# David Cruz Lopez

Chicago, IL


**Research Interest**

I am interested in the used of computational fluid dynamics code to model various astrophysical events. I have used CFD to model tidal disruption events, white dwarf star collisions, common envelope phase, and AGN galactic feedback. During my graduate studies, I am interested in developing sub-grid and numerical methods to reduce to connect microphysics to global simulations to overcome the computational cost limits in astrophysical simulations.

**EDUCATION**

**New York University**, NYC, NY 2024-2026
*Masters Degree*, Scientific Computing

**University of Illinois**, Urbana, IL 2022
*Bachelor of Science*, Engineering Physics
Concentration: Computer Science

**Research Experience**

- **Post-Bachelor Research Assistant**, *University of Illinois* 2023 - Present
  Coupled AGN galactic feedback to accretion disk model using the hydrodynamics of FLASH code.
- **Graduate DSTI Intern**, *Lawrence Livermore National Laboratory* 2023
  Conducted convergence study of Type Ia Supernovae from colliding white dwarf stars using the hydrodynamics of Cosmos++ code
- **Undergraduate DSTI Intern**, *Lawrence Livermore National Laboratory* 2022
  Improved computational simulations of Type Ia supernovae in Cosmos++ to include stellar profiles generated from Mesa and dipole magnetic field configurations
- **Research Assistant**, *University of Illinois* 2021-2022
  Developed a 1D common envelope inspiral model using the Mesa hydrodynamics to investigated envelope ejection
- **URAP Apprenticeship**, *University of Illinois* 2020
  Ran simulations in python of merging binary neutron stars to study the impact of supernovae kicks to their gravitational wave signature

**Awards and Honors**

**GSAS Dean Master's Scholarship** 2024-2026
**1st Place Illini AstroFest Poster Award** 2022
**Fred S. Bailey Scholarship** 2018

**Skills**

**Languages**: Python, FORTRAN, C++, Java, LaTeX.
**Software**: Linux, Git, Anaconda, Flash, Mesa, Cosmos++, Ansys

**Talks**

1. **DSTI Exit Talk**, Lawrence Livermore National Laboratory 2023
   *Convergence studies for nuclear ignition in binary white dwarf stars collisions*

**Posters**

1. **DSTI Slam Sessions**, Lawrence Livermore National Laboratory 2023
   *Convergence studies for nuclear ignition in binary white dwarf star collisions*
2. **Illini AstroFest**, University of Illinois 2023
   *Modeling 1D Accretion Disk onto 3D Active Galactic Nuclei sink particle simulation*
3. **Illini AstroFest**, University of Illinois 2022
   *Incorporating the Donor Star Response in 1D Simulations of Common Envelope Evolution*
4. **American Astronomical Society 236**, Virtual 2020
   *On the Formation of Double Neutron Stars: Supernova Kicks and Gravitational Waves*

5. **University Spring Research Symposium**, University of Illinois 2020
   *On the Formation of Double Neutron Stars and Pulsar Binaries from Supernova Natal Kicks*

**Teaching Experience**

**ENG 100/199 Teaching Assistant**, University of Illinois 2020-2021
**OMSA STEM Tutor**, University of Illinois 2018-2020

**Outreach Service Experience**

**WYSE Student Mentor**, University of Illinois 2018-2020
**WYSE Summer Camp Counselor**, University of Illinois 2020
**GFX Residential Advisor**, University of Illinois 2019

**Publications**

1. Anninos, **Cruz Lopez**, *Convergence Resolution Study for Type Ia SN in Colliding White Dwarf Stars*, In Prep. 2024
2. Khan, **Cruz Lopez**, Celeste Lu, Ricker, *Subresolution Modeling of Black Hole Feedback using Model Accretion Disks* In Prep. 2024
3. Holgado, **Cruz Lopez**, Herrera, Ricker, *Gravitational Waves and Radiation Reaction from Interacting Binaries* In Prep. 2020