

Emily M. Boudreaux

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RESEARCH INTERESTS

Computational astrophysics, stellar evolution, low mass stars.

JOBS

- **Dartmouth College**, May 2024 - present
Post Doctoral Research Associate working with [Aaron Dotter](#) on [4D-STAR](#)
- **Dartmouth College**, May 2024 - present
Lecturer

EDUCATION

Dartmouth College Hanover, NH
Master of Science — Physics & Astronomy May 2022
Advisor: [Dr. Brian C. Chaboyer](#)
Secondary Advisor: [Dr. Elisabeth R. Newton](#)
Doctor of Philosophy — Physics & Astronomy April 2024
Thesis: [Models of Low Mass Stars as Physical Laboratories](#)
Advisor: [Dr. Brian C. Chaboyer](#)
Committee: Dr. Aaron Dotter, Dr. Elisabeth R. Newton, Dr. Jamie Tayar

High Point University High Point, NC
Bachelor of Science, summa cum laude — Computational Physics May 2019
Advisor: [Brad N. Barlow](#)

PUBLICATIONS

First Author

- **Boudreaux, E.M.**, Garcia Soto, Aylin., Chaboyer, B.C., 2023. [Correlations between Ca II H&K Emission and the Gaia M dwarf Gap](#), *The Astrophysical Journal*. 965(1), p.56
- **Boudreaux, E.M.**, Chaboyer, B.C., Ash, Amanda., Edaes Hoh, Renata., Feiden, Gregory., 2023. Chemically Self-Consistent Modeling of the Globular Cluster NGC 2808 and its Effects on the Inferred Helium abundance of Multiple Stellar Populations, *Submitted to ApJ*.
- **Boudreaux, E.M.**, Chaboyer, B.C., 2023. [Updated High-Temperature Opacities for the Dartmouth Stellar Evolution Program and their Effect on the Jao Gap Location](#), *The Astrophysical Journal*. 944(2), p.129
- **Boudreaux, E.M.**, Newton, E.R., Mondrik, N., Charbonneau, D., Irwin, J., 2021. [The Ca II H&K Rotation-Activity Relation in 53 mid-to-late type M-Dwarfs](#), *The Astrophysical Journal*. 926(1), p.80
- **Boudreaux, T. M.**, 2017, “[The applications of deep neural networks to sdBV classification](#)”, *Open Astronomy*, **26**, 258.

- **Boudreaux, E. M.**, Barlow, B. N., Fleming, S. W., Soto, A. V., Million, C., Reichart, D. E., Haislip, J. B., Linder, T. R., Moore, J. P., 2017. “[A search for rapidly pulsating hot subdwarf stars in the GALEX survey](#)”, *Astrophysical Journal*, **845**, 171.

Contributing Author

- Ying, M., Chaboyer, B., **Boudreaux, E.M.**, Slaughter, C., Boylan-Kolchin, M., Wesiz, D., [The Absolute Age of M92](#). *The Astronomical Journal*, 166(1), p.18.
- Guidry, J.A., Vanderbosch, Z.P., Hermes, J.J., Barlow, B.N., Lopez, I.D., **Boudreaux, E.M.**, Corcoran, K.A., Bell, K.J., Montgomery, M.H., Heintz, T.M. and Castanheira, B.G., 2021. [I Spy Transits and Pulsations: Empirical Variability in White Dwarfs Using Gaia and the Zwicky Transient Facility](#). *The Astrophysical Journal*, 912(2), p.125.
- Vos, J., Vučković, M., Chen, X., Han, Z., **Boudreaux, E. M.**, Barlow, B. N., Østensen, R., Németh, P., 2019, “[The orbital period — mass ratio relation of wide sdB+MS binaries and its application to the stability of RLOF.](#)”, *Monthly Notices of The Royal Astronomical Society*, **482**, 4592

COMPUTING SKILLS

- *Programming Languages:*
 1. *Expert:* Python, C, C++, Fortran
 2. *Comfortable:* Arduino, PHP, JavaScript, Mathematica
 3. *Familiar:* Go, Rust
- *Web Backend Technologies:* Flask, MongoDB, MySQL, MariaDB
- *Misc:* Period04, Docker, GitHub, ZFS, LaTeX, Bash, Zsh

INTERNSHIPS

- **Harvard Smithsonian Astrophysical Observatory**, 2018
Harvard SAO REU Student
- **Space Telescope Science Institute**, 2016
SASP Summer Intern

AWARDS & HONORS

- **Dartmouth College Department of Physics & Astronomy** 2024
Selamawit Tsehaye Teaching Award
- **Dartmouth College Department of Physics & Astronomy** 2019
Department Chair Fellowship
- **The National Science Foundation**, 2019
Graduate Record Fellowship Program Honorable Mention
- **High Point University**, 2019
University Award for Highest Achievement
- **High Point University Honors Scholar Program**, 2019
All University Honors
- **The Barry Goldwater Scholarship and Excellence in Education Foundation**, 2018
Goldwater Scholar in Mathematics, Science, and Engineering
- **High Point University Department of Physics**, 2018
Endowed Scholarship

- **National Collegiate Honors Council**, 2018
Portz Scholarship
- **Sigma Xi, The Scientific Research Honors Society**, 2018
Elected Associate Member
- **Sigma Pi Sigma, National Physics Honor Society**, 2018
Elected Member
- **The Barry Goldwater Scholarship and Excellence in Education Foundation**, 2017
Honorable Mention for excellence in Mathematics, Science, and Engineering
- **High Point University**, 2015–2019
Presidential Scholarship

SELECTED ORAL PRESENTATIONS

- **National Collegiate Honors Council Annual Meeting**, 2018, Boston, MA
“The Applications of Deep Neural Networks to sdBV Classification” [Invited]
- **North Carolina Astronomers Meeting**, 2017, Greensboro, NC
“The Applications of Deep Neural Networks to sdBV Classification”
- **Eighth Annual Meeting on Hot Subdwarfs and Related Objects**, 2017, Kraków, Poland
“The Applications of Deep Neural Networks to sdBV Classification”
- **High Point University Research and Creative Works Symposium**, 2017, High Point, NC
“A Virtual Survey of all known Hot Subdwarfs – searching for p-mode pulsations with GALEX”
- **Meeting of Astronomers in South Carolina**, 2017, Greenville, SC
“The Applications of Deep Neural Networks to Time Domain Astrophysics”

SELECTED POSTER PRESENTATIONS

- **21st Meeting on Cool Stars**, 2022, Toulouse France
Updated High-Temperature Opacities for DSEP and Their Effect on the Jao Gap Location
- **233rd Meeting of the American Astronomical Society**, 2019, Seattle Washington
“[A Journey to Mars: HPUniverse Day and Its Impact on Young Minds and a Community.](#)”
- **233rd Meeting of the American Astronomical Society**, 2019, Seattle Washington
“[Effects of the Primordial Binary Fraction on the Evolution of Globular Clusters.](#)”
- **231st Meeting of the American Astronomical Society**, 2018, Washington D.C.
“[Using Deep Learning to Analyze the Voices of Stars.](#)”
- **227th Meeting of the American Astronomical Society**, 2016, Kissimmee, FL
“[New Long Period Hot Subdwarfs from the Hobby-Eberly Telescope](#)”

TEACHING EXPERIENCE

- **High Point University**, 2016,2017
Multivariable Calculus (*MTH 2410*, SI)
- **Dartmouth College**, 2022
Advanced Stellar Astrophysics (*Astr 115*, TA)
- **Dartmouth College**, 2021,2022
Public Observing (TA)
- **Dartmouth College**, 2020
Introductory Mechanics (*Phys 13*, TA)

- **Dartmouth College**, 2020, 2023
Introductory Solar System Astronomy (*Astr 1*, TA, 4 Lectures)
- **Dartmouth College**, 2023
Stars and the Milky Way (*Astr 15*, TA)
- **Dartmouth College**, 2024
The Development of Astronomical Thought (*Astr 4*, TA)

MENTORSHIP & STUDENTS

- **Renata Edaes Hoh**, **Dartmouth College**, **WISP**, 2022
Identifying zero point offsets between absolute and differential photometry the globular cluster NGC 2808.
- **Mayumi Liz de Andrade Miyazato**, **Dartmouth College**, **WISP**, 2023
Identifying zero point offsets between absolute and differential photometry the globular clusters NGC 6752 & 47 Tuc.

SELECTED SOFTWARE

All of my software can be found on my [GitHub](#) page.

- [CoolDwarf](#) — Three dimensional brown dwarf structure cooling model.
- [fidanka](#) — Robust CMD fiducial line extractor and isochrone fitter.
- [pyTOPSScrape](#) — Custom python API for the Los Alamos OPLIB High-Temperature Opacities tables.
- [mplEasyAnimate](#) — Simple and easy animation library for use with matplotlib.
- [pubPolishPy](#) — Automatically rebuilt LaTeX project to target different journals.
- [splitAxes](#) — An easy way to build complex split axes graphs in matplotlib.
- [PolytropicStellarModel](#) — A blazingly fast, GPU accelerated, polytrope solver.

VOLUNTEER WORK

- **Dartmouth College**, 2024
Dartmouth Astronomy Night
- **Dartmouth College**, 2023–2024
Dartmouth Physics and Astronomy Graduate Curriculum Committee
- **Dartmouth College**, 2020,2021,2022,2023
Public Observing
- **The Hopkins Center for the Arts**, 2022
Pre-Movie Public Science Talk
- **Montshire Museum of Science**, 2020,2022,2023
Astronomy Day – Comet Making, Ask an Astronomer, Star Clock
- **High Point University**, 2015,2016,2017,2018,2019
HPUniverse Day – Finding Exoplanets

RESEARCH PROJECTS

- The effects of OPLIB opacities and multiple populations on the location of the Red Giant Branch Bump, 2024–
- The Jao Gap width and location as a population age indicator, 2022–
- The effect of Opacities on the location of the Jap Gap, 2021–2023
- Modifying the Dartmouth Stellar Evolution Program to fully self consistently handle increased He abundance, 2020–
- The Ca II H&K Rotation-Activity Relation in 50 early-to-late type M-dwarfs, 2019–2020.

- Effects of the Primordial Binary Fraction on Globular Cluster Evolution, 2018
- Applications of Deep Learning to Classification of PTF Data, 2018
- Applications of Machine Learning to the Classification of Pulsating Stars, 2017–2018
- A Search for Rapidly Pulsating Hot Subdwarfs in the GALEX Survey, 2016–2017
- Orbital Solution Analysis of Long Period sdB+F/G/K Binaries, 2015–2016