

# Matthew E. Quenneville

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## Research Interests

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

## Education

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**Ph.D. Physics**, UC Berkeley *Expected May 2022*  
*Advisor:* Chung-Pei Ma  
*Thesis:* Dynamics and Shapes of Galaxies:  
Orbit Modelling 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

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**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

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**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

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**Graduate Student Instructor**, UC Berkeley

Fall 2016

*Physics 7B: Physics for Scientists and Engineers*

Spring 2017

Fall 2017

Spring 2018

## Telescope and Computing Allocations

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*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

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### 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

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- 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](#))

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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.