

SOLICITATION TITLE: Optimizing EB Follow-Up Strategies for Model Uncertainties
SOLICITATION DEADLINE: Jan 31, 2020
SOLICITATION SPONSOR: Dr Kyle Conroy
SOLICITATION FUNDING: VURF/Department

With the advent of high-precision photometric surveys (including Kepler), the Eclipsing Binary (EB) field has had to shift from modeling individual systems from ground-based photometry to ingesting large quantities of data and using automated pipelines for initial analysis. Eclipse timing variations (ETVs) have been measured across the Kepler EB dataset as a way to search for triple systems. However, the limited time baseline of Kepler has limited our sensitivity to long-period triple star systems. The selected student will develop a code capable of fitting third body orbits to ETVs, determine the uncertainties on the resulting orbital parameters, extrapolate the uncertainties of these orbital parameters onto the model forward in time, and determine a method for optimizing follow-up of eclipse timing variations into the future to attempt to minimize the uncertainties and maximize the science output.

SOLICITATION REQUIREMENTS:

The research position is open to all Villanova undergraduates that are majoring in astronomy or a closely related field. Experience with Python is preferred. 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. Only electronic submissions are accepted; email your applications to kyle.conroy@villanova.edu. Any applications received after the deadline will be returned without review.

SOLICITATION DOCUMENTS:

In order to prepare a strong proposal, the following sources might be useful:

- Kepler EB ETVs paper (Conroy+ 2014)
- Kepler EBs catalog: <http://keplerebs.villanova.edu>

In addition to these, applicants are encouraged to use their own sources of information.

SOLICITATION OUTCOME ANNOUNCEMENT:

The review of solicitation material will begin on Feb 1, 2020 and a short-list will be assembled by Feb 14, 2020. The highest-ranking candidate will be informed and offered a position. In the event that the highest-ranking candidate accepts the position, the solicitation will be closed. Otherwise the position will be offered to the next highest ranking applicant until the position is filled.