Dr. Raissa Estrela

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Curriculum Vitae (December 2024)

Education

11/2023–Present: **Research Scientist** at NASA's Jet Propulsion Laboratory
10/2022–11/2023: **JPL Postdoctoral Fellow** at NASA's Jet Propulsion Laboratory
10/2020–10/2022: **NASA Postdoctoral Program Fellow** at NASA's Jet Propulsion Laboratory
01/2017–09/2020: **Ph.D. in Geospatial Sciences and Applications** at Mackenzie Presbyterian University, Sao Paulo, Brazil, with long-term internship at NASA's Jet Propulsion Laboratory, JPL Graduate Fellowship, Pasadena, USA.
01/2015–01/2017: **Master in Geospatial Sciences and Applications** at Mackenzie Presbyterian University, Sao Paulo, Brazil.
01/2009–12/2014: **B.Sc. in Physics** at University Federal of Rio Grande do Norte, Natal, Brazil.
07/2007-01/2009: **B.Sc. in Ecology** (transfered to Physics in 2009) at University Federal of Rio Grande do Norte, Natal, Brazil.

Complementary Education

07/2018–10/2020: **JPL Graduate Fellowship Program** Implementation of the calibration of HST/STIS in the EXCALIBUR pipeline, under supervision of Dr. Mark Swain
03/2018–04/2018: **ESO Scientific Visitor Program** Data reduction of exoplanet transmission spectra data taken with VLT/FORS2, under supervision of Dr. Elyar Sedaghati
01/2013–12/2013: **Undergraduate Exchange Period at University of Toronto, Toronto**, CNPq Fellowship, Canada.

Awards, Fellowships and Honors

2025 JPL North Star award - for scientific excellence in developing a new measurement capability for the EMIT mission
2025 JPL Team Awards - for contributing to the organization of the HWO 2025 Conference
2024 JPL Team Awards - for participating in the development of the Excalibur pipeline
2023 NASA Honor Awards - Group Achievement - for contributing to the professional development program ExoExplorers

2020 International Astronomical Union PhD at-large Prize in recognition for outstanding scientific achievement in astronomy
Best Poster Awards in the XLII Annual Meeting of the Brazilian Astronomical Society (1st place): "Detection of Earth-sized exoplanets atmospheres using ground-based telescopes." (2018)
JPL Postdoctoral Fellowship (2020)
NASA Postdoctoral Program Fellowship (2020)
JPL Graduate Fellowship (2019-2020)
FAPESP BEPE grant (2018-2019)
ESO Scientific Visitor Program Scholarship (2018)
FAPESP (Sao Paulo State Research Foundation) PhD Fellowship 2017-2020
Swiss Government Excellence Scholarship (PhD) (2017) - declined
Max Planck Institute for Astronomy PhD Fellowship - Heidelberg (2017) - declined
CAPES Fellowship (Master) - (01/01/2015-01/01/2017)
CNPq Scientific Initiation Fellowship (Undergraduate) (2009-2014)
CNPq Fellowship Science Without Borders - University of Toronto - (2013)

Missions Involvement

- Science Project Team Member and Co-leader of Science Engagement, NASA's Habitable Worlds Observatory
- Member of the Science Team, CASE/ARIEL mission
- Member of the Greenhouse Gases Science Team and Applications Team, NASA's EMIT's Imaging Spectrometer

Professional Activities and Service

2024-present: Scientific Engagement Co-Leader - Habitable Worlds Observatory
2021-present: NASA's ExoExplorers Series - Organizing Committee
2025:
2022: Master Committee Member - Master defense of Ester Costa Nascimento (Observatório Nacional, Rio de Janeiro)
2025: Invited to serve as an JWST Cycle 3 Exoplanet Atmospheres & Habitability Discussion Panelist
2024: European Service Module Extended Mission Science Workshop [Invited to provide Astrophysics Consultation]
2024: Reviewer, Astrophysical Journal (ApJ)
2024: Doctoral Committee Member - PhD defense of Aline Novais (University Federal of Rio de Janeiro)
2023–Present: Science team of the NASA CASE mission (the Contribution to ARIEL Spectroscopy of Exoplanets)
2023: James Webb Space Telescope Cycle 2 External Reviewer Committee
2022: Doctoral Committee Member - qualifying exam of PhD candidate Aline Novais (University Federal of Rio de Janeiro)
2022: Reviewer, NASA Exoplanets Research Program (XRP) Panel 2022
2022: Youth Delegate (Representing Brazil) for the XI Summit of the Americas

2022: Doctoral External Examiner (substitute) - PhD Thesis defense of Alexandre de Araujo de Souza (Mackenzie Presbyterian University)
2021: Committee Member for the Final Year Project Undergraduate Dissertation of the student Abel Grangeiro (Mackenzie Presbyterian University)
2021-present: JPL Astrophysics Colloquium Committee Member
2015-2018: Organizer of the journal club of the graduate program that I was enrolled at Mackenzie Presbyterian University

2022-2024: Postdoc Leader - Foreign National Advocacy Network
2024-present: HR Leader - Foreign National Advocacy Network

Teaching Experience

Short-term course offered to the Engineering and Biological Sciences Dept. at Mackenzie Presbyterian University:

Astrobiology: Life Beyond Earth

- Lecture 1: Search for life in our Solar System: the perspectives to find life in other planets or moons in our solar system and their potential for habitability
- Lecture 2: Search for life beyond our Solar System: detection of exoplanets and the search for biosignatures
- Lecture 3: Planetary habitability: analysis of factors that can impact or influence the presence of life

Advising and Mentoring

- 09/2023–Present (ongoing): **Co-adivising Sarah Gomes Aroucha Barbosa**, PhD student, Ceara Federal University, Brazil
  Project: Convolutional Neural Networks for Characterizing Reflection Spectra of Earth-Like Planets Throughout Their Geological Evolution Around FGKM Stars

- 06/2024–Present (ongoing): **Co-advising Viktor Sumida**, PhD student, Mackenzie Presbyterian University (Sao Paulo, Brazil)
  Project: Effects of stellar activity and transit latitute on the transmission spectra of planets observed with the Hubble Space Telescope

- 06/2025–08/2025 (concluded): **Co-advised Shirley Deng**, JPL summer intern, Jet Propulsion Laboratory
  Project: Detection of Infrared Stellar Flares in Exoplanet Photometric Data

- 06/2024– 10/2024 (concluded): **Co-adivised Edypo Ribeiro de Melo**, PhD student, Sergipe Federal University, Brazil
  Project: Towards Characterizing Earth-like Exoplanets Atmospheres

- 06/2020–08/2023 (concluded): **Ashini Modi**, undergraduate student at Harvard University (Cambridge, US)

Project: Evolution of the atmospheric escape of Habitable Zone planets around M dwarfs

- 03/2018–08/2018 (concluded): **Co-advised Abel Granjeiro**, undergraduate student in Chemistry at Mackenzie Presbyterian University (Sao Paulo, Brazil)
  Project: Atmosphere and Habitability of TOI-700d

- 06/2018–08/2018 (concluded): **Co-advised Luisa Cabral**, undergraduate student in Biological Sciences at Mackenzie Presbyterian University (Sao Paulo, Brazil)
  Project: Simulating the effects of UV radiation due to superflares on microorganisms using laboratory resources

Conference & Workshop Organization

- **Towards the Habitable Worlds Observatory - 2025** Role: Local Organizer Committee.
- **Excalibur Workshop - 2023 Sagan Summer Workshop** Role: Organizer. Gave an overview and working example of the JPL Excalibur pipeline data products. Location: California Institute of Technology, 07/29/2023.
- **ExoSS II - Atmospheric and Interior connection in rocky EXOplanets and what we can learn from the Solar System** Role: Creator and organizer of the event. Location: Jet Propulsion Laboratory, 08/29/2023 and 08/30/2022.
- **ExoSS I - Atmospheric and Interior connection in rocky EXOplanets and what we can learn from the Solar System** Role: Creator and organizer of the event. Location: Jet Propulsion Laboratory, 05/23 and 05/24/2022.
- **Exoplanets Atmospheres Workshop** Role: Creator and Organizer. Gave two introductory lectures. Location: Mackenzie Presbyterian University, Sao Paulo, Brazil 03/08 and 03/09/2022.
- **Precision Spectroscopy 2022** Role: Scientific Organizing Committee (SOC)

Invited talks

1. The Biodiversity Cost of Animal Agriculture, Plant Futures Challenge Lab Course, UC Berkeley, Virtual, 02/09/2026.

2. Stellar Magnestim and its Impact on (exo)Planets, International Space Science Institute (ISSI), Bern, Switzerland, 06/02/2025.

3. São Paulo School of Advanced Science on Solar Activity and Space Weather, Sao Paulo, Brazil, 11/11/2024.

4. XXXVIII Brazilian North and Northeast Physics Meeting, Aracaju, Brazil, 11/26/2024.

5. Caltech Astrophysics Coloquium, Pasadena, California, 11/2023.

6. Space Week 2023 (Northeast Brazil), Fortaleza, Brazil, 08/17/2023.

7. NASA Ames Research Center, “Astrophysics Colloquium”, Mountain View, California, 05/09/2023.

8. Other Worlds Laboratory (OWL), PLUNCH seminar, Santa Cruz, California, 05/08/2023.
9. PhD Prize talk at the International Astronomical Union General Assembly in Busan, South Korea, 08/2022
10. Colloquium Carnegie Observatories, Pasadena, 09/20/2022.
11. NAT Colloquiums (Astrophysics division), University Cidade de São Paulo (UNICID), Brazil
12. Women Representation in the Scientific Community. Panel discussion at University of Santa Maria, Brazil
13. Seminar at ETH Zurich Seminar Series (remote) 01/12/2022.
14. Seminars of the Institute of Astronomy, Geophysics and Atmospheric of Sao Paulo (remote) on 09/08/2021.
15. Exoplanet Centre Seminars at the University of Cambridge (remote) on 06/15/2021.
16. NExScI seminar, Caltech/IPAC, 06/23/2021.
17. IAU Symposium 354 Solar and Stellar Magnetic Fields: Origins and Manifestations, Copiapó, Chile, 06/07/2019.

Main Contributed talks - Conferences

1. American Geophysical Union (AGU) Fall Meeting, 12/09/2024 and 12/11/2024.
2. JPL Astrophysics Science 101, 08/07/2024.
3. Cool Stars 22, Splinter Session Exoplanet Space Weather around Cool Stars, San Diego, USA, 06/27/2024.
4. Exoplanets IV, Splinter Session on Atmospheric Escape, Las Vegas, USA, 05/04/2022.
5. AGU Fall meeting 2021 (remote), 12/17/2021.
6. Habitable Worlds 2021 (remote), 02/23/2021.
7. Precision Spectroscopy 2021 (remote), 02/01/2021.
8. Exoplanet Science Initiative Symposium (remote), 08/31/2020.
9. Virtual 236th Annual Meeting of the American Astronomical Society, 02/06/2020.
10. Exoplanet Science Initiative Symposium, Caltech, Pasadena, USA, 26/03/2019.
11. 42nd COSPAR Assembly, Pasadena, USA, 15/07/2018.
12. ESO Coloquium, Santiago, Chile, 19/04/2018.

13. XLI Brazilian Astronomical Society Annual Meeting, Sao Paulo, Brazil, 05/09/2017.
14. Precision Spectroscopy: Towards Earth 2.0, Sao Paulo, Brazil, 04/08/2017.
15. AASTCS 5: Radio Exploration of Planetary Habitability, Palm Springs, California, USA, 12/05/2017.
16. IAU Symposium 328 (Living Around Active Stars), Maresias, Sao Paulo, Brazil, 17/10/2016.
17. XL Brazilian Astronomical Society Annual Meeting, Ribeirao Preto, Sao Paulo, Brazil, 29/08/2016.
18. Exoplanetary Atmospheres and Habitability Workshop, Observatoire de la Côte d'Azur, Nice, France, 12/10/2015

Observing Experience

2018-2022: Part of the New Mexico Exoplanet Spectroscopic Survey Instrument (NESSI) team at Palomar Observatory (∼5 nights per semester)
04/2018: Internship at Paranal Observatory for 1 week - observations with VLT/FORS2
05/2017: **PI on Gemini's Fast Turnaround (FT) - accepted:** The first detection of a terrestrial exoplanet atmosphere around a bright K dwarf (2.5 hours)
11/2017: **PI on SOAR Telescope - accepted:** Unveiling the optical spectra of the Super-Earth GJ 1214b (5 hours)

Grants

JPL North Star Award - Project: The Biodiversity Cost of Animal Agriculture in the Amazon Basin. Total funded: $25K$

Outreach

Public talk (virtual) Spaceweek 2024 (Northeast of Brazil) - "From Exoplanets to Our Planet: a look at atmospheres and the presence of life", 09/18/2024.
Public talk (virtual) on exoplanets and climate change for the Phoenix/Arizona arts, science, and cultural salon organization "Spirits of Senses', 08/15/2024.
- Public talk (remote) - Exoplanets Atmospheres and the Search For Life - University Federal of Ceara, Brazil, 05/22/2024.
- Public talk (in person) - Exoplanets & Arts - La Cañada Flintridge High School 11/14/2023.
- Public talk (in person) for the Los Angeles Public Library, "Seeing Stars: Solar Eclipses and Discovering New Planets", 10/07/2023.
- Public talk (remote), Iguatemi Mall, Fortaleza, Brazil, "In the Search of Other Worlds: The Journey of a Scientist From Northeast Brazil to NASA", 10/19/2023.
- Public talk (remote) for the Physics Week at University Federal of Paraiba, Brazil, "Atmosphere of distant worlds and the search for life beyond Earth", 09/13/2013.
- Public talk (remote), Celebrating Women in Astronomy, Astrophysics and Astronautics, Instituto Federal do Ceará - Campus Tianguá, Brazil, 06/02/2023.

- CineScience Movie Discussion, Discussing the movie AD Astra, Museum of the Image and Sound (Sao Paulo), 02/28/2023.
- Public talk (remote) for "Astronomy at noon" Series, University of Sao Paulo, 11/17/2022.
- Volunteer for the AstroFest, Pasadena Convention Center, June 2022.
- Public talk (remote) for "Astronomy for Everyone" Series, University of Sao Paulo, April 2022.
- Public talk (remote) to the organization Women in STEM2D, Brazil, August 2021.
- Public talk (remote) to Instituto Princípia, Sao Paulo, Brazil, July 2021.
- Public talk (remote) to several elementary schools in Brazil, 2022
- Contributor writer for Astropontos (portuguese version of Astrobites)
- Interview to the high school radio "Nas Ondas do Daura" about the career in science and exoplanets atmospheres, Brazil, 2022
Interview to Podcast Exploring Astrophysics
Interview to Podcast Estacao Planetário

Interviews - Media

[English] CBC/Radio-Canada - What on Earth - Astronomers are shifting their gaze to planet Earth
English] New York Times (NYT) - Alarmed by Climate Change, Astronomers Train Their Sights on Earth
[English] Astronomy Magazine - Volcanoes could have breathed new life into a super-Earth's atmosphere
[English] WiRed magazine - Did This Scorching-Hot Planet Lose—and Regain—an Atmosphere?
[English] Hubble Press Release - Distant Planet May Be On Its Second Atmosphere, NASA's Hubble Finds
[English] AAS Journal Author Series: Raissa Estrela on the detection of Aerosols at Microbar Pressures on an Exoplanet Atmosphere
[English] LUNATICS Astrobiologist of the Month (October 2023 New Moon)
[Portuguese] Pesquisa Fapesp magazine - The universe data
[Portuguese] UOL - Meet the Brazilian scientist who works at NASA in a research with the Hubble Space Telescope
[Portuguese] Canaltech - Hubble observes exoplanet that formed a secondary atmosphere
[Portuguese] Tilt UOL - Brazilians scientists participated in the discovery of a reestablished atmosphere on an exoplanet
[Portuguese] Interview to the Series "Quem estuda, vai longe" for Portal Correios
[Portuguese] Space Today - Hubble Detects Exoplanet that changed its Atmosphere (youtube channel)
[Portuguese] Mensageiro Sideral - The week in the Solar System # 37 (youtube channel)
[Portuguese] Globo TV - Scientist from Paraíba (Brazil) is part of the team that discovered an atmosphere that is being regenerated
[Portuguese] Folha de Sao Paulo - Study with a star similar to the Sun helps to understand the evolution of life on Earth

[Portuguese] G1 Globo - Student from Paraíba (Brazil) will study planets outside of the Solar System at NASA
[Portuguese] Moderna Parahyba (blog): - Raissa Estrela: the interstellar scientist from Paraíba, Brazil
[Portuguese] Globo TV - At the forefront of science, Chile hosts two of the biggest astronomy observatories
[Portuguese] Radio CBN - Career in Science/Astronomy

Publications List

17 total refereed/under-review papers. 6 first author papers (+ 1 submitted). 1 paper as a primary mentor and 2 co-mentoring. 6 second author papers (2 submitted). 4 proceedings. h-index=9

Book Chapter

"Superflares UV impact on the habitability of exoplanets" in the book *UV Astronomy and the investigation of the origin of life* by Elsevier (2021).

Major Publications (Total: 16. First author: 8 total; Second author: 5 + 2 submitted; Others: 4)

First author:

1. **Global-scale detection of plastic from space with the EMIT imaging spectrometer**
Estrela, R., Thompson, D. R., Brodrick, P., Chadwick, K. D., Gierach, M., Luis, K., Green, R., Swain, M., Geophysical Research Letter (2025)

2. **A Trend in Temperature for Clouds and Hazes in Exoplanets Atmospheres**
Estrela, R., Swain, M. R., Roudier, G., ApJL, V. 941, Issue 1 (2022)

3. **Detection of aerosols at microbar pressures in exoplanet atmosphere**
Estrela, R., Swain, M. R., Roudier, G., West, R., Valio, A., AJ, 162, 91 (2021)

4. **The evolutionary track of the H/He envelope in the observed population of sub-Neptunes and super-Earths planets**
Estrela, R., Swain, M., Gupta, A., Sotin, C., Valio, A; ApJ, 898, 104 (2020)

5. **Surface and oceanic habitability in the Trappist-1 Planets under the impacts of flares**
Estrela, R., Palit, S. and Valio, A.; Astrobiology, V. 20, Issue 12, p.1465-1475

6. **Superflare UV flashes impact on Kepler-96 system: a glimpse of habitability when the ozone layer first formed on Earth**;
Estrela, R. and Valio, A.; Astrobiology, 18, 1414-1424 (2018).

7. **Stellar magnetic cyles in Kepler-17 and Kepler-63**
Estrela, R. and Valio, A.; ApJ v.831 57E (2016)

Second author (Co-leading):

8. **Co-mentoring: Where does the simplified Stellar Contamination Model fail in Exoplanet Transmission Spectroscopy?**
   Sumida, V., **Estrela, R.**, Valio, A., Swain, M., Accepted by A&A (2026)

9. **Co-mentoring: UV Impact on the Atmospheric Photochemistry and Habitability in TOI-700d**
   Sumida, V., **Estrela, R.**, Valio, A., accepted by ApJ (2025)

10. **Co-mentoring: The Stellar Spectral Type Matters: Compositional Trends of Small Exoplanets**
    Sumida, V., **Estrela, R.**, Swain, M., Valio, A., under review by ApjL (2026)

11. **Primary mentor: Impact of M-dwarf Stellar Wind and Photoevaporation on the Atmospheric Evolution of Small Planets**
    Modi, A., **Estrela, R.**, Valio, A., MNRAS, V. 525, Issue 4 (2023)

12. **Detection of an Atmosphere on a Rocky Exoplanet**
    Swain, M. R., **Estrela, R.**, Roudier, G. M., Sotin, C. et al., AJ, 161, 213 (2021)

13. **Two Terrestrials Families with Different Origins**
    Swain, M., **Estrela, R.**, Sotin, C., et al.; ApJ, 881, 117 (2019)

14. **Activity and rotation of Kepler-17**
    Valio, A., **Estrela, R.**, Dirceu, Y., Bravo, J. P., and Medeiros, J. R.; ApJ v.835, 294V (2017)

Others:

15. **Volcanic Satellites Tidally Venting Na, K, SO2 in Optical and Infrared Light** Oza, A., Gebek, A., Westram, M., Tokadijan, A., Piro, A., Hu, R., Unni, A., Chari, R., Bello-Arufe, A., Schmidt, C., Louca, A., Miguel, Y., **Estrela, R.**, Yang, J. et al., accepted by MNRAS (2025)

16. **Comparing transit spectroscopy pipelines at the catalogue level: evidence for systematic differences**
Mugnai, L.; Swain, M.; **Estrela, R.**; Roudier, G., MNRAS, V. 531, Issue 1 (2024)

17. **Disequilibrium chemistry in exoplanets atmospheres observed with the Hubble Space Telescope**
Roudier, G., Swain, M; Gudipati, M., West, **R., Estrela** and Zellem, R., AJ, 162, 37 (2021)

    Huber-Feely, N., Swain, M., Roudier, G. M., **Estrela, R.**, A&A, 163, 22 (2021)

18. **Wavelets: a powerful tool for studying rotation, activity, and pulsation in Kepler and CoRoT stellar light curves**
Bravo, J. P., Roque, S., **Estrela, R.**, Leão, I. C., Medeiros, J. R.; A&A V.568 A34 (2014)

Proceedings

- **Optical transmission spectrum of Trappist-1b using from ground based observations** **Estrela, R.** and Sedaghati, E.; Proceedings of the Brazilian Astronomical Society, 31, no. 1, 17-20 (2019)
- **Characterization of stellar activity using transits and its impact on habitability** **Estrela, R.** and Valio, A.; Proceedings of the International Astronomical Union, Solar and Stellar Magnetic Fields: origins and manifestations, 354, 461 (2020)
- **Using planetary transits to estimate magnetic cycles of Kepler stars** **Estrela, R.** and Valio, A.; Proceedings of the International Astronomical Union, V. 328, pp 152-158 (2017).
- **The biological impact of superflares on planets in the Habitable Zone** Valio, A., **Estrela, R.**, Cabral, L., Grangeiro, A.; Proceedings of the International Astronomical Union, V. 345, pp. 176-180 (2020)