Carlos Eduardo Barbosa
| Curriculum Vitae

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Personal

Date of Birth: August 25th, 1984

Nationality: Brazilian

Marital Status: Married, 1 son

Research Interests

Stellar populations: Using modern facilities to study ages and chemical abundances of galaxies in the local universe.

Bayesian inference in astronomy: Development of new methods for data analysis and modeling using advanced statistical tools.

Dynamics of galaxies: Determination of kinematics of galaxies and dynamical modeling.

Current Position

2017 - present FAPESP Post-Doctoral Fellow, Universidade de São Paulo, IAG

Project: Galaxy evolution in different environments using spatially resolved kinematics and stellar populations (Process 2016/12331-0)

Supervisor: Dr. Cláudia Mendes de Oliveira

Education

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

Thesis Title: *Kinematics and Stellar Populations in the Nearby Universe* (Funded by FAPESP)

Supervisor: Dr. Cláudia Mendes de Oliveira

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* (Funded by CNPq and FAPESP)

Supervisor: Dr. Cláudia Mendes de Oliveira

Brief Synopsis of Research: Spiral galaxies obey several scaling relations relating their sizes, luminosi-

ties 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

Average grade: 8.0/10

Final essay: *Photometry of Spiral Galaxies*

Supervisor: Dr. Cláudia Mendes de Oliveira

Brief Synopsis of Research: In this first experience in astronomical research, we have performed the reduction, calibration and surface photometry of galaxis in the GHASP survey. Essay presented as requirement to obtain a certification in Astronomy.

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

Supervisor: Dr. Carla Goldman

Brief Synopsis of Research: The one-dimensional cable theory is usually invoked to explain the propagation of signals along neurons. In the course of our study, we have developed an alternative model for transmission of signals using known thermomecanic properties of neurons, deriving a wave equation of Boussinesq type which allow for the formation of non-dissipative compression waves (solitons).

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.

Visitorship

Visiting Professor: Observatorio Astronómico de La Plata, 11/2018

Visiting Student: European Southern Observatory, 2013-2014

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

Invited talks and coloquia

Observatorio Astronómico de La Plata:: 24/10/2018

IAG/USP:: 08/2017

Employment

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

I have 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 joined 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: IRAF, PyRAF, diverse reduction packages (EsoReflex, dohydra)

Other: LaTeX, Git, GitHub, Overleaf, HTML

References

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Publications

M. Hilker, T. Richtler, **Barbosa, C. E.**, 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. *A&A*, 619:A70, November 2018. doi: 10.1051/0004-6361/201731737.

Barbosa, C. E., 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. *A&A*, 609:A78, January 2018. doi: 10.1051/0004-6361/201731834.

Barbosa, C. E., 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. *A&A*, 589:A139, May 2016. doi: 10.1051/0004-6361/201628137.

Barbosa, C. E., 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. *MNRAS*, 453:2965–2981, November 2015a. doi: 10.1093/mnras/stv1685.

Barbosa, C. E., 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 B. L. Ziegler, F. Combes, H. Dannerbauer, and M. Verdugo, editors, *IAU Symposium*, volume 309 of *IAU Symposium*, pages 223–224, February 2015b. doi: 10.1017/S1743921314009727.

M. Hilker, **Barbosa, C. E.**, 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 B. L. Ziegler, F. Combes, H. Dannerbauer, and M. Verdugo, editors, *IAU Symposium*, volume 309 of *IAU Symposium*, pages 221–222, February 2015. doi: 10.1017/S1743921314009715.

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