

Cameron MacKeen, PhD

Data Scientist | Research Scientist

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Skills

Programming: Python (pyspark, pandas, scikit-learn, sqlalchemy, torch, flask, plotly, bokeh) · Kafka · Linux shell scripting · AWS · Spark · SQL · Java · C++ · MATLAB · Javascript

Work Experience

Machine Learning Engineer

TENSORTRADE

January 2020 – May 2020

- Contributed to open source AI framework that trains a reinforcement learning agent to trade currencies.
- Aggregated, explored, and engineered features including wavelet transforms to enrich agent's observation state space.
- Invented first OpenAI gym environment based on MakerDAO protocol, trained agent to recreate auction grinding.
- Integrated CNN model trained to predict market extrema within RL policy learning model.

Research Scientist

UNIVERSITY OF CALIFORNIA, SANTA CRUZ — DR. FRANK BRIDGES

June 2014 – March 2019

- Many research projects resulted in academic publications, awarded Chancellor's Dissertation Fellowship for achievements.
- Analyzed interference patterns of the X-ray absorption fine structure, engineered physical models using high parameter fits.
- Successfully collected and processed data, iterative background characterization with command line and Linux shell scripts.
- Created automated analysis framework with Python to optimize pipeline, redefined lab procedures, and saved 600 work-hours.
- Discovered two new, self-consistent algorithms for extracting an anomalous parameter of a general stochastic distribution.
- Developed framework for unsupervised clustering on big XAS data using pyspark, pandas, and scikit-learn.
- Built 1D CNN trained on simulated spectra to predict atomic properties and dopant species of real data.

Data Scientist

SERACARE LIFE SCIENCES — LORN DAVIS

May 2016 – September 2016

- Created precision-incentivized model to maximize profit from \$600k of stagnant inventory, while increasing turnover ratio.
- Employed AWS and cleaned large data sets; began with an analytical overview of test data and imputed sparse features.
- Engineered features and developed a random forest model coupled with an industry-based economic loss function.
- Presented results and strategic roadmap to executives, with explicit short-term action items for next phase of program.

Machine Learning Engineer

CONCORD CONSORTIUM — DR. HEE-SUN LEE

January 2015 – May 2015

- Utilized Python to parse and clean log data of students' interactions with computer module, engineered entropy-based features.
- Self-taught R to use Rattle for statistically analyzing data and developed a binary decision tree model to categorize students.
- Compiled results and protocols in a manuscript; established new link between student understanding and action entropy.

Undergraduate Researcher

UNIVERSITY OF MASSACHUSETTS, AMHERST — DR. ANDREA POCAR

April 2010 – June 2013

- Erected an ultra-high vacuum manifold with a liquid nitrogen plumbing system to cool avalanche photodiodes.
- Constructed a circuit to bias photodiodes, wrote C++ scripts to interface with circuit board firmware for signal analysis.
- Research presented at symposium; awarded an Honors grant and fellowship for exceptional work.

Education

University of California, Santa Cruz

PH.D. IN PHYSICS

September 2013 – March 2019

- Published 6 papers (3 first authors) and collaborated internationally.
- Awarded Chancellor's Dissertation Fellowship.
- Trained multiple students in lab technique and analysis, delegated research tasks, assisted students on individual projects.

University of Massachusetts, Amherst

B.SC. IN PHYSICS AND MATH

September 2009 – May 2013

- Submitted Honors Senior Thesis on research, received an Honors grant and Cervo fellowship.

Publications

- (1) F. Bridges, R. Dudschus, C. MacKeen, T. Keiber, C. H. Booth, M. B. Maple, "EXAFS investigation of the local structure in URu₂-xFe_xSi₂; evidence for unusual distortions at low T", *Under review* (2020)
- (2) C. MacKeen, F. Bridges, L. Kovács, J. Castillo-Torres "Substitution of Er, In, and Hf in LiNbO₃: evidence for multiple defect distributions about dopant sites", *Physical Review Materials*, **2** 093602 (2018)
- (3) G. Abdelmageed, C. MacKeen, K. Hellier, L. Jewell, L. Seymour, M. Tingwald, F. Bridges, J.Z. Zhang, S.A. Carter "Effect of Temperature On Light Induced Degradation in Methylammonium Lead Iodide Perovskite Thin Films and Solar Cells", *Solar Energy Materials and Solar Cells*, **174** 566-571 (2018)
- (4) C. MacKeen, F. Bridges, L. Seijo, Z. Barandiarán, M. Kozina, A. Mehta, M.F. Reid, J.-P. R. Wells, "The Complexity of the CaF₂:Yb System: A Huge, Reversible, X-ray Induced Valence Reduction", *J. Phys. Chem. C*, **121**, 28435-28422 (2017)
- (5) C. MacKeen, F. Bridges, M. Kozina, A. Mehta, M.F. Reid, J.-P. R. Wells, Z. Barandiarán, "Evidence That the Anomalous Emission from CaF₂:Yb²⁺ Is Not Described by the Impurity Trapped Exciton Model", *J. Phys. Chem. Let.*, **8**, 3313-3316 (2017)
- (6) A. Sharenko, C. MacKeen, L. Jewell, F. Bridges, M. Toney, "Evolution of Iodoplumbate Complexes in Methylammonium Lead Iodide Perovskite Precursor Solutions", *Chem. Mater.*, **29** (3) (2017)
- (7) F. Bridges, C. MacKeen, and L. Kovács, "No difference in local structure about a Zn dopant for congruent and stoichiometric LiNbO₃", *Phys. Rev. B*, **94**, 014101/1-5 (2017)