Catherine Zucker
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EDUCATION

University of Virginia
B.A. in Astronomy-Physics and B.A. in History — Spring 2015

Harvard University
M.A. in Astronomy and Astrophysics — Fall 2017

PhD in Astronomy and Astrophysics — May 2020 (anticipated)
Advisors: Alyssa Goodman and Douglas Finkbeiner

RESEARCH INTERESTS

- Delineating the spiral structure of the Milky Way
- Mapping the distribution of the Milky Way's dust in 3D using stellar photometry
- Combining gas and dust measurements (plus Gaia) to determine better distances to local molecular clouds
- "Big Data", Bayesian statistics, statistical computing, and interactive data visualization
- Characterizing the physical properties of the largest-scale filaments in the interstellar medium of our Galaxy via observations and simulations

PUBLICATIONS

First Author/co-PI

- **Zucker, C**; Smith, R.; Goodman, A. 2019. *ApJ*, 887, 186. Synthetic Large-Scale Galactic Filaments — on their Formation, Physical Properties, and Resemblance to Observations.
- **Zucker, C**, Speagle, J; Schlafly, E.; Green, G.; Finkbeiner, D.; Goodman, A.; Alves, J. 2019. *A&A*. Accepted. A Compendium of Distances to Molecular Clouds in the Star Formation Handbook.
- **Zucker, C** & Speagle, J; Schlafly, E.; Green, G.; Finkbeiner, D.; Goodman, A.; Alves, J. 2019. *ApJ*, 879, 125. A Large Catalog of Accurate Distances to Local Molecular Clouds: The Gaia DR2 Edition
- **Zucker, C**; Schlafly, E.; Green, G.; Speagle, J.; Portillo, S.; Finkbeiner, D.; Goodman, A. 2018c. *ApJ*, 869, 83. Mapping Distances across the Perseus Molecular Cloud Using CO Observations, Stellar Photometry, and Gaia DR2 Parallax Measurements.
- **Zucker, C**; Chen, H. H. 2018b. *ApJ*, 864, 162. RadFil: A Python Package for Building and Fitting Radial Profiles for Interstellar Filaments.
- **Zucker, C**; Battersby, C.; Goodman, A. 2018a. *ApJ*, 864, 2. The Physical Properties of Large-scale Galactic Filaments.
- **Zucker, C**; Walker, L.M..; Johnson, K.; Gallagher, S.; Alatalo, K.; Tzanavaris, P. 2016. *ApJ*, 821, 113. Hierarchical Formation in Action: Characterizing Accelerated Galaxy Evolution in Compact Groups using Whole-Sky WISE Data.
- **Zucker, C**; Battersby, C.; Goodman, A. 2015. *ApJ*, 815, 23. The Skeleton of the Milky Way.

Contributing Author

- Smith, R. J., Tress, R., Sormani, C., Clover, S. Klessen, R., Clark, P., Izquierdo, A., Duarte-Cabral, A., **Zucker, C.**. 2019. *MNRAS*. Accepted. The Cloud Factory I: Generating resolved filamentary molecular clouds from galactic-scale forces
- Green, G.; Schlafly, E.; **Zucker, C.**; Speagle, J.; Finkbeiner, D. 2019. MNRAS, 887, 93. A 3D Dust Map Based on Gaia, Pan-STARRS 1 and 2MASS.
- Fissel, L. & 39 co-authors, including **Zucker, C.**. 2019. *ApJ*, 878, 110. Relative Alignment between the Magnetic Field and Molecular Gas Structure in the Vela C Giant Molecular Cloud Using Low- and High-density Tracers.
- Monsch, K.; Pineda, J.; Liu, H.B., **Zucker, C.**, H.; Chen, H.; Pattle, K.; Offner, S.; Di Francesco, J.; Ginsburg, A.; Ercolano, B.; Arce, H.; Friesen, R.; Kirk, H.; Caselli, P.; Goodman, A. 2018. *ApJ*, 861, 77. Dense Gas Kinematics and a Narrow Filament in the Orion A OMC1 Region using NH_3.
- Lisenfeld, U.; Alatalo, K.; **Zucker, C.**; Appleton, P. N.; Gallagher, S.; Guillard, P.; Johnson, K.. 2017. *A&A*, 607, A110. The role of molecular gas in galaxy transition in compact groups
- Walker, L.M.; Butterfield, N.; Johnson, K.; **Zucker, C.**; Gallagher, S.; Konstantopoulos, I., Hornschemeier, A.; Tzanavaris, P.; Charlton, J. 2013. *ApJ*, 775,129. The Optical Green Valley vs Mid-IR Canyon in Compact Groups

PRESENTATIONS

Talks

- American Museum of Natural History Colloquium (New York, New York; December 2019). *Mapping our Galactic Neighborhood from the Inside Out with Gaia. Invited*
- *Harvard-Heidelberg Meeting on Star Formation (Cambridge, MA; November 2019). A Galactic-scale Gas Wave in the Solar Neighborhood.*
- *So-Star – The self-organized star formation process (Orsay, France; October 2019). Mapping our Local Milky Way: Dust, Gas (& Stars). Invited*
- *Crete III – Through dark lanes to new stars (Heraklion, Crete; September 2019). Mapping the Local Interstellar Medium with Gaia*
- *SAO REU Summer Colloquium Series (Center for Astrophysics | Harvard & Smithsonian; June 2019), Charting Nearby Molecular Clouds with Gaia: A New Map of Our Local Interstellar Medium. Invited.*
- *New England Regional Star Formation Meeting (UMass Amherst; January 2019), A Uniform Catalog of Gaia-Informed Distances to Local Molecular Clouds*
- *Harvard-Heidelberg Meeting on Star Formation (Heidelberg, Germany; December 2018), Better Distances to Local Molecular Clouds with Gaia (Starting with Perseus)*
- *ITC Luncheon Talk (Cambridge, MA; November 2018), Large-scale Galactic Filaments – Shock and Shear in the Milky Way?. Invited.*
- *The Interstellar Filament Paradigm (Nagoya, Japan; November 2018), The Physical Properties of Observed (and Synthetic!) Large-Scale Galactic Filaments*
- *The Milky Way in the Age of Gaia (Orsay, France; October 2018), Better Distances to Local Molecular Clouds with Gaia. Invited*
- *MIT Haystack Lunch Talk, Invited (Westford, MA; August 2018), Visualization and Outreach with glue and the WorldWide Telescope. Invited.*

- *The Olympian Symposium (Paralia, Greece; May 2018), The Physical Properties of Large-Scale Galactic Filaments*
- *AAS Splinter Session (Washington DC; January 2018), Better Data Visualization and Exploration with GLUE*
- *Sun, Stars, and Galaxies Lunch Talk (Manchester, UK; October 2017), The Physical Properties of Large-Scale Galactic Filaments*
- *Harvard-Smithsonian Center for Astrophysics Astrostats Day (Cambridge, MA; September 2017), Interactive multi-dimensional data exploration and linking with the* `glue` *visualization software*
- *Galactic Star Formation with Surveys Conference (Heidelberg, Germany; July 2017), The Physical Properties of Large-Scale Galactic Filaments*
- *Dunlap Institute for Astronomy & Astrophysics (Toronto, Canada; May 2017), The Physical Properties of Large-Scale Galactic Filaments. Invited.*
- *Dunlap Institute for Astronomy & Astrophysics, (Toronto, Canada; May 2017), Interactive multi-dimensional data exploration and linking with the* `glue` *visualization software. Invited.*
- *New England Regional Star Formation Meeting (Cambridge, MA; January 2016), The Skeleton of the Milky Way*
- *Filamentary Structure in Molecular Clouds Workshop (Charlottesville, VA; October 2014), The Skeleton of the Milky Way*
- *2014 SAO Astronomy Intern Symposium (Cambridge, MA; August 2014), The Milky Way Skeleton*

Posters

- Harvard-Heidelberg Meeting on Star Formation (Heidelberg, Germany; November 2016), *The Physical Properties of Large-Scale Galactic Filaments*
- Via Lactea: The Milky Way as a Star Formation Engine (Rome, Italy; September 2016), *The Physical Properties of Large-Scale Galactic Filaments*
- The Milky Way in Molecular Clouds Meeting (Charlottesville, VA; April 2016); *The Skeleton of the Milky Way*
- 225 AAS (January 2015; Seattle, WA) *The Skeleton of the Milky Way*
- VA Space Grant Research Conference (Hampton, VA; April 2014) *Hierarchical Formation in Action: Characterizing Accelerated Galaxy Evolution in Compact Groups*
- 221st AAS (January 2013; Long Beach, CA) *Hierarchical Formation in Action: Characterizing Accelerated Galaxy Evolution in Compact Groups*

OBSERVING EXPERIENCE

Cerro Tololo Observatory, Chile (Blanco 4m) (2 half-nights)	July 2019
Cerro Tololo Observatory, Chile (Blanco 4m) (2 nights)	May 2019
Cerro Tololo Observatory, Chile (Blanco 4m) (2 half-nights)	January 2019
Cerro Tololo Observatory, Chile (Blanco 4m) (4 half-nights)	August 2018
Cerro Tololo Observatory, Chile (Blanco 4m) (3 nights)	February 2018
MMT Observatory; Tucson, AZ (4 nights)	August 2014
Kitt Peak Observatory (Bok 90"); Tucson, AZ (5 nights)	December 2012

SELECTED AWARDS

- Harvard-Horizons 2020 Scholar — Spring 2020
- Certificate of Distinction in Teaching, Harvard University — Spring 2019
- Harvard Astronomy Departmental Teaching Award — Spring 2018
- Certificate of Distinction in Teaching, Harvard University — Spring 2018
- La Serena School for Data Science Full Scholarship — Summer 2017
- NSF Graduate Research Fellowship Award — Fall 2016-Fall 2019
- John P. and Carol J. Merrill Graduate Fellowship, Harvard University — Fall 2015-Spring 2017
- Peirce Fellowship, Harvard Astronomy — Fall 2015-Fall 2018
- UVA Undergraduate Physics Research Symposium, 1st Place — Fall 2014
- Vyssotsky Prize, University of Virginia Astronomy — Spring 2014
- Double Hoo Research Award, University of Virginia — Spring 2014
- Intermediate Honors, University of Virginia — Fall 2013
- Virginia Space Grant Consortium Research Fellowship — Summer 2013–Spring 2014
- Kate Cabell Claiborne Cox Scholarship, University of Virginia History — Spring 2013
- Harrison Undergraduate Research Award, University of Virginia — Summer 2013–Spring 2014
- Echols Scholarship Fund Grant, University of Virginia — Summer 2012
- Small Research and Travel Grant, University of Virginia — Summer 2012
- Wolfe Undergraduate Docent Award, University of Virginia — Spring 2012
- Echols Scholar, University of Virginia — Fall 2011–Fall 2015

SERVICE

- Public Talk, Gloucester Area Astronomy Club — Summer 2019
- Referee for Astronomy & Astrophysics, The Astronomical Journal — Fall 2018 - Present
- CfA Star Formation Journal Club Series Co-Organizer — Spring 2018 - Present
- Astronomy Rewind, Volunteer Lead — Fall 2018 - Present
- Public Talk, New Hampshire Astronomical Society — Spring 2018
- Cambridge Explores the Universe Volunteer, Harvard University — Spring 2016, 2017, 2018, 2019
- Development of MilkyWay3D.com Galactic Plane Mapper Tool — Fall 2016
- Harvard College Undergraduate Research Association Conference Invited Speaker — Fall 2016
- Interview with Science News on the Milky Way Skeleton — December 2015
- Interview with Space.com on the Milky Way Skeleton — January 2015
- *Dark Skies, Bright Kids Planetarium Lead*, University of Virginia — March 2012–May 2015
- Harrison Institute for American History Docent, University of Virginia — September 2011–May 2015

TEACHING

- Teaching Fellow —Physics & Chemistry of the ISM (AY203). Harvard University. — Spring 2019
- Teaching Fellow —Galactic and Extragalactic Astronomy (AY17). Harvard University. — Fall 2017

COMPUTING

Programming Languages: Python
Tools: LaTeX, glue, ds9, git