Matthew E. Quenneville

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Research Interests

Galactic dynamics; orbit modeling; supermassive black holes; galaxy formation and evolution

Education

Ph.D. Physics, UC Berkeley — *Expected* May 2022
Advisor: Chung-Pei Ma
Thesis: Dynamics and Shapes of Galaxies:
Orbit Modeling of Triaxial Galaxies Hosting Supermassive Black Holes

B.Sc. Honours Mathematical Physics, Simon Fraser University — Jun. 2016
Advisor: David Sivak
Thesis: Energy Dissipation and Information Flow in Coupled Markovian Systems

Research Positions

Graduate Student Researcher, UC Berkeley — 2018-present
Advisor: Chung-Pei Ma
Topic: Dynamics and Shapes of Massive Elliptical Galaxies

Honours Thesis, Simon Fraser University — 2015-2016
Advisor: David Sivak
Topic: Energy Dissipation and Information Flow in Coupled Markovian Systems

Undergraduate Researcher, Canadian Institute for Theoretical Astrophysics (CITA) — Summer 2015
NSERC USRA
Advisor: Ue-Li Pen
Topic: Using pulsar scintillation and VLBI to study the Crab Pulsar

Institute of Particle Physics Summer Student Fellowship, CERN — Summer 2014
SFU Vice-president Research USRA
Advisor: Dugan O'Neil
Topic: Measuring the Higgs boson mass in decays to tau leptons with machine learning

Undergraduate Researcher, Simon Fraser University — Summer 2013
SFU Vice-president Research USRA
Advisor: Dugan O'Neil
Topic: Reconstructing decay products of tau leptons with machine learning

Advising Experience

Shaunak Modak 2020-2021
Testing Schwarzschild Orbit Models for Black Hole Mass Determination with Mock Datasets
Undergraduate Honors Thesis
Co-supervised with Chung-Pei Ma

Teaching Experience

Graduate Student Instructor, UC Berkeley
Physics 7B: Physics for Scientists and Engineers
Fall 2016
Spring 2017
Fall 2017
Spring 2018

Telescope and Computing Allocations

As Co-Investigator:

- **Keck Observatory** (PI: Chung-Pei Ma) 2019A-2021B — 6.5 nights
- **XSEDE San Diego Supercomputer Center** (PI: Chung-Pei Ma) 2019-2021 — 3,702,490 SUs (+1,872,000 pending)

Research Skills and Experience

Observational:

Photometry:	Data reduction; processing (ARCHANGEL); fitting (Imfit, GALFIT, MGE)
Galactic Kinematics:	Voronoi binning, spectrum fitting (pPXF)
Catalogs:	2MASS XSC, WISE, 2MASS PSC
Observing:	Keck Observatory, Algonquin Radio Observatory

Technical:

Programming:	Python; Bash; Fortran
Code Development:	Git; supercomputing clusters (SLURM and Torque schedulers)
Software:	LaTeX; Mathematica
Statistics:	MCMC sampling; Bayesian inference; information theory; machine learning

Talks

- NRC Herzberg DAO Colloquium — Nov. 2021
- CITA Cosmology Group Meeting — Nov. 2021
- UC Berkeley Graduate Student Postdoc Seminar — Oct. 2021
- UC Berkeley Astro 250 Special Topics - Guest Lecture — Sept. 2021
- UC Berkeley Physics Graduate Student Seminar — Dec. 2018

Publications (view on ADS)

1. **M. E. Quenneville**, J. P. Blakeslee, C.-P. Ma, J. E. Green, & S. Gwyn (2022). *The MASSIVE Survey XVIII. K-band Photometry and the Fundamental Plane for Massive Early Type Galaxies*. In prep.
2. M. Gu, J. E. Greene, A. B. Newman, C. Kreisch, **M. E. Quenneville**, C.-P. Ma, & J. P. Blakeslee (2022). *The MASSIVE Survey XVI. The Stellar Initial Mass Function in the Center of Massive Early Type Galaxies*. Submitted to ApJ.
3. J. D. Pilawa, C. M. Liepold, S. C. Delgado Andrade, J. L. Walsh, C.-P. Ma, **M. E. Quenneville**, J. E. Greene, & J. P. Blakeslee (2022). *The MASSIVE Survey - XVII. A Triaxial Orbit-based Determination of the Black Hole Mass and Intrinsic Shape of Elliptical Galaxy NGC 2693*. Accepted to ApJ - In press.
4. **M. E. Quenneville**, C. M. Liepold, & C.-P. Ma (2022). *Triaxial Orbit-based Dynamical Modeling of Galaxies with Supermassive Black Holes and an Application to Massive Elliptical Galaxy NGC 1453*. The Astrophysical Journal 926 (1), 30.
5. **M. E. Quenneville**, C. M. Liepold, & C.-P. Ma (2021). *Dynamical Modeling of Galaxies and Supermassive Black Holes: Axisymmetry in Triaxial Schwarzschild Orbit Superposition Models*. The Astrophysical Journal Supplement Series 254 (2), 25.
6. C. M. Liepold, **M. E. Quenneville**, C.-P. Ma, J. L. Walsh, N. J. McConnell, J. E. Greene, & J. P. Blakeslee (2020). *The MASSIVE Survey. XV. A Stellar Dynamical Mass Measurement of the Supermassive Black Hole in Massive Elliptical Galaxy NGC 1453*. The Astrophysical Journal 891 (1), 4.
7. J. E. Greene, M. Veale, C.-P. Ma, J. Thomas, **M. E. Quenneville**, J. P. Blakeslee, J. L. Walsh, A. Goulding, & J. Ito (2019). *The MASSIVE Survey. XII. Connecting Stellar Populations of Early-type Galaxies to kinematics and Environment*. The Astrophysical Journal, 874 (1), 66.
8. **M. E. Quenneville** & D. A. Sivak (2018). *Energy Dissipation and Information Flow in Coupled Markovian Systems.* Entropy, 20 (9), 707.