

ANNA LORRAINE ROSEN

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Institute for Theory and Computation, Center for Astrophysics | Harvard & Smithsonian, Cambridge MA 02138

EDUCATION

Ph.D., Astronomy & Astrophysics, University of California, Santa Cruz 2017
Advisors: Mark Krumholz, Enrico Ramirez-Ruiz
M.S., Astronomy & Astrophysics, University of California, Santa Cruz 2012
B.A., Physics & Astrophysics, University of California, Berkeley 2009
Cumulative GPA: 3.81/4.0 , Major GPA: 3.82/4.0, Honors: Fall 2007-2009, General Distinction

AWARDS AND RESEARCH POSITIONS

Institute for Theory and Computation (ITC) Post-doctoral Fellowship, Harvard University 2020-2022
NASA Einstein Post-doctoral Fellowship, Harvard University 2017-2020
NASA Hubble Post-doctoral Fellowship (declined) 2017
Rodger Doxsey Dissertation Prize (American Astronomical Society) 2017
ARCS Foundation Fellowship 2016
American Association of University Women (AAUW) American Dissertation Year Fellowship 2016
Excellence in Mentoring Award (UC Santa Cruz Astronomy & Astrophysics Department) 2015
American Astronomical Society International Travel Grant 2014, 2016, 2017
National Science Foundation Graduate Research Fellowship Program 2011
Daniel Edward Wark Memorial Scholarship (UC Berkeley Astrophysics Department) 2009
NASA Motivating Undergraduates in Science and Technology Scholarship 2007
Alexander Frolich Award for excellence of achievement in Physics 2007
NASA JPL Undergraduate Scholars Award for excellence of achievement in Physics 2007
Thomas McCutcheon Award for excellence of achievement in Mathematics 2006

SUCCESSFUL PROPOSALS

Total of grants obtained as Principal Investigator: \$174,825

1. Co-I, Chandra Observation, Cycle 21 (awarded 100 ks) 2019
Title: *A Superstar Cluster is Born: Probing the X-ray Emission of H72.97-69.39 in LMC-N79*
2. PI, Chandra Theory, Cycle 16 2014
Title: *To Leak or Not to Leak: Where are the Missing X-ray Photons from Massive Star Clusters?*
3. PI, Hubble Archival, Cycle 21 2013
Title: *Simulating the Birth of Massive Star Clusters: Is Destruction Inevitable?*

TECHNICAL SKILLS

Computer Languages	C++, Fortran, IDL, Python, R, MPI
Simulation Codes	ORION2
Analysis Codes	<i>yt</i> , RADMC-3D, GLUE

ADVISING EXPERIENCE

Graduate Students:

- Michael Foley (grad student at Harvard), *2018-2019**
Bubbles around Intermediate and High-mass Stars due to Wind Feedback
- Hope Chen (grad student at Harvard, now Postdoc at UT Austin), *2018-2019**
Effects of an Embedded B-Star Wind in Ophiuchus

Undergraduate Students:

- Mikayla Wilson, physics and astronomy undergrad at TCU, Banneker Intern at Harvard, *2020-present*
Tracing the Evolution of Molecular Outflows in Massive Star Formation
- Monica Gallegos-Garcia (Banneker Intern at Harvard, now astro grad at Northwestern), *2018-2020**
Winds in Star Clusters Drive Kolmogorov Turbulence
- Courtney Bishop (physics undergrad at College of William & Mary), SAO NSF REU program *2018*
Comparing Molecular Line Tracers in Outflows Generated by Massive Star Formation
- Evan Carter (physics undergrad at UCSC, then astro masters student at Wesleyan), *2014-2016*
Synthetic Observations of Low-Mass Star Formation: Implications for Current SED-Fitting Methods

High School Students:

- Shreya Karri *2019*
Census of Stellar Feedback in the Milky Way

* Denotes students whose project led to or will soon lead to a refereed publication

SERVICE EXPERIENCE

- Referee for A&A, MNRAS, & RAA
- Galaxies & Cosmology Seminar Organizer *2019-Present*
- NASA Theory Astrophysics Program Panelist *1 year*
- NASA Earth and Space Science Fellowship (NESSF) Reviewer *2019*
- Organizer, Equity & Inclusion Journal Club, Harvard-Smithsonian CfA *2018-2019*
- Proposal Reviewer for the Czech Science Foundation *2018*
- ITC Post-doctoral Fellowship Committee Member, Harvard-Smithsonian CfA *1 year*
- SOC/LOC Member for Harvard-Heidelberg Star Formation meeting, *2017, 2019 (Chair)*
Harvard-Smithsonian CfA
- Organizer, Diverse Topics in Astronomy Lecture Series, Lamat REU Program, UCSC *2015, 2016*
- Organizer, Space Telescope Proposal Writing Workshop, *2015*
UCSC Astronomy & Astrophysics Department
- Member of the LAMAT Research Internship Admissions Committee *2014*
- Undergraduate Student Mentor, UCSC Women in Physics Group *2013-2017*
- Graduate Student Mentor, UCSC Astronomy & Astrophysics Department *2012-2013, 2016-2017*
- Astronomy Graduate Student Representative, UCSC Graduate Student Association *2012-2013*
- Organizer, Applying to the NSF GRFP Workshop, *2012-2016*
UCSC Astronomy & Astrophysics Department

TEACHING EXPERIENCE

- Co-Instructor, Python Programming Bootcamp, Lamat Program, UCSC *2015*
- Activity Designer/Facilitator, Institute for Science & Engineering Educators *2011*
Professional Development Program (PDP), Hartnell College
- Teaching Assistant, "Astronomy 2: Overview of the Universe", UCSC *2010*
- Grader, "Astronomy C161: Relativistic Astrophysics & Cosmology", UC Berkeley *2010*
- Undergraduate Student Instructor, "Astronomy C10: Introduction to Astronomy", UC Berkeley *2009*

PROFESSIONAL DEVELOPMENT

- Diversity & Inclusion Certificate Program, UCSC Office for Diversity, Equity, and Inclusion 2017
Institute for Science & Engineering Educators, PDP for Inquiry-based Education, UCSC 2011

REFEREED PUBLICATIONS (7 1ST-AUTHORED PUBLICATIONS)

1. “Winds in Star Clusters Drive Kolmogorov Turbulence”
Gallegos-Garcia, M., Burkhardt, B., **Rosen, A.L.**, Naiman, J.P., Ramirez-Ruiz, E., 2020, *Astrophysical Journal Letters* (accepted), [NASA ADS](#)
2. “The Role of Outflows, Radiation Pressure, and Magnetic Fields in Massive Star Formation”
Rosen, A. L., Krumholz, M. R., 2020, *Astronomical Journal*, 160, 78, [NASA ADS](#)
3. “Zooming in on Individual Star Formation: Low- and High-mass Stars”
Rosen, A.L., Offner, S.S.R, Sadavoy, S.I., Bhandare, A., Vázquez-Semadeni, Ginsburg, A., 2020, *Space Science Reviews*, 216, 62, [NASA ADS](#)
4. “Formation and Evolution of Disks Around Young Stellar Objects”
Zhao, B, Tomida, K, Hennebelle, P., Tobin, J.J., Maury, A., Hirota, T., Sánchez-Monge, Á., Kuiper, R., **Rosen, A.**, Bhandare, A., Padovani, M., Lee, Y., 2020, *Space Science Reviews*, 216, 43, [NASA ADS](#)
5. “Circumbinary Disks: Accretion and Torque as a Function of Mass Ratio and Disk”
Duffell, P.C., D’Orazio, D., Derdzinski, A., Haiman, Z., MacFayden, A., **Rosen, A.L.**, & Zrake, J., 2020, *Astrophysical Journal* (accepted), [NASA ADS](#)
6. “Continuity of Accretion from Clumps to Class 0 High-Mass Protostars”
Avison, A., Fuller, G.A., N. Peretto, N., Duarte-Cabral, A., **Rosen, A.L.**, Traficante, A., Pineda, J.E., Güsten, R., & Cunningham, N., 2020, submitted to *Astronomy & Astrophysics*
7. “Massive Star Formation via the Collapse of Subvirial and Virialized Turbulent Massive Cores”
Rosen, A.L., Li, P.S., Zhang, Q., Burkhardt, B., 2019, *Astrophysical Journal*, 887, 108, [NASA ADS](#)
8. “unyt: Handle, manipulate, and convert data with units in Python”
Goldbaum, N.J., ZuHone, J.A., Turk, M.J., Kowalik, K., & **Rosen, A.L.**, 2018, *Journal of Open Source Software*, 3, 28, 809; [NASA ADS](#)
9. “Hybrid Adaptive Ray-Moment Method (HARM²): A Highly Parallel Method for Radiation Hydrodynamics on Adaptive Grids”
Rosen, A. L., Krumholz, M. R., Oishi, J.S., Lee, A.T., & Klein, R.I., 2017, *Journal of Computational Physics*, 330, 924; [NASA ADS](#)
10. “An Unstable Truth: How Massive Stars get their Mass”
Rosen, A. L., Krumholz, M. R., McKee, C.F., & Klein, R.I., 2016, *Monthly Notices of the Royal Astronomical Society*, 463, 2553; [NASA ADS](#)
11. “Gone with the Wind: Where is the Missing Stellar Wind Energy from Massive Star Clusters?”
Rosen, A. L., Lopez, L.A., Krumholz, M. R., & Ramirez-Ruiz, E.; 2014, *Monthly Notices of the Royal Astronomical Society*, 442, 2701; [NASA ADS](#)
12. “What Sets the Initial Rotation Rates of Massive Stars?”
Rosen, A. L., Krumholz, M. R., & Ramirez-Ruiz, E.; 2012, *Astrophysical Journal*, 748, 97; [NASA ADS](#)

SELECTED SCIENTIFIC PRESENTATIONS (22 INVITED)

Given **23** invited talks and **31** contributed talks to date, including

1. Invited Review, Radiation Hydrodynamics: Implementation and Application;
Royal Astronomical Society; London, UK 2020
2. Invited Talk, Astronomy Seminar, Rutgers University Physics & Astronomy Department;
Piscataway, NJ 2019

3. Invited Review, International Space Science Institute (ISSI),
Star Formation Workshop; Bern, Switzerland 2019
4. Invited Talk, Gas Fueling of Galaxy Structures Across Cosmic Time, Astro 3D Workshop;
Barossa Valley, South Australia 2018
5. Invited Colloquium, University of Florida Astronomy Department; Gainesville, FL 2018
6. Invited Review, Stars Birth & Death: GMT Community Science Meeting; Honolulu, HI 2018
7. Invited Talk, Astrophysical Shocks Meeting, AIP Potsdam; Potsdam, Germany 2018
8. Invited Talk, Astronomy Seminar, University of Connecticut; Storrs, CT 2017
9. Invited Colloquium, University of Massachusetts Amherst Astronomy Department;
Amherst, MA 2017

PUBLIC OUTREACH

- Interviewee, “How to Make Stars on a (super)Computer,” 2020
Astrochats Interview hosted by MicroObservatory, [Link to YouTube Video](#)
- Speaker, “How to Make Massive Stars on a (super)Computer,”
Astronomy on Tap Boston Event 2020
- Presenter, “Visualizing Numerical Simulations with *yt*”
Center for Astrophysics | Harvard & Smithsonian *Demofest* 2019
- Speaker, “How to Make Stars on a (super)Computer,”
Women in Science and Engineering (WiSE) Science on Tap Event 2017
- Speaker, “An Unstable Truth: How Massive Stars get their Mass,”
AAUW Monterey Peninsula Chapter Meeting 2017
- Speaker, “How to Write an Effective Abstract,” Lamat REU Program, UCSC 2016
- Organizer and Panelist, “Astronomy Grad Student and Post-doc Panel,”
Lamat REU Program, UCSC 2016
- Speaker, “Then and Now: From North Hills Prep to a Ph.D. in Astrophysics,”
North Hills Prep School 2016
- Astronomy Outreach Activity, Expanding Your Horizons Workshop for Young Girls,
Hartnell College 2015
- Speaker, “How to Make Stars on a (super)Computer,”
UCSC, Monterey Astronomy Club, Scotts Valley High School 2015
- Speaker, “Computational Astrophysics”, Stanford Pre-collegiate Summer Courses, Stanford 2015
- Speaker, “Star Formation and Stellar Feedback”, Lamat Research Experience 2015, 2016
for Undergraduates (REU) Program, UCSC
- Speaker, “Reading Scientific Literature,” Lamat REU Program, UCSC 2015
- Graduate Student Panelist, Advancement Via Individual Determination (AVID) Program,
Soquel High School 2015
- Women in Science & Engineering (WiSE) Astronomy Education Outreach Presentation,
Seaside High School 2014
- Panelist, STEM Diversity Professional Development Workshop Series, UCSC 2014
- Author, www.astrobites.org 2011-2013
- WiSE Education Outreach Presentation, Santa Cruz High School 2011
- Panelist, Girls Scouts “Girls Go Tech” Event, NASA Ames, Moffatt Field, CA 2011