# BENJAMIN RICHARD ROULSTON

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## EDUCATION

**Boston University** *September 2016 - Present*
Ph.D., Astronomy — in progress
Masters, Astronomy — May 2018

**Clarkson University** *September 2013 - May 2016*
B.S., Physics with University Honors, Minor in Mathematics

## RESEARCH EXPERIENCE

**Radial Velocity Variations of Dwarf Carbon Stars** January 2017 - Present

- Used multi-epoch spectroscopy for a sample of 245 dwarf carbon (dC) stars from the SDSS-IV Time Domain Spectroscopic Survey (TDSS) to measure radial velocity shifts.
- Used multi-epoch spectroscopy of stars in SDSS-IV to build control sample, and measured their radial velocity shifts.
- Used statistical testing methods and a Hierarchical Bayesian inference model to determine if the dC population is consistent with a 100% binarity, in order to confirm binary mass-transfer as source of excess atmospheric C.

**Spectral and Photometric Variability of the Eclipsing LBV R81** April 2015 - June 2016
*Clarkson University Honors Research Project*

- Used 28 epochs of spectra to measure the variability of spectral lines, mainly H$\alpha$.
- Used spectral line variability coupled with photometric light curves of the eclipse to constrain geometric configurations of the binary with possible circumbinary material.
- Used this geometric constraint and spectral variability to search for signatures of mass-transfer.

## TEACHING EXPERIENCE

**Boston University** Fall 2016, Spring 2017, Fall 2017, Spring 2018
*Teaching Fellow*

- Courses Taught: AS101, AS202, AS203
- Conducted lab sections of undergraduate non-major and major students.
- Taught students basics of error analysis and propagation, mechanics, and basic observing techniques including: imaging, spectroscopy.
- Introduced students to basic computer programming in Python using Astropy and SDSS spectra

**Clarkson University** Spring 2015, Fall 2015, Spring 2016
*Teaching Assistant*

- Courses Taught: PH131, PH132
- Conducted both discussion and lab sections for undergraduate non-major and major students.
- Taught students concepts in mechanics and E&M including: statics, dynamics, rotation, charges, currents, induction, Gauss's Law, etc.

## OBSERVING EXPERIENCE

**Perkin's Telescope - Lowell Observatory** 11/10/2017 - 11/12/2017

· Two nights in observer mode — Infrared Spectroscopy

**Mont Mégantic Observatory** 07/08/2015 - 07/10/2015

· Two nights in observer mode — Optical Spectroscopy

**Clarkson University Reynolds Observatory** May 2014 - June 2016

· Observed multiple objects over the course of approximately two years as part of research project and as assistant to astronomy course.

## DATA ANALYTICS SKILLS

| | |
|---|---|
| **Programming Languages** | Python, IDL, MATLAB, C++, SQL, Bash |
| **Python Packages** | Astropy, Pandas, Matplotlib, Numpy, Scipy |
| **Software & Tools** | IRAF, LaTeX, Excel, Mathematica, HTML |

## ACHIEVEMENTS

Clarkson University Physics Department Outstanding Senior Award *May 2016*

## OUTREACH

Boston University Center for Space Physics Science for Kids Day *June 15, 2018*
Boston University Observatory Public Nights *Fall 2016 - Present*
Clarkson University Roller Coaster Camp — Counselor *Summer 2014, Summer 2015*

## CONFERENCES

Cool Stars 20 — Poster *July 29 - August 3, 2018*
Clarkson University SURE Conference — Talk *July 2015*
Syracuse University Undergraduate Research Day — Talk *November 2014*
Clarkson University SURE Conference — Talk *July 2014*
Clarkson University SURE Conference — Poster *July 2013*

## PUBLICATIONS

**Roulston, B. R.**, Green, P.J., + 2018, in prep