Dr. William H. Ashfield IV

Southwest Research Institute
1301 Walnut St Suite 400, Boulder, CO 80302

Phone: (406) 580-1635
Email: william.ashfield@swri.org
URL: wilashfie.com

Appointments

2025-Present *Postdoctoral Research Scientist* Southwest Research Institute
2022-2024 *Postdoctoral Research Scientist* Bay Area Environmental Research Institute/ Lockheed Martin Solar & Astrophysics Laboratory
2019-2022 *Graduate Research Assistant* Montana State University Physics Dept.
Advisor: Dana Longcope
2018-2019 *Graduate Teaching Assistant* Montana State University Physics Dept.

Education

2022 PH.D. | Physics | Montana State University
2021 M.S. | Physics | Montana State University
2017 B.A. | Physics | Reed College

Areas of Specialisation

Solar Flares | UV and Hard X-ray Spectroscopy
Image Processing | Data Analysis and Visualization
Scientific Python Development | Numerical Simulation

Research Experience

Present Calibration and analysis of high-altitude infrared images from the 2024 total solar eclipse captured with the SAMI multi-spectral sensor platform aboard NASA's WB-57 aircraft.
2023-2024 Spectral analysis of ultra-high-cadence chromospheric UV ribbon emission using IRIS and SST to characterize the interconnection between condensation, QPPs, and flare energy release.
2022-2024 Quantification of temporal and spatial evolution of turbulence through spectral line broadening analysis.
2021-2022 Numerical simulation of Alfvén wave-induced turbulence effects on flare heating, chromospheric condensation, and long-duration coronal EUV emission.

2020-2021 Forward modeling of observations using synthetic emission spectra generated from data-driven simulations.

2019-2020 Development of one-dimensional hydrodynamic simulations to characterize downflows observed in the solar atmosphere during flares.

2016-2017 Undergraduate thesis: *Reduced Simulations: A technique for $\gamma - \gamma$ angular correlation analysis*. Developed a novel analysis technique to reduce computational time required for extracting angular correlation coefficients from nuclear decay measurements using the GRIFFIN spectrometer at TRIUMF facility in Vancouver, Canada. Available here.

Publications & Conference Proceedings

Refereed articles

2025 Ryan J. French, **William H. Ashfield IV**, Cole A. Tamburri, Maria D. Kazachenko, Marie Dominique, Marcel Corchado Albelo, and Amir Caspi, "Dual Origins of Rapid Flare Ribbon Downflows in an X9-class Solar Flare", *ApJ*
DOI: 10.48550/arXiv.2511.13862

2025 **W. Ashfield IV**, V. Polito, J. Lörinčík, B. De Pontieu, G. Chintzoglou, S. Bose, N. Freij, L. Rouppe van der Voort, R. Joshi, J. Thoen Faber, "Spectroscopic Observations of Solar Flare Pulsations Driven by Oscillatory Magnetic Reconnection", *Nature Astronomy*
DOI: 10.1038/s41550-025-02706-4

2024 **W. Ashfield IV**, V. Polito, S. Yu, H. Collier, L. Hayes, "Non-thermal Observations of a Flare Loop-top using IRIS and EOVSA: Implications for Turbulence and Electron Acceleration", *ApJ*
DOI: 10.3847/1538-4357/ad64ca

2024 Andy S.H. To, David H. Brooks, Shinsuke Imada, Ryan J. French, Lidia van Driel-Gesztelyi, Deborah Baker, David M. Long, **William Ashfield IV**, "Spatially Resolved Plasma Composition Evolution in a Solar Flare – The Effect of Reconnection Outflow", *A&A*
DOI: 10.1051/0004-6361/202449246

2024 H. Collier, L. Hayes, S. Yu, A. Battaliga, **W. Ashfield**, V. Polito, L. K. Harra, S. Krucker, "Localising pulsations in the hard X-ray and microwave emission of an X-class flare", *A&A*
DOI: 10.1051/0004-6361/2023486522

2023 **W. Ashfield IV** & D.W. Longcope, "A Model for Gradual Phase Heating Driven by MHD Turbulence in Solar Flares", *ApJ*
DOI: 10.3847/1538-4357/acb1b2

2022 **William Ashfield IV**, Dana W. Longcope, Chunming Zhu, and Jiong Qiu, "Connecting Chromospheric Condensation Signatures to Reconnection Driven Heating Rates in an Observed Flare", *ApJ*
DOI: doi.org/10.3847/1538-4357/ac402d

2021 **W. H. Ashfield** & D.W. Longcope "Relating the Properties of Chromospheric Condensation to Flare Energy Transported by Thermal Conduction", *ApJ*
DOI: doi.org/10.3847/1538-4357/abedb4

2019 J. K. Smith, A. D. MacLean, **W. Ashfield**, A. Chester, A. B. Garnsworthy, C. E. Svensson, "Gamma-gamma angular correlation analysis techniques with the GRIFFIN spectrometer", *NIM A*
DOI: 10.1016/j.nima.2018.10.097

2019 A. B. Garnsworthy, C. E. Svensson, M. Bowry, R. Dunlop, A. D. MacLean, B. Olaizola, J. K. Smith, F. A. Ali, C. Andreoiu, J. E. Ash, **W. H. Ashfield**, G. C. Balle, et. al., "The GRIFFIN Facility for Decay-Spectroscopy Studies at TRIUMF-ISAC", *NIM A*
DOI: 10.1016/j.nima.2018.11.115

Invited Presentations

2022 William Ashfield, Dana Longcope, Chunming Zhu, and Jiong Qiu "Connecting Chromospheric Condensation Signatures to Reconnection Driven Heating rates in an X1.0 Flare", Hinode-15 / IRIS-12, Prague, Czech Republic

Selected Contributed Presentations

2025 William Ashfield et al. "The 50,000 Foot View: Upgraded Observations of the Corona at the 2024 April 8 Total Eclipse from NASA's WB-57 Aircraft", 246 AAS/SPD Summer Meeting, Anchorage Alaska

2024 William Ashfield et al. "Non-thermal Observations of a Flare Loop-top with IRIS and EOVSA: Implications for Turbulence and Electron Acceleration", AGU Fall Meeting, Washington D.C.

2023 William Ashfield, Dana Longcope "A Model for Gradual Phase Heating Driven by MHD Turbulence in Solar Flares", RoCMI Workshop, Longyearbyen, Svalbard, Norway

2022 William Ashfield, Dana Longcope "A Model for Gradual Phase Heating Driven by MHD Turbulence in Solar Flares", SHINE Conference, Honolulu, Hawai'i

2021 William Ashfield, Dana Longcope, Chunming Zhu, and Jiong Qiu "Connecting chromospheric condensation signatures to reconnection driven heating rates in an X1.0 flare", AAS/Solar Physics Division Meeting (Virtual) See it here.

2021 William Ashfield, Dana Longcope, Chunming Zhu, and Jiong Qiu "Connecting chromospheric condensation signatures to reconnection driven heating rates in an X1.0 flare", SolFER Spring Meeting (Virtual) See it here.

2020 William Ashfield and Dana Longcope "Characterizing Chromospheric Condensation from Shocks Driven by Thermal Conduction", AGU Fall Meeting (Virtual)

Conference Activities

2025 Session chair - The Sun, AAS/SPD 246 Summer Meeting, Anchorage, Alaska

2025 Session co-chair - Coronal Dynamics: Unveiling the Origins of the Solar Wind, SDO Science Workshop 2025, Boulder, Colorado

2021 Session co-chair - Solar Flare Onset and Energy Release II Oral, AGU Fall Conference, New Orleans, Louisiana

Invited Talks and Seminars

2022 Stanford Solar Seminar, "Modeling the Effects of Flare Energy Release and Transport through Chromospheric Condensation and Coronal EUV Emission"
2022 Lockheed Martin Solar and Astrophysics Seminar, "Modeling the Effects of Flare Energy Release and Transport through Chromospheric Condensation and Coronal EUV Emission"
2021 National Solar Observatory APS Seminar, "Chromospheric Condensations as a Diagnostic for the Flare Energy Release Process"

Workshops

2023 EOVSA Data and GX Simulator Modeling Camp, NJIT, Newark, NJ
2022 Solar Spectropolarimetry and Diagnostic Techniques School, NSO/HAO, Boulder, CO
2022 Solar Physics High Energy Research (SPHERE) Workshop, SwRI, Boulder, CO
2022 5nd NCSP DKIST Data-Training Workshop, NSO, Virtual
2021 4nd NCSP DKIST Data-Training Workshop, NSO, Virtual
2020 2nd NCSP DKIST Data-Training Workshop, NSO, Cal State Northridge
2020 Heliophysics Summer School, UCAR, CU Boulder

Observing and Planning Experience

2023-2024 Interface Region Imaging Spectrograph (IRIS) - 8 weeks
2024 Swedish Solar Telescope (SST) - 1 week

Software Development

Present PyPREFT | Rewriting and expanding the numerical simulation code developed by Longcope and Klimchuk for efficiency and integration with scientific Python.
2017 US Elections Data Visualization App | Assisted Dr. Michael McDonald with the US Elections Project Team in creating automated election demographic visualization using R shiny.

Work

2015-2017 *Science Educator*, Oregon Museum for Science and Industry
2015-2017 *Tutor & Grader*, Reed College Dorothy Johansen House for Academic Support Services
2014-2016 *Line Chef* Pok Pok

Updated: December 4, 2025