

# Shauna M Kravec

PO Box 15  
Bridgeport, CA 93517

Email: [smkravec@gmail.com](mailto:smkravec@gmail.com)  
Homepage: [celest.ai](http://celest.ai)  
GitHub: [github.com/smkravec](https://github.com/smkravec)  
Google Scholar: [link](#)

## Education

**Ph.D. Physics:** University of California: San Diego, May 2019.

Advisor: John McGreevy

Thesis: *High Energy Problems, Low Energy Solutions*

**B.S. Physics, B.S. Mathematics:** University of Rochester, May 2012.

Minor in Biomedical Engineering

Advisor: Esther Conwell

## Professional Experience

**Researcher:** Anthropic, Jan. 2022 - current

- \* Investigating reinforcement learning approaches to training large scale language models

**Co-Founder:** Hofvarpnir Studios, Aug. 2021 - current

- \* Founded non-profit dedicated to providing infrastructure support for AI safety researchers, both independent and at institutions such as UC: Berkeley, MILA, and UT Austin

- \* Setup and help facilitate a dedicated GPU cluster for training research ML models

- \* Designing and building a new multi-node high-performance computing cluster for AI safety groups at UC: Berkeley

- \* Provide DevOps support in deploying and managing experiments using Docker, Kubernetes, Ansible, and Terraform

**Machine Learning Engineer:** Clostra, Jan. 2021 - Jan. 2022

- \* Lead a group of nine software and machine learning engineers on a DoD wargaming project

- \* Designed the core strategic wargame with ML generated synthetic event timelines based on news, econometric, and geospatial data

- \* Worked with the customer, leading interactive demos and playtests with military officers, incorporating regular feedback

- \* Worked with ML engineers to design, evaluate, and improve event prediction models using noisy heterogeneous data based on a variety of different methods including Poisson regression, HMMs, LightGBM, and LSTM/RNNs

- \* Built the pipeline for training AI opponents in the game with reinforcement learning

- \* Conducted experiments comparing different policy gradient algorithms (PPO, VMPO, IMPALA), hyperparameter optimization, state/action space designs, and model architectures

**Postdoctoral Researcher:** University of California: Riverside, Sept. 2019 - 2020

- \* Research in theoretical condensed matter and high energy physics

- \* Worked on models of non-Fermi liquids or “exotic metals”

- \* Investigations of dualities in large- $N$  Chern-Simons theories

- \* Research into behavior of conformal field theories in their large charge sectors

## Programming Experience

**Languages:** Python, C++, C#, Rust, Go, Mathematica, Matlab

**Orchestration Tooling:** Docker, Kubernetes, Ansible, Terraform, Prometheus, Grafana

**Technologies:** PyTorch, Tensorflow, RLLib, Scikit-learn, PostgreSQL, Unity, CP2K, AMBER

## Projects

### Prismata RL Environment:

- \* Prismata is a commercial turn based strategy game with perfect information but a large combinatorial state and action space
- \* Exposed C++ game engine methods to Python and built a Gym API for RL training
- \* Built parallel self-play training pipeline and benchmarked custom PPO variant against classical AI
- \* Researching novel hierarchical AlphaZero/MCTS variants for this environment

### ML Models for Fletcher:

- \* Trained single pass multi-style transfer model (VGG-19 backbone) for images
- \* Trained T5 language model for headline generation from keywords based on scraped parody news
- \* Quantized models for deployment on edge GPU device (Jetson TX2)
- \* Wrapped models as webservice and deployed to a Discord bot with 1M+ users

## Publications

### Fermi Liquids and Critical Theories 2020

SM Kravec, J McGreevy

*To Appear*

### The Spinful Large Charge Sector of Non-Relativistic CFTs: From Phonons to Vortex Crystals 2019

SM Kravec, S Pal

*Journal of High Energy Physics 2019 (5), 194*, [arxiv.org/abs/1904.05462](https://arxiv.org/abs/1904.05462)

### Nonrelativistic Conformal Field Theories in the Large Charge Sector 2019

SM Kravec, S Pal

*Journal of High Energy Physics 2019 (2), 8*, [arxiv.org/abs/1809.08188](https://arxiv.org/abs/1809.08188)

### All-Fermion Electrodynamics and Fermion Number Anomaly Inflow 2015

SM Kravec, B Swingle, J McGreevy

*Phys. Rev. D 92, 085024 (2015)*, [arxiv.org/abs/1409.8339](https://arxiv.org/abs/1409.8339)

### A Gauge Theory Generalization of the Fermion-Doubling Theorem 2013

SM Kravec, J McGreevy

*Phys. Rev. Lett. 111, 161603 (2013)*, [arxiv.org/abs/1306.3992](https://arxiv.org/abs/1306.3992)

### Hole Wave Functions and Transport with Deazaadenines Replacing Adenines in DNA 2013

AJ Breindel, RE Stuart, WJ Bock, DN Stelter, SM Kravec, EM Conwell

*J. Phys. Chem. B, 2013, 117 (11), pp 3086-3090*

### Localization of a Hole on an Adenine-Thymine Radical Cation in B-Form DNA in Water 2011

SM Kravec, CD Kinz-Thompson, EM Conwell

*J. Phys. Chem. B, 2011, 115 (19), pp 6166-6171*