

# Martin Lopez Jr.

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## Education

**University of California, Santa Cruz**  
**PHYSICS (ASTROPHYSICS) B.S., SUMMA CUM LAUDE**

*Santa Cruz, CA*  
*2018*

- Overall GPA: 4.0, Highest Honors in the Major

## Computational Skills

### PROFICIENT

- Python
- Fortran
- Shell Scripting
- Supercomputer Batch Scripting
- LaTeX

### FAMILIAR

- C/C++
- MATLAB
- HTML/CSS

## Experience

### Astrophysics Researcher

*UC Santa Cruz*

#### PROJECTS

*2016-2019*

- **Stellar Mass Binary Black Hole Systems**
  - Studied stellar mass binary black hole systems resulting in two refereed-journal publications, including one first-author paper.
  - Used Python to create initial condition files for the hydrodynamic code, GADGET, to run simulations of these systems.
  - Used Python to create visualizations and perform statistical analysis for the publication.
  - Used visualization software to create animations of simulation output.
- **Eccentric X-ray Binary Systems**
  - Successfully implemented binary stellar wind emission into the hydrodynamic simulation code written in Fortran, FLASH.
  - Used Python to visualize and analyze simulation output to study mass accretion rates, eccentricity time dependency, and fluid stream morphology.
- **Red Giant - Star Collisions:**
  - Presented a poster our findings to a multi-disciplinary audience.
  - Used the Python package NumPy to simulate collisions using meshgrids.
  - Used Python to create initial conditions for simulations run in the hydrodynamic code, GADGET.
  - Used visualization software to create animated visualizations of GADGET simulations.
  - Used Python to create visualizations for poster.

## Publications

“Tidal Disruptions of Stars by Binary Black Holes: Modifying The Spin Magnitudes and Directions of LIGO Sources in Dense Stellar Environments”, **MARTIN LOPEZ JR.**, ALDO BATTÀ, ENRICO RAMIREZ-RUIZ, IRVIN MARTINEZ, JOHAN SAMSING. 2019, THE ASTROPHYSICAL JOURNAL, ACCEPTED TO APJ.

“Probing the Black Hole Merger History in Clusters using Stellar Tidal Disruptions”, JOHAN SAMSING, TEJASWI VENUMADHAV, LIANG DAI, IRVIN MARTINEZ, ALDO BATTÀ, **MARTIN LOPEZ JR.**, ENRICO RAMIREZ-RUIZ, KYLE KREMER. 2019, PHYSICAL REVIEW D, ACCEPTED TO PHYSREV D.

## Honors & Awards

2019	Harvard Graduate School of Arts and Sciences Prize Fellowship
2019	NSF Graduate Research Fellowship Honorable Mention
2017	UCSC Women's Club Scholarship (Re-Entry Scholarship)
2016-2017	Ron Ruby Memorial Scholarship
2015-2017	Karl S. Pister Leadership Opportunity Award