

Ray Garner

TAMU POSTDOCTORAL RESEARCHER

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Education

Case Western Reserve University

Cleveland, OH

PH.D. IN ASTRONOMY

Aug 2018 – Aug 2023

- Thesis title: “Investigating the Galactic Evolution of M101 with Deep 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, SUMMA CUM LAUDE

Aug 2014 – May 2018

Honors & Awards

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| 2023 | Winner , Lenore A. Kola Graduate Student Community Service Award | Cleveland, OH |
| 2023 | Winner , Graduate Dean's Instructional Excellence Award | Cleveland, OH |
| 2019 | Member , American Astronomical Society | Cleveland, OH |
| 2018 | Member , The Phi Beta Kappa Society | Greenville, SC |
| 2017 | Member , Sigma Pi Sigma, the Physics & Astronomy Honor Society | Greenville, SC |
| 2017 | Member , Furman University Quaternions Club | Greenville, SC |
| 2015 | Member , Phi Eta Sigma National Honor Society | Greenville, SC |

Research Publications

8. *Ionized gas in NGC 4258: Exploring the AGN - Star formation connection*, David Fernández-Arenas, Laurie Rousseau-Nepton, Carmelle Robert, ..., **Ray Garner** (9th author), ..., *Monthly Notices of the Royal Astronomical Society*, submitted.
7. *Implications on star-formation-rate indicators from H II regions and diffuse ionized gas in the M101 Group*, Aaron E. Watkins, J. Christopher Mihos, Paul Harding, & **Ray Garner**, *Monthly Notices of the Royal Astronomical Society*, 530, 4560, 2024.
6. *A Dynamic Galaxy: Stellar Age Patterns across the Disk of M101*, **Ray Garner**, J. Christopher Mihos, Paul Harding, & Charles R. Garner, Jr., *The Astrophysical Journal*, 961, 217, 2024
5. *Spectroscopic Follow-up of Two Star-forming Objects in the M101 Field*, **Ray Garner**, Steven Janowiecki, & J. Christopher Mihos, *Research Notes of the AAS*, 7, 149, 2023.
4. *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
3. *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
2. *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
1. *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

Presentations

SCIENTIFIC PRESENTATIONS

10. **NGC 628 in SIGNALS: Explaining the Abundance-Ionization Correlation in H II Regions**, presented in some form under various titles at:
 - the 8th Annual Postdoctoral Research Symposium at Texas A&M University in College Station, TX, Sept 2024.

- the “Star Formation Across the Scales: Star Clusters to Galactic Disks” workshop at McMaster University in Hamilton, ON, Canada, Aug 2024.
 - the “Recipes to Regulate Star Formation at All Scales: From the Nearby Universe to the First Galaxies” symposium as a poster at the Space Telescope Science Institute in Baltimore, MD, Apr 2024.
 - the Joint Nuclear and Astrophysics Seminar series Texas A&M University in College Station, TX, Feb 2024.
9. **Stellar Age Patterns Across the Disk of M101 with Narrowband Imaging**, presented virtually as part of a symposium series at the Centro de Estudios de Física del Cosmos de Aragón in Teruel, Spain, Dec 2023.
 8. **Investigating the Galactic Evolution of M101 with Deep Narrowband Imaging**, presented as part of a colloquium series at the University of Toronto in Toronto, ON, Canada, Oct 2023.
 7. **Investigating the Galactic Evolution of M101 with Deep Narrowband Imaging**, presented as my PhD thesis defense at CWRU in Cleveland, OH, June 2023.
 6. **Galactic Interactions and Peculiar Galaxies**, presented as part of a colloquium series for the CWRU Undergraduate Research Society in Cleveland, OH, Mar 2023.
 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

17. **The Apollo Missions and the Moon Landing**, presented at the
 - Brazos Valley Astronomy Club in College Station, TX, Sept 2024.
 - Martz-Kohl Observatory in Frewsburg, NY, July 2022.
 - Andover Public Library in Andover, OH, July 2019.
16. **A Journey Through the Night Sky**, presented at the
 - Navasota Public Library in Navasota, TX, Aug 2024.
 - Brazos Valley Astronomy Club in College Station, TX, Jan 2024.
 - Andover/Pymatuning Lake KOA in Williamsfield, OH, July 2022.
 - Kent Free Library in Kent, OH, May 2022.
15. **2024 Solar Eclipse Project**, presented in collaboration with the Friends of Chamber Music and the Brazos Valley Astronomy Club in College Station, TX, Apr 2024.
14. **The 2024 Solar Eclipse**, presented at the Navasota Public Library in Navasota, TX, Apr 2024.
13. **An Annular Solar Eclipse in Texas!**, presented at the Navasota Public Library in Navasota, TX, Oct 2023.
12. **Astronomy on Tap: An Astronomer’s Perspective**, presented at the Grand Stafford Theater in Bryan, TX, Sept 2023.
11. **The Wonderful World of Peculiar Galaxies**, presented at the Stark Library in Canton, OH, July 2023.
10. **Becoming Galactic Detectives!**, my thesis presentation geared towards a public audience, presented at the Andover Public Library in Andover, OH, June 2023.
9. **The Mystery of Dark Matter**, presented at the Andover Public Library in Andover, OH, Apr 2023.
8. **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.
7. **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.
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.

Professional Experience

Texas A&M University, Physics & Astronomy Department

College Station, TX

POSTDOCTORAL RESEARCH ASSOCIATE

Sept 2023 – Present

- Hired to work with Rob Kennicutt (U. of Arizona) and Laurie Rousseau-Nepton (U. of Toronto) on the **Star formation, Ionized Gas, and Nebular Abundances Legacy Survey (SIGNALS)** project, a survey of H II regions across ~60 nearby galaxies.
- Mentored several graduate students in their research, work-life balance, well-being, and job prospects.
- Elected as Postdoctoral President for the Astronomy Postdocs in June 2024. In charge of running monthly postdoc meetings, organizing social events, and implemented a postdoc talk exchange program.

Art of Problem Solving

Online

INSTRUCTOR, ASSISTANT, & GRADER

Aug 2015 – Feb 2016, May 2022 – Present

- Originally hired in Aug 2015 solely as a Grader for weekly advanced mathematics courses ranging from pre-algebra to number theory and competition mathematics.
- Returned as an Assistant in May 2022. Courses assisted: Introduction to Physics, Introduction to Programming with Python, F=ma Problem Series, PhysicsWOOT, and Prealgebra 2.
- Promoted to Instructor in Sept 2023. Courses taught: Introduction to Programming with Python and AP Physics 1: Mechanics.

Case Western Reserve University, Astronomy Department

Cleveland, OH

TEACHING ASSISTANT

Aug 2018 – Aug 2023

- 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 – Dec 2022

- 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.

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

Texas A&M University Postdoctoral Association

College Station, TX

COMMUNICATIONS OFFICER

Jan 2024 – present

- Organization by postdocs for postdocs throughout the entire Texas A&M University system
- Maintained and organized the PDA's social media accounts and email
- Created flyers and advertised numerous professional development and social events in concert with the Office of Postdoctoral Affairs

Mentor High School Science Olympiad

Mentor, OH

COACH & TEST WRITER

Sept 2021 – present

- Coached the Mentor High School Division C Astronomy team in weekly meetings throughout the school years 21-22 and 22-23.
- Wrote the 2022, 2023, & 2024 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 & 2023 Northeast Ohio Regional Science Olympiad Tournament Division B Reach for the Stars exam.

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 35 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.

Graduate Council of Arts & Sciences

Cleveland, OH

TREASURER (2020–2021) AND CO-PRESIDENT (2021–2023)

Aug 2020 – May 2023

- 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.