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 May 2025
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 (ASTR 1010/ASTR 1020). 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 training for online teaching.

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 velocity measurements, X-ray imaging, speckle imaging, ground-based astrometry, and a large breadth of archival data sources including *Gaia*, *TESS*, ZTF, MEarth, ASAS, and ASAS-SN. Also includes the application of Bayesian numerical methods via Gaussian Processes and MCMC analyses applied to novel datasets and use cases.
-Co-advised summer 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 ∼40 nights of data to study 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 1.5m with CHIRON Spectrograph**.
203 hrs	High-resolution spectroscopic observations to investigate radial velocity behaviors and Hα magnetic activity for 27 M dwarf twin wide binaries, through RECONS/GSU time.
OCT 2023	**CTIO - SMARTS 0.9m**, La Serena, Chile.
16 nights	Awarded time from NOIRLab proposal 2023A-549259 (PI: Andrew A. Couperus). Photometric observations to determine rotation periods of M dwarfs in twin wide binary systems, along with observations for the RECONS long-term 0.9m program.
APR 2023	**CTIO - SMARTS 0.9m**, La Serena, Chile.
20 nights	Awarded time from NOIRLab proposal 2023A-549259 (PI: Andrew A. Couperus). Photometric observations to determine rotation periods of M dwarfs in twin wide binary systems, along with observations for the RECONS long-term 0.9m program.
SEP 2022	**CTIO - SMARTS 0.9m**, La Serena, Chile.
20 nights	Photometric observations to determine rotation periods of M dwarfs in twin wide binary systems, along with observations for the RECONS long-term 0.9m program.
2021–2022	**XMM-Newton**.
13 ksec	Awarded low-priority time from GO proposal ID 088170 (Co-I: Andrew A. Couperus). X-ray imaging study targeting M dwarf twin wide binary components to determine their X-ray luminosities and coronal properties.
2020–2022	**Chandra X-ray Observatory**.
188 ksec	Awarded time from GO proposal ID 22200260 (Co-I: Andrew A. Couperus). X-ray imaging study targeting four M dwarf twin wide binaries to determine their component X-ray luminosities and coronal properties.
2021A	**CTIO - SMARTS 0.9m**, La Serena, Chile.
12 nights	Awarded time from NOIRLab proposal 2021A-0005 (PI: Andrew A. Couperus), but lost due to COVID-19 pandemic. Photometric observations were planned to determine rotation periods of M dwarfs in twin wide binary systems.
2020B	**CTIO - SMARTS 0.9m**, La Serena, Chile.
12 nights	Awarded time from NOIRLab proposal 2020B-0031 (PI: Andrew A. Couperus), but lost due to COVID-19 pandemic. Photometric observations were planned to determine rotation periods of M dwarfs in twin wide binary systems.
2020A	**CTIO - SMARTS 0.9m**, La Serena, Chile.
12 nights	Awarded time from NOIRLab (NOAO at the time) proposal 2020A-0178 (PI: Andrew A. Couperus), but lost due to COVID-19 pandemic. Photometric observations were planned to determine rotation periods of M dwarfs in twin wide binary systems.
2019	**CTIO - SMARTS 0.9m**, La Serena, Chile.
12 nights	Obtained photometry and astrometry data for the RECONS multi-decade long-term program.
2019	**Apache Point Observatory - ARC 3.5m**, Sunspot, NM.
3 half-nights	Trained on site using the ARCES instrument, obtaining spectra of visual binaries and B stars.
2019	**Hard Labor Creek Observatory - Miller 0.61m**, Rutledge, GA.
3 nights	Photometric observations of Boyer, a rotating asteroid.
2016–2017	**Reynolds Observatory - 12in Meade**, Potsdam, NY.
$\sim$20 nights	Spectroscopic observations of the colliding-wind binary WR140 and other binary star systems.

Work

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

Publications

in prep **Andrew A. Couperus**, Todd J. Henry, Eliot Halley Vrijmoet, Wei-Chun Jao, & Aman Kar, *The Solar Neighborhood LIV: New Photometric Stellar Activity Cycles in Nearby M Dwarfs Demonstrate Cycle Periods Beyond Two Decades*, in prep.

in prep **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 Fraternal and Identical in Activity and Rotation*, in prep.

in prep **Andrew A. Couperus**, Todd J. Henry, Rachel A. Osten, Wei-Chun Jao, Eliot Halley Vrijmoet, & Aman Kar, *The Solar Neighborhood LII: M Dwarf Twin Binaries — X-rays, Hα, and Rotation of Four Systems Uncover Differences Between Similar Stars*, in prep.

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.

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.

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.

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.

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.

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.

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.

Presentations

Talks

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

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

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

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

2022 Andrew A. Couperus, 2022, *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, 2022, *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, 2021, *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, 2020, *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, 2016, *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, 2024, *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, 2022, *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, 2021, *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, 2021, *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, 2016, *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

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

2024–2027 **Committee Member**, Sustainability Committee, American Astronomical Society.

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

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

2018–2022 **Stellar Journal Club**, rotating discussion leader and attendee, 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

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

2024–2027 **Committee Member**, Sustainability Committee, American Astronomical Society.

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

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

2022 **Astronomy x 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 **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.