

José Manuel Zorrilla Matilla

+1 646 832 7024 | jzorrilla@astro.columbia.edu | josezorrilla.com | [LinkedIn](#)

Education

Columbia University

Ph.D., Astronomy.

Thesis "*Extracting cosmological information from small scales in weak gravitational lensing data*", advised by Prof. Zoltán Haiman

2020 (expected)

M.A., M.Phil., Astronomy

2016, 2017

The University of Chicago Booth School of Business

M.B.A., concentration in strategic management, finance and entrepreneurship; graduated with honors

2011

Supaero (French school of Aerospace Engineering)

Master in Aerospace Engineering, graduated in top 5% of class

2006

Thesis "*Application of EMV emitting electromagnetic tethers to radiation belt remediation*" at the Space Propulsion Lab (MIT)

ETSIA UPM (Spanish school of Aerospace Engineering)

Master in Aerospace Engineering, graduated 3rd out of a class of 206

2006

Experience

Columbia University

Graduate Research Assistant

2014-2020

Researched novel ways to test the standard cosmological model using galaxy surveys:

- Ran large scale cosmological simulations in an **HPC environment (Linux, C, Python)**.
- Performed **bayesian inference** in **large simulated datasets**.
- Applied **convolutional neural networks (Keras)** to simulations and interpreted their results.
- Built **physical models** of astrophysical processes and tested them on observational data.

Co-advised undergraduate (A. Gupta) and graduate (S. Waterval) students.

Taught astronomy-related courses to high-school and undergraduate students:

- Lectured and graded part of *Physical cosmology* (2020).
- Developed and taught lab-portion of *Observational astronomy* (2015, 2017-18, 2020).
- Developed and taught the curriculum of *Modern cosmology* to high-school students as part of Columbia's Science Honors Program (2016-2018).

McKinsey & Company

Advised companies from diverse industries in Europe, Africa, and North America as a management consultant.

Senior Associate

2012-2013

- Managed consultant teams (3-4 members) ensuring the quality of the delivery.
- Defined new **pricing algorithms** and planned their implementation for a manufacturer. Used **game theory and optimization** techniques to devise the network deployment plan for a telecommunications operator.

Associate

2011-2012

- Led problem definition and analysis within projects. **Optimized** plant geographical footprint and **production plan** for cement producer. Set up **revenue management** unit for an airline.

Fellow

2007-2009

- Built **financial models** (Excel, VBA) for business planning in the banking, telecommunications, and airline industries.

EADS (Airbus' parent company)

Design Engineer

2006-2007

- **Designed and tested mathematical algorithms** to be implemented in the aircraft's computer as part of the Eurofighter program.

Honors and awards

- Dr. Pliny A. and Margaret H. Price Prize in Cosmology and AstroParticle Physics (2018)
- Spain's National Prize for academic achievements in Aerospace Engineering (2006)
- UPM/French Embassy in Spain prize for best Master thesis (2006)
- Supaero prize for best research thesis (2006)
- Pegasus award for academic achievements (2006)
- GMV award for best curriculum in Astronautics in Spain (2006)
- Francisco Arranz award, granted by Spain's professional association of Aerospace Engineers, for academic achievements (2006)

Selected publications

- **Zorrilla Matilla, J. M.**; Haiman, Z., *Probing gaseous galactic halos through the rotational kSZ effect*, admitted to Phys Rev. D, ([arXiv:1909.04690](https://arxiv.org/abs/1909.04690))
- Gupta, A.; **Zorrilla Matilla, J. M.**; Hsu, D.; Haiman, Z., *Non-Gaussian information from weak lensing data via deep learning*, Phys. Rev. D, 97, 103515, 2018
- **Zorrilla Matilla, J. M.**; Haiman, Z.; Petri, A.; Namikawa, T., *Geometry and growth contributions to cosmic shear observables*, Phys. Rev. D, 96, 02353513, 2017 ([arXiv:1706.05133](https://arxiv.org/abs/1706.05133))
- **Zorrilla Matilla, J. M.**; Haiman, Z.; Hsu, D.; Gupta, A.; Petri, A., *Do dark matter halos explain lensing peaks?*, Phys. Rev. D, 94, 083506, 2016 ([arXiv:1609.03973](https://arxiv.org/abs/1609.03973))

Service

- Referee in high-impact scientific journals, MNRAS, JCAP.
- Coordinator, Columbia Astronomy Graduate mentoring program, 2015-2018.
- Columbia Astronomy outreach co-coordinator, 2018.
- Public speaker at Columbia Astronomy lecture series (2016, 2019).
- Rooftop variables program representative at Bayside High School (2013-17) and Bronxville High School (2019-20).
- Commentator on current Astronomical discoveries for NTN24 TV channel (2016).

References available upon request