Matthew Quenneville

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Education

Ph.D. Physics, UC Berkeley. (GPA: 4.0/4.0) 2016-2022

- Awarded NSERC Postgraduate Scholarship ($73,000 CAD)

B.Sc. Honours Mathematical Physics, Simon Fraser University. (GPA: 4.23/4.33) 2011-2016

- Awarded Physics Charter Faculty Prize (Top graduating student in any physics major)
- Awarded Gordon M. Shrum Entrance Scholarship ($24,000 CAD)

Experience

Graduate Student Researcher, UC Berkeley 2018-2022

- Made substantial contributions to galaxy modeling methods resulting in ~4x more accurate determinations of galaxy shape and a ~2x speedup
- Weighed a black hole 3 billion times heavier than the sun, and measured the shape of its host galaxy - the most massive black hole where such a measurement has been made
- Contributed to an improved parameter search strategy based on a surrogate Gaussian process regression model, reducing computation time by ~10x
- Generated Monte Carlo simulations of galaxy observations to validate models
- Utilized Bayesian modeling to infer relationships between galaxy size, brightness, and stellar velocity dispersions
- Supervised undergraduate student research projects including an Honors Thesis
- Communicated results through publishing papers and giving talks and seminars

Graduate Student Instructor, UC Berkeley 2016-2018

- Awarded an Outstanding Graduate Student Instructor award for exceptional teaching
- Consistently outperformed the department average on student evaluations for overall effectiveness as an instructor with an average score of 6.35/7

Honours Thesis, Simon Fraser University 2015-2016

- Used analytic and numerical techniques to elucidate the relationship between learning rate and energetic efficiency, leading to publication in a peer-reviewed journal

Undergraduate Researcher, Simon Fraser University/CERN 2013-2015

- Sped up existing techniques for Higgs Boson mass estimation for a specific decay channel by about 1500x using machine learning (Boosted Regression Trees)
- Engineered input features leading to an increase in high energy particle decay product classification accuracy of 4% (Boosted Decision Trees)
- Won a CERN summer student fellowship to perform research with the ATLAS collaboration at CERN in Geneva, Switzerland.

Technical Skills

- Python (NumPy, SciPy, Matplotlib, scikit-learn, TensorFlow, pandas, PyMC), computing (Unix shell, Git, Fortran, LaTex, SQL), data analysis (bayesian modeling, machine learning, data visualization), math (statistics, linear algebra, calculus, information theory), physics (astrophysics, statistical mechanics)

Peer-reviewed Publications

- 3 first author publications; 7 total publications (view on Google Scholar)