Andresa Rodrigues de Campos

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Research Interests

Observational Cosmology, Weak Gravitational Lensing, Photometric Redshifts, Statistical Methods, Data Analysis, and Machine Learning

Education

Carnegie Mellon University, Pittsburgh, PA USA
Ph.D., Physics, 2018-present (expected date of completion: July, 2023)
Advisor: Scott Dodelson, Ph.D.

São Paulo State University, SP Brazil
M.S., Physics, 2018 - Advisor: Rogerio Rosenfeld, Ph.D.

Universidade Federal de São Jõao del-Rei, MG Brazil
B.S., Physics (GPA: 9.23/10), Minor in Computational Physics, 2015

Employment

Universidade Federal de São Jõao del-Rei, MG Brazil
Lecturer at the Department of Physics and Mathematics, Fall 2015

Awards & Fellowships

Dark Energy Survey Builder
Two years of full-time equivalent work on infrastructure, Fall 2022

Dark Energy Survey Early Career Scientist
Grant for participating in the Fall 2019 DES Collaboration Meeting

Dark Energy Survey Observing Award
Grant for observing for DES using the DECAM at Cerro Tololo in Chile
7 nights in January 2019 - DES Year 6

CNPq Scholarship, São Paulo State University, SP, Brazil
Graduate Research Fellowship, awarded in 2016 (2 years duration)

FAPEMG Scholarship, UFSJ, MG, Brazil
Undergraduate Research Fellowship, awarded in 2013 & 2014

Leadership

Dark Energy Survey
Analysis Team Lead, Weak Lensing Redshifts, 2020 - present
Analysis Team Co-Lead, Samplers and Tensions, 2018 - 2020
Builder with data rights

Collaborations

The Dark Energy Survey (DES)
The LSST Dark Energy Science Collaboration (DESC)
The Rubin Observatory Legacy Survey of Space and Time (LSST)

Recent Talks	**Weak Lensing Photo-Z for DES Y6**, Cambridge UK, July 2022 **Self-Organing Maps**, Duke NC, May 2022 **SOMPZ for Lens and Source Galaxy Samples**, Duke NC, May 2022 **Empirical Model Selection**, Duke NC, May 2022 **Statistical Tension Metrics**, Sussex UK, November 2019
Teaching	**Teaching Assistant - Carnegie Mellon University** Physics II for Engineering and Physics Students, Spring 2019 & Fall 2018 Stars, Galaxies and the Universe, Fall 2018 **Lecturer - Universidade Federal de São João del-Rei** Fundamentals of Physics I, Fall 2015 Introductory Experimental Physics, Fall 2015 **Course Tutor - Universidade Federal de São João del-Rei** Calculus II, Fall 2012 Treatment and Representation of Exp. Measurements, Spring 2012 & Fall 2011
Mentoring	**Hannah Varekamp**: Undergraduate, Carnegie Mellon University **Boyan Yin**: Undergraduate, Carnegie Mellon University
Service	**McWilliams Software Development Series** Co-organizer: Sessions with tutorials and talks related to software development and computing resources, 2021 - present
Grants	**Extracting Information from the Large Scale Structure of the Universe** XSEDE Allocation: AST200006, 2021 (200,000 CPU hours) Co-lead and authored the proposal. PI: Scott Dodelson
Skills	**Programming Languages:** Python, R, Bash, FORTRAN **Machine Learning:** PyTorch, TensorFlow and Keras **Data Analysis:** Jupyter, Numpy, CUPy, Scipy, Pandas **Data Visualization:** Matplotlib, Seaborn, Plotly, Altair **Markup Languages:** LaTeX, basic knowledge of HTML + CSS **Databases:** Intermediate knowledge of SQL and PostgreSQL **High Performance Computing:** Spark, SLURM, MPI, mpi4py
Relevant Coursework	**10-601: Introduction to Machine Learning** **38-616: Neural Networks and Deep Learning in Science** **38-610: Modern Programming for Data Scientists** **38-611: Introduction to Large-Scale Computing**
Languages	English (fluent), Portuguese (native), Spanish (advanced)
Other Leadership	**Tartan Salsa - President** Student organization at Carnegie Mellon University with the goal of promoting Latin American dances and culture, 2021 - present

Publications

Since the start of my PhD in Sept 2018, I have authored a total of 46 papers in international peer-reviewed journals with a total of 2,498 citations (h-index of 22). See My ADS library.

First-author publications:

- **A. Campos**, S. Samuroff and R. Mandelbaum "An empirical approach to model selection: weak lensing and intrinsic alignments", doi:10.48550/arXiv.2211.02800.
- Lemos P., Raveri M., **Campos A.**, *et al.* [DES], "Assessing tension metrics with dark energy survey and Planck data", Monthly Notices of the Royal Astronomical Society, vol. 505, no. 4, pp. 6179–6194, 2021. doi:10.1093/mnras/stab1670. [1]

Selected papers in which I led or was part of main science team:

- S. Samuroff, R. Mandelbaum, J. Blazek, **A. Campos** *et al.* [DES], "The Dark Energy Survey Year 3 and eBOSS: constraining galaxy intrinsic alignments across luminosity and colour space", doi:10.48550/arXiv.2212.11319.
- P. Lemos, N. Weaverdyck, R. Rollins, J. Muir, A. Ferté, A. R. Liddle, **A. Campos** *et al.* [DES], "Robust sampling for weak lensing and clustering analyses with the dark energy survey", Monthly Notices of the Royal Astronomical Society, 2022. doi:10.1093/mnras/stac2786.
- J. P. Cordero, ..., **A. Campos** *et al.* [DES], "Dark Energy Survey Year 3 results: marginalization over redshift distribution uncertainties using ranking of discrete realizations", Monthly Notices of the Royal Astronomical Society, vol. 511, no. 2, pp. 2170–2185, 2022. doi:10.1093/mnras/stac147.
- DES Collaboration, "Dark Energy Survey Year 3 results: Cosmological constraints from galaxy clustering and weak lensing", Physical Review D, vol. 105, no. 2, 2022. doi:10.1103/PhysRevD.105.023520.
- L. F. Secco, S. Samuroff, E. Krause, B. Jain, J. Blazek, M. Raveri, **A. Campos** *et al.* [DES], "Dark Energy Survey Year 3 results: Cosmology from cosmic shear and robustness to modeling uncertainty", Physical Review D, vol. 105, no. 2, 2022. doi:10.1103/PhysRevD.105.023515.
- J. Myles, ..., **A. Campos** *et al.* [DES], "Dark Energy Survey Year 3 results: redshift calibration of the weak lensing source galaxies", Monthly Notices of the Royal Astronomical Society, vol. 505, no. 3, pp. 4249–4277, 2021. doi:10.1093/mnras/stab1515.
- C. Doux, E. Baxter, P. Lemos, C. Chang, A. Alarcon, A. Amon, **A. Campos** *et al.* [DES], "Dark energy survey internal consistency tests of the joint cosmological probes analysis with posterior predictive distributions", Monthly Notices of the Royal Astronomical Society, vol. 503, no. 2, pp. 2688–2705, 2021. doi:10.1093/mnras/stab526.

[1] The three authors co-lead the analysis team "Samplers and Tensions" in DES, and made equivalent contributions to this paper, which is a 3-first-author publication.

- DES Collaboration, "Dark Energy Survey year 1 results: Constraints on extended cosmological models from galaxy clustering and weak lensing", Physical Review D, vol. 99, no. 12, 2019. doi:10.1103/PhysRevD.99.123505.

- DES Collaboration, "Cosmological Constraints from Multiple Probes in the Dark Energy Survey", Physical Review Letters, vol. 122, no.17, 2019. doi:10.1103/PhysRevLett.122.171301.

- DES Collaboration, "Dark Energy Survey year 1 results: Cosmological constraints from galaxy clustering and weak lensing", Physical Review D, vol. 98, no. 4, 2018. doi:10.1103/PhysRevD.98.043526.

Co-authored white papers and reports:

- K. Breivik *et al.* [LSST], "From Data to Software to Science with the Rubin Observatory LSST", doi:10.48550/arXiv.2208.02781

- H. T. Diehl *et al.* [DES], "The Dark Energy Survey and Operations: Year 6 – The Finale", doi:10.2172/1596042

Second tier co-authored papers (contributed to data analysis and code used on these papers):

- Sánchez, J., "Mapping gas around massive galaxies: cross-correlation of DES Y3 galaxies and Compton-y-maps from SPT and Planck", arXiv e-prints, 2022.

- Myles, J., "Mapping Variations of Redshift Distributions with Probability Integral Transforms", arXiv e-prints, 2022.

- Doux, C. *et al.* [DES], "Dark energy survey year 3 results: cosmological constraints from the analysis of cosmic shear in harmonic space", Monthly Notices of the Royal Astronomical Society, vol. 515, no. 2, pp. 1942–1972, 2022. doi:10.1093/mnras/stac1826.

- Giannini, G., "Dark Energy Survey Year 3 Results: Redshift Calibration of the MagLim Lens Sample from the combination of SOMPZ and clustering and its impact on Cosmology", arXiv e-prints, 2022.

- Elvin-Poole, J., "Dark Energy Survey Year 3 results: Magnification modeling and impact on cosmological constraints from galaxy clustering and galaxy-galaxy lensing", arXiv e-prints, 2022.

- Pandey, S. *et al.* [DES], "Dark Energy Survey year 3 results: Constraints on cosmological parameters and galaxy-bias models from galaxy clustering and galaxy-galaxy lensing using the redMaGiC sample", Physical Review D, vol. 106, no. 4, 2022. doi:10.1103/PhysRevD.106.043520.

- DES Collaboration, "Dark Energy Survey Year 3 Results: Constraints on extensions to ΛCDM with weak lensing and galaxy clustering", arXiv e-prints, 2022.

- Pandey, S. *et al.* [DES], "Cross-correlation of Dark Energy Survey Year 3 lensing data with ACT and P l a n c k thermal Sunyaev-Zel'dovich effect observations. II. Modeling and constraints on halo pressure profiles", Physical Review D, vol. 105, no. 12, 2022. doi:10.1103/PhysRevD.105.123526.

- Chen, A., "Constraining the Baryonic Feedback with Cosmic Shear Using the DES Year-3 Small-Scale Measurements", arXiv e-prints, 2022.

- DeRose, J. *et al.* [DES], "Dark Energy Survey Year 3 results: Cosmology from combined galaxy clustering and lensing validation on cosmological simulations", Physical Review D, vol. 105, no. 12, 2022. doi:10.1103/PhysRevD.105.123520.

- Gatti, M. *et al.* [DES], "Cross-correlation of Dark Energy Survey Year 3 lensing data with ACT and Planck thermal Sunyaev-Zel'dovich effect observations. I. Measurements, systematics tests, and feedback model constraints", Physical Review D, vol. 105, no. 12, 2022. doi:10.1103/PhysRevD.105.123525.

- Abbott, T. M. C., "Joint analysis of DES Year 3 data and CMB lensing from SPT and Planck III: Combined cosmological constraints", arXiv e-prints, 2022.

- Secco, L. F. *et al.* [DES], "Dark Energy Survey Year 3 Results: Three-point shear correlations and mass aperture moments", Physical Review D, vol. 105, no. 10, 2022. doi:10.1103/PhysRevD.105.103537.

- Prat, J. *et al.* [DES], "Dark energy survey year 3 results: High-precision measurement and modeling of galaxy-galaxy lensing", Physical Review D, vol. 105, no. 8, 2022. doi:10.1103/PhysRevD.105.083528.

- Zürcher, D. *et al.* [DES], "Dark energy survey year 3 results: Cosmology with peaks using an emulator approach", Monthly Notices of the Royal Astronomical Society, vol. 511, no. 2, pp. 2075–2104, 2022. doi:10.1093/mnras/stac078.

- Sánchez, C. *et al.* [DES], "Dark Energy Survey Year 3 results: Exploiting small-scale information with lensing shear ratios", Physical Review D, vol. 105, no. 8, 2022. doi:10.1103/PhysRevD.105.083529.

- Chang, C., "Joint analysis of DES Year 3 data and CMB lensing from SPT and Planck II: Cross-correlation measurements and cosmological constraints", arXiv e-prints, 2022.

- Omori, Y., "Joint analysis of DES Year 3 data and CMB lensing from SPT and Planck I: Construction of CMB Lensing Maps and Modeling Choices", arXiv e-prints, 2022.

- Kovács, A. *et al.* [DES], "The DES view of the Eridanus supervoid and the CMB cold spot", Monthly Notices of the Royal Astronomical Society, vol. 510, no. 1, pp. 216–229, 2022. doi:10.1093/mnras/stab3309.

- Amon, A., "Consistent lensing and clustering in a low-S_8 Universe with BOSS, DES Year 3, HSC Year 1 and KiDS-1000", arXiv e-prints, 2022.

- Lee, S. *et al.* [DES], "Probing gravity with the DES-CMASS sample and BOSS spectroscopy", Monthly Notices of the Royal Astronomical Society, vol. 509, no. 4, pp. 4982–4996, 2022. doi:10.1093/mnras/stab3129.

- Amon, A. *et al.* [DES], "Dark Energy Survey Year 3 results: Cosmology from cosmic shear and robustness to data calibration", Physical Review D, vol. 105, no. 2, 2022. doi:10.1103/PhysRevD.105.023514.

- Zacharegkas, G. *et al.* [DES], "Dark Energy Survey Year 3 results: galaxy-halo connection from galaxy-galaxy lensing", Monthly Notices of the Royal Astronomical Society, vol. 509, no. 3, pp. 3119–3147, 2022. doi:10.1093/mnras/stab3155.

- Friedrich, O. *et al.* [DES], "Dark Energy Survey year 3 results: covariance modelling and its impact on parameter estimation and quality of fit", Monthly Notices of the Royal Astronomical Society, vol. 508, no. 3, pp. 3125–3165, 2021. doi:10.1093/mnras/stab2384.

- Shin, T. *et al.* [DES], "The mass and galaxy distribution around SZ-selected clusters", Monthly Notices of the Royal Astronomical Society, vol. 507, no. 4, pp. 5758–5779, 2021. doi:10.1093/mnras/stab2505.

- Gatti, M., *et al.* [DES], "Dark Energy Survey Year 3 results: cosmology with moments of weak lensing mass maps", arXiv e-prints, 2021.

- Jeffrey, N. *et al.* [DES], "Dark Energy Survey Year 3 results: Curved-sky weak lensing mass map reconstruction", Monthly Notices of the Royal Astronomical Society, vol. 505, no. 3, pp. 4626–4645, 2021. doi:10.1093/mnras/stab1495.

- Chen, A.*et al.* [DES], "Constraints on dark matter to dark radiation conversion in the late universe with DES-Y1 and external data", Physical Review D, vol. 103, no. 12, 2021. doi:10.1103/PhysRevD.103.123528.

- Muir, J. *et al.* [DES], "DES Y1 results: Splitting growth and geometry to test ΛCDM", Physical Review D, vol. 103, no. 2, 2021. doi:10.1103/PhysRevD.103.023528.

- Krause, E. *et al.* [DES], "Dark Energy Survey Year 3 Results: Multi-Probe Modeling Strategy and Validation", arXiv e-prints, 2021.

- Porredon, A.*et al.* [DES], "Dark Energy Survey Year 3 results: Cosmological constraints from galaxy clustering and galaxy-galaxy lensing using the MagLim lens sample", arXiv e-prints, 2021.