Carlos Eduardo Barbosa

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Academic Experience

12/2016 - present: FAPESP Postdoctoral Fellow, Universidade de São Paulo, IAG......

Collaborator: Dr. Cláudia Mendes de Oliveira

02/2019 - 02/2020: Research Associate, Steward Observatory, University of Arizona....

Collaborator: Dr. Dennis Zaritsky

Education

2012 - 2013, 2014-2016: PhD in Astronomy, University of São Paulo, IAG

2013 - 2014: European Southern Observatory...

Thesis Title: *Kinematics and Stellar Populations in the Nearby Universe*

Supervisor: Dr. Cláudia Mendes de Oliveira

ESO supervision: Dr. Magda Arnaboldi

Brief Synopsis of Research: The environment has an important role in the morphological transformations of galaxies. Using spectroscopic observations, we have studied the physical mechanisms that led to morphological transformations at the environments of groups and clusters. By the study of the kinematics and stellar populations of the cD galaxy NGC 3311 at the core of the Hydra I cluster, we have shown that the formation of its diffuse halo happened recently, with the merging events related to the formation of the BCG itself being responsible to unbound stars that ended up in the cD halo, with a contribution of satellite galaxies in groups.

2009 - 2011: MSc in Astronomy, University of São Paulo, IAG...................................

Dissertation Title: *Photometry, Decomposition and Correlations for Nearby Spiral Galaxies from the GHASP Survey*

Supervisor: Dr. Cláudia Mendes de Oliveira

Brief Synopsis of Research: Spiral galaxies obey several scaling relations relating their sizes, luminosities and kinematics. In this study, we have deployed a detailed analysis of the photometry of 173 galaxies in the GHASP survey to obtain a precise characterization of scaling relations, including sub-components such as bulges and disks.

2005 - 2009: BSc in Physics, University of São Paulo, Institute of Physics.................

Final essay: *Photometry of Spiral Galaxies*

Supervisor: Dr. Cláudia Mendes de Oliveira

Undergraduate Research in Theoretical Biophysics: *The role of the anesthetics on neural signal propagation and the cellular membrane thermomecanic properties*

Supervisor: Dr. Carla Goldman

2002 - 2003: Technical Education in Refrigeration, SENAI Oscar Rodrigues Alves.......

Design, installation and maintenance of refrigeration and air conditioning facilities, from residential to industrial systems.

2000 - 2001: Professional Education in Machining, SENAI Mariano Ferraz

Theory and practice of the operation of lathes, milling machines, vertical drills and surface grinding machines. Technical drawing and AutoCAD training for design of mechanical systems. CNC programming for lathe and milling machine.

Professional Memberships

International Astronomical Union: Junior member.

Brazilian Astronomical Society: Effective member.

Organizing Committees

LOC member: SPAnet Workshop on Clusters of Galaxies and the Large-Scale Structure of the Universe, 03/2018

LOC member: ESO/NUVA/IAG Workshop on Challenges in UV Astronomy, 10/2013

Grants

FAPESP Postdoctoral Fellowship: IAG, Universidade de São Paulo

São Paulo, Dec 2016 - present

FAPESP Research Internships Abroad (BEPE): Steward Observatory, University of Arizona

Tucson, Feb 2019 – Jan 2020

FAPESP Research Internships Abroad (BEPE): European Southern Observatory

Munich, Mar 2013 – Feb 2014

FAPESP Doctoral Fellowship: IAG, Universidade de São Paulo

Jan 2012 – Jun 2016

FAPESP Masters Fellowship: IAG, Universidade de São Paulo

São Paulo, Aug 2009 – Jun 2011

Invited talks and couses

Visiting Professor (mini-course): Observatorio Astronómico de La Plata, 11/2018

Observatorio Astronómico de La Plata (coloquium): 24/10/2018

IAG/USP (coloquium): 08/2017

Mentoring

Undergraduate research: Jessica Silva Amorim (08/2020 - present)

Undergraduate research: Matheus Zaghi de Oliveira (08/2017 - 08/2018)

Non Academic Experience

2006 - 2008: Administrative Intern, Library of the Biomedical Sciences Institute, University of São Paulo

I performed a range of activities including the installation and administration of computers for the users, digitalization of numerous rare books and old slides and other assigned tasks. I have built a positive relationship with other members of the staff.

2000 - 2005: CNC Lathe Operator, York International

I worked at York International as an apprentice in Machining in parallel to my studies at the SENAI technical school, developing skills in diverse machine tools and in metrology. In the last year, I was dedicated to the programming and the operation of CNC lathes of different kinds. This job required abilities such as responsibility, ethics, constant focus and team abilities, which I have been using successfully in my professional career ever since.

Skills

Languages

Portuguese: Native language

English: Fluent

French: Basic

Software

Operating Systems: Unix (Debian, Ubuntu, Mint) and Windows (XP, Vista, 8)

Applications: Microsoft Office Word, Excel and Power-Point and open-source equivalents (LibreOffice, OpenOffice).

Programming: Python, IDL, FORTRAN, C

Astronomical Packages: astropy, IRAF, PyRAF, diverse reduction packages (EsoReflex, dohydra)

Other: LaTeX, Git, GitHub, Overleaf, HTML

Methods

Bayesian methods: Probabilistic programming (pymc3), data analysis.

References

Cláudia Mendes de Oliveira	Lodovico Coccato	Chiara Spiniello
Professor	Science Data Product group	Hintze Research Fellow
IAG-USP	European Southern Observatory	University of Oxford
São Paulo, Brazil	München, Germany	Oxford, UK
claudia.oliveira@iag.usp.br	mailto:lcoccato@eso.org	chiara.spiniello@physics.ox.ac.uk

Publications

[1] **C. E. Barbosa**, C. Spiniello, M. Arnaboldi, L. Coccato, T. Richtler, and M. Hilker. "A preserved red nugget in the heart of the BCG of the Hydra I cluster revealed with MUSE 2D stellar population analysis." In: *A&A* (2021). Submitted.

[2] M. L. Buzzo, B. Ziegler, C. Mendes de Oliveira, M. Verdugo, **C. E. Barbosa**, B. Ciocan, P. Papaderos, S. Torres-Flores, and P. Amram. "Physical and kinematic conditions of the local merging galaxy NGC 1487". In: *MNRAS* (2021). Submitted.

[3] C. Lima-Dias, A. Monachesi, S. Torres-Flores, A. Cortesi, D. Hernández-Lang, **C. E. Barbosa**, C. Mendes de Oliveira, D. Olave-Rojas, D. Pallero, L. Sampedro, A. Molino, F. R. Herpich, Y. L. Jaffé, R. Amorín, A. L. Chies-Santos, P. Dimauro, E. Telles, P. A. A. Lopes, A. Alvarez-Candal, F. Ferrari, A. Kanaan, T. Ribeiro, and W. Schoenell. "An environmental dependence of the physical and structural properties in the Hydra cluster galaxies". In: *MNRAS* 500.1 (Jan. 2021), pp. 1323–1339. arXiv: `2010.15235 [astro-ph.GA]`.

[4] L. M. I. Nakazono, C. Mendes de Oliveira, N. S. T. Hirata, S. Jeram, C. Queiroz, S. S. Eikenberry, A. H. Gonzalez, R. Abramo, M. Overzier R. Espadoto, A. Martinazzo, L. Sampedro, F. R. Herpich, A. Cortesi, F. Almeida-Fernandes, A. Werle, **C. E. Barbosa**, L. Sodré Jr., E. V. Lima, K. Menéndez-Delmestre, S. Akras, A. Alvarez-Candal, A. R. Lopes, E. Telles, W. Schoenell, A. Kanaan, and T. Ribeiro. "On the discovery of stars, quasars, and galaxies in the Southern Hemisphere with S-PLUS". In: *MNRAS* (2021). Under consideration.

[5] **C. E. Barbosa**, C. Spiniello, M. Arnaboldi, L. Coccato, M. Hilker, and T. Richtler. "What does (not) drive the variation of the low-mass end of the stellar initial mass function of early-type galaxies". In: *arXiv e-prints*, arXiv:2012.01431 (Dec. 2020), arXiv:2012.01431. arXiv: `2012.01431 [astro-ph.GA]`.

[6] **C. E. Barbosa**, D. Zaritsky, R. Donnerstein, H. Zhang, A. Dey, C. Mendes de Oliveira, L. Sampedro, A. Molino, M. V. Costa-Duarte, P. Coelho, A. Cortesi, F. R. Herpich, J. A. Hernand ez-Jimenez, T. Santos-Silva, E. Pereira, A. Werle, R. A. Overzier, R. Cid Fernandes, A. V. Smith Castelli, T. Ribeiro, W. Schoenell, and A. Kanaan. "One Hundred SMUDGes in S-PLUS: Ultra-diffuse Galaxies Flourish in the Field". In: *ApJS* 247.2, 46 (Apr. 2020), p. 46. arXiv: `2002.05171 [astro-ph.GA]`.

[7] S. Bonoli et al. "The miniJPAS survey: a preview of the Universe in 56 colours". In: *arXiv e-prints*, arXiv:2007.01910 (July 2020), arXiv:2007.01910. arXiv: `2007.01910 [astro-ph.CO]`.

[8] A. Molino, M. V. Costa-Duarte, L. Sampedro, F. R. Herpich, J. Sodré L., C. Mendes de Oliveira, W. Schoenell, **C. E. Barbosa**, C. Queiroz, E. V. R. Lima, L. Azanha, N. Muñoz-Elgueta, T. Ribeiro, A. Kanaan, J. A. Hernandez-Jimenez, A. Cortesi, S. Akras, R. Lopes de Oliveira, S. Torres-Flores, C. Lima-Dias, J. L. N. Castellon, G. Damke, A. Alvarez-Candal, Y. Jiménez-Teja, P. Coelho, E. Pereira, A. D. Montero-Dorta, N. Benítez, T. S. Gonçalves, L. Santana-Silva, S. V. Werner, L. A. Almeida, P. A. A. Lopes, A. L. Chies-Santos, E. Telles, T. de Souza, R. C, D. R. Gonçalves, R. S. de Souza, M. Makler, M. L. Buzzo, V. M. Placco, L. M. I. Nakazono, R. K. Saito, R. A. Overzier, and L. R. Abramo. "Assessing the photometric redshift precision of the S-PLUS survey: the Stripe-82 as a test-case". In: *MNRAS* 499.3 (June 2020), pp. 3884–3908. arXiv: `1907.06315 [astro-ph.GA]`.

[9] T. Richtler, M. Hilker, M. Arnaboldi, and **C. E. Barbosa**. "Dust and star formation in the centre of NGC 3311". In: *arXiv e-prints*, arXiv:2008.10662 (Aug. 2020), arXiv:2008.10662. arXiv: `2008.10662 [astro-ph.GA]`. Forthcoming.

[10] M. V. Costa-Duarte, L. Sampedro, A. Molino, H. S. Xavier, F. R. Herpich, A. L. Chies-Santos, **C. E. Barbosa**, A. Cortesi, W. Schoenell, A. Kanaan, T. Ribeiro, C. Mendes de Oliveira, S. Akras, A. Alvarez-Candal, C. L. Barbosa, J. L. N. Castellón, P. Coelho, M. L. L. Dantas, R. Dupke, A. Ederoclite, A. Galarza, T. S. Gonçalves, J. A. Hernandez-Jimenez, Y. Jiménez-Teja, A. Lopes, P. A. A. Lopes, R. Lopes de Oliveira, J. L. Melo

de Azevedo, L. M. Nakazono, H. D. Perottoni, C. Queiroz, K. Saha, J. Sodré L., E. Telles, and R. C. Thom de Souza. "The S-PLUS: a star/galaxy classification based on a Machine Learning approach". In: *arXiv e-prints*, arXiv:1909.08626 (Sept. 2019), arXiv:1909.08626. arXiv: `1909.08626 [astro-ph.GA]`.

[11]   C. Mendes de Oliveira et al. "The Southern Photometric Local Universe Survey (S-PLUS): improved SEDs, morphologies, and redshifts with 12 optical filters". In: *MNRAS* 489.1 (Oct. 2019), pp. 241–267. arXiv: `1907.01567 [astro-ph.GA]`.

[12]   **C. E. Barbosa**, M. Arnaboldi, L. Coccato, O. Gerhard, C. Mendes de Oliveira, M. Hilker, and T. Richtler. "Sloshing in its cD halo: MUSE kinematics of the central galaxy NGC 3311 in the Hydra I cluster". In: *A&A* 609, A78 (Jan. 2018), A78. arXiv: `1710.08941`.

[13]   M. Hilker, T. Richtler, **C. E. Barbosa**, M. Arnaboldi, L. Coccato, and C. Mendes de Oliveira. "The Hydra I cluster core. II. Kinematic complexity in a rising velocity dispersion profile around the cD galaxy NGC 3311". In: *A&A* 619, A70 (Nov. 2018), A70. arXiv: `1809.01163`.

[14]   **C. E. Barbosa**, M. Arnaboldi, L. Coccato, M. Hilker, C. Mendes de Oliveira, and T. Richtler. "The Hydra I cluster core. I. Stellar populations in the cD galaxy NGC 3311". In: *A&A* 589, A139 (May 2016), A139. arXiv: `1603.02202`.

[15]   **C. E. Barbosa**, M. Arnaboldi, M. Hilker, L. Coccato, T. Richtler, and C. Mendes de Oliveira. "A 3D view of the Hydra I cluster core- II. Stellar populations". In: *IAU Symposium*. Ed. by B. L. Ziegler, F. Combes, H. Dannerbauer, and M. Verdugo. Vol. 309. IAU Symposium. Feb. 2015, pp. 223–224. arXiv: `1410.0696`.

[16]   **C. E. Barbosa**, C. Mendes de Oliveira, P. Amram, F. Ferrari, D. Russeil, B. Epinat, V. Perret, C. Adami, and M. Marcelin. "GHASP: an Hα kinematic survey of spiral galaxies - X. Surface photometry, decompositions and the Tully-Fisher relation in the R$_c$ band". In: *MNRAS* 453 (Nov. 2015), pp. 2965–2981. arXiv: `1508.03004`.

[17]   M. Hilker, **C. E. Barbosa**, T. Richtler, L. Coccato, M. Arnaboldi, and C. Mendes de Oliveira. "A 3D view of the Hydra I galaxy cluster core - I. Kinematic substructures". In: *IAU Symposium*. Ed. by B. L. Ziegler, F. Combes, H. Dannerbauer, and M. Verdugo. Vol. 309. IAU Symposium. Feb. 2015, pp. 221–222. arXiv: `1410.0695`.

[18]   J. C. Basto Pineda, C. Mendes de Oliveira, **C. E. Barbosa**, P. Amram, and V. Perret. "The CUSP/CORE problem from a 2D view". In: *Dark Side of the Universe (DSU 2012)*. Jan. 2012, p. 23.