

Benjamin Ricketts

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Office: SRON, Leiden
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Research interests Black holes, accretion physics, machine learning, X-ray timing, Bayesian hierarchical modeling

Education
University of Amsterdam Amsterdam, Netherlands
PhD in Astronomy September 2022 – Present
Supervisors: Daniela Huppenkothen, Phil Uttley

University of Southampton Southampton, United Kingdom
MSci in Astrophysics September 2018 – July 2022
Mentors: James Steiner, Cecilia Garraffo, Ian McHardy

Other experience
Principal Investigator: NEBULA-Xplorer 2024 - present
The NEBULA-Xplorer project is an €50M X-ray timing small satellite concept orientated around long term observations of bright X-ray binary sources within the Milky Way. NEBULA-Xplorer was approved to move to the next stage in the 2025 ESA exploratory mini-F call and deemed "high scientific value for money".

Publications
Presentations
Software

2 refereed, 3 under review, 1 non-refereed, list attached
1 invited, 3 contributed, 5 colloquia, 6 posters, list attached

nDspec

Lead developer of open-source python package providing analysis tools for multi-dimensional X-ray data: <https://github.com/matteolucchini1/nDspec>

XRIimulator

Lead developer of the model simulator for the X-ray Interferometry Simulator XRIimulator: <https://github.com/X-ray-interferometry/XRIimulator>

reltrans

Developer of the reltrans black hole X-ray reverberation model package as part of my research: <https://github.com/reltrans/reltrans>

Teaching experience
Workshop Instructor, Software Carpentry (NWO-I) 2023 - Present
I teach as both a primary instructor and helper for various software workshops where I generally teach principals of version control and integration of programming in python into the workflow of researchers at all points in their career.

Teaching assistant, API (University of Amsterdam)

Extreme astrophysics Autumn 2022, Autumn 2023

Master's course encompassing the physics of black hole accretion discs and jets. Gave 2 3-hour tutorials weekly as well as creating solutions/rubrics for biweekly problem sheets. Graded problem sheets. Marked final project programs.

	Introduction to cosmology	Autumn 2023
Research supervision	Bachelor course encompassing an introduction to cosmology for bachelor students. Taught in 2 blocks of 4-hour lectures/problem classes per week. Graded final presentations and the final exam.	
	Merijn van Otterlo, BSc project (University of Amsterdam)	2025
	Project title: "Emulating comptonisation around a black hole"	
	Fatima Abdiche, MSc project (University of Amsterdam)	2024-2025
	Project title: "QPOs as Probes of Relativistic Precession: Lorentzian Modeling in GX339-4 and MAXI-J1820"	
	Chuhan Jiang, MSc project (University of Amsterdam)	2024-2025
	Project title: "Developing the science case for NEBULA-Xplorer: a new generation X-ray timing telescope"	
	Konstantinos Tsalapatas, MSc project (University of Leiden)	2023-2024
	Project title: "X-raying the stellar wind of Cygnus X-1"	
Computing resource grants	SURF EINF-13764	April 2025 - April 2026
	"Emulation of black hole reflection spectra"	
	Awarded 30000 CPU hours and 5000 GPU hours on Research Cloud - HPC Cloud from SURF NL	
	SURF EINF-9197	March 2024 - March 2025
	"Bayesian inference of black holes with X-ray timing"	
	Awarded 30000 CPU hours and 5000 GPU hours on Research Cloud - HPC Cloud from SURF NL	
	SURF EINF-5505	March 2023- March 2024
	"Exploring Black Hole Spectral Timing with Bayesian Hierarchical Modeling"	
	Awarded 15000 CPU hours and 10000 GPU hours on Research Cloud - HPC Cloud from SURF NL	
Skills	Programming	
	Proficient in: Python, Fortran, Pytorch, git/github.	
	Familiar with: HTML, machine learning, C++, high performance computing.	
	Languages	
	English (native speaker), Dutch (basic), Swedish (basic), French (basic)	
	Organisation	
	Hackathons, Digital Carpentry workshops.	
Professional memberships	American Astronomical Society.	September 2023 – Present
Service to profession	Attended 19th AAS HEAD division meeting and 243rd AAS meeting.	
	Invited referee for APJ and A&A	

Publications

Benjamin Ricketts

Lead author

RTFAST-Spectra: emulation of X-ray reverberation mapping for active active galactic nuclei

Ricketts, B., Huppenkothen, D., Lucchini, M., et al *MNRAS*, *V538*, *p1096-1117*, (2025).

Mapping the X-ray variability of GRS1915+105 with machine learning

Ricketts, B., Steiner, J., Garraffo, C., et al *MNRAS*, *V523*, *p1946-1966*, (2023).

Disk warping and black hole X-ray binaries I. Tentative unification of low-frequency quasi-periodic oscillations

Marcel, G., Turner, S., **Ricketts, B.**, et al. *A&A*, *arXiv:2511.10474*, (*under review*).

Equation-of-state-informed pulse profile modeling

Hoogkamer, M., et al, **incl Ricketts, B.** *PRD*, *arXiv:2510.27619*, (*under review*)

nDspec: a new Python library for modelling multi-dimensional datasets in X-ray astronomy

Lucchini, M., **Ricketts, B.**, et al, *A&A*, *arXiv:2512.10615*, (*under review*)

NEBULA-Xplorer (Novel Extended Binary Linked Astrophysics - Xplorer): mini-Fast mission proposal

Ricketts, B., et al, *available on request*

Non-refereed

Presentations

Benjamin Ricketts

Invited talks

Machine learning and Black hole modelling

The True Appearance of Black Holes workshop, Milan, Italy. April 2025

Colloquia

NEBULA-Xplorer: an X-ray timing small satellite concept for long term

SRON colloquium, Leiden, Netherlands. February 2025

Mapping the X-ray variability of GRS1915+105 with machine learning

Data Science, SISSA, Trieste, Italy. May 2023

ML Journal club, Leiden Observatory, Netherlands. April 2023

SRON, Leiden, Netherlands. March 2023

X-ray Bun Club, Cambridge University, UK. February 2023

Contributed talks

NEBULA-Xplorer: an X-ray timing small satellite concept for long term x-ray timing monitoring

NOVA Network 3 meeting, Nijmegen, Netherlands November 2025

CTAO/KM3NeT synergy meeting, Leiden, Netherlands. November 2025

Accretion meeting, Vasto, Italy. June 2025

Posters

RTFAST-S: emulation of X-ray reflection around black holes

11th Microquasar Workshop, Cefalù, Italy. September 2025

Emulation for x-ray reverberation: faster fitting

Netherlands' Astronomers Conference 2024, Egmond An Zee, Netherlands.

May 2024

Emulation by committee: faster AGN fitting

EUCAIFcon 2024, Amsterdam, Netherlands. April 2024

243rd AAS, New Orleans, USA. January 2024

Mapping the X-ray variability of GRS1915+105 with machine learning

EAS annual meeting, Krakow, Poland. July 2023

19th AAS HEAD meeting, PA, USA March 2022