

Ana Carolina de Souza Feliciano

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Current Position

December 2021 –

Preeminent Postdoctoral Researcher, Astronomy

- Institution: Florida Space Institute - University of Central Florida
- Supervisor: Dr. Noemí Pinilla-Alonso
- Project: Discovering the composition of trans-Neptunian objects and icy embryos for planet formation with the James Webb Space Telescope (DISCO-TNOs).

Last Position

July 2020 – December 2020

Postdoctoral Researcher, Astronomy

- Institution: Observatório Nacional/MCTI, Rio de Janeiro, Brazil.
- Supervisor: Dr. Jorge Carvano.
- Project: The compositional analysis of trans-Neptunian objects: links from light curves of the Spitzer Space Telescope. The first goal of this project was to construct a synthetic light curve based on the amplitude of the Spitzer light curve to look for variations that could be associated with the composition of the objects. The second one was to use the Spitzer albedo to study the surface composition of the sample using the Shkuratov model.

Academic Collaboration

September 2019 – December 2019

Guest International Scholar

- Institution: Florida Space Institute / University of Central Florida, Florida, USA.
- Advisor: Dr. Noemí Pinilla Alonso.
- Project: Investigating heterogeneities on Dwarf Planets with the Spitzer Space Telescope.
- Funded by Florida Space Institute/University of Central Florida.

August 2018 – January 2019

PhD Internship

- Institution: Florida Space Institute - University of Central Florida
- Researcher Dr. Noemí Pinilla Alonso
- Project: Visible Analysis of Lucy Targets (3548) Eurybates, (15094) Polymele, (21900) Orus and (52246) Donaldjohanson.
- Funded by Brazilian governmental agency CAPES (Coordination for Higher Education Staff Development).

Short visit

October 2019

- Institution: Northern Arizona University, Arizona, USA.
- Collaborator: Dr. Joshua Emery.
- Project: Investigating heterogeneities on Dwarf Planets with the Spitzer Space Telescope - Data reduction and analysis.

Extended Education

January 2019 - April 2019

NASA L'SPACE Mission Concepty Academy

- Student collaboration program - Lucy Student Pipeline Accelerator and Competency Enabler (L'SPACE) Virtual Academy.
- Team and project-based program to gain competency in NASA mission protocols.

November 2016

XXVIII Canary Islands Winter School of Astrophysics: Solar System Exploration - IAC

- The exploration of the Solar System, covering different topics like asteroids, comets, icy objects, planetary atmospheres, dynamical models, and a variety of planetary space missions.

August 2015 **Workshop on Astronomical Observation and Instrumentation at Observatório Pico dos Dias (Brazil)**

- Review of the instruments of operation and highlight on the next generation of instruments at OPD.
- Photometry, Polarimetry, and Spectroscopy at OPD.
- Remote observations.

Formal Education

April 2016 - April 2020 **Ph. D., Astronomy**

- Observatório Nacional/MCTI, Rio de Janeiro, Brazil
- Thesis Title: "From Trojans to trans-Neptunian objects: a compositional analysis of the small bodies in the Solar System".
- Advisor: Dr. Alvaro Alvarez-Candal (Observatório Nacional/ON-MCTI)

March 2014 - March 2016 **Master of Science, Astronomy**

- Observatório Nacional/MCTI, Rio de Janeiro, Brazil
- Master Dissertation Title: "The study of small ices absorption bands on the spectra of trans-Neptunian objects".
- Master Advisor: Dr. Alvaro Alvarez-Candal (Observatório Nacional/ON-MCTI)

August 2010 - January 2014 **Physics degree**

- Universidade Federal Fluminense (UFF), Rio de Janeiro, Brazil

Awards

2022 **54th DPS Hartmann grant**

Financial support to attend the 54th edition of the Division of Planetary Sciences Meeting, October 2022, London (Canada).

2020 **52th DPS Hartmann grant**

Financial support to the registration fee of the 52th edition of the Division of Planetary Sciences Meeting, October 2020, Virtual meeting.

2019 **LPI Career Development Award 2019**

LPI Career Development is given to graduate students who have submitted a first-author abstract for presentation at the Lunar and Planetary Science Conference (LPSC). The awards are based on a review of the application materials by a panel of planetary scientists, and recipients will receive funds to help cover their expenses for attending the conference. The work contemplated was: Visible Analysis of NASA's Lucy Mission Targets 3548 Eurybates, 15094 Polymele, 21900 Orus, and 52246 Donaldjohanson.

2018 **50th DPS Hartmann grant**

Financial support to attend the 50th edition of the Division of Planetary Sciences Meeting in Knoxville, Tennessee, USA.

2018 **Fellowship Program: Sandwich Ph.D.**

Ph.D. program that provides scholarships at universities outside Brazil paid by CAPES (Brazilian government organization) from 6 months to one year. Through this program, I spent 6 months at the Florida Space Institute at the University of Central Florida.

Book chapter

Pinilla-Alonso, N, De Prá, M., and **Souza-Feliciano, A. C.** . Surface Composition of the trans-Neptunian Objects: Where are the ices in the Solar System?

Publications in refereed journals

I. Evangelista-Santana, M., Carvano, J. M., De Prá, M., de la Fuente Marcos, R., Schambeau, C., Licandro, J., de la Fuente Marcos, C., **Souza-Feliciano, A. C.** , Pinilla-Alonso, N. Physical and dynamical characterization of hyperbolic comet C/2017 U7 (PANSTARRS). Icarus. <https://10.1016/j.icarus.2021.114834>.

II. J. Licandro, J. de Leon, F. Moreno, C. de la Fuente Marcos, R. de la Fuente Marcos, A. Cabrera-Lavers, L. Lara, **A.C. Souza Feliciano**, M. De Prá, N. Pinilla-Alonso, S. Gueier. Activity of the Jupiter co-orbital comet P/2019 LD2 (ATLAS) observed with OSIRIS at the 10.4 m GTC. A&A. <https://doi.org/10.1051/0004-6361/202038842>.

III. A. Alvarez-Candal, **A.C. Souza-Feliciano**, W. Martins-Filho, N. Pinilla-Alonso, J.L. Ortiz. The Dwarf Planet Makemake as seen by X-Shooter. MNRAS. <https://doi.org/10.1093/mnras/staa2329>

IV. J. de León, J Licandro, C. de la Fuente Marcos, R. de la Fuente Marcos, L. M. Lara, F. Moreno, N. Pinilla-Alonso, M. Serra-Ricart, M. De Prá, G. P. Tozzi, **A. C. Souza-Feliciano**, M. Popescu, R. Scarpa, J. Font Serra, S. Geier, V. Lorenzi, A. Harutyunyan, A. Cabrera-Lavers. Visible and near-infrared observations of interstellar comet 2I/Borisov with the 10.4m GTC and the 3.6m TNG telescopes. MNRAS. <https://doi.org/10.1093/mnras/staa1190>.

V. **A.C.Souza-Feliciano**; M. De Prá, N.Pinilla-Alonso, A.Alvarez-Candal, E.Fernández-Valenzuela, J. de León, R.Binzel, P.Arcoverde, E.Rondón, M.E. Santana. 2019. Analysis in the Visible Range of NASA Lucy Mission Targets: Eurybates, Polymele, Orus and Donaldjohanson. Icarus. <https://doi.org/10.1016/j.icarus.2019.113463>.

VI. **A. C. Souza-Feliciano**; A. Alvarez-Candal , Y. Jiménez-Teja. 2018. Wavelet theory applied to the study of spectra of trans-Neptunian objects. A& A, Volume 614, A92. <https://doi.org/10.1051/0004-6361/201731464>

Professional Presentations

Oral Presentations

- 2023 Studying the composition of TNOs with the Spitzer Space Telescope: a preview of what Webb will bring! 1st Workshop on Ices in the Solar System. Montreal (Canada). 09-11 January 2023.
- 2022 Studying the composition of TNOs with the Spitzer Space Telescope: a preview of what Webb will bring! (#105.03). 54th edition of Division of Planetary Sciences Meeting. London (Canada). 02-07 October, 2022.
- 2022 La Ciencia del Telescopio Espacial James Webb. Proyecto Palabra Tuluá. Colombia. October, 26, 2022.
- 2022 Los cuerpos pequeños del Sistema Solar de una perspectiva observacional. Star-Academy. Arecibo Observatory. March, 12, 2022.
- 2020 Compositional Analysis of Haumea and Varuna with Spitzer Space Telescope (#307.05D). Virtual meeting of the Division for Planetary Science. 26-30 October, 2020.
- 2019 Visible spectra of Lucy Targets. Lucy Science Team Meeting #4, Boulder, Colorado. 13 and 14 of November, 2019.
- 2019 Visible Analysis of NASA's Lucy Mission Targets 3548 Eurybates, 15094 Polymele, 21900 Orus, and 52246 Donaldjohanson. 50th Lunar and Planetary Science Conference. Texas. March 18-22, 2019.
- 2016 Spectroscopy Analysis in the Near-Infrared of TNOs: Methanol case. Taller de Ciências Planetárias, Porto Alegre, RS, Brazil.

Poster Presentations

- 2018 Wavelet theory applied to the study of spectra of trans-Neptunian objects, The trans-Neptunian solar system, Coimbra, Portugal and DPS 2018, Knoxville, TN, EUA.
- 2017 A new data analysis technique in the study of the spectra of Trans-Neptunian objects, ACM, Montevideo, Uruguay.
- 2016 A search for water and methanol ices in Trans-Neptunian Objects, IAC Winter School 2016, Tenerife, Spain.

- 2015 Análise de espectros no infravermelho próximo de objetos trans-Netunianos, XXXIX Brazilian Astronomical Society Reunion, Ouro Preto, Brazil.

Participation as collaborator

- 2020 Physical characterization of hyperbolic comet C/2017 U7 (#319.04). Santana, M., et al (including Souza-Feliciano, A.C.). DPS 2020. iPoster presentation.
- 2020 The activity of the Jupiter co-orbital comet P/2019 LD2 (ATLAS) observed with the 10.4m GTC. Licandro, J., et al (including Souza-Feliciano, A.C.). EPSC. Poster presentation.
- 2017 A study of the absorption features of Makemake. Alvarez-Candal, A., Souza-Feliciano, A.C., et al. ACM, Montevideo, Uruguay. Poster presentation.

Seminars

- October 2022 "The trans-Neptunian objects from an observational perspective: what can we expect from the JWST data era?". Florida Space Institute/ University of Central Florida.
- October 2019 "NASA Lucy Mission: How ground-based observations can support the exploration of primitive objects in the Solar System". Northern Arizona University.
- March 2019 "NASA Lucy Mission: How ground-based observations can support the exploration of primitive objects in the Solar System". Universidad Nacional Autonoma de Mexico. Campus: Ensenada.
- January 2019 "NASA Lucy Mission: How ground-based observations can support the exploration of primitive objects in the Solar System". Journal Club of Planetary group of University of Central Florida.

Observing Experience

- James Webb Space Telescope - NIRSPEC* GO 2418 - DiSCo-TNOs: Discovering the composition of the trans-Neptunian objects, icy embryos for planet formation. P.I.: Noemí Pinilla-Alonso, Co-Is: 13 investigators with **A.C. de Souza-Feliciano**. 96 hours awarded.
- To analyze the sample of "cold" classical TNO population (data reduction, spectral analysis, and compositional modeling).
 - To provide python codes to analyze the spectral features of the data.
- GTO 1191 - Kuiper Belt Science with JWST. P.I.: John A. Stansberry.
- To analyze the spectral features of selected TNOs.
- James Webb Space Telescope - MIRI* GO 1658 - Pluto's Climate System with JWST. P.I.: Emmanuel Lellouch.
- To analyze the spectral features of Pluto.
- OASI - ON* Approximately 10 nights of observation in remote mode in 2014. Photometric observations of Near-Earth Asteroids.
- Observatorio Astronómico Nacional - San Pedro Mártir* Observational campaign: Deciphering the physical properties of Trojans. From March 27 to March 31, 2019. Photometric observations of Jupiter Trojan asteroids.
- Gran Telescopio Canarias (Spain) - EMIR instrument* Observational campaign: Digging-up iced fossils in the Solar System, a search for methanol ice on TNOs. First semester of 2021. Spectroscopic observations of red TNOs on HK spectral region.
- Observatorio Astrofísico de Javalambre (Spain) - JAST/T80 - T80CAM instrument* Observational campaign: Understanding the Jupiter Trojans objects. First semester of 2021. Photometric observations of Jupiter Trojans objects from near UV until the visible range.

- SO2020B-007: Deepening the understanding of Eurybates: NASA Lucy mission target. **PI.: A. C. Souza-Feliciano**, A. Alvarez-Candal, M. De Prá, N. Pinilla-Alonso. 8 hours guaranteed in November of 2020.
- SO2020B-012: Monitoring the spectra and dust properties of the first known active Jupiter Trojan: 2019 LD2. Santana, M., Carvano, J., De Prá, M., **Souza-Feliciano, A. C.**, Pinilla-Alonso, N. 18 hours guaranteed in 2020B. Due to the pandemic situation, the Telescope was closed to observation.
- SO2020A-002: A search for rotational variability in 11351 Leucus, target of NASA Lucy mission. **PI.: A. C. Souza-Feliciano**, A. Alvarez-Candal, M. De Prá, N. Pinilla-Alonso, E. Fernández-Valenzuela. 15 hours guaranteed in 2020A. Due to the pandemic situation, the Telescope was closed to observation.
- SO2019B-003: A search for rotational variability on 3548 Eurybates, 15094 Polymele and 21900 Orus: NASA Lucy Mission Targets. **PI.: A. C. Souza-Feliciano ***, A. Alvarez-Candal, M. De Prá, N. Pinilla-Alonso, E. Fernández-Valenzuela. 20 hours guaranteed in August of 2019.
- SO2019B-009: Discovering 52246 Donaldjohanson: NASA Lucy Mission Target. D. Morate, **A. C. Souza-Feliciano ***, A. Alvarez-Candal, M. De Prá, N. Pinilla-Alonso, E. Fernández-Valenzuela, J. S. Silva. 20 hours guaranteed in August of 2019.
- SO2019A-007: A search for rotational variability in 11351 Leucus, target of the NASA Lucy mission. **PI.: A. C. Souza-Feliciano ***, A. Alvarez-Candal, M. De Prá, N. Pinilla-Alonso, E. Fernández-Valenzuela. 10 hours guaranteed for June and July of 2019.
- SO2018A-007: Observing Lucy NASA Mission targets. **PI.: A. C. Souza-Feliciano ***, M. De Prá, A. Alvarez-Candal. 4.0m SOAR + GHTS. 11h granted in 2018A.
- SO2017A-006: Observing Thule Objects. A. Alvarez-Candal, **A. C. Souza-Feliciano**, M. C. Ayala-Loera. 4.0m SOAR + GHTS. 11h granted in 2017A but not utilized due to bad climatic conditions.

(*) Observations carried on by A. C. Souza-Feliciano.

Near-IR spectroscopy with TSPEC4.

- SO2022A-013: Unveiling the rotational heterogeneity of the near-Earth asteroid 1996FG3. P.I.: A. Alvarez-Candal, A. C. Bagatin, T. Santana-Ros, **A. C. Souza-Feliciano**. 10 hours observed by A. C. Souza-Feliciano in March 23, 2022.

Other professional experience

Reviewer

2022 Reviewer of Hubble Space Telescope cycle 29 proposals

Service

2022 Member of Virtual Organizer Committee (VOC) of DPS 2022

2022 Volunteer of the 54th edition of the Division of Planetary Sciences Meeting

2022 Judge of Graduate S.T.E.M. posters on the 2022 Student Scholar Symposium at the University of Central Florida. March 30, 2022. Section: 12:00 - 13:45h

2020 Member of International Committee of exams of XII *Olimpiada Latinoamericana de Astronomía y Astronáutica* (OLAA) - Ecuador

2020 Member of Virtual Organizer Committee (VOC) of DPS 2020

2020 Chair of DPS section #104 Main-belt Asteroids 2: Physical Properties

Events Organization

2013 Workshop: 'High School Astronomy topics based on minimum curriculum'. Bruno, R. ; Feliciano, A. C. S. , Niterói, Rio de Janeiro, Brazil.