

## Thomas M. Boudreaux

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19 Drake Lane  
West Lebanon, New Hampshire 03784  
(571)-428-8828  
thomas@boudreauxmail.com

### RESEARCH INTERESTS

Computational astrophysics, stellar evolution, machine learning, pulsating hot sub-luminous 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 Opacities for the Dartmouth Stellar Evolution Program and their Effect on the Jao Gap Location, *The Astrophysical Journal*. **In. Pres.**
- **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., Vučković, M., Chen, X., Han, Z., **Boudreaux, T. 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
- **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., Vučković, M., Chen, X., Han, Z., **Boudreaux, T. M.**, Barlow, B. N., Østensen, R., Németh, 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, 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

- **Dartmouth College**, 2022  
Advanced Stellar Astrophysics (*Astr 115*)
- **Dartmouth College**, 2021,2022  
Public Observing 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 Opacities 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 Opacities on the location of the Jap Gap, 2021-
- Modifying the Dartmouth Stellar Evolution Program to fully self consistently 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