

Alexander Rawlings

Theoretical Extragalactic Astrophysics

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📍 Garching, Germany 🇦🇺 Australian Citizen

I am a post-doctoral researcher in theoretical extragalactic astrophysics at the Max-Planck-Institut für Astrophysik in Garching, Germany. I am designing and using simulations of massive galaxy mergers to study the impact of orbital perturbations on supermassive black hole binary merging timescales, and the effect of gravitational wave-induced supermassive black hole recoil on the surrounding galaxy. I adopt a forward-modelling approach and Bayesian methods to draw conclusions from our simulations and compare to observations.

📁 PROFESSIONAL EXPERIENCE

Present	Post-doctoral Researcher, Max-Planck-Institut für Astrophysik, Garching, Germany
Mar 2026	› Supermassive black hole dynamics in different galactic environments › Bayesian hierarchical modelling › Mock integral field unit observations › Reference: Dr. Thorsten NAAB · naab@mpa-garching.mpg.de Python C/C++
Nov 2025	Doctoral Candidate, University of Helsinki, Helsinki, Finland
Sep 2021	› Design and analysis of gas-free merger simulations with realistic initial conditions › Orbit modelling › Bayesian hierarchical modelling and Gaussian processes › Mock integral field unit observations › Reference: Prof. Peter JOHANSSON · peter.johansson@helsinki.fi Python C/C++
Feb 2021	Research Assistant, University of Helsinki, Helsinki, Finland
Sep 2020	› Design and analysis of galaxy merger simulations to investigate the stalling of supermassive black hole binary systems at parsec scales › Reference: Prof. Peter JOHANSSON · peter.johansson@helsinki.fi Python C/C++
Nov 2019	Research Scholar, Sydney Institute for Astronomy, Sydney, Australia
Jan 2019	› Determine the relationship between galaxy ellipticity and the spin parameter λ_R › Academic writing › Reference: Dr. Caroline FOSTER · caroline.foster@sydney.edu.au R bash

📖 PUBLICATIONS

My list of refereed-publications may be found through the link [here](#). Some publications may be missing if they are in press. I have four first-author publications, two second-author publications, and five coauthor publications.

🎓 FUNDING AND AWARDS

2026	Väisälä Prize for Best Thesis in Astronomy
2025	University of Helsinki 30 under 30 recipient
2021	UH Research Foundation Doctoral Researcher — University of Helsinki
2019	Fully-Paid Tuition and Study Grant — University of Helsinki
2019	Denison Research Scholar — University of Sydney
2016	Chancellor's Scholarship — University of Southern Queensland

EDUCATION

Nov 2028	Doctoral Researcher, School of Particle Physics and Universe Sciences, University of Helsinki, Helsinki, Finland
Sep 2021	> Doctoral thesis: “Supermassive black hole dynamics in massive early-type galaxies” > 3 first author, 8 coauthor publications in peer-reviewed journals > High performance computing courses > Galactic dynamics > Personal development courses
May 2021	Master’s of Particle Physics and Astrophysical Sciences, University of Helsinki, Helsinki, Finland
Sep 2019	> GPA: 4.85/5.00 > Thesis: <i>The Final Parsec Problem in Massive Early-Type Galaxies</i> > Studies: Galactic dynamics and evolution, observational astronomy, general relativity, radiative transfer, and Monte Carlo methods.
Nov 2018	Bachelor of Science (Physical Sciences), University of Southern Queensland, Toowoomba, Australia
Feb 2016	> GPA: 6.96/7.00 > Thesis: <i>Insights into Stellar Dynamo Evolution: the Young Sun HD 106506</i> > Studies: Astronomical sciences, statistics, and programming.
Jan 2018	Exchange Studies, University of Zürich, Zürich, Switzerland
Aug 2017	> Studies: Computational astrophysics (N-body simulations and smoothed particle hydrodynamics), mathematical methods for physics, and astrobiology

SKILLS

Communication

- > Confident and apt public speaker
- > Concise, professional academic writing
- > Effective group communicator

Languages

- > English (native)
- > German (intermediate)
- > Finnish (basic)

PROGRAMMING LANGUAGES

Python	● ● ● ● ○
C/C++	● ● ● ● ○
Stan	● ● ● ● ○
R	● ● ● ○ ○
bash	● ● ● ○ ○
L ^A T _E X	● ● ● ○ ○
MATLAB	● ● ● ○ ○
SQL	● ● ○ ○ ○
IRAF	● ● ○ ○ ○

SPECIFIC INTERESTS

- > Galactic dynamics
- > Galaxy formation & evolution
- > Supermassive black hole dynamics
- > Computational astrophysics
- > Bayesian Statistics
- > Hierarchical Modelling

TEACHING AND MENTORING

2021–2025	<i>University of Helsinki</i> : Graduate course assistant (astrophysics & statistics)
2019–2020	<i>University of Helsinki</i> : English language assistant
2017–2018	<i>University of Southern Queensland</i> : Undergraduate course assistant (physics)
2017–2019	Private Tutor

Last updated: August 16, 2026