

Brenna Mockler

The Observatories of the Carnegie Institution for Science

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Education

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

Ph.D, Astronomy & Astrophysics

June 2022

M.Sc., Astronomy & Astrophysics

December 2018

CORNELL UNIVERSITY

B.A. Physics and College Scholar

May 2016

Research Appointments

Carnegie Theoretical Astrophysics Center Postdoctoral Research Fellow

2023 - present

UCLA Chancellor's Postdoctoral Research Fellow

2022

Selected Awards & Fellowships

HEAD Dissertation Prize Honorable Mention

2023

AAUW American Dissertation Fellowship

2021-2022

UC Santa Cruz President's Dissertation Year Fellowship

2021-2022

Denice Denton Excellence in Research Award

2021

NSF Graduate Research Fellowship Honorable Mention

2018

UC Santa Cruz Astronomy Award for Excellence in Mentoring

2017-2018

UC Santa Cruz Chancellor's Fellowship

2016 - 2017

UC Santa Cruz Regents' Fellowship

2016 - 2017

Member of Mortar Board Der Hexenkreis Senior Honor Society

2016 - present

Research Grants (PI)

NASA Swift Cycle 17 Guest Investigator Grant

2021-2022

Seminar & Conference Presentations

Summary: 35 presentations (16 invited, 12 contributed, 7 other)

INVITED

UC Davis Cosmology and Astronomy Seminar

2024

'Exploring galactic nuclei with tidal disruption events'

Tidal Disruption Events and Nuclear Transients: Entering the Data-Rich Era (Crete)

2024

'TDE light curves from emission to observations'

Rise_Time 2024 (Purdue)

2024

'Exploring galactic nuclei with tidal disruption events'

Anticipating the Rising Tide of TDEs: Theory and Observations (KITP blackboard talk)

2024

'Lighting up Supermassive Black Holes with TDEs'

HEAD Dissertation Prize talk <i>‘Exploring galactic nuclei with tidal disruption events’</i>	2024
UC Berkeley TAC Seminar <i>‘TDEs as probes of SMBH binaries & stellar populations in galactic nuclei’</i>	2024
Monash University Colloquium <i>‘Exploring galactic nuclei with tidal disruption events’</i>	2024
Loss Cones in Como – review talk <i>‘TDEs: theory and observations’</i>	2024
Flares and Bursts in Galactic Nuclei – IAS workshop <i>‘Finding hidden massive black hole binaries and repeated TDEs with the eccentric Kozai-Lidov mechanism’</i>	2023
Institute for Advanced Study Seminar <i>‘Exploring galactic nuclei with tidal disruption events’</i>	2023
19th High Energy Astrophysics Division meeting <i>‘Exploring galactic nuclei with tidal disruption events’</i>	2022
Caltech TAPIR seminar <i>‘Exploring galactic nuclei with tidal disruption events’</i>	2021
University of Melbourne Colloquium <i>‘Exploring galactic nuclei with tidal disruption events’</i>	2021
TDEs in the Golden Age of Time Domain Astronomy – 235th AAS Meeting <i>‘Weighing Black Holes with Tidal Disruption Events’</i>	2020
University of Nova Gorica Colloquium <i>‘Weighing Black Holes with Tidal Disruption Events’</i>	2019
DARK Institute for Cosmology <i>‘The future of Black Hole population studies’</i>	2018
CONTRIBUTED	
Intermediate-Mass Black Holes: The Dawn of A Revolutionary Era (CIERA) <i>‘Finding hidden massive black hole binaries with TDEs and the eccentric Kozai-Lidov mechanism’</i>	2023
IMBHs: New Science from Stellar Evolution to Cosmology <i>‘TDEs from IMBHs in binary systems’</i>	2022
EAS 2021 <i>‘Probing the stellar populations around supermassive black holes with tidal disruption events’</i>	2021
Supermassive Black Holes (originally in Pucon, Chile) <i>‘Tidal Disruption Events’</i> , watch here .	2020
Chandra Frontiers in Time-Domain Science <i>‘An Energy Inventory of Tidal Disruption Events’</i>	2020
Tidal Disruptions in Kyoto <i>‘An Energy Inventory of Tidal Disruption Events’</i>	2020

Hot-Wiring the Transient Universe VI <i>'Tidal Disruption Events with LSST'</i>	2019
2019 Spring Symposium – The Deaths & Afterlives of Stars (poster) <i>'Weighing Black Holes with Tidal Disruption Events'</i>	2019
17th Meeting of the AAS High Energy Astrophysics Division <i>'Weighing Black Holes with Tidal Disruption Events'</i>	2019
Aspen Winter Conference: Using TDEs to study super-massive black holes <i>'Weighing Black Holes with MOSFiT'</i>	2018
TDE17: Piercing the sphere of influence <i>'Weighing Black Holes with MOSFiT'</i>	2017
Deciphering the violent universe <i>'Weighing Black Holes with MOSFiT'</i>	2017
OTHER	
Penn State lunch talk <i>'Exploring galactic nuclei with tidal disruption events'</i>	2022
Carnegie Observatories lunch talk <i>'Exploring galactic nuclei with tidal disruption events'</i>	2022
UC Berkeley TAC seminar <i>'Exploring galactic nuclei with tidal disruption events'</i>	2022
Northwestern CIERA Science Happy Hour <i>'Exploring galactic nuclei with tidal disruption events'</i>	2021
MIT Astrophysics Brown Bag lunch talk <i>'Exploring galactic nuclei with tidal disruption events'</i>	2021
University of Colorado CASA/JILA lunch seminar <i>'Exploring galactic nuclei with tidal disruption events'</i>	2021
UC Santa Cruz FLASH <i>'Weighing Black Holes with MOSFiT'</i>	2018

Mentoring & Advising

Research Mentor - UCLA & Carnegie Observatories 2020 - current
I am one of the primary research mentors for a UCLA Ph.D. student (Denyz Melchor). We recently published two papers together.

Lamat REU program - UC Santa Cruz 2020 - 2022
Project advisor
I was the primary advisor for an REU student (Angela Twum, current Ph.D. student at UC Santa Cruz). Our work together led to a published paper.

Thesis advisor - UC Santa Cruz 2016 - 2020
Primary advisor to undergraduate student (Michael Miller, B.S. UC Santa Cruz, 2020). Thesis project: "The phase space of astronomical transients".

AY9: Introduction to Research in Astronomy - UC Santa Cruz

2016 - 2017

Project advisor

As part of an intro to research class aimed at students from under-resourced and minority backgrounds, I volunteered to lead a group of students in an original research project which they presented to the department at the end of the year.

Women in Physics and Astronomy Group - UC Santa Cruz

2016 - 2022

Mentor

General academic mentor to undergraduate students through WiPA program. This has included editing students' applications, connecting students with potential research advisors, and supporting students as they seek mental health care.

Outreach Activities

Carnegie CASSI Program - Carnegie Observatories

2023 - current

Workshop Leader, Mentor

The Carnegie CASSI program provides summer research opportunities for undergraduate students from local California schools. I lead workshops for the program and mentor summer students.

Lamat REU Program - UC Santa Cruz

2020 - 2022

Workshop Leader

The Lamat REU program is focused on increasing the retention of diverse students in astronomy and planetary science, and recruits from local community colleges. I lead workshops for the program on research methods in astrophysics, aimed at students who are learning to code in Python.

Astro on Tap, Science on Tap - Santa Cruz

2020 - 2022

I give public, informal public talks on my research (watch example [here](#)).

Women in Physics & Astronomy Group - UC Santa Cruz

2016 - 2022

Talk Chair

As a chair of the WiPA group at UCSC, I organize outreach and community building events. In particular, I organize and lead discussions with visiting scientists (focusing on women and people of color) and UCSC undergraduate and graduate students on life in academia, common challenges faced, and advice for students.

Undergraduate Women in Physics Group - Cornell University

2015 - 2016

Founder and Leader of UWIP at Cornell

I organized and applied for funding for community building activities for women in physics at Cornell with the goal of increasing retention rates in the undergraduate physics program.

Publications

Summary: 26 published, 1 in press (4 second author, 5 first author)

Gibson, C., et al. inc. **Mockler, B.**, 2024, [accepted to ApJ](#)

Formation of Stripped Stars From Stellar Collisions in Galactic Nuclei

Mockler, B., et al. 2024, [ApJL](#), 973, 9

Tidal Disruption Events from Stripped Stars

Xiang, X., et al. inc. **Mockler, B.**, 2024, [ApJ](#), 972, 1

Investigating the Mass of the Black Hole and Possible Wind Outflow of the Accretion Disk in the Tidal

Disruption Event AT2021ehb

Melchor, D., **Mockler, B.**, et al. 2024, [ApJ](#), 960, 39

Tidal Disruption Events from the Combined Effects of Two-Body Relaxation and the Eccentric Kozai-Lidov Mechanism

Mockler, B., et al. 2023, [ApJ](#), 959, 18

Uncovering Hidden Massive Black Hole Companions with Tidal Disruption Events

Miller, J., **Mockler, B.**, et al. 2023, [ApJL](#), 953, 2

Evidence of a Massive Stellar Disruption in the X-Ray Spectrum of ASASSN-14li

Kremer, K., **Mockler B.**, et al. 2023, [MNRAS](#), 524, 4

Wind-reprocessed transients from stellar-mass black hole Tidal Disruption Events

Wiseman, P., et al. inc. **Mockler, B.**, 2023, [MNRAS](#), 522, 3

Multiwavelength observations of the extraordinary accretion event AT2021lwx

Angus, C.R., et al. inc. **Mockler, B.**, 2023, [Nature Astronomy](#), 6, 1452

A fast-rising tidal disruption event from a candidate intermediate-mass black hole

Liu, C., **Mockler, B.**, et al., 2022, [ApJ](#), 944, 184

Tidal disruption events from eccentric orbits and lessons learned from the noteworthy ASASSN-14ko

Nicholl, M., et al. inc. **Mockler, B.**, 2022, [MNRAS](#), 515, 4

Systematic light curve modelling of TDEs: statistical differences between the spectroscopic classes

Naoz, S., et al. inc. **Mockler, B.**, 2022, [ApJ](#), 927, 18

The Combined Effects of Two-body Relaxation Processes and the Eccentric Kozai-Lidov Mechanism on the Extreme-mass-ratio Inspirals Rate

Mockler, B., et al. 2022, [ApJ](#), 924, 70

Evidence for the preferential disruption of moderately massive stars by supermassive black holes

Gagliano, A., et al. inc. **Mockler, B.**, 2021, accepted to [ApJ](#), [ApJ](#), 924, 55

An Early-Time Optical and Ultraviolet Excess in the type-Ic SN 2020oi

Hung, T., et al. inc. **Mockler, B.**, 2021, [ApJ](#), 917, 9

Discovery of a Fast Iron Low-ionization Outflow in the Early Evolution of the Nearby Tidal Disruption Event AT2019qiz

Jones, D.O., et al. inc. **Mockler, B.**, 2021, [ApJ](#), 908, 143

The Young Supernova Experiment: Survey Goals, Overview, and Operations

Mockler, B. & Ramirez-Ruiz, E., 2021, [ApJ](#), 906, 101

An Energy Inventory of Tidal Disruption Events

Roth, N., et al. inc. **Mockler, B.**, 2020, [Space Sci. Rev.](#), 216, 114

Radiative Emission Mechanisms of Tidal Disruption Events

Law-Smith, J. A. P., et al. inc. **Mockler, B.**, 2020, [ApJ](#), 905, 141

Stellar TDEs with Abundances and Realistic Structures (STARS): Library of Fallback Rates

Hung, T., et al. inc. **Mockler, B.**, 2020, [ApJ](#), 903, 31

Double-peaked Balmer Emission Indicating Prompt Accretion Disk Formation in an X-Ray Faint Tidal Disruption Event

- Holoien, T.W.-S., et al. inc. **Mockler, B.**, 2020, [ApJ](#), 898, 161
The Rise and Fall of ASASSN-18pg: Following a TDE from Early To Late Times
- Leloudas, G., et al. inc. **Mockler, B.**, 2019, [ApJ](#), 887, 218
The spectral evolution of AT 2018dyb and the presence of metal lines in tidal disruption events
- Mockler, B.**, Guillochon, J., & Ramirez-Ruiz, E., 2019, [ApJ](#), 872, 151
Weighing Black Holes with Tidal Disruption Events
- Ascenzi, S., et al. inc. **Mockler, B.**, 2019, [MNRAS](#), 486, 672
A luminosity distribution for kilonovae based on short gamma-ray burst afterglows
- Perley, D., et al. inc. **Mockler, B.**, 2019, [MNRAS](#), 484, 1031
The fast, luminous ultraviolet transient AT2018cow: extreme supernova, or disruption of a star by an intermediate-mass black hole?
- Guillochon, J., et al. inc. **Mockler, B.**, 2018, [ApJS](#), 236, 6
MOSFiT: Modular Open-Source Fitter for Transients
- Gallardo, P. A. et al. inc. **Mockler, B.**, 2017, [Appl. Opt.](#) 56, 2796
Deep reactive ion etched anti-reflection coatings for sub-millimeter silicon optics