Brandon Radzom

PhD Student · Astronomy

Indiana University, Department of Astronomy, 727 East 3rd Street, Swain West 324, Bloomington, IN 47405-7105, USA

+1 (763)-898-2847 | bradzom@iu.edu | https://brandonradzom.github.io/

Education

Indiana University (IU) - Bloomington *Bloomington, IN 47405-7000*

PhD Astronomy *Aug. 2020 - May 2025 (anticipated)*

- Minor: Scientific Computing
- Advisor: Dr. Songhu Wang
- Course highlights: Orbital Dynamics & Exoplanets, Numerical Analysis, Computational Physics

University of Wisconsin (UW) - Madison *Madison, WI 53706-1507*

B.S. Astronomy-Physics, B.S. Physics *Sept. 2016 - May 2020*

- Minor: Computer Sciences
- Distinctions: Thesis of Distinction Award, Lowell Doherty Award for Excellence in Astronomy
- Thesis title: *Characterizing AGN Activity in the SSA22 Field*
- Advisor: Dr. Amy Barger

Research Experience

Graduate Research Assistant, IU-Bloomington, Dept. of Astronomy *Bloomington, IN*

Post-disk Dynamical Evolution of Short-period Gas Giants in Multi-planet Systems *2021-2022*

- Demonstrated through N-body simulations that post-disk dynamical evolution of short-period gas giants in compact multi-planet systems can produce the companionship dichotomy observed between hot Jupiters and warm Jupiters. This formation and evolution paradigm allows short-period giants to emerge from the disk phase with several nearby super-Earth companions.
- Data: REBOUND (N-body)
- Advisor: Dr. Songhu Wang

Parameterization of Dynamical Stability in Hierarchical Non-EMS Planetary Systems With Application to *Kepler* Multis

- An applied computational investigation of hot Jupiters that emerge from the disk phase within multi-planet systems. I use N-body simulations of non-EMS multis containing a hot Jupiter to study analytic and empirical parameterizations of gravitational instability in systems with mass hierarchy.
- Data: REBOUND (N-body), *Kepler* (NASA Exoplanet Database)
- Advisor: Dr. Songhu Wang

Undergraduate Research Assistant, UW-Madison, Dept. of Astronomy *Madison, WI*

X-ray Sources in the SSA22 Field *2019-2022*

- Utilizing optical, IR, X-ray, and newly obtained (optical) spectroscopic data along with calculated photometric redshifts to construct 2-8 keV X-ray luminosity functions (LFs) over the range $z = 0.25 - 4$ for Active Galactic Nuclei (AGN) and other extragalactic objects in the Hawaii Deep Survey Field SSA22 in order to constrain AGN activity over cosmic time and cosmic variance. I published this work to ApJ (see Publications section) and included an updated source catalog for the field.
- Data: *Chandra*/ACIS X-ray, Subaru $BVRiz$, Subaru/HSC $Ugrizy$, Keck/DEIMOS optical spectroscopy, UKIRT J & K NIR, *Spitzer* IRAC IR
- Advisor: Dr. Amy Barger

Thesis of Distinction: "Characterizing AGN Activity in the SSA22 Field"

- Combined recently obtained optical spectroscopy with 2-8 keV X-ray data to construct the LF for AGNs, Broad-line AGNs, and other extragalactic sources from $z = 0.25 - 4$. Ran a comparison with leading X-ray LF models
- Data: *Chandra*/ACIS X-ray, Keck/DEIMOS optical spectroscopy
- Advisor: Dr. Amy Barger

Undergraduate Research Assistant, UW-Madison, Dept. of Physics *Madison, WI*

Development and Implementation of a Temperature Regulation System for an Atomic Trapping Chamber *2017-2020*

- Designed, built, tested, and implemented a PID-controlled temperature regulation system for an atomic trapping chamber used for quantum computation.
- Supervisors: Dr. Mark Saffman, Dr. Matt Ebert

Minimizing Polarization Drift in a Polarization Maintaining Optical Fiber With a Dispersive Measurement

- Devised, constructed, and documented a novel device and associated methodology for polarization alignment in birefringent optical fibers. Write-up is internal to laboratory.
- Supervisors: Dr. Mark Saffman, Dr. Matt Ebert

Skills & Competencies

Programming Languages

- Python, Unix/Linux shell, HTML, Java, C++, LabView

Software

- REBOUND (collisional N-body code), GADGET-2 (collisionless N-body code), git & GitHub, LaTeX, MATLAB, Mathematica, Maple, EAZY & LePHARE (photometric redshift codes)

Awards, Fellowships, & Grants

2020	**Thesis of Distinction**, UW-Madison College of Letters & Science	
	Lowell Doherty Award for Excellence in Astronomy, Dept. of Astronomy, UW-Madison	*$500*
	Member of the Dean's List, College of Letters & Science, UW-Madison	
2019	**Member of the Dean's List**, College of Letters & Science, UW-Madison	
	Liebenberg Family Undergraduate Research Scholarship, UW-Madison	*$ 2,000*
	David H. Durra Scholarship, UW-Madison	*$ 3,000*
2018	**John Karl Scholz Sophomore General Scholarship**, UW-Madison	*$ 500*
2017	**Member of the Dean's List**, College of Letters & Science, UW-Madison	
2016	**Memorial Scholarship**, Anoka High School	*$ 500*

Publications

Refereed

Brandon T. Radzom, Anthony J. Taylor, Amy J. Barger, Lennox L. Cowie 2022. *X-ray Sources in the Chandra Field SSA22*, ApJ, 940 114

Non-Refereed

Brandon T. Radzom 2020. *Characterizing AGN Activity in the SSA22 Field*, Senior thesis submitted to the UW-Madison Dept. of Astronomy

Conference Posters

Brandon T. Radzom, Songhu Wang, and Bonan Pu. "In Situ Origins of Hot Jupiters", 2022, Emerging Researchers in Exoplanet Science VII, 10.5281/zenodo.6944743

Brandon T. Radzom, Amy J. Barger, and Anthony J. Taylor. "Characterizing AGN Activity in the SSA22 Field", 2020, American Astronomical Society Meeting #236, id.137.03

Minho Kwon, Christopher Young, Matthew Ebert, Sebastian Malewicz, **Brandon Radzom**, Thad Walker, and Mark Saffman. "Progress toward entanglement of atomic ensemble qubits via Rydberg blockade", 2018, International Conference on Atomic Physics

Presentations

Invited Talks

In Situ Origins of Hot Jupiter Isolation. Great Lakes Exoplanet Area Meeting 2022, The Ohio State University.

The X-ray Luminosity Function of Optically Narrow and Broad-line AGNs Out To $z \sim 4$. Fall 2020 IU Astronomy Lunch Talk Series, Indiana University.

Teaching Experience

Associate Instructor, IU-Bloomington, Dept. of Astronomy

Astronomy 100: The Solar System (Spring 2023)

- Assisted in teaching an in-person 180-student course for non-majors that covers the components of our solar system, their origins, and exoplanets.
- Duties: Graded assignments, held weekly virtual office hours, developed course material, guest lectured

Astronomy 107: The Art of Astronomy (Spring 2023)

- Assisted in teaching an online 141-student course for non-majors covering the night sky, telescopes and cameras, light and color, and the science behind astronomical images.
- Duties: Graded assignments, held weekly virtual office hours

Astronomy 103: Search For Life In The Universe (Fall 2021)

- Assisted in teaching an in-person 178-student course for non-majors that explores the basics of astronomy and prospects for extraterrestrial life.
- Duties: Graded assignments, held weekly hybrid office hours, attended lectures

Astronomy 222: General Astronomy II (Spring 2021)

- Assisted in teaching an online 25-student course for majors that provides a quantitative introduction to stellar astrophysics, galaxy dynamics and observational and theoretical cosmology.
- Duties: Graded assignments, held weekly online office hours, attended lectures, proctored in-person exams

Astronomy 107: The Art of Astronomy (Fall 2020)

- Assisted in teaching an online 130-student course for non-majors covering the night sky, telescopes and cameras, light and color, and the science behind astronomical images.
- Duties: Graded assignments, facilitated online discussions, held weekly online office hours

Observational Experience

2019 **WIYN/Hydra Spectrograph**, Remote observing of the North Ecliptic Pole (two nights) *Madison, WI*

Outreach & Professional Development

Service and Outreach

2023	**International Day of Women and Girls in Science**, Astronomy demo facilitator	*Bloomington, IN*
2021-2022	**IU Science Fest**, Astronomy demo facilitator	*Bloomington, IN*
2021-2022	**Kirkwood Observatory Open Nights**, Telescope operator & tour guide	*Bloomington, IN*
2022	**Streets Paved With Gold**, JWST demo facilitator	*Bloomington, IN*
2022	**STEM Exploration Day**, JWST demo facilitator	*Indianapolis, IN*
2022-2023	**IU Astronomy Graduate Leadership**, Undergraduate Research Coordinator	
2021	**Indiana Master Naturalist Event**, Guest speaker, telescope operator	*Bloomington, IN*
2019-2020	**UW-Madison Astronomy Club**, Vice President	
2020	**Girl Scout Astronomy Night**, UW-Madison Astronomy Club volunteer	*Madison, WI*
2018-2019	**UW-Madison Astronomy Club**, Volunteer Coordinator	
2019	**Moon Over Monona Terrace**, UW-Madison Astronomy Club volunteer	*Madison, WI*
2019	**My UW Days**, UW-Madison Astronomy & Physics Dept. representative	*Madison, WI*
2019	**UW Space Place OAO-2 Anniversary Event**, Orbital Astronomical Observatory (OAO) guide	*Madison, WI*
2018	**UW STEM Immersion Day**, UW Astronomy/ Astronomy Club representative	*Madison, WI*
2017	**UW Space Place Family Science Night**, Physics and Astronomy demo leader	*Madison, WI*

Development

2022-2023: Python for Astronomers Crash Course and Workshop Series, Lead organizer for two novel event series hosted by graduate students covering various topics related to Python for IU undergraduates interested in astronomy or physics. Topics for both events include `anaconda` installation, `jupyter notebook`, logical operators, classes, functions, loops, I/O, plotting, integration, scientific packages (`numpy`, `astropy`, `scipy`), and more.

2022: Special "1-minute" Colloquium, Lead organizer for IU Astronomy's first-ever Special Colloquium session. The event brought together researchers at all levels in the department (undergraduate to faculty) to share their work with each other.

2021: Bring an Inclusive Mindset to Your Teaching, Participant in a 90-minute virtual workshop discussing data-driven techniques to make your classroom more inclusive to all, especially members of minoritized groups.

Professional Memberships

American Astronomical Society (2020-2023)