

Christopher S. Moore - CV

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Planetarium Show Link: <https://www.youtube.com/watch?v=ixlsKTNS61A>

Education

Ph. D, Astrophysical and Planetary Science – U of Colorado December 2017
Advisors: Prof. Kevin France and Dr. Thomas Woods

M.S., Astrophysical and Planetary Science – U of Colorado May 2014
Advisor: Prof. Mark Rast

B.S. Physics, B.S. Astronomy and Minor Spanish – U of Iowa May 2010

Research Positions

Postdoctoral Fellow – Harvard-Smithsonian CfA, Cambridge, MA. Dec 2017 – Present

Research Assistant – LASP, Boulder, CO. Jun – Aug 2007 - 2008 and Jan 2013 – Dec 2017

Research Assistant – CASA, Boulder, CO. Jan 2012 – Dec 2017

Research Assistant – NASA NSTRF, JPL, Pasadena, CA May 2014 – Dec 2017

Research Assistant – NASA Intern, Goddard, Greenbelt, MD Jun - Aug 2009 - 2011

Teaching Positions

Team Lead/Member – ISEE Professional Development Program, Boulder and CO. Maui, HI. 2012 - 2014

Teaching Assistant – U. of Colorado, 1030: Accelerated Intro to Astronomy Fall 2011

Teaching Assistant – U. of Iowa, 29:050: Stars, Galaxies and Universe Lab Fall 2010 – Spring 2011

Calculus I Tutor – U. of Iowa, Iowa Biosciences Advantage Program Fall 2010 – Spring 2011

Awards/Honors/Fellowship

2017 PhD Prize - International Astronomical Union (IAU) Division E Sun and heliosphere 2018

Rodger Doxsey Dissertation Travel Prize – American Astronomical Society (AAS) 2018

NASA Postdoctoral Program fellowship (NPP) - declined 2017

NASA Space Technology Research Fellowship (NSTRF) Fall 2013 – December 2017

2017 Black Excellence Award – Black Student Alliance (BSA), U of Colorado	Oct 2017
2016 Diversity Service Recognition Award by the Chancellor’s Committee on Race and Ethnicity (CCORE) - CU Café	Nov 2016
Mission of the Year – Miniature X-ray Solar Spectrometer (MinXSS) CubeSat Team	May 2016
Robert H. Goddard Honor Award – Solar Dynamics Observatory (SDO) Team	2015 - 2017
Congressional Visits Day (CVD) – American Astronomical Society (AAS)	Mar 2015
Best Oral Presentation – Beth Brown Memorial Award National Society of Black Physicists	Feb 2015
Certificate in Teaching Innovative Laboratory Experiences – ISEE PDP	May 2013
NASA Student Ambassador	2011 – 2017
Progressive Achievement Award –Kappa Alpha Psi Inc., Gamma Chapter, University of Iowa	Mar 2010
Best Oral Presentation –Science and Engineering Summer Internship [SESI], NASA Goddard	Aug 2009

Invited Presentations

Panel Talk: April 2019 American Physical Society (APS) Meeting (T03), “How Mentoring Shapes Pathways into Physics”, Apr 2019

Seminar: U. of Iowa, “Big Science of the Solar Corona with SmallSats and CubeSats: The MinXSS CubeSats, SSXDI CubeSat and SSAXI SmallSat”, Dec 2018

Colloquium: U of. Iowa, “Using CubeSats to Probe HOT Plasma in the Atmosphere of a COOL Star”, Dec 2018

Conference Talk: NSBP 2018, “The Miniature X-ray Solar Spectrometer (MinXSS) CubeSats: instrument capabilities and early science analysis on the quiet Sun, active regions, and flares”, Nov 2018

Seminar: Harvard CfA ITC, “The Effects of Magnetic Field Morphology on the Determination of Oxygen and Iron Abundances in the Solar Photosphere”, Nov 2018

Seminar: Penn State University, CEHW, “The Miniature X-ray Solar Spectrometer (MinXSS) CubeSats: instrument capabilities and early science analysis on the quiet Sun, active regions, and flares.”, Oct 2018

Seminar: U. of California San Diego, CASS, “The Miniature X-ray Solar Spectrometer (MinXSS) CubeSats: instrument capabilities and early science analysis on the quiet Sun, active regions, and flares.”, Oct 2018

Seminar: Harvard CfA Postdoc Symposium, “Spectrally Resolved Soft X-ray Observations of the Solar Corona”, Oct 2018

Seminar: Harvard CfA Stars and Planets, “Connecting Solar Coronal Soft-X-ray Spectral and Plasma Temperature Variability to Photospheric Magnetic Flux”, Sep 2018

Conference Talk [2017 IAU PhD Prize]: IAU GA XXX, “The Solar Corona viewed through the MinXSS (Miniature X-ray Solar Spectrometer) CubeSats”, Aug 2018

Colloquium: U of. Wesleyan, “The Miniature X-ray Solar Spectrometer (MinXSS) CubeSats: instrument capabilities and early science analysis on the quiet Sun, active regions, and flares.”, Apr 2018

Seminar: Hinode-JAXA-ISAS, “The Miniature X-ray Solar Spectrometer (MinXSS) CubeSats: instrument capabilities and early science analysis on the quiet Sun, active regions, and flares.”, Apr 2018

Seminar: Harvard CfA High Energy Phenomena, “The Miniature X-ray Solar Spectrometer (MinXSS) CubeSats: instrument capabilities and early science analysis on the quiet Sun, active regions, and flares.”, Jan 2018

Conference Talk [Rodger Doxsey Travel Prize]: 231st American Astronomical Society (402.03D) Christopher S. Moore, “The Miniature X-ray Solar Spectrometer (MinXSS) CubeSats: instrument capabilities and early science analysis on the quiet Sun, active regions, and flares.”, Jan 2018

Group: NASA Marshall Space Flight Center, “Exploring solar coronal properties through soft X-ray observations of the MinXSS (Miniature X-ray Solar Spectrometer) CubeSat.” July 2017

Seminar: University of Chicago, “Exploring solar coronal properties through soft X-ray observations of the MinXSS (Miniature X-ray Solar Spectrometer) CubeSat”, May 2017

Group: MIT Kavli Institute, “Atomic layer coatings to solar CubeSats: unique research experiences of a grad student”, April 2017

Seminar: Harvard CfA Stars and Planets, “The Effects of Magnetic Field Morphology on the Determination of Oxygen and Iron Abundances in the Solar Photosphere”, Nov 2016

Colloquium: U of. Wyoming, “The Miniature X-ray Solar Spectrometer (MinXSS) CubeSat: Mission overview, spacecraft testing, instrument characterization and solar science objectives”, Apr 2016

Seminar: NASA Goddard Heliophysics Division, “The Effects of Magnetic Field Morphology on the Determination of Oxygen and Iron Abundances in the Solar Photosphere”, Oct 2015

Colloquium [Beth Brown Memorial Award]: Howard University, “Diverse Research Experiences of a Graduate Student: Solar physics numerical simulations to CubeSats” Oct 2015

Colloquium [Beth Brown Memorial Award]: University of Michigan, “The Effects of Magnetic Field Morphology on the Determination of Oxygen and Iron Abundances in the Solar Photosphere”, Oct 2015

Contributed Presentations

Conference Talk: Hinode13/IPELS2019, “Solar Soft X-ray Variations from the 2008 - 2019 Solar Cycle inferred from CORONAS/SphinX, GOES/XRS, Hinode/XRT, MinXSS, NuSTAR, and RHESSI Instruments”, Sep 2019

Conference Talk: April 2019 American Physical Society (APS) Meeting (X08.00002), “Using CubeSats to Probe HOT Plasma in the Atmosphere of a COOL Star”, Apr 2019

Conference Talk: Fall 2018 American Geophysical Union (AGU) Meeting (SH33B 459504), “Prospects of the SmallSat Solar Activity X-ray Imager (SSAXI)”, Dec 2018

Conference Talk: CoolStars 20, “Full Sun Spectrally Resolved Soft X-ray Measurements from the Miniature X-ray Solar Spectrometer (MinXSS) CubeSats”, Aug 2018

Conference Talk: RHESSI 17 Workshop, “Solar Flare Temperature and Elemental Abundance Analysis Using MinXSS-1 and RHESSI Data”, Jun 2018

Conference Talk: Fall 2016 American Geophysical Union (AGU) Meeting (SH11D 137211), “Solar quiescent Active Region temperature distribution inferred from the Miniature Solar X-ray Solar Spectrometer (MinXSS) CubeSat soft X-ray spectra, Hinode X-ray Telescope (XRT) soft X-ray filter images and EUV measurements”, Dec 2016

Conference Talk: SPIE Astronomical Telescopes and Instrumentation (9905.08): “The miniature x-ray solar spectrometer (MinXSS) CubeSat instrument characterization techniques, instrument capabilities, and solar science objectives”, Jun 2016

Conference Talk: 47th Solar Physics Division (SPD) - American Astronomical Society (301.02), “The Miniature X-ray Solar Spectrometer (MinXSS) CubeSat: instrument characterization techniques, instrument capabilities and solar science objectives”, Jun 2016

Conference Talk [Beth Brown Memorial Award]: 227th American Astronomical Society Meeting (125.01): Christopher S. Moore, “The Effects of Magnetic Field Morphology on the Determination of Oxygen and Iron Abundances in the Solar Photosphere” Jan 2016

Seminar: NASA Goddard RHESSI Discussion, “The Miniature X-ray Solar Spectrometer CubeSat: Mission overview, spacecraft testing, instrument characterization and solar science objectives”, Oct 2015

Section 389E Group Meeting: JPL, “ALD UV Coatings: Project Overview and LiF Development Process at JPL”, Aug 2015

Conference Talk: National Society of Black Physicists (NSBP), “The Effects of Magnetic Field Morphology on the Determination of Oxygen and Iron Abundances in the Solar Photosphere”, Feb 2015

Seminar: CU Prime Talk, “What Does an Astrophysicist Do”, Feb 2015

NASA JPL Director of Astrophysics Meeting: “NASA Space Technology Research Fellowship at JPL”, Jul 2014

Colloquium: U. of Iowa, “Fabrication of a Terahertz Emitter for Background Limited Cryogenic Detector Characterization”, Sep 2010

Seminar: University of Iowa, “X-Ray Solar Flare Analysis”, Feb 2010

Seminar: NASA Goddard RHESSI Discussion, “X-Ray Solar Flare Analysis”, Aug 2009

Oral Presentation: Science and Engineering Summer Internship [SESI]: “X-Ray Solar Flare Analysis”, Aug 2009

Seminar: NASA Goddard RHESSI Discussion, “TSI and VUV Radiative Energies During X-Class Solar Flares”, Jul 2009

Conference Talk: Solar Cycle 24 Conference, “TSI and VUV Radiative Energies During X-Class Solar Flares”, Dec 2008

Colloquium: University of Iowa, “Solar Flare Variations”, Sep 2008

Oral Presentation: Research Experience for Undergraduates [REU]: “Solar Flare Variations”, Aug 2007

Press Conferences

Web link: April 2019 American Physical Society (APS) Meeting, “Using CubeSats to Probe HOT Plasma in the Atmosphere of a COOL Star”, Apr 2019

Refereed Publications

1. **Moore, C. S.**, Takeda, A., Sylwester, B., Sylwester, J., Hannah, I.G., Dennis, B. R., Reeves, K. K., Woods, T. N., “Solar Soft X-ray Variations from the 2008 - 2019 Solar Cycle inferred from CORONAS/SphinX, GOES/XRS, Hinode/XRT, MinXSS, NuSTAR, and RHESSI Instruments”, Solar Physics Topical Collection Invitation on IAU GA XXX FM9, in prep.
2. **Moore, C. S.**, Hennessy, J., Balasubramanian, K., Rife, J., C., Vest, R., E., Carter, C., O’Connor, L., Renninger, N., Jewell, A. D., Nikzad, S., France, K., “Ultrathin Protective Coatings for Enhanced Ultraviolet Reflectance with Aluminum Mirrors”, in prep.
3. Mason, J.P., Woods, T.N., Chamberlin, P.C., Jones, A., Kohnert, R., Schwab, B., Sewell, R., Caspi, A., **Moore, C.S.**, Palo, S., Solomon, S.C., Warren, H., “MinXSS-2 CubeSat Mission Overview: Improvements from the Successful MinXSS-1 Mission”, Advances in Space Research (2019), doi: <https://doi.org/10.1016/j.asr.2019.02.011>
4. **Moore, C. S.**, Caspi, A., Woods, T. N., Chamberlin, P. C., Dennis, B. R., Jones, A., Mason, J. P., Schwartz, R., Tolbert, K. A., Solar Physics, “The Instruments of the Miniature X-ray Solar Spectrometer (MinXSS) CubeSats”, Sol Phys (2018) 293: 21. <https://doi.org/10.1007/s11207-018-1243-3>

5. Hennessy, J., **Moore, C. S.**, Balasubramanian, K., Jewell, A. D., Nikzad, S., France, K., "Enhanced atomic layer etching of metallic aluminum native oxide for ultraviolet optical applications", JVTSA, (2017)
6. Woods, T. N., Caspi, A., Chamberlin, P. C., Jones, A., Kohnert, R., Mason, J. P., **Moore, C. S.**, Palo, S., Rouleau, C., Solomon, S. C., Machol, J., V., R., "New Solar Irradiance Measurements from the Miniature X-Ray Solar Spectrometer CubeSat", ApJ, 835:122, (2017)
7. Wieman, S., Didvosky, L., V., Woods, T., Jones, A., **Moore, C. S.**, "Sounding Rocket Observations of Active Region Soft X-Ray Spectra between 0.5 and 2.5 nm using a Modified SDO/EVE Instrument", Solar Physics, 291, 12 (2016)
8. Hennessy, J., Balasubramanian, K., **Moore, C. S.**, Jewell, A. D., Nikzad, S., France, K., Quijada, M., "Performance and prospects of far ultraviolet aluminum mirrors protected by atomic layer deposition," J. Astron. Telesc. Instrum. Syst. 2(4), 041206 (2016)
9. Mason, J. P., Woods, T. N., Caspi, A., Chamberlin, P. C., **Moore, C. S.**, Jones, A., Kohnert, R., Li, X., Palo, S., Solomon, S. C., "Miniature X-Ray Solar Spectrometer (MinXSS) - A Science-Oriented, University 3U CubeSat", JOURNAL OF SPACECRAFT AND ROCKETS, Vol. 53, No. 2, (2016)
10. **Moore, C. S.**, Uitenbroek, H., Rempel, M., Criscuoli, S., and Rast, M., "The Effects of Magnetic Field Morphology on the Determination of Oxygen and Iron Abundances in the Solar Photosphere", 2015, ApJ, 799, 150M
11. **Moore, C. S.**, Chamberlin, P. C. and Hock, R., "Measurements and Modeling of Total Solar Irradiance in X-class Solar Flares," 2014, ApJ, 787, 32M
12. France, K., Nell, N., Hoadley, K., Robert Kane, R. Burgh, E. B., Beasley, M., Bushinksy, R., Schultz, T. B., Kaiser, M., **Moore, C. S.**, Kulow, J., Green, J. C.; "Flight performance and first results from the sub-orbital local interstellar cloud experiment (SLICE)". Proc. SPIE 8859, (2013)
13. Emslie A. G., Dennis, B. R., Shih, A. Y., Chamberlin, P. C., Mewaldt, R. A., **Moore, C. S.**, Share, G. H., Vourlidas, A., and Welsch, B. T., "Global Energetics of Thirty-Eight Large Solar Eruptive Events," 2012, ApJ, 759, 71E

Conference Proceedings

1. Hong, J., Romaine, S., Kenter, A., **Moore, C. S.**, Reeves, K., Ramsey, B. D., Kilaru, K., Vogel, J., Ruz, J., Hudson, H., Perez, K., "SmallSat solar axion and activity x-ray imager (SSAXI)", Proc. SPIE 11118, (2019)
2. Wolk, S. J., Hong, J., Romaine, S., Poppenhaeger, K., Kenter, A., Moorhead, A. V., Gallagher, D. L. **Moore, C. S.**, Elvis, M., Kraft, R., Drake, J. Kashyap, V., Winston, E., Wargelin, B., Pillitteri, I., Jerius, D., Stahl, M., Wiegmann, B., Loghry, C., "SEEJ: SmallSat Exosphere Explorer of Hot Jupiters", Proc. SPIE 11118, (2019)
3. Hong, J., Romaine, S., **Moore, C. S.**, Reeves, K., Kenter, A., Ramsey, B. D., Kilaru, K., Perez, K., Vogel, J., Ruz, J., Hudson, H., "SmallSat Solar Axion X-ray Imager (SSAXI)", 32nd Annual AIAA/USU Conference on Small Satellites, LLNL-CONF-759341, (2018)
4. Hennessy, J., Jewell, A. D., **Moore, C. S.**, Carver, A. G., Balasubramanian, K., France, K., Nikzad, S., "Ultrathin protective coatings by atomic layer engineering for far ultraviolet aluminum mirrors", Proc. SPIE 10699, (2018)
5. Carter, C., **Moore, C. S.**, Hennessy, J., Jewell, A. D., Nikzad, S., France, K., "Characterizing Environmental Effects on UV Reflectance of ALD Coated Optics", Proc. SPIE 9963, (2016)
6. **Moore, C. S.**, Woods, T. N., Caspi, A., Mason, J. P., "The Miniature X-ray Solar Spectrometer (MinXSS) CubeSats: spectrometer characterization techniques, spectrometer capabilities, and solar science objectives." Proc. SPIE 9905, (2016)

7. **Moore, C. S.**, Hennessy, J., Jewell, A. D., Nikzad, S., France, K., “Atomic Layer Deposited (ALD) coatings for future astronomical telescopes: recent developments.” Proc. SPIE 9912, 99122U (2016)
8. **Moore, C. S.**, Hennessy, J., Kersgaard, E., Jewell, A. D., Nikzad, S., France, K., “Current progress in the characterization of atomic layer deposited AlF₃ for future astronomical ultraviolet mirror coatings”, Proc. SPIE 9601, (2015)
9. **Moore, C. S.**, Hennessy, J., Jewell, A. D., Nikzad, S., France, K., “Recent developments and results of new ultraviolet reflective mirror coatings”. Proc. SPIE 9144, (2014)
10. France, K., Nell, N., Hoadley, K., Kane, R., Burgh, E. E., Beasley, M., Bushinsky, R., Schultz, T. B., Kaiser, M., **Moore, C. S.**, Kulow, J., Green, J. C., “Flight performance and first results from the sub-orbital local interstellar cloud experiment (SLICE)”, Proc. SPIE 8859, (2012)

Students Advised

Crisel Suarez-Bustamante, Fiske-Vanderbilt Bridge PhD Program	May 2018 - Present
Sierra Garza (Co-advised w/ Katharine Reeves), Harvard-Smithsonian Solar REU	Jun – Aug 2018
Christian Carter (Co-advised w/ Kevin France), U of Colorado, Independent Study	2015 – Fall 2017
Caroline Leaman (Co-advised w/ Tom Woods), U of Colorado, LASP REU	Summer 2016
Eliot Kersgaard (Co-advised w/ Kevin France), U of Colorado, Independent Study	Fall Semester 2014

Professional Development and Leadership

Junior Member Working Group – International Astronomical Union (IAU)	Aug 2018 – Present
Committee on the Status of Minorities in Astronomy (CSMA) – American Astronomical Society (AAS)	Jun 2018 – Present
Information Technology Committee – SPIE	Jan 2016 – Present
Chambliss Poster Judge – 227 th , 231 st American Astronomical Society Meeting,	Jan 2016 and 2018
Founding member and Seminar Series Director of CU Café – CU Café (Cultural Awareness for Everyone), a collective of diverse STEM grad students and postdocs at CU that promote inclusivity and scientific excellence.	Aug 2015 – Dec 2017
Early Career Advisory Board (ECAB) – American Astronomical Society (AAS)	Jan 2016 – Dec 2016
Membership Committee – National Society of Black Physicists (NSBP)	Aug 2016 – Mar 2017
Graduate School Admissions Committee member – U of Colorado, Astrophysical & Planetary Sciences Department	Spring 2016
Panel Member – 133 Town Hall: AAS Advocacy Town Hall with a Panel of CVD Participants, 227 th American Astronomical Society Meeting,	Jan 2016
Review Panel Executive Secretary – NASA Heliophysics Guest Investigators Program	Oct 2015
Congressional Visits Day Participant – American Astronomical Society (AAS)	Mar 2015
Design Team Leader/Member – Institute for Scientist and Engineer Educators (ISEE) Professional Development Program (PDP)	2012 - 2014
Participant – NASA STS-135 Education Student Un-Conference,	Jul 2011

Community Involvement

Panelist – REACH youth meeting, U of Colorado,	Mar and Sep 2016
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Facilitator – Students of Color Leadership Series, U of Colorado, Spring 2016
Mentor – Impact The Youth (ITY) mentorship program U of Colorado, Jan 2013 – May 2015
Discussion Group Leader – “Peer to Peer Dialogue with CU Students” Crowley Foundation College Visit U Colorado, Apr 2015
Career Day Speaker – I Have A Dream, Boulder County, Angevine School, Lafayette, CO Mar 2015
Organizer – Physics and Astronomy Table, Academic Day, Be Boulder Week, U of Colorado Apr 2014
Organizer – Physics Activity, I Have A Dream Conference, Activity title: “The Colorful World of Light” Jul 2013
Career Day Speaker – Park Middle School, Riverdale, IL. May 2011
Mentor – The SPOT youth development program, Iowa City, IA. Aug 2009 – May 2011

Grants

Laboratory for Atmospheric and Space Physics MinXSS data analysis & software development ~\$25,000
March 2019 – January 2020
Smithsonian Astrophysical Observatory Internal Research and Development (IR&D) ~\$122,000
Oct 2018 – Sep 2019
NASA Space Technology Research Fellowship, training grant, \$71,000/year Aug 2013 – Dec. 2017
Impart Grant + Funding from the Vice Chancellor for Diversity, U of Colorado, \$10,000
Aug 2015 – May 2016
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