

José Manuel Zorrilla Matilla

550 W 120th Street, Pupin Physics Laboratory, 1328, New York, NY, 10027
+1 646 832 7024, jzorrilla@astro.columbia.edu

Education

Columbia University

Ph.D., Astronomy.

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

2020

M.A., M.Phil., Astronomy.

2016, 2017

The University of Chicago Booth School of Business

M.B.A., graduated with honors

2011

Supaero (French school of Aerospace Engineering)

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

2006

Thesis on long-term orbital evolution of space debris, at CNES

Supaero/Universite Toulouse III

Master in Astrophysics

2006

Thesis “*Application of EMV emitting electromagnetic tethers to radiation belt remediation*” at the SPL (MIT)

ETSIA UPM (Spanish school of Aerospace Engineering)

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

2006

Publications

12. Hamden, E.; Marting, C.; Milliard, B.; [and 31 others, including **Zorrilla Matilla, J. M.**], *FIREBall-2: The Faint Intergalactic Medium Redshifted Emission Balloon Telescope* accepted to ApJ, ([arXiv:2007.08528](https://arxiv.org/abs/2007.08528))
11. **Zorrilla Matilla, J. M.**; Sharma, M.; Hsu, D.; Haiman, Z., *Interpreting deep learning models for weak lensing*, submitted to PRD, ([arXiv:2007.06529](https://arxiv.org/abs/2007.06529))
10. **Zorrilla Matilla, J. M.**; Waterval, S.; Haiman, Z., *Optimizing simulation parameters for weak lensing analyses involving non-Gaussian observables*, AJ, 159, 6, 284, ([arXiv:1909.12345](https://arxiv.org/abs/1909.12345))
9. **Zorrilla Matilla, J. M.**; Haiman, Z., *Probing gaseous galactic halos through the rotational kSZ effect*, Phys Rev. D, 101, 083016, 2020, ([arXiv:1909.04690](https://arxiv.org/abs/1909.04690))
8. Hamden, E.; Hoadley, K.; Martin, C.; Schiminovich, D.; [and 31 others, including **Zorrilla Matilla, J. M.**], *FIREBall-2: advancing TRL while doing proof-of-concept astrophysics on a suborbital platform*, Proceedings of SPIE Vol. 10982, 2019 ([DOI:10.1117/12.2518711](https://doi.org/10.1117/12.2518711))
7. Ribli, D.; Ármín Pataki, B.; **Zorrilla Matilla, J. M.**; Hsu, D.; Haiman, Z.; Csabai, I., *Weak lensing cosmology with convolutional neural networks on noisy data*, MNRAS 490, 1843 (2019), ([arXiv:1902.03663](https://arxiv.org/abs/1902.03663))
6. Marques, G. A.; Liu, J.; **Zorrilla Matilla, J. M.**; Haiman, Z.; Bernui, A.; Novaes, C. P., *Constraining neutrino mass with weak lensing Minkowski Functionals*, JCAP, 06, 019, 2019 ([arXiv:1812.08206](https://arxiv.org/abs/1812.08206))

5. Li, Z.; Liu, J.; **Zorrilla Matilla, J. M.**; Coulton, W., *Constraining neutrino mass with tomographic lensing peak counts*, Phys. Rev. D, 99, 063527, 2019 ([arXiv:1810.01781](#))
4. Liu, J.; Bird, S.; **Zorrilla Matilla, J. M.**; Hill, J.C.; Haiman, Z.; Madhavacheril, M. S.; Petri, A.; Spergel, D.N., *MassiveNuS: cosmological massive neutrino simulations*, JCAP, 03, 049, 2018 ([arXiv:1711.10524](#))
3. 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 ([arXiv:1802.01212](#))
2. **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](#))
1. **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](#))

Presentations

- *Probing galactic halos with the rotational Sunyaev Zeldovich effect*, Princeton University, October 2019 (cosmology lunch talk)
- *Extracting information from small scales in weak lensing data*, CALTECH, October 2019 (Tapir seminar)
- *Learning from small scales in weak lensing and CMB data*, University of California, Berkeley, October 2019 (BCCP/Cosmology seminar)
- *Using ML to extract non-Gaussian information from weak lensing datasets*, CSF-ETH Ascona (Artificial intelligence methods in Cosmology), June 2019 (contributed talk)
- *Weak lensing cosmology with convolutional neural networks on noisy data*, Data Science Day, Columbia University, April 2019 (poster)
- *How to extract non-Gaussian information from weak lensing datasets*, AAS, January 2019 (contributed talk)
- *Deep learning analysis of cosmic shear*, Computing systems for Data-Driven Science, Columbia University, November 2018 (poster)
- *Extracting Cosmological information from weak lensing surveys*, Ohio State University, September 2018 (CCAPP seminar)
- *Extracting non-Gaussian information from WL data with neural networks*, The Non-linear Universe workshop, Smartno, July 2018 (contributed talk)
- *Extracting cosmological information from weak lensing data*, ELTE Institute of Physics (Unsolved problems in Astrophysics and Cosmology conference), July 2018 (invited talk)
- *Applying deep learning to analyzing weak lensing data*, Complutense University, June 2018 (seminar)
- *Applying deep learning techniques to analyzing weak lensing data*, Princeton University, May 2018 (cosmology lunch talk)
- *Using deep learning to probe dark matter*, Data Science Day, Columbia University, March 2018 (poster)

- *Geometry vs. growth in non-Gaussian statistics*, Flatiron Institute Center for Computational Astrophysics, June 2017 (talk)
- *Probing the Universe with Weak Gravitational Lensing*, Columbia University, 2016 (poster)
- *The Faint Intergalactic medium-Redshifted Emission Balloon: FireBall-2*, Pontificia Universidad Católica de Chile, May 2015 (talk)

Teaching

- Teaching assistant, *Physical Cosmology* 2020
- Instructor, Columbia University SHP, *Modern Cosmology* 2016-2018
- Grader, Columbia University, *Relativity, Black Holes, and Cosmology* 2017
- Teaching assistant, Columbia University, *Observational astronomy* 2015-18, 2020
- Observing teaching assistant, Columbia University, *Astronomy Lab* 2016
- Teaching assistant, Columbia University, *Stars and Galaxies* 2015
- Teaching assistant, Columbia University, *Earth, Moon and Planets* 2014

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)

Public outreach

- Public lecture, *Spacetime telescopes*, Astronomy Outreach Lecture, Nov 2019
- Columbia Astronomy outreach co-coordinator, 2018
- Organized Astronomical observing activities for The Cathedral School of St. John the Divine, including visits to Columbia's Rutherford observatory, 2017-2018
- Member of Rooftop variables program at Columbia University, collaborating with the Astronomy club at Bayside High School, Queens, NY, 2013-2017
- Commentator on current Astronomical discoveries for NTN24 TV channel, 2016
- Public lecture, *La escalera de distancias cosmicas*, Astronomy Outreach Lecture, 2016
- Roof captain and manager at events for Columbia Astronomy Outreach, 2013-2016

Service

- Referee, MNRAS, JCAP
- Coordinator, Columbia Astronomy Graduate mentorship program, 2015-2018
- Admissions fellow at the University of Chicago Booth School of Business, 2012
- Organizer Aerotec, aeronautical fair, 2003

Past professional experience

McKinsey & Company

Management consultant

Senior Associate

2012-2013

Associate

2011-2012

Fellow

2007-2009

EADS (Airbus' parent company)

Design Engineer

Eurofighter program

2006-2007

References available upon request