@colorado.edu
.kirklong.space
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#### Research Interests

I am broadly excited about employing advances in modern computing to analyze large data-sets and to simulate interesting systems numerically, techniques I am currently using to better understand the true nature of the broad emission line region in active galactic nuclei.

### Education

08/2020 -	University of Colorado Boulder, Dept. of Astrophysical and
	Planetary Sciences
	Ph.D. thesis: "Unraveling the Quasar Broad-Emission Line Region"
	(working title, degree expected Summer 2026)
	M.S. awarded December 2023: "A Possible Thin Disk-Wind Launching
	Mechanism of Broad-Line Emission in AGN Applied to Quasar 3C 273"
08/2017 - 05/2020	Boise State University, Honors College
	B.Sc. in Physics, Astrophysics emphasis, Magna Cum Laude
	Minors in Music and Applied Mathematics, recognized as a Graduating
	Student Leader
08/2015 - 05/2017	Idaho State University (transferred prior to completing degree)

### **Publication List**

- "A Convolutional Neural Network for the Recovery of Transfer Functions From Velocity-Resolved Reverberation Mapping Data," **Long, K.**, Horne, K., Dexter, J., & Tremblay, B. 2025, Submitted to ApJ November 2025.
- "BroadLineRegions.jl: A fast and flexible toolkit for modeling the broad-line region (BLR) in Julia," Long, K., 2025, Submitted to JOSS July 2025 (awaiting reviewer)
- "Reverberation Mapping Data of NGC 5548 Imply a Multicomponent Broad-line Region," Long, K. & Dexter, J., 2025, ApJ, 987, 196
- "Confronting a Thin Disk-Wind Launching Mechanism of Broad-Line Emission in AGN with GRAVITY Observations of Quasar 3C 273," **Long, K.**, et al. 2023, ApJ, 953, 184

#### Awards

2025	GPSG DEI Excellence Award
2021-2022	Astrophysics Graduate Fellowship (APS department prize)
2015 - 2020	Dean's List and \$22,000 in undergraduate scholarship awards
Press	
2023-2024	"Questions about Quasars: How to Best Weigh a Celestial Body", $JILA$ Light & Matter, same paper also featured in $SciTechDaily$
2019-2020	"Physics Student Brings Science Class to Prison", Boise State University
	website, local news channel KIVI, and Boise State University alumni
	magazine, Focus

# Selected Presentations (\*indicates invited)

09/2025	AstroLunch Seminar*,	St Andrews, UK
	University of St Andrews School of Physics and Astron	lony
	"Unraveling the Quasar Broad-Emission Line Region"	
09/2025	Massive Black Holes Across Cosmic Time,	Cambridge, UK
	Kavli Institute for Cosmology, University of Cambridge	2
	Contributed talk: "Unraveling the Quasar Broad-Emiss	sion Line Region"
07/2025	Vasto Accretion Meeting,	Vasto, IT
	Organized by Durham University and the INAF	
	Contributed talk: "Unraveling the Quasar Broad-Emiss	sion Line Region"
06/2024	SMBH Sexten,	Sexten/Sesto, IT
	Organized by Chalmers & Virginia Initiatives on Cosm	ic Origins
	Contributed talk: "Unraveling the Quasar Broad-Emiss	sion Line Region"

# Selected Teaching Experience

01/2023 - 05/2023	Graduate Part-Time Instructor	
	CU Boulder Dept. of Astrophysical and Planetary Sciences	
	Instructor of record for ASTR 2030 Black Holes with enrollment of >100	
	students. Responsible for all course content and managing TA, grader.	
08/2020 - 12/2023	Graduate Teaching Assistant (4 semesters)	
	CU Boulder Dept. of Astrophysical and Planetary Sciences	
	Taught recitations/labs for both lower-division and upper-division courses,	
	assisted with grading assignments/exams, and occasionally assisted in the	
	development of class materials (like Jupyter notebook labs).	
	Courses TA'd: ASTR 3730 (Astrophysics I), ASTR 1040 (Accelerated	
	Intro to Astronomy II), ASTR 2030 (Black Holes)	
09/2023 & 10/2025	Invited Guest Lecturer, CU Boulder Dept. of Astrophysical and	
	Planetary Sciences	
	Gave lectures on black holes for Prof. Jason Dexter's ASTR 2030 Black	
	Holes and Prof. Erica Nelson's ASTR 1200 Stars and Galaxies courses,	
	each with enrollment of >200 students	

### Selected Service and Outreach

01/2019 -	Volunteer Instructor, Idaho & Colorado Correctional Facilities Taught introductory programming classes, gave physics and astronomy demonstrations/lectures, and helped > 50 students obtain their GEDs.
01/2020 $-$	Open-source software contributor
,	Contributed to various open-source Julia and Python projects as well as
	distributing my own code in easily installable format.
	Top $\sim 2\%$ contributor on StackOverflow.
	Notable software releases:
	• BroadLineRegions.jl - A fast and flexible toolkit for modeling
	the broad-line region (BLR) in Julia.
	• BinnedStatistics.jl – An analogue to SciPy stat's
	binned_statistic benefitting from performance of native Julia.

12/2019 -@ThreeBodyBot, #scicomm Built automated Twitter/Mastodon/Tumblr/BlueSky/YouTube account that posts random three-body simulations  $\sim 1/\text{day}$ . Source code here. 06/2017 - 08/2020Park Astronomer, Bruneau Sand Dunes State Park Observatory Operated large telescopes to show visitors celestial objects and gave  $\sim 45$ minute public talks on astronomy topics. Interacted with >20,000 total visitors during employment. 08/2020 -Graduate mentor, CU Boulder (5 students) Mentored both undergraduate and incoming first-year graduate students on both research and academic topics. Graduate committee member, CU Boulder 08/2020 -Served on several department service committees with faculty and other graduate students, influencing departmental policies.

### References

Dr. Jason Dexter, University of Colorado Boulder—jason.dexter@colorado.edu

Dr. Keith Horne, University of St Andrews—kdh1@st-andrews.ac.uk

Dr. Erica Nelson, University of Colorado Boulder—erica.nelson@colorado.edu

Dr. Ric Davies, Max Planck Institute for Extraterrestrial Physics—davies@mpe.mpg.de