



Science and Technology
of Materials, Interfaces, and Processing

Southern California Chapter

Summer 2016

Quarterly Newsletter

Special points of interest:

- SCCAVS Short Course Program Oct. 3-5 Registration now open
- Elmer Carvey Scholarship winners 2016
- Mount Wilson Observatory Trip to 100" Scope
- FREE Pump Care and Maintenance Workshop sponsored by Kurt J. Lesker at the SCCAVS Expo October 4th, 2016

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Mount Wilson Observatory Trip to 100" Telescope

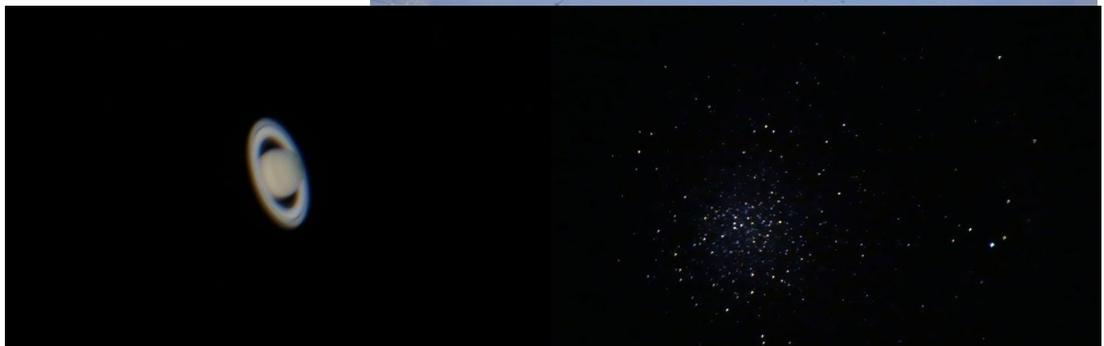
By Corinne D'Ambrosio

Sunset was at 8:08pm on Saturday, June 25th, and that marked the beginning of an amazing night of astronomical observations through the 100" telescope at Mount Wilson Observatory.

The SCCAVS sponsored a group of 18 members and supporters to travel to the summit of Mount Wilson for a private tour and viewing through the Hooker Telescope, the world's largest from 1917-1949, and the very same instrument used by Edwin Hubble in the 1920's to determine that the universe was expanding.

Tim Thompson, retired JPL astrophysicist and tour guide on Mount Wilson for 30 years led us on an informative tour before sun down that included (Continued on page 4)

Clockwise From Top: SCCAVS group at Mount Wilson in front of the 60" telescope, a globular star cluster seen through the 100" scope, and Saturn, again seen through the 100" scope.



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Elmer Carvey Scholarship Winners 2016

By Jeff Lince

The winners of the 2016 Elmer Carvey Scholarship are Paul Robinson, an undergraduate majoring in Physics, and Emily Paluch, an undergraduate student majoring in Materials Science and Engineering. Both are attending University of California, Los Angeles.



Paul Robinson, UCLA

Mr. Robinson is conducting research in Professor Anastassia Alexandrova's lab in the Department of Chemistry and Biochemistry, where he has worked for the past two years, starting in his freshman year. He has concentrated on theoretical calculations of chemical bonding in materials. His first project – conceived by him – involved the effects of high pressures on bonding in molecules. After mastering quantum mechanical calculation computer programs based on density functional theory, he rapidly achieved results and published a paper as the primary author (see P.J. Robinson and A.N. Alexandrova, *Assessing the bonding properties of individual molecular orbitals*, *J. Phys. Chem. A*, 2015, <http://pubs.acs.org/doi/abs/10.1021/acs.jpca.5b09687>).

After his initial success, he has developed collaborations with the Tolber and Kaner labs at UCLA, where using theoretical calculations, he analyzed and predicted new, industrially useful, super-hard tungsten borides to be evaluated in the laboratory. The goal is to “fix” the super-hard materials *in silico* and guide synthesis to create metals rivaling diamond's hardness. Mr. Robinson also has developed a collaboration with the Bowne and McQueen research groups at Johns Hopkins. The work has involved developing candidate materials for hydrogen gas storage. In this collaboration he has also elucidated the electronic structure of samarium hexaboride, which will be used to make quantum-computing circuits.

Mr. Robinson has attained numerous honors, including becoming an Eagle Scout. He has a total of two publications, with several more in preparation, and has made two presentations at scientific conferences. In addition, he has maintained an excellent academic record.

After graduating in 2018, Mr. Robinson plans to attain his Ph.D. in theoretical chemistry, focusing on designing and tuning the properties of materials. He would like to work on cross-disciplinary problems including superconductivity and the electronic structure of rare-earth materials.

Ms. Paluch has been performing research in Professor Mark Goorsky's lab in the Materials Science and Engineering Department at UCLA for the last two years. The thrust of her research is to identify a viable material and processing technique for producing high-efficiency antireflective coatings for thin-film silicon solar cells. She has identified porous silicon as the material of choice for the antireflective coating. She successfully produced and characterized samples that have yielded surface reflections of approximately 7%, which is a significant reduction in reflectivity when compared to bare silicon which reflects approximately 30% of incident light. Ms. Paluch has experienced several challenges (Cont'd Page 5)

**SOUTHERN CALIFORNIA
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**We're on the web!
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Upcoming Events

SCCAVS Equipment
Exhibition & Short
Course Program
Holiday Inn
Buena Park, CA
October 3-5, 2016



AVS 63rd International
Exhibition & Symposium
Music City Center
Nashville, TN
November 6-11, 2016



Chapter Activities

FREE Pump Care & Maintenance Workshop October 4, 2016

Prior to the doors opening for our 2016 Equipment Exhibition at the Holiday Inn Buena Park, the SCCAVS will be offering a FREE Vacuum Pump Care and Maintenance Workshop sponsored by Kurt J. Lesker from 10AM-12PM on Tuesday, October 4th, 2016.

Workshop Synopsis: Proper vacuum pump selection and care can mean the difference between years of effective service life and an expensive paperweight. To protect your investment, you want to ensure you're providing the conditions to maximize the service life. In this workshop, we'll review aspects important to the long term performance of your vacuum pump. This will include everything from choosing the correct new pump and system components for your application to basic repairs and maintenance for heavily used pumps. Some highlights include:

- Specifying the correct type and size pump for your system
- Choosing the correct accessories to protect the pump during operation
- Importance of using the right fluids (e.g. Hydrocarbon vs Fomblin vs Other)
- Proper installation and start-up
- Preventative maintenance
- Basic repairs and services (i.e. replacing tip seals and oil changes)

In addition to the lecture, vacuum pumps will be on-hand for a live demonstration of the discussed techniques.

The instructor will be Garrett Grenek of Kurt J. Lesker, Product Manager, Vacuum Pumps and Gauging.

For more information please visit <http://www.sccavs.org/symposium2016.html>

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Visit <http://www.sccavs.org/Employment.htm>
for info on AVS related jobs!

Employment Opportunities and Jobs Wanted are listed free of charge as a service to the Southern California technological community.

CURRENT OPENING:
Thin Film Coating Manager in Northern OC

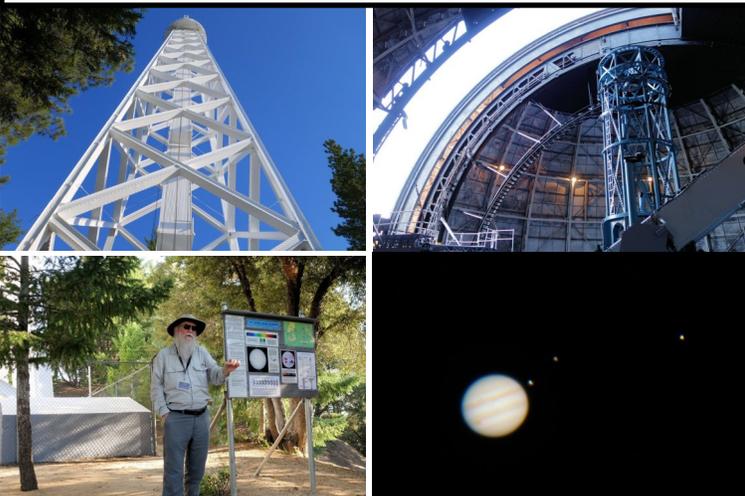
Chapter Announcements

Mount Wilson (Cont'd from page 1)

not only the 100" Hooker and 60" historic telescopes, but also the vacuum aluminizing chamber used to coat the mirrors in a process described in John Strong's 1936 paper (<http://adsabs.harvard.edu/abs/1936ApJ....83..401S>).

Many don't realize that Mount Wilson has the first dedicated SOLAR Observatory as well, and we learned a great deal about its rich history. THANK YOU to the staff and volunteers at Mount Wilson Observatory for making this year's trip one of the most memorable yet!

Clockwise from top left: 150 Foot Solar Tower, Inside Dome at Hooker Telescope, Jupiter w/ its 3 moons as seen through 100" scope, Tour guide and retired JPL astrophysicist Tim Thompson.



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2016 SCCAVS Short Course Program
—REGISTRATION NOW OPEN—

Short Course Program – October 3 – 5, 8:30 am to 5 pm, Holiday Inn Buena Park, Marquis I and Plaza

- ▶ **An Overview of Applied Vacuum Technology** (2 days)
- ▶ **UHV Design and Practices** (1 day)
- ▶ **Cleaning and Surface Conditioning Techniques for Integrated Circuit Manufacturing** (2 days)
- ▶ **Focused Ion Beams (FIB) and Secondary Ion Mass Spectrometry (SIMS)** (1 day)

Two-Day courses are \$850 Regular/\$200 Student.

One-Day short courses are \$575 Regular/\$100 Student.

Price includes lunch and coffee breaks, all course materials, and Course Completion Certificate.

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MORE INFORMATION & REGISTER HERE: <https://www2.avs.org/shortcourses/schedule/sccavs/regform.html>

Elmer Carvey Winners (Cont'd)

during the development of this new material solution, including finding a way to control the electrical current of the power source during electrochemical etching of the porous silicon.



She is also beginning an internship with Rayton Solar, a start-up solar cell company headquartered in Santa Monica, CA. There she will apply lessons-learned from her research to an industrial environment. In addition to her success in the laboratory and in industry, she is also the President of the Society of Women Engineers at UCLA for the coming year. She has also maintained a laudable academic record.

Emily Paluch, UCLA

After graduating with her B.S. degree in 2017, Ms. Paluch plans to obtain an M.S. degree in materials science and engineering with an emphasis on electronic materials. Her career goal is to work at a solar cell company, performing research and development on ways to improve efficiency and reduce cost.

The Elmer Carvey Memorial Scholarship was established in honor of Elmer Carvey, an active member of the SCCAVS from 1964 until 1982. The Scholarship is awarded to undergraduate students attending public, four-year colleges in California who are planning careers in areas of interest to the society, including vacuum-related technologies, surface and thin film science, nanotechnology, understanding of materials properties, and the development of new materials. The stipend is \$1,500.00 for one year.

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July/August 2016

Sun	Mon	Tue	Wed	Thu	Fri	Sat
24 <i>ALD 2016</i>	25 <i>ALD 2016</i>	26 <i>ALD 2016</i>	27 <i>ALD 2016</i>	28	29	30
31	1	2 <i>Chapter Meeting</i>	3	4	5	6
7	8	9	10	11	12	13
14	15	16 <i>Surface Analysis</i>	17 <i>Surface Analysis</i>	18 ^o <i>Full Moon</i>	19	20
21	22	23	24	25	26	27
28	29	30	31			



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