Andrew Couperus

Curriculum Vitae

Department of Physics and Astronomy
Georgia State University
Atlanta, GA
✉ *andcoup1@gmail.com*

Education

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

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

2014–2017 **BS, Physics**, Clarkson University, Potsdam, NY.
Minor in Mathematics
Research Adviser: Dr. Joshua Thomas

Professional Experience

Teaching

2018–2021 **Graduate Teaching Assistant**, Georgia State University.
Lab instructor for 16 undergraduate introductory astronomy course sections. Aided in design of new in-person lab activities and helped train new TAs. Developed new online lab instructional materials, led online groups of new TAs, and helped coordinate transition to online lab teaching over 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 Hα emission, activity evolution, and multiplicity. Utilizing newly-obtained short- and long-baseline optical photometry, optical spectroscopy, radial velocities, X-ray imaging, speckle imaging, ground-based astrometry, and a large breadth of archival data sources including *Gaia*, *TESS*, ZTF, MEarth, 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.
Aided in the implementation, calibration, and use of a new LHIRES III Spectrograph. Completed spectroscopic observations and analysis for $\sim$40 nights of data to refine orbital properties of high-mass binary star systems.

Observing

2019–present **RECONS CTIO/SMARTS 0.9m Observing Program Support**, La Serena, Chile.
Regularly assisted in various aspects of observations and analysis for the RECONS long-term 0.9m program. Included coordination of simultaneous observations from the 0.9m and 1.5m SMARTS telescopes on several nights 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 long in-person observing runs myself. Acquired photometric observations to determine rotation periods of M dwarfs in twin wide binary systems, along with observations for the RECONS multi-decade long-term 0.9m program. 36 nights were awarded competitively from NOIRLab proposal 2023A-549259 (PI: Andrew A. Couperus), with another 36 nights awarded competitively as PI for NOAO/NOIRLab proposals 2020A-0178 / 2020B-0031 / 2021A-0005 but lost due to the COVID-19 pandemic.

2019–2023 **CTIO - SMARTS 1.5m with CHIRON Spectrograph**.
203 hrs High-resolution spectroscopic observations to investigate RV behaviors and Hα 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 (Co-I: Andrew A. Couperus). 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 (Co-I: Andrew A. Couperus). 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 the ARCES instrument, 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.
$\sim$20 nights Acquired 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 environment to support custom software and characterize user bugs.

Publications

Pending submission April 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 April 2025.

Pending submission Dec. 2024 **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 December 2024.

Submitted Sep. 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, Hα, and X-rays*, submitted to AJ, arXiv: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.
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.
Aided development of project, some analysis codes, writing of paper, and guidance of work.

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.
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.
Acquired many spectral observations and processed a portion of the data 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.
Helped acquire spectral observations and 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.
Acquired absolute photometric observations for use in validating properties of the host star.

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.
Acquired many spectral observations and processed a portion of the data for RV analyses.

Presentations

Talks

2024 Andrew A. Couperus, *Twin M Dwarfs Appear Both Fraternal and Identical in Activity and Rotation*, Stellar Symposium, Georgia State University.

(invited) 2024 Andrew A. Couperus, *Climate Change and the American Astronomical Society*, Department Seminar, Georgia State University.

2024 Andrew A. Couperus, T. J. Henry, R. A. Osten, W. Jao, E. H. Vrijmoet, Aman Kar, & the Recons Team, *Seeing Double: Are Twin M Dwarfs Fraternal or Identical in Activity and Rotation?*, AAS #243, 254.05, abstract available here.

2023 Andrew A. Couperus, *Seeing Double: Are Twin M Dwarfs Fraternal or Identical in Activity?*, Stellar Symposium, Georgia State University.

(invited) 2022 Andrew A. Couperus, *Twinkle Twinkle Little Star ET Wonders How You Are*, Special Seminar, Space Telescope Science Institute.

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

2022 Andrew A. Couperus, *M Dwarf Stellar Activity — A Coming-of-Age Story*, Undergraduate Research Program "Galaxies to Gluons" Summer Seminar Series, Georgia State University.

2022 Andrew A. Couperus, *Stellar Cycles in Fully Convective M Dwarfs: Astronomy Beyond a Funding Cycle*, Fifty Years of the Skumanich Relations, id.29, abstract available here.

2021 Andrew A. Couperus, *Twinkle Twinkle Little Star ET Wonders How You Are*, Undergraduate Research Program Summer Seminar Series, Georgia State University.

2020 Andrew A. Couperus, T. J. Henry, E. H. Vrijmoet, & W. Jao, *Characterizing M Dwarf Stellar Cycles with Two Decades of RECONS Data*, AAS #236, 319.01, abstract available here.

2016 Andrew A. Couperus & Joshua D. Thomas, *Benchmarking of Shelyak LHIRES III Spectrograph*, Clarkson SURE Conference.

Posters

2024 Andrew A. Couperus, T. J. Henry, R. A. Osten, W. Jao, E. H. Vrijmoet, & Aman Kar, *Twin M Dwarfs Appear Both Fraternal and Identical in Activity and Rotation*, Cool Stars 22 Conference, available here.

2022 Andrew A. Couperus, Aman Kar, T. J. Henry, W. Jao, E. H. Vrijmoet, & the Recons Team, *The Long-Term Photometric Variability of Nearby M Dwarfs and Exoplanet Hosts*, AbSciCon2022 Conference, abstract available here.

2021 Andrew A. Couperus, T. J. Henry, R. A. Osten, W. Jao, E. H. Vrijmoet, & the Recons Team, *Twinkle Twinkle Little Star: ET Wonders How You Are*, Cool Stars 20.5 Conference, doi:10.5281/zenodo.4560930.

2021 Andrew A. Couperus, T. J. Henry, R. A. Osten, W. Jao, E. H. Vrijmoet, & the Recons Team, *Twinkle Twinkle Little Star: ET Wonders How You Are*, AAS #237, 141.04, abstract available here.

2016 Andrew A. Couperus, Courtney R. Maki, & Joshua D. Thomas, *The Science at Clarkson's Reynolds Observatory*, Astronomical Society of New York Conference.

Awards

2021 **Outstanding Junior Astronomy Graduate Student Award**, Department of Physics and Astronomy, Georgia State University.

2020 **Exceptional Department Service Award**, Department of Physics and Astronomy, Georgia State University.

2020 **Outstanding Astronomy Graduate Teaching Assistant Award**, Department of Physics and Astronomy, Georgia State University.

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

2014–2017 **Clarkson Merit Scholarship**, Clarkson University.

Funding

2021–2024 **$65,845 from the Smithsonian Astrophysical Observatory as Co-I**.
Fraternal or Identical? The Magnetic Properties of M Dwarf Twins
Part of Chandra X-ray Observatory GO proposal ID 22200260 (Co-I: Andrew A. Couperus)

Service

2024–present **Committee Member**, Sustainability Committee, American Astronomical Society.

2020–present **Graduate Student Mentor**, AstroPALs, Georgia State University.
Mentored multiple students, developed and regularly led focus group activities, and aided steering committee, all as part of the Astronomy Peer Advising Leaders (AstroPALs) program.

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

2023 **Astronomy Graduate Student Representative**, Department Graduate Committee, Georgia State University.

2018–2022 **Stellar Journal Club**, rotating discussion leader, Georgia State University.

2020 **Member**, Astro/Physics Graduate Student DEI Committee, Georgia State University.

Outreach

2018–present **Open Night Assistant**, Hard Labor Creek Observatory, Georgia State University.

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

2024 **Science Demonstration Leader**, John Robert Lewis Elementary School STEM Night, Atlanta, GA.

2021 & 2022 **Planning Committee Member and Demonstration Leader**, Atlanta Science Festival, Georgia State University.

2021 **Science Partner**, Science.Art.Wonder, Georgia Institute of Technology.
Collaborated with an artist to convey astronomy concepts through digital art (available here).

2019 **Program Assistant**, Georgia Science Olympiad Regional Tournament, Georgia State University.

2019 **Science Demonstration Leader**, Trip Elementary School Science Night, Atlanta, GA.

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.

Climate Change Education & Action

2024–present **Committee Member**, Sustainability Committee, American Astronomical Society.

2022–present **Astronomy × Climate Change Guest Lecturer**, Georgia State University.
Taught guest lectures for several graduate and undergraduate astronomy classes discussing the intersection of astronomy and climate change content. Provided guidance for climate change content taught by others in their intro astronomy classes.

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

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

2024 **Participant**, Saving Astronomy Workshop: Light Pollution, Satellite Constellations, and Climate Change, AAS #243.

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

Technical skills

Proficient Python, 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