Andrew Couperus

Curriculum Vitae

Department of Physics and Astronomy
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Professional Profile: I am an observational astronomer with extra experience in climate change communication. I currently research the astrophysical behaviors of nearby stars to ultimately inform how their activity might impact orbiting exoplanets. I seek to work in astronomy research and instruction while leveraging astronomy to teach and talk about climate change.

Education

2018–present **PhD - Astronomy**, Georgia State University (GSU), Atlanta, GA.
In progress, defending June 2025 | Research Adviser: Dr. Todd Henry
Thesis: *The Long-Term Stellar Activity Cycles and Magnetic Predictability of Nearby M Dwarfs*

2018–2020 **MS - Physics**, Georgia State University, Atlanta, GA.
Concentration in Astronomy | Research Adviser: Dr. Todd Henry

2014–2017 **BS - Physics (with Great Distinction)**, Clarkson University, Potsdam, NY.
Minor in Mathematics | Research Adviser: Dr. Joshua Thomas

Professional Experience

Teaching

2018–2021 **Graduate Teaching Assistant**, Georgia State University.
– Taught 16 undergraduate intro astronomy lab sections across eight semesters.
– Helped improve in-person lab activities and train new TAs.
– Completed online teaching training, developed new online lab materials, led online groups of new TAs, and helped coordinate transition to online lab teaching during the pandemic.

Research

2018–present **Graduate Research Assistant**, Georgia State University.
– Investigating nearby low-mass stars, particularly their stellar magnetic activity, activity evolution, long-term activity cycles, rotation, variability, X-ray emission, and multiplicity. Managed six observing campaigns obtaining short- and long-baseline optical photometry, optical spectroscopy, radial velocities, X-ray imaging, speckle imaging, and ground-based astrometry, alongside a large breadth of archival data sources including *Gaia*, *TESS*, *Kepler*, ZTF, ASAS-SN, 2MASS, and others. This has included the application of MCMC and Gaussian process techniques.
– Co-advised undergraduate research student, Summer 2022.
– Member of the REsearch Consortium On Nearby Stars (RECONS - www.recons.org)

2016–2017 **Undergraduate Research Assistant**, Clarkson University.
– Helped implement and calibration a new LHIRES III spectrograph at Reynolds Observatory.
– Completed optical spectroscopy observations and analysis for ∼40 nights of data to refine orbital measurements of high-mass binary star systems.

Observing

2025A **Canada-France-Hawai'i Telescope 3.6m**, Maunakea, Hawai'i.
3.6 hrs – Awarded snapshot time with the SPIRou spectropolarimetry instrument as Co-I.

2019–present **RECONS CTIO/SMARTS 0.9m Program Support**, La Serena, Chile.
– Regularly assist observations and analysis for the RECONS multi-decade 0.9m program.
– Coordinated simultaneous observations with the SMARTS 0.9m and 1.5m for a targeted multi-messenger study.

2019–2023 **CTIO/SMARTS 0.9m**, La Serena, Chile.
68 nights – Experience carrying out multiple 12–20 night in-person observing runs.
– 36 nights awarded competitively from NOIRLab proposal 2023A-549259 as PI. Another 36 nights awarded competitively from NOIRLab proposals 2020A-0178 / 2020B-0031 / 2021A-0005 as PI, but lost due to the COVID-19 pandemic.

2019–2023 **CTIO/SMARTS 1.5m**, La Serena, Chile.
203 hrs – High-resolution spectral observations with the CHIRON echelle spectrograph through RECONS/GSU time.

2021–2022 **XMM-Newton**.
13 ksec – Awarded low-priority time from GO proposal ID 088170 as Co-I.

2020–2022 **Chandra X-ray Observatory**.
188 ksec – Awarded time from GO proposal ID 22200260 as Co-I.

2019 **Apache Point Observatory - ARC 3.5m**, Sunspot, NM.
3 half-nights – Trained with the high-resolution ARCES spectrograph.

2019 **Hard Labor Creek Observatory - Miller 0.61m**, Rutledge, GA.
3 nights – Collected photometric observations of a rotating asteroid.

2016–2017 **Reynolds Observatory - 12in Meade**, Potsdam, NY.
∼20 nights – Acquired low-resolution spectra for a multi-institution project including citizen scientists.

Industry

2017–2018 **Customer Service Technician**, Frazer Computing, Canton, NY.
– Worked in a team-based technical environment to support software and characterize user bugs.

Publications 📖 3 first-author (1 published, 1 drafted, 1 in prep), 7 co-authored

Pending submission August 2025 **Andrew A. Couperus**, Todd J. Henry, Eliot Halley Vrijmoet, et al., *The Solar Neighborhood. LIV. New Photometric Stellar Activity Cycles in Fully Convective M Dwarfs Uncover Cycle Periods Beyond Two Decades*, in prep.

Pending submission May 2025 **Andrew A. Couperus**, Todd J. Henry, Aman Kar, et al., *The Solar Neighborhood. LIII. M Dwarf Twin Binaries — The Full Sample Reveals Siblings Can Appear Both Matched and Mismatched in Activity and Rotation*, fully drafted.

2025 **Andrew A. Couperus**, Todd J. Henry, Rachel A. Osten, et al., *The Solar Neighborhood. LII. M Dwarf Twin Binaries — Presumed Identical Twins Appear Fraternal in Variability, Rotation, Hα, and X-rays*, AJ, 169, 41, available at ADS or AJ.

2024 T.A. Rector, L. Barbier, **Andrew A. Couperus**, et al., *Climate Change Task Force Report for the American Astronomical Society*, arXiv, arXiv:2406.10451.
– Aided in AAS emissions assessment, membership climate survey, and writing of report.

2024 Aman Kar, Todd J. Henry, **Andrew A. Couperus**, et al., *The Solar Neighborhood LI: A Variability Survey of Nearby M Dwarfs with Planets from Months to Decades with TESS and the CTIO/SMARTS 0.9 m Telescope*, AJ, 167, 196, doi:10.3847/1538-3881/ad2ddc.
– Aided development and guidance of project, some analysis codes, and writing of paper.

2022 Wei-Chun Jao, **Andrew A. Couperus**, Eliot H. Vrijmoet, et al., *Estimating the Convective Turnover Time*, ApJ, 940, 145, doi:10.3847/1538-4357/ac9cd8.
– Aided discussions of project, interpretation of analysis, and writing of paper.

2021 Joshua D. Thomas, Noel D. Richardson, J. J. Eldridge, ... [including **Andrew A. Couperus**], et al., *The orbit and stellar masses of the archetype colliding-wind binary WR 140*, MNRAS, 504, 5221, doi:10.1093/mnras/stab1181.
– Acquired many observations and processed a portion of the spectra for RV analyses.

2020 Douglas R. Gies, Kathryn V. Lester, Luqian Wang, **Andrew A. Couperus**, et al., *Spectroscopic Detection of the Pre-White Dwarf Companion of Regulus*, ApJ, 902, 25, doi:10.3847/1538-4357/abb372.
– Aided preliminary RV analyses of the system.

2020 Emily A. Gilbert, Thomas Barclay, Joshua E. Schlieder, ... [including **Andrew A. Couperus**], et al., *The First Habitable-zone Earth-sized Planet from TESS. I. Validation of the TOI-700 System*, AJ, 160, 116, doi:10.3847/1538-3881/aba4b2.
– Acquired absolute photometric observations to help validate the host star properties.

2018 Rachel A. Johnson, Noel D. Richardson, Anthony F. J. Moffat, ... [including **Andrew A. Couperus**], et al., *An Updated Ephemeris for the Single-lined Orbit of the Supergiant μ Sagittarii*, RNAAS, 2, 138, doi:10.3847/2515-5172/aad6ed.
– Acquired many observations and processed a portion of the spectra for RV analyses.

Presentations 14 talks (2 invited), 5 posters

Talks

2025 *The Interconnection of Astronomy and Climate Change*.
| GSU Graduate Conference for Research, Scholarship, and Creative Activity #3

2025 *The AAS Climate Change Task Force Report*.
| AAS Meeting #245

2025 *The Magnetic Predictability and Stellar Activity Cycles of Nearby M Dwarfs*.
| AAS Meeting #245

2024 *Twin M Dwarfs Appear Both Fraternal and Identical in Activity and Rotation*.
| GSU Stellar Symposium

(invited) 2024 *Climate Change and the American Astronomical Society*.
| GSU Department Seminar

abstract 2024 *Seeing Double: Are Twin M Dwarfs Fraternal or Identical in Activity and Rotation*.
| AAS Meeting #243, 254.05

2023 *Seeing Double: Are Twin M Dwarfs Fraternal or Identical in Activity*.
| GSU Stellar Symposium

(invited) 2022 *Twinkle Twinkle Little Star ET Wonders How You Are*.
| STScI Special Seminar

2022 *M Dwarf Stellar Activity — A Coming-of-Age Story*.
| Clarkson University Summer Undergraduate Research Program

2022 *M Dwarf Stellar Activity — A Coming-of-Age Story*.
| GSU Galaxies to Gluons Summer Seminar Series

abstract 2022 *Stellar Cycles in Fully Convective M Dwarfs: Astronomy Beyond a Funding Cycle*.
| Skumanich Conference, id.29

2021 *Twinkle Twinkle Little Star ET Wonders How You Are*.
| GSU Undergraduate Research Program Summer Seminar Series

abstract 2020 *Characterizing M Dwarf Stellar Cycles with Two Decades of RECONS Data*.
| AAS Meeting #236, 319.01

2016 *Benchmarking of the Shelyak LHIRES III Spectrograph*.
| Clarkson SURE Conference

Posters

poster 2024 *Twin M Dwarfs Appear Both Fraternal and Identical in Activity and Rotation*.
| Cool Stars 22 Conference

abstract 2022 *The Long-Term Photometric Variability of Nearby M Dwarfs and Exoplanet Hosts*.
| AbSciCon2022 Conference

poster 2021 *Twinkle Twinkle Little Star: ET Wonders How You Are*.
| Cool Stars 20.5 Conference

abstract 2021 *Twinkle Twinkle Little Star: ET Wonders How You Are*.
| AAS Meeting #237, 141.04

2016 *The Science at Clarkson's Reynolds Observatory*.
| Astronomical Society of New York Conference

Awards & Funding

2025 **$5,060**, NASA SCoPE Seed Grant Proposal, awarded but declined due to scheduling.
Engaging Children and Adults with (Exo) Planetary Astronomy at Local Libraries

2025 **Outstanding Advanced Astronomy Graduate Student Award**, GSU.

2021–2024 **$65,845**, Smithsonian Astrophysical Observatory, Co-I, via Chandra prop. ID 22200260.
Fraternal or Identical? The Magnetic Properties of M Dwarf Twins

2021 **Outstanding Junior Astronomy Graduate Student Award**, GSU.

2020 **Exceptional Department Service Award**, GSU.

2020 **Outstanding Astronomy Graduate Teaching Assistant Award**, GSU.

2020 **Honorable Mention**, NSF Graduate Research Fellowship Program.

Professional Service

2020–present **Graduate Student Mentor**, AstroPALs, GSU.
– Directly mentored 2 students, developed and led 5 focus group sessions and co-led several others, and regularly aided the Astronomy Peer Advising Leaders (AstroPALs) steering committee.

2023 **Astronomy Student Representative**, Department Graduate Committee, GSU.

2018–2022 **Stellar Journal Club Rotating Discussion Leader**, GSU.

2020 **Astro/Physics Graduate Student DEI Committee Member**, GSU.

(See *Climate Change Education, Action, & Service* for additional service items.)

Climate Change Education, Action, & Service

2024–present **Sustainability Committee Member**, American Astronomical Society (AAS).
– I am presently developing the REACT (Rapidly Expanding Astronomy & Climate Teaching) Initiative in collaboration with other leaders in this space and external specialists.

2022–present **Astronomy × Climate Change Guest Lecturer**, GSU.
– Taught guest lectures for 3 graduate and undergraduate astronomy classes to discuss content at the intersection of astronomy and climate change.
– Provided help for ∼10 others to include such content in their classes and research efforts.

2021–present **Member**, Astronomers for Planet Earth (A4E).

2024 **Invited Speaker**, *Climate Change and the American Astronomical Society*, GSU.

2024 **Participant**, Saving Astronomy Workshop: Light Pollution, Satellite Constellations, and Climate Change, AAS #243.
– Worked with several dozen interdisciplinary professionals, spanning architects to rocket scientists, in order to develop action items for advancing light pollution and satellite contamination mitigation efforts.

2022–2024 **Climate Change Task Force Member**, AAS.
report – Helped assess AAS CO2 emissions, survey AAS membership regarding climate action, investigate virtual meeting methods, and write report with recommendations for AAS leadership.

2021 **Completed Climate Leadership Training**, The Climate Reality Project.

Outreach

Summary: My responsibilities have included event planning, developing new educational materials and presentations, leading science activities and talks, and summer mentoring of high school students.

2018–present **Open Night Assistant**, Hard Labor Creek Observatory, GSU.

2024 **Volunteer Presenter**, Three Taverns Brewery: Astronomy Night Lecture Series.

2024 **Science Activity Leader**, John Lewis Elementary School STEM Night.

2021 & 2022 **GSU Committee Member and Activity Leader**, Atlanta Science Festival.

art 2021 **Science Partner**, Science.Art.Wonder, Georgia Institute of Technology.
– Collaborated to convey astronomy concepts with a digital artist.

2019 **Program Assistant**, Georgia Science Olympiad Regional Tournament, GSU.

2019 **Science Activity Leader**, Trip Elementary School Science Night.

2017 **Color Images of the Orion Nebula**, Reynolds Observatory, Clarkson University.
– Created new composite color images of the Orion Nebula for use in public engagement.

2016–2017 **Open Night Assistant**, Reynolds Observatory, Clarkson University.

Summer 2016 **Mentor & Program Aid**, IMPETUS High School Program, Clarkson University.

Technical skills

Proficient Python, Jupyter Notebooks, LaTeX, IRAF, Windows, Linux

Introductory IDL, Bash Scripting, C++, MATLAB

2012 Certified Microsoft Office Specialist in Word, PowerPoint, and Excel.

Professional References

1. Dr. Todd Henry, RECONS & Georgia State University, thenry88@gsu.edu
2. Dr. Rachel Osten, STScI & Johns Hopkins University, osten@stsci.edu
3. Dr. Travis Rector, University of Alaska Anchorage, tarector@alaska.edu