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# Edgar Perez Vidal

Undergraduate Student Researcher

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## EDUCATION

**University of California, Berkeley,**  
*B.A. Physics and Honors Candidate in Astrophysics GPA: 3.629/4.000*

Berkeley, CA  
*expected Dec 2023*

## SKILLS

**Programming Languages** Python,  $\text{\LaTeX}$ , LabVIEW, HTML  
**Technologies** GitHub, Adobe Lightroom and Photoshop, Google Drive.  
**Libraries** Numpy, Scipy, Astropy, PyTorch, Pandas, PYMC, Astroquery, Jupyter, Matplotlib  
**Communication** Spanish (Native), English, French (elementary)

## RESEARCH EXPERIENCE

### Undergraduate Researcher

**Feb 2022 — Present**

*Zwicky Transient Facility (ZTF) and Nickel Observer under Alex Filippenko*

*Berkeley, CA*

- **Developed and implemented** interactive software in python to analyze and track the spectral evolution of normal Type Ia Supernovae, leveraging our group's Supernova Database.
- **ZTF Remote Checker:** Collaborating with the ZTF team, I contribute to the search for supernova candidates. As part of my role, I thoroughly review data from the previous night, identifying potentially interesting candidates and recommending follow-up observations.
- **Nickel 1 Meter Observer:** Monthly overnight observer on the Nickel at Lick Observatory.
  - Successfully completed training and certification as a Nickel observer, conducting observations for 15+ nights.

### Astromatic Hackathon

**Aug 2023**

*Ciela Institute*

*Montreal, Canada*

- Selected as one of 16 participants for Astromatic 2023, a week-long program that united undergraduate students worldwide interested in artificial intelligence, machine learning, and astrophysics.
- Engaged in lectures, workshops, and a hackathon competition at the intersection of astrophysics and machine learning, fostering teamwork, creativity, and impactful project development. The program included career seminars, science talks, programming sessions, and networking events.

### Institut de Recherche en Astrophysique et Planétologie (IRAP)

**June 2023 — Aug 2023**

*Research intern under Florian Sarron & Nicolas Clerc*

*Toulouse, France*

- **Developed** a galaxy cluster matching algorithm to find the SDSS Temple Groups associated with an x-ray emission detected by the XCLASS cluster sampled with confirmed spectroscopic redshift.
- **Performed statistical analysis** of the scaling relationship between the mass of the XCLASS galaxy cluster and the cosmic web filament connectivity using the skeleton provided by the SDSS.
- **Validated** simulations from the Eagle Project by comparing the distribution of the distance between the X-ray emission from the inter-cluster medium to its associated node in the cosmic filament, proving that the distance was proportional to the mass of the galaxy cluster.

## PROFESSIONAL EXPERIENCE

### Stellar Physics Course Reader

**Aug 2022 — Dec 2022**

*University of California, Berkeley*

*Berkeley, CA*

- Graded student problem sets and final research papers for an upper-division physics course.
- Provided detailed feedback and comments on student coursework on their methods and analysis, as well as programming and computational skills.

### Academic Mentor

**Feb 2021 — Dec 2022**

*Calculus Round Table*

*Oakland, CA*

- **Facilitated** engaging instruction for K-5 classrooms, overseeing 20+ students, and conducted personalized one-on-one tutoring sessions with high school students. Covered subjects included biology, math, astronomy, and Python programming, with an emphasis on empowering and supporting underprivileged schools within the West Contra Costa Unified School District.

- **Developing curriculum**, specifically on technology use, to effectively teach classroom during COVID-19 stay-at-home order.
- **Assisted** students at the Juvenile Justice Center in San Leandro, CA by providing valuable guidance and mentorship, aiding them in formulating a post-release plan to embark on a new life.

### **Wolf Kitchen Manager**

**Aug 2021 — Aug 2022**

*Berkeley Student Cooperative*

*Berkeley, CA*

- **Uphold and Maintain** professional kitchen standards for Wolf House (30 members) working 20h per week.
- **Budget** \$20,000 worth of Food and Supplies for the House, providing weekly budget reports for members.
- *ServeSafe Certified*

### **R.I.S.E Mentor**

**Aug 2020 — Sept 2021**

*Berkeley High School*

*Berkeley, CA*

- Mentor and tutor students from underprivileged backgrounds and coach them to be college ready.

## **RESEARCH PROJECTS**

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### **Derivation and Simulation of Photon Trajectory from the Schwarzschild Metric**

**Spring 2022**

*Astro 161*

- Derived the photon trajectories of a non-rotating black hole using the Schwarzschild metric and simulated them using a Python code. I presented my project in a research paper format along with a 30-second animation of the photon orbits.

### **Beat Frequency Metal Detector**

**Spring 2022**

*Physics 111a*

- Designed a beat frequency metal detector using circuit elements such as op-amps, mixers, feedback loops, and JFETS. The metal detector was tuned using software programs such as Diligent, LabView, and SPICE.

### **Stellar Environment and Its Influence on Super Massive Black Holes**

**Fall 2021**

*Astro 160*

- Final Research paper where I contemplated the origins of Super Massive Black Holes at the center of Galaxies by referencing peer-reviewed papers from the Astrophysical Journal and producing an original figure of the  $M-\sigma$  Relationship.

### **Gravitational Lensing Project**

**Fall 2021**

*Python Decal*

- Exploration group project on the topic of Gravitation Lensing. We created figures that plotted the Einstein Angle in terms of Lens Mass, and magnification of different mass lenses using Python. After collecting all the figures, we presented our findings including computational methods and figures to our Python Decal Class and course staff.

## **AWARDS**

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- LSAMP NSF International Center of Excellence (NICE) fellowship.
  - Selected to participate in the summer of 2023 at the Institut de Recherche en Astrophysique et Planétologie (IRAP) associated with the Université Paul Sabatier, Toulouse III and the Centre National de la Recherche Scientifique (CNRS).
- NFS CAMP/LSMAP fellowship.
- Rose Hill Foundation Scholarship
- California Middle-Class Scholarship
- Berkeley CARES award
- Berkeley Scholarship
- Simon Family Foundation Scholarship

## **CONFERENCES**

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- **2023 NSF CAMP Statewide Symposium & Special Merit Award** recipient for my research talk: Population Study of the Velocity of Silicon II Lines in Type Ia Thermonuclear Supernova Explosions.
- **2022 NDISTEM First Time Attendee** and travel grant recipient from UC Berkeley for the National Diversity in STEM conference held in San Juan, Puerto Rico, and hosted by SACNAS in October 2022.

## **ACTIVITIES**

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- Hispanic Engineers and Scientist Club Member
- Undergraduate Astronomy Society member