Brandon Park Coy

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Contact Information

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Research Interests

- **Planetary Habitability**: Earth-like exoplanet atmospheres and biosignatures
- **Exoplanet Spectroscopy**: Space-based transmission/emission spectroscopy
- **Solar System Science**: Atmosphere and hydrological cycle systems of Titan

Education

University of Chicago, Chicago, IL 2021–

- PhD in Geophysical Sciences
- M.S. in the Physical Sciences Division (Geophysical Sciences), GPA: **4.0/4.0** 2022
- Advisor: Prof. Edwin Kite
- Thesis: *The Role of Tectonic Luck and Weathering in Long-Term Climate Stability*

UC Berkeley, Berkeley, CA 2015–2019

- B.A., Astrophysics, GPA: **3.84/4.0**, *Cum Laude*, Dean's List

Research Experience

- **UCLA**, Advisor: Prof. Jean-Luc Margot Sept 2022–Present
  - Currently using radar images of Venus from the NASA Magellan data to better constrain its spin state and interior structure, expected to improve precision drastically.
- **NASA Jet Propulsion Laboratory**, Advisor: Dr. Keeyoon Sung Jul 2022–Sept 2022
  - Used high-precision laboratory spectroscopic data to update telluric line parameters for methane spectral bands.
  - Work will be crucial in high-precision radial velocity measurements of exoplanets conducted by various telescopes.
- **University of Chicago**, Advisor: Prof. Edwin Kite Sept 2021–Present
  - Simulating how continental plate collisions affect long-term climate stability of both Earth & terrestrial exoplanets.
  - Previously investigated the stability of water world climates and its effect on habitability.
- **NASA Goddard Space Flight Center**, Advisor: Dr. Conor Nixon Jan 2021–Nov 2021
  - Completed the first analysis of Spitzer Infrared Spectrometer data of Titan.
  - Retrieved disc-averaged temperature and gas profiles of Titan spanning 2004-2006 and calculated upper limits for exotic molecules theorized in Titan's atmosphere.
- **NASA Marshall Space Flight Center**, Advisor: Danielle Moser Aug 2019–Dec 2019
  - Calibrated a newly uncovered method of analyzing meteor breakup events. Determined what type of meteor events NASA cameras were able to detect.
  - Used public eyewitness reports combined with a large amount of camera data to submit detailed reports on meteor breakup events.
- **NASA Ames Research Center**, Advisor: Dr. Thomas Greene Jun 2019–Aug 2019
  - Modernized and improved a Python-based data analysis pipeline created by staff at the Keck telescope to convert stellar image data to atmospheric spectra.
  - Significantly improved signal-to-noise of the pipeline using innovative noise removal techniques.
- **UC Berkeley**, Advisor: Dr. Gaspard Duchêne Aug 2018–May 2019
  - Used Python-based image analysis to locate and catalog extremely faint binary companions in Gemini Planet Imager data. Lead to the discovery of more than three previously unknown binary systems.

Teaching

- **English and Math Instructor** Elite Educational Institute, Seoul, South Korea Jan 2020–Dec 2020
  - Taught conversational and written English to elementary school, junior high school, and high school students. Also taught various mathematics subjects including calculus and geometry.
- **Undergraduate Student Instructor** UC Berkeley
  - Astro C10: Introduction to Astronomy Aug 2018–Dec 2018
  - Astro 9: Python Programming in Astronomy Jun 2018–Aug 2018

Publications

1. (In Preparation) **Brandon Park Coy** and Edwin Kite. "The Role of Plate Tectonics and Weathering in Long-Term Climate Stability".
2. (Accepted) **Brandon Park Coy**, Conor A. Nixon, Naomi-Rowe Gurney, Richard Achterberg, Leigh N. Fletcher, and Patrick Irwin. "Spitzer IRS Observations of Titan as a Precursor to JWST MIRI Observations". *Planetary Science Journal*.
3. Gaspard Duchene...**Brandon Park Coy** et al. "A low-mass companion desert among intermediate-mass visual binaries: The scaled-up counterpart to the brown dwarf desert". *Monthly Notices of the Royal Astronomical Society*, 2022
4. Edward Molter...Gaspard Duchene, **Brandon Park Coy** et al. "Analysis of Neptune's 2017 Bright Equatorial Storm". *Icarus* Vol 321 p. 324-325, 2019.

Contributed Talks and Posters

- **Metal Enhancment in sub-Neptune Atmospheres via Magma-Atmosphere Interaction**
  - **Lightning Talk** Great Lakes Exoplanet Area Meeting 2023
- **Spitzer IRS Observations of Titan as a Precursor to JWST MIRI Observations**
  - **Poster** Planetary Systems and the Origins of Life in the Era of JWST 2023
  - **Talk** NASA Outer Planets Assessment Group Meeting 2023
  - **Talk** NASA Astrobiology Institute Titan Meeting 2021
  - **Poster** Division for Planetary Sciences of the American Astronomical Society 2021
  - **Poster** NASA Outer Planets Assessment Group Fall Meeting 2021
  - **Poster** Titan Through Time Conference 2021
  - **Talk** International Symposium on Molecular Spectroscopy 2021

Community Outreach

- **Undergraduate Laboratory at UC Berkeley Mentor 2017–2018**
  - Mentored a freshmen-led project in exoplanet habitability and taught freshmen standard research techniques and skills
  - Hosted research workshops and coding challenges sponsored by UC Berkeley
- **Adler Planetarium Astro-Overnight Coordinator 2013–2015**
  - Facilitated monthly day-long events at the Adler Planetarium focused on exposing elementary school students to astronomy and physics concepts as well as current NASA mission goals.

Service

- **Oakland Asian Student Educational Services Officer 2016–2019**
  - Co-led a 200+ member UC Berkeley volunteer organization aimed at providing underprivileged youth with educational opportunities outside of the classroom.
  - Hosted early career workshops and panels for organization members.
- **Associated Students of the University of California Academic Opportunity Fund Director 2015–2017**
  - Personally managed a $30,000 annual university grant that awards exceptional students in need research travel opportunities.
  - Worked closely with student senators to award UN conference speakers, national competition winners, and more travel funding.