Thomas M. Boudreaux

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RESEARCH INTERESTS

Computational astrophysics, stellar evolution, machine learning, pulsating hot subluminous B stars, chaotic systems.

EDUCATION

Dartmouth College — Hanover, NH

Master of Science — Astronomy — May 2022
Advisor: Brian C. Chaboyer
Secondary Advisor: Elisabeth R. Newton

Doctor of Philosophy —- Astronomy — Spring 2024 (expected)

High Point University — High Point, NC

Bachelor of Science, **summa cum laude** — Computational Physics — May 2019
Advisor: Brad N. Barlow

PUBLICATIONS

- **Boudreaux, T.M.**, Chaboyer, B.C., 2022. Updated High-Temperature Opacties for the Dartmouth Stellar Evolution Program and their Effect on the Jao Gap Location, *The Astrophysical Journal*. **submitted**
- **Boudreaux, T.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
- Guidry, J.A., Vanderbosch, Z.P., Hermes, J.J., Barlow, B.N., Lopez, I.D., **Boudreaux, T.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., Vučkovič, M., Chen, X., Han, Z., **Boudreaux, T. M.**, Barlow, B. N., Østensen, R., Nèmeth, 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
- **Boudreaux, T. M.**, 2017, "The applications of deep neural networks to sdBV classification", *Open Astronomy*, **26**, 258.
- **Boudreaux, T. 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.

PROCEEDINGS

- Vos, J., Vučkovič, M., Chen, X., Han, Z., **Boudreaux, T. M.**, Barlow, B. N., Østensen, R., Nèmeth, P., 2019, "Using wide hot subdwarf binaries to constrain Roche-lobe overflow models", *Contrib. Astron. Obs. Skalnaté Pleso*, **49**, 264

COMPUTING SKILLS

- *Programming Languages:*
  1. *Expert:* Python, C/C++
  2. *Comfortable:* Fortran 77/90/95, Arduino, PHP, JavaScript, Mathematica
  3. *Familiar:* LabView, Go, Rust
- *Web Backend Technologies:* Flask, MongoDB, MySQL, MariaDB
- *Misc:* Period04, Docker, GitHub, ZFS, LaTeX, Bash, Zsh

AWARDS & HONORS

- **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, Krakòw, 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 Opacties 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

- **Dartmouth College**, 2022
  Advanced Stellar Astrophysics (*Astr 115*)
- **Dartmouth College**, 2021,2022
  Public Obsserving Teaching Assistant
- **Dartmouth College**, 2020
  Introductory Mechanics Teaching Assistant (*Phys 13*)
- **Dartmouth College**, 2020
  Introductory Solar System Astronomy (*Astr 1*)

JOBS & INTERNSHIPS

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

SOFTWARE

All of my software can be found on my GitHub page.

- pyTOPSScrape — Custom python API for the Los Alamos OPLIB High-Temperature Opacties tables.
- mplEasyAnimate — Simple and easy animation library for use with matplotlib.
- astroSynth — Synthetic pulsating star light curve generation suite.
- pyBJD — Python bindings for Ohio state UTC to BJD conversion. [Deprecated]
- vectorPy — Python 3–vector package.

RESEARCH PROJECTS

- The Jao Gap width and location as a population age indicator, 2022-
- The effect of Opacties on the location of the Jap Gap, 2021-
- Modifying the Dartmouth Stellar Evolution Program to fully self consistantly handel 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