

Tatsuya Akiba

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Research Interests

My research focuses on the gravitational dynamics of bodies around compact objects. I study eccentric nuclear disks around supermassive black holes which form as a result of a gravitational recoil kick imparted on the central black hole. Using similar dynamics, I study the evolution of eccentric planetesimal disks following a white dwarf natal kick.

Education

Expected 2025	<i>Ph.D.</i> , Astrophysical and Planetary Sciences University of Colorado, Boulder Boulder, CO
2022	<i>M.S.</i> , Astrophysical and Planetary Sciences University of Colorado, Boulder Boulder, CO
2019	<i>B.S.</i> , Physics (Honors) & Mathematics (Honors), <i>Valedictorian</i> Truman State University Kirksville, MO

Honors and Awards

2024	Dissertation Completion Fellowship (CU Boulder)
2023	Carl Hansen Memorial Fellowship (CU Boulder)
2022	Chance Irick Cooke Fellowship (CU Boulder)
2021	Raynor L. Duncombe Student Research Prize (DDA) Award for Excellence in Teaching (CU Boulder)
2019	Outstanding Student in Physics (Truman State) President's List (Truman State)
2018	Dr. Lanny C. Morley Scholarship (Truman State) Dr. Robert and Harlene Bailey Scholarship (Truman State)
2017	Dr. Robert Peavler Memorial Scholarship (Truman State) Dr. Wray and Helen Rieger Scholarship (Truman State) Dr. Eugene W. Smith Memorial Scholarship (Truman State)

2017	Mr. and Mrs. Robert Lisle Walker Scholarship (Truman State)
	TruScholars Award (Truman State)
	Kappa Mu Epsilon (Mathematics Honor Society)
	Sigma Pi Sigma (Physics Honor Society)
	L. Scott and Carol D. Ellis Scholarship (Truman State)
2016	Duane and Donna Norman Hicks Scholarship (Truman State)
2015	President's Honorary Scholarship (Truman State)
	International Baccalaureate Scholarship (Truman State)

Publications

4. **Akiba** & Madigan (2023); ApJ, 958:137
Anisotropic Star Clusters Around Recoiling Supermassive Black Holes
3. **Akiba**, Dexter, et al. (2023); ApJ, 953:124
Reprocessing Models for the Optical Light Curves of Hypervariable Quasars from the Sloan Digital Sky Survey Reverberation Mapping Project
2. **Akiba** & Madigan (2021); ApJ Letters, 921:L12
On the Formation of an Eccentric Nuclear Disk following the Gravitational Recoil Kick of a Supermassive Black Hole
1. **Akiba**, Neugarten, Ortmann, & Gokhale (2019); JAAVSO, 47:2
Multi-filter Photometric Analysis of W Ursae Majoris (W UMa) Type Eclipsing Binary Stars KID 11405559 and V342 Boo

Submitted or In-Preparation:

3. **Akiba**, McIntyre, & Madigan (2024); Submitted to ApJ Letters
Tidal Disruption of Planetesimals in an Eccentric Disk Following a White Dwarf Natal Kick
2. **Akiba**, Naoz, & Madigan (2024); Manuscript in preparation
Evidence of a Past Intermediate-Mass Black Hole Merger in the Galactic Center
1. Bright, **Akiba**, & Madigan (2024); Submitted to ApJ Letters
Precessing Eccentric Stellar Disks

Invited* & Contributed Presentations

2024	*WCAPP White Dwarf Research Group (UT Austin)
2023	*Astrophysics Friday Lunch Seminar (CU Boulder) MODEST-23 (Northwestern), poster *Applied Math Dynamical Systems Seminar (CU Boulder)
2022	*Smadar Naoz Research Group (UCLA) AAS DDA 53 (Flatiron Institute) *AAS HEAD 19 (Pittsburgh, PA) *Colloquium (Truman State)
2021	Master's Thesis Defense (CU Boulder) AAS DDA 52 (Virtual)
2019	APS April Meeting 2019 (Denver, CO) Student Research Conference (Truman State) SPS Zone 12 Meeting (William Jewell College)
2018	Mathematics Capstone Talk (Truman State) 48th MARAC (University of Missouri, Kansas City) SPS Zone 12 Meeting (Truman State)
2017	Summer Research Symposium (Truman State)

Research Computing Allocations

2024 – 2025	Alpine Supercomputer 350k CPU hours
2021 – 2022	RMACC Summit Supercomputer 384k CPU hours

Mentoring Experience

[Undergraduate Students](#) and [High School Students](#) I mentored at CU Boulder.

2024 – Present	Kalvyn Adams Evolution of a Double Eccentric Disk and Tidal Disruptions
2023 – 2024	Tom Alexander Stellar Disk Evolution Following an Out-of-plane Recoil Kick
2021 – 2023	Selah McIntyre Stars Engulfing Planets
2020 – 2021	Allie Christensen Formation of Eccentric Disks from a Black Hole Companion

Teaching Experience

2024	Instructor for ASTR 2600: Scientific Computing (CU Boulder)
2023	Guest Lecturer for ASTR 3710: Planet Dynamics (CU Boulder)
2021 – 2023	Lead Graduate Student Fellow (CU Boulder)
2022	Graduate TA for ASTR 5720: Galaxies (CU Boulder)
2022	Guest Lecturer for ASTR 2030: Black Holes (CU Boulder)
2020	Graduate TA for ASTR 1010: Intro Astronomy (CU Boulder)
2019	Graduate TA for ASTR 3510: Astro Observations (CU Boulder)
2018 – 2019	STEP Scholars Program Academic Trainer (Truman State)
2017 – 2019	Upward Bound Coordinator & Academic Coach (Truman State)
2016 – 2019	Calculus & Physics Tutor (Truman State)
2016 – 2018	Astronomy Undergraduate TA (Truman State)
2017	Introductory Physics Grader (Truman State)
2015 – 2016	Summer School Math Instructor (KIST, Tokyo, Japan)

Community Service Experience

2024	Longmont Astronomical Society Public Lecture (Longmont, CO)
2023	Referee for ApJ Letters
2020 – 2023	Welcome/Social Committee (CU Boulder)
2021 – 2022	Admissions Committee (CU Boulder)
2021 – 2022	Graduate Peer Mentor (CU Boulder)
2020 – 2022	CU-Prime Mentor (CU Boulder)
2019 – 2021	Diversity, Equity, & Inclusion Committee (CU Boulder)
2019 – 2020	McNair Program Mentor (CU Boulder)
2019 – 2020	Graduate Curriculum and Concerns Committee (CU Boulder)
2019 – 2020	Observatory Committee (CU Boulder)
2019 – 2020	Observatory Open House Volunteer (CU Boulder)
2017 – 2019	President of Physics/Astronomy Clubs (Truman State)

Abbreviations

ApJ	The Astrophysical Journal
JAAVSO	The Journal of the American Association of Variable Star Observers
MODEST	Modeling and Observing Dense Stellar Systems
AAS	American Astronomical Society
DDA	Division on Dynamical Astronomy
HEAD	High Energy Astrophysics Division
APS	American Physical Society
MARAC	Mid-American Regional Astrophysics Conference
RMACC	The Rocky Mountain Advanced Computing Consortium
SPS	Society of Physics Students
STEP	STEM Talent Expansion Programs
KIST	K. International School Tokyo

March 15, 2024