

Lucas F. Secco

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Education

Ph.D. in Physics & Astronomy

University of Pennsylvania

2015–2020

M.Sc. in Physics

University of São Paulo (Brazil)

2013–2015

B.Sc. in Physics

Federal University of Rio Grande do Sul (Brazil)

2009–2013

Research and Analysis Experience

University of Chicago

Postdoctoral Fellow at Kavli Institute for Cosmological Physics

2020–2024

- Led analysis of correlations of 500 million galaxies with statistical models in Python, compressing information down to one parameter with 2% accuracy (2× improvement over state-of-the-art) leading to publication with over 150 citations.
- Extracted faint signals from galaxy shapes in complex datasets by optimally engineering features, thereby obtaining the first-ever detection of an effect predicted 20 years prior; invited to communicate findings at top universities worldwide.
- Forecasted capabilities of datasets 10 years into the future, helping optimize the strategy of upcoming multi-billion dollar astronomical surveys and determine the priorities of ongoing efforts, resulting in publication by undergraduate mentee.
- Optimized predictive models by selectively cleaning parts of the data that failed core assumptions via comparison with simulations; reduced model biases by 75%, enhanced interpretability of results and enabled 5 impactful publications.

University of Pennsylvania

Research Assistant (Dark Energy Survey Collaboration)

2015–2020

- Led large (>20) and small (<5) teams of physicists, astronomers and data scientists in processing/maintaining large astronomical datasets; rewarded with exclusive data access rights to one of the largest astronomical surveys in the world.
- Created thousands of mock datasets including realistic experimental errors in order to quantify statistical fluctuations, uncertainties and risks in modeling strategies, with results featured in more than 6 publication with over 100 citations.
- Collaboratively wrote Python and SQL code to process astronomical images; created data visualizations that enabled fast identification and treatment of data anomalies and reduced incidence of errors by 90% based on signal-to-noise metrics.

University of São Paulo (Brazil)

Research Scholar

2013–2015

- Improved extraction of information from noisy datasets by numerically minimizing uncertainty factors, forecasting a ten-fold improvement of experimental sensitivity; awarded scholarship granted to top 3% of all STEM students in Brazil.

Technical Skills

Statistics: Estimation of uncertainties, likelihood inference, statistical significance evaluation, Bayesian statistics.

Data Science and Computing: Data visualization, large-scale data analytics, exploratory data analysis, hypothesis testing, supervised and unsupervised machine learning, model selection, Python (incl. Pandas, Scikit-Learn), SQL, github, MS Office.

Communication Skills and Additional Information

Academic publications: 50 peer-reviewed publications in cosmology & astrophysics (see lfsecco.com/publications)

Volunteer work: Weekend math lectures to adult Brazilian immigrants without high school education (NYC 2016-2017).

Public speaking: 20+ invited seminars/colloquia at international universities and outreach talks at museums/libraries.

Languages: English (fluent), Portuguese (native), Spanish & Italian (basic).

Hobbies: Chess (rapid ELO 1607, 97th percentile chess.com), Triathlon (2223th/2622 Chicago 2023, olympic distance).