EVAN AUSTEN COLEMAN, PHD

Principal at C1 Ventures, Research Affiliate at MIT

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Venture capitalist, investor in climate-critical industrial technology. Researcher in corporate sustainability strategy at MIT. Doctoral dissertation in string theory, with background in ML. I am passionate about synthesizing nontraditional technical skillsets to build innovative teams which can tackle the world's biggest challenges.

EXPERTISE

- **Industrial Innovation and Emerging Technology:** $1.8m USD deployed as pre-seed stage startup investor in technologies relevant to industrial decarbonization, AI, and high-performance computing. In 9 months, successfully negotiated 1 investment and incubated 2 startups out of Ivy+ academic IP.
- **Machine Learning and Data Analysis:** Research at MIT utilizing physics-informed models and RL for climate-relevant measurement tasks and sampling optimization. Prior research utilizing ML to optimize particle physics detector design.
- **Earth System Science:** Stanford coursework on nutrient cycles, climate simulation, energy & entropy budgets, tropical cyclones, greenhouse gas sequestration, and geoengineering. Independent study on farming techniques.
- **Theoretical Physics:** ∼200 citations, 6 publications in quantum gravity and particle physics.

EDUCATION

Ph.D., Theoretical Physics

Stanford University

Aug 2018 – Aug 2022

Advisor: Eva Silverstein. 3.99 GPA.

Sc.B. (Honors), Mathematical Physics

Brown University

Sept 2014 – May 2018

Magna cum laude, Sigma Xi. 4.00 GPA.

EXPERIENCE

Principal

C1 Ventures

Jan 2024 – Present Boston, MA

- Invested in industrial innovation as first hire at C1 Ventures. Individually originated and diligenced over 50 deals within high throughput experimentation, data-driven materials characterization and optimization, AI chips and 3D CMOS integration, advanced transceivers and networking, geological hydrogen, and phosphate mining.
- Incubated 2 stealth startup companies with Ivy+ professors related to data-driven in situ materials characterization and membrane separations.
- Developed internal incubation roadmaps for 3 market segments: mining, batteries, and industrial chemicals.

Postdoctoral Impact Fellow, Research Affiliate

MIT Climate & Sustainability Consortium

Aug 2022 – Present Cambridge, MA

- Consulted with Apple, Cargill, and PepsiCo to scale environmental data collection using modern machine learning approaches, for optimization of land use sustainability and analysis of local conditions driving soil carbon sequestration.
- Organized 4 workshops at 2 conferences for corporate sustainability experts. For one workshop, co-developed and showcased a board game ("6cycle") demonstrating the use of materials data for maintaining circular supply chains.
- Managed five students (1 Ph.D., 2 M.S., 2 B.S.) to execute a research program with six-figure industry backing.
- Research on atomic abundance measurement in mixed-stream, mixed-phase environments ("atom counting"). Applications to carbon measurement in soils and rare earth minerals extraction in electronic or metallurgical waste products. Motivation is to make sustainability profitable through the systematic collection and use of empirical data.
- One publication applying VAEs to structured prediction of soil organic carbon content. One patent filed for device to optimize physical separations of mixed-stream material flows. 2 forthcoming publications applying RL to NMR pulse optimization for low-field atomic abundance measurement, and transformer models to sampling optimization.

EXPERIENCE

NSF Graduate Research Fellow

Stanford Institute for Theoretical Physics

Aug 2018 – Aug 2022 | Stanford, CA

- Advised by Prof. Eva Silverstein in cosmology and string theory. Thesis demonstrated a mathematical technique to relate the entropy of cosmic horizons in inflationary universes to the Bekenstein-Hawking entropies of black holes.
- Taught 3 quarters: quantum mechanics, relativity, and advanced electricity & magnetism. Recognized as top 5 Stanford Physics TA in 2021. Advised an undergraduate thesis project on supersymmetry.

Undergraduate Researcher

CERN: Compact Muon Solenoid Experiment

Mar 2015 – July 2018 | Brown University

- Applied machine learning methods (BDTs, MLPs) to particle identification and detector optimization. Using Poissonian MLE, measured the top quark lifetime in first data from 13 TeV collider run in 2016.
- Coded in C++, Python, bash. Used distributed computing to process TB-scale datasets.
- Contributed to CMSSW, the codebase running the Compact Muon Solenoid on the Large Hadron Collider.
- Taught statistics at CMS Data Analysis School, a preparatory program for young graduate students.

PUBLICATIONS

- Coleman, E., Moralejo, J. et al. (2024). Sampling Without Stratification: End-to-end Methods for Farm-scale Soil Carbon Monitoring. Forthcoming: to be submitted to ICLR2025.
- Coleman, E., Nair, S. et al. (2024). Structured Spectral Reconstruction for Scalable Soil Organic Carbon Inference. Presented at "Tackling Climate Change with Machine Learning" at ICLR2024.
- Coleman, E., Shenoy, R. et al. (2024). Rapid Atomic Abundance Measurement via RL-driven NMR Pulse Sequence Optimization. Accepted: "Tackling Climate Change with Machine Learning" at NeurIPS2024.
- Coleman, E., Soni, R. M., & Yang, S. (2022). On the Spread of Entanglement at Finite Cutoff. arXiv: 2208.12376 [hep-th]
- 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 AdS_3. arXiv: 2010.08504 [hep-th]
- Coleman, E., Aguilera-Damia, J., Freedman, D. Z., & Soni, R. M. (2019). $T\overline{T}$ -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 $\sqrt{s} = 13\ \mathrm{TeV}$. (2016), (CMS-PAS-TOP-16-019). Retrieved from https://cds.cern.ch/record/2218019

RECOGNITION

NSF Graduate Research Fellowship
$138,000 grant to pursue Ph.D.

Paul H. Kirkpatrick Award
Top 5 Stanford Physics TA of 2021

R. Bruce Lindsay Prize for Physics
Top physics student, Brown U. '18

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.