Cristóbal Sifón

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Research Interests

My research focuses on galaxy cluster physics including observable–mass scaling relations for cosmological analyses, brightest cluster galaxies, the mass content of cluster galaxies, and merging clusters. I am also interested in intrinsic galaxy alignments, both as contaminants for cosmic shear and as a physical mechanism in their own right. I use various tools and techniques to study these phenomena, including weak gravitational lensing, spectroscopy, the exploitation of optical surveys in general, and most recently analyses involving hydrodynamical simulations.

Collaborations: Atacama Cosmology Telescope (ACT) — Canadian Cluster Comparison Project (CCCP) — Galaxy Cluster Mass Reconstruction Project — Kilo-Degree Survey (KiDS) — Large Synoptic Survey Telescope Dark Energy Science Collaboration (LSST-DESC) — Multi-Epoch Nearby Cluster Survey (MENeaCS) — Simons Observatory.

Employment

[2019 – Present] Profesor Asociado (Assistant Professor), Pontificia Universidad Católica de Valparaíso (PUCV), Chile
[2016 – 2019] Postdoctoral Research Associate, Princeton University, USA

Education

[2012 – 2016] Ph.D. Astrophysics, Universiteit Leiden, The Netherlands
[2010 – 2012] M.Sc. Astrophysics, P. Universidad Católica de Chile (PUC), Chile
[2005 – 2010] B.Sc. Astronomy, P. Universidad Católica de Chile, Chile

Internships

[2011] Science Intern, Gemini South Observatory (6 months)
[2011] Internship, Rutgers University (2 months)
[2009] Science Intern, Gemini South Observatory (6 months, *B.Sc. thesis*)

Teaching & Mentoring

Student Research Mentoring

[2020 – present] Camila Aros, PUCV: MSc thesis advisor.
[2020 – present] Nicole Mejía, Universidad Nacional Autónoma de Honduras (Honduras): Advising undergraduate research project through the Central American-Caribbean Bridge in Astrophysics Program.
[2017 – 2019] Naomi Robertson, Oxford University (UK): co-advised PhD thesis project.
[2018] Malik Walker, Princeton University: Undegraduate Summer Research Program and Junior Project.
[2013 – 2014] Joshua Albert, Universiteit Leiden: co-advised MSc thesis project.

Courses Taught

[2020B] Observational Cosmology (graduate level, PUCV)

Teaching Assistant

[Leiden] Stellar dynamics; organizer of MSc thesis defense presentations
[PUC] Extragalactic astrophysics; Experimental astrophysics; Laboratory of thermodynamics and kinetic theory

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Grants

[2019] Proyecto FONDECYT Iniciación (**PI**, 3 years, US$125,000)

Successful Observing Proposals (as PI)

I have been the PI of 9 different successful observing proposals in 5 different telescopes:
[Magellan/FourStar] (2020AB,2019AB) 6 nights for near-infrared imaging of galaxy clusters
[Very Large Array] (2019A) 4.5 h to study AGN feedback in galaxy clusters
[Giant Metrewave Radio Telescope] (2017B,2013B) 44 h to study diffuse radio emission in clusters
[Gemini South/GMOS] (2017B) 24 h for optical imaging and spectroscopy of high-redshift galaxy clusters
[VLT Survey Telescope/OmegaCAM] (2015A) 6 h for optical imaging of galaxy clusters

Observing Experience: I have spent roughly 180 hours observing with optical (Gemini South/GMOS) and near-infrared (NTT/SofI, Magellan/Fourstar) instruments performing both imaging and spectroscopy of galaxy clusters.

Community Activity

Journals: I have served as a referee for Astronomy & Astrophysics, The Astrophysical Journal, Monthly Notices of the Royal Astronomical Society, and Nature Astronomy.
Telescope Allocation Committees (TACs): I have served as a reviewer for the Canadian TAC, as well as for the *Chandra* X-ray Observatory.

Informal courses

[2016] *Making Better Figures*, Universiteit Leiden (http://bit.ly/2NTznxW)

Press articles authored

Galaxy clusters: Falling into line (Nature Astronomy *News & Views*, July 2017)
Dynamical masses of galaxy clusters discovered with the Sunyaev-Zel'dovich effect (Gemini Focus *Featured Science*, July 2013)

Outreach

[2018 – 2019] Assisted with *Public Astronomical Observations in Spanish*, Princeton University.
[2013 – 2014] Assisted with *Public Observations at the Old Observatory*, Leiden Observatory.
[2012] Co-taught an *Astronomy Course for Seniors*, PUC.
[2011] Participated in *Starry Nights*, observation nights for elementary and middle school students in social risk organized by ESO-Santiago.
[2010] Invited talk on board the "FFG14 Almirante Latorre" Chilean Navy ship, Valparaíso, Chile.
[2010] *The Universe*, a series of talks for elementary school students in social risk organized by PUC.

Technical skills

I am an experienced `python` programmer, and I also have some experience with IRAF/PyRAF. I have written `pygmos`, a Python/PyRAF pipeline to reduce Gemini-GMOS spectra which is available here. I also developed an early analysis pipeline for the FLAMINGOS-II infrared imager and spectrograph installed in the Gemini-South telescope. I am one of three lead developers and maintainers of the galaxy-galaxy lensing pipeline used by the

KiDS collaboration (written in `python`, but which is not public at the moment). Other codes I have written are posted at my `github` page.

Other Work Experience

[2007 – 2008] Ski instructor at Homewood Mountain Ski Resort in Lake Tahoe, CA. Obtained certification as *Level I Ski Instructor* by the Professional Ski Instructors of America (PSIA).
[2006 – 2007] Ski lift operator at Sun Valley Resort, Sun Valley, ID.

References

- Prof. Henk Hoekstra (*PhD advisor*)
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