Brooke Kotten

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Education

University of Michigan *August 2024-Present*
PhD, Astronomy, expected 2029 *Ann Arbor, MI*

University of Wisconsin-Madison *September 2021-May 2024*
B.S., Astronomy-Physics (Honors) and Physics, 3.843/4.000 *Madison, WI*

Saint Cloud State University *August 2019-May 2021*
A.A., Liberal Arts, *summa cum laude*, 4.00/4.00 *Saint Cloud, MN*
Concurrent with high school diploma

Research Experience

Graduate Student at the University of Michigan *August 2024-Present*
with Dr. Mary Anne Limbach (UMich)
Searching for transiting exosatellites in JWST time series observations of substellar worlds and investigating the detectability of exo-Ios.

Lamat REU & UW-Madison Senior Honors Thesis *June 2023-Present*
with Professor Melinda Soares-Furtado (UW-Madison) and Professor Enrico Ramirez-Ruiz (UCSC)
Measured lithium abundance of a planetary engulfment companion and curated control sample to compare to.

Bolder Solar Alliance REU & Student Researcher at CIRES *May 2022-June 2023*
with Dr. Courtney Peck and Dr. Janet Machol (CIRES/NOAA/NCEI)
Implemented Monte Carlo methods in IDL and Python to optimize location calculation parameters. Improved GOES-R's X-Ray Sensor (XRS) location algorithm to correct for near-simultaneous, double, solar flares in real-time. My location correction method is used operationally to improve real-time flare locations.

Undergraduate Research Scholars Program *October 2021-May 2022*
with Dr. Ralf Kotulla (UW-Madison)
Investigated star formation on the outskirts of spiral galaxies.

Publications

Kotten, B., Soares-Furtado, M., Yarza, R., Nine, A. C., et al. (2025). Evaluating the Lithium Abundance of a Subgiant Star with a Brown Dwarf Companion: A Planetary Engulfment Candidate. *(Submitted)*

Limbach, M.A., Dacus, B., **Kotten, B.**, et al. (2025). Exomoons and Exorings with the Habitable Worlds Observatory II: Finding 'Endor' with Lunar Eclipses. *(Submitted to AAS Journals)*

Householder, A., Limbach, M. A., Biller, B., **Kotten, B.**, et al.(2025). Sensitivity to Sub-Io-sized Exosatellite Transits in the MIRI LRS Lightcurve of the Nearest Substellar Worlds. *(Accepted to ApJL)*

Wilson, M. J., Limbach, M. A., Skemer, A. J., et al. **incl. Kotten, B.** (2025). A Deep Search for Exomoons Around WISE 0855 With JWST. *(Submitted to AAS Journals)*

Schulte, J., Rodriguez, J. E., Latham, D. W., Sheilds, J. V., Vowell, N., Soares-Furtado, M., **Kotten, B.**, et al. (2025). Migration and Evolution of giant ExoPlanets (MEEP) II: Super-Jupiters and Lithium-rich Host Stars. *(Accepted to MNRAS)*

Vowell, N., Rodriguez, J. E., Latham, D. W., Quinn, S. N., Schulte, J., et al. **incl. Kotten, B.** (2025). Eleven New Transiting Brown Dwarfs and Very-low-mass Stars from TESS. *The Astronomical Journal, 170*(2), 68. doi:10.3847/1538-3881/addd17

Science Presentations

July 2025 **OWL Exoplanet Summer Program, Santa Cruz, CA**
"The Detectability of Volcanic Exo-Ios that Fuel Auroras on Super Jupiters" -Talk

June 2024 **244th American Astronomical Society Summer Meeting, Madison, WI**
"Chemical Abundance Tracers in a Planetary Engulfment Candidate" –Poster

Apr 2024 **UW-Madison Undergraduate Symposium, Madison, WI**
"Measuring the Milky Way's Rotation Curve" –Group Poster with ASTRON 465

Jan 2024 **243rd American Astronomical Society Winter Meeting, New Orleans, LA**
"Chemical Abundance Tracers in a Planetary Engulfment Candidate" –Poster
Dec 2023 **UW-Madison Astronomy Club Symposium, Madison, WI**
"Chemical Abundance Tracers in a Planetary Engulfment Candidate" –Talk
Aug 2023 **Lamat REU Final Presentations 2023, Santa Cruz, CA**
"Chemical Abundance Tracers in a Planetary Engulfment Candidate" –Talk
Apr 2023 **UW-Madison Undergraduate Symposium, Madison, WI**
"Real-Time GOES-R XRS Solar Flare Location Data Product" –Talk
Apr 2023 **Space Weather Workshop, Boulder, CO**
"Real-Time GOES-R XRS Solar Flare Location Data Product" –Poster
Dec 2022 **UW-Madison Astronomy Club Symposium, Madison, WI**
"Correcting for Double Solar Flares in the Real-Time GOES-R XRS Location Product" –Talk
July 2022 **Boulder Solar Alliance REU Final Presentations 2022, Boulder, CO**
"Improved Accuracy of the Real-Time GOES-R XRS Solar Flare Location Data Product"– Talk and Poster
Apr 2022 **UW-Madison Undergraduate Symposium, Madison, WI**
"Determining Where and Why Galaxies Form New Stars in their Outskirts"– Talk

Awards

2025 **Precandidate Rackham Graduate Student Research Grant** ($1,500), University of Michigan
2024 **Chambliss Undergraduate Poster Honorable Mention**, American Astronomical Society
2024 **Graduate Research Fellowship Program** ($111,000), National Science Foundation
2024 **Lowell Doherty Award for Excellence in Astronomy** ($500), UW-Madison Department of Astronomy
2024 **Undergraduate Scholarship** ($3,000), NASA Wisconsin Space Grant Consortium
2024 **FAMOUS Travel Grant** ($1,000), American Astronomical Society
2023 **Bromley Conference Travel Award** ($500), UW-Madison L&S Honors Program
2023 **Dr. Maritza Irene Stapanian Crabtree Undergraduate Award** ($3,000), UW-Madison
2023 **Best General Radio News Story**, Wisconsin Broadcasters Assoc.
2023 **Lamat Fellowship** ($4,500), University of California Santa Cruz
2021-2023 **Dean's List x3**, UW-Madison
2022 **William F. Vilas Scholarship** ($500), UW-Madison
2021-2022 **Undergraduate Research Scholars**, UW-Madison
2019-2021 **Dean's List x4**, Saint Cloud State University

Computer Skills

Languages: Python, IDL, MatLab
Software: TopCat, SAO DS9, Git

Projects:

GOES-R XRS Flare Location Parameter Algorithm *May 2022-June 2023*
Lead Developer and Maintainer
Improves the XRS flare location calculation algorithm with a Monte Carlo routine that optimizes the geometric factors in the algorithm via comparisons with locations determined using Solar Dynamics Observatory Atmospheric Imaging Assembly. Due to export control this project is not publicly available at this time. Data and ReadMe available at `https://www.ngdc.noaa.gov/stp/satellite/goes-r.html`

Brown Dwarf Visualizer *August 2025*
Co-Lead Developer
Created and released small package to plot brown dwarfs in an interactive plotting space during 2025 Code Astro program. See `https://github.com/astrojorge/BDViz`

Teaching

UW-Madison Physics Learning Center, Peer Mentor Tutor *September 2023-May 2024*
Group-based active learning for Physics 103, 104, 207, and 208

Other Presentations

Oct 2025 **University of Michigan, Ann Arbor, MI**
NSF Graduate Research Fellowships Program Q&A –Invited Panelist
May 2024 **Astronomy on Tap, Madison, WI**
Dancing Lights: Exploring Auroras from Earth to Exoplanets
Nov 2023 **Astronomy Club, Madison, WI**
Research Experience for Undergraduates and Internships Panel – Panelist
July 2023 **Badger Talks Live, Madison, WI**
Devoured Worlds: Lessons From Planet-Ingesting Stars –Invited introduction
Mar 2023 **WSUM News *On Wisconsin* Podcast, Madison, WI**
On Wisconsin podcast E20: Women in STEM interview –Invited speaker
Dec 2022 **Astronomy Club, Madison, WI**
Research Experience for Undergraduates Panel – Panelist

Observations

JWST Cycle 4 Program 8155, *Storms are Brewing in the ONC: Variability Monitoring of 50 Substellar Worlds* (43.3 hrs, PI Limbach; Co-I Kotten)

UW-Madison Pine Bluff 2.3 Meter Small Radio Telescope (ASTRON 465, 3 labs)

Peter Livingston Optical 16 inch Telescope (ASTRON 465, 2 labs)

Activities & Outreach

Astronomy on Tap Ann Arbor, Lead Organizer *July 2025-Present*
University of Michigan Museum of Natural History, Planetarium Operator *September 2024-Present*
UW-Madison Astronomy Department, Undergraduate Representative *Februrary 2023-May 2024*
Faculty Honors Committee, Student Representative *September 2022-May 2024*
WSUM Student Radio News Team, Science Desk *February 2022-February 2024*
UW-Madison Astronomy Club, Member *September 2021-May 2024*