

Andrew Couperus

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Curriculum Vitae

Education

- 2018–present **PhD - Astronomy**, Georgia State University (GSU), Atlanta, GA.
In progress, expected August 2025 | Research Adviser: Dr. Todd Henry
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.
 - Helped improve in-person lab activities and train new TAs.
 - Developed new online lab instructional materials, led online groups of new TAs, and helped coordinate transition to online lab teaching during COVID-19 pandemic.
 - Completed online teaching training.

Research

- 2018–present **Graduate Research Assistant**, Georgia State University.
- Investigating nearby low-mass stars, particularly their stellar and magnetic activity, rotation, variability, long-term activity cycles, X-ray and H α emission, activity evolution, and multiplicity. Utilizing 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*, ZTF, M_{Earth}, 2MASS, and ASAS-SN.
 - 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 spectrograph at Reynolds Observatory.
 - Completed spectroscopic observations and analysis for ~ 40 nights of data to refine orbital properties of high-mass binary star systems.

Observing

- 2019–present **RECONS CTIO/SMARTS 0.9m Program Support**, La Serena, Chile.
- Regularly assist observations and analysis for the RECONS long-term 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 – Extensive experience carrying out multiple 12–20 night in-person observing runs.
 – Acquired photometry to measure rotation periods of M dwarfs in twin wide binaries, along with observations for the RECONS multi-decade long-term 0.9m program.
 – 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 with CHIRON Spectrograph**, La Serena, Chile.
 203 hrs – High-resolution spectral observations to investigate RV behaviors and H α magnetic activity for 27 M dwarf twin wide binaries, through RECONS/GSU time.
- 2021–2022 **XMM-Newton**.
 13 ksec – Awarded low-priority time from GO proposal ID 088170 as Co-I. Study targeting M dwarf twin binary components to determine their X-ray coronal properties.
- 2020–2022 **Chandra X-ray Observatory**.
 188 ksec – Awarded time from GO proposal ID 22200260 as Co-I. Study targeting four M dwarf twin binaries to determine their component X-ray coronal properties.
- 2019 **Apache Point Observatory - ARC 3.5m**, Sunspot, NM.
 3 half-nights – Trained with ARCES obtaining spectra of binaries and B stars for RV analyses.
- 2019 **Hard Labor Creek Observatory - Miller 0.61m**, Rutledge, GA.
 3 nights – Photometric observations of Boyer, a rotating asteroid, to determine its basic properties.
- 2016–2017 **Reynolds Observatory - 12in Meade**, Potsdam, NY.
 ~20 nights – Got spectra of the colliding-wind binary WR140 and other binaries for RV analyses.

Industry Work

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

Publications

3 first-author (1 in prep, 1 drafted, 1 accepted), 7 co-authored.

Pending submission May 2025 **Andrew A. Couperus**, Todd J. Henry, Eliot Halley Vrijmoet, Steven H. Saar, Wei-Chun Jao, & Aman Kar, *The Solar Neighborhood LIV: New Photometric Stellar Activity Cycles in Fully Convective M Dwarfs Demonstrate Cycle Periods Beyond Two Decades*, in prep, pending submission May 2025.

Drafted, pending submission Jan. 2025 **Andrew A. Couperus**, Todd J. Henry, Wei-Chun Jao, Aman Kar, Eliot Halley Vrijmoet, & Rachel A. Osten, *The Solar Neighborhood LIII: M Dwarf Twin Binaries — The Full Sample of 36 Systems Reveals Twin Stars Can Appear Both Matched and Mismatched in Activity and Rotation*, drafted, pending submission January 2025.

Accepted In Press Oct. 2024 **Andrew A. Couperus**, Todd J. Henry, Rachel A. Osten, Wei-Chun Jao, Eliot Halley Vrijmoet, et al. 2024, *The Solar Neighborhood LII: M Dwarf Twin Binaries — Presumed Identical Twins Appear Fraternal in Variability, Rotation, H α , and X-rays*, Accepted to AJ, [arXiv:2410.04726](https://arxiv.org/abs/2410.04726).

- 2024 T.A. Rector, L. Barbier, **Andrew A. Couperus**, R. Danner, A. Egan, et al. 2024, *Climate Change Task Force Report for the American Astronomical Society*, arXiv, [arXiv:2406.10451](https://arxiv.org/abs/2406.10451).
– Aided in AAS emissions assessment, membership climate survey, and writing of report.
- 2024 Aman Kar, Todd J. Henry, **Andrew A. Couperus**, Eliot Halley Vrijmoet, & Wei-Chun Jao, 2024, *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](https://doi.org/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, Nicholas J. Wright, & Todd J. Henry, 2022, *Estimating the Convective Turnover Time*, ApJ, 940, 145, [doi:10.3847/1538-4357/ac9cd8](https://doi.org/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, Gail H. Schaefer, John D. Monnier, ... [including **Andrew A. Couperus**], et al. 2021, *The orbit and stellar masses of the archetype colliding-wind binary WR 140*, MNRAS, 504, 5221, [doi:10.1093/mnras/stab1181](https://doi.org/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**, Katherine Shepard, et al. 2020, *Spectroscopic Detection of the Pre-White Dwarf Companion of Regulus*, ApJ, 902, 25, [doi:10.3847/1538-4357/abb372](https://doi.org/10.3847/1538-4357/abb372).
– Aided preliminary RV analyses of the system.
- 2020 Emily A. Gilbert, Thomas Barclay, Joshua E. Schlieder, Elisa V. Quintana, Benjamin J. Hord, ... [including **Andrew A. Couperus**], et al. 2020, *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](https://doi.org/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, Joshua D. Thomas, Terry Bohlsen, ... [including **Andrew A. Couperus**], et al. 2018, *An Updated Ephemeris for the Single-lined Orbit of the Supergiant μ Sagittarii*, RNAAS, 2, 138, [doi:10.3847/2515-5172/aad6ed](https://doi.org/10.3847/2515-5172/aad6ed).
– Acquired many observations and processed a portion of the spectra for RV analyses.

Presentations 11 talks (2 invited), 5 posters

Talks

- 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.*
| STScl 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

- 2021–2024 **\$65,845**, Smithsonian Astrophysical Observatory, Co-I.
Fraternal or Identical? The Magnetic Properties of M Dwarf Twins
– Part of Chandra X-ray Observatory GO proposal ID 22200260.
- 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.

- 2015–2017 **Presidential Scholar**, Five Semesters, Clarkson University.
- 2014–2017 **Clarkson Merit Scholarship**, Clarkson University.
- 2013–2014 **President's Honors List**, Two Semesters, SUNY Canton.

Service

- 2020–present **Graduate Student Mentor**, AstroPALs, GSU.
 - Mentored multiple students, developed and regularly led focus groups, and aided steering committee within the Astronomy Peer Advising Leaders (AstroPALs) program.
- 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).
- 2022–present **Astronomy × Climate Change Guest Lecturer**, GSU.
 - Taught guest lectures for several graduate and undergraduate astronomy classes to discuss content at the intersection of astronomy and climate change.
 - Provide help for 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.
- 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.
- 2021 **Completed Climate Leadership Training**, The Climate Reality Project.

Outreach

- 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
- 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