

## **Activities Attended and Value of Conference Statement**

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### **SHINE Workshop**

SHINE (Solar and Heliospheric Interplanetary Environment)  
at UCAR (University Corporation of Atmospheric Research)  
Boulder, Colorado  
August 4 to 9, 2019

August 19, 2019

Among the working group sessions at the SHINE workshop, a couple of sessions discussed the importance of binning multi-instrument data-sets using the same time resolution and correct alignment to better observe features from the middle corona all the way down to the photosphere over two solar rotations. It was shared at the meeting that Y-Ming Wang is seeing large concentrations of helium-ions in the fast solar-wind in the low corona. Conversely, due to the slow solar-wind having a low Alfvén velocity in the low corona, there is no pile up of helium-ions in the slow solar-wind there. Note that the slow solar-wind is normally observed nearer the equator and that the fast solar-wind is observed towards and at the poles. In another session, it was pointed out that some features are observed better in the denser slow solar-wind. Also, Hugh Hudson gave a thought provoking lecture on making sure scientists enforce momentum and energy conservation during the evolution of flare and CME (coronal mass ejection) events.

On the Parker Solar Probe mission, data will be available to the public this November. The Parker probe is making multiple close approaches to the Sun over the next few years. The spacecraft makes use of Venus and other planets for gravity assist and data is gathered from closest approaches to the Sun and planets. Dust in the solar-wind has been observed and might come from early solar system. Data includes particle, magnetic and coronagraph data.

At SHINE, I was a volunteer judge of student posters which were presented during the evenings. I had previously attended three SHINE workshops as a student and am very supportive of student research. One SHINE student is studying ways to computationally identify the main two sunspot pairs of an active region. Another student is looking to see if different models of CME configurations can fit the same background magnetic field over time.

The SunPy software session discussed the current software for solar image-processing and data analysis. SunPy is now the mostly used software over the traditional SolarSoft software.

Funding opportunities were discussed at the workshop. The National Science Foundation have collaborative-field funding available for cross-discipline research. This is potentially a funding source for my planned long duration solar-cycle and extreme climate change research. The Foundation Center (<https://foundationcenter.org/>) is another good source for funding opportunities. Also, NASA Summer training is available for instructors, for student research projects to bring back to the college. The research involves using data analysis to identify and classify solar events. This work is important as solar data-sets are becoming extremely large, and a good tested method to analyze large data-sets is with collaborative crowd-type research.