

Martin Lopez Jr.

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Education

University of California, Santa Cruz

Santa Cruz, CA

PHYSICS (ASTROPHYSICS) B.S., SUMMA CUM LAUDE

2018

- Advisors: Prof. Enrico Ramirez-Ruiz and Dr. Aldo Batta
- Overall GPA: 4.0, Highest Honors in the Major

Mission College

Santa Clara, CA

- Overall GPA: 3.92

2011 - 2015

Research Interests

Theoretical and computational astrophysics, transients, high energy astrophysics, compact objects, formation channels of LIGO sources.

Research Experience

Junior Specialist

UC Santa Cruz

ADVISOR: PROF. ENRICO RAMIREZ-RUIZ

2018-Present

- Study the structure of binary black hole tidal disruption events using numerical tools such as SPH and FLASH.

Undergraduate Research Fellow, Supercomputer Lab for Undergraduates

UC Santa Cruz

ADVISORS: PROF. ENRICO RAMIREZ-RUIZ AND DR. ALDO BATTÀ

2016 - 2018

- Use 3D Lagrangian hydrodynamic simulations and analytic methods to study dense stellar systems (globular clusters and galactic nuclei). Specifically, the physical and tidal interactions within them.

Open Questions in Astrophysics Program

Niels Bohr Institute

ADVISOR: PROF. ENRICO RAMIREZ-RUIZ

2018

- Gain exposure to cutting-edge research in various fields of astrophysics such as high energy astrophysics, star formation, galaxy dynamics, and cosmology. Discuss issues of diversity and inclusion in the astronomy community.

NBIA & DARK Summer School: Multi-Messengers from Compact Sources

Niels Bohr Institute

ADVISORS: PROF. ENRICO RAMIREZ-RUIZ AND DR. ALDO BATTÀ

2018

- Study how tools from an array of disciplines can be utilized to better understand gravitational wave and electromagnetic sources.

Kavli Summer Program in Astrophysics

Niels Bohr Institute

ADVISORS: PROF. ENRICO RAMIREZ-RUIZ AND DR. ALDO BATTÀ

2017

- Study tidal disruptions of stars by LIGO binary black holes to understand the evolution of their individual spins.

NSF Research Experience for Undergraduates, Lamat

UC Santa Cruz

ADVISORS: PROF. ENRICO RAMIREZ-RUIZ AND DR. ALDO BATTÀ

2016

- Study physical encounters between compact objects and red giants using analytical methods.
- Use order of magnitude estimates to calculate rates of collisions and significance of feedback energy on the system.

Computational Skills

HYDRODYNAMICS

- Proficiency in the Lagrangian Smoothed Particle Hydrodynamic (SPH) formulated code GADGET-3 (Springel, V.). GADGET-3 utilizes MPI.

PROGRAMMING LANGUAGES

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

SUPERCOMPUTERS

- University of Copenhagen HPC@UCPH Cluster
- UC Santa Cruz Hyades Cluster

Publications

“PROBING THE BLACK HOLE MERGER HISTORY IN CLUSTERS USING STELLAR TIDAL DISRUPTIONS”, JOHAN SAMSING, TEJASWI VENUMADHAV, LIANG DAI, IRVIN MARTINEZ, ALDO BATTA, **MARTIN LOPEZ JR.**, ENRICO RAMIREZ-RUIZ, KYLE KREMER. 2019, SUBMITTED.

“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 BATTA, ENRICO RAMIREZ-RUIZ, IRVIN MARTINEZ, JOHAN SAMSING. 2018, THE ASTROPHYSICAL JOURNAL, ACCEPTED TO APJ.

Honors & Awards

2019	Harvard Graduate School of Arts and Sciences Prize Fellowship
2017	UCSC Women's Club Scholarship (Re-Entry Scholarship)
2016-2017	Ron Ruby Memorial Scholarship
2015-2017	Karl S. Pister Leadership Opportunity Award
2012-Present	Dean's Honor List

Presentations

Poster, High Energy Astrophysics Division 17th Meeting	Monterey, CA
<i>Tidal Disruptions by Binary Black Holes in Dense Stellar Systems</i>	2019

Talk, Transient Lunch	UC Santa Cruz
TIDAL DISRUPTIONS OF STARS BY BINARY BLACK HOLES	2018

Talk, TDE Meeting	UC Santa Cruz
<i>Tidal Disruptions by Binary Black Holes: Altering Birth Spin Magnitude and Direction</i>	2018

Presentation, UC Board of Regents Meeting	San Francisco, CA
<i>The Benefit of Undergraduate Research</i>	2018

Poster, American Astronomical Society 231st Meeting	Washington, DC
<i>Understanding The Spin Evolution of LIGO Sources</i>	2018

Talk, Dynamically Assembled Binaries at the Beach Program <i>Understanding The Spin Evolution of LIGO Sources</i>	<i>UC Santa Cruz</i> 2017
Talk, Department Funding Presentation <i>Red Giant Depletion Through Collisions in Dense Stellar Systems</i>	<i>UC Santa Cruz</i> 2017
Talk, Prof. Ruth Murray-Clay Group Collaboration Presentation <i>Red Giant Depletion Through Collisions in Dense Stellar Systems</i>	<i>UC Santa Cruz</i> 2017
Poster, Undergraduate Research Symposium <i>The Extermination of Stars Through Collisions</i>	<i>UC Santa Cruz</i> 2016

Outreach, Services, and Experiences

Math and Physics Academic and Test Prep Tutor AJ TUTORING	<i>AJ Tutoring</i> 2019-Present
High School Spring Into STEM Day SLUG Lab Tour Host STEM DIVERSITY	<i>UC Santa Cruz</i> 2019
STEM Transfer Day SLUG Lab Tour Host STEM DIVERSITY AND STARS	<i>UC Santa Cruz</i> 2016-2018
COMET Mentor STARS	<i>UC Santa Cruz</i> 2016
Tutor, Introduction to Scientific Computing LEARNING SUPPORT SERVICES	<i>UC Santa Cruz</i> 2016
Free Tutoring Services, Math MUSLIM COMMUNITY ASSOCIATION	<i>Santa Clara, CA</i> 2015
Peer Mentor, Arithmetic and Elementary Algebra AANAPISI	<i>Mission College</i> 2014-2015
Tutor, Physics, Math, Statistics, Chemistry, and English ACADEMIC SUPPORT CENTER	<i>Mission College</i> 2014-2015

Languages

ENGLISH AND SPANISH (NATIVE)
ARABIC (INTERMEDIATE)