

SOLICITATION TITLE: CONTACT BINARIES IRL
SOLICITATION DEADLINE: JANUARY 31 2020
SOLICITATION SPONSOR: ANGELA KOCHOSKA
SOLICITATION FUNDING: NOT SECURED

SOLICITATION SUMMARY

Post-doctoral fellow Angela Kochoska is seeking an undergraduate student for a summer research opportunity to work on the implementation of advanced treatment of contact binary stars in the PHOEBE code. The appointment is for 10 weeks, starting on June 1, 2020. The student will learn the deficiencies of the current implementation, the physics of the contact binary interior structure and evolution and why they break many of the assumptions made when using PHOEBE for their analysis. To provide a more robust model, the student will build an interface between hydrodynamical simulations of contact binaries using the Flow-er and Octo-tiger codes and the PHOEBE mesh. The final goal of this project is to analyze Kepler data on contact binaries and demonstrate the discrepancies in the results obtained when using the current, simplistic approach and the proposed, more robust model.

APPLICATION REQUIREMENTS

The research position is open to all Villanova undergraduates that are majoring in astronomy or a closely related field. Some experience with coding in `python` is preferred but not mandatory.

Applicants need to provide:

- a current CV that highlights commitment to excellence in the applicant's current field of study;
- a 3-page proposal that discusses the scientific background and proposed work timeline;
- a 1-page narrative on expected outcomes and procedures; and
- a 1-page personal statement that conveys the suitability and interest of the applicant.

To apply for this position, interested students need to submit their applications by the deadline in the form of a single pdf document via email to angela.kochoska@villanova.edu. Any applications received after the deadline will be returned without review.

USEFUL SOURCES

The following sources can be used in the preparation of the applicant's proposal:

- PHOEBE 2 paper: [2016ApJS..227...29P](#)
- COBAIN paper, sections 1 and 2: [arXiv:1804.08781](#)
- Application of the Flow-er and Octo-tiger codes: [2018MNRAS.481.3683K](#)

Applicants are also encouraged to use their own sources.

OUTCOME ANNOUNCEMENT

The review process will begin February 1st 2020 and the position will be offered to the highest ranking applicant no later than February 14th. The solicitation will be closed if the applicant accepts the offer, otherwise it will be offered to the next highest ranking applicant until the position is filled.