WLADIMIR EDUARDO BANDA BARRAGÁN

PERSONAL INFORMATION

Current Status	Lecturer/Researcher
Current Affiliation	Universidad Yachay Tech
E-mail Addresses	wbanda@yachaytech.edu.ec
Personal Website	https://github.com/wbandabarragan

EDUCATION

2012 - 2016
Canberra, Australia

Australian National University (ANU)

Ph.D. in Astronomy and Astrophysics

School: Research School of Astronomy and Astrophysics (RSAA)
Thesis: "Magnetohydrodynamics of wind-cloud interactions: Filament Formation in the Interstellar Medium"
Supervisor: A/Prof. Roland Crocker· Roland.Crocker@anu.edu.au

2005 - 2010
Quito, Ecuador

Escuela Politécnica Nacional

B.Sc. in Physics

School: Department of Physics and Astronomy

WORK AND TEACHING EXPERIENCE

2022 - present
Urcuquí, Ecuador

Universidad Yachay Tech

Lecturer / Researcher

Department: School of Physics and Nanotechnology
Teaching computational physics and quantum mechanics.

2018 - 2021
Hamburg, Germany

Universität Hamburg

Postdoctoral Researcher

Department: Hamburger Sternwarte and Department of Physics
Worked on the physics of galactic winds and tutored an optics laboratory course.

2016 - 2018 Ambato & Quito, Ecuador

Universidad Técnica de Ambato and Escuela Politécnica Nacional

Junior Lecturer / Researcher

Departments: Facultad de Ingeniería Civil y Mecánica and Observatorio Astronómico de Quito
Taught courses on thermodynamics, waves and oscillations, and Newtonian mechanics.

2013
Canberra, Australia

Australian National University

Teaching Assistant

Department: College of Physical and Mathematical Sciences
Tutored an undergraduate course on Black Holes and Cosmology (ASTR-3002).

2010 - 2012
Quito, Ecuador

National Institute of Meteorology and Hydrology of Ecuador (INAMHI)

Researcher

Department: Weather and climate modelling group.
Worked on numerical weather and climate models.

2009 - 2010
Quito, Ecuador

San Gabriel High School

Science Teacher

Department: Division of Natural Sciences.
Instructor of basic calculus and analytical geometry.

SCHOLARSHIPS AWARDED

1) 2012 - 2016 · "Olin J Eggen Scholarship" awarded by the Research School of Astronomy and Astrophysics at the Australian National University.

2) 2012 - 2016 · Doctoral scholarship (CI: 1711298438) under the "Universidades de Excelencia" programme awarded by the National Secretariat of Higher Education, Science, Technology and Innovation of Ecuador (SENESCYT).

SELECTED TALKS IN THE LAST 5 YEARS

1) Oct 2021 · Talk: "An overview of shock-multicloud interactions in magnetised galactic winds", at the "XVII Physics Meeting" (virtual contributed talk).

2) Sep 2020 · Talk: "Dense cloud survival in radiative multi-phase outflows", at the "International Annual Meeting of the German Astronomical Society" (virtual contributed talk).

3) Sep 2020 · Talk: "A cloud-cloud collision in Sgr B2? 3D simulations meet SiO observations", at the "École Normale Supérieure" (virtual invited talk).

4) Sep 2018 · Talk: "Magnetohydrodynamics of Wind-Cloud Interactions", at the "Stellar and Interstellar Environments: Shocking Structures in and around Astrospheres and their Relevance for Cosmic Ray Transport"' in Bochum, Germany (invited talk).

5) Jan 2017 · Talk: "Synthetic Radio Emission Maps" at the I Ecuadorian School of Radio Astronomy at Escuela Politécnica Nacional in Quito, Ecuador (invited lecture).

6) Oct 2016 · Talk: "Simulations of filaments arising from wind-swept turbulent clouds", at Konkoly Observatory in Budapest, Hungary (colloquium).

TIME ALLOCATED ON SUPERCOMPUTERS

1) 2020-2022 · Granted 14Mcore-hours on "Supermuc-NG" at the LRZ facility - as Principal Investigator (Germany).

2) 2018-2019 · Granted 2Mcore-hours on "HPC-Cedia" at the RED CEDIA facility - as Principal Investigator (Ecuador).

3) 2016-2017 · Granted 2Mcore-hours on "raijin" at the NCI facility and "magnus" at iVEC by NCMAS as a researcher on project ek9 - joint proposal (Australia).

4) 2012-2015 · Granted 5Mcore-hours on "raijin" at the NCI facility and "magnus" at iVEC by NCMAS as a researcher on project n72 - joint proposal (Australia).

5) 2014-2015 · Granted 1.5 Mcore-hours on "raijin" at the NCI facility and "magnus" at iVEC by NCMAS as a researcher on project n72 (6 Mcore-hours) (Australia).

SUPERVISION EXPERIENCE

A) AS AN OFFICIAL SUPERVISOR:

1) 2017-2018 · Jorge Manobanda and Omar Silva, BSc in Mechanical Engineering at Universidad Técnica de Ambato. Thesis title: *Análisis del comportamiento Aerodinámico de autobuses: Modelación CFD y validación con prototipos a escala.* (completed in July 2018, available at: https://repositorio.uta.edu.ec/handle/123456789/28778)

2) 2021 · Felix Teutloff, BSc in Physics at Hamburg University. Thesis title: *Shock waves in magnetohydrodynamical simulations of galactic wind-cloud interactions.* (finished on 27 October 2021)

3) 2021 · Benedetta Casavecchia, MSc in Astrophysics and Cosmology at Bologna University. Thesis title: *Studying synthetic column density maps and absorption spectra from galactic wind models*. (expected to finish in March 2022)

B) AS AN EXTERNAL ADVISOR:

4) 2018-2020 · J'Neil Cottle, PhD in Astrophysics at Arizona State University. Thesis title: *Evolution, Disruption, and Composition of Galactic Outflows Around Starburst Galaxies.* (completed in May 2021)

5) 2019-2021 · Paola Domínguez-Fernández, PhD in Astrophysics at Hamburg University. Thesis title: *Magnetic fields in the intracluster medium*. (completed in January 2021)

PUBLICATION LIST

A) JOURNAL ARTICLES

2016 **W. E. Banda-Barragán**, R. Parkin, C. Federrath, R. Crocker, and G. Bicknell, Filament formation in wind-cloud interactions. I. Spherical clouds in uniform magnetic fields, MNRAS, volume 455, pages 1309-1333, January 2016, doi:10.1093/mnras/stv2405.
http://adsabs.harvard.edu/abs/2016MNRAS.455.1309B

2018 **W. E. Banda-Barragán**, C. Federrath, R. Crocker, and G. Bicknell, Filament formation in wind-cloud interactions. II. Clouds with turbulent density, velocity, and magnetic fields, MNRAS, volume 473, pages 3454-3489, January 2018, doi:10.1093/mnras/stx2541.
http://adsabs.harvard.edu/abs/2018MNRAS.473.3454B

2019 **W. E. Banda-Barragán**, F. Zertuche, C. Federrath, J. García Del Valle, M. Brüggen, and A. Y. Wagner, On the dynamics and survival of fractal clouds in galactic winds, MNRAS, volume 486, pages 4526-4544, July 2019, doi:10.1093/mnras/stz1040.
https://ui.adsabs.harvard.edu/abs/2019MNRAS.486.4526B

2020 J. Cottle, E. Scannapieco, M. Brüggen, **W. E. Banda-Barragán**, and C. Federrath, The Launching of Cold Clouds by Galaxy Outflows. III. The Influence of Magnetic Fields, ApJ, volume 892, page 59, March 2020, doi:10.3847/1538-4357/ab76d1.
https://ui.adsabs.harvard.edu/abs/2020ApJ...892...59C

2020 **W. E. Banda-Barragán**, M. Brüggen, C. Federrath, A. Y. Wagner, E. Scannapieco, and J. Cottle, Shock-multicloud interactions in galactic outflows - I. Cloud layers with lognormal density distributions, MNRAS, volume 499, pages 2173-2195, December 2020, doi:10.1093/mnras/staa2904.
https://ui.adsabs.harvard.edu/abs/2020MNRAS.499.2173B

2020 J. Armijos-Abendaño**, **W. E. Banda-Barragán****, J. Martín-Pintado, H. Dénes, C. Federrath, and M. Requena-Torres, Structure and kinematics of shocked gas in Sgr B2: further evidence of a cloud-cloud collision from SiO emission maps, MNRAS, volume 499, pages 4918-4939, December 2020, doi:10.1093/mnras/staa3119. **(**Equal contribution)**
https://ui.adsabs.harvard.edu/abs/2020MNRAS.499.4918A

2021 P. Domínguez-Fernández, M. Brüggen, F. Vazza, **W. E. Banda-Barragán**, K. Rajpurohit, A. Mignone, D. Mukherjee, and B. Vaidya. Morphology of radio relics - I. What causes the substructure of synchrotron emission?, MNRAS, volume 500, pages 795-816, January 2021, doi:10.1093/mnras/staa3018.
https://ui.adsabs.harvard.edu/abs/2021MNRAS.500..795D.

2021 **W. E. Banda-Barragán**, M. Brüggen, V. Heesen, E. Scannapieco, J. Cottle, C. Federrath, and A. Y. Wagner, Shock–multicloud interactions in galactic outflows - II. Radiative fractal clouds and cold gas thermodynamics, MNRAS, Volume 506, Issue 4, pages 5658-5680,
https://ui.adsabs.harvard.edu/abs/2021MNRAS.506.5658B

2021 P. Domínguez-Fernández, M. Brüggen, F. Vazza, M. Hoeft, **W. E. Banda-Barragán**, K. Rajpurohit, A. Mignone, D. Mukherjee, and B. Vaidya. Morphology of radio relics - II. Properties of polarized emission, MNRAS, Volume 507, Issue 2, pages 2714-2734, doi:10.1093/mnras/stab2353.
https://ui.adsabs.harvard.edu/abs/2021MNRAS.507.2714D.

2022 **W. E. Banda-Barragán**, J. Armijos-Abendaño, and H. Dénes. A cloud-cloud collision in Sgr B2? 3D simulations meet SiO observations, Proceedings of the International Astronomical Union (in press),
https://ui.adsabs.harvard.edu/abs/2022arXiv220412603B/.

2022 B. Casavecchia, **W. E. Banda-Barragán**, M. Brüggen, and F. Brighenti. Absorption spectra from galactic wind models: a framework to link PLUTO simulations to TRIDENT, Proceedings of the International Astronomical Union (in press), https://ui.adsabs.harvard.edu/abs/2022arXiv220502680C.

b) other publications

2016 **W. E. Banda-Barragán**, Magnetohydrodynamics of Wind-Cloud Interactions: Filament Formation in the Interstellar Medium, PhD thesis at Research School of Astronomy & Astrophysics, Australian National University, doi:10.25911/5d7635f22a5e3.
https://openresearch-repository.anu.edu.au/handle/1885/110693

2019 D. Vera, E. Valencia, E. López, and **W. E. Banda-Barragán**, Modeling a propulsion system for the trajectory correction of weather balloons, AIAA 2019-4464. AIAA Propulsion and Energy 2019 Forum. August 2019, doi.org/10.2514/6.2019-4464.
https://arc.aiaa.org/doi/abs/10.2514/6.2019-4464

2023 **W. E. Banda-Barragán**, M. Brüggen, E. Scannapieco, V. Heesen, C. Federrath, P. Domínguez-Fernández, J. Cottle, A. Y. Wagner, and J. Armijos-Abendaño, Shock–multicloud interactions in galactic outflows - III. Uniformly magnetised flows with radiative clumpy layers, **in preparation.**

2023 **W. E. Banda-Barragán**, and D. Wittor, A view on enstrophy and turbulence in shock-multicloud interactions within galactic winds, **in preparation.**

REFERENCES

Prof. Marcus Brüggen - mbrueggen@hs.uni-hamburg.de
A/Prof. Christoph Federrath - christoph.federrath@anu.edu.au

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