.
2024	Recorded technical seminar. Complexity Sciences Center, University of California, Davis. *Universal Dynamical Computing on the Nanoscale*
2024	Dynamic Days 2024 conference. Davis, California.
2023	Information Engines at the Frontiers of Nanoscale Thermodynamics workshop. Telluride, Colorado.
2023	Army Research Office on-site visit. Complexity Sciences Center, University of California, Davis.

Teaching

2026	9A: Classical mechanics
2025	256A: Physics of Information 256B: Physics of Computation
2021 – 2022	7B: Fluid mechanics, electrical circuits, Newtonian mechanics 7C: Modern physics, waves, optics 9A: Classical mechanics

Awards & Honors

2025	Ryan Couch Memorial Travel Award Department of Physics and Astronomy University of California, Davis
Fall 2025, Winter 2025, Spring 2024, Spring 2023	Graduate Student Researcher Fellowship Department of Physics and Astronomy University of California, Davis
2018	NASA Community College Aerospace Scholar
2016 – 2019	Dean's Honors List San Diego Community College District

Service and Outreach

2025	Workshop Volunteer Organizer. *Physics of Agency*. Beyond Institute for Theoretical Science (BITS). Pioneer, California.
2025	Session Chair for CS28: Electronic, Optical, and Condensed Matter Systems. *Society for Industrial and Applied Mathematics (SIAM) Conference on Applications of Dynamical Systems (DS25)*. Denver, Colorado.
2020 – 2021	Mentor, Support Encourage and Develop For Children (SendForC)
2018	Volunteer, New Story Charity
2017 – 2018	Volunteer, San Diego Rescue Mission
2016 – 2018	Volunteer, San Diego Air and Space Museum

Last updated: February 16, 2026