Grace E. Chesmore

The University of Chicago, Department of Physics
5720 S Ellis Ave, Chicago, IL 60637
https://chesmore.github.io
chesmore@uchicago.edu

EDUCATION

Ph.D. Candidate in Physics — 2019-
University of Chicago
Thesis Advisor: Jeff McMahon

M.S. Physics — 2017-2019
University of Michigan
Thesis Advisor: Jeff McMahon

B.A. Physics — 2017
Santa Clara University
Graduation with Honors

SKILLS

Programming Skills: Python, Linux and Bash Scripting, LaTeX, IDL, HTML, Matlab.
Software Languages: SolidWorks, AutoCAD.
Languages: Spanish (fluent), English (fluent) and Italian (B1).
Instrumentation: Lathe, mill, drill press.

RESEARCH EXPERIENCE

Graduate Student Researcher — University of Chicago
2019 - present — Chicago, IL
Research focuses on the characterization of optical elements and systematics in the Simons Observatory Large Aperture Telescope, a next-generation cosmic microwave background (CMB) experiment. Extending this, I develop software to model the propagation of systematic effects into later analysis of the CMB.

Graduate Student Researcher — University of Michigan
2017 - 2019 — Ann Arbor, MI
My work included characterization of optical elements and systematics in the Large Aperture Telescope in Simons Observatory, the next-generation cosmic microwave background experiment. This work completed my Master's Degree in Physics, whereupon my advisor, Jeff McMahon, was hired by the University of Chicago. Following the completion of my Master's degree, I transferred to the University of Chicago where I continued onto my PhD candidacy.

Committee on SS&T Intern — United States House of Representatives
Sept. 2019 - Oct. 2019 — Washington D.C., VA
Two month internship in the House of Representatives Committee on Science, Space and Technology. I was tasked with writing scientific reviews of space policy meetings for the Space and Aeronautics subcommittee. I also advised committee staff on the science behind 5G technology.

Undergraduate Researcher — University of Michigan
2016 - 2017 — Ann Arbor, MI
As a part of the Research Experience for Undergraduates program, funded by the NSF, I assisted in the construction of a Fourier transform spectrometer, which will calibrate the detectors within the Atacama Cosmology Telescope in Chile.

Scientific Technical Author — Carbon Design Innovations
2015 - 2017 — Burlingame, CA
Reviewed atomic force microscopy technology provided by Carbon Design Innovations, captured publish worthy images and scans, and wrote scientific letters describing new

products.

Student Researcher Department of Physics
2014 - 2017 Santa Clara, CA
Examined the efficiency and lifetime of polymer solar cells by varying a third component in the active layer, study cells under the atomic force microscope, manage projects in machine shop and operate atomic force and scanning electron microscopes.

HONORS & AWARDS

Department of Energy Science Graduate Student Research Fellow	2022 - present
National Science Foundation: Graduate Research Fellow	2018 - 2021
NASA: Space and Technology Research Fellowship Recipient (declined award)	2018
American Physical Society, Society of Physics Students Travel Grant	2016
Santa Clara University: Presidential Scholarship	2016
Santa Clara University: Hayes Fellowship	2016
American Physical Society: Women in Physics Grant	2016
Santa Clara University: University Honors Program	2015-2017
Santa Clara University: Clare Booth Luce Research Scholar	2015
Santa Clara University: Roelandts Grant	2014-2015

SERVICE

Optica Publishing Group - Applied Optics: Peer Reviewer	2022 - present
The Simons Observatory: Conference Committee, Member	2021
University of Chicago: Science Policy Group, Vice-President	2020-2021
University of Michigan: Association for Women in Science, Co-President of Mentorship 2019 - 2020	
University of Michigan: LSA Machine Shop, Machining Instructor	2019
Santa Clara University: Women in Physics, Founder and President	2015-2017
Santa Clara University: Women in STEM, Leadership Board Member	2015-2017
Santa Clara University: Calculus Peer Educator	2013-2014

PROFESSIONAL MEMBERSHIP

CMB-S4 Collaboration
Simons Observatory Collaboration
Atacama Cosmology Telescope Collaboration
Science Policy Group at the University of Chicago
American Women in Science, University of Michigan
Sigma Pi Sigma, The Physics Honor Society
Sigma Xi, The Scientific Research Society
Society of Physics Students, American Physics Society
Women in STEM, Santa Clara University
Women in Physics, Santa Clara University

OUTREACH

NSBP + Simons Obs. Undergraduate Program Coordinator	2020
University of Michigan Department of Physics Graduate Mentor	2018 - 2019
University of Michigan Society for Women in Physics Mentor	2018 - 2019
University of Michigan Rackham International Network Mentor	2018 - 2019
Astrobites.com Guest Author	2018
After School Physics Instructor, Santa Jose, CA	2017
STEM Mentoring Program Educator, Santa Clara University	2014-2015
Newport High School Sexual Health Educator, Bellevue, WA	2011-2013

INVITED TALKS AND CONFERENCES

"The Simons Observatory: Receiver Characterization with Radio Holography," SPIE Astronomical Telescopes + Instrumentation 2022, Montreal, Canada (2022).

"Modeling (and Measuring) Complex Optical Systems for The Simons Observatory and The Atacama Cosmology Telescope," Stockholm University, Stockholm, Sweden (2022).

69^{th} Lindau Nobel Laureate Meeting (2019).

"Reflectometry Measurements of the Loss Tangent in Silicon at Millimeter Wavelengths," ESA Workshop, Noordwijk, Netherlands (2018).

"ACTPol Instrumentation: Fourier Transform Spectrometer," Physics Department Research Colloquium, Santa Clara, CA (2016).

"Evaluation of 3D carbon nanotube composite AFM probes fabricated with ion flux molding," APS March Meeting, Baltimore, MD (2016).

"Evaluation of 3D carbon nanotube composite AFM probes fabricated with ion flux molding," (poster), APS Conference for Undergraduate Women in Physics, Corvallis, OR (2016).

"Polymer Solar Cells with Varied Dye Percentages" APS Conference for Undergraduate Women, Santa Cruz, CA (2015).

PUBLICATIONS, MAIN AUTHOR

1. "The Simons Observatory: Characterizing the Large Aperture Telescope Receiver with Radio Holography", **G.E. Chesmore**, et al. *in progress.*
2. "The Simons Observatory: HoloSim-ML: machine learning applied to the efficient analysis of radio holography measurements of complex optical systems", **G.E. Chesmore**, et al. *Applied Optics*, Volume 60 **29**, pp. 9029-9035 (2021), arXiv:2107.04138.
3. "The Simons Observatory: Metamaterial Microwave Absorber (MMA) and its Cryogenic Applications", Z. Xu, **G.E. Chesmore**, et al. *Applied Optics*, Volume 60 **4**, pp. 864-874 (2021), arXiv:2010.02233v2.
4. "Reflectometry Measurements of the Loss Tangent in Silicon at Millimeter Wavelengths", **Grace E. Chesmore**, Tony Mroczkowski, Jeff McMahon, Shreya Sutariya, Alec Josaitis, and Leif Jensen, *Proceedings from the 8th ESA Workshop on Millimetre-Wave Technology and Applications* (2018).
5. "Evaluation of 3D carbon nanotube composite AFM probes fabricated with ion flux molding," **Grace E. Chesmore** et al., *Journal of Advanced Microscopy Research* (2016).

PUBLICATIONS, COLLABORATION

1. "The Atacama Cosmology Telescope: Measurement and Analysis of 1D Beams for DR4", M. Lungu, et al. (in progress).
2. "The Simons Observatory Large Aperture Telescope Receiver", N. Zhu, et al. *The Astrophysical Journal Supplement Series*, Volume 257 **2**, pp. 71 (2021).
3. "The Simons Observatory: The Large Aperture Telescope (LAT)", Z. Xu, et al. *Research Notes of the AAS*, Volume 5 **4**, pp. 100 (2021).
4. "The Atacama Cosmology Telescope: Summary of DR4 and DR5 Data Products and Data Access", M. Mallaby-Kay, et al. *The Astrophysical Journal Supplement Series*, Volume 225 **1** (2021).
5. "The Simons Observatory: modeling optical systematics in the large aperture telescope", J.E. Gudmundsson, P.A. Gallardo, R. Puddu, S.R. Dicker, et al. *Applied Optics*, Volume 60 **4**, pp. 823-837 (2021), arXiv:2010.02233v2.

6. "The integration and testing program for the Simons Observatory Large Aperture Telescope optics tubes", K. Harrington, C. Sierra, G.E. Chesmore, et al. *SPIE: Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy*, Volume 11453, pp. 1145318 (2020).
7. "The Atacama Cosmology Telescope: A Measurement of the Cosmic Microwave Background Power Spectra at 98 and 150 GHz", S.K. Choi, M. Hasselfield, S.P.P. Ho, B. Koopman, M. Lungu, M.H. Abitbol, et al. (2020), arXiv:2007.07289.
8. "The Atacama Cosmology Telescope: DR4 Maps and Cosmological Parameters", S. Aiola, E. Calabrese, L. Maurin, S. Naess, B.L. Schmitt, M.H. Abitbol, et al. (2020), arXiv:2007.07288.
9. "Atacama Cosmology Telescope: Constraints on cosmic birefringence", T. Namikawa, Y. Guan, O. Darwish, B.D. Sherwin, S. Aiola, N. Battaglia, et al. *Physical Review D*, Volume 101 **8**, (2020).
10. "Broadband, millimeter-wave antireflection coatings for large-format, cryogenic aluminum oxide optics", A. Nadolski, J. D. Vieira, J. A. Sobrin, A. M. Kofman, Grace E. Chesmore et al. *Applied Optics*, submitted, in progress (2019).
11. "Wideband 67-116 GHz receiver development for ALMA Band 2", Pavel Yagoubov, Tony Mroczkowski, Grace E. Chesmore et al. *Astronomy and Astrophysics*, Volume 634, article id A46, 22 pp. (2020).
12. "The Simons Observatory collaboration", Ade, P., et al. Journal of Cosmology and Astro-Particle Physics 056, (2019).
13. "The Simons Observatory: Astro2020 decadal project whitepaper", The Simons Observatory Collaboration, arXiv:1808.07445.
14. "The Simons Observatory: Science Goals and Forecasts", The Simons Observatory Collaboration (2018).
15. "The Simons Observatory: Instrument Overview", The Simons Observatory Collaboration, *Proceedings of SPIE*, Volume 10708 (2018).
16. "Time-dependent efficiency measurements of polymer solar cells with dye additives: unexpected initial increase of efficiency," K. J. Bandaccari et al., *European Physical Journal Photovoltaics*, (2018).
17. "Structure-function relationships of fullerene esters in polymer solar cells: Unexpected structural effects on lifetime and efficiency" Michael Tro, et al., *International Journal of Energy Research* (2015).
18. "Effect of electron acceptor structure on stability and efficiency in polymer solar cells: a combinatorial approach," Michael Tro, et al., *International Journal of Energy Research* (2015).