



SCCAVS Newsletter

June 2011

The Science & Technology of Materials, Interfaces, & Processing

Special points of interest:

- “Advances in Vacuum Quality Measurement” Speaker/Dinner will be June 14th, 2011
- OCSEF and LASF Winners announced for 2011 Science Fairs
- Short Course pre-announcement dates set for Aug 1-4, 2011
- Elmer Carvey Scholarship Applications due June 1st

Contact Us:

Jeff Lince, Chair

jeff@sccavs.org

Corinne Freeman, Treasurer

corinne@sccavs.org

Jim Garner, Secretary

jim@sccavs.org

Members at Large:

Linda Ellsworth

Rick Seboldt

Richard Stamberg

Dan Coursen

Greg Mills

General Inquiries:

info@sccavs.org

Advances in Vacuum Quality Measurement

On June 14, 2011 the SCCAVS will host a dinner and presentation by Gerardo Brucker, Ph.D., the Chief Scientist of the Granville-Phillips Instrumentation Division at Brooks Automation, entitled “Advances in Vacuum Quality Measurement.”

This talk will discuss significant improvements being made possible by innovations in electrostatic ion traps and autoresonant mass detection.

Relying simply on total pressure to monitor vacuum system readiness and integrity is both dangerous and inefficient. Mass spectrometers – often based on quadrupole filtering – can be used to provide identification of the chemical species that are present in the background. The recently developed autoresonant ion trap mass spectrometer (ART MS) provides potential improvements in vacuum quality control for many industrial applications. For example, the

fast response time of ART MS enables tracking of rapidly changing vacuum conditions. The principles of operation of ART MS will be described and compared to quadrupole mass spectrometry legacy technology. The application of ART MS traps to real vacuum quality measurement problems will be explored.

Granville-Phillips Instrumentation Division of Brooks Automation Inc. is located in Longmont, CO. Since 1992, Dr. Brucker has been involved in the development and commercialization of scientific instruments including electrostatic ion traps, residual gas analyzers, high vacuum gauges, time-of-flight mass spectrometers, thermal analysis instruments and research-grade quartz crystal microbalance systems. Dr. Brucker is a short course instructor for AVS and a member-at-large of the Rocky Mountain Region AVS Chapter. He was previously respon-



Dr. Gerardo Brucker is Chief Scientist of the Granville-Phillips Instrumentation Division at Brooks Automation

sible for the creation of the Vacuum and Analytical Products division at Stanford Research Systems, Inc.

The dinner and presentation will be held at the Holiday Inn, Santa Ana, from 6:30-9:00pm on Tuesday, July 14, 2011. The cost is \$30 per person, which includes dinner and the presentation. Pre-registration is required and the deadline to do so is June 6th.

For more information please contact:

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Linda Ellsworth
DF Technology Inc.
(949) 361-8120
lindaellsworth@cox.net

Fred Van der Linde
DF Technology Inc.
(626) 794-4173
fredvanderlinde@cs.com

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Short Courses Planned for this Summer

The SCCAVS plans to hold a series of Short Courses August 1-4, 2011 in Orange County, CA. Courses available are:

*Overview of Applied Vacuum (2-day course)

*UHV Design & Practices (1-day course)

*Vacuum Vessel Engineering (1-day course)

To get on our early interest list and be updated as dates are confirmed please email corinne@sccavs.org

SOUTHERN CALIFORNIA
CHAPTER OF THE AVS :
THE SCIENCE &
TECHNOLOGY OF
MATERIALS,
INTERFACES, AND
PROCESSING

Mailing Address:
Southern California Chapter AVS
1365 Delaware Street Suite 101
Huntington Beach, CA 92648

info@sccavs.org

We're on the web!
www.sccavs.org

Upcoming Events

Semicon West 2011
&
Intersolar North America
July 12th-14th
Moscone Center
San Francisco, CA

www.semiconwest.org

www.intersolar.us



Local Chapter Activities

OCSEF & LASF Winners Announced for 2011

April 6th & 15th, 2011

Corinne Freeman, Greg Mills, & Larry Oberlander

The Orange County Science & Engineering Fair (OCSEF) took place at the Costa Mesa Fairgrounds on April 6, 2011. The SCCAVS awarded first and second prizes for students with an interest in vacuum-related technologies. This year our first place winner was Alan Tang, a senior at Woodbridge High School in Irvine for his project, "Ag & Cu Deposition on TiO₂ Film Substrate & Observation With Scanning Electron Microscopy". Alan worked with Dr. John C. Hemminger's lab at UCI at the Institute for Surface and Interface Science (ISIS) to deposit Ag and Cu on TiO₂ film. He used one of the labs PVD tools to evaporate the materials using a Ta sample holder, reaching pressures of 6.0×10^{-6} Torr, and heating to temperatures of 480° C. He used a mechanically backed diffusion pump, and deposited 2.0nm of Ti and then oxidized it. His goal was to find a less expensive alternative to using Au in this application, and found that while the Ag worked the Cu could not be detected using the available XL-30 SEM. He noted that a higher resolution electron microscope would soon be available in the ISIS lab, and that with future research there he aims to develop optimal methods for the deposition of Cu and other metals onto TiO₂ film. Being a senior in High School we will certainly not have to wait long until we get to see what kind of amazing work this young gentleman will do in University and possibly private industry.

Our second place winner at OCSEF was 8th grader Jonathan Bailey's project, "What's More Expensive? A \$200 Faucet or a \$300 Faucet?". Jonathan's experiment asked the question whether PVD is more effective than powder (clear) coating on brass used for everyday items like kitchen and bathroom fixtures. He received 10 medallions (5 PVD coated and 5 polished brass) from West Coast Metal Finishing Company and PVD expert Brian Nevill. He tested resistance to direct sunlight, wire wool, Lime-A-Way, Windex, and transmission fluid. After subjecting the medallions to 30 days of environmental testing, 250 abrasive passes, and 72 hours of sustained chemical resistance he determined that the PVD coated brass was superior to the clear coat polished (or powder coated) brass surfaces. He concluded that while a clear coat polished brass faucet may cost \$200 to purchase, product failure in the home would be expected in 1-2 years. In contrast, a \$300 PVD coated faucet would maintain its appearance for a lifetime, making the \$200 faucet more expensive over time than the \$300 faucet! From his introduction I think Jonathan certainly has a future in this field, as he exclaimed, "Vaporizing metal is so cool!"

The Los Angeles Science Fair (LASF) was held at the Pasadena Convention Center on April 15th and again, the Chapter awarded two student prizes. Jose Perez was awarded 1st place (\$100). Jose is a student at Bravo Medical Magnet High School. He is working on a project aimed at supplying an implantable chip in the eyes of those with impaired vision. The plan is to transfer information from the retina with PT-IR nanowires. Jose used an electro chemical process to use a platinum iridium solution to form the nanowires in a porous wafer. He used a helium leak detector to determine the density of the nanowires he manufactured.

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Corinne Freeman
Sales, Southern California
(714) 536-2800
Corinne@mbarotech.com
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Elmer Carvey Scholarship Program

Jeff Lince

The Southern California Chapter of the AVS Science and Technology Society (SCCAVS) currently administers a scholarship program for undergraduate students planning a career in the physical sciences. It is the **2011 Elmer Carvey Memorial Scholarship** -- established in honor of Elmer Carvey, an active member of the SCCAVS from 1964 until 1982.

This Scholarship is valid for undergraduate studies at any public four-year college in California, i.e. California State University or University of California. **The stipend is \$1,500 and may be used for tuition for the 2011-2012 school year.** Applications are accepted from students in physics, chemistry, materials science and engineering. Applicants should be planning study in areas of interest to the SCCAVS, including surface and thin film science, nanotechnology, the understanding of materials properties, and the development of new materials and devices. (Biological sciences are generally not covered by this Scholarship unless the student's study area is interdisciplinary and involves areas of interest to the SCCAVS.)

The application materials should be sent to the mailing address shown on the SCCAVS website (see below). They must be received by June 1, 2011, for the 2011-2012 academic year.

Scholarship recipients will be notified by August 1, 2011. If you have any questions, please contact Jeff Lince at: jeff@sccavs.org

For more information on the Scholarship, and to download an application, go to:

<http://sccavs.org/scholarship.htm>



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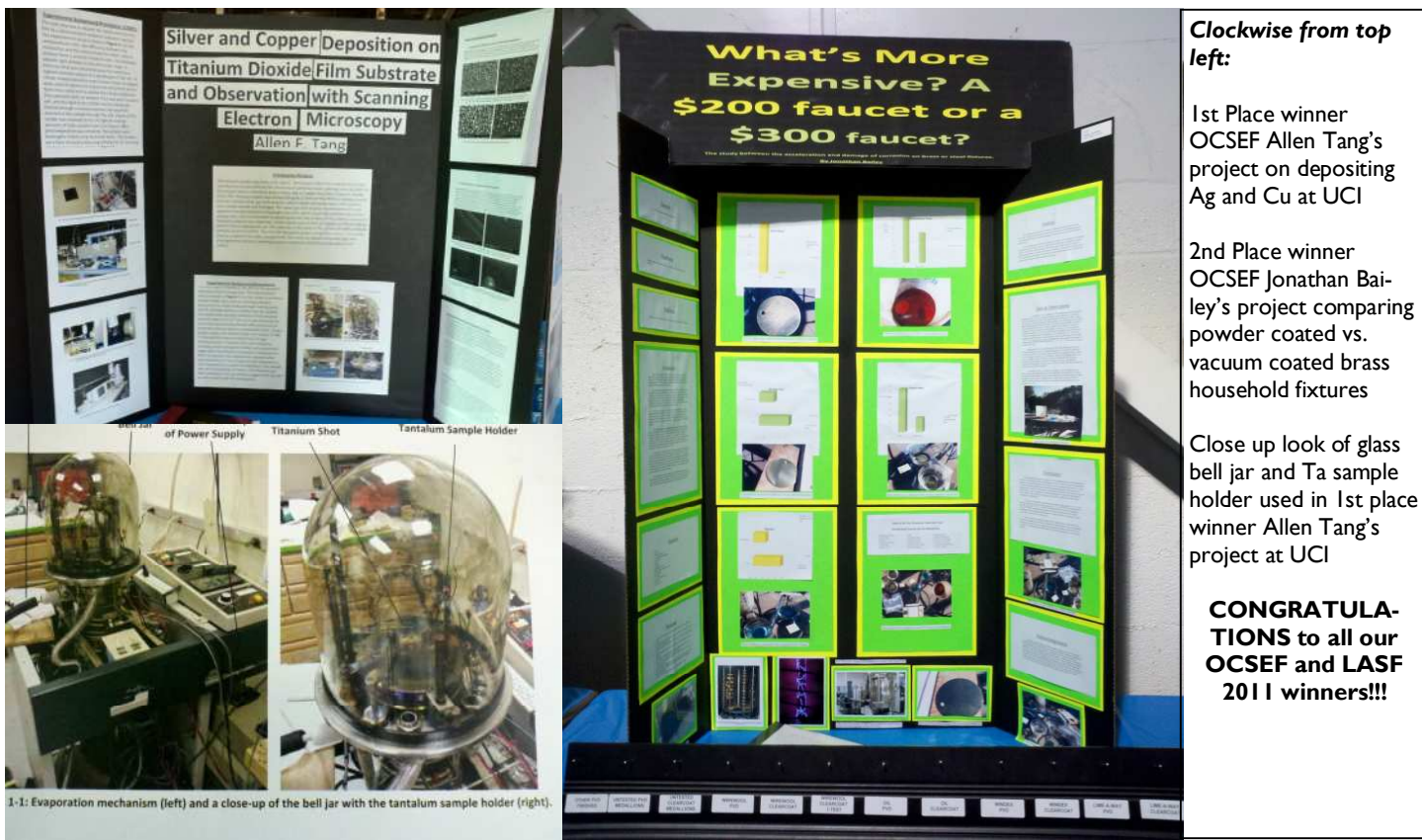
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Marc Matossian of AGBU Manoogian-Demirdjian High School captured second place (\$50). He measured the growth characteristics of plasma treated plant seeds. He tried three different plasmas. The plasmas consisted of ionized air, nitrogen and carbon dioxide. He got increased growth in the case of bush beans but a decrease in growth with Mung beans. Although some lack of control of variables was evident in his methods, Mark was encouraged to continue use of his plasma cell with some refinements in technique.

Volunteer judges at this year's OCSEF were Corinne Freeman-D'Ambrosio of Mbar and Greg Mills of AXR Tech. The volunteer judge at this year's LASF was Larry Oberlander of Northrop Grumman, our former Chapter Chair.



Clockwise from top left:

1st Place winner OCSEF Allen Tang's project on depositing Ag and Cu at UCI

2nd Place winner OCSEF Jonathan Bailey's project comparing powder coated vs. vacuum coated brass household fixtures

Close up look of glass bell jar and Ta sample holder used in 1st place winner Allen Tang's project at UCI

CONGRATULATIONS to all our OCSEF and LASF 2011 winners!!!

June 2011

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1 <i>Elmer Carvey Deadline</i>	2	3	4
5	6 <i>Speaker/Dinner Deadline</i>	7	8	9	10	11
12	13	14 <i>Dr. Brucker Dinner</i>	15	16	17	18
19	20	21	22	23	24	25
26	27	28 <i>Next SCCAVS Meeting</i>	29	30		