

Emily M. Silich

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Education

California Institute of Technology (Caltech)

Astrophysics, PhD (expected 2026) Astrophysics, MS (2023)

NSF Graduate Research Fellow

2023 - 2026

SAO Predoctoral Fellow

2024 - 2025

Wallace L. W. Sargent Graduate Fellow

2021 - 2022

University of Iowa

Astronomy, BS Physics, BS Mathematics, minor

2017 - 2021

with University Honors, High Distinction, Honors in Astronomy, Phi Beta Kappa

Research

Graduate Research Assistant

2021 -

Division of Physics, Mathematics and Astronomy, Caltech

Predoctoral Fellow

2024 - 2025

Center for Astrophysics | Harvard & Smithsonian

Undergraduate Research Assistant

2017 - 2021

Department of Physics & Astronomy, University of Iowa

Research Intern

Summer 2020

X-ray Astrophysics Laboratory, NASA Goddard Space Flight Center

Student Researcher

Winter 2019

Canada-Norway Student Sounding Rocket Program (CaNoRock)

Peer-reviewed publications

1. **E.M. Silich**, J. ZuHone, E. Bellomi, et al., “X-ray emission signatures of galactic feedback in the hot circumgalactic medium: predictions from cosmological hydrodynamical simulations”, 2025, submitted to The Astrophysical Journal.
2. **E.M. Silich**, E. Bellomi, J. Sayers, et al., “ICM-SHOX. Paper II: Galaxy cluster sample overview”, 2024, Proc. of the mm Universe 2023 conference, EPJ Web of conferences, EDP Sciences.
3. **E.M. Silich**, E. Bellomi, J. Sayers, et al., “ICM-SHOX. Paper I: Methodology overview and discovery of a gas–dark matter velocity decoupling in the MACS J0018.5+1626 merger”, 2024, The Astrophysical Journal, 968, 74.
4. **E.M. Silich**, K. Jahoda, L. Angelini, et al., “A Search for the 3.5 keV Line from the Milky Way’s Dark Matter Halo with HaloSat”, 2021, The Astrophysical Journal, 916, 2.
5. **E.M. Silich**, P. Kaaret, A. Zajczyk, et al., “Global X-Ray Properties of the Vela and Puppis A Supernova Remnants”, 2020, The Astronomical Journal, 160, 1.
6. P.F. Hopkins, E. Quataert, S.B. Ponnada, & **E.M. Silich**, “Cosmic Rays Masquerading as Hot CGM Gas: An Inverse-Compton Origin for Diffuse X-ray Emission in the Circumgalactic Medium”, 2025, The Open Journal of Astrophysics, 8, 78.
7. P.F. Hopkins, E. Quataert, **E.M. Silich**, et al., “Cosmic Rays Masquerading as Cool Cores: An Inverse-Compton Origin for Cool Core Cluster Emission”, 2025, submitted to The Open Journal of Astrophysics.

8. A. Zajczyk, P. Kaaret, D. LaRocca, et al. (including **E.M. Silich**), “*On-ground calibration of the HaloSat science instrument*”, 2020, J. Astron. Telesc. Instrum. Syst. 6(4), 044005.
9. P. Kaaret, A. Zajczyk, D.M. LaRocca, et al. (including **E.M. Silich**), “*HaloSat - A CubeSat to Study the Hot Galactic Halo*”, 2019, The Astrophysical Journal, 884, 2.

Teaching

Ay 105: Optical Astronomy Instrumentation Lab	Graduate TA // Spring 2023
Ay 122c: High Energy Astronomical Measurements & Instrumentation	Graduate TA // Winter 2023
Ay 127: Astrophysical Cosmology	Graduate TA // Fall 2022
PHYS 1611: Introductory Physics I	Undergraduate TA // Spring 2020
PHYS 1512: College Physics II	Undergraduate TA // Spring 2020

Fellowships & Awards (selected)

Smithsonian Astrophysical Observatory (SAO) Predoctoral Fellow	2024 - 2025
Garmire Scholar, France A Cordova Graduate Student Fund (Caltech)	2023
NSF Graduate Research Fellowship (GRFP)	2023 - 2026
Wallace L. W. Sargent Graduate Fellowship (Caltech)	2021 - 2022
Chambliss Astronomy Achievement Student Awards - Honorable Mention	2021
University of Iowa Dare to Discover	2021
Barry Goldwater Scholar	2020
James A. Van Allen Award (Ulowa)	2020
John Mather Nobel Scholar (NASA/GSFC)	2020
Western Dubuque High School Young Accomplished Alumni	2020
APS Division of Astrophysics (DAP) Travel Grant	2020
Manuel Paul & Abraham Chinitz Liberal Arts & Sciences Scholarship (Ulowa)	2019 - 2020, 2020 - 2021
NASA Iowa Space Grant Consortium Research Fellowship	2018 - 2019, 2019 - 2020
Myrtle K. Maier Scholarship (Ulowa)	2019 - 2020
Rhodes Dunlap Award for Excellence in the First/Second Year (Ulowa)	2018 - 2019, 2019 - 2020
ICRU Academic Year Research Fellowship	2018 - 2019, 2019 - 2020
Charles A. Wert Summer Research Fund (Ulowa)	2019
UI Department of Physics & Astronomy Poster Prize	2018, 2019
ICRU Summer Research Fellowship	2018
UI Old Gold Scholarship	2017 - 2021
UI Top Scholars Award	2017 - 2021
UI Academic Success Scholarship	2017 - 2021
CLAS Undergraduate Scholarship (Ulowa)	2018 - 2019

Academic Presentations (selected)

Talks:

1. *mm Universe*, Kavli Institute for Cosmological Physics, University of Chicago. Chicago, IL. June 2025.
2. *Observational Cosmology Seminar*, Caltech. Pasadena, CA. November 2024.
3. *Astronomy Lunch Seminar*. University of Massachusetts. Amherst, MA. October 2024.
4. *Galaxy Clusters & Radio Relics II*. Center for Astrophysics | Harvard & Smithsonian. Cambridge, MA. September 2024.
5. *Multiphase Madness: Resolving the CGM in Theory and Observations*. Center for Astrophysics | Harvard & Smithsonian. Cambridge, MA. August 2024.
6. *7th ICM Theory & Computation Workshop*. Ann Arbor, MI. June 2024.

7. *Galaxy Cluster Discussion Group Meeting*, Center for Astrophysics | Harvard & Smithsonian. Cambridge, MA. February 2024.
8. *High Energy Astrophysics Seminar*, Center for Astrophysics | Harvard & Smithsonian. Cambridge, MA. February 2024.
9. *Merging Cluster Workshop*, Yonsei University. Seoul, KR. December 2023.
10. *Observational Cosmology Seminar*, Caltech. Pasadena, CA. October 2023.
11. *Observing the Universe at Millimetre Wavelengths (mm Universe)*, Laboratory of Subatomic Physics & Cosmology (LPSC). Grenoble, FR. June 2023.
12. *Observational Cosmology Seminar*, Caltech. Pasadena, CA. February 2023.
13. *Galaxy Cluster Discussion Group Meeting*, Center for Astrophysics | Harvard & Smithsonian. Virtual. November 2022.
14. *240th American Astronomical Society (AAS) Meeting*, Pasadena, CA. June 2022.
15. *Department of Physics & Astronomy Awards Colloquium*, University of Iowa. Virtual. April 2021.
16. *Department of Physics & Astronomy Colloquium*, University of Iowa. Virtual. October 2020.
17. *Gulf Coast Undergraduate Research Symposium*, Virtual. October 2020.
18. *NASA/GSFC Code 660 Intern Presentation Symposium*, Virtual. August 2020.
19. *Iowa Space Grant Consortium Student Research Symposium*, Virtual. April 2020.
20. *Conference for Undergraduate Women in Physical Sciences*, University of Nebraska. Lincoln, NE. November 2019.
21. *Astrophysics & Space Physics Seminar*, University of Iowa. Iowa City, IA. October 2019.

Posters:

1. *STScI Galaxy Clusters 2022: Challenging Our Cosmological Perspectives*, Virtual. April 2022.
2. *237th American Astronomical Society (AAS) Meeting*, Virtual. January 2021.
3. *American Physical Society (APS) April Meeting*, Virtual. April 2020.
4. *Iowa Space Grant Consortium Student Research Symposium*, Virtual. April 2020.
5. *APS CUWiP*, University of Minnesota. Minneapolis, MN. January 2020.
6. *ICRU Fall Undergraduate Research Festival*, Iowa City, IA. November 2019.
7. *ICRU Fall Undergraduate Research Festival*, Iowa City, IA. November 2018.
8. *Conference for Undergraduate Women in Physical Sciences*, University of Nebraska. Lincoln, NE. October 2018.

Press Releases

1. *"Dark Matter Flies Ahead of Normal Matter in Mega Galaxy Cluster Collision"*, Caltech PR, July 2024. Read [here](#).

Observing

Awarded PI telescope proposals:

1. *"Revealing the nature of the putative equatorial shock in the MACS J0018.5+1626 galaxy cluster merger with ALMA"*, 31 hrs, ALMA Cycle 12, ranked Priority C.
2. *"Separating dark matter and hot gas velocities in a unique merging cluster: first comparison of X-rays and the kSZ effect"*, 300 ks, XRISM AO-1, ranked Priority C.

Observing time:

1. Keck Observatory, *DEIMOS*: 7.5 nights

2. Keck Observatory, *LRIS*: 4 nights

Computer Skills

Languages	Python, R, HTML
Applications	Xspec/PyXspec, \LaTeX , CIAO/Sherpa, IRAF/dsimulator, SLURM, Keck Remote Observing Software (DEIMOS, LRIS), yt, SpecPro, Pypelt, CASA, ds9
Operating Systems	macOS, Linux, Windows

Outreach

Lectures & speaking engagements:

1. Astronomy on Tap – Death Valley, “*Galaxy Clusters Collide: The Most Energetic Events since the Big Bang*”, DVNP, CA. February 2025.
2. Caltech Stargazing Lectures, “*Galaxy Clusters Collide: The Most Energetic Events since the Big Bang*”, Pasadena, CA. August 2023. Watch [here](#).
3. Death Valley Dark Sky Festivals, “*Ask an Astrophysicist*” Q&A panelist, DVNP, CA. March 2023.

Volunteering:

1. Astronomy on Tap – Los Angeles	Volunteer & telescope operator	//	2022 -
2. Caltech Stargazing Lectures & Public Observing	Telescope operator	//	2022 -
3. Gabrielino High School physics classrooms	Guest lab assistant & speaker	//	2021 -
4. Death Valley Dark Sky Festival	Science booth & telescope operator	//	2022 -
5. Girl Scouts Troop 6371 (Monrovia, CA)	Guest speaker	//	2023
6. Astrobites	Guest author	//	2021
7. Iowa Center for Research by Undergraduates	Research ambassador	//	2020 - 2021
8. Society of Physics Students, Ulowa	Vice president & secretary	//	2017 - 2021
9. Van Allen Observatory Public Observing	Volunteer & telescope operator	//	2017 - 2021
10. Drexler Middle School FIRST Lego League	Team mentor	//	2018