

JESSE A. MILLER

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EDUCATION

University of Illinois at Urbana-Champaign

Ph.D. in Astronomy expected summer 2022
M.S. in Astronomy August 2018
Advisor: Brian Fields

Washington State University

BS in Physics (Astrophysics option), Honors College, *Magna cum laude* May 2014
Minors: Mathematics and Spanish

RESEARCH EXPERIENCE

Graduate Research August 2016 - present
University of Illinois Urbana-Champaign, advisor: Brian Fields

- Performed hydrodynamic simulations of supernova blast waves striking the heliosphere
- Analyzed and visualized simulation frames with Python, VisIt and yt
- Obtained NASA FINESST award in Heliophysics for these simulations
- Analyzed contribution of cosmogenic radioisotopes on impactors to terrestrial supernova signals
- Presented research at the group, department, university, and conference levels

Graduate Research August 2015 - August 2016
University of Illinois Urbana-Champaign, advisor: Ryan Foley

- Performed quick data reduction of supernova spectra for the Foundation Supernova Survey

Undergraduate Research August 2012 - May 2014
Washington State University, advisor: Michael Allen

- Collapsed a 3D spherical model of starburst galaxy outflow to 2D and applied it to M82

REU Program June 2012 - August 2012
University of Wisconsin Madison, advisor: Snežana Stanimirović

- Fit radio spectra of cold and warm atomic hydrogen in the Perseus Molecular Cloud

HONORS AND AWARDS

Future Investigators in NASA Earth and Space Science and Technology (FINESST) 2020-2022
Astrofest 2021 Best Graduate Student Poster 2021
PNAS cover image, volume 117, issue 35 2020
UI Astronomy Department Travel Grant Spring 2019
List of TAs ranked as excellent by their students Fall 2017
Phi Beta Kappa Honors Society 2013
WSU Honors Thesis Pass with Excellence 2013

PUBLICATIONS

Miller, J. & Fields, B. (in prep, planning to submit in April 2022). Idealized simulations of supernova collisions with the heliosphere.

Miller, J. & Fields, B. (in prep). Contribution of cosmogenic radioisotopes on impactors to the terrestrial ^{60}Fe supernova signal.

Wang, X., Clark, A., Ellis, J., Ertel, A., Fields, B., Fry, B., Liu, Z., **Miller, J.**, Surman, R. (2021). Future radioisotope measurements to clarify the origin of deep-ocean ^{244}Pu . [arXiv:2112.09607](https://arxiv.org/abs/2112.09607)

Wang, X., Clark, A., Ellis, J., Ertel, A., Fields, B., Fry, B., Liu, Z., **Miller, J.**, Surman, R. (2021). *r*-Process Radioisotopes from Near-Earth Supernovae and Kilonovae. (accepted to *ApJ*) [arXiv:2105.05178](https://arxiv.org/abs/2105.05178)

Fields, B., Melott, A., Ellis, J., Ertel, A., Fry, B., Lieberman, B., Liu, Z., **Miller, J.**, & Thomas, B. (2020). Supernova triggers for end-Devonian extinctions. *PNAS*, 117: 35. [arXiv:2007.01887](https://arxiv.org/abs/2007.01887), also see the press release here: <https://news.illinois.edu/view/6367/750171228>

Fields, B., Ellis, J., Binns, W., Breitschwerdt, B., de Nolfo, G., Diehl, R., Dwarkadas, V., Ertel, A., Faestermann, T., Feige, J., Fitoussi, C., Frisch, P., Graham, D., Haley, B., Heger, A., Hillebrandt, W., Israel, M., Janka, T., Kachelrieß, M., Korschinek, G., Limongi, M., Lugaro, M., Marinho, F., Melott, A., Mewaldt, R., **Miller, J.**, Ogliore, R., Paul, M., Paulucci, L., Pecaut, M., Rauch, B., Rehm, K., Schulreich, M., Seitenzahl, I., Sørensen, M., Thielemann, F., Timmes, F., Thomas, B., & Wallner, A. (2019). Near-Earth Supernova Explosions: Evidence, Implications, and Opportunities. *Submitted to the Astro 2020 Decadal Survey*. [arXiv:1903.04589](https://arxiv.org/abs/1903.04589)

Foley, R., Scolnic, D., Rest, A., Jha, S., Pan, Y., Riess, A., Challis, P., Chambers, K., Coulter, D., Dettman, K., Foley, M., Fox, O., Huber, M., Jones, D., Kilpatrick, C., Kirshner, R., Schultz, A., Siebert, M., Flewelling, H., Gibson, B., Magnier, E., **Miller, J.**, Primak, N., Smartt, S., Smith, K., Wainscoat, R., Waters, C., & Willman, M. (2018). The Foundation Supernova Survey: motivation, design, implementation, and first data release. *MNRAS*, 475: 193-219. [arXiv:1711.02474](https://arxiv.org/abs/1711.02474)

Lee, M., Stanimirovic, S., Murray, C., Heiles, C., & **Miller, J.** (2015). Cold and warm atomic gas around the Perseus Molecular Cloud II: the impact of high optical depth on the HI column density distribution and its implication for the HI-to-H₂ transition. *The Astrophysical Journal*, 809: 56. [arXiv:1504.07405](https://arxiv.org/abs/1504.07405)

Stanimirovic, S., Murray, C., Lee, M., Heiles, C., & **Miller, J.** (2014). Cold and warm atomic gas around the Perseus Molecular Cloud I: Basic properties. *The Astrophysical Journal*, 793:132. [arXiv:1407.7778](https://arxiv.org/abs/1407.7778)

Miller, J., Lee, M., Murray, C., Stanimirovic, S. & Heiles, C. (2013). Cold Atomic Hydrogen in the Perseus Molecular Cloud. *American Astronomical Society*, AAS Meeting #221, #349.12.

Miller, J. & Allen, M. (2013). A visual model of a starburst galaxy. Washington State University Honors Thesis.

SELECTED PRESENTATIONS

AGU 2021: Near-Earth supernovae and the Interstellar Probe (accepted)

December 2021

Outer heliosphere: Nearby supernovae and the heliosphere (with Brian Fields)	November 2021
Heliophysics 2050 workshop (poster): Idealized supernova-solar wind collisions	May 2021
Astrofest poster: Idealized simulations of supernova-solar wind collisions	April 2021
Presolar Grains workshop: Unearthing the remains of local supernova debris	October 2019
JINA-CEE Frontiers: Meteoritic material in the terrestrial ^{60}Fe supernova signal	May 2019
Astrofest poster: Contribution of impactors to terrestrial ^{60}Fe signals	April 2019

SERVICE

Graduate Admissions Committee, grad representative	2020-2021
UIUC Astronomy Girls' Summer Camp observatory tour	2018-2019
Curriculum Committee, grad representative	2018-2019
Grad student astro-ph discussion, chair	2018-2019
UIUC TA for 7 different astronomy courses	2015-2019
Astronomy journal club, co-chair	2017-2018
UIUC Solar eclipse public telescope coordinator	2017