Kyle A. Corcoran

Curriculum Vitae

Ph. D. Candidate
Department of Astronomy
University of Virginia

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Research Interests

Compact binary stars, millisecond pulsars, white dwarfs, hot subdwarfs, timing analyses, stellar evolution, observational & computational techniques for astrophysics

Education

University of Virginia — Charlottesville, VA
Doctor of Philosophy [Third Year] — Projected 2024
Dissertation: Name TBD – Compact stars and binaries
Advisor: Dr. Scott Ransom

University of Virginia — Charlottesville, VA
Master of Science – Astronomy — May, 2021
Advisor: Dr. Scott Ransom

High Point University — High Point, NC
Bachelor of Science, **summa cum laude** – Physics — May, 2019
Advisor: Dr. Brad N. Barlow
Double Major: Mathematics [B.A.]

Peer-Reviewed Articles

** denotes student advisee co-author*

6. A TESS Cycle 2 Survey of Candidate Variable Hot Subdwarf Stars Identified from Anomalous Gaia DR2 Flux Errors
Brad N. Barlow, **Kyle A. Corcoran**, Isabelle Parker*, Thomas Kupfer, Péter Németh, J.J. Hermes, Isaac D. Lopez, Will Frondorf*, David Vestal*, Jazzmyn Holden
Barlow, B. N., Corcoran, K. A., Parker, I. M., et al. 2022, ApJ, 928, 20

5. Eclipsing Binaries Found by the EREBOS Project – A Deeply Eclipsing sdB+dM System
Kyle A. Corcoran, Brad N. Barlow, Veronika Schaffenroth, Ulrich Heber, Stephen Walser*, Andreas Irgang
Corcoran, K. A., Barlow, B. N., Schaffenroth, V., et al. 2021a, ApJ, 918, 28

4. I Spy Transits and Pulsations: Empirical Variability in White Dwarfs Using Gaia and the Zwicky Transient Facility
Joseph A. Guidry, Zachary P. Vanderbosch, J. J. Hermes, Brad N. Barlow, Isaac D. Lopez, Thomas M. Boudreaux, **Kyle A. Corcoran**, Keaton J. Bell, Michael H. Montgomery, Tyler M. Heintz, Barbara G. Castanheira, Joshua S. Reding, Bart H. Dunlap, Donald E. Winget, Karen I. Winget, John W. Kuehne
Guidry, J. A., Vanderbosch, Z. P., Hermes, J. J., et al. 2021, ApJ, 912, 125

3. Analysis of Previously Classified White Dwarf-Main Sequence Binaries Using Data from the APOGEE Survey
Kyle A. Corcoran, Hannah M. Lewis, Borja Anguiano, Steven R. Majewski, Marina Kounkel, Devin J. McDonald, Keivan G. Stassun, Katia Cunha, Verne Smith, Carlos Allende Prieto, Carles Badenes, Nathan De Lee, Christine N. Mazzola, Penélope Longa-Peña, Alexandre Roman-Lopes

Corcoran, K. A., Lewis, H. M., Anguiano, B., et al. 2021b, AJ, 161, 143

2. EVR-CB-004: An Inflated Hot Subdwarf O Star + Unseen WD Companion in a Compact Binary Discovered with the Evryscope
Jeffrey K. Ratzloff, Thomas Kupfer, Brad N. Barlow, David Schneider, Thomas R. Marsh, Ulrich Heber, **Kyle A. Corcoran**, Evan Bauer, Haemmerich, S., Henry T. Corbett, Amy Glazier, Ward S. Howard, Nicholas M. Law

Ratzloff, J. K., Kupfer, T., Barlow, B. N., et al. 2020, ApJ, 902, 92

1. EVR-CB-001: An Evolving, Progenitor, White Dwarf Compact Binary Discovered With The Evryscope
Jeffrey K. Ratzloff, Brad N. Barlow, Thomas Kupfer, **Kyle A. Corcoran**, Stephan Geier, Evan Bauer, Henry T. Corbett, Ward S. Howard, Amy Glazier, Nicholas M. Law

Ratzloff, J. K., Barlow, B. N., Kupfer, T., et al. 2019b, ApJ, 883, 51

Conference Proceedings

** denotes student advisee co-author*

1. White Dwarfs in Close Binaries: A Systematic Search for Mass-transfer Systems and Supernova Ia Progenitors in the APOGEE Survey
Borja Anguiano, Hannah M. Lewis, **Kyle A. Corcoran**, Jasmin Washington, Steven R. Majewski, Carlos-Allende Prieto, Christine N. Mazzola, Carles Badenes, Keivan Stassun, John Blondin

Anguiano, B., et al. 2021, RNAAS, 4, 127

Selected Successful Telescope Proposals

- 2022, *Verifying the Black Widow Nature of the Shortest Period Candidate to Date* [GBT, **PI**, GBT22A-486, DDT – 2.5 hr]
- 2021, *Gemini Observations of a Candidate Double-detonation Supernova Ia Progenitor,* [Gemini–N/FT, **PI**, GN-2021B-FT-120, Band-1 – 2 hr]
- 2021, *Radio Searches for Four Candidate Spider Binaries* [GBT, **PI**, GBT22A-355, Rank C – 5 hr]
- 2021, *Gaia DR2 3231653210215464832: The Second Sub-Chandrasekhar Double-detonation Supernova Ia Progenitor?* [Gemini–N/FT, **PI**, GN-2021B-FT-107, Band-1 – 2 hr]

- 2021, *Follow-Up Spectroscopy of Variable sdB Candidates Observed in TESS Cycle 3* [SOAR 4.1m/AEON, **PI**, NOIRLab 2020A-0268, Queue – 40 hr]
- 2020, *TESS Cycle 3 Observations Of Variable Hot Subdwarf Stars* [*TESS*, **CoI**, G03221, 2153 Targets]
- 2020, *The EREBOS Project: Determining the Influence of Substellar Objects on Stellar Evolution* [SOAR 4.1m, **CoI**, NOIRLab 2020A-0268, 4 Nights]
- 2019, *TESS Observations of Compact Hot Subdwarf Binaries* [*TESS*, **CoI**, G022141, 293 Targets]

Observing Experience

Note that telescopes and exact numbers in this section may not be up to date

- **4.1m SOAR Telescope (Goodman Spectrograph) – CTIO**
  - 9 nights of observing experience (awarded through NOIR Lab)
- **ARC 3.5m Telescope – Apache Point Observatory**
  - awarded 15 half nights of observing time (awarded through ARC)
  - 8 nights of observing experience
  - reduced and analyzed around 20 hours of time-series photometry (ARCTIC)
  - reduced and analyzed around 12 hours of of spectroscopy (DIS)
  - obtained about 6 hours of infrared spectroscopy (TripleSpec)
- **Bok 2.3m Telescope – Steward/Kitt Peak National Observatory**
  - awarded 12 nights of observing time (awarded through Steward)
  - one night of observing experience (most nights lost due to COVID-19 restrictions)
  - reduced and analyzed around 3 hours of spectroscopy
- **SMARTS Consortium Telescopes (CTIO 1.5m/CHIRON, CTIO 0.9m)**
  - 7 nights of observing experience on the 0.9m
  - reduced and analyzed around 80 hours of time-series photometry
  - obtained, reduced, and analyzed over 5 hours of spectroscopy on the 1.5m telescope
- **ARCSAT 0.5m Telescope – Apache Point Observatory**
  - five weeks of awarded observing time (awarded through ARC)
  - reduced and analyzed around 60 hours of time-series photometry
- **SKYNET/PROMPT Telescopes – CTIO**
  - obtained, reduced, and analyzed over 15 hours of time-series photometry
- **40ft and 20m Radio Telescopes – Green Bank Observatory**
  - Several day/night observing sessions conducting maps, scans, and spectroscopy of several radio sources using the 40ft telescope
  - Obtained maps for several pulsars using the 20m telescope

Academic Employment

University of Virginia Charlottesville, VA
Teaching Assistant – ASTR 5110 (Graduate) Fall 2021

University of Virginia Charlottesville, VA
Research Assistant Summer 2020-Summer 2021

University of Virginia Charlottesville, VA
Grader Spring 2020 - Present

- graded homeworks for undergraduate and graduate classes that needed the support

University of Virginia Charlottesville, VA
Teaching Assistant – ASTR 3130 (Undergraduate) Spring 2020

- oversaw lab activities for multiple groups of 4 students at McCormick Observatory and Fan Mountain Observatory
- held weekly sessions to teach coding and useful astronomical tools as well as to answer lab and homework questions
- created IPython notebook and PDF resources to aide students in lab analyses

University of Virginia Charlottesville, VA
Teaching Assistant – Telescope Observing Lab (Undergraduate) Fall 2019

- oversaw lab activities for groups of $\sim$50 students at McCormick Observatory
- operated two small telescopes for students to complete observing activities

University of Virginia Charlottesville, VA
Teaching Assistant – ASTR 1220 (Undergraduate) Fall 2019

- held office hours and review sessions for student questions
- assisted professor with in-class questions and activities
- calculated and recorded grades for students

High Point University High Point, NC
Research Assistant 2018-2019

- conducted research projects on hot subdwarfs using SOAR, the Evryscope, SKYNET, and the SMARTS 1.5m/CHIRON
- advised five undergraduate students with research projects on hot subdwarfs
- helped to submit two observing proposals – one to NOAO for which we were awarded four nights on SOAR's Goodman spectrograph and one to the TESS Guest Investigator program for Cycle 2
- gave multiple presentations at national and international conferences to report results from our research

High Point University High Point, NC
Supplemental Instructor and Tutor – PHY 1050 2018-2019

- held office hours and review sessions for student questions
- worked with students both in one-on-one and group settings

Awards & Honors

- **Laurence W. Fredrick Teaching Award** (2022) – Astronomy Department, University of Virginia
- **Jefferson Scholars Foundation Research Prize** (2021) – Jefferson Scholars Foundation, University of Virginia
- **All University Honors** (2019) – High Point University
- **Sigma Pi Sigma, National Physics Honors Society** (2018) – Elected Member
- **Walt and Susan Patterson Prize for Outstanding Presentation** (2017) – MAA 96th Southeastern Regional Meeting
- **High Point University Dean's List Honoree** (2015-2019) – High Point University
- **Presidential Fellowship Scholarship** (2015-2019) – High Point University
- **Honors Scholars Program** (2015-2019) – High Point University

Professional Memberships & Service

- NANOGrav Collaboration — Associate Member
- UVA Astronomy Graduate Student Representative — 2021-2022 Academic Year
- TESS Asteroseismic Science Consortium (TASC) – Working Group 8 — Member
- American Astronomical Society — Graduate Member
- Sigma Pi Sigma, National Physics Honors Society — Member

Educational & Public Outreach

- Astronomy Mentorship Program (AMP) Graduate Mentor — 2019-Present
- DSBK Member — 2019-Present
- HPUniverse Day Volunteer — 2016-2019
- Dark Skies Bright Kids (DSBK) Virtual Camp Counselor — Summer 2020
- Bob Rood Memorial Research Symposium Co-Organizer — 2020
- Fan Mountain Observatory Public Night Volunteer — 2019-Present
- McCormick Observatory Public Nights Volunteer — 2019-Present
- Piedmont Triad Science Fair for Non-Public Schools Volunteer — 2016-2019
- Spaceport America Cup Volunteer — 2016

Computing Skills

- Programming Languages
  1. Expert: Python, C
  2. Proficient: MATLAB, Arduino
  3. Familiar: C++, R, HTML
- Miscellaneous: LaTeX, GitHub, IRAF, TOPCAT Period04

Selected Professional Talks

3. **APOGEE Collaboration Science Telecon [*Invited*]** — Online
   "Analysis of White Dwarf-Main Sequence Binaries Using APOGEE Data" — Sep 29th, 2020

2. **Ninth Meeting on Hot Subdwarfs and Related Objects** — Hendaye, France
   "A Radial Velocity Survey of Candidate Variable Hot Subdwarfs from Gaia DR2" — Jun 24th, 2019

1. **MAA Southeastern Section 96th Annual Meeting** — Macon, GA
   "The O-C Diagram and its Applications to Astrophysical Systems" — Mar 11th, 2017

Selected Public Talks

3. **Charlottesville Astronomical Society Meeting [*Invited*]** — Charlottesville, VA
   "Searching for Variable Stars in the New Age of Space-Based Surveys" — Sep 2nd, 2020

2. **Piedmont Triad Science Fair for Non-Public Schools [*Invited*]** — High Point, NC
   "HPU Physics Presents: The Ping-Pong Ball Cannon!" — Jan 27th, 2018

1. **Piedmont Triad Science Fair for Non-Public Schools [*Invited*]** — High Point, NC
   "The IR Camera: A Different View of the World!" — Jan 28th, 2017

Poster Presentations

7. **237th Meeting of the American Astronomical Society** — Online
   "A TESS Cycle 2 Survey of Candidate Variable Hot Subdwarf Stars Identified from Anomalous Gaia DR2 Flux Errors" — Jan 15th, 2021

6. **233rd Meeting of the American Astronomical Society** — Seattle, WA
   "Evryscope Observations of Post-CommonEnvelope Hot Subdwarf Systems" — Jan 9th, 2019

5. **233rd Meeting of the American Astronomical Society** — Seattle, WA
   "A Journey to Mars: HPUniverse Day and Its Impact on Young Minds and a Community" — Jan 7th, 2019

4. **North Carolina Astronomer's Meeting – 2018** — Greensboro, NC
   "A Method to Select Candidate WD Variables from Gaia DR2" — Sep 22nd, 2018

3. **High Point University Research and Creative Works Symposium** — High Point, NC
   "Updated O-C Diagrams for Several Bright HW Vir Binaries Observed with the Evryscope" — Apr 10th, 2018

2. **231st Meeting of the American Astronomical Society** — Washington D.C.
   "Updated O-C Diagrams for Several Bright HW Vir Binaries Observed with the Evryscope" — Jan 9th, 2018

1. **North Carolina Astronomer's Meeting – 2017** — Greensboro, NC
   "AA Dor: An Irritatingly Stable Post-Common-Envelope Binary " — Sep 23rd, 2017

Selected Published Abstracts

** denotes student advisee co-author*

12. A TESS Cycle 2 Survey of Candidate Variable Hot Subdwarf Stars Identified from Anomalous Gaia DR2 Flux Errors
    Corcoran, K. A., Barlow, B. N., Hermes, J., Nemeth, P., Kupfer, T., Parker, I., Frondorf, W., Vestal, D., 2021, AAS Meeting, 237, #550.01

11. White Dwarfs in Close Binaries: A Systematic Search for Mass Transfer Systems and Supernova Ia Progenitors
Anguiano, Borja Lewis, Hannah, Washington, Jasmin, **Corcoran, Kyle**, Majewski, Steven, Allende-Prieto, Carlos, Badenes, Carles, Stassun, Keivan, Blondin, John, APOGEE Team, 2020, AAS Meeting, 236, #108.02

10. Dark Skies, Bright Kids – Year 11
Pryal, Matt, Johnson, Kelsey, et al. including **Corcoran, Kyle A.**, 2020, AAS Meeting, 235, #203.12

9. Into the Black Hole: HPUniverse Day and its Impact on Young Minds and a Community
Walser, Stephen, **Corcoran, Kyle**, Welter, Michael, Roth, Nolan, McClung, Jordan, Anderson, Kennedy, Grinalds, Nathan, Barlow, Brad, 2020, AAS Meeting, 235, #203.06

8. Updates from the EREBOS Project: the First Deeply-Eclipsing Hot Subdwarf Binary
Walser, Stephen*, Barlow, Brad, Veronika Schaffenroth, **Corcoran, Kyle A.**, 2020, AAS Meeting, 235, #170.18

7. A Radial Velocity Survey of Candidate Variable Hot Subdwarfs from Gaia DR2
Grinalds, Nathan J.*, **Corcoran, Kyle**, Vestal, David*, Frondorf, Will*, Parker, Isaac*, Barlow, Brad, 2020, AAS Meeting, 235, #170.08

6. New Variable Hot Subdwarfs from the Evryscope
Brad Barlow, Jeff Ratzloff, **Kyle Corcoran**, Thomas Kupfer, Veronika Schaffenroth

5. A Radial Velocity Survey of Candidate Variable Hot Subdwarfs from Gaia DR2
Nathan Grinalds*, **Kyle Corcoran**, Will Frondorf*, Isaac Parker*, David Vestal*, Brad Barlow

4. Evryscope Photometry of the New Hot Subdwarf Reflection Effect Binary EC 01578-1743
Walser, Stephen*, **Corcoran, Kyle A.**, Barlow, Brad, Mycroft, Sam*, Aube, John, Ratzloff, Jeff, Law, Nicholas, Corbett, Henry T., Fors, Octavi, Howard, Ward S., 2019, AAS Meeting, 233, #464.03

3. Evryscope Observations of Post-Common-Envelope Hot Subdwarf Systems
Corcoran, Kyle A., Barlow, Brad, Walser, Stephen, Mycroft, Sam, Aube, John, Ratzloff, Jeff, Law, Nicholas, Corbett, Henry T., Howard, Ward S., Fors, Octavi, 2019, AAS Meeting, 233, #360.16

2. A Journey to Mars: HPUniverse Day and Its Impact on Young Minds and a Community
Corcoran, Kyle A., Barlow, Brad, Welter, Michael, Brady, Erin, Roth, Nolan, Boudreaux, Thomas Macauly, Walser, Stephen, 2019, AAS Meeting, 233, #147.05

1. Updated O-C Diagrams for Several Bright HW Vir Binaries Observed with the Evryscope **Corcoran, Kyle A.**, Barlow, Brad, Corbett, Hank, Fors, Octavi, Howard, Ward S., Law, Nicholas, Ratzloff, Jeff, 2018, AAS Meeting, 231, #150.23.

References

Dr. Scott Ransom sransom@nrao.edu
National Radio Astronomy Observatory (434) 296-0320

Dr. Brad Barlow bbarlow@highpoint.edu
High Point University (336) 841-9542

Dr. Aaron Titus atitus@highpoint.edu
High Point University (336) 841-4668

Dr. Dan Reichart reichart@physics.unc.edu
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Furman University (864) 294-2259