ERIN FLOWERS

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Research Interests:

Planetary atmospheric chemistry and dynamics; astrobiology; exoplanet detection and atmospheric characterization; astronomical spectroscopy

Education:

Princeton University, Department of Astrophysical Sciences

PhD Astrophysics (Fall 2019 – Spring 2023)

Advisor: Christopher Chyba

Princeton University, Department of Astrophysical Sciences

M.S. Astrophysics (Fall 2017 – Fall 2019)

Columbia University, Columbia College

B.A. Astrophysics (Fall 2013 - Spring 2017)

Research Experience:

Using TitanWRF to analyze Titan's atmospheric dynamics (present)

Advisor: Claire Newman

Thesis research on Titan's atmospheric dynamics and chemistry (Summer 2020 - Spring 2023)

Advisor: Christopher Chyba

Determining the effect of Joule heating on the atmospheres of Europa and Enceladus (spring 2021)

Candidate Research Project, Princeton University

Advisor: Christopher Chyba

Determining the effects of interplanetary dust particle bombardment on the energy budget and chemical reaction rates within titan's atmosphere (Spring 2020 – Spring 2021)

Candidate Research Project, Princeton University

Advisor: Christopher Chyba

Determining the effects of a period of late heavy bombardment on the earth's present C/N ratio (Fall 2019)

Pre-candidate Research Project, Princeton University

Advisor: Christopher Chyba

Analysis of Template Spectra for use in RV Exoplanet Detections (Summer 2018)

Pre-candidate Research Project, Carnegie Observatories

Advisor: Johanna Teske

Exploring the effects of Turbulence on Star Formation with ATHENA (Spring 2018)

Pre-candidate Research Project, Princeton University

Advisor: Eve Ostriker

Analyzing Dynamical Trends of Hot Jupiters With Large Spin-Orbit Misalignments (Fall 2017)

Pre-candidate Research Project, Princeton University

Advisor: Josh Winn

Analyzing the Atmosphere of HD 189733b with Transmission Spectroscopy (Summer 2016 –Summer 2017)

NSF Research Experience for Undergraduates Internship and Senior Thesis, University of Michigan and

Columbia University

Advisors: Emily Rauscher and Eliza Kempton

Exploring the Limits of Exoplanet Habitability (Summer 2015)

NSF Research Experience for Undergraduates Internship, Weber State University

Advisor: John Armstrong

Poster Presentations:

"Reproducing Stratospheric Superrotation in Titan's Atmosphere with the TitanWRF GCM"

Extreme Solar Systems V Meeting, March 2023, Christchurch, New Zealand

AGU Fall Meeting, December 2022, Chicago, IL

241st AAS Meeting, January 2023, Seattle, WA

"Getting to Know Your Star: A Comparison of Analytic Techniques for Deriving Stellar Parameters and Abundances for the Magellan Planet Search Program"

231st AAS Meeting, January 2019, Seattle, WA

"Using Transmission Spectroscopy to Determine the Rotation Rate of HD 189733b"

APS Conference for Undergraduate Women in Physics, Spring 2017, Princeton University

229th AAS Meeting, January 2017, Grapevine, TX

Columbia University Astrofest, September 2016, Columbia University

Oral Presentations & Invited Talks:

Youth STEM Conference Career Panel

Princeton Plasma Physics Laboratory "Build Big Dreams" Youth STEM Conference, March 2026, Princeton, NJ

Summer of a Lifetime Astrobiology Workshop

SOAL-U Summer High School Intensive, August 2025, Princeton, NJ

Inclusive Academy Symposium Graduate Alumni Panel

Princeton Graduate Office of Access, Diversity and Inclusion IA Symposium, April 2025, Princeton, NJ

Every Voice Alumni Conference "Seeing Each Other Across Generations" Panel

Every Voice Princeton LGBTQIA+ Alumni Conference, September 2024, Princeton, NJ

Indiana University Women+ Technology Summit Conference Panel & Colloquium

April 2024, Indianapolis, IA

Women+ of Color Project "Choosing a Graduate School" Panel

Harvard University, October 2023, Cambridge, MA

"Shock Synthesis of Organic Molecules by Meteors in the Atmosphere of Titan"

AAS Division of Planetary Science Meeting, October 2022, London, ON

National Society of Black Physicists Meeting, November 2022, Charlottesville, VA

"The Stars Behind Bars: Teaching Astronomy & Physics in a Prison Classroom"

AAS Division of Planetary Science Meeting, October 2022, London, ON

241st AAS Meeting, January 2023, Seattle, WA

"energy delivery via meteors into titan's atmosphere"

Astrobiology Science Conference, May 2022, Atlanta, GA

AAS Division of Planetary Science Meeting October 2021, Virtual Conference

"Full STEAM Ahead! How To Implement a Rich STEAM (Science, Technology, Engineering, Arts, and Mathematics) Curriculum Inside Correctional Facilities"

National Conference on Higher Education in Prison, November 2021, Denver, CO

"The Chemical Quandaries of Titan's Atmosphere (And How We Can Solve Them)"

Franklin & Marshall College Physics & Astronomy Department, March 2021, Virtual Visit

University of Wisconsin Eau Claire Astronomy Department, April 2021, Virtual Visit

"Education, Race, & Justice: An Intro to the Prison Teaching Initiative"

Princeton University Class of '94, January 2021, Virtual Meeting

AAS CSMA Panel: "Anti-Blackness in Astronomy"

AAS 237st Winter Meeting, January 2021, Virtual Meeting

"Extreme Atmospheres: Analyzing the Atmospheres of Hot Jupiters with High Resolution Transmission Spectroscopy"

University of Chicago Astronomy & Astrophysics Department, September 2020, Virtual Visit

Indiana University Astronomy Department, September 2020, Virtual Visit

"Community Care as an Act of Resistance for People of Color"

National Conference on Race and Ethnicity (NCORE), Summer 2020, Virtual Meeting

"Getting to Know Your Star: A Comparison of Analytic Techniques for Deriving Stellar Parameters and Abundances for the Magellan Planet Search Program"

Carnegie Observatories Summer Research Symposium, Summer 2018, Carnegie Observatories, Pasadena, CA

"Using Transmission Spectroscopy to Determine the Rotation Rate of HD 189733b"

Columbia BlueShift Public Meeting, Spring 2017, Columbia University

University of Michigan Summer Research Symposium, Summer 2016, University of Michigan

Observing Experience:

Magellan Telescope

6.5-m, Magellan II Clay Telescope, Las Campanas Observatory, Vallenar, Chile (December 17 – 20, 2018; August 4 – 14, 2019)

REOSC Telescope

1.52-m, Haute-Provence Observatory, St. Michel l'Observatoire, FR (February 13 – 20, 2016)

Grubb-Parsons telescope

1.93-m, Haute-Provence Observatory, St. Michel l'Observatoire, FR (February 13 – 20, 2016)

Hiltner Telescope

2.4-m, MDM Observatory, Kitt Peak, AZ (March 16 – 21, 2014)

McGraw-Hill Telescope

1.3-m, MDM Observatory, Kitt Peak, AZ (March 16 – 21, 2014)

Teaching Experience:

Instructor, 'FRS 155 - The Oldest Science: A History of Astronomy Around the World' (Fall 2024, Fall 2025)

Co-instructor, 'AST 207 - A Gateway to Science: Observational Astronomy in the James Webb Era' (Spring 2025)

Graduate Teaching Assistant, Princeton University (Fall 2018, Spring 2020, Fall 2020, Spring 2023)

Prison Teaching Initiative Pre-algebra Teacher, East Jersey State Prison, Woodbridge, NJ (Spring 2020)

Prison Teaching Initiative Astronomy Teacher, East Jersey State Prison, Woodbridge, NJ (Fall 2018)

Prison Teaching Initiative Algebra II Teacher, Albert C. Wagner Youth Correctional Facility, Chesterfield, NJ (Spring 2018)

Undergraduate Teaching Assistant, Columbia University (2015 – 2016)

Mentoring Experience:

Previous undergraduate mentees: Emma Louden, JingJing Gao, Teo Grosu, Lillie Szemraj

Previous graduate mentees: Eden Girma

Awards and Fellowships:

Princeton University Association of Black Graduate Alumni Patrice Y. Johnson *80 Service Award (Spring 2023)

Princeton University Prison Teaching Initiative Math Fellowship (Fall 2019 – Spring 2023)

Princeton University Access, Diversity and Inclusion Graduate Fellowship (Fall 2018 – Spring 2023)

Princeton University Best of Access, Diversity and Inclusion (BADI) Pinnacle Award (May 2022)

Princeton University Graduate Student Teaching Award (2021)

National Science Foundation Graduate Research Fellowship (2017 - 2020)

Chambliss Astronomy Achievement Award Student Prize Honorable Mention (January 2017)

Columbia University Named Scholarship (2015/2016)

American Physical Society Minorities in Physics Scholarship (2013/2014, 2014/2015)

Columbia University Dean's List (Fall 2013, Spring 2014, Fall 2014, Spring 2015)

Outreach and Community Service:

Princeton University Forbes College Faculty Fellow (present)

National Science Foundation Grant Review Panel (Spring 2025)

American Astronomical Society Committee on the Status of Minorities in Astronomy Member (Fall 2019 - Spring 2023)

American Astronomical Society Astronomy Ambassador (present)

Princeton University Prison Teaching Initiative Coordinator & Volunteer Teacher (Princeton, NJ, January 2018 – May 2023)

'Out of This World!' Plant-based Eating Gala presentation (December 2022)

Presentation to 10th, 11th, & 12th grade physics classes on astronomy (May 2021)

Presentation to Cambridge Elementary 5th grade science classes on astronomy (January 2021)

Presentation to Bronx Preparatory Charter School 10th & 11th grade physics classes (January 2019)

Carnegie Public Outreach Volunteer (Pasadena, CA, June 2018 – August 2018)

Girl Scouts of America (local chapter) Science Consultant (October, 2018)

Princeton University Astronomy Public Outreach Coordinator & Volunteer Educator (Princeton, NJ, September 2017 – present)

Presentation to St. Hilda's and St. Hugh's 4th and 5th grade science classes on astronomy (January 26, 2017)

Presentation to Girl Scouts of America (local chapter) (November 9, 2018)

Columbia University Teaching-Learning Center Tutorial Assistant (New York, NY, October 2016 – May 2017)

Columbia University Astronomy Public Outreach Volunteer Educator (New York, NY, September 2013 – May 2017)

Private tutor (math, grades 4 – 12; physics, grades 6 – 12; chemistry, grades 6 – 12) (2011 – present)

Weber State University Science Saturdays Volunteer (Ogden, UT, June – August 2015)

Cranbrook Institute of Science Discovery Room Volunteer Educator (Bloomfield Hills, MI, June – August 2014)

Programing Languages:

Python (advanced), IDL (advanced), Fortran (moderate), C (basic/moderate), HTML (basic/moderate), SQL (moderate)

Language Skills:

German (advanced), French (proficient), Dutch (basic), Japanese (basic)

PUBLICATIONS:

"Reproducing Superrotation in Titan's Stratosphere with the TitanWRF GCM" Erin Flowers et al., in prep 2026

"Shock Synthesis of Organic Molecules by Meteors in the Atmosphere of Titan" Erin Flowers and Christopher Chyba, arXiv: 2307.10293

"TESS reveals a short-period sub-Neptune sibling (HD 86226 c) to a known long-period giant planet" Johanna Teske… Erin Flowers, et al., arXiv: 2007.13927

"The CARMENES search for exoplanets around M dwarfs. LP 714-47 b (TOI 442.01): populating the Neptune desert" S. Dreizler, … E. E. Flowers, et al., arXiv: 2011.01716

"The Young Planet DS Tuc Ab has a low Obliquity" Benjamin T. Montet, Adina D. Feinstein, Rodrigo Luger, Megan E. Bedell, Michael A. Gully-Santiago, Johanna K. Teske, Sharon Xuesong Wang, R. Paul Butler, Erin Flowers, Stephen A. Shectman, Jeffrey D. Crane, Ian B. Thompson, AJ, arXiv:1912.03794

"TOI 694 b and TIC 220568520 b: Two Low-Mass Companions Near the Hydrogen Burning Mass Limit Orbiting Sun-like Stars" Ismael Mireles, … Erin Flowers, et al., arXiv:2006.14019

"The multi-planet system TOI-421 -- A warm Neptune and a super puffy mini-Neptune transiting a G9 V star in a visual binary" Ilaria Carleo, … Erin Flowers, et al., AJ, arXiv:2004.100095

"The High-Resolution Transmission Spectrum of HD 189733b Interpreted with Atmospheric Doppler Shifts from Three-Dimensional General Circulation Models" Flowers, E., Brogi, M., Rauscher, E., Kempton, E. M.-R., & Chiavassa, A., AJ, arXiv:1810.06099