

Sagnick Mukherjee

51 Pegasi b Postdoctoral Fellow, School of Earth & Space Exploration, Arizona State University
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h-Index: 25 **Citations:** 3076 **First-Author Papers:** 11 **Other Co-Authored Papers:** 45
Software Developed: PICASO 3.0, VIRGA **Students Advised:** 14

Research Snapshot

My research asks a fundamental question: how do planets and substellar objects form and evolve, and what shapes their observed diversity today? I address this by theoretically understanding the atmospheres of substellar objects across a broad mass range, from brown dwarfs and giant exoplanets to sub-Neptunes and terrestrial worlds. I seek to unravel the physical, chemical, and geological processes that govern these atmospheres using optical/infrared spectroscopy from space-based observatories such as JWST/HST and from ground-based facilities. I am also an expert on observational studies of exoplanet atmospheres. By connecting atmospheric properties to interior structure, evolutionary pathways, and formation environments, I aim to reveal the mechanisms that shape planetary origins, diversity, and assess their potential for habitability.

Research Interests

1. Theory of Exoplanet & Brown Dwarf Atmospheres
2. Interior and Evolution of substellar objects
3. Characterization of Exoplanet Atmospheres with JWST, HST, and ground-based observatories.
4. Open-source Software Development in Astronomy

Education

Ph.D., Astronomy & Astrophysics University of California, Santa Cruz; Advisor: Prof. Jonathan Fortney. Thesis: <i>Understanding Atmospheres of Exoplanets and Brown Dwarfs with JWST.</i>	Dec 2022 – Aug 2025
M.S., Astronomy & Astrophysics University of California, Santa Cruz; GPA: 4.0/4.0.	Oct 2020 – Dec 2022
M.Sc., Physics Presidency University, Kolkata; GPA: 9.65/10 (Gold Medalist).	Sep 2018 – Jul 2020
B.Sc., Physics Presidency University, Kolkata; GPA: 9.21/10 (Gold Medalist).	Aug 2015 – Sep 2018

Appointments

51 Pegasi b Postdoctoral Fellow School of Earth & Space Exploration, Arizona State University (SESE). Advisors: Prof. Luis Welbanks & Prof. Michael Line	Sep 2025 – present
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Templeton Theory-Experiment Cross Training Fellow
Dept. of Physics & Astronomy, Johns Hopkins University.
Advisor: Prof. David Sing

June 2023 – August 2025

S N Bose Summer Research Fellow
Dept. of Astronomy & Astrophysics, UC Santa Cruz.
Advisor: Prof. Puragra Guhathakurta

June 2019 – August 2019

Awards and Fellowships

1. **51 Pegasi b Postdoctoral Fellowship (2025)** — Heising–Simons Foundation, host: SESE, ASU.
2. **NASA Hubble Postdoctoral Fellowship (2025-2028), Sagan Fellowship** — hosted at University of Texas, Austin (**Declined**).
3. **Templeton Theory–Experiment Cross Training (TEX) Fellowship** — co-hosted by UCSC and JHU.
4. **UC President’s Lindau Fellow 2024** — Participant, **73rd Lindau Nobel Laureate Meeting (Physics)**, Lindau, Germany.
5. **Barbara Walker Best Paper Award (2023–24)** for “*PICASO 3.0: A One-dimensional Climate Model for Giant Planets and Brown Dwarfs*”.
6. **UC Regents Fellowship** — first-year graduate study, Dept. of Astronomy & Astrophysics, UCSC.
7. **Whitford Prize** — highest achievement in research, coursework, and teaching as a 2nd-year Graduate Student, UCSC Astronomy.
8. **S.N. Bose Scholarship (IUSSTF, 2019)** — short-term summer research at UC Santa Cruz.
9. **Gold Medalist — M.Sc. Physics** (2018–2020) and **B.Sc. Physics** (2015–18).
10. **Jagadis Bose National Science Talent Search Scholarship (2015–2020)** — undergraduate research.

Highlighted Publications

5 most cited or impactful first-authored publications; full list at the end

- “The Sonora Substellar Atmosphere Models. IV. Elf Owl: Atmospheric Mixing and Chemical Disequilibrium With Varying Metallicity and C/O Ratios”, **Sagnick Mukherjee**, Jonathan J. Fortney, *et al.*, (2023, *The Astrophysical Journal*)
- “PICASO 3.0: A One-Dimensional Climate Model for Giant Planets and Brown Dwarfs”, **Sagnick Mukherjee**, Natasha E. Batalha, *et al.*, (2022, *The Astrophysical Journal*)
- “Probing the Extent of Vertical Mixing in Brown Dwarf Atmospheres with Disequilibrium Chemistry”, **Sagnick Mukherjee**, Jonathan J. Fortney, *et al.*, (2022, *The Astrophysical Journal*)
- “Effects of Planetary Parameters on Disequilibrium Chemistry in Irradiated Planetary Atmospheres: From Gas Giants to Sub-Neptunes”, **Sagnick Mukherjee**, Jonathan J. Fortney, *et al.*, (2025, *The Astrophysical Journal*)
- “Cloudy Mornings and Clear Evenings in a Giant Extrasolar World”, **Sagnick Mukherjee**, David Sing, *et al.*, (2025, under final editorial review in *Science*; arxiv:2505.10910)

Grants & Observing Proposal Awards

Grant Summary

JWST AR Theory Programs & GO Observing Programs	\$528,797
Role: 2 Principal Investigator, 2 Co-Investigator	
Templeton TEX Fellowship	\$234,462
Role: Principal Investigator	
51 Pegasi b Fellowship	\$436,025
Role: Principal Investigator	

Observing Proposal Awards

1. PI of Awarded **James Webb Space Telescope (JWST) Cycle 4 AR GO 7358** "The Other Extreme: Enabling Characterization of Metal-poor Brown Dwarfs and testing our Understanding of Jupiter and Saturn"
2. Co-PI and theory lead of Awarded **JWST Cycle 2** time for the **GO 4094** "Probing the Depths: Disequilibrium Chemistry as a Tracer of Mixing Processes in Brown Dwarf Atmospheres".
3. PI of Awarded **JWST Cycle 2 AR GO 3245** "Up to the Task? A New Generation of Atmospheric and Interior Models of Brown Dwarfs for the JWST Era".
4. PI of Awarded **Gemini South** time (2026A-188207) for the program "Chasing Clouds from Dawn to Dusk: Probing Aerosol Cycling in Hot Jupiters".
5. Co-I of Awarded **JWST Cycle 4 GO 9025** "The Warm Jupiter Opportunity for Understanding Giant Exoplanet Evolution"
6. Co-I of Awarded **JWST Cycle 4 GO 8004** "Cliff Hangers: Testing for Atmosphere-Mantle Interactions in Radius Cliff Planets".
7. Co-I of Awarded **JWST Cycle 4 GO 9095** "Combining Emission and Transmission Spectroscopy to reveal Exo-Neptune Aerosols, Chemistry, and Formation".
8. Co-I of Awarded **JWST Cycle 4 GO 8140** "Empirically anchoring the physics of silicate clouds using L0- T9 benchmark brown dwarfs".
9. Co-I of Awarded **JWST Cycle 3 Large GO 5959** "KRONOS: Keys to Revealing the Origin and Nature Of sub-neptune Systems".
10. Co-I of Awarded **JWST Cycle 3 GO 6122** "Cool kids on the block: The direct detection of cold ice giants and gas giants orbiting young low-mass neighbors".
11. Co-I of Awarded **JWST Cycle 2 GO 3231** "Panchromatic Phase Curve of the Highest-S/N Hot Neptune".
12. Co-I of Awarded **JWST Cycle 2 AR GO 3201** "The Utility of Self-Consistent Models and Photochemistry in Understanding Transiting Planet Atmospheres".
13. Co-I of Awarded **JWST Cycle 2 DD 4558** "Establishing the Formation of AF Lep b with NIRCam: The Lowest-Mass Imaged Exoplanet with a Dynamical Mass".
14. Member of the **JWST grand tour collaboration** from the awarded **JWST Cycle 3 GO 5924** large program.

15. Member of the JWST Morning/Evening collaboration from the awarded JWST Cycle 2 GO 3969 program.
16. Member of the JWST MANATEE GTO collaboration.
17. Co-I of Awarded uGMRT Cycle 47 GO program "Investigating the Auroral Heating of Brown Dwarf Atmosphere with uGMRT and JWST".
18. Co-I of Awarded uGMRT Cycle 47 GO program "Can rogue super-Jupiters be radio-bright? A search for radio emission at the deuterium burning limit".
19. Co-I of Awarded HST Cycle 30 GO 17136 "Photometry of a Young Planetary-Mass Companion to a Taurus M Dwarf Star".
20. Co-I of Awarded HST Cycle 30 AR 17064 "Advancing our understanding of stellar variability with the Panchromatic Hubble Andromeda Treasury".

Teaching & Mentoring

Advised 4 graduate, 4 undergraduate, & 6 high-school students, Taught 2 courses

1. Co-advising PhD student Arjun Dawn (ARIES, India) for the thesis project "Studying Exoplanetary Atmospheres in High Resolution with the DOT-HRS instrument" with Prof. Jeewan Pandey, 2025-present
2. Co-advising graduate student Finnegan Keller (SESE, ASU) for the project "Statistical Techniques to Extract Limb Resolved Spectra of Giant Exoplanets from JWST data" with Prof. Luis Welbanks, 2025-present.
3. Mentored PhD student Aditya Sengupta (UCSC) for the project "Implementation of user defined aerosol properties within PICASO", 2024.
4. Mentored PhD student Anna Gagnebin (UCSC) for the project "Simulating the Climates of Volatile Rich sub-Neptunes", 2024.
5. Mentoring Master's students Saibal Dey Biswas and Tiyasa Pyne (Presidency University, Kolkata, India) for their Master's thesis project "Limb Asymmetries in Giant Exoplanets", 2025-present.
6. Mentored undergraduate student Arya Jhamb (UCSC) for the project "Retrievals on Brown Dwarf Spectra in the JWST Era", 2024
7. Mentored undergraduate student Anna Gagnebin (California State University, Sacramento) for the project "Exoplanet Atmosphere Models for JWST Spectroscopy", 2022.
8. Mentored 6 high school students for the astronomy project "Photometrically variable stars in M31" as a part of the Science Internship Program (SIP) 2019 and 2020.
9. Teaching Assistant for ASTR-10 "From the Big Bang to Planet Earth" with Prof. Alexie Leauthaud, Spring 2023.
10. Teaching Assistant for ASTR-16 "Astrobiology: Life in the Universe" with Prof. Natalie Batalha, Fall 2021.

Colloquia and Seminars

1. "Constraints on Atmospheric Mixing in Brown Dwarf and Transiting Exoplanet Atmospheres in the JWST Era", **September 2024, Dept. of Astronomy, UT Austin**, Texas.
2. "Constraints on Atmospheric Mixing in Transiting Exoplanet and Brown dwarf Atmospheres in the JWST Era", **September 2024, Lunar and Planetary Laboratory, Univ. of Arizona**, Tucson.
3. "Constraints on Atmospheric Mixing in Brown Dwarf and Exoplanet Atmospheres in the JWST Era", **February 2024, Carnegie Earth and Planets Laboratory**, Washington DC.
4. "Constraints on Atmospheric Mixing in Brown Dwarf and Exoplanet Atmospheres in the JWST Era", **November 2023, CTC Seminar, Univ. of Maryland**, College Park.
5. "Constraints on Atmospheric Mixing in Brown Dwarf and Exoplanet Atmospheres in the JWST Era", **November 2023, Dept. of Astronomy, Cornell University**, Ithaca.
6. "Constraints on Atmospheric Mixing in Brown Dwarf and Exoplanet Atmospheres in the JWST Era", **October 2023, School of Earth and Planetary Sciences, NISER**, Bhubaneswar, India.
7. "Constraints on Atmospheric Mixing in Brown Dwarf and Exoplanet Atmospheres in the JWST Era", **November 2023, Dept. of Astrophysics and High Energy Physics, SNBNCBS**, Kolkata, India.
8. "Constraints on Atmospheric Mixing in Brown Dwarf and Exoplanet Atmospheres in the JWST Era", **July 2023, Imperial College London**, London.
9. "Constraining Vertical Mixing, Metallicity, and C/O Ratio of Giant Planet and Brown Dwarf Atmospheres", **March 2023, SESE, Arizona State University**, Tempe.
10. "Understanding Exoplanet and Brown Dwarf Atmospheres in the JWST Era", **June 2022, CESSI Seminar, IISER Kolkata**.

Conferences, Talks, & Posters

1. **Contributed Talk**, "A Panchromatic and Physically Consistent View of K2-18 b's Atmosphere", **January 2026, 247th AAS**, Phoenix, AZ.
2. **Dissertation Presentation**, "Disequilibrium Chemistry in Planet Atmospheres: from Brown Dwarfs to sub-Neptunes", **January 2025, 245th AAS**, National Mall, Washington DC
3. **Contributed Talk**, "Cloudy Mornings and Clear Evenings in a Giant Extrasolar World", **August 2025, 51 Pegasi b Summit**, Half Moon Bay, California
4. **Contributed Talk**, "Effects of Planetary Parameters on Disequilibrium Chemistry: From Gas Giants to Sub-Neptunes", **July 2024, MPIA Heidelberg — Challenge Accepted! Linking Planet Formation with Present-Day Atmospheres**.
5. **Contributed Talk**, "Revisiting GJ 436b's Atmosphere with Panchromatic JWST Emission Spectroscopy", **June 2024, Exoplanets V**, Leiden, Netherlands.
6. **Contributed Talk**, "PICASO: An Unified Atmospheric Model of Exoplanetary Atmospheres with Photochemistry and Vertical Mixing", **June 2023, ERES Conference**, Yale University.

7. **Poster Presentation**, "Constraints on Atmospheric Vertical Mixing in Giant Exoplanets and Brown Dwarfs", **September 2023, Exoplanets: Atmospheres to Architecture**, Washington DC.
8. **Poster Presentation**, "PICASO: An Unified Atmospheric Model of Exoplanetary Atmospheres with Photochemistry and Vertical Mixing", **June 2023, Exoclimes Conference**, University of Exeter.
9. **Contributed Talk**, "Atmospheric and Evolutionary Models of Substellar Objects with Disequilibrium Chemistry for the JWST Era", **January 2023, AAS Conference**, Seattle.
10. **Contributed Talk**, 'Atmospheric and Evolutionary Models of Substellar Objects with Disequilibrium Chemistry for the JWST Era', **January 2023, ExoPAG 27**, Seattle.
11. **Contributed Talk**, 'PICASO 3.0: A One-Dimensional Open Source Climate Model for Giant Planets and Brown Dwarfs', **October 2022, 42nd Bay Area Exoplanets Meeting**, SETI.
12. **Contributed Talk**, 'Understanding Atmospheric Mixing with Disequilibrium Chemistry in Brown Dwarfs', **July 2022, Other Worlds Laboratory (OWL) Summer Program**.
13. **Poster Presentation**, 'Measuring Vertical Mixing in Giant Planets and Brown Dwarf Atmospheres', **September 2023, Giant Magellan Telescope Community Science Meeting**, Washington DC.
14. **Poster Presentation**, 'PICASO+VULCAN: Modeling Exoplanetary Atmospheres Self-Consistently with Photochemistry and Vertical Mixing', **June 2023, Exoclimes VI**, University of Exeter, UK.
15. **Poster Presentation**, 'Probing Atmospheric Mixing with Disequilibrium Chemistry in Brown Dwarfs and Warm Exoplanets', **May 2022, Exoplanets IV**, Las Vegas.
16. **Contributed Talk**, 'Understanding Atmospheric Mixing with Disequilibrium Chemistry in Brown Dwarfs', **January 2022, CHAMPs Exoplanet Early Career Seminar**.
17. **Contributed Talk**, 'Modeling Polarization Signals from Cloudy Brown Dwarfs: Luhman 16 A and B in Three Dimensions', **September 2021, Bay Area Exoplanet Meeting 38**.
18. **Poster Presentation**, 'Modeling Polarization signals in 3D from brown dwarfs Luhman 16 and B', **April 2021, STScI Spring Symposium**.
19. **Contributed Talk**, 'Cloud Complexity Required for Retrievals on Reflected Spectroscopy of Cool Giants', **September 2020, Bay Area Exoplanet Meeting 34**.
20. **Contributed Talk**, 'The accretion disc-jet connection in blazars', **Spring 2019, 37th ASI Annual Meeting**, Christ University, Bangalore.

Open-Source Software & Scientific Computing

1. Developed the open-source atmospheric model **PICASO 3.0** for exoplanets and brown dwarfs.
2. 5 years experience with exoplanet atmospheric simulation package **PICASO**.
3. Contributed to development of exoplanet cloud modeling package **VIRGA**.
4. Proficient scientific programming with **Python** and **Fortran**.
5. Proficient in GPU-based Python programming with **Numba CUDA** and **CuPy**.
6. Selected and Participated in the **NASA GPU Hackathon 2022** co-organized by **NASA and NVIDIA**.

Professional Service

1. **Referee** for leading astronomy journals including *The Astrophysical Journal* and *Astronomy & Astrophysics*
2. Served as a **reviewer** for scientific funding proposal panels for NASA.
3. Served as a **trainer** for the **PICASO** software in the **Sagan Summer Workshop, 2023**.
4. Served as a **mentor** for the **PICASO** hands-on session in the **Sagan Summer Workshop, 2021**.
5. Co-designer of "Atmospheric modelling and retrieval" workshop in the upcoming Roman Coronagraph School Europe 2026 to be held in France, March 2026.
6. Organizer of the Exoplanet and Brown Dwarf Journal Club at SESE, ASU.

Media & Press

1. "Methane Throughout The Atmosphere Of The Warm Exoplanet WASP-80b", **Astrobiology**, September 7, 2023.
2. "Astronomy PhD candidate researching mysteries of sub-Neptune planets wins fellowship", **UCSC Newscenter**, March, 2025.
3. "JWST makes first unequivocal detection of carbon dioxide in an exoplanet atmosphere", **UCSC Newscenter**, August 25, 2022.
4. "James Webb telescope detects dust storm on distant world", **BBC News**, March 22, 2023.
5. "NASA's Webb Detects Carbon Dioxide in Exoplanet Atmosphere", **NASA JPL**, August 25, 2022. Also covered by leading news platforms across the world.
6. "JWST's First Direct Spectrum of a Planetary-Mass Object", **Astrobites**, September 2, 2022.
7. "NASA releases Webb telescope's first exoplanet image", **UCSC Newscenter**, September 1, 2022. Also covered by leading news platforms across the world.

Publications

Papers published or in review in leading journals including *Science*, *Nature*, *Nature Astronomy*, *PNAS*, *ApJ*, *ApJL*, *MNRAS*, *ApJS*, and *AJ*.

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Publications – First-Authored

10 published/accepted, 1 in final editorial review (available on arxiv)

1. "[Cloudy Mornings and Clear Evenings in a Giant Extrasolar World](#)", **Sagnick Mukherjee**, David Sing, *et al.*, (2025, under final editorial review in *Science*, arxiv:2505.10910)

2. "Effects of Planetary Parameters on Disequilibrium Chemistry in Irradiated Planetary Atmospheres: From Gas Giants to Sub-Neptunes", **Sagnick Mukherjee**, Jonathan J. Fortney, *et al.*, (2025, The Astrophysical Journal)
3. "A JWST Panchromatic Thermal Emission Spectrum of the Warm Neptune Archetype GJ 436b", **Sagnick Mukherjee**, Everett Schlawin, *et al.*, (2025, The Astrophysical Journal Letters (ApJL))
4. "The Sonora Substellar Atmosphere Models. IV. Elf Owl: Atmospheric Mixing and Chemical Disequilibrium With Varying Metallicity and C/O Ratios", **Sagnick Mukherjee**, Jonathan J. Fortney, *et al.*, (2023, The Astrophysical Journal)
5. "Probing the Extent of Vertical Mixing in Brown Dwarf Atmospheres with Disequilibrium Chemistry", **Sagnick Mukherjee**, Jonathan J. Fortney, *et al.*, (2022, The Astrophysical Journal (ApJ))
6. "PICASO 3.0: A One-Dimensional Climate Model for Giant Planets and Brown Dwarfs", **Sagnick Mukherjee**, Natasha E. Batalha, *et al.*, (2022, The Astrophysical Journal)
7. "Modeling Polarization Signals from Cloudy Brown Dwarfs Luhman 16 A and B in Three Dimensions", **Sagnick Mukherjee**, Jonathan J. Fortney, *et al.*, (2021, The Astrophysical Journal)
8. "The Impact of Irradiation on the Radius and Thermal Evolution of Transiting Brown Dwarfs", **Sagnick Mukherjee**, Jonathan Fortney, *et al.*, (2025, in press ApJ)
9. "Cloud Parameterizations and their Effect on Retrievals of Exoplanet Reflection Spectroscopy", **Sagnick Mukherjee**, Natasha E. Batalha, and Mark S. Marley (2021, The Astrophysical Journal)
10. "The accretion disc-jet connection in blazars", **Sagnick Mukherjee**, Kaustav Mitra, and Ritaban Chatterjee (2019, Monthly Notices of the Royal Astronomical Society)
11. "X-Ray Surface Brightness Profiles of Optically Selected Active Galactic Nuclei: Comparison with X-Ray AGNs", **Sagnick Mukherjee**, Anirban Bhattacharjee, *et al.*, (2019, The Astrophysical Journal)

Publications — 2nd & 3rd-Authored

11 published, 1 student-led

1. "Overcast Mornings and Clear Evenings in Hot Jupiter Exoplanet Atmospheres", Guangwei Fu, **Sagnick Mukherjee**, *et al.*, (2025, ApJL)
2. "A Metal-poor Atmosphere with a Hot Interior for a Young Sub-Neptune Progenitor: JWST/NIRSpec Transmission Spectrum of V1298 Tau b", Saugata Barat, Jean-Michel Désert, **Sagnick Mukherjee**, *et al.*, (2025, AJ)
3. "Disequilibrium Chemistry, Diabatic Thermal Structure, and Clouds in the Atmosphere of COCONUTS-2b", Zhoujian Zhang, **Sagnick Mukherjee**, *et al.*, (2024, AJ)
4. "Bayesian Model Comparison and Significance: Widespread Errors and how to Correct Them", Daniel P. Thorngren, David K. Sing, **Sagnick Mukherjee** (2025, ApJS)
5. "A Tale of Two Molecules: The Underprediction of CO 2 and Overprediction of PH 3 in Late T and Y Dwarf Atmospheric Models", Samuel A. Beiler, **Sagnick Mukherjee**, *et al.*, (2024, ApJ)
6. "The atmosphere of HD 149026b: Low metal-enrichment and weak energy transport", Anna Gagねbin, **Sagnick Mukherjee**, *et al.*, (2024, ApJ); student-led

7. "Multiple Clues for Dayside Aerosols and Temperature Gradients in WASP-69 b from a Panchromatic JWST Emission Spectrum" Everett Schlawin, **Sagnick Mukherjee**, *et al.*, (2024, AJ)
8. "High-Precision Atmospheric Constraints for a Cool T Dwarf from JWST Spectroscopy", Callie E. Hood, **Sagnick Mukherjee**, *et al.*, (2024, Nature Astronomy, Under Review)
9. "The Sonora Substellar Atmosphere Models. III. Diamondback: Atmospheric Properties, Spectra, and Evolution for Warm Cloudy Substellar Objects" Caroline V. Morley, **Sagnick Mukherjee**, *et al.*, (2024, ApJ)
10. "Early Release Science of the exoplanet WASP-39b with JWST NIRSpec PRISM", Z. Rustamkulov, D. K. Sing, **Sagnick Mukherjee**, *et al.*, (2023, Nature)
11. "The Infrared Colors of 51 Eridani b: Micrometeoroid Dust or Chemical Disequilibrium?", Alexander Madurowicz, **Sagnick Mukherjee**, *et al.*, (2022, AJ)

Publications — Other Co-Authored

30 published, 4 in review

1. "Statistical trends in JWST transiting exoplanet atmospheres", Fu *et al.*, including **Sagnick Mukherjee** (2025, ApJ)
2. "The Challenges of Detecting Gases in Exoplanet Atmospheres", Welbanks *et al.*, including **Sagnick Mukherjee** (2025, Accepted in Nature Astronomy)
3. "The Sonora Substellar Atmosphere Models VI. Red Diamondback: Extending Diamondback with SPHINX for Brown Dwarf Early Evolution", Davis *et al.*, including **Sagnick Mukherjee** (2025, Accepted in ApJ)
4. "A Panchromatic Characterization of the Evening and Morning Atmosphere of WASP-107 b: Composition and Cloud Variations, and Insight into the Effect of Stellar Contamination", Murphy *et al.*, including **Sagnick Mukherjee** (2025, ApJ)
5. A Precise Metallicity and Carbon-to-Oxygen Ratio for a Warm Giant Exoplanet from its Panchromatic JWST Emission Spectrum Wiser *et al.*, including **Sagnick Mukherjee** (2025, PNAS)
6. "Atmospheric abundances and bulk properties of the binary brown dwarf Gliese 229 Bab from JWST/MIRI spectroscopy", Xuan *et al.*, including **Sagnick Mukherjee** (2024, ApJL)
7. "Quartz Clouds in the Dayside Atmosphere of the Quintessential Hot Jupiter HD 189733 b", Inglis *et al.*, including **Sagnick Mukherjee** (2024, ApJL)
8. "Precise Bolometric Luminosities and Effective Temperatures of 23 late-T and Y dwarfs Obtained with JWST", Beiler *et al.*, including **Sagnick Mukherjee** (2024, ApJ)
9. "Sulfur Dioxide and Other Molecular Species in the Atmosphere of the Sub-Neptune GJ 3470 b", Beatty *et al.*, including **Sagnick Mukherjee** (2024, ApJL)
10. "The Complete CEERS Early Universe Galaxy Sample: A Surprisingly Slow Evolution of the Space Density of Bright Galaxies at $z \sim 8.5\text{--}14.5$ " Finkelstein *et al.*, including **Sagnick Mukherjee** (2024, ApJL)

11. "JWST/NIRCam 4-5 μ m Imaging of the Giant Planet AF Lep b", Franson *et al.*, including **Sagnick Mukherjee (2024, ApJL)**
12. "Probing the Heights and Depths of Y Dwarf Atmospheres: A Retrieval Analysis of the JWST Spectral Energy Distribution of WISE J035934.06–540154.6", Kothari *et al.*, including **Sagnick Mukherjee (2024, ApJ)**
13. "High-precision Atmospheric Characterization of a Y Dwarf with JWST NIRSpec G395H Spectroscopy: Isotopologue, C/O Ratio, Metallicity, and the Abundances of Six Molecular Species", Lew *et al.*, including **Sagnick Mukherjee (2024, AJ)**
14. "A high internal heat flux and large core in a warm Neptune exoplanet", Welbanks *et al.*, including **Sagnick Mukherjee (2024, Nature)**
15. "The JWST Early Release Science Program for Direct Observations of Exoplanetary Systems. V. Do Self-consistent Atmospheric Models Represent JWST Spectra? A Showcase with VHS 1256–1257 b", Petrus *et al.*, including **Sagnick Mukherjee (2024, ApJ)**
16. "Sulfur dioxide in the mid-infrared transmission spectrum of WASP-39b", Powell *et al.*, including **Sagnick Mukherjee (2024, Nature)**
17. "The JWST Early Release Science Program for Direct Observations of Exoplanetary Systems. IV. NIRISS Aperture Masking Interferometry Performance and Lessons Learned", Sallum *et al.*, including **Sagnick Mukherjee (2024, ApJL)**
18. "Methane throughout the atmosphere of the warm exoplanet WASP-80b", Bell *et al.*, including **Sagnick Mukherjee (2023, Nature)**
19. "The JWST Early Release Science Program for Direct Observations of Exoplanetary Systems III: Aperture Masking Interferometric Observations of the star HIP 65426 at 3.8 μ m", Ray *et al.*, including **Sagnick Mukherjee (2023, ApJL)**
20. "Identification of carbon dioxide in an exoplanet atmosphere", JWST Transiting Exoplanet Community Early Release Science Team including **Sagnick Mukherjee (2023, Nature)**
21. "A Wolf 359 in Sheep's Clothing: Hunting for Substellar Companions in the Fifth-closest System Using Combined High-contrast Imaging and Radial Velocity Analysis", Bowens-Rubin *et al.*, including **Sagnick Mukherjee (2023, ApJ)**
22. "Awesome SOSS: transmission spectroscopy of WASP-96b with NIRISS/SOSS", Radica *et al.*, including **Sagnick Mukherjee (2023, MNRAS)**
23. "First Observations of the Brown Dwarf HD 19467 B with JWST", Greenbaum *et al.*, including **Sagnick Mukherjee (2023, ApJ)**
24. "Early Release Science of the exoplanet WASP-39b with JWST NIRISS", Feinstein *et al.*, including **Sagnick Mukherjee (2023, Nature)**
25. "Early Release Science of the exoplanet WASP-39b with JWST NIRSpec G395H", Alderson *et al.*, including **Sagnick Mukherjee (2023, Nature)**
26. "Early Release Science of the exoplanet WASP-39b with JWST NIRCam", Ahrer *et al.*, including **Sagnick Mukherjee (2023, Nature)**

27. "The First JWST Spectral Energy Distribution of a Y Dwarf", Beiler *et al.*, including **Sagnick Mukherjee** (ApJL, 2023)
28. "A Clear View of a Cloudy Brown Dwarf Companion from High-resolution Spectroscopy", Xuan *et al.*, including **Sagnick Mukherjee** (2022, ApJ)
29. "PHAT XX. AGB Stars and Other Cool Giants in M31 Star Clusters", Girardi *et al.*, including **Sagnick Mukherjee** (2020, ApJ)
30. Variable Stars in M31 Stellar Clusters from the Panchromatic Hubble Andromeda Treasury, Smith *et al.*, including **Sagnick Mukherjee** (2024, ApJ)
31. "JADES: An Abundance of Ultra-Distant T- and Y-Dwarfs in Deep Extragalactic Data", Hainline *et al.*, including **Sagnick Mukherjee** (2025, Under review in ApJ)
32. "Uniform Forward-Modeling Analysis of Ultracool Dwarfs. IV. Benchmarking the Sonora Diamond-back Atmospheric Models Using Late-M, L, and T-type Brown Dwarfs and Planetary-mass Objects", Mader *et al.*, including **Sagnick Mukherjee** (2025, Under review in ApJ)
33. "The WIRC+Pol Brown Dwarf Survey: A J-band polarimetric survey of 22 brown dwarfs", Millar-Blanchaer *et al.*, including **Sagnick Mukherjee** (2025, Under review in ApJ)
34. "Condensation Clouds in Substellar Atmospheres with Virga", Batalha *et al.*, including **Sagnick Mukherjee** (2025, Under review in AAS journals)

References

Prof. Jonathan J. Fortney

Professor & Chair,
Department of Astronomy & Astrophysics,
University of California, Santa Cruz
Email: jfortney@ucsc.edu

Prof. David K. Sing

Bloomberg Distinguished Professor,
William H. Miller III Department of Physics & Astronomy,
Departments of Earth and Planetary Sciences,
Johns Hopkins University
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Prof. Luis Welbanks

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Email: luis.welbanks@asu.edu