

EVAN COLEMAN

Ph.D. Candidate in Theoretical Physics

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eacoleman

I am a string theorist with a background in AI, transitioning to a career in climate-adaptive infrastructure and disaster mitigation technology. I care deeply about preparing our world for a changing climate.

EXPERTISE

- Theoretical Physics:** Over 80 citations, five publications in quantum gravity and particle physics, utilizing a spectrum of mathematical frameworks: quantum field theory, string theory, supergravity, statistical mechanics, symplectic geometry, differential topology, and general relativity.
- Machine Learning and Data Analysis:** One research publication utilizing decision trees to evaluate experimental performance as function of detector design. Deep learning coursework at Stanford. Independent projects utilizing RL, RNNs, generative models, ImageNets to analyze weather patterns and develop novel devices for methane capture.
- Earth System Science:** Extensive Stanford coursework on nutrient cycles, climate simulation, energy & entropy budgets, tropical cyclones, greenhouse gas sequestration, and geoengineering. Independent study on farming techniques.

EXPERIENCE

NSF Graduate Research Fellow

Stanford Institute for Theoretical Physics

Aug 2018 – Present

Stanford, CA

- Working under Prof. Eva Silverstein in cosmology and string theory. Thesis will cover my work on adapting formulations of quantum gravity to inflationary universes. Tools include Mathematica and MATLAB for numerical simulation.
- Advised an undergraduate thesis project on supersymmetry.
- Taught 3 quarters: quantum mechanics, relativity, and advanced electricity & magnetism.

Undergraduate Researcher

CERN: Compact Muon Solenoid Experiment

Mar 2015 – July 2018

Brown University

- Applied machine learning methods (BDTs, Bayesian NNs) to particle identification. Using MLE, measured the top quark lifetime to record precision.
- Contributed to codebase running the Large Hadron Collider.
- As college senior, taught statistics at CMS Data Analysis School, a preparatory program for young graduate students.
- Gained 3 years of coding experience in C++, Python, bash/zsh scripting, Linux systems. 1 year experience in TensorFlow.

JavaScript API Developer

Acxiom, Inc.

Summer 2014

Foster City, CA

Web Application Developer

NASA Ames Research Center, Center for Mars Exploration

Summer 2013

Moffett Field, CA

EDUCATION

Ph.D., Theoretical Physics

Stanford University

Aug 2018 – July 2022

Sc.B. (Honors), Mathematical Physics

Brown University

Sept 2014 – May 2018

4.00 GPA, Magna cum laude, Sigma Xi

PROJECTS & SERVICE

Methane Capture Device

Present

Developing RL-based device to achieve methane capture in existing direct air capture units.

Little Earth Sandbox

Summer 2020

Built a toy climate simulator in OpenGL, with machine learning analysis framework.

Stanford Community Farm

May 2019 – Present

Volunteer farmhand.

ITPO for Undergraduates

thworldcup.com

Sept 2018 – Present

Coordinate, write problems for annual International Theoretical Physics Olympiad.

PUBLICATIONS

- Coleman, E., Silverstein, E. et al. (2021). de Sitter Microstates from $T\bar{T} + \Lambda_2$ and the Hawking-Page Transition. arXiv: 2110.14670 [hep-th]
- Aguilera-Damia, J., Anderson, L. M., & Coleman, E. (2020). A substrate for brane shells from $T\bar{T}$. arXiv: 2012.09802 [hep-th]
- Coleman, E., & Shyam, V. (2020). Conformal Boundary Conditions from Cutoff AdS₃. arXiv: 2010.08504 [hep-th]
- Coleman, E. A., Aguilera-Damia, J., Freedman, D. Z., & Soni, R. M. (2019). $T\bar{T}$ -deformed actions and (1,1) supersymmetry. *JHEP*, 10, 080. arXiv: 1906.05439 [hep-th]
- Coleman, E. et al. (2018). The importance of calorimetry for highly-boosted jet substructure. *JINST*, 13(01), T01003. arXiv: 1709.08705 [hep-ph]
- Bounding the top quark width using final states with two charged leptons and two jets at $\sqrt{s} = 13$ TeV. (2016), (CMS-PAS-TOP-16-019). Retrieved from <https://cds.cern.ch/record/2218019>

RECOGNITION

NSF Fellowship

\$138,000 grant to pursue Ph.D.

Paul H. Kirkpatrick Award

Top 5 Stanford Physics TA of 2021

Astronaut Scholarship

Merit-based scholarship

Goldwater Scholarship

Merit-based scholarship

Youth Philanthropist of the Year, California Central Coast

Cycled 600 mi. across Tibet, raising money to fight child trafficking.