Stanford

Shea Hess Webber

Physical Science Research Scientist

W. W. Hansen Experimental Physics Laboratory

Bio

BIO

EDUCATION:

Dr. Hess Webber received a BS in Physics from Gettysburg College in 2009. She subsequently joined the Computational Data Sciences PhD program (formerly, Computational Science and Informatics) at George Mason University, with a specialty in Astrophysics and Space Sciences. Her PhD thesis work was entitled "Solar f-mode Wave Scattering Off Linear Source Boundaries" and she successfully completed her PhD in late 2016 (also earning an MS along the way -- 2012).

EXPERIENCE:

Dr. Hess Webber began her career in solar physics research in 2005, as a summer intern in the Solar Physics Division at NASA's Goddard Space Flight Center. She continued collaborating with scientists at Goddard through undergrad, mainly working in solar coronal hole studies using SOHO/EIT data but also collaborating briefly on solar flare studies with the RHESSI team. She began working at GSFC full-time as a graduate research assistant in 2009. Her initial GRA work continued the ongoing coronal hole detection research, extending the data set with SDO/AIA images and improving the detection technique. The core of Dr. Hess Webber's dissertation considered coronal holes using helioseismology, investigating how surface waves on the Sun are influenced when passing through a coronal hole and whether wave perturbations can be used to isolate coronal hole boundaries. In doing so, she developed a new geometry-dependent helioseismic technique and showed that the geometry of a "scattering feature" is non-negligible in helioseismology studies. After defending her PhD, Dr. Hess Webber continued as a contracted postdoctoral researcher at GSFC for a year, collaborating on CME-tracking methods. In early 2018, she began as a postdoctoral scholar at Stanford University in the W. W. Hansen Experimental Physics Lab's solar physics group. Currently, Dr. Hess Webber is continuing as research staff with the HEPL solar physics team, where her main research projects include helioseismic studies, and machine-learning applied to solar magnetism to enable improved coronal/solar-wind models for space-weather forecasting.

LEADERSHIP:

Dr. Hess Webber is currently an elected member of the AAS Solar Physics Division Committee. She is also a co-lead of the COFFIES Center Effectiveness Team.

BROADER IMPACTS

Dr. Hess Webber also has extensive experience with Education and Public Outreach in solar physics, and some experience with science policy. She is currently on the KIPAC Equity & Inclusion Task Forces for 1) Mental Health and 2) Mentoring. She also actively participates in the COFFIES DEIA and Beans initiatives, as well as organizes the Stanford Solar Physics Summer Student program.

ACADEMIC APPOINTMENTS

- Phys Sci Res Assoc, W. W. Hansen Experimental Physics Laboratory

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Full Member, AGU - SPA Division (2016 - present)
- Full Member, AAS - SPD division (2016 - present)
- Committee Member, AAS Solar Physics Division (2022 - present)

PROFESSIONAL EDUCATION

- PhD, George Mason University , Computational Astrophysics (2016)
- MS, George Mason University , Computational Astrophysics (2012)
- Bachelor of Science, Gettysburg College (2009)

Publications

PUBLICATIONS

- **The Sun's Large-Scale Flows I: Measurements of Differential Rotation & Torsional Oscillation** *SOLAR PHYSICS*
  Mahajan, S. S., Upton, L. A., Antia, H. M., Basu, S., Derosa, M. L., Webber, S., Hoeksema, J., Jain, K., Komm, R. W., Larson, T., Nagovitsyn, Y. A., Pevtsov, A. A., Roudier, et al
  2024; 299 (3)
- **Inferring Maps of the Sun's Far-side Unsigned Magnetic Flux from Far-side Helioseismic Images Using Machine Learning Techniques** *ASTROPHYSICAL JOURNAL*
  Chen, R., Zhao, J., Hess Webber, S., Liu, Y., Hoeksema, J., DeRosa, M. L.
  2022; 941 (2)
- **Solar Flare Predictive Features Derived from Polarity Inversion Line Masks in Active Regions Using an Unsupervised Machine Learning Algorithm** *ASTROPHYSICAL JOURNAL*
  Wang, J., Zhang, Y., Webber, S., Liu, S., Meng, X., Wang, T.
  2020; 892 (2)