

Luis Angel Gutiérrez Soto

CURRICULUM VITAE

PERSONAL INFORMATION

Nationality Colombian
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GitHub <https://github.com/AngelGSoto>
Website <https://angelgsoto.github.io/>
Languages Spanish (Native), English (Fluent), Portuguese (Fluent)

EDUCATION

PhD in Astronomy 2015-2019
Observatório do Valongo, Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil
Advisors: Denise Rocha Gonçalves and Stavros Akras

Master in science (Astrophysics) 2012-2015
Centro de Radioastronomía y Astrofísica (CRYA), Universidad Nacional autónoma de México (UNAM), Morelia, Michoacán, México
Advisor: William John Henney

Bachelor of Education in Mathematics and Physics 2005-2010
Universidad Popular del Cesar (UPC), Valledupar, Cesar, Colombia
Advisor: Elio Fabio Mejía Henao

ACADEMIC CERTIFICATIONS

Superior Normalist with Emphasis in Spanish Language 2003-2004
Escuela Normal Superior María Inmaculada, Manaure, Cesar, Colombia

ADDITIONAL EDUCATION

Spectral Synthesis of Stellar Populations in Galaxies.
Short-term course 2024
Facultad de Ciencias Astronómicas y Geofísicas – UNLP, La Plata, Argentina

Third Winter School of the Valongo Observatory.
Short-term course 2017
Observatório do Valongo, UFRJ, Rio de Janeiro, Brazil

XX Special Courses Cycle of the National Observatory.
Short-term course 2015
Observatório Nacional, Rio de Janeiro, Brazil

ACADEMIC AND PROFESSIONAL PROFILE

Postdoctoral Researcher

2022-Present

*Instituto de Astrofísica de La Plata,
CONICET – UNLP, La Plata, Argentina*

Supervisor: Favio R. Faifer

Co-supervisor: Claudia Lucia Mendes de Oliveira

Postdoctoral Researcher

2020-2022

*Instituto de Astronomia, Geofísica e Ciências Atmosféricas (IAG),
Universidade de São Paulo, Brazil*

Supervisor: Claudia Lucia Mendes de Oliveira

ACADEMIC SERVICE

- **Member, Local Organizing Committee (LOC):** XI La Plata International School: "Machine Learning and Deep Learning Techniques in Large Multi-band Photometric Surveys (S-PLUS)". FCAG-UNLP, Argentina. April 7-9, 2025.

TEACHING

Assistant Professor

2016

*Stellar Evolution, University level,
Observatório do Valongo, UFRJ, Rio de Janeiro, Brazil*

Assistant Professor

2016

*Extragalactic Astronomy, University level,
Observatório do Valongo, UFRJ, Rio de Janeiro, Brazil*

Mathematics and Physics Teacher

2010

*Centro de Enseñanza Media "Santa Teresita", High School,
Valledupar, Cesar, Colombia*

Mathematics and Physics Teacher

2009

*Institución Educativa Manuel Germán Cuello, High School,
Valledupar, Cesar, Colombia. Pedagogical and Educational
Practices of the Bachelor's Degree in Mathematics and Physics*

OBSERVATIONAL EXPERIENCE

PI

2022

SOAR Telescope

Spectroscopic confirmation of planetary nebula candidates in VPHAS+ (DR3) and ALLWISE, impacting Galaxy's PNe statistics

Telescope Operator

2020-2024

T80-Sur Telescope, Southern Photometric Local Universe Survey (S-PLUS)

Responsibilities included telescope operation, data acquisition, and instrument maintenance

MENTORSHIP AND SUPERVISION

Scientific Initiation

2023-Present

Débora Brandão dos Santos

Early-type star-forming galaxies in the Fornax cluster and the S-PLUS survey. Observatório do Valongo, Universidade Federal do Rio de Janeiro.

Role: Co-supervisor

Scientific Initiation

2020-2024

Giovanna Liberato César

The identification and optical follow-up spectroscopy of PN and SySt candidates in photometric surveys. Observatório do Valongo, Universidade Federal do Rio de Janeiro.

Role: Co-supervisor

PARTICIPATION IN UNDERGRADUATE THESIS COMMITTEES

On February 27, 2024, I served as a member of the evaluation committee for the undergraduate thesis titled “*Photometric Selection and Spectroscopic Confirmation of Planetary Nebulae and Symbiotic Stars in the Galactic Plane*”, presented by Giovanna Liberato César at the Observatório do Valongo, Universidade Federal do Rio de Janeiro.

PEER REVIEW ACTIVITIES

- **Frontiers in Astronomy and Space Sciences** - Peer reviewer
- **Galaxies** - Peer reviewer
- **IJECE** - Peer reviewer (topics: ML in scientific data)

RESEARCH VISITS

Observatório do Valongo, Universidade Federal do Rio de Janeiro (UFRJ).

2024

Rio de Janeiro, Brazil

Host: Denise Rocha Gonçalves and Marco Grossi

Center for the Study of the Physics of the Cosmos of Aragón (CEFCA).

2018

Teruel, Spain

Host: Carlos López Sanjuan

AWARDS AND TITLES

Young Researcher and Innovator

“Virginia Gutiérrez de Pineda”

2010

Colciencias, Colombia

SKILLS

- **Programming:** PYTHON, FORTRAN

- **Software:** TOPCAT, ALADIN, CLOUDY, L^AT_EX, GITHUB
- **Data Query:** Astronomical Data Query Language (ADQL)
- **Machine Learning:** Applied to astronomy and astrophysical simulations
- **Linux:** Development and maintenance of data analysis servers, task automation, system monitoring
- **Shell Scripting:** Automation of tasks
- **Astronomy:** Telescope operation, data processing, astronomical instrumentation
- **Experience:** Operated T80-Sul telescope for Southern Photometric Local Universe Survey (S-PLUS) project

REFEREED ARTICLES

1. *Variables in S-PLUS. I. Period–Luminosity relations of Classical Cepheids in 12 bands.*
Debasish Hazarika, Carlos E. Ferreira Lopes, Márcio Catelan, Felipe Almeida-Fernandes, Nicolás Rodríguez-Segovia, ... **L. A. Gutiérrez-Soto** et al., 2025, Submitted to *A&A*.
2. *Discovery of thirteen new symbiotic stars in Gaia DR3.*
Stavros Akras, Anastasis Karagiannis, Giorgos Charalampopoulos, Panagiotis Gavras, **L. A. Gutiérrez-Soto** et al., 2025, Under review, *MNRAS*.
3. *Targeting cluster galaxies for the 4MOST CHANCES Low-z sub-survey with photometric redshifts.*
Hugo Méndez-Hernández, Ciria Lima-Dias, Antonela Monachesi, L. Yara Jaffé, P. Christopher Haines, ... **L. A. Gutiérrez-Soto** et al., 2025, Accepted, *A&A*.
4. *The Southern Photometrical Local Universe Survey (S-PLUS): searching for metal-poor dwarf galaxies.*
M. Grossi, D. R. Gonçalves, A. C. Krabbe, **L. A. Gutiérrez-Soto**, E. Telles et al., 2025, *ApJ*, in press, arXiv:2501.18498.
5. *The S-PLUS Fornax Project (S+FP): Mapping emission in 77 Fornax galaxy members reaching $\sim 4 R_{\text{vir}}$.*
A. R. Lopes, A. V. Smith Castelli, A. C. Krabbe, J. A. Hernandez-Jimenez, D. Pallero, ... **L. A. Gutiérrez-Soto** et al., 2025, *A&A*, 699, A331.
6. *The S-PLUS Fornax Project (S+FP): Mapping globular cluster systems within 5 virial radii around NGC 1399.*
L. Lomelí-Núñez, A. Cortesi, A. V. Smith Castelli, M. L. Buzzo, Y. Divakara Mayya, ... **L. A. Gutiérrez-Soto** et al., 2025, *AJ*, 169, 263.
7. *The S-PLUS 12-band photometry as a powerful tool for discovery and classification: ten cataclysmic variables in a proof-of-concept study.*
Raimundo Lopes de Oliveira, Amanda S. de Araujo, Angela C. Krabbe, Claudia L. Mendes de Oliveira, Koji Mukai, **L. A. Gutiérrez-Soto** et al., 2025, *ApJL*, 981, L1.
8. *Mapping H α -excess candidate point sources in the Southern Hemisphere using S-PLUS data.*
L. A. Gutiérrez-Soto, R. Lopes de Oliveira, S. Akas, D. R. Gonçalves, L. F. Lomelí-Núñez, et al., 2025, *A&A*, 695, A104.

9. *Stellar atmospheric parameters and chemical abundances of ~ 5 million stars from S-PLUS multi-band photometry.*
C. E. Ferreira Lopes, **L. A. Gutiérrez-Soto**, V. S. Ferreira Alberice, N. Monsalves, D. Hazarika, et al., 2025, *A&A*, 693, A306.
10. *The Fourth S-PLUS Data Release: 12-filter photometry covering 3000 square degrees in the Southern Hemisphere.*
F. R. Herpich, F. Almeida-Fernandes, G. B. Oliveira Schwarz, E. V. R. Lima, L. Nakazono, ... **L. A. Gutiérrez-Soto** et al., 2024, *A&A*, 689, A249.
11. *The S-PLUS Fornax Project (S+FP): A first 12-band glimpse of the Fornax galaxy cluster.*
A. V. Smith Castelli, A. Cortesi, R. F. Haack, A. R. Lopes, J. Thainá-Batista, ... **L. A. Gutiérrez-Soto** et al., 2024, *MNRAS*, 530, 3787.
12. *Unveiling compact planetary nebulae: broadband survey analysis and LAMOST confirmation.*
L. A. Gutiérrez-Soto, M. Belén Mari, W. A. Weidmann, F. R. Faifer, 2024, *NewA*, 109, 102207.
13. *Euclid preparation. XXVII. A UV–NIR spectral atlas of compact planetary nebulae for wavelength calibration.*
K. Paterson, M. Schirmer, Y. Copin, J.-C. Cuillandre, W. Gillard, **L. A. Gutiérrez-Soto** et al., 2023, *A&A*, 674, A172.
14. *Spectroscopic analysis tool for intEgraL fieLd unIt daTacubEs (SATELLITE): case studies of NGC 7009 and NGC 6778 with MUSE.*
S. Akas, H. Monteiro, J. R. Walsh, J. García-Rojas, I. Aleman, ... **L. A. Gutiérrez-Soto** et al., 2022, *MNRAS*, 512, 2202.
15. *Data Release 2 of S-PLUS: accurate template-fitting based photometry covering 1000 square degrees in 12 optical filters.*
F. Almeida-Fernandes, L. Sampedro, F. R. Herpich, A. Molino, C. E. Barbosa, ... **L. A. Gutiérrez-Soto** et al., 2022, *MNRAS*, 511, 4590.
16. *Catalogue of the central stars of planetary nebulae. Expanded edition.*
W. A. Weidmann, M. B. Mari, E. O. Schmidt, G. Gaspar, M. M. Miller Bertolami, G. A. Oio, **L. A. Gutiérrez-Soto**, M. G. Volpe, R. Gamen, and D. Mast, 2020, *A&A*, 640, A10.
17. *J-PLUS: Tools to identify compact planetary nebulae in the Javalambre and Southern Photometric Local Universe Surveys.*
L. A. Gutiérrez-Soto, D. R. Gonçalves, S. Akas, A. Cortesi, C. López-Sanjuan, M. A. Guerrero et al., 2020, *A&A*, 633, A123.
18. *The Southern Photometric Local Universe Survey (S-PLUS): improved SEDs, morphologies, and redshifts with 12 optical filters.*
C. Mendes de Oliveira, T. Ribeiro, W. Schoenell, A. Kanaan, R. A. Overzier, ... **L. A. Gutiérrez-Soto** et al., 2019, *MNRAS*, 489, 241.
19. *J-PLUS: The Javalambre Photometric Local Universe Survey.*
A. J. Cenarro, M. Moles, D. Cristóbal-Hornillos, A. Marín-Franch, A. Ederoclite, ... **L. A. Gutiérrez-Soto** et al., 2019, *A&A*, 622, A176.

PREPRINTS

1. *Bow shocks, bow waves, and dust waves. IV. Shell shape statistics.*
W. J. Henney, J. A. Tarango-Yong, **L. A. Gutiérrez-Soto**, S. J. Arthur, 2019, arXiv:1907.00122.

PUBLISHED WORKS IN CONFERENCE PROCEEDINGS

1. *El pasado caótico de NGC 4546 vs. la evolución pacífica de sus estrellas.*
J. P. Varela, V. Reynaldi, F. R. Faifer, **L. A. Gutiérrez-Soto**, T. Ricci, 2025, BAAA, 66, 266–268.
2. *Blue elliptical galaxies in the Fornax cluster through S-PLUS data.*
D. Brandão, A. Cortesi, R. F. Haack, **L. A. Gutiérrez-Soto**, F. Ferrari, A. R. Lopes, A. V. Smith Castelli, P. A. Lopes, D. Brambilla, 2025, BAAA, 66, 301–304.
3. *Los colores del proceso de ensamble de las galaxias elípticas masivas: fotometría óptica e IR de NGC 1395.*
A. Boland, F. Faifer, V. Reynaldi, **L. A. Gutiérrez-Soto**, C. Escudero, 2025, BAAA, 66, 305–308.
4. *S-PLUS: An atlas of integrated $H\alpha$ + $[N II]$ fluxes for planetary nebulae in the Magellanic Clouds.*
L. A. Gutiérrez-Soto, A. R. Lopes, A. V. Smith Castelli, F. R. Faifer & R. Haack, 2024, BAAA, 65, 181.
5. *Ultra Diffuse Galaxy formation constraints and possible detection in S-PLUS images.*
P. Astudillo Sotomayor, N. W. C. Leigh, R. Demarco, A. V. Smith Castelli, R. F. Haack, ... **L. A. Gutiérrez-Soto**, 2024, BAAA, 65, 244.
6. *Photometric candidate selection and spectroscopic confirmation of new PNe and SySts in the Galactic plane.*
G. Liberato, D. R. Gonçalves, **L. A. Gutiérrez-Soto**, S. Akas, 2023, BAAA, 34, 100–103.
7. *Exploring the population of $H\alpha$ emitters in the Southern Photometric Local Universe Survey (S-PLUS).*
L. A. Gutiérrez-Soto, R. Lopes de Oliveira, S. Akas, et al., 2023, BAAA, 64, 187.
8. *Identification of interacting galaxies in the S-PLUS database.*
G. B. Oliveira Schwarz, N. M. Cardoso, A. Cortesi, A. V. Smith Castelli, G. Lucatelli, ... **L. A. Gutiérrez-Soto** et al., 2022, BAAA, 63, 259.
9. *Identifying Galactic halo PN candidates in the imaging surveys: J-PLUS/S-PLUS and J-PAS.*
L. A. Gutiérrez-Soto, D. R. Gonçalves, S. Akas, A. Cortesi, A. Ederoclite, et al., 2017, Rev. Mex. Astron. Astrofís. (Serie Conf.), 49, 162.

TALKS AND POSTERS AT SCIENTIFIC MEETINGS

1. *Probing the Low-Surface-Brightness Universe with S-PLUS: Can a Small Telescope Compete?*
L. A. Gutiérrez-Soto & S-PLUS Collaboration. Búzios, Brazil, 2025, Conference. Galaxy Memoirs: Inferring their past from their present. **Poster Presenter.**
2. *Unveiling the Hidden Population of H-alpha Excess Sources in the Southern Sky: A Synergy of S-PLUS Photometry and Machine Learning.*
L. A. Gutiérrez-Soto & S-PLUS Collaboration. Córdoba, Argentina, 2025, Conference. XIV Friends of Friends Meeting. **Invited Speaker.**
3. *Mapping $H\alpha$ -Excess Candidate Point Sources in the Southern Hemisphere Using S-PLUS Data.*

- L. A. Gutiérrez-Soto** & S-PLUS Collaboration. 19th S-PLUS Collaboration Meeting, 2024, Rio de Janeiro, Brazil. **Speaker**.
4. *An Integrated H α Flux Atlas of Planetary Nebulae in the Magellanic Clouds: Combining S-PLUS Photometry and Spectroscopic Analysis*.
L. A. Gutiérrez-Soto, A. R. Lopes, A. V. Smith Castelli & F. R. Faifer. Montevideo, Uruguay, 2023. Conference. XVII Latin American Regional IAU Meeting. **Speaker**.
 5. *S-PLUS: An atlas of integrated H α fluxes for planetary nebulae in the Magellanic Clouds*.
L. A. Gutiérrez-Soto, A. R. Lopes, A. V. Smith Castelli, F. R. Faifer & R. Haack. San Juan, Argentina, 2023. Conference. La 65^o Reunión Anual de la Asociación Argentina de Astronomía. **Poster Presenter**.
 6. *S-PLUS: An atlas of integrated H α fluxes for planetary nebulae in the Magellanic Clouds*.
L. A. Gutiérrez-Soto, A. R. Lopes, A. V. Smith Castelli & F. R. Faifer. La Serena, Chile. 2023, Conference. Galaxy Groups and Clusters III: Laboratories to study Galaxy Evolution (GGCIII). **Poster Presenter**.
 7. *An atlas of integrated H α fluxes for planetary nebulae in the Magellanic Clouds*.
L. A. Gutiérrez-Soto, A. R. Lopes, A. V. Smith Castelli & F. R. Faifer. Córdoba, Argentina, 2023, Conference. XII Friends of Friends Meeting. **Poster Presenter**.
 8. *Exploring the population of H α emitters in the Southern Photometric Local Universe Survey (S-PLUS)*.
L. A. Gutiérrez-Soto, R. Lopes de Oliveira, S. Akas, et al., 2022, Conference. 64^o Reunión Anual de la Asociación Argentina de Astronomía. **Speaker**.
 9. *Revealing the population of compact emission line sources in the Southern Photometric Local Universe Survey (S-PLUS)*.
L. A. Gutiérrez-Soto & S-PLUS Collaboration. 17th S-PLUS Collaboration Meeting, 2022, Rio de Janeiro, Brazil. **Speaker**.
 10. *H α emitters from the Southern Photometric Local Universe Survey (S-PLUS)*.
L. A. Gutiérrez-Soto, R. Lopes de Oliveira, S. Akas, D. R. Gonçalves, C. Mendes de Oliveira & S-PLUS Collaboration. 16th S-PLUS Collaboration Meeting, 2021, São Paulo, Brazil. **Poster Presenter**.
 11. *Planetary nebulae in S-PLUS*.
L. A. Gutiérrez-Soto, D. R. Gonçalves, S. Akas & S-PLUS Collaboration. 15th S-PLUS Collaboration Meeting, 2021, São Paulo, Brazil. **Speaker**.
 12. *Planetary nebulae in S-PLUS*.
L. A. Gutiérrez-Soto, D. R. Gonçalves, S. Akas & S-PLUS Collaboration. 14th S-PLUS Collaboration Meeting, 2020, São Paulo, Brazil. **Speaker**.
 13. *Tools to identify planetary nebulae and symbiotic stars*.
L. A. Gutiérrez-Soto, Denise R. Gonçalves, Stavros Akas and the J-PLUS & S-PLUS collaborations. 10th S-PLUS Meeting. 2019, São Paulo, Brazil. **Speaker**.
 14. *Photometric tools to select planetary nebulae and symbiotic stars in J-PLUS and S-PLUS surveys*.
L. A. Gutiérrez-Soto, Denise R. Gonçalves, Stavros Akas and J-PLUS & S-PLUS collaborations. II Workshop: chemical abundances in gaseous nebulae. 2019, São José dos Campos, São Paulo, Brazil. **Poster Presenter**.

15. *Detecting Galactic halo planetary nebulae and symbiotic stars in multi-band photometric surveys.*
L. A. Gutiérrez-Soto, D. R. Gonçalves & S. Akas. XXXth General Assembly of the International Astronomical Union (IAU). Division G: Stars and Stellar Physics, 2018, Vienna, Austria. **Speaker.**
16. *Galactic halo planetary nebulae and symbiotic stars in multi-band photometric surveys.*
L. A. Gutiérrez-Soto, D. R. Gonçalves & S. Akas. Workshop "Science with SOAR and Gemini telescopes: preparing for the GMT". 2018, São José dos Campos, São Paulo, Brazil. **Speaker.**
17. *S-PLUS, J-PLUS and J-PAS in the search for planetary nebulae.*
L. A. Gutiérrez-Soto, D. R. Gonçalves, S. Akas, A. Cortesi, S. Daflon, et al. XLI Reunião Anual da Sociedade Astronômica Brasileira 2017, 2018, São Paulo, Brazil. Boletim da Sociedade Astronômica Brasileira, 30, no. 1, 158-159. **Poster Presenter.**
18. *Identifying Galactic halo PN candidates in the imaging surveys: J-PLUS/S-PLUS and J-PAS.*
L. Gutiérrez-Soto, D. R. Gonçalves, S. Akas, A. Cortesi, A. Ederoclite, et al., Latin American Regional IAU Meeting (LARIM) Cartagena 2016, Cartagena de Indias, Colombia. *Rev. Mex. Astron. Astrofís. (Serie de Conferencias).* **Poster Presenter.**
19. *A catalog of stationary bow shocks in the Orion Nebula.*
L. A. Gutiérrez-Soto, W. J. Henney, J. A. Tarango-Yong, OSSF14: The Olympian Symposium on Star Formation, 2014, Paralia Katerini, Greece. **Poster Presenter.**

PARTICIPATION IN OTHER EVENTS

1. 3rd J-PLUS Virtual Meeting. 2020, Teruel, España.
2. 12th J-PAS Collaboration Meeting. 2016, Río de Janeiro, Brasil.
3. Frontiers in Contemporary Astrophysics. 2013, Morelia, México.
4. 9th Colombian Conference on Mathematics Education. 2008, Valledupar, Colombia.

PUBLIC OUTREACH & SCIENCE COMMUNICATION

1. **Noche de las Estrellas / Star Night** (2013)
 Morelia, Mexico.
Organized astronomical observations and workshops for 500+ attendees.
2. **Lotería Matemática / Math Bingo** (2013)
 Universidad Michoacana de San Nicolás de Hidalgo, Mexico.
Designed and facilitated an educational math bingo game for high-school students.
3. **El Universo en tu Escuela / Universe in Your School** (2013)
 Pre-university program, Morelia, Mexico.
Organized and delivered astrophysics lectures to underserved schools.
4. **Feria Matemática de Morelia / Morelia Science Fair** (2012)
 Centro de Ciencias Matemáticas (UNAM), Mexico.
Volunteer: Developed hands-on activities on applied mathematics for public engagement.

COLLABORATIONS

S-PLUS Collaboration

2015-Present

Southern Photometric Local Universe Survey (S-PLUS)

Active member of the S-PLUS collaboration, contributing to the technical team as a telescope operator and data processor. Involved in data analysis and scientific exploitation of photometric data from the survey. Participated in projects focused on the identification of planetary nebulae and emission-line objects.

J-PAS Collaboration

2024-Present

Javalambre Physics of the Accelerating Universe Astrophysical Survey (J-PAS)

Contributing to the scientific analysis and exploitation of J-PAS data, focusing on the detection and characterization of planetary nebulae and symbiotic stars. Responsible for photometric analysis and integration of multi-wavelength data.

FINANCIAL SUBSIDIES

Consejo Nacional de Investigaciones Científicas
y Técnicas, CONICET.

2022

Postdoctoral Fellowship

Fundação de Amparo à Pesquisa do Estado
de São Paulo, FAPESP.

2020

Postdoctoral Fellowship

Coordenação de Aperfeiçoamento de Pessoal
de Nível Superior, CAPES.

2015

Doctoral Studies Fellowship

Dirección General de Asuntos del Personal
Académico, DGAPA.

2013

Master's Studies Fellowship

Departamento Administrativo de Ciencia,
Tecnología e Innovación, COLCIENCIAS.

2010

Research Stay Fellowship