

# Lilianne Nakazono

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Website <https://marixko.github.io>  
Languages Portuguese (native), English (fluent), Spanish (Intermediate),  
Japanese (Intermediate)

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## RESEARCH INTERESTS

- Stellar and Extragalactic Astrophysics, High-redshift Universe
- Machine Learning, Data Science, Big Data
- Astrostatistics
- Large-area sky surveys

## EDUCATION

<b>Doctorate in Astronomy</b> Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo São Paulo, Brazil	2018 - present
<b>Bachelor in Astronomy</b> Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo São Paulo, Brazil	2014 - 2016
<b>Bachelor in Statistics</b> Instituto de Matemática e Estatística, Universidade de São Paulo São Paulo, Brazil	2010 - 2013

## RESEARCH EXPERIENCE

<b>Doctorate program in Astronomy</b> Thesis: "Classification and redshift estimation of new quasars in photometric surveys, using S-PLUS as study case"; Advisor: Prof. Claudia Mendes de Oliveira (IAG-USP) Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo São Paulo, Brazil	2018
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Our object classifier is one of the pillars of the S-PLUS data releases, being the primary source of separation between stars, quasars and galaxies. This project has leveraged my knowledge in machine learning and software engineering for astronomy, as well as in querying, cross-matching and/or analyzing data from all major astronomical surveys, having a huge impact in the new era of JWST, LSST, and Euclid.

**Exchange program at the University of Washington (12 months)** 2022

Advisor: Prof. Željko Ivezić (UW)

**Exchange program at the University of Florida (4 months)** 2017 / 2018

Advisors: Prof. Stephen Eikenberry (UF), Prof. Anthony Gonzalez (UF)

**Awarded time as Principal Investigator** 2018

8 hours with Goodman spectrograph, SOAR telescope

20 hours with GMOS-S spectrograph, GEMINI-South telescope

## LEADERSHIP EXPERIENCES

**Vice-Director of Research & Development at Turing USP** 2023 - present

**Director of Research & Development at Turing USP** 2022 - 2023

Turing USP has 60+ members with different backgrounds from Universidade de São Paulo. Our goal is to disseminate, study, develop and apply Machine Learning ([GitHub Organization](#)). My role as head of R&D is to bring innovation into our projects and to implement better workflows while guaranteeing that our members are improving their hard and soft skills.

## PRESENTATIONS

### Invited talks

**Panel discussion: Practical Problem Solving — including Interpretability** 2022

IAU Symposium 368 "Machine Learning in Astronomy: Possibilities and Pitfalls"

XXXIst IAU General Assembly

Busan, Rep. of South Korea

**Lecturer on the topic of Machine Learning in Astronomy** ([GitHub repository](#)) 2020

IX La Plata International School on Astronomy and Geophysics

La Plata, Argentina

### Contributed talks

**Redshift estimation of quasars using 12-band photometry from S-PLUS** 2022

241st annual meeting of the American Astronomical Society

Seattle, Washington, United States of America

**Assessing the impact of narrow-band information in photometric surveys** 2022

iid2022: Statistical Methods for Event Data Illuminating the Dynamic Universe

Guntersville, Alabama, United States of America

<b>VAC: Classification of stars, quasars, and galaxies for S-PLUS DR2 and iDR3</b> 15th S-PLUS Meeting Online	<b>2021</b>
<b>How narrow-band surveys can provide a better quasar selection?</b> Quasars During Reionisation (SAZERAC) Online	<b>2020</b>
<b>New version of the star/quasar/galaxy classification</b> 13th S-PLUS Meeting Online	<b>2020</b>
<b>Search for QSOs: updates</b> 11th S-PLUS Meeting, IAG-USP, São Paulo, Brazil	<b>2019</b>
<b>Classification and photo-zs of quasars using machine learning in photometric observations from S-PLUS</b> XLIII annual meeting of Sociedade Astronômica Brasileira Universidade de São Paulo, São Paulo, Brazil	<b>2018</b>
<b>Separation of stars and quasars in multispectral images</b> II J-PAS and S-PLUS Brazilian Meeting IAG-USP, São Paulo, Brazil	<b>2015</b>

## Poster and attendances

- 9th-16th S-PLUS Meeting, 2018-present
- AstroHackWeek2022, Max Planck Institute for Astronomy, Heidelberg, Germany, 2022
- 16th S-PLUS Meeting, "**Identification of C-rich and O-rich AGB stars**", Ubatuba, Brazil, 2021
- IAU 359: Galaxy Evolution and Feedback Across Different Environments, "**Classification and redshift estimation of quasars in photometric surveys**", Bento Gonçalves, Rio Grande do Sul, Brazil, 2020
- PAPIs LATAM: Real-World Machine Learning Stories, 2019
- FIRST LIGHT Advanced School, IAG-USP, São Paulo, Brazil, 2019
- SPANet Workshop on Clusters of Galaxies and the Large-Scale Structure of the Universe, 2018
- AstroHackWeek2018, Lorentz Center, Leiden, The Netherlands, 2018
- XLII annual meeting of Sociedade Astronômica Brasileira, "**Search for new bright quasars with S-PLUS**", 2018
- Machine Learning workshop in R, XII aMostra de Estatística, IME-USP, 2017
- XLI annual meeting of Sociedade Astronômica Brasileira, "**Separation of stars and quasars in multispectral images of J-PAS, J-PLUS, S-PLUS and ALHAMBRA**", 2017
- I Python BootCamp, IAG-USP, São Paulo, Brazil, 2015

## TEACHING EXPERIENCE

### Undergraduate supervision and co-supervision

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|---|-----------------------|
| <ul style="list-style-type: none"> <li>• <b>Raquel Ruiz, Astronomy undergraduate student</b><br/>Project: Estimation of quasar photo-zs in S-PLUS using Bayesian Neural Networks PIBITI (2020-2021) and FAPESP scholarship (2021-2022)<br/>Contributed talks: IAU Symposium 368 (2022) and XLV Annual Meeting of Sociedade Astronômica Brasileira (2022)</li> </ul> | <b>2020 - present</b> |
| <ul style="list-style-type: none"> <li>• <b>Gabriel Jacob Perin, Computer Science undergraduate student</b> (co-supervision)<br/>Project: Classification of stars, quasar, and galaxies with self-supervised learning approach using S-PLUS images (FAPESP scholarship)</li> </ul>  | <b>2022 - present</b> |
| <ul style="list-style-type: none"> <li>• <b>Gabriela Soares, Statistics undergraduate student</b> (co-supervision)<br/>Project: Estimation of quasar photo-zs in S-PLUS using FlexCoDE</li> </ul>   | <b>2022</b>           |

## Teaching assistant and lectures

- TA for the "Astronomical databases and Astrostatistics in the Big Data era" undergraduate/graduate course, 2021  
Roles: conducted hands-on activities, created slack channel, wrote instructions to install all needed softwares in Linux/Windows/macOS, helped with questions from students on slack, reviewed jupyter notebooks
- TA for the "Numerical methods in Astronomy" undergraduate course, 2016  
Roles: evaluated student's activities
- TA for the "Introduction to Probability and Statistics II" undergraduate course, 2011  
Roles: evaluated student's activities
- Machine learning lecture/hands-on for graduate and undergraduate students at IAG-USP, 2017-2018
- Machine learning lecture/hands-on for graduate students at University of Florida, 2017 ([GitHub repository](#))

## AWARDS, SCHOLARSHIPS AND GRANTS

- IAU grant to attend IAUS 368 at the General Assembly in South Korea, 2022
- FAPESP (funding agency from the state of Sao Paulo) grant for research abroad at University of Washington, US, 2022
- Grant from the organization to attend AstroHackWeek, 2022
- Certificate of excellence in the "Observational Astrophysics" graduate course, 2018
- FAPESP scholarship for the Doctorate program, 2019
- IAU Grant to attend IAUS 359, 2020
- Grant from the organization to attend AstroHackWeek, 2018
- CAPES (federal funding agency) scholarship for M.Sc. program, 2018
- Prize of Excellence at Asia Supercomputer Community, 2016
- Best undergraduate research of the Astronomy Department (IAG-USP), 2015
- FAPESP scholarship for Research Experience for Undergraduates, 2014-2016

## OUTREACH, SERVICE & OTHERS

- Discord's admin for the S-PLUS collaboration (including coordinating the migration from Slack to Discord), 2023 - present
- Volunteer staff at the 241st annual meeting of the American Astronomical Society, Seattle, 2023
- Refereed for Astrophysics and Space Science journal, 2022
- Web designer and administrator of the S-PLUS collaboration's website, 2020 - present
- Participated in the project ASTROMINAS, where I followed up groups of secondary-school students identified as a woman (40 hours), 2020
- Created and maintained the Slack workspace for the S-PLUS collaboration, 2019 - 2023
- Coordinator of the development group for the S-PLUS logo and visual identity, 2021-2022
- Volunteer staff at IAUS 359: Galaxy Evolution and Feedback Across Different Environments, 2020
- LOC of FIRST LIGHT Advanced School, 2019
- Instructor of "Introduction to Machine Learning" workshop for PyLadiesSP (4-hours duration); Innovation Congress at FEI (1-hour); Universidade Estadual de Londrina (1-hour), 2019-2020 ([GitHub Repository](#))
- Visitor guide at Observatório Abraão de Moraes (OAM-USP), 2019

## PROGRAMMING & SKILLS

- Major contributions to the splusdata package (Python)

- Python, R, SQL, ADQL, Fortran 95, C, Julia
- TOPCAT, STILTS, IRAF, Aladin, DS9

## PRESS & INTERVIEWS

- [EN] [Funding crisis at Brazilian science agency could leave 80,000 researchers and students without pay](#), Science.org
- [PT-BR] [Astrônomos descobrem estrela que desafia modelos atuais de evolução do Universo](#), Jornal da USP

## PUBLICATIONS

### Major-contributed (refereed)

- **Nakazono, L.**, et al., "On the discovery of stars, quasars, and galaxies in the Southern Hemisphere with S-PLUS DR2", Monthly Notices of the Royal Astronomical Society, vol. 507, no. 4, pp. 5847–5868, 2021.
- Almeida-Fernandes, F., SamPedro, L., Herpich, F. R., Molino, A., Barbosa, C. E., Buzzo, M. L., Overzier, R. A., de Lima, E. V. R., **Nakazono, L.**, et al., "Data Release 2 of S-PLUS: Accurate template-fitting based photometry covering 1000 deg<sup>2</sup> in 12 optical filters", Monthly Notices of the Royal Astronomical Society, vol. 511, no. 3, pp. 4590–4618, 2022.
- Lima, E. V. R., Sodré Jr, L., Bom, C.R., Teixeira, G.S.M., **Nakazono, L.**, et al., "Photometric redshifts for the S-PLUS Survey: Is machine learning up to the task?", Astronomy and Computing, vol. 38, 2022.
- Mendes de Oliveira, C., Ribeiro, T., Schoenell, W., Kanaan, A., Overzier, R. A., Molino, A., Sampedro, L., ..., **Nakazono, L.**, et al., "The Southern Photometric Local Universe Survey (S-PLUS): improved SEDs, morphologies, and redshifts with 12 optical filters", Monthly Notices of the Royal Astronomical Society, Volume 489, Issue 1, October 2019, Pages 241–267.

### Minor-contributed (refereed)

- Werner, S., ..., **Nakazono, L.**, et al., "S-PLUS DR1 galaxy clusters and groups catalogue using PzWav", submitted to Monthly Notices of the Royal Astronomical Society.
- Jeram, S., ..., **Nakazono, L.**, et al., "An Extremely Bright QSO at  $z = 2.89$ ", The Astrophysical Journal, vol. 899, no. 1, 2020.
- Molino, A., ..., **Nakazono, L.**, et al., "Assessing the photometric redshift precision of the S-PLUS survey: the Stripe-82 as a test-case", Monthly Notices of the Royal Astronomical Society, Volume 499, Issue 3, December 2020, Pages 3884–3908.

### Non-refereed

- Eikenberry, S., ..., **Nakazono, L.**, et al., "Astro2020: Decadal Survey on Astronomy and Astrophysics", APC white papers, no. 137; Bulletin of the American Astronomical Society, Vol. 51, Issue 7, id. 137, 2019.