

# Luis Angel Gutiérrez Soto

## CURRICULUM VITAE

### PERSONAL INFORMATION

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*Nationality* Colombian  
*Phone* (+54) 9 2216818395  
*E-Mail* gsoto.angel@gmail.com — gsotoangel@fcaglp.unlp.edu.ar  
*GitHub* <https://github.com/AngelGSoto>  
*Website* <https://angelgsoto.github.io/>  
*Languages* Spanish (Native), English (Fluent), Portuguese (Fluent)

### EDUCATION

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**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

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

### ADDITIONAL EDUCATION

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**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

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### 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

## TEACHING

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### 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

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### 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

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### 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 Cézar*  
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**

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On February 27, 2024, I participated as a member of the evaluation committee for the final project titled “Photometric Selection and Spectroscopic Confirmation of Planetary Nebulae and Symbiotic Stars in the Galactic Plane”, presented by Giovanna Liberato Cézar

## **PEER REVIEW ACTIVITIES**

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- **Galaxies:** Peer reviewer for submitted manuscripts.
- **International Journal of Electrical and Computer Engineering (IJECE):** Peer reviewer for submitted manuscripts.

## **RESEARCH VISITS**

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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**

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**Young Researcher and Innovator**  
“Virginia Gutiérrez de Pineda” 2010  
*Colciencias, Colombia*

## **SKILLS**

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- **Programming:** PYTHON, FORTRAN
- **Software:** TOPCAT, ALADIN, CLOUDY, L<sup>A</sup>T<sub>E</sub>X, 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

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1. *The Southern Photometrical Local Universe Survey (S-PLUS): searching for metal-poor dwarf galaxies.*  
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, Submitted.
2. *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, in press.
3. *Mapping H $\alpha$ -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, in press.
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, Submitted.
5. *The S-PLUS Fornax Project (S+FP): Mapping globular clusters 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., 2024, ApJ, Submitted.
6. *Stellar atmospheric parameters and chemical abundances of  $\sim 5$  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., 2024, A&A, 693, A306.
7. *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.
8. *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.
9. *Unveiling compact planetary nebulae: Broad-band survey analysis and LAMOST confirmation.*  
**L. A. Gutiérrez-Soto**, M. Belén Mari, W. A. Weidmann, F. R. Faifer, 2024, NewA, 109, 102207.

10. *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.
11. *Spectroscopic analysis tool for intEgraL fieLd unIt daTacubEs (SATELLITE): case studies of NGC 7009 and NGC 6778 with MUSE.*  
S. Akras, H. Monteiro, J. R. Walsh, J. García-Rojas, I. Aleman, ... **L. A. Gutiérrez-Soto** et al., 2022, MNRAS, 512, 2202.
12. *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.
13. *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.
14. *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. Akras, A. Cortesi, C. López-Sanjuan, M. A. Guerrero et al., 2020, A&A, 633, A123.
15. *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.
16. *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.

## NON-PEER-REVIEWED ARTICLES

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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, arXiv:1907.00122.

These articles are preprints or manuscripts available on arXiv and have not yet undergone peer review.

## PUBLISHED WORKS IN CONFERENCE PROCEEDINGS

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1. *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.
2. *Ultra Diffuse Galaxy formation constraints and possible detection in S-PLUS images .*  
P. Astudillo Sotomayor, N. W. C. Leigh, R. Demarco, Smith Castelli, R. F. Haack, ... **L. A. Gutiérrez-Soto**, 2024, BAAA, 65, 244.

3. *Photometric candidate selection and spectroscopic confirmation of new PNe and SySts in the Galactic plane.*  
Giovanna Liberato, Denise R Gonçalves, **L. A. Gutiérrez-Soto**, S. Akas, 2023, *Boletim da Sociedade Astronômica Brasileira*, Vol. 34, pp. 100-103.
4. *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.
5. *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.
6. *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, 2017, Cartagena de Indias, Colombia. *Rev. Mex. Astron. Astrofís. (Serie de Conferencias)*, Vol. 49, pp. 162-162.

## TALKS AND POSTERS AT SCIENTIFIC MEETINGS

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1. *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.**
2. *An Integrated H $\alpha$  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.**
3. *S-PLUS: An atlas of integrated H $\alpha$  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<sup>o</sup> Reunión Anual de la Asociación Argentina de Astronomía. **Poster Presenter.**
4. *S-PLUS: An atlas of integrated H $\alpha$  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.**
5. *An atlas of integrated H $\alpha$  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.**
6. *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., 2022, Conference. 64<sup>o</sup> Reunión Anual de la Asociación Argentina de Astronomía. **Speaker.**
7. *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.**

8. *H $\alpha$  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**.
9. *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**.
10. *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**.
11. *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**.
12. *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**.
13. *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**.
14. *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**.
15. *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**.
16. *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**.
17. *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

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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. Noveno encuentro colombiano de matemática educativa. 2008, Valledupar, Colombia.

## PUBLIC COMMUNICATION OF SCIENCE

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1. Noche de las Estrellas. 2013, Morelia, Michoacán, México.
2. El Universo en tu Escuela. 2013, Preuniversitaria, Morelia, Michoacán, México.
3. Feria Matemática de Morelia. 2012, Morelia, Michoacán, México.

## COLLABORATIONS

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**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

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**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*