

# Ray Garner

CWRU ASTRONOMY GRADUATE STUDENT

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## Education

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### Case Western Reserve University

Cleveland, OH

PH.D. IN ASTRONOMY

Aug 2018 – Aug 2023 (Expected)

- Thesis title: “Investigating the Galactic Evolution of M101 with Narrowband Imaging”
- Committee: J. Christopher Mihos (Chair), Paul Harding, Steve A. Hauck, Bill Janesh, Stacy S. McGaugh
- Involves investigating the star formation, nebular abundance, and stellar populations of M101.

### Furman University

Greenville, SC

B.S. IN PHYSICS

Aug 2014 – May 2018

## Research Publications

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5. *Deep Narrowband Photometry of the M101 Group: Strong-Line Abundances of 720 H II Regions*, **Ray Garner**, J. Christopher Mihos, Paul Harding, Aaron E. Watkins, & Stacy S. McGaugh, *The Astrophysical Journal*, 491, 182, 2022
4. *Determining the Timescale over Which Stellar Feedback Drives Turbulence in the Interstellar Medium: A Study of Four Nearby Dwarf Irregular Galaxies*, Laura Congreve Hunter, Liese van Zee, Kristen B. W. McQuinn, **Ray Garner**, and Andrew E. Dolphin, *The Astronomical Journal*, 163, 132, 2022
3. *A Deep Census of Outlying Star Formation in the M101 Group*, **Ray Garner**, J. Christopher Mihos, Paul Harding, and Aaron E. Watkins, *The Astrophysical Journal*, 915, 57, 2021
2. *Searching for Extragalactic Star Formation in the M101 Group*, **Ray Garner**, J. Christopher Mihos, Paul Harding, and Aaron E. Watkins, *Research Notes of the AAS*, 5, 63, 2021
1. *Ionized Gas Kinematics of Nearby Low-Mass Galaxies*, **Ray Garner**, Liese van Zee, Kristen McQuinn, and Evan Skillman, *Proceedings of the AAS*, #231, 312.03, 2018

## Presentations

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### SCIENTIFIC PRESENTATIONS

5. **Investigating the M101 Group with Deep Narrowband Imaging**, presented as a 15-minute dissertation session at the 241st Meeting of the AAS in Seattle, WA, Jan 2023.
4. **Investigating the Oxygen Abundance of the M101 Group with Deep, Narrowband Imaging**, presented as part of a colloquium series at the Oberlin College & Conservatory in Oberlin, OH, Nov 2022.
3. **The M101 Interaction & Narrowband Photometry**, virtually to the LSST LSB Working Group, June 2022.
2. **Searching for Extragalactic Star Formation in the M101 Group**, virtual iPoster at the 237th Meeting of the AAS, Jan 2021.
1. **Ionized Gas Kinematics of Nearby Low-Mass Galaxies**, presented at
  - Furman Engaged at Furman University in Greenville, SC, Apr 2018.
  - 231st Meeting of the AAS in Washington, DC, Jan 2018.
  - SoCon Undergraduate Research Forum at Wofford College in Spartanburg, SC, Oct 2017.

### PUBLIC OUTREACH TALKS

10. **To Universes Beyond with the James Webb Space Telescope**, presented as part of the Association for Continuing Education at Case Western Reserve University in Cleveland, OH, Oct 2022.
9. **The Moon Through the Ages: The Stories Humanity Have Told**, presented as part of International Observe the Moon Night at the Andover Public Library in Andover, OH, Oct 2022.
8. **The Apollo Missions and the Moon Landing**, presented at the Martz-Kohl Observatory in Frewsburg, NY, July 2022.
7. **A Journey Through the Night Sky**, presented at the
  - Andover/Pymatuning Lake KOA in Williamsfield, OH, July 2022.
  - Kent Free Library in Kent, OH, May 2022.
6. **Sailing the Seas of the Solar System**, presented at the

- Ida Rupp Public Library in Port Clinton, OH, June 2022.
  - Andover Public Library in Andover, OH, June 2022.
5. **What Was the Star of Bethlehem?**, presented at the Andover Public Library in Andover, OH, Dec 2021.
  4. **Journey to the Surface of the Moon**, presented as part of International Observe the Moon Night at the Andover Public Library in Andover, OH, Oct 2021.
  3. **As Organism**, a documentary produced by BrainDagger Films in Cleveland, OH, July 2021.
  2. **Comets: A Dark Omen**, presented at the Andover Public Library in Andover, OH, June 2021.
  1. **Astronomy Lecture Series**, a seven-month series of lectures covering introductory astronomy, presented virtually, Feb – Sept 2020.

## Teaching Experience

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### Case Western Reserve University, Astronomy Department

Cleveland, OH

TEACHING ASSISTANT

Aug 2018 – Present

- Assisted in the instruction and graded course assessments of freshmen- and sophomore-level undergraduates.
- Led nighttime Python help sessions for sophomore-level undergraduates regarding data analysis problems given as homework.
- Specifically assisted the following classes with class numbers ranging from 20 to 80 students: ASTR-101 *The Sun & Its Planets*, ASTR-105 *Introduction to Einstein's Universe*, ASTR-221 *Stars & Planets*, and ASTR-222 *Galaxies & Cosmology*

### Varsity Tutors

Online & Atlanta, GA

PRIVATE TUTOR

May 2015 – Dec 2016, Apr 2022 – Present

- Tutored middle school, high school, and college students in a range of topics from pre-algebra, physical science, calculus, physics, and physics GRE exam prep.
- Worked both on the Varsity Tutors online platform as well as in-person.

### Art of Problem Solving

Online

GRADER & TEACHING ASSISTANT

Aug 2015 – Feb 2016, May 2022 – Present

- Originally hired solely as a grader for weekly advanced mathematics courses ranging from pre-algebra to number theory and competition mathematics.
- Returned as a grader for beginners' and intermediate Python programming and introductory physics as well as being a teaching assistant for weekly introductory physics classes and beginners' Python classes.

### Furman University, Physics Department

Greenville, SC

TEACHING ASSISTANT

Aug 2015 – May 2018

- Led weekly group tutoring sessions for the introductory physics courses, ranging from homework help to test preparation.
- Specifically assisted the following classes: PHY-111 *General Physics I* and PHY-112 *General Physics II*, covering introductory mechanics and electromagnetism, respectively.

## Organizations and Volunteer Service

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### Mentor High School Science Olympiad

Mentor, OH

COACH

Sept 2021 – Present

- Coached the Mentor High School Division C Astronomy team in weekly meetings throughout the school year.
- Wrote the 2022 & 2023 Mentor Invitational Division C Astronomy test for roughly 100 high school students each.
- Wrote the 2023 Kenston Invitational Division C Astronomy test for roughly 50 high school students.
- Proctored the 2022 Northeast Ohio Regional Science Olympiad Tournament Division B Solar System exam.

### Graduate Council of Arts & Sciences

Cleveland, OH

TREASURER (2020–2021) AND CO-PRESIDENT (2021–PRESENT)

Aug 2020 – Present

- Council led by graduate students to represent all graduate and professional students in CWRU's College of Arts & Sciences.
- Organized professional development and social events for graduate students ranging from professional talks by CWRU faculty to encouraging interdepartmental cooperation between students.
- As Co-President, additionally sat on the Graduate Committee with faculty members to review departmental graduate programs.
- Implemented the first GCAS [Graduate Student Scholarship and Creative Endeavors Grants](#) to fund student-proposed research and professional development across the College.

## Adopt-a-Physicist

Online

VOLUNTEER

October 2018 – Present

- Volunteer service to communicate with high school students in physics classes across the country in an online forum to foster an appreciation and understanding of what physicists do “in real life.”
- Service provided by Sigma Pi Sigma, the national physics honor society.
- Operates yearly in October for a month.

## NASA/JPL Solar System Ambassadors

Various Locations

AMBASSADOR

Jan 2017 – Present

- Volunteer organization with NASA/JPL to disseminate information about NASA's solar system missions.
- Participates in frequent teleconferences with NASA scientists, mission specialists, and other astronomers to stay updated on the latest solar system information.
- Given multiple talks at libraries and schools around the country about the solar system, the night sky, and astronomy in general.
- A recent selection of presentations is given above. A (current) total of 29 presentations have been given as part of this program. See the NASA/JPL Directory for more information, <https://solarsystem.nasa.gov/ambassadors/1469/>, and my personal website for a complete list of talks given.


## References

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### J. Christopher Mihos

Worcester R. and Cornelia B. Warner Professor of Astronomy

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### Stacy S. McGaugh

Professor and Chair of Astronomy

Director of the Warner & Swasey Observatory

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### Bill Janesh

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### Lauren Calandruccio

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