



Sergio Martin-Alvarez

Postdoctoral researcher in Computational Astrophysics

This my summarised CV, a more detailed version is available at <https://www.martin-alvarez.com/about-me>

Research interests:

Galaxy formation and evolution — Large Scale Structure — Synthetic observations — Numerical Methods
Magnetohydrodynamics — Magnetic fields — Cosmic rays — Radiation & reionization

Education

- 2015 – 2019 **Ph.D. in Astrophysics**, *University of Oxford*, Title: Magnetic fields in and around galaxies.
- 2014 – 2015 **MSc Advanced Physics (Theoretical Physics & Astrophysics)**, *Universitat de València*.
- 2013 – 2014 **Erasmus, MPhys in Physics and Astrophysics**, *University of Leeds*.
- 2010 – 2014 **BSc in Physics**, *Universitat de València*.

Research experience - Astrophysics

- 2019 – Present **Postdoctoral Research Associate**, *Institute of Astronomy & KICC, University of Cambridge*.
- 2019 – Present **Churchill postdoctoral By-Fellow**, *Churchill college, University of Cambridge*.
- Apr – Jun, 2019 **Balzan Fellow**, *Balzan Centre for Cosmological Studies & Institute d'Astrophysique de Paris*.
- 2015 – 2019 **Ph.D. in Astrophysics**, *University of Oxford*.
- Jun – Sep, 2015 **Research scholar**, *Astronomy & Astrophysics - Universitat de València*.
- Jun – Sep, 2014 **IAC Research Scholarship**, *Instituto de Astrofísica de Canarias (IAC)*.

Supervised students

- 2021 – Present **Yuxuan Yuan - PhD projects**, *University of Cambridge*.
- 2021 – Present **Charlie Brooker - Master project**, *University of Cambridge*.
- 2020 – Present **Francisco Rodriguez-Montero - PhD projects**, *University of Oxford*.
- 2020 – 2021 **Rahma Alfarsy - Master project**, *University of Cambridge*.
- Summer 2020 **Jacob Gunn - Summer project**, *University of Cambridge*.
- Summer 2020 **Stefano Zazzera - Summer project**, *University of Cambridge*.
- 2019 – 2020 **Francisco Rodriguez-Montero - Master project**, *University of Cambridge*.
- 2018 – 2019 **Petr Jakubcik - Undergraduate project**, *University of Oxford*.

Experience

Academic teaching and outreach

- 2020 – Present **Supervisor for Statistical Physics**, *University of Cambridge*.
- 2019 – Present **Postgraduate students mentor**, *Churchill College, University of Cambridge*.
- 2019 – Present **Supervisor for Stellar Dynamics and Structure of Galaxies**, *University of Cambridge*.
- 2016 – 2019 **C1 Astrophysics MPhys tutor**, *University of Oxford*.
- 2016 – 2019 **Astrophysics lab. junior demonstrator**, *University of Oxford*.
- 2015 – 2019 **Outreach grad coordinator and speaker**, *University of Oxford*.
- 2015 **Examiner**, *Colegio Mayor San Juan de Ribera, Valencia*.
- 2013 – 2014 **Spanish BSc Conversation tutor**, *University of Leeds*.
- 2013 – Present **Outreach speaker**, *independent*.

Academic - community service

- 2019 – Present **Reviewer**, *STFC Consolidated grants*, Astrophysics reviewer.
- 2019 – Present **Reviewer**, *MNRAS journal manuscripts referee*.
- [Organisation, communication, and management](#)
- 2020 – Present **Postdoc Committee**, *Institute of Astronomy*, University of Cambridge.
- 2020 **Postdoc welcome week organiser**, *Institute of Astronomy*, University of Cambridge.
- 2020 – Present **Postdoc mentor**, *Institute of Astronomy*, University of Cambridge.
- 2019 – 2020 **Seminar organiser**, *University of Cambridge*, Galaxies journal club.
- 2018 – 2019 **Seminar organiser**, *University of Oxford*, GES and simulators meeting.
- 2015 – 2018 **Welfare Officer** (2015 - 2016), **social secretary** (2015 - 2016), **ethics and environment officer** (2016), **food officer** (2016 - 2018), *Christ Church College - University of Oxford*.
- 2014 – 2015 **President and Founder**, *Student Association for Scientific Divulgateion*, València.
- 2014 – 2015 **Physics MSc. Student representative**, *Universitat de València*.
- 2014 – 2015 **Official tutor for international incoming students**, *Universitat de València*.
- 2014 – 2015 **Physics BSc. Student representative**, *Universitat de València*.
- 2012 – 2015 **Physics Association of Student Representatives**, *Universitat de València*.
- 2012 – 2013 **Official tutor for freshmen students**, *Universitat de València*.

Selected awards

Scholarships and prizes

- 2019 – Present Churchill postdoctoral By-Fellowship - Churchill College, Cambridge.
- 2018 Balzan visitor Fellowship - Balzan Centre for Cosmological Studies, New College, Oxford.
- 2018 Contribution to access and outreach (University of Oxford - Students Union).
- 2017 Highly commended SEPnet communication awards - Stargazing team.
- 2015 – 2019 Hintze Scholarship - University of Oxford.
- 2015 Introduction to Research Scholarship - Universitat de València.
- 2014 IAC Summer Research Scholarship.
- 2013 – 2014 Erasmus Scholarship - Leeds university.
- 2010 – 2015 Fully-funded university Scholarship - CMU San Juan de Ribera.

Computing time

All indicated awards (in Millions of computing hours; Mh) correspond exclusively to proposals I lead or subprojects I co-lead. Full proposals may have received higher amounts (e.g. SPHINX, 68 Mhours).

- 2021 **18 Mh.** PI: The first cosmic rays radiation-MHD galaxy formation simulations. DiRAC, UK
- 2021 **9 Mh.** Subproject PI: Influence of PMFs on the cosmic distribution of baryons. DiRAC, UK
- 2017 - 2019 **1.75 Mh.** PI: The effect of magnetic fields on the ISM of galaxies. ARC, Oxford
- 2018 **12 Mh.** Subproject co-PI: Magnetic fields in the Epoch of Reionization. PRACE, EU.
Proposal: The first luminous objects and reionization with SPHINX (P.I.: J. Rosdahl).
- 2018 **3 Mh.** Subproject co-PI: Magnetized galaxy formation in the SKA Era. DiRAC, UK.
Proposal: Galaxy physics from cosmological to galactic scales (P.I.: A. Slyz).
- 2015 – 2016 **0.65 Mh.** PI: Magnetic fields in galaxy formation. ARCHER, UK

Other skills

Coding skills

Basic: HTML, QBasic, MATLAB, CUDA **Intermediate:** VisualBasic, R, OpenMP, C/C++
Advanced: PYTHON, Mathematica, L^AT_EX, FORTRAN, MPI

Languages

Spanish 🇪🇸 **Native** Catalan 🇪🇸 **Native** English 🇬🇧 **Bilingual** Mandarin 🇨🇳 **Basic**

Scientific contributions

Find more updated information about my publications on my [webpage](#) and on [ADS](#).

Refereed publications as lead author

- Submitted **Beyond supernova feedback: cosmological dwarf galaxy formation simulations with magnetic fields, radiative transfer and cosmic rays**,
Martin-Alvarez et al. submitted, MNRAS, Draft available upon request.
- Submitted **Towards convergence of turbulent dynamo amplification in cosmological simulations**,
Martin-Alvarez et al. submitted, MNRAS, Draft available upon request.
- 2021 **Unraveling the origin of magnetic fields in galaxies**, *Martin-Alvarez et al. 2021*, MNRAS.
Featured in magazines as [Academic Times](#) and [New Scientist](#)
- 2020 **How primordial magnetic fields shrink galaxies**, *Martin-Alvarez, et al. 2020*, MNRAS.
Featured in magazines as [New Scientist](#).
- 2018 **A three-phase amplification of the cosmic magnetic field in spiral galaxies**,
Martin-Alvarez et al. 2018, MNRAS.
- 2017 **On the interplay between cosmological shock waves and their environment**,
Martin-Alvarez et al. 2017, Astrophysics and Space Science.
Journal issue cover picture

Refereed publications as co-first author

- 2021 **Introducing SPHINX-MHD: The Impact of Primordial Magnetic Fields [...]**,
Co-first authored: Katz & Martin-Alvarez, et al. 2021, MNRAS.
- 2019 **Magnetogenesis at cosmic dawn: tracing the origins of cosmic magnetic fields**,
Co-first authored: Katz & Martin-Alvarez, et al. 2019, MNRAS.

Refereed publications from my supervised students

- Submitted **Momentum deposition of Supernovae with Cosmic Rays**,
Rodriguez-Montero, Martin-Alvarez, et al. submitted, MNRAS.
Resulting from supervised master thesis. Best IoA's Master Project prize. Draft available upon request

Other refereed publications I am part of

- 2021 **The Nature of High $[OIII]_{88\mu m}/[CII]_{158\mu m}$ Galaxies in the Epoch of Reionization [...]**,
Katz et al. 2021, MNRAS.
- 2021 **Cosmological magnetogenesis: the Biermann battery during the Epoch of reionization**,
Attia et al. 2021, MNRAS.
- 2019 **Compact Star-Forming Galaxies as Old Starbursts Becoming Quiescent**,
Gómez-Guijarro et al. 2019, ApJ.
- 2019 **Modelling baryonic feedback for survey cosmology**, *Chisari et al. 2019*, OJA.

Selected presentations

- 2021 **Dwarf galaxies beyond supernova feedback: magnetism, radiation, and cosmic rays**.
RAMSES User Meeting 2021, Online
- 2019 **Unveiling the origin of galactic magnetic fields**.
Invited talk, Institute d'Astrophysique de Paris, France
- 2018 **In and around: galaxies, magnetism, and star formation**.
Invited talk, University of Bologna
- 2018 **Magneto-thermo-turbulent star formation in cosmic spiral galaxies**.
Magnetic fields or Turbulence conference. Hsinchu, Taiwan
- 2017 **Triphasic dynamo amplification: cosmic magnetic fields in galaxies**.
Magnetic Fields in the Universe VI conference, Natal, Brasil

References

- 1 **Debora Sijacki**, *Kavli Institute for Cosmology, Cambridge*, University of Cambridge.
mailto: deboras@ast.cam.ac.uk
 - 2 **Adrianne Slyz**, *Department of Astrophysics*, University of Oxford.
PhD Advisor. mailto: adrianne.slyz@physics.ox.ac.uk
 - 3 **Martin Haehnelt**, *Kavli Institute for Cosmology, Cambridge*, University of Cambridge.
mailto: haehnelt@ast.cam.ac.uk
- Julien Devriendt**, *Department of Astrophysics*, University of Oxford.
PhD Advisor. mailto: julien.devriendt@physics.ox.ac.uk
- Yohan Dubois**, *Institute d'Astrophysique de Paris*.
mailto: dubois@iap.fr