

Curriculum Vitae: Steven R. Cranmer

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- EMPLOYMENT** 2015–present: Associate Professor, APS Dept., University of Colorado
- HISTORY** 2011–2014: Lecturer on Astronomy, Harvard University
1996–2014: Astrophysicist, Smithsonian Astrophysical Observatory
- EDUCATION** Ph.D. Physics and Astronomy, University of Delaware, 1992–1996.
M.S. Astronomy, Ohio State University, 1990–1991.
B.S. Physics, Drexel University, 1985–1990, *summa cum laude*.
- RESEARCH INTERESTS** ★ Plasma physics and kinetic theory of waves and turbulence
★ Heating of the solar corona and acceleration of the solar wind
★ Stellar astrophysics, radiative transfer, and spectroscopy
- HONORS** ★ 2016 CU Boulder Faculty Teaching Excellence Program course development award
★ 2006 Karen Harvey Prize, Solar Physics Division of the AAS
★ SAO Performance Awards: 9 annual awards between 1999 and 2013.
★ 1997 Theodore Wolf Dissertation Prize, University of Delaware.
- TEACHING EXPERIENCE** ★ CU Astron. 1200: Stars & Galaxies (intro undergrad.): 2019
★ CU Astron. 2100: Fund. Concepts in Astrophysics (mid-level undergrad.): 2020
★ CU Astron. 3760: Solar & Space Physics (upper level undergrad.): 2015, 2017
★ CU Astron. 5120: Radiative & Dynamical Processes (graduate): 2016, 2018–2021
★ CU Astron. 5700: Stellar Astrophysics (graduate): 2016, 2018
★ CU Astron. 7500: Special Topics (graduate): 2016
★ Taught 3 Harvard graduate-level Astron. courses (2012–2014).
★ Advised 6 grad. students (5 CU Boulder, 1 Harvard); 2 undergrad. students.
- SOCIETIES & ACTIVITIES** ★ Member of AAS, AGU, APS. Assoc. Editor, *JGR Space Physics*, 2006–2009.
★ Daniel K. Inouye Solar Telescope (DKIST) Science Working Group, 2013–2018.
★ Head of Education Office: U. Colorado Space Weather Technology, Research, and Education Center (SWx TREC), 2017–present.
- SELECTED GRANTS** ★ PI, 15% support, NASA Heliophysics Supporting Research, 2020–2023: *Winnowing in the Wind: Testing Theories of Solar Wind Acceleration*
★ PI, 15% support, NSF AAG Program, 2016–2021: *“Coronal Turbulence Driven from the Photosphere: Preparing for the DKIST Era”*
★ PI, 30% support, NSF SHINE Program, 2013–2018: *“Accelerating the turbulent solar wind: One flux tube at a time”*
★ PI, 100% support, NASA Long-Term Space Astrophysics, 2004–2009: *“Waves and turbulence in stellar winds across the H–R diagram”*
★ Summary: brought in > \$3.9 million as PI from 2001 to present.
- MISSIONS** ★ Co-Investigator: SWEAP & FIELDS suites on *Parker Solar Probe*, 2010–present.
★ Co-Investigator: UVCS instrument on *SOHO*, 1996–2013.
- PUBLICATIONS** ★ 116 papers in refereed journals, 268 conference presentations (53 invited).
★ Chief editor for *SOHO–23* workshop proceedings (ASP Conf. Ser. 428, 2010).
★ Co-edited *Solar Wind 13* (2013) and *SOHO–7* (1999) conference proceedings.

BIBLIOGRAPHY

More complete and up-to-date listings, including links to many of the papers and presentations, online data, and other technical notes, can be found at: <https://stevencranmer.bitbucket.io/>

Publications in Refereed Journals

- ★ Cranmer, S. R., and Schiff, A. J. 2021, “Electron Heat Flux in the Solar Wind: Generalized Approaches to Fluid Transport with a Variety of Skewed Velocity Distributions,” *J. Geophys. Res.*, **126**, e29666. [ADS]
- ★ Cranmer, S. R. 2021, “Brown Dwarfs are Violet: A New Calculation of Human-eye Colors of Main-sequence Stars and Substellar Objects,” *Research Notes AAS*, **5**, 201. [ADS]
- ★ Molnar, M. E., Reardon, K. P., Cranmer, S. R., Kowalski, A. F., Chai, Y., and Gary, D. E. 2021, “High-frequency Wave Power Observed in the Chromosphere with IBIS and ALMA,” *Astrophys. J.*, **920**, 125. [ADS]
- ★ Shoda, M., Chandran, B. D. G., and Cranmer, S. R. 2021, “Turbulent Generation of Magnetic Switchbacks in the Alfvénic Solar Wind,” *Astrophys. J.*, **915**, 52. [ADS]
- ★ Van Kooten, S. J., Anders, E. H., and Cranmer, S. R. 2021, “A Refined Model of Convectively-Driven Flicker in Kepler Light Curves,” *Astrophys. J.*, **913**, 69. [ADS]
- ★ Cranmer, S. R., DeForest, C. E., and Gibson, S. E. 2021, “Inward Propagating Plasma Parcels in the Solar Corona: Models with Aerodynamic Drag, Ablation, and Snowplow Accretion,” *Astrophys. J.*, **913**, 4. [ADS]
- ★ Zhao, J., Gibson, S. E., Fineschi, S., Susino, R., Casini, R., Cranmer, S. R., Ofman, L., and Li, H. 2021, “Simulating the Solar Minimum Corona in UV Wavelengths with Forward Modeling, II: Doppler Dimming and Microscopic Anisotropy Effect,” *Astrophys. J.*, **912**, 141. [ADS]
- ★ MacGregor, M. A., Weinberger, A. J., Loyd, R. O. P., Shkolnik, E., Barclay, T., Howard, W. S., Zic, A., Osten, R. A., Cranmer, S. R., Kowalski, A. F., Lenc, E., Youngblood, A., Estes, A., Wilner, D. J., Forbrich, J., Hughes, A., Law, N. M., Murphy, T., Boley, A., and Matthews, J. 2021, “Discovery of an Extremely Short Duration Flare from Proxima Centauri Using Millimeter through Far-ultraviolet Observations,” *Astrophys. J. Lett.*, **911**, L25. [ADS]
- ★ Rast, M. P., Bello Gonzalez, N., Bellot Rubio, L., et al. (72 authors in total, with S. R. Cranmer listed 33rd out of 72) 2021, “Critical Science Plan for the Daniel K. Inouye Solar Telescope (DKIST),” *Solar Physics*, **296**, 70. [ADS]
- ★ Lattimer, A. S., and Cranmer, S. R. 2021, “An Updated Formalism for Line-Driven Radiative Acceleration and Implications for Stellar Mass Loss,” *Astrophys. J.*, **910**, 48. [ADS]
- ★ Cranmer, S. R. 2020, “Updated Measurements of Proton, Electron, and Oxygen Temperatures in the Fast Solar Wind,” *Research Notes AAS*, **4**, 249. [ADS]
- ★ Linsky, J. L., Wood, B. E., Youngblood, A., Brown, A., Froning, C. S., France, K., Buccino, A. P., Cranmer, S. R., Mauas, P., Miguel, Y., Pineda, J. S., Rugheimer, S., Vieytes, M., Wheatley, P. J., and Wilson, D. J. 2020, “The Relative Emission from Chromospheres and Coronae: Dependence on Spectral Type and Age,” *Astrophys. J.*, **902**, 3. [ADS]
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- ★ Owocki, S. P., Shultz, M. E., ud-Doula, A., Sundqvist, J. O., Townsend, R. H. D., and Cranmer, S. R. 2020, “How the Breakout-Limited Mass in B-star Centrifugal Magnetospheres Controls their Circumstellar H-alpha Emission,” *Mon. Not. R. Astr. Soc.*, **499**, 5366–5378. [\[ADS\]](#)
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- ★ Cranmer, S. R., DeForest, C. E., & Gibson, S. E. 2021, “Mapping the Sun’s Alfvén Zone with Inward-Flowing Plasma Parcels,” *IAGA-IASPEI 2021 Joint Scientific Assembly* (August 21–27, 2021, Hyderabad, India), Symposium 4.1: Advances and Upcoming Developments in Solar and Heliospheric Physics (invited talk).
- ★ Miralles, M. P., & Cranmer, S. R. 2021, “Coronal Pseudostreamers and Helmet Streamers: New Measurements of Plasma Properties near the Cusps,” *IAGA-IASPEI 2021 Joint Scientific Assembly* (August 21–27, 2021, Hyderabad, India), Symposium 4.1: Advances and Upcoming Developments in Solar and Heliospheric Physics.

- ★ Molnar, M. E., Cranmer, S. R., & Reardon, K. 2021, “Using IRIS, ALMA, and the Dunn Solar Telescope to Learn about (Acoustic-)wave Heating in the Chromosphere,” *IAGA-IASPEI 2021 Joint Scientific Assembly* (August 21–27, 2021, Hyderabad, India), Symposium 4.1: Advances and Upcoming Developments in Solar and Heliospheric Physics.
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- ★ Linsky, J., Wood, B. E., Youngblood, A., Brown, A., Froning, C. S., France, K., Buccino, A. P., Cranmer, S. R., Mauas, P., Miguel, Y., Pineda, J. S., Rugheimer, S., Vieytes, M., Wheatley, P. J., and Wilson, D. J. 2021, “The Relative Emission from Chromospheres and Coronae: Dependence on Spectral Type and Age,” *20.5th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun*, March 2–4, 2021, poster 257. [\[ADS\]](#)
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- ★ Cranmer, S. R. 2019, “Solar Wind Origins: A Survey of Proposed Physical Processes,” *SHINE 2019 Workshop*, Boulder, Colorado, August 5–9, 2019 (invited scene-setting talk). [\[ADS\]](#)
- ★ Cranmer, S. R. 2019, “Element Abundances and Solar Wind Acceleration,” *SHINE 2019 Workshop*, Boulder, Colorado, August 5–9, 2019 (invited scene-setting talk). [\[ADS\]](#)
- ★ Gilbert, C., and Cranmer, S. R. 2019, “Interpreting Off-Limb Emission Lines from Polar Coronal Holes,” *SHINE 2019 Workshop*, Boulder, Colorado, August 5–9, 2019, poster. [\[ADS\]](#)
- ★ Molnar, M., Reardon, K., and Cranmer, S. R. 2019, “High frequency chromospheric observations with IBIS and ALMA,” *SHINE 2019 Workshop*, Boulder, Colorado, August 5–9, 2019, poster. [\[ADS\]](#)
- ★ Schiff, A., and Cranmer, S. R. 2019, “Thermal conduction throughout the solar wind: the eight-moment approximation,” *SHINE 2019 Workshop*, Boulder, Colorado, August 5–9, 2019, poster. [\[ADS\]](#)
- ★ Van Kooten, S. J., and Cranmer, S. R. 2019, “Coronal Turbulence Driven from the Photosphere: Opportunities for DKIST,” *SHINE 2019 Workshop*, Boulder, Colorado, August 5–9, 2019, poster. [\[ADS\]](#)
- ★ Caspi, A., Seaton, D. B., Case, T., Cheung, M., Cranmer, S. R., DeForest, C. E., de Toma, G., Downs, C., Elliott, H., Gold, A. U., Longcope, D., Savage, S. L., Sullivan, S., Viall, N., Vourlidis, A., and West, M. J. 2019, “COHERENT: Studying the Corona as a Holistic Environment,” *SHINE 2019 Workshop*, Boulder, Colorado, August 5–9, 2019, poster. [\[ADS\]](#)
- ★ Cranmer, S. R. 2019, “Simulations of Stellar Winds and Exoplanet Magnetospheres: Hidden Assumptions in the Boundary Conditions,” *Bull. Am. Astr. Soc.*, AAS meeting 234 (June 10–13, 2019), talk abstract 215.01. [\[ADS\]](#)
- ★ Gilbert, C., and Cranmer, S. R. 2019, “Forward Models of Off-Limb Emission Lines in Solar Coronal Holes,” *Bull. Am. Astr. Soc.*, AAS meeting 234 (June 10–13, 2019), poster abstract 106.06. [\[ADS\]](#)
- ★ Van Kooten, S. J., and Cranmer, S. R. 2019, “Preparing for DKIST: Connecting the High-Resolution Sun to the Turbulent Corona,” *Bull. Am. Astr. Soc.*, AAS meeting 234 (June 10–13, 2019), poster abstract 302.04. [\[ADS\]](#)
- ★ Cranmer, S. R., Berger, T. E., Raftery, C. L., and Thayer, J. P. 2019, “Graduate, Undergraduate, and Professional Education in Space Weather at the University of Colorado Boulder,” *99th Annual AMS Meeting*, 16th Conference on Space Weather, January 6-10, 2019, talk abstract 1.5.
- ★ Cranmer, S. R. 2018, “Unsolved Problems in the Middle Corona,” *Eos Trans. AGU*, Fall 2018 Meeting Suppl., abstract SH34A-01 (invited talk).
- ★ Gilbert, C., and Cranmer, S. R. 2018, “Refinement of a Semi-Empirical Model to Understand Spectroscopic Indications of Alfvén Waves in the Solar Corona,” *Eos Trans. AGU*, Fall 2018 Meeting Suppl., abstract SH33H-3729, poster.

- ★ Van Kooten, S. J., and Cranmer, S. R. 2018, “Investigating the Complex Motions of Photospheric Bright Points as a Lower Boundary Condition for Coronal Magnetism,” *Eos Trans. AGU*, Fall 2018 Meeting Suppl., abstract SH23C-3318, poster.
- ★ Gibson, S. E., DeForest, C., Cranmer, S. R., de Koning, C. A., Desai, M. I., Thompson, B. J., Viall, N. M., and Webb, D. F. 2018, “Mysteries of the Young Solar Wind,” *Eos Trans. AGU*, Fall 2018 Meeting Suppl., talk abstract SH43A-05.
- ★ Berger, T. E., Duncan, N. A., Baker, D. N., Thayer, J. P., Cranmer, S. R., Pankratz, C. K., Hurlburt, N. E., and Bosanac, N. 2018, “The Solar Polar Constellation (SPOC) Mission: Combining Operational Full-Sun Magnetic Field Measurements with Polar Exploration,” *Eos Trans. AGU*, Fall 2018 Meeting Suppl., abstract SH41E-3688, poster.
- ★ Cranmer, S. R. 2018, “Corotating Streams in Solar and Stellar Winds,” *Waves, Turbulence, and Large-scale Structures in Rotating Magnetic Fluids: Above and Beyond Geophysical Fluid Dynamics*, National Center for Atmospheric Research (NCAR) Geophysical Turbulence Program (GTP) Workshop, Boulder, Colorado, September 10–14, 2018 (invited talk).
- ★ MacGregor, M., Weinberger, A., Wilner, D., Kowalski, A., and Cranmer, S. 2018, “Detection of a Millimeter Flare from Proxima Centauri,” *20th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun*, Boston, Massachusetts, July 30–August 3, 2018, talk.
- ★ Gilbert, C., and Cranmer, S. R. 2018, “Modeling Spectroscopy to Understand Alfvén Waves and Turbulence in the Solar Corona,” *SHINE 2018 Workshop*, Cocoa Beach, Florida, July 30–Aug 3, 2018, poster. [\[ADS\]](#)
- ★ Molnar, M., Reardon, K., Chai, Y., and Cranmer, S. R. 2018, “Probing the Turbulent Quiet Chromosphere with ALMA, IRIS, and IBIS,” *IRIS-9 Workshop*, Göttingen, Germany, June 25–29, 2018, talk.
- ★ Cranmer, S. R. 2018, “Waves and Turbulence in the Solar Corona: A Surplus of Sources and Sinks,” *Bull. Am. Astr. Soc.*, AAS meeting 232, June 4–7, 2018, talk abstract 405.02. [\[ADS\]](#)
- ★ Cranmer, S. R. 2017, “Waves and Turbulence in the Solar Wind: Disputed Origins and Predicted PSP Spectra,” *Parker Solar Probe Science Working Group (SWG) Meeting*, Johns Hopkins Applied Physics Laboratory, Laurel, Maryland, October 2–6, 2017 (invited talk).
- ★ Cranmer, S. R. 2017, “Kinetic Effects in Coronal Holes and High-Speed Streams: A Roundup of Observational Constraints,” *SHINE 2017 Workshop*, Saint-Sauveur, Quebec, July 24–28, 2017, poster.
- ★ Gilbert, C., and Cranmer, S. R. 2017, “Relating Spectroscopic Measurements of the Solar Corona to Alfvén Waves and Turbulence,” *SHINE 2017 Workshop*, Saint-Sauveur, Quebec, July 24–28, 2017, poster.
- ★ Schiff, A. J., and Cranmer, S. R. 2017, “Exploring the Role of Nonlinear Mode Conversion in the Solar Corona,” *SHINE 2017 Workshop*, Saint-Sauveur, Quebec, July 24–28, 2017, poster.
- ★ Van Kooten, S. J., and Cranmer, S. R. 2017, “Characterizing the Motion of Photospheric Magnetic Bright Points at High Resolution,” *SHINE 2017 Workshop*, Saint-Sauveur, Quebec, July 24–28, 2017, poster.
- ★ Cranmer, S. R. 2017, “What Can Coronal Holes Tell Us About Ion Energization?” *16th RHESSI Workshop / 1st MinXSS Workshop*, Boulder, Colorado, June 19–24, 2017, poster.
- ★ DeForest, C. E., Matthaeus, W. H., Viall, N. M., and Cranmer, S. R. 2016, “Imaging the Top of the Solar Corona and the Young Solar Wind,” *Eos Trans. AGU*, Fall 2016 Meeting Suppl., abstract SH53A-05. [\[ADS\]](#)

- ★ Cranmer, S. R. 2016, “Leaves in the Wind: On the Variety of Radiative and MHD fluctuations in Rotating Solar/Stellar Outflows,” *Turbulence and Waves in Flows Dominated by Rotation*, National Center for Atmospheric Research (NCAR) Geophysical Turbulence Program (GTP) Workshop, Boulder, Colorado, August 15–19, 2016 (invited talk). [\[video link\]](#)
- ★ Cranmer, S. R. 2016, “How Important is Alfvén Wave Heating?” *SHINE 2016 Workshop*, Santa Fe, New Mexico, July 11–15, 2016 (invited scene-setting talk).
- ★ Cranmer, S. R. 2016, “The Origin and Variability of the Slow Solar Wind,” *The Scientific Foundations of Space Weather*, Workshop of the International Space Science Institute (ISSI), Bern, Switzerland, June 27 to July 1, 2016 (invited talk).
- ★ Cranmer, S. R. 2016, “Coronagraphs on the Frontier: Connecting Astronomy, Space Physics, and Plasma Physics,” *Exploring the Geospace Frontier: Quo Vadis?* NCAR Foothills Lab, Boulder, Colorado, May 25–27, 2016 (invited talk).
- ★ Cranmer, S. R. 2016, “Predictions for Dusty Mass Loss from Asteroids during Close Encounters with Solar Probe Plus,” *Dusty Visions Workshop 2016*, Boulder, Colorado, July 22–24, 2016, poster.
- ★ Cranmer, S. R. 2016, “Stirring Coronal Spaghetti: Exploring Multiple Interactions Between MHD Waves and Density Fluctuations,” *Bull. Am. Astr. Soc.*, 2016 SPD meeting, Boulder, Colorado, talk abstract 201.04. [\[ADS\]](#)
- ★ Cranmer, S. R. 2015, “The Role(s) of Electrons in the Turbulent Corona and Solar Wind,” *SHINE 2015 Workshop*, Stowe, Vermont, July 6–10, 2015 (invited scene-setting talk).
- ★ Cranmer, S. R. 2015, “Driving Jets and Spicules with Alfvén Waves: The Idea That Won’t Go Away,” *IRIS–4 Workshop*, Boulder, Colorado, May 18–22, 2015, contributed talk. [\[video link\]](#)
- ★ Cranmer, S. R. 2014, “Waves and Turbulence in the Corona and Solar Wind,” *SHINE 2014 Workshop*, Telluride, Colorado, June 23–27, 2014 (invited scene-setting talk).
- ★ Cranmer, S. R. 2014, “Turbulence-Driven Solar Wind Models in 2014: Filling in the Gaps,” *SHINE 2014 Workshop*, Telluride, Colorado, June 23–27, 2014 (Poster).
- ★ Cranmer, S. R. 2014, “Solar/Stellar Granulation as the Key Lower Boundary Condition for Coronal Heating and Wind Acceleration,” *Bull. Am. Astr. Soc.*, AAS meeting 224, Talk 211.06. [\[ADS\]](#)
- ★ Cranmer, S. R., and Woolsey, L. N. 2013, “Turbulent Dissipation and Kinetic Heating in the Solar Wind: Benefits of an Ensemble Simulation Approach,” *Eos Trans. AGU*, Fall Meeting Suppl., abstract SH41F-04. (invited talk). [\[ADS\]](#)
- ★ Cranmer, S. R. 2013, “Turbulence as a Unifying Principle in Coronal Heating and Solar Wind Acceleration,” *2013 LWS/SDO Science Workshop*, Cambridge, Maryland, March 3–8, 2013 (invited talk).
- ★ Cranmer, S. R. 2012, “Stellar Wind Theory,” *Radio Stars and Their Lives in the Galaxy*, MIT Haystack Observatory Workshop, October 2012 (invited talk).
- ★ Cranmer, S. R. 2012, “Understanding the Origins of the Solar Wind,” *SHINE 2012 Workshop*, Wailea, Hawaii, June 2012 (invited talk).
- ★ Cranmer, S. R. 2012, “Connecting the Solar Wind to the Corona,” *From the Heliosphere to the Sun*, 511th Heraeus Seminar, Physikzentrum Bad Honnef, Germany, February 2012 (invited talk).

- ★ Cranmer, S. R., van Ballegoijen, A. A., & Woolsey, L. N. 2012, “New Models of Solar Wind Acceleration and Stream Interactions in the Sun’s Topologically Complex Magnetic Field,” *Eos Trans. AGU*, Fall Meeting Suppl., abstract SH53A-2266. [\[ADS\]](#)
- ★ Woolsey, L. N., and Cranmer, S. R. 2012, “A Magnetic Field Parameter Study of Turbulence-Driven Solar Wind,” *Eos Trans. AGU*, Fall 2012 Meeting Suppl., abstract SH33D-2252. [\[ADS\]](#)
- ★ Cranmer, S. R., Chandran, B. D. G., and van Ballegoijen, A. A. 2011, “Tools for Predicting the Rates of Turbulent Heating for Protons, Electrons, and Heavy Ions in the Solar Wind,” *Eos Trans. AGU*, Fall 2011 Meeting Suppl., abstract SH41C-04 (invited talk). [\[ADS\]](#)
- ★ Cranmer, S. R. 2011, “Telescoping in on the Microscopic Origins of the Fast Solar Wind,” *Eos Trans. AGU*, Fall 2011 Meeting Suppl., abstract SH43F-01 (invited talk). [\[ADS\]](#)
- ★ Cranmer, S. R. 2011, “Turbulent Heating of Protons, Electrons, and Heavy Ions in the Tangled and Twisted Solar Corona,” *2011 General Meeting of the Center for Magnetic Self-Organization (CMSO)*, Durham, New Hampshire, October 2011 (invited talk).
- ★ Cranmer, S. R. 2011, “The Physics of Coronal Heating and Solar Wind Acceleration: Ongoing Research and Unanswered Questions,” *IUGG General Assembly, IAGA Symposium A152*, Melbourne, Australia, July 2011 (invited reporter’s review).
- ★ Kohl, J. L., Panasyuk, A. V., Cranmer, S. R., Raymond, J. C., and Rosati, R. E. 2011, “UVCS/ SOHO Search for Coronal Suprathermal Seed Particles: 2011 Campaign,” *Eos Trans. AGU*, Fall 2011 Meeting Suppl., abstract SH33D-05. [\[ADS\]](#)
- ★ Strachan, L., Cranmer, S. R., Panasyuk, A. V., Kohl, J. L., and Lamy, P. L. 2011, “Comparison of Velocity, Density, Temperature, and Mass Flux Results with Solar Coronal Models,” *Eos Trans. AGU*, Fall 2011 Meeting Suppl., abstract SH53C-07. [\[ADS\]](#)
- ★ Cranmer, S. R., & Saar, S. H. 2011, “Testing a Predictive Theoretical Model for the Mass Loss Rates of Cool Stars,” *Bull. Am. Astr. Soc.*, AAS Meeting 218 (Meeting-in-a-Meeting “What’s New under the Suns”), May 24, 2011, talk abstract 205.03. [\[ADS\]](#)

Colloquia, Seminars, and Outreach Presentations (most recent 10 year period)

- ★ Cranmer, S. R. “Solar Wind Origin and Acceleration: Unraveling the Multi-Scale Physics,” December 20, 2021, Solar Orbiter Remote Sensing Working Group (RSWG) invited seminar.
- ★ Cranmer, S. R. “Working Group 1C Introduction and Overview,” August 10, 2021, Second PUNCH Science Meeting, Boulder, Colorado.
- ★ Cranmer, S. R. “Working Group 1C Overview: How will PUNCH map the Sun’s Alfvén surface/zone/region?” December 3, 2020, Second PUNCH Science Team Meeting, Boulder, Colorado.
- ★ Cranmer, S. R. “Two Line-of-Sight Effects to Keep in Mind when Flow-Mapping,” November 19, 2020, PUNCH Flow Mapping Workshop (virtual).
- ★ Cranmer, S. R. “Working Group 1C Overview: How will PUNCH map the Sun’s Alfvén surface/zone/region?” June 3, 2020, First PUNCH Science Team Meeting, Boulder, Colorado.
- ★ Cranmer, S. R., “Plasma Unbound: New Insights into Heating the Solar Corona and Accelerating the Solar Wind,” October 7, 2019, University of Colorado Boulder, Department of Astrophysical & Planetary Sciences Colloquium.

- ★ Cranmer, S. R., “TREC Educational Efforts: Across Campus and Beyond,” April 1, 2019, Space Weather TREC Science Advisory Board (SAB) Meeting, University of Colorado Boulder.
- ★ Cranmer, S. R., DeForest, C. E., Gibson, S. E., de Koning, C., Pizzo, V., and the PUNCH Science Team, 2019, “Imaging the Corona and Young Solar Wind in 3D with PUNCH,” March 12, 2019, poster presented at Boulder Solar Day, High Altitude Observatory.
- ★ Cranmer, S. R., “Turbulent Origins of Solar and Stellar Winds,” November 28, 2018, Colloquium, Columbia University Department of Astronomy.
- ★ Cranmer, S. R., three lectures for the 2018 Boulder Space Weather Summer School: (1) “Introduction and Overview,” (2) “The Solar Atmosphere,” and (3) “Modeling the Solar Wind and IMF with WSA-ENLIL.” July 9–20, 2018, High Altitude Observatory.
- ★ Cranmer, S. R., “Turbulent Origins of Solar-type Coronae and Winds: Current Thoughts,” May 31, 2018, ISSI Team Meeting on the Solar and Stellar Wind Connection: Heating Processes and Angular Momentum Loss (Skype talk).
- ★ Cranmer, S. R. “What do we know about the Physics of Energy Transport in Solar/Stellar Coronae and Winds?” April 3, 2018, talk at NSO’s monthly Solar Focus Meeting, Boulder.
- ★ Cranmer, S. R. “Parker Solar Probe: Will it Revolutionize Our Understanding of the Sun (and Exoplanets?),” March 15, 2018, invited presentation at Boulder Solar Day, High Altitude Observatory.
- ★ Cranmer, S. R., “Ripples in the Solar Wind,” December 4, 2017, University of Colorado Boulder, APS Department Undergraduate Research Symposium.
- ★ Cranmer, S. R., “Did Coronal Mass Ejections Contribute to the Young Sun’s Mass Loss?” February 15, 2017, talk at the CU/NSO Solar-Stellar Connections Workshop, Boulder.
- ★ Cranmer, S. R., “How Will DKIST Help Validate or Falsify Models of Coronal Heating From Waves/Turbulence?” February 14, 2017, talk at NSO’s monthly Solar Focus Meeting, Boulder.
- ★ Cranmer, S. R., “Circumstellar Turbulence: Is There Anything It Can’t Do?” October 13, 2016, Colloquium, High Altitude Observatory (HAO).
- ★ Cranmer, S. R., “Predictions for Dusty Mass Loss from Asteroids during Close Encounters with Solar Probe Plus,” October 7, 2016, science talk presented at the Solar Probe Plus (SPP) Science Working Group (SWG) teleconference.
- ★ Cranmer, S. R., “Turbulent Origins of Solar and Stellar Winds,” September 23, 2016, University of Colorado Boulder, Faculty Research Talk.
- ★ Cranmer, S. R., “Solar Wind Acceleration: Puzzles, Progress, and (DKIST) Prospects,” August 3, 2016, National Solar Observatory Brown Bag Lunch Talk, Boulder.
- ★ Cranmer, S. R., “Hale Collaborative Graduate Education (COLLAGE) Program Update,” May 11, 2016, National Solar Observatory Users’ Committee Meeting, Boulder.
- ★ Cranmer, S. R., “Turbulent Origins of Solar and Stellar Winds,” October 20, 2015, University of Colorado Boulder, Faculty Research Talk.
- ★ Cranmer, S. R., “Coronal Science: Preparing for the DKIST Era,” October 15, 2015, DKIST 2015 Science Working Group Meeting, Boulder, Colorado.

- ★ Cranmer, S. R., “Solar Magnetism and Activity: Progress, Puzzles, and Prospects,” September 2, 2015, *HAO: Past, Present, and Future: Three-day celebration of the 75th anniversary of the High Altitude Observatory*, Boulder, Colorado. [\[video link\]](#)
- ★ Cranmer, S. R., “Turbulent Origins of Solar and Stellar Winds,” May 7, 2015, Canadian Institute for Theoretical Astrophysics (CITA) Seminar, Toronto, Canada. [\[video link\]](#)
- ★ Cranmer, S. R., “Solar Wind Turbulent Dissipation: A Collisionless Zoo,” April 28, 2015, University of Colorado Boulder, LASP Friends of the Magnetosphere (FOM) Seminar.
- ★ Cranmer, S. R., “Solar and Stellar Winds: Progress, Puzzles, and Prospects,” March 5, 2015, University of Colorado Boulder, LASP Science Seminar.
- ★ Cranmer, S. R., “Turbulent Origins of Solar and Stellar Winds,” January 27, 2015, University of Colorado Boulder, Faculty Research Talk.
- ★ Cranmer, S. R., “Stellar Winds Across the H-R Diagram,” July 3, 2014, Harvard-Smithsonian CfA Summer Colloquium.
- ★ Cranmer, S. R., “Sweeping Overview of Plasma Diagnostics in Solar Physics and Astrophysics,” May 5, 2014, New England Space Science Consortium (NESSC) meeting on *Diagnostics in Laboratory, Heliospheric, and Astrophysical Plasmas*, Massachusetts Institute of Technology.
- ★ Cranmer, S. R., “Turbulent Origins of Solar and Stellar Winds,” November 20, 2013, Colloquium, High Altitude Observatory (HAO). [\[video link\]](#)
- ★ Cranmer, S. R., “Turbulent Origins of Coronal Heating and the Solar Wind,” October 29, 2013, New England Space Science Consortium (NESSC) meeting on *Turbulence in Laboratory, Heliospheric, and Astrophysical Plasmas*, Harvard-Smithsonian CfA.
- ★ Cranmer, S. R. “Studying the Sun: Why and How?” October 17, 2013, Solar BigData Video Conference, Harvard-Smithsonian CfA.
- ★ Cranmer, S. R. “Turbulence as a Unifying Principle in Coronal Heating and Solar/Stellar Wind Acceleration,” April 29, 2013, Harvard-Smithsonian CfA Solar, Stellar, and Planetary Sciences Division Seminar.
- ★ Cranmer, S. R. “How Stars Gain Mass,” April 15, 2013, Overview talk given to visiting students and faculty from Phillips Academy, Andover, Massachusetts.
- ★ Cranmer, S. R. “Turbulent Origins of the Solar Wind,” April 3, 2013, Brown University Astrophysics Seminar Series (‘BASS’), Providence, Rhode Island.
- ★ Cranmer, S. R., “Turbulent Origins of the Solar Wind,” July 27, 2012, Tutorial talk for solar REU (Research Experiences for Undergraduates) summer students.
- ★ Cranmer, S. R., “Turbulent Origins of the Sun’s Hot Corona and the Solar Wind,” September 22, 2011, Boston University, Center for Space Physics Seminar.
- ★ Cranmer, S. R., “The Solar Probe Plus Theory and Modeling Team: Exploring Predictions and Controversies,” March 8, 2011, talk given at the 2nd SWEAP Science Team Meeting, Harvard-Smithsonian CfA.
- ★ Cranmer, S. R., “Turbulent Origins of the Sun’s Hot Corona and the Solar Wind,” February 21, 2011, Colloquium, University of Iowa, Dept. of Physics and Astronomy.