



Science and Technology of Materials, Interfaces, and Processing Southern California Chapter

Summer 2018

Quarterly Newsletter

Special points of interest:

- Speaker Dinner with BFK Solutions Barbara Kanegsberg at ZC&R
- LA & OC Science and Engineering Fair 2018 Winners
- Elmer Carvey Scholarship
- Science Educator's Workshop Long Beach

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LA & OC Science and Engineering Fair 2018 Winners

Contributed By Corinne D'Ambrosio and Jim Garner

The SCCAVS is an annual special awards judge at the Los Angeles Science & Engineering Fair and Orange County Science and Engineering Fair, both held in March. We award two \$100 1st prize gift cards and two 2nd prize gift cards. In 2017, the awards given at OCSEF and LASEF were named in memorial of Dan Coursen for his years of service to SCCAVS and commitment to educational outreach in vacuum science.

Jim Garner of MacroVantage was the special awards judge at LASEF in Pasadena. Corinne D'Ambrosio of Von Ardenne North America and Dan Coursen Junior, son of Coursen Coating Labs founder and SCCAVS Committee Member, Dan Coursen, judged at OCSEF in Costa Mesa.

LASEF & OCSEF are qualifying events for

the 67th annual California State Science Fair in April, which draws 900 participants from 400 schools throughout the State in competition for awards totaling \$60,000.

The 2018 OCSEF first prize award winner (\$100) was Sasha Ronagi of Sage Hill in Newport Beach. This sophomore in Mrs. Robinson's class presented her project, "Designing a Water Repellent and Breathable Material for Wound Dressings using Nanotechnology," to solve the problem of suboptimal surgical dressings that trap moisture leading to infection and require frequent changes. She aimed to create an optimal surgical dressing that would be hydrophobic, breathable, and most importantly, biocompatible. Working with UCI's Khine Lab, she deposited Au film on Polystyrene sheets (PS), then heated to 160 degrees C to create Au

(Continued on page 2)



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LA & OC Science Fair Winners (Continued from Page 1)

“wrinkles” on the PS sheet, creating a very hydrophobic material that is 230% more breathable than TegaDerm, the leading water repellent and hydrophobic wound dressing brand.

Miss Ronagi impressed the judges with her hands-on approach to this project, which she was allowed to work on quite independently at UCI with some support of Dr. Michelle Khine and her graduate students. She not only used PVD equipment at UCI but also analytical and measurement equipment, which demonstrates real-world knowledge of vacuum technology.

The second prize award winner (\$50) was Samuel Alber of University High School in Irvine. He is a sophomore in Nicholas Brighton’s class with a high level of interest in astrophysics and dark matter, in particular. His project, “A Determination of Optimal Dark Matter Model for the SPARC Galaxies,” questions the efficacy of the Λ CDM Paradigm, the modern theory of the overall universe which envisions it as being dominated by dark energy with cold dark matter halos (spheres of dark matter) encapsulating galaxies, versus the SIDM model (or self-interacting dark matter), aiming to solve their “core” versus “cusp” problems. He created an algorithm to read the SPARC data, analyze it, and determine which model is preferred for each individual galaxy. What Mr. Alber found was further evidence for the self-interactions of dark matter, and is currently working on trying to fit SIDM to the SPARC galaxies. His project’s goal was to aid in solving one of the biggest mysteries of all time: What is dark matter?

With such a diverse array of studies that either involve use of vacuum technology or run tangentially to it, the Chapter wants to encourage Mr. Alber’s studies in astrophysics and his higher education in STEM fields.

The first prize winners of our SCCAVS awards at the Los Angeles County Science Fair were Allyson Ee (12th Gr) and Albert Tan (11th Gr) of Palos Verdes Peninsula High School for “Analyzing Electrochemical Effects of Ni Substitutions on Iron Silicate Compounds.” They found that replacing some of the lithium in storage battery electrodes with nickel actually increased efficiency while reducing cost. They used excellent experimental techniques in surface-interface chemistry, which is a major focus of the AVS.

Allyson Ee is planning to study materials science and has applied to several leading research universities. Albert Tan is interested in a career in engineering.

(Continued on page 5)

**SOUTHERN CALIFORNIA
CHAPTER OF THE AVS :
THE SCIENCE &
TECHNOLOGY OF
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PROCESSING**

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Upcoming Events

**AVS 65th International
Symposium and Exhi-
bition**

October 21 – 26, 2018
Long Beach, CA
[http://avs.org/
Symposium](http://avs.org/Symposium)

**AVS Pacific Northwest
Chapter Annual Sym-
posium**

June 19 – 22, 2018
Richland, WA
[https://www.avs.org/
Chapters/Pacific-
Northwest/Annual-
Symposium](https://www.avs.org/Chapters/Pacific-Northwest/Annual-Symposium)

**AVS Rocky Mountain
Chapter Symposium
and Vendor Exhibit**

September 13, 2018
Westminster, CO
<http://www.rmccavs.org/>

Chapter Activities

"Cleaning, Adhesion, and Productivity" -September 26, 2018

SCCAVS and ZC&R Coatings in Torrance will host Barbara "The Cleaning Lady" and Ed Kanegsburg of BFK Solutions for a dinner talk on "Cleaning, Adhesion, and Productivity on Tuesday, September 26, 2018. Registration details to come this summer. Cleaning, surface quality, and coating are interconnected. Consider them together, and product quality improves dramatically. The September program will mesh basic principles with examples and case studies - the good, the bad, and the ugly. Topics include:

- Why strategic critical cleaning are essential for the adhesion and quality of thin film optical coatings.
- What could ever possibly go wrong in a vacuum? Plenty! Residual surface soil, both thin film and particulate, can result in product defects. Visual defects are well-known. We will also discuss non-visual defects that are manifested audibly and, in at least one instance, dramatically.
- How understanding the relationships between cleaning, extraction, separation and detection speeds up the process of tracking down contaminants.

Our speakers, Barbara and Ed Kanegsburg of BFK Solutions are recognized consultants in critical and precision product cleaning. Their experience includes improving production for advanced optics, and thin film coating deposition. Their workshops and training programs are dynamic and interactive. They recently conducted a two-day Product Quality Cleaning Workshop with Sam Houston State University; the program combined instruction with demonstrations and hands-on lab exercises. They are co-editors of and contributors to the two-volume "Handbook For Critical Cleaning," second edition, CRC



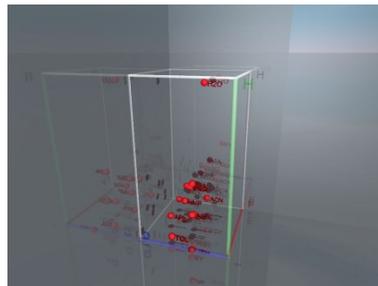
Barbara And Ed Kanegsburg of BFK Solutions, co-editors and contributors to the "Handbook For Critical Cleaning" and our speakers Sept 26.

Press, 2011.

Defect Photos:

(Left) Hansen solubility parameters

(Right) Handprint under coating



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2018 Elmer Carvey Scholarship

The Elmer Carvey Memorial Scholarship is awarded to undergraduate students attending public, four-year colleges in California. The stipend is \$1,500 for one year and is applied toward tuition during the 2018-2019 school year. Applications from students in physics, chemistry, materials science and engineering, whose desired career goals are in areas of interest to the society are encouraged (see <http://sccavs.org/about.htm>). (Planned careers in biology/medicine are generally not covered by this Scholarship unless they are interdisciplinary and involve areas of interest to the SCCAVS.) High school seniors and current college students may apply. Please address questions to info@sccavs.org.

Application available at: <http://www.sccavs.org/CarveyScholarshipApplication.pdf>

Completed applications must be received by July 1, 2018 for the 2018-2019 academic year. Scholarship recipients will be notified by August 1, 2018.



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Since 1963

Science Educator's Workshop at AVS 65 in Long Beach

AVS has conducted a two-day in-service workshop on low-pressure experiments and modeling for high school science teachers from the United States and Canada since 1990. Attendees are sponsored by regional Chapters of the Society with all expenses paid by the sponsoring Chapter. The workshop is accredited for CEU's and is aligned with the national science and mathematics standards. **The next workshop will be held October 22-23, 2018 in Long Beach, California** during the AVS 65th International Symposium & Equipment Exhibition. The Southern California Chapter of the AVS will be sponsoring local teachers to attend, *and encourages all of you reading this to please share with qualified teachers in your network.*

The workshop is divided into two parts: (1) lectures on the underlying science and the mathematical calculations and (2) hands-on experience in which a group of teachers perform experiments and develop models under the guidance of an instructor team.

Upon completion of the workshop, teachers receive at no cost

- A certificate of completion
- 1.5 Nationally certified CEU's or 150 sixty-minute clock hours from the University of Dayton
- A vacuum system for their school identical to ones used in the workshop



Interested teachers should submit an application online at <https://www.avs.org/Form/SEW-Application>

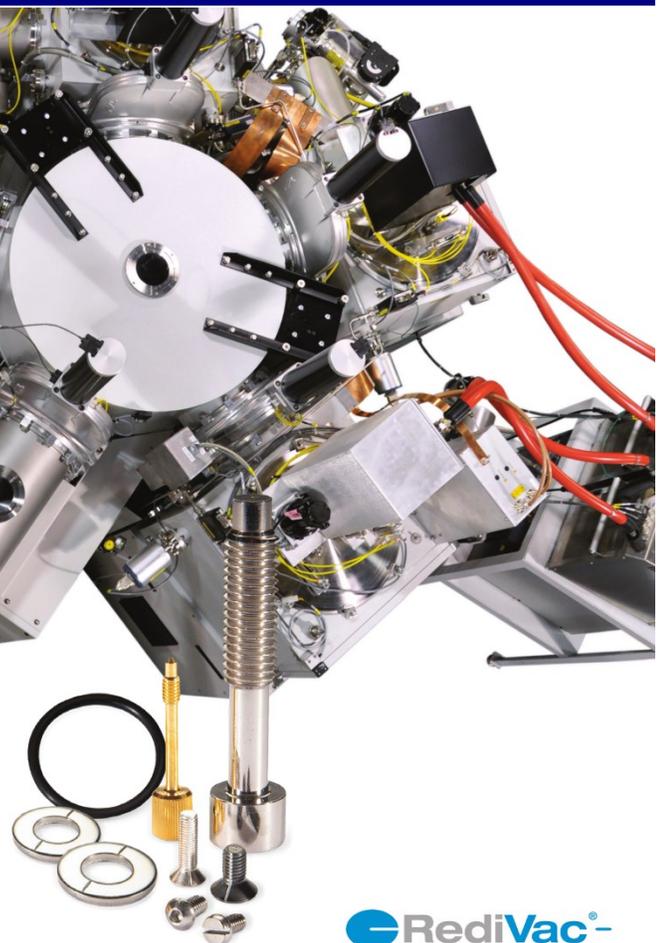
The deadline for submission is August 10, 2018. Additional information about the workshop can be obtained by e-mail at SEW@AVS.ORG or by calling 1-212-248-0200.

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LA & OC Science Fair Winners (Continued from page 2)

The second prize winner at the LASEF was Leo Guo (12th Gr), Palos Verdes Peninsula High School for “Modeling and Ideal Structure of Tunneling Barrier to Minimize the Energy Loss of Electron Wave Packets Undergoing the Quantum Tunneling Process” He analyzed various tunneling barrier shapes using numerical solutions to the Schrodinger Wave Equation. He found that the Gaussian-pulse yielded the lowest energy deflected electron wave. This represented excellent work in nanoscience, which is a major focus of the AVS .

Leo is planning to study engineering. Both of the winners for the LASEF this year have the same advisor: Melissa Klose, Palos Verdes Peninsula High School.



From Left to Right: Sasha Ronagi of Sage Hill (Newport Beach), Samuel Alber of University High School (Irvine), Allyson Ee & Albert Tan of Palos Verdes Peninsula High School, and Leo Guo also of Palos Verdes Peninsula High School

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June/July 2018

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-----|-----|--|---|----------------|---------------|-----|
| 10 | 11 | 12 | 13 ● New Moon | 14 | 15 | 16 |
| 17 | 18 | 19 <i>SCCAVS Meeting at Renato's (Westminster)</i> | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 ○ Full Moon | 29 | 30 |
| 1 | 2 | 3 | 4  | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 ● New Moon | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |



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