Solar Physics Division of the American Astronomical Society

Annual Report: 2015-2016

Dana Longcope, SPD Chair

2016-May-2

The Solar Physics Division of the American Astronomical Society works to advance the study of the Sun and to promote the coordination of solar research with other branches of science.

Sunspot Cycle 24 appears to have passed its maximum. This cycle, like several before, has shown two distinct peaks in activity indices, such as sunspot number. This first occurred in 2012 when the Sun's northern hemisphere reached its peak activity. The southern hemisphere, however, appears to be lagging by about two years, and reached its peak some time in the middle of 2014.

A number of highlights are worthy of note from the past year:

- Solar & Heliospheric Observatory (SOHO) celebrated its 20th birthday making it the longest-running solar observatory. It also discovered its 3,000th comet, making it (by far) the leading discoverer of comets.
- Plasma at the solar surface flows primarily from East to West, in a differential rotation, but also has a measurable poleward component. The poleward surface flow must be balanced by an equatorward return flow at some depth. Only over the past two years has direct measurements of this deep return flow been made using helioseiesmolgy. Several independent measurements have now observed equatorward flows at depths below about 50 Mm. These are more complex than a simple single meridional cell, and future work will focus on mapping and understanding its complex structure.
- How energy is deposited in the solar corona to heat it remains a mysterie challenging the field of Solar Physics. Recent observations using imaging and spectroscopic data from three different spacecraft (*Hinode*, IRIS and SDO) have provided, for the first time, definitive evidence of damping plasma waves accompanied by an increase in termparature.
- Construction continues of the 4-meter future flagship telescope, named the Daniel K. Inouye Solar Telescope (DKIST) on Haleakelaa on Maui, HI. Upon completion of the telescope enclosure, expected within months, the project will no longer be subject to weather difficulties too often experienced at that high location. DKIST staff has continued moving to its new headquarters in Boulder, CO.
- In October 2015, The US Office of Science and Technology Policy announced an official National Space Weather Strategy. This document outlines the measures the US government will take to prepare for and mitigate effects of space weather.

The SPD has 450 active members (as of April 30, 2016), of which 54 are Division Affiliates from other scientific organizations. This total is virtually unchanged from last year's, which had been an 8% drop from 2014. It therefore seems that the membership is holding steady at a new level. The numbers within various categories of membership (full, 263; associate, 31; affiliate 53; junior, 26; emeritus, 72) have changed, but the overall total has remained constant.

The SPD was led during the 2015-2016 interval by chair Dana Longcope, and vice-chair Leon Golub. The other officers are Aimee Norton (secretary) and David McKenzie, (treasurer), and committee members are David Alexander (past-chair), Steven Bradshaw, Mark Cheung, Gordon Emslie, and Sabrina Savage. The committee last met in person at the TESS meeting in Indianapolis on April 25, 2015. It has conducted business over e-mail since then. The next in-person meeting will be on May 30, 2016 in Boulder, CO, just before the SPD meeting.

The 2016 SPD meeting will be a stand-alone meeting held in Boulder Colorado, May 31 – June 4, and hosted by the National Solar Observatory (NSO) at its new headquarters location on the campus of the University of Colorado. The meeting preparations are nearly complete. 295 abstracts were received, 166 of which requested orals (i.e., 56%). Approximately half of the requests for oral session were accommodated. Of the 129 poster requests, 38 asked for additional e-posters. All e-poster requests were granted. Because Monday was a holiday (Memorial Day), the meeting was kept to 4 days (with only a partial morning session on the 1st day). Attempts were made to prevent closely related sessions from running in parallel.

Former plans had called for the 2017 SPD meeting to be held in Jackson Hole, WY (Aug. 21-26, 2017) as part of back-to-back meetings with the AAS High Energy Astrophysics Division (HEAD), bracketing the total eclipse on Aug. 21, 2017. Recently the conference hotel, the Snow King, came under new ownership, converted many of its rooms to condominiums, and canceled the SPD contract. It offered to renegotiate the terms, proposing to charge more than the original $235.00/night, and to add fees and to remove concessions. Some of the additional fees would have appeared as "resort fees", for which many members would not be eligible for reimbursement. Additionally, due to their newly reduced capacity it became unlikely that the hotel could accommodate both SPD and HEAD members on the all-important night of Sun Aug 20.

The SPD committee deemed these proposed changes to be unacceptable, and voted to change the venue of the 2017 SPD meeting. After weighing different options, the committee voted to move the 2017 SPD meeting to Portland, OR, and to retain the original dates, Mon-Sat Aug. 21-26, 2017. Portland is outside the eclipse path, but a 1-hour bus trip gets one to Salem, OR which has among the highest chances of clear skies on the entire path.

The SPD bestows two annual scientific prizes to deserving members. The 2016 Hale Prize will be awarded to Dr. Terry Forbes "for his significant contributions to the theory of magnetic reconnection, for his development of important new models of the physics of solar flares and coronal mass ejections, and for his achievements mentoring students and junior scientists in the solar physics community." The 2016 Karen Harvey Prize, for younger investigators, will be awarded to Dr. Katharine Reeves "for her work elucidating the energetics of solar flares and coronal mass ejections, for her leadership within the multi-national *Hinode*/X-Ray Telescope project, and for her strong role in scientific education and public outreach."

It has been a long-standing tradition for the Hale Prize winner to deliver a plenary talk at the Summer AAS meeting, and for the prize to be officially bestowed at that lecture. The recipient, division chair, and several members of the SPD would typically attend the Summer AAS to officiate and participate in this ceremony. Due to a scheduling oversight no plenary lecture was scheduled for the Hale prize winner at the 2016 AAS meeting in San Diego, CA. As a result, attendance plans were scrapped and the Hale prize lecture abstract was withdrawn. Instead the prize will be, for the first time ever, awarded at a plenary lecture delivered at a stand-alone SPD meeting – the 2016 meeting in Boulder, CO. Discussions with AAS have begun about having the 2016 winner (Forbes) deliver a plenary lecture at the 2017 Winter AAS meeting, but obviously not in conjunction with the official awarding of the prize.

Most of the work of the SPD is accomplished by committees. The SPD is grateful for their efforts. More detailed information about committees, activities, and history of the division can be found at the SPD's website: http://spd.aas.org.

The Prize committee selects the recipients of the Hale and Harvey Prizes. Members of the committee are Mark Linton (chair), Doug Braun, Sarah Gibson, K.D. Leka, and Haimin Wang.

The Nominating Committee submits nominations to the SPD Secretary for vacancies in the positions of Officers and Committee-persons. The Nominating Committee ascertains the willingness of its nominees to serve if elected. It is currently chaired by Amy Weinbarger and includes Kathy Reeves and Steven Cranmer. They have submitted names and elections are currently under way to fill next year's vacancies.

Popular writing awards are presented to authors of popular or semi-popular articles on the Sun or the effects of the Sun on the Earth's environment. One award is typically made to a scientist author and another to a science writer/journalist. Eligible articles are reviewed, and winners are selected by the Public Writing Award committee, consisting of Monica Bobra (Chair), Angela DesJardins, Cooper Downs, Kelly Korreck, and Timothy Ferris. Timothy Ferris, is an author, science writer, and former winner of the public writing award. This is the first time such a member has been included in the committee.

This year's since writer/journalist winner was Jonathan Keats for his article *"The 315-Year-Old Science Experiment*" published in the March 2015 Issue of *Nautilus.* The winner of the prize for scientists was Neel Savani, for his article *"New Solar Storm Forecasting Technique Breaks the 24-Hour Warning Barrier For Earth"* published in the June 2015 Issue of *Popular Science.* Both winners will receive a $500.00 cash prize as well as a certificate.

The Studentship Committee, aided by Treasurer David McKenzie, continues to award travel scholarships to enable undergraduate and graduate students to attend the annual SPD meeting. This program is now in its 38th year, and has an impressive number of notable "alumni." This year the Committee made 12 awards to students with home universities ranging from US universities such as George Mason University and NJIT, to international institutions such as Aberystwyth University (Wales), Queens University (Northern Ireland) and Monash University (Australia).

For several years, ending with the last fiscal year, the NSF had provided, through a generous grant to New Mexico State University (Dr. Jason Jakiewicz. PI), additional funding for student travel to meetings. This allowed the Studentship Committee to supplement SPD funds and so support a greater student attendance at the annual SPD meeting, and it also supported student attendance at other solar-related meetings. This grant has now terminated, and it is a priority of the Committee to re-establish a similar support mechanism in the near future. In the interim the SPD committee voted, during its 2015 meeting, to increase to $10,000 the total amount allocated to studentship committee for awards.

The Studentship Committee also sponsors, with enormous help from the SPD membership, the annual Student Poster contest, which awards a cash prize, and recognition during the meeting, to the student with the best poster at the Annual Meeting.

Adopting a suggestion from the 2014 AAS leadership meeting, the SPD committee created an award to offset costs (up to $400) of family care for members attending the annual SPD meeting. In its inaugural year there was only a single applicant, perhaps due

to low visibility early on. The award appears to be gaining visibility and there were three applications for the 2016 SPD meeting. All three were granted.

During its meeting in Indianapolis, the SPD committee discussed the need for increased diversity in Solar Physics. Toward this end they voted to a number of minority graduate student fellowships of $2,500 per year. Plans are being made for awarding these.

The Thomas Metcalf SPD Travel Fund was established in 2007 to help support travel costs of recent PhDs and advanced graduate students in order to enable them to participate in a meeting relevant to solar physics. Awardees are selected based on their potential for future contributions to the field of Solar Physics. Recipients are expected to present results relevant to their thesis or current work in solar physics. In the coming year awards will be made to support two lecturers at each of the following meetings, IAU meeting 327 in Cartegena de Indias, Colombia, IAU meeting 328 in Maresias, Brazil, and the SDO meeting in Burlington, VT. Supporting three meetings will require slightly more funding than usual, but since the fund has been consistently spending less than its yearly allocation, the SPD committee voted to allow the higher level for thus year. The Metcalf Travel Fund committee is chaired by Todd Hoeksema with members Marc DeRosa, Mark Miesch and Kathy Reeves.

The Education and Public Outreach (EPO) committee is now chaired by Claire Raftery, with the support of Trae Winter, Mitzi Adams, Zoe Frank, and graduate student Juan Camillo Buitrago Casas. In the run up to the 2017 total eclipse, the committee has changed its focus to that of preparing and supporting SPD community members for public outreach and press opportunities around the eclipse. As such, the committee has arranged for a 2-hour workshop/seminar to be held at the 2016 SPD meeting in Boulder that will focus on science communication and speaking to the public. This workshop will be focused on simplifying messages, reducing the use of jargon, and speaking at an appropriate level for an audience. The workshop will target early career researchers and students, but will be open to any SPD member in attendance at the Boulder meeting.

The EPO committee is also planning to host a student lunch, in lieu of the annual student mixer. With the support of the SPD LOC, the EPO committee has encouraged community members to submit abstracts on their planned activities around the solar eclipse. This will give the rest of the community the opportunity to see what is happening, and will also give others the chance to be involved if they wish. Finally, it is planning to gather lists of scientists who would like to be involved in eclipse efforts, and plan to make that list available to program organizers.

The EPO Chair (Raftery) has been attending monthly meetings of the Heliophysics Education Consortium - a recently-awarded NASA Cooperative Agreement grant awarded to NASA/GSFC. This project is taking the lead on coordinating eclipse efforts across the nation. The EPO Chair is representing the needs and skills of the SPD community at these meetings.

The Public Policy Committee (PPC), consisting of A. Gordon Emslie (chair), Stephen Bradshaw, Nicole Duncan, Kelly Korreck, and Brian Welsch, involves itself in a variety

of activities aimed at increasing awareness of, and ultimately funding for, research in Solar Physics and Heliophysics. The Chair liaised closely throughout this past year with Dr. Joel Parriott, Director of Public Policy in the AAS Office, and with members of the Advocacy Committee of the AGU Space Physics & Aeronomy Division. Members of the PPC are planning a visit to various congressional offices on May 11 to (a) maintain and build relationships with local representatives and senators from the local districts of the Committee Members, and (b) to encourage influential members of the House and Senate Appropriations and Budget Committees to support increased funding for Heliophysics research (within NASA, NSF, and other agencies), in particular the substantial increase for NASA Heliophysics in the President's FY 2017 budget request.

Dr. Welsch engaged a number of younger SPD members in a letter-writing campaign to various NASA officials, emphasizing the long-term value of a robust program of solar physics research, ranging from space missions (including Explorer opportunities), sub-orbital programs, laboratory research and small grants programs, and urging those officials to ensure the vitality of our field, with its value to both science and society.

Dr. Korreck organized a lecture-series entitled "Space on the Hill", co-sponsored by the Smithsonian Astrophysical Observatory and the AAS/SPD, aimed at elected members and staffers on Capitol Hill. The lecture series will provide educational lectures on astronomical topics, and is explicitly devoted to education rather than advocacy. The first in this series, entitled "Cloudy with a chance of Solar Flare: How Space Weather Affects your Life", was given in two separate sessions, on April 20, 2016. Each session featured three speakers, Kelly Korreck (SAO), C.Alex Young (GSFC), and Harlan Spence (UNH). The morning session was held in the House of Representatives Science and Technology Committee Hearing Room in Rayburn Office Building and was attended by 22 congressional staffers. The afternoon session was held in the Senate Russell Office Building, with 34 attendees from the hill, NSF, NASA, and some science non-profits. Senator Gary Peters (D-MI) attended, spoke for about 10 minutes at the start, and stayed for most of the lecture.

The next in this series is slated for May 17, 2016, entitled "A Mission to Touch the Sun", and will feature Justin Kasper, from the University of Michigan.

Finally, the Senate Commerce, Science, and Transportation (CST) committee introduced the *Space Weather Research and Forecasting Act* (S.2817) on April 19, 2016, sponsored by Sen. Peters (D-MI), and co-sponsored by Sens. Booker (D-NJ) and Gardiner (R-CO). In advance of its introduction, the SPD/PPC worked with the AAS to advise the CST committee on wording. The PPC chair (Emslie) worked the SPD chair (Longcope) to draft a formal letter of endorsement for this bill. Upon approval by the SPD committee and the AAS, the letter was submitted to the CST on behalf of the AAS and SPD, signed by Meg Urry and Dana Longcope.

Craig DeForest has served the SPD as its press officer since the post was created 17 years ago. He has finally decided to step down and a new press officer, H. Trae Winter, has been appointed to replace him. Craig and Trae are working together to prepare press

information for the 2016 SPD meeting. Following the meeting Craig will turn over the reins to Trae.

The SPD's electronic newsletter, SolarNews, is distributed semimonthly to the worldwide solar physics community. It provides the disciplines' premier global means for communicating news and information. Archives are available at http://solarnews.nso.edu. Its current subscriber list. 1189, is 10% larger than it was at this time last year. Since 2009, SolarNews has a direct news exchange with the UK Solar Physics newsletter. SolarNews is prepared and edited by the SPD secretary, Aimee Norton.