

# Orlando M. Romeo

oromeo@berkeley.edu

||

(410) 900-6893

||

www.omromeo.com

---

## EDUCATION

---

12/2024 **University of California, Berkeley, CA**  
*Doctor of Philosophy, Earth and Planetary Science*

05/2020 **University of Maryland, College Park, MD**  
*Bachelor of Science (Honors), Physics - Magna Cum Laude*  
*Bachelor of Science (Honors), Astronomy - Magna Cum Laude*

---

## RESEARCH INTERESTS

---

**Heliophysics:** Solar wind dynamics, Coronal mass ejections, Wave-particle interactions  
**Planetary Science:** Crustal magnetization, Planetary magnetospheres  
**Geospace:** Space physics, Space weather prediction  
**Instrumentation:** Electrostatic analyzers, X-ray optics, Magnetometers, Space mission design

---

## RESEARCH EXPERIENCE

---

01/2025 **Postdoctoral Researcher**, University of California Berkeley/SSL  
– Present **Parker Solar Probe (PSP) SWEAP Team**, *Advisor: Dr. Davin Larson*

- Calibrating the SPAN-E ESA on PSP to produce solar wind electron parameters
- Studying Coronal Mass Ejections with in situ measurements close to the Sun
- Collaborating with other instrument teams to produce additional data products

08/2020 **Graduate Student Researcher**, University of California Berkeley/SSL  
– 12/2024 **Parker Solar Probe (PSP) SWEAP Team**, *Advisor: Dr. Davin Larson*

- Calibrating the SPAN-E ESA on PSP to produce solar wind electron parameters
- Studying electron strahl scattering under varying solar wind conditions
- Collaborating with other instrument teams to produce additional data products

**FOXSI-4 Sounding Rocket Mission**, *Advisor: Dr. Juan Camilo Buitrago-Casas*

- Assembled, tested, and integrated the Solar Aspect and Alignment System (SAAS)
- Performed laser and X-ray alignment tests and simulations for the optics modules
- Supported multiple stages of rocket integration at SSL, WSMR, & PFRR
- Monitored solar conditions to capture real-time observations of an M-class solar flare

**InSight & Zhurong Surface Magnetometers**, *Advisor: Dr. Michael Manga*

- Conducted Monte Carlo simulations of crustal magnetic fields on Mars
- Determined probable magnetic coherence scales and depths below each landing site
- Developed geological magnetization models to study the Martian geodynamo history

**SWFO-L1 STIS Team**, *Advisor: Dr. Davin Larson*

- Characterized magnetic field emission from the STIS solid-state telescope
- Tested Amptek pre-amps on the electronics board for each detector channel
- Performed detector calibration tests with high-energy ion beams and radioactive sources to validate instrument performance
- Monitored STIS conditions during spacecraft Thermal Vacuum Chamber testing

- 05/2019 **Planetary Science Intern**, NASA Goddard Space Flight Center
- 09/2020 **MAVEN Proton Cyclotron Waves (PCWs)**, *Advisor: Dr. Norberto Romanelli*
- Identified PCWs near Mars using Fourier and minimum variance analysis on MAVEN magnetometer data
  - Characterized PCWs and shock processes upstream of the Martian bow shock based on solar wind and planetary properties derived from the MAG and SWIA instruments
- 08/2017 **Plasma Physics Undergraduate Researcher**, University of Maryland
- 06/2020 **Machine Learning Space Weather Forecasting**, *Advisor: Dr. Surjalal Sharma*
- Adapted detrending fluctuation analysis on Advanced Composition Explorer (ACE) space weather data to detect long-range correlations over several days
  - Forecasted space weather parameters using nonlinear and data-derived techniques (delay embedding, singular value decomposition, and nearest neighbor tree search)
- Magnetic Nanoparticle Antennas**, *Advisor: Dr. Dennis Papadopoulos*
- Simulated magnetization dynamics for nanoparticles in ferro-fluid antennas from the Stoner-Wohlfarth Model, including effects of magnetization precession, hysteresis, and quantum tunneling
  - Calculated nanoparticle magnetization states to determine energy efficient materials for CubeSat antennas in plasma environments
- 05/2017 **Space Physics Intern**, Johns Hopkins University APL
- 08/2018 **RBSP Data-Driven Forecasting**, *Advisor: Dr. Aleksandr Ukhorskiy*
- Modeled radiation belt electron energy flux (eflux) from Dst index using particle diffusion theory
  - Filtered eflux measurements based on adiabatic invariants from the MagEIS and REPT instruments on the Van Allen Probes (RBSP) to calculate electron Phase Space Density (PSD)
  - Forecasted PSD from geomagnetic parameters and geosynchronous satellite observations, implementing nonlinear and data-derived techniques, such as delay embedding, singular value decomposition, and nearest neighbor tree search
- 01/2017 **Seismology Undergraduate Researcher**, University of Maryland
- 06/2017 **Seismic Wave Travel Times of Varying Frequencies**, *Advisor: Dr. Vedan Lekic*
- Cross-correlated observed travel times of seismic waves during the 2013 Sea of Okhotsk Earthquake with seismograms from the Preliminary Reference Earth Model (PREM) and Generalized Seismological Data Functionals (GSDF) method
  - Adapted Fourier and Gaussian wavelet analysis to filter the correlograms based on varying levels of frequency to calculate phase arrival times
  - Developed new framework for earthquake predictions with error bound estimation using significant deviations from PREM to characterize Earth's interior structure
- 09/2015 **Space Physics Intern (DMSP)**, Johns Hopkins University APL
- 12/2016 **Solar Wind and IMF Activity on SAA Intensity**, *Advisor: Dr. Robert Schaefer*
- Filtered UV spectrographic imaging from the Defense Meteorological Satellite Program (DMSP) based on photon counts and geographical, lunar and solar positions
  - Fitted photon counts in the South Atlantic Anomaly (SAA) region of Earth to a spherical harmonics model for daily SAA intensity
  - Correlated SAA intensity with solar wind speed and IMF activity from ACE

## TEACHING & MENTORING EXPERIENCE

---

### University of California Berkeley, Space Sciences Lab (SSL)

- 01/2025 **Heliophysics Mentor**, *Student: Yuqi Zhang*
- Present
    - Junior undergraduate in the Berkeley International Study Program developed *CMEMoss*, a public python tool enabling general searches for spacecraft conjunctions with CME trajectories
- 06/2025 **ASSURE REU Mentor**, *Student: Joseph Byrnes*
- 08/2025
    - Junior undergraduate simulated spacecraft electrostatic charging in various space plasma environments using *SPIS* (Spacecraft Plasma Interaction Software) to support flight calibration and future mission design
- 06/2024 **FOXSI-5 SAAS/Optics Mentor**, *Student: Danny Sun*
- 08/2024
    - Graduate student improved the SAAS instrument and performed optical alignment tests for the FOXSI-5 sounding rocket mission
- 06/2023 **ASSURE REU Mentor**, *Student: Elyas Ahmed*
- 08/2023
    - Sophomore undergraduate utilized machine learning techniques (PySR) to characterize solar wind electron strahl scattering observed by PSP
      - Ahmed, E. *et al.* (2023). Machine Learning for Electron Distributions Observed by PSP. *AGU Fall Meeting Abstracts*, SH31D-3005.
- 06/2022 **ASSURE REU Mentor**, *Student: Kyla Giron*
- 08/2022
    - Sophomore undergraduate investigated a potential Earth to Sun connection by studying possible asymmetries in flare and CME production on the Sun
      - Giron, K. *et al.* (2022). Investigating a Possible Earth to Sun Connection - Can the Earth Affect the Sun. *AGU Fall Meeting Abstracts*, ED35D-0579.

### University of California Berkeley, Department of Earth & Planetary Science (EPS)

- 08/2023 **EPS Graduate Student Mentor**, *EPS Graduate Mentoring Program*
- 05/2024
    - Mentored three first-year graduate students in the EPS department
    - Established and tracked short and long term goals for students over academic year
    - Provided advice on navigating graduate school, conducting research, and networking
- 08/2021 **EPS Graduate Student Grader**, *EPS150 – Case Studies in Earth Systems*
- 12/2021
    - Reviewed weekly manuscripts related to Earth's carbon cycle and Martian hydrology
    - Graded weekly student abstracts summarizing each research paper
- 01/2021 **EPS Graduate Student Instructor**, *EPS50 – The Planet Earth*
- 05/2021
    - Instructed students during weekly three-hour lab sections on the study of minerals, rocks, geologic maps, and geological processes
    - Designed weekly lab assignments and created questions for midterm and final exams
    - Assisted students during weekly three-hour office hours and exam review sessions

### University of Maryland, College Park, Department of Astronomy

- 08/2019 **Astronomy Teaching Assistant**, *ASTR310 – Observational Astronomy*
- 12/2019
    - Directed weekly two-hour research labs on image processing and data analysis
    - Aided students during two-hour office hours with programming troubleshooting
    - Graded weekly quizzes, lab activities, exams, and research projects

### University of Maryland, College Park, Department of Physics

- 01/2020 **Physics Teaching Assistant, PHYS121 – Fundamentals of Physics I**  
 – 05/2020
  - Graded weekly quizzes/exams for 120 students focused on introductory physics
  - Held weekly one-hour discussion classes and two-hour office hours
  - Led two-hour lab sections using Microsoft Excel, Logger Pro, and physics demos
- 08/2019 **Physics Teaching Assistant, PHYS161– General Physics**  
 – 12/2019
  - Graded quizzes/exams for 120 students focused on mechanics and particle dynamics
  - Assisted students during weekly two-hour office hours and exam review sessions
- 02/2019 **Python Class Session Instructor, PHYS205: Developing Essential Research Skills**
  - Instructed Python coding sessions over two weeks to undergraduate freshmen
  - Provided an overall introduction to Python with basics of coding syntax and logic
  - Presented data science methods to visualize and analyze cosmic ray counts from the Bartol Research Institute Neutron Monitor Program
- 07/2018 **Arduino Workshop Instructor, UMD Physics Summer Girls Outreach Program**  
 – 08/2018
  - Led Arduino programming workshop for 60 female high school students
  - Introduced Arduino code, sensors, and circuits to monitor plant growth over 1 week
  - Presented methods to extract and visualize data for plant sustainability statistics

## AWARDS & CERTIFICATIONS

---

- 2024 **Certification of Heliophysics Mission Design School – NASA/JPL**  
 2023 **Group Achievement Award for Parker Solar Probe Team – NASA**  
 2023 **Certification of Heliophysics Summer School – NASA/UCAR**  
 2022 **FINESST Fellowship Award (Heliophysics Division) – NASA**  
 2022 **Certification of Solar Orbiter Summer School – ESA/CNES**  
 2022 **SSL Robert P. Lin Graduate Fellowship – University of California, Berkeley**  
 2022 **Travel Award for SHINE 2022 Workshop – SHINE**  
 2019 **William M. MacDonald Physics Scholarship – University of Maryland**  
 2017 – 2020 **Group Award for SPS Outstanding Chapter (Annual) – AIS SPS**  
 2016 – 2020 **JHU APL Academic Merit Scholarship (Annual) – JHU APL**  
 2016 – 2020 **Angelo Bardasis Physics Scholarship (Annual) – University of Maryland**

## PUBLICATIONS

---

31. **Romeo, O. M., et al.** (2025). Scales of Martian crustal magnetization constrained by MAVEN, InSight, and Zhurong. *Journal of Geophysical Research: Planets*, 130, e2025JE008986.
30. Pulupa, M., ..., **Romeo, O. M., et al.** (2025). Highly Polarized Type III Storm Observed with Parker Solar Probe. *The Astrophysical Journal Letters*, 987(2), L34.
29. Phan, T., **Romeo, O. M., et al.** (2025). Parker Solar Probe Observations of a Highly Energetic and Asymmetric Reconnecting Heliospheric Current Sheet during Encounter 13. *The Astrophysical Journal*, 986(2), 209.
28. Huang, J., ..., **Romeo, O. M., et al.** (2025). The Temperature Anisotropy and Helium Abundance Features of Alfvénic Slow Solar Wind Observed by Parker Solar Probe, Helios, and Wind Missions. *The Astrophysical Journal Letters*, 986(2), L28.
27. Alnussirat, S. T., ..., **Romeo, O. M., et al.** (2025). Impulsive Solar Flares in the Parker Solar Probe Era. I. Low-energy Electron, Proton, and Alpha Beams. *The Astrophysical Journal Letters*, 985(1), 19.
26. Riley, P., ..., **Romeo, O. M., et al.** (2025). Understanding the global structure of the September 5, 2022, coronal mass ejection using sunRunner3D. *Journal of Space Weather and Space Climate*, 15, 17.
25. Muro, G. D., ..., **Romeo, O. M., et al.** (2025). Radial Dependence of Ion Fluences in the 2023 July 17 Solar Energetic Particle Event from Parker Solar Probe to STEREO and ACE. *The Astrophysical Journal Letters*, 981(1), 8.
24. Ruffolo, D., ..., **Romeo, O. M., et al.** (2024). Observed Fluctuation Enhancement and Departure from WKB Theory in Sub-Alfvénic Solar Wind. *The Astrophysical Journal Letters*, 977(1), L19.
23. Shaver, S. R., ..., **Romeo, O. M., et al.** (2024). Exploring Observational Heliophysics Across All Scales:

- Reflections and Insights From the 2023 NASA Heliophysics Summer School. *Perspectives of Earth and Space Scientists*, 5(1), e2023CN000217.
22. Ervin, T., ..., **Romeo, O. M.**, et al. (2024). Near Subsonic Solar Wind Outflow from an Active Region. *The Astrophysical Journal*, 972(1), 129.
  21. Phan, T. D., ..., **Romeo, O. M.**, et al. (2024). Multiple Subscale Magnetic Reconnection Embedded inside a Heliospheric Current Sheet Reconnection Exhaust: Evidence for Flux Rope Merging. *The Astrophysical Journal Letters*, 971(2), L42.
  20. Ervin, T., ..., **Romeo, O. M.**, et al. (2024). Compositional Metrics of Fast and Slow Alfvénic Solar Wind Emerging from Coronal Holes and Their Boundaries. *The Astrophysical Journal*, 969(2), 83.
  19. Cohen, C. M. S., ..., **Romeo, O. M.**, et al. (2024). Observations of the 2022 September 5 Solar Energetic Particle Event at 15 Solar Radii. *The Astrophysical Journal*, 966(2), 148.
  18. Zaslavsky, A., ..., **Romeo, O. M.**, et al. (2024). Probing Turbulent Scattering Effects on Suprathermal Electrons in the Solar Wind: Modeling, Observations, and Implications. *The Astrophysical Journal*, 966(1), 60.
  17. Eriksson, S., ..., **Romeo, O. M.**, et al. (2024). Parker Solar Probe Observations of Magnetic Reconnection Exhausts in Quiescent Plasmas near the Sun. *The Astrophysical Journal*, 965(1), 76.
  16. Palmerio, E., ..., **Romeo, O. M.**, et al. (2024). On the Mesoscale Structure of Coronal Mass Ejections at Mercury's Orbit: BepiColombo and Parker Solar Probe Observations. *The Astrophysical Journal*, 963(2), 108.
  15. McManus, M. D., ..., **Romeo, O. M.**, et al. (2024). Proton- and Alpha-driven Instabilities in an Ion Cyclotron Wave Event. *The Astrophysical Journal*, 961(1), 142.
  14. Mozer, F. S., ..., **Romeo, O. M.**, et al. (2023). Density Enhancement Streams in The Solar Wind. *The Astrophysical Journal Letters*, 957(2), L33.
  13. Alnussirat, S. T., ..., **Romeo, O. M.**, et al. (2023). Dispersive Suprathermal Ion Events Observed by the Parker Solar Probe Mission. *The Astrophysical Journal Letters*, 954(1), L32.
  12. **Romeo, O. M.**, et al. (2023). Near-Sun in situ and remote-sensing observations of a Coronal Mass Ejection and its effect on the Heliospheric Current Sheet. *The Astrophysical Journal*, 954(2), 168.
  11. Huang, J., ..., **Romeo, O. M.**, et al. (2023). The Temperature, Electron, and Pressure Characteristics of Switchbacks: Parker Solar Probe Observations. *The Astrophysical Journal*, 954(2), 133.
  10. Huang, J., ..., **Romeo, O. M.**, et al. (2023). The Structure and Origin of Switchbacks: Parker Solar Probe Observations. *The Astrophysical Journal*, 952(1), 33.
  9. Bowen, T. A., ..., **Romeo, O. M.** (2023). Constraining Collisionless Processes in Planetary Magnetospheres. *Uranus Flagship: Investigations and Instruments for Cross-Discipline Science Workshop*, 2808, 8170.
  8. Mozer, F. S., Bale, S. D., Kellogg, P., **Romeo, O. M.**, et al. (2023). Arguments for the physical nature of the triggered ion-acoustic waves observed on the Parker Solar Probe. *Physics of Plasmas*, 30(6), 062111.
  7. Mozer, F. S., ..., **Romeo, O. M.**, et al. (2023). Direct observation of solar wind proton heating from in situ plasma measurements. *Astronomy & Astrophysics*, 673, L3.
  6. Huang, J., ..., **Romeo, O. M.**, et al. (2023). Parker Solar Probe Observations of High Plasma  $\beta$  Solar Wind from the Streamer Belt. *The Astrophysical Journal Supplement Series*, 265(2), 47.
  5. Short, B., Malaspina, D. M., Halekas, J., **Romeo, O. M.**, et al. (2022). Observations of Quiescent Solar Wind Regions with Near- $f_{ce}$  Wave Activity. *The Astrophysical Journal*, 940(1), 45.
  4. McManus, M. D., ..., **Romeo, O. M.**, et al. (2022). Density and Velocity Fluctuations of Alpha Particles in Magnetic Switchbacks. *The Astrophysical Journal*, 933(1), 43.
  3. Mozer, F. S., ..., **Romeo, O. M.** (2022). An Improved Technique for Measuring Plasma Density to High Frequencies on the Parker Solar Probe. *The Astrophysical Journal*, 926(2), 220.
  2. Bandyopadhyay, R., ..., **Romeo, O. M.**, et al. (2022). Sub-Alfvénic Solar Wind Observed by the Parker Solar Probe: Characterization of Turbulence, Anisotropy, Intermittency, and Switchback. *The Astrophysical Journal*, 926(1), L1.
  1. **Romeo, O. M.**, et al. (2021). Variability of Upstream Proton Cyclotron Wave Properties and Occurrence at Mars Observed by MAVEN. *Journal of Geophysical Research: Space Physics*, 126(2), e28616.

## PRESENTATIONS

### International – Oral

- 2024 45th COSPAR Scientific Assembly, *Near-Sun In Situ & Remote Sensing Observations of a CME and its Effect on the HCS*, Busan, Korea

### International – Poster

- 2023 American Geophysical Union Fall Meeting, *Determination and Calibration of Solar Wind Electron Moments Observed by PSP*, San Francisco CA, United States
- 2023 16th Solar Wind Conference, *Determining the Anatomy of an ICME by Relating Remote Sensing and In Situ Observations Within 13 Rs*, Pacific Grove CA, United States
- 2022 American Geophysical Union Fall Meeting, *Characterization of Solar Wind Strahl Electron Scattering Observed by PSP*, Chicago IL, United States
- 2022 Solar Orbiter Summer Conference, *Solar Wind Electron Distributions as Observed by PSP*, Sète, France
- 2021 American Geophysical Union Fall Meeting, *Characterization of Strahl Electron Scattering in the Solar Wind Observed by PSP*, New Orleans LA, United States
- 2019 American Geophysical Union Fall Meeting, *Solar Longitudinal Variability of Waves at the Local Proton Cyclotron Frequency*, San Francisco CA, United States

### National – Oral

- 2025 Parker Solar Probe Fourth Annual Conference, *Evolution of Electron Distributions During the March 13, 2023, ICME Observed by PSP*, Laurel MD, United States
- 2024 American Geophysical Union Fall Meeting, *Overview of PSP Electron Observations from 10 to 100 Solar Radii*, Washington D.C., United States
- 2023 16th PSP Science Working Group Meeting, *CME Anatomy from Remote Sensing Observations and In-situ Measurements near 13 Rs*, Pasadena CA, United States

### National – Poster

- 2022 JHU/APL Parker Two Meeting (PSP), *Characterization of Strahl Electron Scattering in the Solar Wind Observed by PSP*, Laurel MD, United States
- 2019 Sigma Pi Sigma Physics Congress, *Seasonal Variability of Waves near the Proton Cyclotron Frequency Upstream from Mars*, Providence RI, United States
- 2019 MAVEN Project Science Group Meeting, *Seasonal Variability of Waves near the Proton Cyclotron Frequency Upstream from Mars*, Boulder CO, United States

### Institutional – Oral

- 2025 University of California, Berkeley Space Sciences Seminar, *Exploring the Inner Heliosphere with Novel in situ Measurements*, Berkeley CA, United States
- 2022 Space Sciences Lab Robert P. Lin Fellowship Seminar, *Electron Distribution Evolution near the Sun Observed by PSP*, Berkeley CA, United States
- 2018 University of Maryland Astronomical Observatory Open House, *Changes in Brightness for Cataclysmic Variables in Different Galactic Regions*, College Park MD, United States
- 2018 Johns Hopkins University APL Student Expo, *Data Driven Forecasting Model of Radiation Belt Intensities*, Laurel MD, United States

### Institutional – Poster

- 2019 NASA Goddard Space Flight Center Student Poster Expo, *Seasonal Variability of Waves near the Proton Cyclotron Frequency Upstream from Mars*, Providence RI, United States
- 2017 University of Maryland Physics Research Showcase, *Seismic Wave Travel Times at Varying Frequencies*, College Park MD, United States
- 2016 Science and Math Academy Symposium, *Correlation of Solar Wind and IMF Activity on SAA Intensity*, Aberdeen MD, United States

## SERVICE & OUTREACH

---

### Professional

2024	NASA ROSES Solicitation, <i>Executive Secretary</i>
2024	The Astrophysical Journal, <i>Reviewer of 1 manuscript</i>
2024	Geophysical Research Letters, <i>Reviewer of 1 manuscript</i>
2022	The Astrophysical Journal, <i>Reviewer of 1 manuscript</i>
2022	Heliophysics 2050 Workshop: Space Physics, <i>Executive Secretary</i>
2021	AGU Fall Meeting Parker Solar Probe Session, <i>Volunteer Chair</i>
2020	Intersect: The Stanford Journal of STS, <i>Reviewer of 1 manuscript</i>

## Community

2025	SSL ASSURE REU Program, <i>Student Poster Judge</i>
2024	SSL ASSURE REU Program, <i>Student Poster Judge</i>
2023	SSL ASSURE REU Program, <i>Guest Speaker on Planetary Environments</i>
2022	SSL ASSURE REU Program, <i>Student Application Reviewer</i>
2022 – Present	California Academy of Sciences, <i>Volunteer</i>
2019	UMD Society of Physics Students, <i>President</i>
2018	UMD SPS National Zone 4 Meeting, <i>Lead Python Workshop Instructor</i>
2018	UMD SPS National Zone 4 Meeting, <i>Lead Arduino Workshop Instructor</i>
2017 – 2018	UMD Society of Physics Students, <i>Vice President</i>

## Media Outreach

2023	Press Release, <i>News Article on Romeo et al. 2023 manuscript</i>
------	--

## PROFESSIONAL SKILLS

---

### Programming & Software

- |          |           |           |
|----------|-----------|-----------|
| • Python | • Julia   | • UNIX    |
| • IDL    | • Arduino | • pyGSEOS |
| • MATLAB | • Java    | • HTML    |

### Instrumentation & Lab Experience

- |                           |                            |  |
|---------------------------|----------------------------|--|
| • Electrostatic Analyzers | • Oscilloscopes            | • Optics Alignment                         |
| • Magnetometers           | • Vacuum chambers          | • Magnetic Characterization                |
| • Solid State Telescopes  | • Circuit design & testing | • Carbon Foil Floating                     |
| • Observatory telescopes  | • Soldering                | • Data Acquisition Processor (DAP) testing |
| • Raspberry Pi            | • 3D printing              |  |

### Languages

- |                    |                        |                      |
|--------------------|------------------------|----------------------|
| • English (Native) | • Italian (Proficient) | • Spanish (Beginner) |
|--------------------|------------------------|----------------------|
-