
In early August, over 80 PSI science and administrative staff gathered in Tucson from 13 U.S. states, Australia, Canada, Ireland, and New Zealand for the 14th Annual Retreat. This year the three-day meeting took place at the gracious Hacienda Del Sol Resort, and at PSI headquarters, in a relaxed atmosphere designed to encourage scientific collaborations and new research approaches, and provide a platform for our newest scientists to introduce themselves and their research.

At the banquet, Contract and Benefits Specialist Elaine Owens was surprised with a Howardite meteorite and an asteroid named in her honor, and four scientists received their 10-year PSI anniversary chairs: R. Aileen Yingst, Larry Lebofsky, Jeff Mogenthaler, and Jen Grier. (See more retreat photos on pgs 2-3.)
Twelve new PSI members (pictured here) gave their introductory talks at the retreat, Aug. 6-8, and dozens of others gave a 1-minute lightning round update on their scientific research.

PSI Director Mark Sykes gets the retreat started.

Tucson High School student and PSI Intern Macey Brown wowed us with her passion for science.

New PSI Trustee Erin Neal came from Washington, D.C., and described her evolution from scientist to space policy adviser.

Senior Scientist Alan Howard is from Crozet, VA.

Associate Research Scientist Kevin Webster is based in Tucson and is profiled on pg. 4.

Post-doctoral Research Scientist Margaret Landis traveled from her home in Albuquerque, NM.

Post-doctoral Research Scientist Patricia Craig lives in Myrtle Beach, SC.

Post-doctoral Research Scientist Jamie Molaro arrived from Altadena, CA.

Research Scientist Gareth Morgan lives in Washington, D.C.

During the lightning round talks by long-time staff, the 1-minute time allotment was enforced by several “hook masters.” L-r, Kevin Webster, Mark Sykes, and Joe Spitale are pictured, though many gleefully participated.

(Retreat Photo Gallery continued on next page.)

Front page banner: Comet Lovejoy C/2014 Q2, photographed by PSI Senior Scientist Roger Clark, is one of six comets discovered by amateur astronomer Terry Lovejoy. In this image taken on January 12, 2015, from Mauna Kea, Hawaii, at the 9,200 foot level, Comet Lovejoy C/2014 Q2 shows an intricate ion tail.

Georgiana Kramer, Interim Senior Scientist, lives in Houston, TX.

Neil Pearson is our new Tucson-based Laboratory Technician.

Research Scientist Jamie Molaro arrived from Altadena, CA.

Senior Scientist Steve Clifford lives in Houston, TX.

Cindy Little, Senior Research Associate, traveled from her home in Los Alamos, NM.

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(Credit Photo Gallery continued on next page.)
In May 2016, I left the Arecibo Observatory in Puerto Rico and joined PSI as a Senior Scientist. But my career was much different in the beginning.

In 1993 (age 32), my previous career in the nuclear power industry as an Operator and Electronics Technician was cut short when I suffered chemical burns to both eyes, resulting in permanent, severe vision loss. Following this accident, I re-established my independence and mobility through rehabilitation, and then re-entered school full time, obtaining first an undergraduate degree in Physics in 2000, and then a doctoral degree in a field of my dreams, Planetary Science in 2005 (having been an amateur astronomer since age eleven).

I specialize in studying the properties and evolution of the surfaces of small Solar System bodies, with a particular interest in impact crater dominated terrains. My work includes the computation of gravitational rotational asteroid surface conditions, and the analytical and numerical modeling of surface development, regolith growth, and cratering on these objects. This modeling work is compared directly to observations, either returned by spacecraft or gathered by Earth-based radar experiments, including such properties as overall shape, spin, topography, density, indications of regolith and boulders, and cratering records.

My interest in space grew out of watching the Gemini and then Apollo program missions on television when I was growing up in West Palm Beach, Florida. I acquired my first 3" Newtonian reflector telescope at age 12.

Currently, I am working on modeling and understanding regolith generation and retention on asteroids in the 10-100 km size range as a function of impact cratering processes.

In my spare time, I enjoy audio ‘bird-watching’ (identifying bird songs) and doing genealogical research on my family tree. The William Richardson that I am descended from came to Virginia in the mid-1600's as part of the Puritan migration from England.

**PSI is very proud to have Jim on our science staff!**

More background and photos can be found at: http://www.jerichardsonjr.info/background.html
Kevin Webster, Astrobiologist *(In his own words)*

I grew up in Aurora, CO, outside of Denver, and attended the University of Colorado at Boulder, earning double major undergraduate degrees in Geology and Evolutionary Biology. My M.S. and Ph.D. were completed at Indiana University, both in Geological Sciences. I joined PSI in April 2018 as an Associate Research Scientist, having previously worked at the University of Arizona.

The science questions that captivate me have to do with understanding life in its planetary context. I am fascinated by what it means to be ‘alive,’ where the special processes of life may occur elsewhere in the universe, and by the origin of life on Earth. If we can answer these questions, we will help ourselves immensely in the search for life on other planets.

My interest in science has been lifelong and has centered on life, fossils, and planets. It all started when I was first introduced to dinosaurs in preschool. I enjoyed imagining them on Earth without humans to observe them. I loved knowing that there would always be more to know about them. This stirred my imagination to question things and be creative. Around the same time, I was introduced to the planets and they also captivated me. Their differences and distances from Earth further expanded my drive to learn about the world around me.

It was my love of paleontology that led me to major in Biology and Geology as an undergraduate. When I learned that almost all fossilization is the result of microbial activity, I became very interested in microbes. In diving into microbes I learned they were capable of all sorts of odd biochemistries. Their ability to persist in extreme environments made me want to know where else in the universe they are, how we can find them, and what might constitute a microbial fossil. This led me into Astrobiology.

My astrobiological research began with a NASA-funded research trip to Greenland in 2011, studying small lakes as analogs for early Mars. Later, I was invited to do fieldwork in caves where we observed abnormally low methane concentrations in cave air. This was a major surprise; what caused the abnormally low methane? My work revealed that this was caused by the action of microorganisms.

My current research seeks to develop the use of cave air as a biosignature. (Biosignatures are anything that is leftover as a by-product of life, such as fossils.) From there I am seeking to make remote measurements of the chemical composition of cave air on Earth and eventually on other planets. I am looking to expand my research into understanding how microbes influence atmospheric chemistry both through time on Earth and other planets.

In my free time I enjoy writing fiction and playing sports; I also enjoy playing and listening to music. Like planets, I tend to go through phases, and am currently interested in triathlons and Brazilian music. I completed my first triathlon in July.

We are delighted to welcome Kevin to PSI!

Award for Hansen-Koharcheck by Alan Fischer

PSI Senior Scientist Candice “Candy” Hansen-Koharcheck received NASA’s Outstanding Public Leadership Medal for her work on the JunoCam camera that is taking amazing images of Jupiter.

Candy, a Co-investigator on the Juno mission now orbiting Jupiter, is responsible for the development and operation of the JunoCam outreach camera that engages the public in planning images of Jupiter. Amateur astronomers supply images from their backyard telescopes for planning. Citizen scientists and artists download raw images and then contribute their own processed versions to the JunoCam online gallery at https://www.juno.nasa.gov/junocam/processing

“The images are amazing. When we designed the outreach part of the experiment we went all in – no science team waiting in the wings to jump in if the public didn’t. So it is incredibly gratifying to see the public’s enthusiasm and to enjoy the beauty of their contributions,” Candy said. “The public outreach is the essence of the investigation. I really did not anticipate the art community getting involved, and it is really wonderful to me, a scientist, to enjoy Jupiter through the eyes of an artist.”

The NASA Outstanding Public Leadership medal is awarded to non-government employees for notable leadership accomplishments that have significantly influenced the NASA mission.

Candy’s work on JunoCam is funded by a subcontract from Southwest Research Institute to the Planetary Science Institute. Juno is supported by NASA.
**Director’s Note**

The PSI Annual Retreat is a very energetic and fun event, bringing in our colleagues from around the country and the world for a few days of engagement, putting faces to new names, spinning up new ideas for new projects and advancing ongoing collaborations.

We try to maximize open time for these interactions and restrict presentations to people hired in the past year. However, it is good to get reacquainted with what everyone is doing so at this Retreat, we instituted the Lightning Rounds — everyone not giving a talk gets one slide and one minute. Each slide had a countdown timer at the top with the name of the next speaker. People were lined up to the left and the right of the front of the room. On each side was an enforcer with a 12-foot pool hook, to remove anyone going over their time. Hooks came down at T-5 seconds, and speakers were scooped away at 0 as the new slide appeared and the next speaker started talking. It was very informative — and entertaining. A number of our more senior members were unceremoniously pulled off. We are looking forward to next year!

We have also been enjoying families coming to our Retreats. For the past several years we have been providing day care for children, which has worked out very well. This year it was particularly fun to see the young children instantly striking up quick friendships and traveling around in mini-packs, having a good time. I like to say that what we do in this business is not a job, it’s a lifestyle. Families are a part of that lifestyle, so we want to do what we can to be accommodating and to make our families welcome.

Another thing that came out of the Retreat this year is a statement that you will find posted on our website — the top item under the “About PSI” drop down. Employee handbooks are often heavy with guidance on behaviors to avoid. “Who We Are” is a positive statement regarding the environment we strive to create and maintain at PSI. It reflects not just a professional respect for each other, but a level of personal caring as well. I feel very fortunate to be able to work with such a great group of people.

Mark V. Sykes  
October 2018

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**PSI Staff News**

PSI Senior Scientist **Amanda Hendrix** has been elected the American Astronomical Society’s Division for Planetary Sciences (DPS) Committee Vice-Chair. She will assume office at the October 2018 DPS meeting in Knoxville, and will become DPS Chair a year later.

“Amanda will be leading one of the major societies in our profession,” said PSI Director Mark Sykes.

Congratulations on this amazing honor, Amanda!

PSI Senior Scientist **Jeff Morgenthaler** and Margaret De Jong were married in Niagara-on-the-Lake, Ontario, Canada, on Sept. 1st.

The couple took a leisurely honeymoon trip back to their home in northern Maine.

Chief Operations Officer **Maui Balistreri** and his wife Tina welcomed their second child on June 25. Their daughter, Mia, weighed 7 lbs, 3 oz, and measured 20 in. Older brother Giovanni, age 3, is learning all about sharing Mom and Dad’s attention.

PSI Senior Scientist **Jian-Yang Li** and his wife Huanning had their second child, a girl, on August 29. Pei-Wen Li weighed 8 lbs, 8 oz, and measured 21.25 in.

She was greeted by her big sister Yi-Wen, age 7, a few hours later. Jian-yang reports: “Mom and baby are doing well, so is Dad.”

**Congratulations to all our scientists!**
Two Awards for M. Darby Dyar by Chris Holmberg

PSI Senior Scientist M. Darby Dyar has been honored with two prestigious awards: the 2018 Eugene Shoemaker Distinguished Scientist Medal and a Helmholtz International Fellow Award.

The Shoemaker Medal is an annual award given to a scientist who has significantly contributed to the field of lunar and/or asteroid science throughout their career. Darby’s research is focused on understanding how hydrogen and oxygen are distributed throughout our Solar System.

Winners are nominated by their peers and selected by the Solar System Exploration Research Virtual Institute (SSERVI) Director, Dr. Yvonne Pendleton. The award presentation with an invited talk by Darby took place at the 2018 Exploration Science Forum (ESF) on June 28 at NASA Ames.

Also in June, Darby was chosen as one of this year’s five Helmholtz International Fellow Awards. This honor is given by the largest science organization in Germany to outstanding senior scientists based outside Germany who have excelled in fields relevant to the Helmholtz Association, such as astrophysics, biology, cell research, environmental research, and many other areas.

The award includes prize money with which the winners will travel to one or more Helmholtz Centers to do research. “I wholeheartedly congratulate them,” says Otmar D. Wiestler, President of the Helmholtz Association. “They have all made exceptional contributions to fields of research which are central to the work of our research association. Above all, the award is therefore intended to deepen our collaboration with them.”

In Darby’s case, the award will support her collaboration with Dr. Joern Helbert at the DLR Institute of Planetary Research, Berlin, studying the high temperature behavior of minerals as applicable to hot surfaces, like those of Mercury, Venus, and Io. The goal of that project is to acquire high-temperature spectra of various materials over a range of temperatures and understand fundamentally how the peaks shift with temperature, which is a function of what happens to the minerals’ crystals at high temperature.