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 (GSU), Atlanta, GA.
In progress, expected June 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**, 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 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 ∼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 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 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.
$\sim$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

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.

Drafted, 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 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.
– 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 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.
– 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 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.
– Acquired many observations and processed a portion of the spectra for RV analyses.

Presentations

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*.
| 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

Funding & Awards

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.

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

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.
– 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, 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