

Renato Mazzei

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EDUCATION

University of Virginia

PhD Astronomy, 2018 - expected 2024

M.S. Astronomy, 2017 - 2018

GPA: 4.00

B.S. Astronomy-Physics, 2013 - 2017

GPA: 3.92

Echols Scholar

College Science Scholar

RESEARCH

The role of magnetic fields in star formation: From cloud to disk scales

Advised by Professor Zhi-Yun Li, Professor Ilse Cleeves, & Dr. Laura Fissel

In my PhD thesis, I use 3D magnetohydrodynamic simulations and 2D synthetic observations to probe the role of magnetic fields in star and planet formation processes. To derive links to real data, these theoretical efforts are accompanied by far-IR (**BLAST**) observations of molecular clouds and radio (ALMA) observations of protoplanetary disks and protostellar objects.

PUBLICATIONS

How Informal Science Education Influences Elementary Students' Perceptions of Science and Themselves. Finn, M. K., Mazzei, R., Drechsler, B., Telkamp, Z., Rao, M., Agrawal, P, & McAlister, A. (2023, Journal of STEM Outreach, [10.15695/jstem/v6i1.10](https://doi.org/10.15695/jstem/v6i1.10)).

Relative alignment between magnetic fields and molecular gas structure in molecular clouds. **Mazzei, R.**, Li, Z.-Y., Chen, C.-Y., Fissel, L. M., Chen, M., & Park, J. (2023, MNRAS, [10.1093/mnras/stad733](https://doi.org/10.1093/mnras/stad733)).

The Davis-Chandrasekhar-Fermi method revisited.

Chen, C.-Y., Li, Z.-Y., Mazzei, R.,...et al. (2022, MNRAS, [10.1093/mnras/stac1417](https://doi.org/10.1093/mnras/stac1417)).

Graduate Student Participation in K-12 Science Outreach: Self-Reported Impact on Identity and Confidence of STEM Graduate Students. Matthews, A., Mazzei, R., McAlister, A., Mills, B., & Song, Y. (2021, Journal of Higher Education Outreach and Engagement, [paper link](#)).

The Davis-Chandrasekhar-Fermi method revisited.

Chen, C.-Y., Li, Z.-Y., Mazzei, R.,...et al. (2022, MNRAS, [10.1093/mnras/stac1417](https://doi.org/10.1093/mnras/stac1417)).

Untangling magnetic complexity in protoplanetary disks with the Zeeman effect. **Mazzei, R.**, Cleeves, L. I., & Li, Z.-Y. (2020, ApJ, [10.3847/1538-4357/abb67a](https://doi.org/10.3847/1538-4357/abb67a)).

A new method to trace three-dimensional magnetic field structure within molecular clouds using dust polarization. Chen, C.-Y., King, P. K., Li, Z.-Y., Fissel, L. M., & Mazzei, R. (2019, MNRAS, [10.1093/mnras/stz618](https://doi.org/10.1093/mnras/stz618)).

TEACHING

ASTR 1280 (University of Virginia)

During Summer 2020, I taught ASTR 1280 (The Origins of Almost Everything) as the instructor of record. This introductory level class aims to elucidate the nature of science through study of the origins of the Universe and the subsequent formation of galaxies, stars, planets, and life. My work included planning the course curriculum, writing tests and quizzes, and delivering in-class lectures.

AWARDS

- 2019 ALMA Student Observing Support Award, Cycle 7 (\$26,334),
PI: Ian Stephens
- 2019 Jefferson Foundation Scholarship Award (\$1,500)
- 2018 ALMA Student Observing Support Award, Cycle 6 (\$33,872),
PI: Ilse Cleeves
- 2017 Limber Prize (Most distinguished 4th year astronomy
undergraduate)
- 2016 Vyssotsky Prize (Most distinguished 3rd year astronomy
undergraduate)

PRESENTATIONS

An exploration of the Zeeman Effect detectability of magnetic substructure in protoplanetary disks. 236th Meeting of the American Astronomical Society (oral presentation)

Simulating circular polarization observations as a probe of magnetic field structure in protoplanetary disks. 2020 Spring Virginia Institute for Cosmic Origins (VICO) Workshop (oral presentation)

Prospects for magnetic field detection and characterization in planet formation environments with ALMA. 2019 Gordon Research Conference: Origins of the Solar System (poster)

The role of magnetic fields in star formation: From cloud to disk scales. 2019 Bob Rood Memorial Symposium (oral presentation)

MHD simulations and synthetic polarimetry of molecular clouds. 2018 Fall Virginia Institute for Cosmic Origins (VICO) Workshop (oral presentation)

OUTREACH

Dark Skies, Bright Kids (DSBK)

DSBK is a grad-student-run initiative intended to bolster science-education, creativity, and curiosity in children throughout the Charlottesville area. Each fall and spring semester we hold an eight-week long after school club at a local elementary school. We also organize one-off events in the community and host the annual Central Virginia Star Party. I have been an active member of DSBK since entering the PhD program and have led several activities and events. For two years I also led our internal “assessments” team. In this role I organized a research group that leveraged data obtained from students and volunteers to analyze the impact of DSBK. In my time as a member of assessments we published two papers (I am listed as the second author of both).

Community Events

I regularly volunteer for the department’s public nights hosted at McCormick Observatory and Fan Mountain Observatory. At these events we teach the public about outer space and provide them with the opportunity to use our telescopes to look at and learn about interesting astronomical objects.