

Allison (Allie) M. McCarthy

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Education

Boston University	Ph.D. Candidate in Astronomy	2020 – Present
Advisor: Dr. P. Muirhead	M.A. Astronomy	Jan. 2024
The University of Alabama	B.S. in Physics, Concentration: Astrophysics	2016 – 2020
	Minors: Aerospace Engineering, Math, Randall Research Scholars Program	GPA: 4.0

Research Appointments

Boston University	Ph.D. Candidate	2020-Present
Advisor: Dr. P. Muirhead	Studying the physical mechanisms driving L and T dwarf variability.	
The University of Alabama	Undergraduate Research Assistant	2017 – 2020
Advisor: Dr. J. Bailin	Studied the evolution of Milky-Way like galaxies using the MUGS simulations.	
The American Museum of Natural History	REU Summer Intern	2019
Advisors: Dr. J. Vos, Dr. J. Faherty, Professor K. Cruz	Studied the variability of brown dwarfs and low mass stars using K2 to independently verify the rotation rate of two different sub-stellar objects as well as the evolution of their light curves.	
Green Bank Observatory	REU Summer Intern	2018
Advisor: Dr. A. Seymour	Studied FRB 110523 using archival Arecibo telescope data to determine if it is a repeating fast radio burst.	

Honors and Awards

Boston University	NSF Graduate Research Fellowship	2021
Boston University	Clare Boothe Luce Fellowship	2020
	2 year fellowship with additional stipend	
The University of Alabama	Randall Research Scholars Senior Leadership Award	2020
American Astronomical Society	Chambliss Astronomy Achievement Student Award	2020
	Recognizes exemplary research by an undergraduate student	
The University of Alabama	Randall Research Scholars Outstanding Junior	2019
The University of Alabama	Goldwater Scholarship Nominee	2019
The University of Alabama	Randall Research Scholars Outstanding Sophomore	2018
The University of Alabama	Presidential Scholarship	2016
	8 semester full tuition scholarship with additional stipend	

Awarded Grants

AAS International Travel Grant	“JWST Weather Report from an Isolated World: Decoding the Causes of Variability on SIMP0136” \$1,200 to travel to present at the Exoplanets 5 Conference	2024
Boston University GRUF	“Color Modulation of Variable L and T dwarfs” \$6,000 to support travel to the Perkins Telescope Observatory	2023

First* and Co-Authored Publications

*The JWST Weather Report from the Isolated Exoplanet Analog SIMP 0136+0933:

Pressure-Dependent Variability Driven by Multiple Mechanisms

McCarthy, Allison M.; Vos, Johanna M.; Muirhead, Philip S.; Biller, Beth A.; Morley, Caroline V.; Faherty, Jacqueline; Burningham, Ben; Calamari, Emily; Cowan, Nicolas B.; Cruz, Kelle L; Gonzales, Eileen; Limbach, Mary Anne; Liu Pengyu; Nasedkin, Evert; Suárez, Genaro; Tan, Xianyu; O’Toole, Cian; Visscher, Channon; Whiteford, Niall; Zhou, Yifan

The Astrophysical Journal Letters, in review 2024

The JWST weather report from the nearest brown dwarfs I: multiperiod JWST NIRSpec + MIRI monitoring of the benchmark binary brown dwarf WISE 1049AB

Biller, Beth A.; Vos, Johanna M.; Zhou, Yifan; **McCarthy, Allison M.**; Tan, Xianyu; Crossfield, Ian J. M.; Whiteford, Niall; Suarez, Genaro; Faherty, Jacqueline; Manjavacas, Elena; Chen, Xueqing; Liu, Pengyu; Sutlief, Ben J.; Limbach, Mary Anne; Molliere, Paul; Dupuy, Trent J.; Oliveros-Gomez, Natalia; Muirhead, Philip S.; Henning, Thomas; Mace, Gregory; Crouzet, Nicolas; Karalidi, Theodora; Morley, Caroline V.; Tremblin, Pascal; Kataria, Tiffany

Monthly Notices of the Royal Astronomical Society, Volume 532, 2207 2024

*Multiple Patchy Cloud Layers in the Planetary Mass Object SIMP0136+0933

McCarthy, Allison M.; Muirhead, Philip S.; Tamburo, Patrick; Vos, Johanna M.; Morley, Caroline V.; Faherty, Jacqueline; Bardalez Gagliuffi, Daniella C.; Agol, Eric; Theissen, Christopher

The Astrophysical Journal, Vol. 965, 83 2024

The Perkins Infrared Exosatellite Survey (PINES). II. Transit Candidates and Implications for Planet Occurrence around L and T Dwarfs

Tamburo, Patrick; Muirhead, Philip S.; **McCarthy, Allison M.**; Hart, Murdock; Vos, Johanna M.; Agol, Eric; Theissen, Christopher; Gracia, David; Bardalez Gagliuffi, Daniella C.; Faherty, Jacqueline

The Astronomical Journal, Vol. 164, 252 2022

The Perkins Infrared Exosatellite Survey (PINES) I. Survey Overview, Reduction Pipeline, and Early Results

Tamburo, Patrick; Muirhead, Philip S.; **McCarthy, Allison M.**; Hart, Murdock; Gracia, David; Vos, Johanna M.; Bardalez Gagliuffi, Daniella C.; Faherty, Jacqueline; Theissen, Christopher; Agol, Eric; Skinner, Julie N.; Sagar, Sheila

The Astronomical Journal, Vol. 163, 253 2022

Conference Abstracts

The JWST Weather Report from the Isolated Exoplanet Analog SIMP 0136+0933:

Pressure-Dependent Variability Driven by Multiple Mechanisms

McCarthy, Allison M.; Vos, Johanna M.; Muirhead, Philip S.; Biller, Beth A.; Morley, Caroline V.; Faherty, Jacqueline; Burningham, Ben; Calamari, Emily; Cowan, Nicolas B.; Cruz, Kelle L; Gonzales, Eileen; Limbach, Mary Anne; Liu Pengyu; Nasedkin, Evert; Suárez, Genaro; Tan, Xianyu; O'Toole, Cian; Visscher, Channon; Whiteford, Niall; Zhou, Yifan

Exoplanets 5 Conference

2024

Multiple Patchy Cloud Layers in the Planetary Mass Object SIMP0136+0933

McCarthy, Allison M.; Muirhead, Philip S.; Tamburo, Patrick; Vos, Johanna M.; Morley, Caroline V.; Faherty, Jacqueline; Bardalez Gagliuffi, Daniella C.; Agol, Eric; Theissen, Christopher

Extreme Solar Systems V (ExSSV) Conference

2024

Modeling the Surface Features of SIMP 0136

McCarthy, Allison M.; Muirhead, Philip S.; Tamburo, Patrick; Vos, Johanna M.; Hart, Murdock; Garcia, David; Bardalez Gagliuffi, Daniella C.; Faherty, Jacqueline; Theissen, Christopher; Agol, Eric

The 21st Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun (CS21)

2022

Brown Dwarf Variability in the Optical: Results from K2 and TESS

McCarthy, A., & Vos, J.

American Astronomical Society Meeting Abstracts, Vol. 235, American Astronomical Society Meeting Abstracts #235, 274.05.

2020

The Search for a Repeating Fast Radio Burst

McCarthy, A. M.

American Astronomical Society Meeting Abstracts, Vol. 233, American Astronomical Society Meeting Abstracts #233, 347.05

2019

Presentations and Invited Talks*

The JWST Weather Report from the Isolated Exoplanet Analog SIMP 0136+0933:

Pressure-Dependent Variability Driven by Multiple Mechanisms

*Exoplanet Seminar, *University of Michigan*

Nov. 2024

*Lunch Seminar, *Massachusetts Institute of Technology*

Oct. 2024

*PLUNCH Seminar, *University of California at Santa Cruz*

Oct. 2024

Contributed Talk, *22nd Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun*

June 2024

Poster, *Exoplanets 5 Conference*

June 2024

Multiple Patchy Cloud Layers in the Planetary-Mass Object SIMP 0136+0933

Poster, <i>Extreme Solar Systems V</i>	Mar. 2024
*Astronomy Colloquium, <i>Tufts University</i>	Oct. 2023
*Exoplanet Lunch Seminar, <i>Center for Astrophysics Harvard & Smithsonian</i>	Mar. 2023

Brown Dwarfs: Spanning the Gap from the Largest of Planets to the Smallest of Stars

*Lunch Seminar Series, <i>IPG Photonics, Marlborough, MA</i>	Nov. 2022
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Modeling the Surface Features of SIMP 0136

Poster, <i>21st Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun</i>	July 2022
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Brown Dwarf Variability in the Optical: Results from K2 and TESS

Poster, <i>235th meeting of the American Astronomical Society</i>	Jan. 2020
REU Presentation, <i>American Museum of Natural History</i>	Aug. 2019

Selected Telescope Time

Perkins Telescope <i>Flagstaff, AZ</i>	7 nights, PI	Feb. 2024
	7 nights, PI	Nov. 2023
	7 nights, PI	Oct. 2022
	7 nights, PI	June 2022
	7 nights, PI	May 2022
	170 nights, Co-I	July 2020- Mar. 2022
Lowell Discovery Telescope <i>Happy Jack, AZ</i>	5 nights, PI	Oct. 2022

Research Advising* and Mentoring

Madison VanWyngarden	Boston University → Fulbright at UToronto → Graduate School	2022–Present
Zhavia Lovell*	National Technical Institute for the Deaf → Applying to graduate school	2022– 2023
Bhargavi Thackar	Boston University → Ph.D. at Georgia Institute of Technology	2021-2022
Rowan Batts	The University of Alabama → Ph.D. at University of Connecticut	2018-2020
Kelsey Johnson	The University of Alabama → Propulsion Flight Test Engineer at Lockheed Martin	2017-2020
Hannah Slater	The University of Alabama → Ph.D. at Vanderbilt University	2017-2020

Outreach

Boston University <i>Boston, MA</i>	Science Train Answer astronomy questions aboard the Boston subway system!	June 2023-Present
Boston University <i>Boston, MA</i>	Astro365 Make astronomy accessible to low-income high school students	Sep. 2022-Present
Boston University <i>Boston, MA</i>	Boston University Public Open Night Weekly event to observe the night sky using 8 inch telescopes	Sep. 2020-Present
YouTube and TikTok	“Al the Science Gal” Astronomy and outreach style content	May 2020 - Present
NTID <i>Rochester, NY</i>	Solar Eclipse Viewing Party Answer questions NTID students had about the solar eclipse.	April 2024
H.H. Wells Middle School <i>Brewster, NY</i>	Women in Science Week Speaker Spoke with 7th and 8th grade classes about careers in astronomy	Feb. 2021
The University of Alabama <i>Tuscaloosa, AL</i>	“Spooky Lab”- Haunting at the Museum “Spooky” physics and astronomy related outreach projects	Oct. 2019
The University of Alabama <i>Tuscaloosa, AL</i>	Local Organizing Committee Conference for Undergraduate Women in Physics	Jan. 2018- Jan. 2019

Teaching Experience

The University of Alabama <i>Learning Assistant</i>	PH 101: General Physics I	Spring 2019
	PH 106: General Physics w/Calculus II	Fall 2018
	PH 105: General Physics w/Calculus I	Spring 2018
The University of Alabama <i>Teaching Assistant</i>	AEM 201: Statics	Fall 2018

Professional Service

Boston University <i>Boston, MA</i>	Inclusive Astronomy A group founded to address issues of inclusivity within Astronomy including outreach & DEI efforts, and an affinity group	Sep. 2022-Present
Boston University <i>Boston, MA</i>	Boston University Astronomy Graduate Student Representative	July 2021-July 2023

Professional Memberships

American Astronomical Society Student Member

Jan. 2020 – Present