Natasha E. Batalha

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Studies planetary atmospheres at the nexus of observation and theory, with planets within the Solar System and beyond. Leverages and develops theoretical models to determine atmospheric properties from spectroscopic observations of exoplanets and Brown Dwarfs.

Appointments

- **NASA Ames Research Center** — **Moffett Field, CA**
  Research Scientist — *Oct 2019 – present*
- **University of California Santa Cruz** — **Santa Cruz, CA**
  UC President's Postdoctoral Fellow — *Sep 2018 – Sep 2019*
- **Space Telescope Science Institute** — **Baltimore, MD**
  Postdoc Science Mission Office — *Aug 2017 - Aug 2018*

Education

- **The Pennsylvania State University** — **State College, PA**
  Dual PhD, Astronomy/Astrophysics & Astrobiology — *2017*
  Dissertation: A Synergistic Approach to Interpreting Planetary Atmospheres
- **Cornell University** — **Ithaca, NY**
  B.A., Physics — *2013*

Awards, Fellowships

- **2021**: NASA Ames Early Career Award
- **2020**: Evans Visiting Lectureship in Exoplanet Science, UC Irvine
- **2018**: University California Postdoctoral Fellowship
- **2017**: Ford Foundation Fellow, Honorable Mention
- **2017**: Alfred P. Sloan Foundation Minority Graudate Scholarship
- **2016**: Kavli Student Fellow
- **2015**: National Astrobiology Early Career Collaboration Award
- **2015**: Stephen B. Brumback Graduate Fellowship in Astrophysics
- **2014**: National Science Foundation Graduate Research Fellowship
- **2013**: STEM Scholar Graduate Fellow

Open Source Projects | GitHub: ☆63 ⑂45 ⬇2,639 | Zenodo: ⬇2,719

- `PICASO`: `https://natashabatalha.github.io/picaso`
  Enables computation of reflected light, thermal, and transmission spectroscopy for exoplanets and Brown

Dwarfs.

- **PandExo**: `https://natashabatalha.github.io/PandExo`
  Enables simulations of JWST and HST observations.
- **Virga**: `https://natashabatalha.github.io/Virga`
  Enables theoretical modeling of exoplanet and Brown Dwarf clouds.

Publications | 12/36 1st author | h-index:20 | Citations:1535

1. **2022**: Batalha, N., Teske, J., Wolfgang, A., et al. 2022, submitted, ApJ
2. **2022**: Robbins-Blanch, N., Kataria, T., Batalha, N. E., & Adams, D. J. 2022, arXiv e-prints, arXiv:2204.03545. 2204.03545
3. **2022**: Alderson, L., Wakeford, H. R., MacDonald, R. J., et al. 2022, MNRAS, 512, 4185, 10.1093/mnras/stac661
4. **2022**: Mang, J., Gao, P., Hood, C. E., et al. 2022, ApJ, 927, 184, 10.3847/1538-4357/ac51d3
5. **2022**: Rooney, C. M., Batalha, N. E., Gao, P., & Marley, M. S. 2022, ApJ, 925, 33, 10.3847/1538-4357/ac307a
6. **2022**: Adams, D. J., Kataria, T., Batalha, N. E., Gao, P., & Knutson, H. A. 2022, , 926, 157, 10.3847/1538-4357/ac3d32
7. **2022**: Harman, C. E., Kopparapu, R. K., Stefánsson, G., et al. 2022, PSJ, 3, 45, 10.3847/PSJ/ac38ac
8. **2021**: Gharib-Nezhad, E., Marley, M. S., Batalha, N. E., et al. 2021b, ApJ, 919, 21, 10.3847/1538-4357/ac0a7d
9. **2021**: Tang, S.-Y., Robinson, T. D., Marley, M. S., et al. 2021, ApJ, 922, 26, 10.3847/1538-4357/ac1e90
10. **2021**: Sotzen, K. S., Stevenson, K. B., May, E. M., et al. 2021, , 162, 168, 10.3847/1538-3881/ac0e2c
11. **2021**: Briesemeister, Z., Sallum, S., Skemer, A., & Batalha, N. 2021, in Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 11823, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, 1182308, 10.1117/12.2594880
12. **2021**: Mukherjee, S., Fortney, J. J., Jensen-Clem, R., et al. 2021b, ApJ, 923, 113, 10.3847/1538-4357/ac2d92
13. **2021**: Gharib-Nezhad, E., Iyer, A. R., Line, M. R., et al. 2021a, ApJs, 254, 34, 10.3847/1538-4365/abf504
14. **2021**: Mukherjee, S., Batalha, N. E., & Marley, M. S. 2021a, ApJ, 910, 158, 10.3847/1538-4357/abe53b
15. **2021**: Gan, T., Wang, S. X., Teske, J. K., et al. 2021, MNRAS, 501, 6042, 10.1093/mnras/staa3886
16. **2020**: Lewis, N. K., Wakeford, H. R., MacDonald, R. J., et al. 2020, ApJL, 902, L19, 10.3847/2041-8213/abb77f
17. **2020**: Hayworth, B. P. C., Kopparapu, R. K., Haqq-Misra, J., et al. 2020, Icarus, 345, 113770, 10.1016/j.icarus.2020.113770
18. **2019**: Wakeford, H. R., Lewis, N. K., Fowler, J., et al. 2019, AJ, 157, 11, 10.3847/1538-3881/aaf04d
19. **2019**: Mayorga, L. C., Batalha, N. E., Lewis, N. K., & Marley, M. S. 2019, AJ, 158, 66, 10.3847/1538-3881/ab29fa
20. **2019**: Batalha, N. E., Marley, M. S., Lewis, N. K., & Fortney, J. J. 2019b, ApJ, 878, 70, 10.3847/1538-4357/ab1b51
21. **2019**: Batalha, N. E., Lewis, T., Fortney, J. J., et al. 2019a, ApJL, 885, L25, 10.3847/2041-8213/ab4909
22. **2019**: Batalha, N. E., Smith, A. J. R. W., Lewis, N. K., et al. 2018c, AJ, 156, 158, 10.3847/1538-3881/aad59d
23. **2018**: Moran, S. E., Hörst, S. M., Batalha, N. E., Lewis, N. K., & Wakeford, H. R. 2018, AJ, 156, 252, 10.3847/1538-3881/aae83a
24. **2018**: Blumenthal, S. D., Mandell, A. M., Hébrard, E., et al. 2018, ApJ, 853, 138, 10.3847/1538-

4357/aa9e51

25. **2018**: Batalha, N. E., Lewis, N. K., Line, M. R., Valenti, J., & Stevenson, K. 2018b, ApJL, 856, L34, 10.3847/2041-8213/aab896
26. **2018**: —. 2018a, EPSL, 484, 415, 10.1016/j.epsl.2017.12.018
27. **2018**: Kempton, E. M. R., Bean, J. L., Louie, D. R., et al. 2018, PASP, 130, 114401, 10.1088/1538-3873/aadf6f
28. **2018**: Bean, J. L., Stevenson, K. B., Batalha, N. M., et al. 2018, PASP, 130, 114402, 10.1088/1538-3873/aadbf3
29. **2017**: Batalha, N. E., & Line, M. R. 2017, AJ, 153, 151, 10.3847/1538-3881/aa5faa
30. **2017**: Christiansen, J. L., Vanderburg, A., Burt, J., et al. 2017, AJ, 154, 122, 10.3847/1538-3881/aa832d
31. **2017**: Batalha, N. E., Kempton, E. M. R., & Mbarek, R. 2017a, ApJL, 836, L5, 10.3847/2041-8213/aa5c7d
32. **2017**: Batalha, N. E., Mandell, A., Pontoppidan, K., et al. 2017b, PASP, 129, 064501, 10.1088/1538-3873/aa65b0
33. **2016**: Haqq-Misra, J., Kopparapu, R. K., Batalha, N. E., Harman, C. E., & Kasting, J. F. 2016, ApJ, 827, 120, 10.3847/0004-637X/827/2/120
34. **2016**: Batalha, N. E., Kopparapu, R. K., Haqq-Misra, J., & Kasting, J. F. 2016, Earth and Planetary Science Letters, 455, 7, 10.1016/j.epsl.2016.08.044
35. **2015**: Batalha, N., Kalirai, J., Lunine, J., Clampin, M., & Lindler, D. 2015b, arXiv e-prints, arXiv:1507.02655. 1507.02655
36. **2015**: Batalha, N., Domagal-Goldman, S. D., Ramirez, R., & Kasting, J. F. 2015a, Icarus, 258, 337, 10.1016/j.icarus.2015.06.016
37. **2015**: Cowan, N. B., Greene, T., Angerhausen, D., et al. 2015, PASP, 127, 311, 10.1086/680855
38. **2011**: Agüeros, M. A., Covey, K. R., Lemonias, J. J., et al. 2011, ApJ, 740, 110, 10.1088/0004-637X/740/2/110

Awarded Grants & Observing Time

- **2021**: **PI** | 21-XRP21-0182

  Towards High Metallicity: Integrated Composition-Dependent Molecular Opacities for Modeling Super-Earth to Neptunian Atmospheres. Science PI: Gharib-Nezhad, Ehsan
- **2021**: **PI** | JWST-GO-2512 | 142 hours

  Seeing the Forest and the Trees: Unveiling Small Planet Atmospheres with a Population-Level Framework. PI: Teske, Johanna
- **2021**: Co-I | JWST-GO-2358 | 13.1 hours

  Under the Light of a Dead Star: Revealing the Atmospheric Composition of a White Dwarf Planet. PI: MacDonald, Ryan
- **2021**: Co-I | JWST-GO-2358 | 75.6 hours

  Tell Me How I'm Supposed To Breathe With No Air: Measuring the Prevalence and Diversity of M-Dwarf Planet Atmospheres. PI: Stevenson, Kevin
- **2021**: Co-I | JWST-GO-2667 | 9.2 hours

  Good vibrations: Directly measuring Exoplanet aerosol compositions with MIRI spectroscopy. PI: Wakeford, Hannah
- **2021**: Co-I | JWST-AR-1977

  Glows in the Dark: New Models for the Atmospheric Structure and Evolution of High Metallicity and. PI: Marley, Mark
- **2021**: Subject Level Member | JWST-GTO-1353 | 74.9 hours

  Transit and Eclipse Spectroscopy of a Hot Jupiter. PI: Lewis, N.

- **2020**: Subject Level Member | JWST-GTO-1312 | 34.1 hours

  Transiting and Eclipse Spectroscopy of a Warm Neptune. PI: Lewis, N.
- **2020**: Subject Level Member | JWST-GTO-1331 | 22 hours

  Transit Spectroscopy of TRAPPIST-1e. PI: Lewis, N.
- **2020**: Co-I | Interdisciplinary Consortia for Astrobiology Research

  Follow the Volatiles: Tracing chemical species relevant to habitability from proto-planetary disks to exoplanet atmospheres. PI: Batalha, N.M.
- **2020**: Co-I | HST-GO-16180

  Constructing the First Spectroscopic, Multi-Dimensional Map of a Hot Jupiter. PI: Kataria, T
- **2020**: Co-I | Gemini 2020-LP

  A high-resolution survey of molecular abundances in transiting exoplanet atmospheres. PI: Mansfield, M.
- **2019**: Co-I | HST-GO-15836

  A deep look into the atmosphere of an exoplanet around a pre-main sequence star. PI: Newton, E.
- **2019**: Collaborator | Planetary Data Archiving, Restoration, and Tools

  Enhancing capabilities of the HITRAN and HITEMP molecular spectroscopic databases for planetary research. PI:Gordon, I.
- **2019**: **Science PI** | NASA Unsolicited Proposal

  Community Tool for Computing, Manipulating and Visualizing Molecular and Atomic Opacities. PI:Lewis, N.K.
- **2017**: Co-I | JWST-ERS-1366

  The Transiting Exoplanet Community Early Release Science Program. PI: Batalha, N.M.
- **2017**: Co-I | HST-GO-14918

  Definitive Measurement of WASP-17b's Water Abundance in Preparation of JWST. PI: Wakeford, H.R.

Professional Service

REFEREE: AAS, MNRAS
PANELIST:TESS, HST, ROSES
MEMBER: AAS, DPS, SACNAS
COMMITTEES: 2020-p:Planetary Data System User Committee
2019-p:ExoPAG Executive Committee
ORGANIZER: 2021: Division of Planetary Science Meeting
2020: ExoExplorers Program
2015: AbGradCon
2014: Emerging Researchers in Exoplanet Symposium
CHAIR: 2021-p:Bay Area Exoplanet Meeting

Broader Impacts

- **2021-p**: Subject Matter Expert, Chabot Space Science Center

  Regular speaker on topics related to NASA's search for life beyond year, and diversity, equity and inclusion within STEM
- **2021-p**: Subject Matter Expert, NASA Community College Network

  An initiative to bring NASA Subject Matter Experts (SMEs), research findings, and science resources into the nation's community college system
- **2018-p**: Advisor/Instructor, Evergreen Valley Community College - Citizen Science Initiative

  501(c)3 with the goal of increasing BIPOC students in STEM.
- **2017**: Instructor, Project Favela

  501(c)3 with the goal of providing education to students in Rocinha, one of Brazil's largest favelas.

- **2014-2017**: Instructor, Centre County Prison Society Education Program
  501(c)3 with the goal of providing education within the prison system.
- **2015-2017**: Director of Programs, Learn to Be Foundation
  501(c)3 with the goal of providing underserved K-12 students with free 1-on-1 online tutoring

Invited Talks, Seminars, Panels & Colloquia

- **Aug. 2022**: ASA-HITRAN
- **Dec. 2021**: UC Berkeley Center for Integrative Planetary Science Seminar
- **Nov. 2021**: Department of Astrophysics Colloquium, University of California Santa Cruz
- **Oct. 2021**: SACNAS: Exploring the Universe with NASA Astrophysics
- **Aug. 2021**: European Southern Observatory: Atmospheres, Atmospheres! Do I look like I care about atmospheres?
- **Aug. 2021**: NASA Ames Summer Series
- **July 2021**: Sagan Summer Workshop
- **June 2021**: Scialog: Signatures of Life in the Universe
- **Apr. 2021**: College of Science Seminar Series, San Jose State University
- **Nov. 2020**: Astronomy & Astrophysics Colloquium, Caltech Institute of Technology
- **July 2020**: Sagan Summer Workshop
- **Dec. 2019**: OWL @ ETH - paving the way to the atmospheric characterization of terrestrial exoplanets
- **Dec. 2019**: Department of Astronomy Colloquium, University of Michigan
- **Nov. 2019**: Carnegie Observatory Colloquium, Pasadena, CA
- **Jul. 2019**: Moonshots and Earthshots in the Search for Life Beyond Earth, Green Bank, WV
- **Dec. 2018**: Department of Astrobiology Colloquium, University of Washington
- **Nov. 2018**: Department of Space Sciences Planetary Lunch Seminar, Cornell University
- **Nov. 2018**: Stars and Planets Seminar Series, Harvard Center for Astrophysics
- **Oct. 2018**: Department of Astronomy & Astrophysics, University of California Santa Cruz
- **Oct. 2018**: Department of Physics Colloquium, University of California Merced
- **Jun. 2018**: Panelist at Emerging Researchers in Exoplanets Symposium
- **Jun. 2018**: Planetary Exploration Group Seminar, JHU Applied Physics Lab
- **Feb. 2018**: George Mason University Observatory Public Lecture, Fairfax, VA
- **Jul. 2017**: Enabling Transiting Exoplanet Observations with JWST Workshop, Space Telescope Science Institute
- **Feb. 2017**: School of Earth and Space Exploration Seminar, Arizona State University
- **Aug. 2016**: Planetary Systems: A Synergistic View, Quy Nhon, Vietnam
- **Aug. 2016**: Department of Terrestrial Magnetism Colloquium, Carnegie Institute
- **Mar. 2016**: Planetary Lunch Seminar, Goddard Space Flight Center
- **Mar. 2016**: Planetary Lunch Seminar, Center for Exoplanets and Habitable Worlds, The Pennsylvania State University
- **Feb. 2016**: Seminar, Jet Propulsion Laboratory
- **May 2015**: Special Seminar to The Pennsylvania State Board of Visitors
- **May 2015**: Special Seminar to The Pennsylvania State Dean of Eberly College of Science Advisory Committee

Contributed Talks

Sept. 2019: Bay Area Exoplanet Meeting, NASA Ames, CA

Aug. 2019: Extreme Solar Systems IV, Reykjavik, Iceland

Dec. 2018 : Bay Area Exoplanet Meeting, NASA Ames, CA

Sept. 2018: Bay Area Exoplanet Meeting, NASA Ames, CA

Jul. 2018: Exoplanets II, Cambridge, UK

May. 2018: Chesapeake Bay Area Exoplanet Meeting, Carnegie DTM, MD

Jan. 2018: Winter AAS Conference, Washington DC

Jan. 2017: Winter AAS Conference, Grapevine, Texas

Oct. 2016: Division of Planetary Sciences Conference, Pasadena, CA

Jan. 2014 : Winter AAS Conference, Washington, DC