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Edgar Perez Vidal

Astrophysics Researcher

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Education

Tufts University — Medford, MA
Ph.D. Physics: Astrophysics — Expected 2030
M.S. Physics: Astrophysics — Expected 2026
University of California, Berkeley — Berkeley, CA
B.A. Physics and Astrophysics GPA: 3.66 — *2023*

Publications

- Alvarado III, Efrain; Bostow, Kate B.; Patra, Kishore C.; Jacobus, Cooper H.; *et al.* (16 other co-authors including **Vidal, Edgar P.**), 2024, Searching for Tidal Orbital Decay in Hot Jupiters, *MNRAS*, **534**, 1 (arXiv:2409.04660)
- Kong, De-Feng; Wang, Xiang-Gao; Zheng, WeiKang; Lu, Hou-Jün; *et. al* (9 other co-authors including **Vidal, Edgar P.**), 2023, GRB 221009A/SN 2022xiw: A Supernova Obscured by a Gamma-Ray Burst Afterglow?, *ApJ*, **971**, 56 (arXiv:2407.00639)
- **Vidal, E.**; Zheng, W., Filippenko, A. V.; & KAIT GRB team. 2022, GRB 221009A/Swift J1913.1+1946: Lick/Nickel telescope optical observations, *GRB Coordinates Network*, **32669**, 1

Skills

Programming Languages	Python , LaTeX, HTML, LabVIEW
Technologies	GitHub, Adobe Lightroom and Photoshop, SAi Flexi, Google Drive.
Libraries	Numpy, Scipy, Astropy, PyTorch, Pandas, PYMC, Astroquery, scikit-learn, 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 by analyzing transient images from the previous night, and recommending follow-up observation.
- **Certified Nickel 1 Meter Telescope Observer**: Monthly overnight photometric observer of supernovas, gamma-ray bursts, and hot Jupiters. Successfully completed certification training, including observations for 20+ nights.

Astromatic Hackathon — **Aug 2023**
Ciela Institute, Université de Montréal — *Montreal, Canada*

- Actively participated in lectures, workshops, and a 30-hour hackathon competition exploring the connection between astrophysics and machine learning. The program encompassed career seminars, scientific discussions, programming workshops, and networking opportunities.
- **Awarded First Place**, within a group three, by developing a simulation-based inference model designed to predict gravitational lensing parameters and presented our findings to a panel of leading experts in Astronomy from Ciela.

Research intern under Florian Sarron (Ph.D) & Nicolas Clerc (Ph.D) — **June 2023 — Aug 2023**
Institut de Recherche en Astrophysique et Planétologie (IRAP) — *Toulouse, France*

- **Developed** a galaxy cluster matching algorithm to find the Temple Groups from the Sloan Digit Sky Survey (SDSS) associated with an x-ray emission detected by the XCLASS survey 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.

Teaching Experience

Course Reader: Astro 160, Astro C161 — **Fall 2022, Spring 2024**
University of California, Berkeley — *Berkeley, CA*

- Reviewed and assessed student problem sets and final research papers for the Stellar Physics course taught by Professor Raffaella Margutti, and the Relativistic Astrophysics and Cosmology course taught by Professor Daniel Kasen.
- Provided detailed feedback and comments on student coursework including programming and computational skills.

Undergraduate Graduate Student Instructor: Astro C10 **Aug 2023 — Dec 2023**
University of California, Berkeley *Berkeley, CA*

- Worked under the guidance of Professor Alex Filippenko in teaching Astro C10, a top-rated general astronomy course.
- Facilitated two discussion sections, conducted weekly office hours, facilitated exam review sessions, and organized star parties to engage students from diverse academic backgrounds in the field of astronomy.

Professional Experience

Student Director **Jan 2023 — Present**
Cal New Experiences for Research and Diversity in Science (NERDS) *Berkeley, CA*

- **Python BootCAMP Instructor** Co-instruct a weekend introductory Python workshop, serving over 50 STEM students from diverse backgrounds, including community college students, undergraduates, and graduate students with no prior Python experience.
- **Research Poster Design and Printing Lab project lead** Managed budgeting and outreach initiatives, overseeing operations and promoting printing services effectively.

Academic Mentor **Feb 2021 — Dec 2022**
Calculus Round Table *Oakland, CA*

- **Facilitated engaging instruction for K-5 classroomss**, 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 classes during the 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 20 hours 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

Derivation and Simulation of Photon Trajectory from the Schwarzchild Metric **Spring 2022**
Astro 161

- Derived the photon trajectories in a non-rotating black hole using the Schwarzchild 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 Dilgent, LabView, and SPICE.

Stellar Environment and Its Influence on Super Massive Blacks 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-σ Relationship.

Awards

- 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 Research and Travel fellowship.
- Rose Hill Foundation Scholarship
- California Middle-Class Scholarship
- Berkeley CARES award
- Berkeley Scholarship
- Simon Family Foundation Scholarship

Conferences

- **2024 NSF CAMP Statewide Symposium** research poster: Determining the Dynamical State of XCLASS Galaxy Clusters at $Z < 0.12$.
- **2023 NSF CAMP Statewide Symposium & Special Merit Award** recipient for my research presentation: Population Study of the Velocity of Silicon II Lines in Type Ia Thermonuclear Supernova Explosions.
- **2022 & 2023 CAL NERDS NDISTEM** UC Berkeley travel grant recipient for the National Diversity in STEM (NDISTEM) conference. The conference is hosted by the Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS).