Curriculum Vitae - Extensive version
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# Lilianne Nakazono


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| Full name | Lilianne Mariko Izuti Nakazono (L. Nakazono) |
| Email | liliannenakazono@on.br |
| Website | https://marixko.github.io |
| Languages | Portuguese (native), English (fluent), Spanish (Intermediate), Japanese (Basic) |
| Membership | S-PLUS, COIN, J-PAS |


## RESEARCH INTERESTS

- Extragalactic Astrophysics
- High-redshift Universe
- Machine Learning, Data Science, Big Data, Astrostatistics
- Cosmology
- Large-area sky surveys
- Software development and open-source projects

## EDUCATION

### Doctorate in Astronomy — 2018 - 2024

Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo
São Paulo, Brazil

### Bachelor in Astronomy — 2014 - 2016

Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo
São Paulo, Brazil

### Bachelor in Statistics — 2010 - 2013

Instituto de Matemática e Estatística, Universidade de São Paulo
São Paulo, Brazil

## RESEARCH EXPERIENCE

### Technology Specialist at Observatório Nacional/MCTI — 2025 - present
Rio de Janeiro, Brazil

### Postdoctoral Researcher in Cosmology — 2025
Instituto de Física, Universidade de São Paulo
Supervisor: Luis Raul Abramo
São Paulo, Brazil

### Doctorate program in Astronomy — 2018-2024
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
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. I also worked in obtaining photometric redshifts for quasar candidates and I've been leading the search for anomalous quasars.

### Exchange program at the University of Washington (12 months) — 2022
Advisor: Prof. Željko Ivezić (UW)
During my internship at DiRAC/UW, I started working with the identification of C-rich and O-rich AGB stars in S-PLUS to study their distribution in the Milky Way, while also writing a paper on quasar photometric redshifts. At this point, we have developed a giant/dwarf classification for S-PLUS.

### Exchange program at the University of Florida (4 months) — 2018 / 2019
Advisors: Prof. Stephen Eikenberry (UF), Prof. Anthony Gonzalez (UF)
During my internship at UF, I started working with quasar/star separation for S-PLUS using color-color diagrams with template spectrophotometry and photometric observations

### Awarded time as Principal Investigator — 2018
8 hours with Goodman spectrograph to observe quasar candidates, SOAR telescope
20 hours with GMOS-S spectrograph to observe quasar candidates, GEMINI-South telescope

## LEADERSHIP EXPERIENCES

### Supervision, co-supervision, collaborations

- **Raquel Valença, graduate student** (supervision) — **2023 - present**
  Department of Astronomy, IAG-USP, São Paulo, Brazil
  Project: The search for anomalous quasars in S-PLUS
  FAPESP scholarship (2023 - present)

- **Raquel Valença, undergraduate student** (supervision) **2020 - 2023**
  Department of Astronomy, IAG-USP, São Paulo, Brazil
  Project: Estimation of quasar photo-zs in S-PLUS using Bayesian Neural Networks
  PIBITI (2020-2021) and FAPESP scholarship (2021 - 2022)
  Contributed talks: IAU Symposium 368 (2022) and XLV Annual Meeting of Sociedade Astronômica Brasileira (2022)
- **Gabriel Jacob Perin, undergraduate student** **2022 -2023**
  Department of Computer Science, IME-USP, São Paulo, Brazil
  Project: Classification of stars, quasar, and galaxies with self-supervised learning approach using S-PLUS images (FAPESP scholarship)
  In collaboration with Prof. Nina Hirata (Department of Computer Science, IME-USP)
- **Gabriela Soares, undergraduate student** **2022**
  Department of Statistics, UFScar, São Paulo, Brazil
  Project: Estimation of quasar photo-zs in S-PLUS using FlexCoDE
  In collaboration with Prof. Rafael Izbicki (Department of Statistics, UFScar)

### Organizations

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

  Turing USP has 60+ members with different backgrounds from Universidade de São Paulo. Our goal is to disseminate, study, develop and apply Artificial Intelligence/Machine Learning (GitHub Organization). My role as head of R&D was to innovate our projects and implement efficient workflows while ensuring hard/soft skills development of our members.

## PRESENTATIONS

### Invited talks

**Lecturer on the topic of Data Science and Machine Learning** **2025**
XI La Plata International School on Astronomy and Geophysics
La Plata, Argentina

**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

**Automatic detection of hostless transients in Fink** **2024**
Enabling Astronomical Transient discoveries in the Rubin era: the Fink-Brazil Workshop
Centro Brasileiro de Pesquisas Físicas, Rio de Janeiro, Brazil

**Searching for rare objects with narrow-band photometry from S-PLUS** **2024**
AISSAI Anomaly Detection Workshop
Clermont-Ferrand, France

**Stellar classification and the search for C-rich and O-rich AGB stars** **2023**
18th S-PLUS Collaboration Meeting
Observatório Nacional, Rio de Janeiro, Brazil

**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

**VAC: Classification of stars, quasars, and galaxies for S-PLUS DR2 and iDR3** **2021**
15th S-PLUS Collaboration Meeting
Online

**How narrow-band surveys can provide a better quasar selection?** **2020**
Quasars During Reionisation (SAZERAC)
Online

**New version of the star/quasar/galaxy classification** **2020**
13th S-PLUS Collaboration Meeting
Online

**Search for QSOs: updates** **2019**
11th S-PLUS Collaboration Meeting
IAG-USP, São Paulo, Brazil

**Classification and photo-zs of quasars using machine learning in photometric observations from S-PLUS** **2018**
XLIII annual meeting of Sociedade Astronômica Brasileira
Universidade de São Paulo, São Paulo, Brazil

**Separation of stars and quasars in multispectral images** **2015**
II J-PAS and S-PLUS Brazilian Meeting
IAG-USP, São Paulo, Brazil

## Poster and attendances

- COIN Residence Program #7, Lisbon, Portugal, 2023
- 9th-16th S-PLUS Collaboration 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
- IAUS 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

- "Bayesian Inference" lecture at EAFExp, CBPF, Rio de Janeiro, 2025.
- 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

- LOC of the 19th S-PLUS Collaboration Meeting held at Centro Brasileiro de Pesquisas Físicas, Rio de Janeiro, 2024
- LOC of the Bayesian Statistics Workshop held at Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo, 2024

- 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 admnistrator 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

- Python, R, SQL, ADQL, Fortran 95, Julia
- TOPCAT, STILTS, IRAF, Aladin, DS9
- Git and Python packaging (PyPI) with major contributions to the splusdata package

## 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., "The Quasar Catalogue for S-PLUS DR4 (QuCatS) and the estimation of photometric redshifts", Monthly Notices of the Royal Astronomical Society, Volume 531, Issue 1, pp. 327–339, 2024.
- **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.
- Oliveira Schwarz, G., Herpich, F., Almeida-Fernandes, F., **Nakazono, L.**, et al., "MAR: A Multiband Astronomical Reduction package", Astronomy and Computing, Volume 51, id.100899, 2025.

- Herpich, F., Almeida-Fernandes, F., Oliveira Schwarz, G., Lima, E. V. R., **Nakazono, L.**, et al., "The Fourth S-PLUS Data Release: 12-filter photometry covering ~3000 square degrees in the southern hemisphere", A&A, 689, id.A249, 2024.
- Pessi, P. J., Durgesh, R., **Nakazono, L.**, et al., "ELEPHANT: ExtragaLactic alErt Pipeline for Hostess AstroNomical Transients", A&A, Volume 691, id.A181, 2024.
- 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 $deg^2$ 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", Monthly Notices of the Royal Astronomical Society, Vol. 519, Issue 2, pp.2630-2645, 2023.
- 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

- Cabrera, C., Hong, S., **Nakazono, L.**, Parkinson, D., Ting, Y., "Sungwook E. (in alphabetical order) "Panel Discussion: Practical Problem Solving for Machine Learning", proceedings of the International Astronomical Union Symposium 368 "Machine Learning in Astronomy: Possibilities and Pitfalls", 2022
- 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.