astrosociety.org

2015 Annual Report

— Inspiring a New Generation of Astronomers —

EXECUTIVE DIRECTOR'S MESSAGE

It has been an enormously successful year for both astronomy and the ASP.

In 2015, the *Rosetta* spacecraft successfully escorted comet 67P/Churyumov-Gerasimenko as it hurtled around the sun; NASA's *New Horizons* arrived at Pluto after a ten-year journey, capturing astonishing images of the surface; evidence of liquid water was discovered on Mars; and the *Dawn* spacecraft arrived at Ceres, the largest body in our asteroid belt! Events like this fuel the public's imagination and inspire the next generation of astronomers.

For 126 years, our mission has been to improve scientific literacy through the awe and wonder of astronomy. We create innovative materials and programs designed to bring the excitement of astronomy to the public. And because one person can inspire thousands in their lifetime, we help educators of all kinds teach astronomy more effectively. ASP programs provide college astronomy lecturers, amateur astronomers, museum staff, park rangers, K–12 teachers, and professional researchers with the training and resources needed to teach astronomy to others.

I am pleased and honored to present this 2015 Annual Report to you, a description of the Society's many accomplishments during my first year as Executive Director. As you will see, we've expanded many existing programs that support the teaching and learning of astronomy, and launched several new exciting and innovative initiatives. We also strengthened our fiscal health with significant increases in both earned revenue and donations.

For example, in 2015:

- **The ASP was awarded over $2 million in NASA education contracts** to support three different projects bringing astronomy to the Girl Scouts, to more than 500 museums around the country, and to people engaged in citizen-science projects. The ASP was also awarded a separate NASA contract to continue our support of the over 450 amateur astronomy clubs in the Night Sky Network (NSN).
- **We wrote and published *The Total Skywatcher's Manual***, the first stargazing guide in our 126-year history. This family-friendly, engaging, activity-based book features more than 275 tips for exploring the sky.
- **The ASP began a formal partnership with IOP Publishing** to create *Publications of the Astronomical Society of the Pacific (PASP)*. With this new collaboration, PASP will broaden its exposure within the international astrophysical community through IOP's partnerships in rapidly developing science communities, such as those in Asia and South America.
- **The ASP received $50,000 from Intel** to develop a portfolio of Arduino programming challenges for middle school students focused on astronomy, space science, and aerospace engineering.
- **We inaugurated the ASP Teacher Learning Center** and hosted our first summer Astronomy Teacher Institute for middle and high school science teachers, who collectively teach more than 4,000 students each year.

None of our successes would be possible without the support of our members and donors. Your incredible generosity makes it possible for the ASP to bring the excitement of astronomy to audiences around the world. Please enjoy reading this report and take pride in what you have helped us accomplish this year.

Linda Shore, EdD
Executive Director

BOARD PRESIDENT'S MESSAGE

As of this spring, the ASP is in its most secure financial standing in years. We have received grants from foundations in support of programs for FY16 totaling over $600,000 in restricted funds, and another $143,000 in unrestricted funds. The programs serve a wide spectrum of audiences that fulfill the ASP's mission, including teachers (for professional development), Girl Scouts, museum educators, astronomy enthusiasts engaged in citizen science, and amateur astronomy clubs.

Since my last message a year ago, the Board of Directors has reconstituted the Advisory Council under the leadership of Michael Bennett (Past Executive Director). The Council will be advising on membership and development. The Board has also initiated a Development Committee and a Diversity Committee to assist the Executive Director and staff. In addition, the Awards Committee has been reconfigured to accommodate the increase in awards by separating them into three categories: awards for astronomy educators, for professional astronomers, and for amateur astronomers. The Awards Committee has members with expertise in each area. The Diversity Committee is in the process of creating a new award to honor African-American scientists. The award will be jointly administered with the Awards Committee. With these committees, together with the rest of the eight Board committees, the Board of Directors will continue to uphold the ASP's mission to increase public science literacy through the study of and participation in astronomy.

Over the past year, instances of sexual harassment in astronomy have surfaced, inflicting emotional damage and causing some women to leave the field. As has always been our position, the ASP will not tolerate harassment or discrimination of any kind, either at ASP Annual Meetings or at any of the other programs or workshops hosted by the Society. We reaffirm our commitment to diversity, inclusion, and equity, and commit ourselves to promoting change through education. The ASP staff and Board are committed to taking the following proactive steps: develop activities and resources for existing ASP programs (such as the Astronomy Ambassadors program) that promote gender equity and inclusion; expand and diversify the pool of award nominees as well as the general membership; and use ASP publications to address gender-related issues in astronomy. The ASP Board is considering the creation of a new award honoring women making significant contributions to astronomy research and education. The ASP will also endeavor to assemble an Equity Task Force with staff, Board members, Advisory Council members, and experts in gender equity and inclusion to help the Society develop new initiatives and forge partnerships with universities, laboratories, observatories, and professional societies.

With an incredibly vigorous, dedicated Board, an amazingly tireless Executive Director, and a highly creative, passionate staff, the ASP will continue to proudly serve its communities. Even with challenges before us, success is an inevitable outcome if we all work together toward the common goal.

Connie Walker

Connie Walker
President, ASP Board of Directors

On the Cover

Front: Science fair participant viewing the sun with Night Sky Network club Charlie Elliot Astronomy. Credit: ©Daniel Thoman, thomanstudio.com.

Back: A member of the Amateur Astronomers Group in New Mexico sets up for a star party. Credit: Barbara Moore.

DIVERSITY STATEMENTS

Dear Members, Supporters, and Friends of the ASP

Over the last six months, the astronomy community has been rocked by the revelations of very serious cases of sexual harassment against women at several institutions. Equally disturbing was the discovery that these behaviors had gone essentially unchecked at universities for decades. Serious questions were raised concerning who knew about it, how and why this behavior was tolerated for so long, and whether the profession has the right mechanisms in place to address sexual harassment swiftly and meaningfully.

Horrendous emotional damage has been done to women directly affected by sexual harassment and we have lost scores of female astronomers who left the field because of what they experienced or witnessed. Internationally respected science news outlets such as *Nature*, *The New York Times*, and *Washington Post* have pronounced: "Astronomy's Snowballing Sexual Harassment Scandal Picks Up Even More Cases," "Stories Spill Out as Spotlight Is Shined on Sexism in Astronomy," and "Astronomy Roiled Again By Sexual-Harassment Allegations." These are hardly headlines that encourage girls and young women to pursue astronomy as a career.

Formal statements have been made by professional societies such as the American Astronomical Society, Royal Astronomical Society, and American Geophysical Union strongly denouncing sexual harassment and re-affirming institutional commitments to create safe and inclusive work and learning environments. ASP now adds its voice to condemn harassment, support victims, and promote a culture of inclusion.

The ASP Board of Directors and ASP Staff have condemned, and continue to strongly condemn, harassment based on gender, gender identity, sexual preference, race, ethnicity, age, religious beliefs, or disability. We affirm our commitment to diversity, inclusion, and equity and commit ourselves to promoting change through education (See ***ASP Board of Director's* Statement on Sexual Harassment in Astronomy** on the next page).

The ASP also announces several proactive initiatives designed to promote equity and inclusion (See ***Astronomical Society of the Pacific's* Statement on Diversity and Inclusion** on the next page). More than any other organization, the ASP is uniquely positioned, holds the reputation, and possesses the skills needed to educate the astronomy community. Ending sexual harassment requires a multipronged approach focusing on the beliefs and behavior of individuals, organizations, and systems. We are ***the*** trusted organization that the entire astronomy community looks to when it needs the access the very best in educational materials, resources, and training. Through existing ASP programs and initiatives — *Astronomy Ambassadors* (training young astronomers in education outreach), *My Sky Tonight* (developing materials for young children), *ASP Teacher Learning Center* (K–12 teacher professional development) — we can do a great deal to promote equity and inclusion.

On behalf of the ASP Board, Staff and all the astronomy enthusiasts our programs serve, thank you for your continued support of our work. Together we will ensure that the excitement of astronomy is available to all.

Sincerely,

Linda Shore, EdD
Executive Director

Connie Walker
President, ASP Board of Directors

DIVERSITY STATEMENTS

ASP Board of Director's Statement on Sexual Harassment in Astronomy

Recently, multiple serious cases of sexual harassment in astronomy occurring at several major universities have been exposed and reported. The Astronomical Society of the Pacific, the oldest astronomical society in the U.S., strongly condemns sexual harassment, as well as any form of harassment or discrimination in the astronomical community. We also unequivocally support the victims of abuse who bravely speak out against such behavior, often at the risk of their own professional careers.

The mission of the ASP is to increase the understanding and appreciation of astronomy by engaging scientists, educators, communicators, amateur astronomers, and the public, to advance science and science literacy. We strive to engage people of all backgrounds, gender, sexual orientation, or disability status. As such, we will not tolerate harassment of any kind in our programs and activities. We encourage all astronomy educators at every level, K–12, college or university, museum, or informal educational setting, to maintain a similar strong stance against harassment of any kind in their educational institution or setting.

Sexual harassment weakens our field by driving out members of our community and hampering their professional development, thereby costing us their contributions, on top of the personal and professional suffering caused. All members of our community must step up and take responsibility for these events, even if committed by a few.

The creation of a truly respectful astronomical community requires the participation of us all; more senior members of the community, especially those from more privileged groups, must speak out and play an active role. If we all work together to develop and maintain an environment that does not tolerate harassment, then the field of astronomy will be better off.

Astronomical Society of the Pacific's Statement on Diversity and Inclusion

The Astronomical Society of the Pacific (ASP) is an international organization whose mission is to increase public science literacy through the study of and participation in astronomy. To fulfill this mission, the ASP provides astronomy enthusiasts of every kind — regardless of age, level of education, or professional training — with the resources, programs, and materials needed to improve their own understanding of astronomy and their abilities to share their knowledge with others.

The ASP is committed to actively promoting diversity and will engage in astronomy initiatives expanding participation among underrepresented groups. These efforts include the development of educational materials and programs specifically designed to increase participation among groups underrepresented in STEM fields, including women and girls, African Americans, Hispanics, Native Americans, Pacific Islanders, the LGBTQ community, and the disabled. Additionally, the ASP commits to involving itself in international efforts supporting the teaching and learning of astronomy in the developing regions of the world, including Central and South America, Asia, and Africa.

The ASP is committed to expanding and diversifying its membership. The ASP has been a membership organization since 1889, first serving the needs of professional researchers and amateur astronomers and then expanding to serve casual enthusiasts and science educators. The ASP is committed to diversifying the membership, and we will actively recruit and provide support to professional researchers, amateur astronomers, astronomy educators, and casual enthusiasts from traditionally underrepresented groups in STEM, including but not limited to women, people of color, the disabled, and members of the LGBTQ communities.

The ASP is committed to celebrating contributions to astronomy made by people across a variety of cultures and from diverse backgrounds. The ASP Annual Awards honors the achievements made by professional astronomers, amateur astronomers, and astronomy educators. The ASP will diversify the pool of nominees in all categories and create new awards that celebrate individuals who have made significant strides in promoting diversity and equity. The ASP's educational resources, books, popular magazines, and other materials will be culturally sensitive and inclusive.

The ASP is committed to creating professional learning communities within which participants feel safe, respected, and free to express their views regardless of gender, sexual orientation, race, ethnicity, religious belief, or disability. The ASP will act to ensure that all of our programs and events are places where participants are free from harassment or discrimination based on gender, sexual orientation, race, ethnicity, religious beliefs, or disability.

ASP SERVICES AND EXPERTISE

PROMOTING LIFELONG LEARNING IN ASTRONOMY

My Sky Tonight: Early Childhood Pathways to Astronomy

During three years of exploring the best ways to introduce three-, four-, and five-year-olds to astronomy, ASP's education staff has developed a set of nine hands-on astronomy activities for young children and their families. These activities have been distributed to 85 museums, parks, and nature centers across the U.S., and will reach another 200 institutions in the final year of the My Sky Tonight project.

Children pretend to be astronauts visiting the moon during a family program run by ASP staff at the Temescal Branch of the Oakland Public Library in Oakland, CA.

In 2015, ASP staff pilot-tested My Sky Tonight activities at venues around the San Francisco Bay Area. This included two week-long astronomy summer camps for four- and five-year-olds at the Lawrence Hall of Science, a series of six workshops for young children and their families in Oakland public libraries, and a full day of drop-in family activities at the Chabot Space and Science Center. Through these events, we served more than 300 young children in the Bay Area, and we were delighted to see several repeat customers who were so excited about astronomy and space that they sought us out for more!

Educators at museums receiving project materials also participate in a six-week online workshop about best practices in early childhood astronomy education, with a focus on encouraging children to engage in the practices of science. Feedback from workshop participants has been very positive. One commented, "What a fantastic workshop! Very thorough, supportive, hands-on, and creative. The tool kits are amazing!" Another wrote, "This course has furthered my 'tool kit' in developmentally appropriate strategies and science practices for these youngest learners. I appreciated the opportunity to hear about the practice, observe it in action in the videos, and then be encouraged to put it into practice with a specific activity in order to stimulate personal reflection."

ASP education staff developed the My Sky Tonight activities and workshops in partnership with a team of early childhood researchers (Maureen Callanan, PhD, UC Santa Cruz; Jennifer Jipson, Cal Poly San Luis Obispo; and Julia Plummer, PhD, Penn State University) and early childhood educators from Lawrence Hall of Science in Berkeley, Children's Discovery Museum of San Jose, San Luis Obispo Children's Museum, and Discovery Space of Central Pennsylvania.

Intel Arduino Project

With funding from Intel Corporation, the ASP has begun developing Arduino programming challenges utilizing their new Galileo 2 development boards. The goal was to bring the excitement of space science, robotics, and programming to middle school students. We began by working with local science teachers with Arduino experience to develop a portfolio of exciting astronomy challenges that included using Arduinos to build observational tools (e.g. star trackers), make robotic rovers to traverse planetary surfaces, and create systems for monitoring environmental conditions in a Martian greenhouse. The success of the project has led to its continuation. In 2016, we will develop a set of space-science Arduino programming projects for Intel's Edison board and Curie modules.

David Prosper helps teachers James Santosa and Jason Blalock program their Intel Galileo 2 boards during an ASP Arduino workshop.

Skynet Junior Scholars

Middle school is when many children start gravitating toward science topics that reflect their own personal interests, and we're making sure that the ASP is there for them when they begin looking to the sky.

Skynet Junior Scholars is an NSF collaborative grant awarded to the University of Chicago (Yerkes Observatory), the National Radio Astronomy Observatory, and the University of North Carolina. This collaboration provides afterschool educators with access to a

global network of robotic telescopes through a kid-friendly web portal (skynetjuniorscholars.org). The ASP inspires authentic investigation by providing online training on how to access the telescopes, as well as by offering hands-on activities introducing 4H and afterschool groups to astronomy basics.

Today, this program is reaching meaningful new audiences, including participants with limited sight and hearing — work that was featured in posters presented at the winter AAS meeting. In 2015, the program expanded as we conducted six-week online workshops in the spring and fall, each with 30 adult participants. For the remainder of the program, we're working on a sustainability plan that will allow participants to work through self-paced training.

HELPING EDUCATORS TEACH ASTRONOMY

Teacher Learning Center

In 2015, ASP inaugurated the Teacher Learning Center (TLC) combining all the professional development programs and resources ASP has developed over two decades. The TLC will become a professional home for K–12 astronomy educators looking for support to enhance their classroom instruction. Under the auspices of the TLC, the ASP conducted a four-day Summer Astronomy Institute focusing on teaching space science in the context of the new Next Generation Science Standards (NGSS). Drawing from familiar activities in *The Universe at Your Fingertips 2.0* (a collection of the ASP's most popular activities and resources for teaching astronomy), participants experienced modified versions with the depth of three-dimensional learning called for in the NGSS.

At the ASP Teacher Learning Center's Summer Astronomy Institute, teachers characterize the properties of a mystery planet by studying its crustal materials.

Project ASTRO National Network

More than 20 years ago, ASP launched Project ASTRO in the San Francisco Bay Area — an innovative program that paired astronomers with classroom teachers to help bring the awe and excitement of astronomy to school children. The success of Bay Area Project ASTRO ultimately led to a national expansion of the model. Today, Project ASTRO sites can be found across the nation, spearheaded by dedicated site leaders whose annual meeting took place in May 2015. Highlights of the Project ASTRO National Network Site Leaders Meeting included a tour of the UC Berkeley Space Science Laboratory and the newly renovated Astronomy Department. Participants had the opportunity to meet with several graduate students who are veteran Project ASTRO volunteers. One has developed a climate-change curriculum for middle schools, which she presented to the group. We also welcomed the newest site to the Network: Georgia College and State University — the first Project ASTRO site in the southeastern United States.

SOFIA: Engaging Teachers in Real Research

NASA's Stratospheric Observatory for Infrared Astronomy (SOFIA) features a 2.5-meter telescope mounted in a modified Boeing 747SP. Flights on SOFIA can take astronomers to altitudes of over 41,000 feet. From this vantage point — above 99 percent of the earth's infrared-absorbing atmospheric water vapor — SOFIA can capture the infrared emissions of astronomical objects that cannot be studied from ground-based telescopes. From aboard SOFIA, astronomers can study the nature of galactic black holes, the evolution of galaxies, the chemical composition of interstellar gas clouds, complex molecules in comets, how stars and solar systems form, and more.

The ASP works closely with SOFIA—a joint project between NASA and the German Aerospace Center (DLR) — by providing the project's education and public outreach efforts. Activities developed by the ASP include programs for K–12 teachers, informal educators, college teachers, journalists, and the general public. Working with the ASP, educators have the opportunity to fly aboard SOFIA and interact with professional astronomers for a first-hand look at the research process.

In 2015, more than 30 educators from 11 states and the District of Columbia flew as Airborne Astronomy Ambassadors. Airborne

ASP SERVICES AND EXPERTISE

Astronomy Ambassadors Michael Shinabery and Jeffrey Killebrew, from the New Mexico Museum of Space History and the New Mexico School for the Blind and Visually Impaired, were honored by the New Mexico House of Representatives for their work as Airborne Astronomy Ambassadors. Shinabery is sharing SOFIA's mission with the museum's visitors, and Killebrew is creating hands-on learning tools to help the visually impaired experience SOFIA observations.

During their flight, Nichelle Nichols and Jeffrey Killebrew, teacher at the New Mexico School for the Blind and Visually Impaired, discuss the message Nichols would send from the stratosphere to the school's students.

Killebrew and Shinabery were also among the five educators who flew on SOFIA with Nichelle Nichols, actress, cultural icon, and science advocate. Playing Lt. Uhura on *Star Trek*, the first major African-American female role on TV, Nichols used her role to touch the lives of many people, a responsibility she carried out with purpose by recruiting women and underserved candidates for NASA and into science careers. Nichols continued this commitment as she flew on SOFIA. Nichols and the Airborne Astronomy Ambassadors engaged with researchers who were acquiring infrared measurements at 5 to 37 microns — some wavelengths within this range cannot be seen from ground-based telescopes because of water vapor in Earth's lower atmosphere.

"Flying on SOFIA has many parallels to the starship *Enterprise*," said Nichols. "We went where no man or woman has gone before, and I think that's what SOFIA gives us — a tool to study where we want to go in the future. It's magnificent."

AAS Astronomy Ambassadors

If research scientists want to promote scientific literacy, it's critically important for them to be able to communicate their work to a variety of audiences, from the general public to teachers, students, and journalists. The ASP supports the efforts of the American Astronomical Society (AAS) to train early career astronomy researchers to be successful communicators.

During the 225th meeting of the AAS, held January 2015 in Seattle, Washington, Suzy Gurton (ASP), Andrew Fraknoi (Foothill College), and Dennis Schatz (Pacific Science Center, Seattle) conducted the third annual AAS Astronomy Ambassadors workshop. This workshop brought the community of participants who have received training in combining communication with hands-on activities up to 120, expanding their professional identities beyond research to include outreach.

These young astronomers have presented hundreds of events and served more than 14,000 people. Their logs reveal that they were inspired to bring astronomy to a wide variety of places — from school visits to open houses to community events — and in some unusual settings.

In Their Own Words

"Grad students from my department… pledge[d] to keep a team member walking on a track for 12 hours because 'cancer never sleeps.' We raised money, etc., and each team had some kind of special activity at their area around the track. Ours was a big Dobsonian telescope! We took turns showing passers-by the moon, Jupiter, Saturn, and other targets throughout the night."

—Meredith Rawls, New Mexico State University

"It went really well. I think they all enjoyed learning and actually doing the activities. Several commented on how cool and simple the activities were."

—Emily Moravec, University of Florida, Gainesville

"For private events in particular, I often struggle with how to start because there is no lecture or activity on the ground floor to get people warmed up before they go upstairs to the telescope viewing area. There's just me and whatever I do in the first 30 seconds, and that sets the tone for the rest of the tour. I've started integrating small talk while I'm in the lobby to retrieve the group, and I can usually make some joke about the elevator on our way up."

—Tiffany Lewis, George Mason University

NASA Night Sky Network, 2015

For over a decade, the ASP has maintained and supported the NASA's Night Sky Network (NSN), helping a community of more than 460 amateur astronomy clubs across the country engage in education outreach and host public events. NASA recently recognized the ASP's enormous success with NSN by including it as one of a handful of education infrastructure projects. The ASP will receive almost $1 million over the next three years to help NSN clubs use the resources and materials created by NASA's newly funded portfolio of education projects to inform and engage the public in astronomy and space science research and exploration.

Wayne "Skip" Bird of Westminster Astronomical Society, Inc., sets up a rocket launcher activity for the Little People Day Care Astronomy Program.

Over the past year, the ASP has created a dozen new activities on the formation of the Solar System and planetary interiors for use by NSN clubs. Funded by NASA's *InSight* mission, which will send a spacecraft to Mars to explore its interior, these toolkits are in the process of being tested with audiences.

In 2015, NSN club members were prolific in their outreach, reporting over 3,500 events across the country and reaching more than 415,000 people with NASA's message of exploration and discovery. Support from the ASP and NASA included six member teleconferences, incentives of more than 100 education toolkits, quarterly prizes, handouts, and more. Clubs that held five or more public outreach events during the year received special award pins for their hardworking members; more than 140 clubs qualified!

- 469 clubs currently belong to the NASA Night Sky Network
- 167 NSN clubs are currently logging events
- 105 NSN clubs are planning 1,955 events in 2016, an average of 163 per month
- 213,000 NSN Facebook followers
- 3,700 NSN Twitter followers

In Their Own Words

"I used the NSN sun poster to talk about features on the sun and to compare the sun to the size of planets using the planet models from NSN. We also talked about several of the NASA missions when doing the Pocket Solar System. I also discussed the current definition of 'planet' and we discussed the history of the four asteroids first discovered and how they had been called planets for 50 years. We discussed why Pluto is now known as a dwarf planet and compared it to the history of some of the asteroids. We talked a little about the Dawn *mission and* New Horizons. *After the pocket solar system activity, I showed them several types of meteorites and discussed them with the kids. It was a lot of fun and the kids were very attentive and curious."*

—Joan Chamberlin, Astronomical Society of Northern New England

Oklahoma City Astronomy Club member Ida Huntz shows how to aim the Astroscan Telescope.

"This was the night of the Celestial Treasure Hunt, which is a star party activity from the Night Sky Network. I handed out about 30 of these activity sheets along with pencils and explained to participants what to do or ask while at any of the telescopes. Participants now have a record of what they saw in a telescope and something to take home with them which may serve as a reminder of the night and bring them back for more, or, even spark an interest in science influencing their academic path."

—Daniel Acker, ChesMont Astronomical Society

2015 ANNUAL MEETING

The 127th Annual Meeting of the ASP was held October 10, 2015, at the Chabot Space and Science Center in Oakland, California. The event included the ASP's Universe 2015 public astronomy festival and the 2015 ASP Awards Gala.

Universe 2015 featured four keynote public lectures from leading astronomers: David Morrison (NASA Ames Research Center), Natalie Batalha (NASA Ames Research Center), Mark Showalter (SETI Institute), and Gibor Basri (University of California, Berkeley), with moderator Andrew Fraknoi (Foothill College).

With Universe 2015, the ASP's Annual Meeting was held for the first time at a public science center/museum. This afforded a wonderful opportunity for members of the public to take in numerous activities during the day, from Chabot's planetarium shows and interactive exhibits to rooms with facilitated projects for children and adults alike.

In addition to the keynote astronomy talks, the ASP partnered with Chabot to organize four other strands of activities for the public. Programs addressed families with children ages 3–8, families with children ages 7–14, outdoor activities and informal chats, and talks for astronomy enthusiasts. Presenters and facilitators included staff from the ASP and Chabot, as well as professional scientists (including Dana Backman, SETI Institute and NASA SOFIA mission), amateur astronomers from several regional astronomy clubs, local science teachers, and ASP leadership, including Past President Gordon Myers and Past Executive Director Mike Bennett. It was an amazing program enjoyed by attendees of every description.

2015 Meeting Sponsors

chabot space & science center

SOFIA Stratospheric Observatory for Infrared Astronomy

CELESTRON

EXPLORE SCIENTIFIC

2015 AWARDS PROGRAM

Each year, the ASP presents awards for excellence in scientific research, education, and amateur astronomy at its Annual Meeting. We're proud to recognize our 2015 award winners:

Catherine Wolfe Bruce Gold Medal, the ASP's most prestigious award for lifetime achievement in astronomy, was presented to Dr. Douglas N.C. Lin, Professor of Astronomy and Astrophysics at the University of California, Santa Cruz. Dr. Lin was recognized for his seminal achievements in a variety of domains, from the orbital motion of the Magellanic Clouds and the formation of exoplanets to the physics of accretion disks and the dynamics of Saturn's rings.

Maria and Eric Muhlmann Award for important research results based upon development of groundbreaking instruments and techniques was awarded to astronomer and instrumentation expert Dr. Stephen A. Shectman of the Carnegie Observatories. Dr. Shectman investigates the large-scale structure of the distribution of galaxies, searches for ancient stars, develops novel and creative astronomical instruments, and constructs large telescopes.

Robert J. Trumpler Award for a recent PhD thesis considered unusually important to astronomy was given to Dr. H. Jabran Zahid, who completed his PhD in June 2014 at the Institute for Astronomy (IFA) of the University of Hawai'i.

Richard H. Emmons Award for excellence in college astronomy teaching was presented to Dr. Edward Prather of the Center for Astronomy Education, University of Arizona**.** For the past 20 years, Dr. Prather has dedicated himself to conducting research on best practices in teaching general education physics and astronomy at the college level.

Thomas J. Brennan Award for exceptional achievement related to the teaching of astronomy at the high school level was given to Ms. Barbel Sepulveda, a science teacher for 21 years at Lincoln High School in Stockton, California, in recognition of her excellence in curriculum and professional development, and for bringing authentic astronomy research into the classroom.

Klumpke-Roberts Award, presented for outstanding contributions to public understanding and appreciation of astronomy, was awarded to Dr. Robert Nemiroff and Dr. Jerry Bonnell for their work on the innovative and widely seen *Astronomy Picture of the Day* website (http://apod.nasa.gov/apod/astropix.html). Dr. Nemiroff is a professor in the Physics Department at Michigan Technological University, and Dr. Bonnell is a research scientist with the University of Maryland Astronomy Department on contract to the Astrophysics Science Division at NASA's Goddard Space Flight Center.

Andrew Fraknoi Supporter's Award for exceptional service and support of the ASP was presented to Michael Greene. Mr. Greene, who manages outreach efforts for NASA's Jet Propulsion Laboratory, is also responsible for overseeing the NASA Night Sky Network's national community of amateur astronomy clubs, reaching millions of people from around the world.

Priscilla and Bart Bok Awards, given jointly by the ASP and the American Astronomical Society recognizes scientific merit of original research projects of pre-college students. Winners were Shashank Dholakia and Shishir Dholakia, Adrian C. Wilcox High School, Santa Clara, California (first prize), and Maxime Horlaville, Jeremiah Knockaert, and Quillere Manon, Lycee la Mennais, Guerande, France (second prize).

Dr. Douglas N.C. Lin

Dr. Stephen A. Shectman

Dr. H. Jabran Zahid

Dr. Edward Prather

Barbel Sepulveda

Dr. Robert Nemiroff

Dr. Jerry Bonnell

Michael Greene

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Publications of the Astronomical Society of the Pacific

PUBLICATIONS
of the ASTRONOMICAL SOCIETY of the PACIFIC

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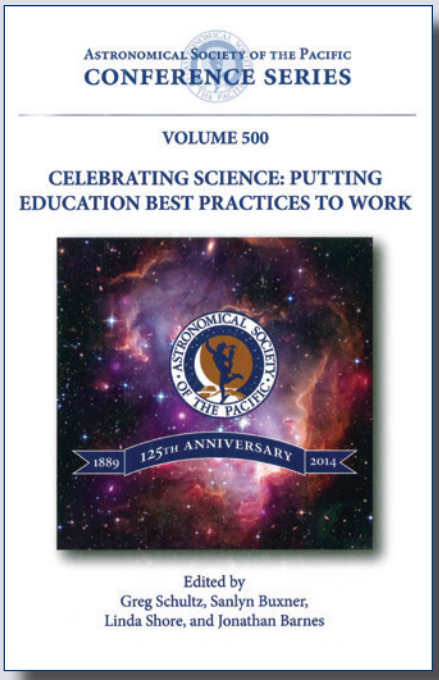
Publications of the Astronomical Society of the Pacific (PASP) publishes refereed manuscripts on astronomical research covering all subject areas, as well as articles on innovations in astronomical instrumentation and software, reviews and tutorials of specific research areas, and summaries of PhD dissertations and conference proceedings.

For calendar year 2015, *PASP* Volume 127 contained 106 articles, including 34 research articles, as well as 59 papers on instrumentation, techniques, astrophysical data and analysis, and atmospheric phenomena. Among the year's offerings:

- 20 articles contained new research on various kinds of normal and peculiar single and binary stars
- 5 articles presented research on extrasolar planets
- Instrumentation manuscripts covered wavelengths from optical to radio with articles on spectrographs, coronographs, interferometers, and IR cameras, as well as filters and adaptive optics
- 16 articles described available new software for obtaining, reducing, and analyzing ground and space observatory data
- 6 invited reviews and tutorials summarized research ranging from extrasolar planet atmospheres and dust in star formation regions to propagation of electromagnetic radiation through Earth's atmosphere

One of the highlights of *PASP* Volume 127 was the special issue created for the July 2015 publication — the first special issue *PASP* has ever published. Ten articles in this notable offering describe the capabilities of the Mid-Infrared Instrument (MIRI) for the James Webb Space Telescope (JWST). Each article focused on specific aspects of the MIRI system, including its imaging module, spectrographs, coronagraphs, detectors, electronics, predicted sensitivity, operation, and data reduction principles. This special issue will serve as the standard reference for the MIRI instrument used by scientists who conduct research with JWST and MIRI.

ASP Conference Series


Astronomical Society of the Pacific
CONFERENCE SERIES

VOLUME 500

CELEBRATING SCIENCE: PUTTING EDUCATION BEST PRACTICES TO WORK

1889 125TH ANNIVERSARY 2014

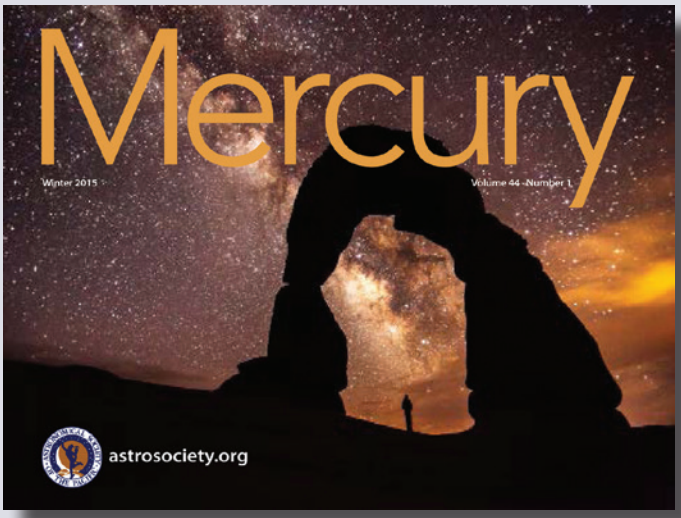
Edited by
Greg Schultz, Sanlyn Buxner,
Linda Shore, and Jonathan Barnes

This year, the ASP Conference Series reached a milestone 500th volume with the publication of the proceedings of the ASP's 2014 meeting entitled *Celebrating Science: Putting Education Best Practices to Work*.

Since 1988, the ASP Conference Series has served the global professional astronomical community by publishing, both electronically and in print, the latest results in astrophysics as presented by astronomers at conferences held around the world. During 2015, the Conference Series published new results on stellar astrophysics from white dwarfs to red giants and exploding stars, extrasolar planets around binary stars, numerical modeling of plasmas, and recent results from the new ALMA radio telescope array in Chile. We also published books about astronomical software and the role of astronomical libraries in promoting "open science."

The Conference Series is an important component of the ASP's mission to promote education and science literacy through astronomy around the world. As a reflection of the impact the Conference Series is having, about 100,000 abstracts and 15,000 papers are accessed *each month* by our readers in countries around the world!

Mercury Online Magazine



Mercury, our exclusive quarterly PDF membership magazine, is provided to all ASP members. Since 1972, our magazine has offered readers insights into the latest astronomical discoveries, details of upcoming celestial events, and information about the ASP's work in science education and public outreach. And now members no longer need their ASP password to view the current issue of *Mercury*.

In 2015, feature articles included a two-part look at the achievements of the Hubble Space Telescope on its 25th anniversary, the importance of dark skies in national parks, the emergence of great science videos on YouTube, and a summary of the impressive results from *MESSENGER* at the conclusion of its mission to Mercury. And with the approach of the August 2017 total eclipse of the sun, which will be visible from across the U.S., we began a series of eclipse-themed features — how to safely view the event, when and where to see it, ideas for outreach activities, and basic information about solar eclipses. The series of articles will continue into 2017.

Astronomy Beat Monthly Magazine

ASTRONOMY BEAT

Man on the Moon

A Memoir by Gordon Myers: Part 1 of a Two-Part Series

Editor's Introduction

This memoir, by Board Past-President Gordon Myers, offers a uniquely personal behind-the-scenes look at the early days of space exploration. As a computer programmer for IBM in the 1960s, Gordon had a front-row seat to NASA's *Apollo* missions. In this excerpt—the first of two—Gordon relives the launch of *Apollo 8*, as well as the excitement of *Apollo 11* and humanity's first-ever moon landing.

The Wake-Up Call

October 4, 1957, was a Friday night. I was 13 years old, and had just returned from the defeat of our local high school's football team to our arch rival. I lay on my bed listening to the radio when the announcer said: "It has been reported that the Soviet Union has launched the world's first artificial satellite into orbit around the earth." I ran downstairs and told my parents. They were surprised—but I was shocked. My eighth-grade view of the world was simple: The Soviet Union was the "bad guy"; America was the "good guy." We were the smartest. We were invincible. Suddenly everything was upside down.

Space and astronomy had always interested me. On my wall was a plastic model of the *Vanguard* satellite the U.S. was planning to launch during the 1957–58 International Geophysical Year. The satellite itself was round, about the size of a grapefruit, and weighed just 3 pounds. Suddenly something called *Sputnik* was hurtling through space, beeping "messages" down to earth. At 22 inches in diameter

Official crew photo of the Apollo 11 Prime Crew. From left to right are astronauts Neil A. Armstrong, Commander; Michael Collins, Command Module Pilot; and Edwin E. Aldrin Jr., Lunar Module Pilot. [NASA]

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In 2015, we featured articles ranging from "See the Milky Way in America's National Parks" (about how stargazing under some of the darkest skies in the U.S. inspired author and poster artist Tyler Nordgren) to "Man on the Moon" (a two-part memoir by ASP Past President Gordon Myers, who offers a uniquely personal behind-the-scenes look at the early days of space exploration and the Apollo missions during his time as a computer programmer for IBM in the 1960s).

When the *New Horizons* probe encountered Pluto in 2015, it carried the ashes of discoverer Clyde Tombaugh, a talented young Kansas farm boy who first detected Pluto using a telescope at the Lowell Observatory in Flagstaff, Arizona, in 1930. In honor of Tombaugh, we reprinted "The Discovery of Pluto: Generally Unknown Aspects of the Story," a 2009 *Astronomy Beat* article he wrote describing what it had been like for him to discover one of the Solar System's most mysterious objects.

ASP'S GENEROUS BENEFACTORS 2015

THE ASTRONOMICAL SOCIETY OF THE PACIFIC WISHES TO THANK the following organizations and individuals for their generous philanthropic support. This list reflects gifts and grants received between January 1, 2015, and December 31, 2015. Funds raised support the ASP's mission to foster scientific curiosity, advance science literacy, share the joy of exploration and discovery, and encourage the development of tomorrow's science, technology, and academic leaders. Although each star shines alone, they add up to a glittering night sky. Likewise, each donation adds to the next to make a great impact. Thank you for believing in the ASP!

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FINANCIAL SUMMARY

Statement of Activities

For the year ending September 30, 2015

	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
Revenues:				
Government grants	$ 1,263,032	$ -	$ -	$1,263,032
Donations and bequests	267,779	60,000	-	327,779
Membership dues	50,454	-	-	50,454
Program service revenues	442,793	-	-	442,793
Sales of conference series, net	252,748	-	-	252,748
Sales of educational materials, net	14,533	-	-	14,533
Investment income/(loss)	(2,450)	(6,512)	(32,668)	(41,630)
Other revenue	13,424	-	-	13,424
Net assets released from restrictions	165,411	(198,079)	32,668	-
Total revenues	2,467,724	(144,591)	-	2,323,133
Expenses:				
Program services:				
Meeting and awards	10,275	-	-	10,275
Membership	39,494	-	-	39,494
Publications	292,866	-	-	292,866
Educational materials	164,297	-	-	164,297
Classroom teacher programs	1,143,008	-	-	1,143,008
Supportive services:				
Administration	655,775	-	-	655,775
Fundraising	92,701	-	-	92,701
Total expenses	2,398,416	-	-	2,398,416
Change in net assets	69,308	(144,591)	-	(75,283)
Net assets, beginning of period	16,041	304,712	992,685	1,313,438
Net assets, end of period	$ 85,349	$ 160,121	$ 992,685	$ 1,238,155

Statement of Financial Position

September 30, 2015

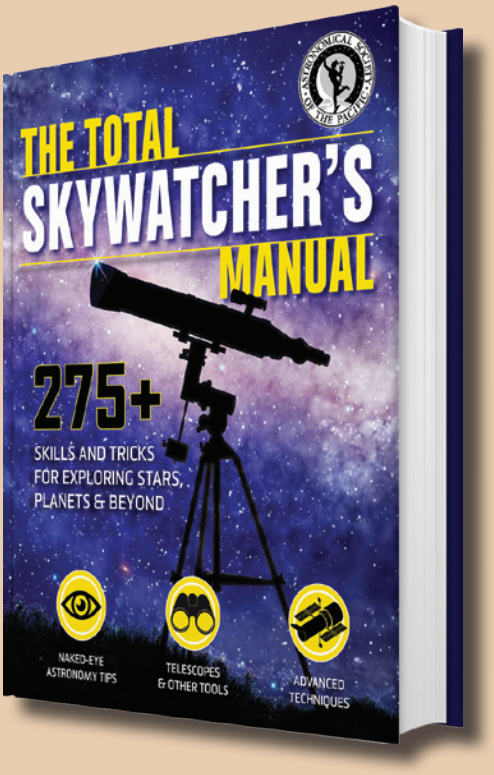
ASSETS	
Current assets:	
Cash and cash equivalents	$ 440,439
Investments	48,870
Accounts receivable, net of allowance for doubtful accounts of $4,000	230,345
Inventory, net	224,147
Prepaid expenses	28,353
Total current assets	972,154
Non-current assets:	
Restricted cash and cash equivalents	27,678
Restricted investments	1,125,128
Fixed assets, net of accumulated depreciation	540,524
Total non-current assets	1,693,330
Total assets	$ 2,665,484
LIABILITIES AND NET ASSETS	
Current liabilities:	
Accounts payable and accrued expenses	$ 228,177
Deferred revenue	145,093
Notes payable, current portion	29,070
Total current liabilities	402,340
Long-term liabilities:	
Notes payable, net of current portion	1,024,989
Total long-term liabilities	1,024,989
Total liabilities	1,427,329
Net Assets:	
Unrestricted, undesignated	11,149
Unrestricted, board designated	74,200
Temporarily restricted	160,121
Permanently restricted	992,685
Total net assets	1,238,155
Total liabilities and net assets	$ 2,665,484

Introducing the ASP's First Stargazing Guide: *The Total Skywatcher's Manual*

In 2015, the ASP proudly published the first stargazing guide in its 126-year history—a way for the society to share its passion and excitement for astronomy with a larger audience.

The Total Skywatcher's Manual is an illustrated, family-friendly guide for astronomy enthusiasts of all ages. It features more than 275 short, intellectually stimulating tips and activities designed to help everyone delve into the wonders of the night sky. The manual helps readers explore the cosmos with unaided eyes, simple tools (like binoculars), telescopes, and other devices. The book was written by ASP Executive Director Linda Shore and ASP staff, David Prosper, and Vivian White, and designed and published by Weldon Owen Press.

During its first week, *The Total Skywatcher's Manual* ranked #1 in Hot New Astronomy Releases at Amazon.com and has remained in Amazon's top 20 books on stargazing ever since. It has received rave reviews and is being translated into French and German for release into the European market. Plans are underway to translate the book into Spanish, and there is significant interest in bringing it to other international markets, including Asia.



In Their Own Words

"Many astronomers worry that our community is shrinking, or at least 'graying out.' If we put a guide as bright and engaging as this in the hands of every person who expressed an interest in stargazing, our numbers would surely grow."

—S.N. Johnson-Roehr, *Sky & Telescope* Magazine

"If you are a beginner, this should be your new best friend! If you are not a beginner, then you will most likely pick up a new skill or two from reading this book, or at the least, gain some new insights on old friends in the night sky… I close this review with my deepest gratitude to those who put this book together — what a fine job you have done to help those of us at the beginning of our journey to wander around the night sky."

—Smartpage Books, Arizona

Join Us for the ASP's New 2016 Awards Gala

October 22, 2016 • Embassy Suites, Burlingame, CA

This year, we're establishing a new tradition, replacing our annual February dinner with a brand new event that will showcase our exciting projects and celebrate the distinguished recipients of our Annual Awards.

Join us for a gourmet reception and sit-down dinner as we honor eight incredible individuals who have made significant contributions to amateur and professional astronomy research, instrumentation, education, and outreach.

Among the evening's highlights will be the presentation of the Catherine Wolfe Bruce Gold Medal. Awarded since 1898 to a professional astronomer in appreciation of lifetime achievement, the Bruce Medal is recognized as one of the most prestigious awards in astronomy.

Watch for your "SAVE THE DATE" announcement coming this summer.

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