



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

Spring 2019

Quarterly Newsletter

## Special points of interest:

- Speaker Dinner in Buena Park on Amphiphobic Coatings for Easy To Clean Surfaces with Bernard Coll of Von Ardenne May 22, 2019
- Orange County Science & Engineering Fair Winners
- SCCAVS Short Course Program 9/30-10/2/19

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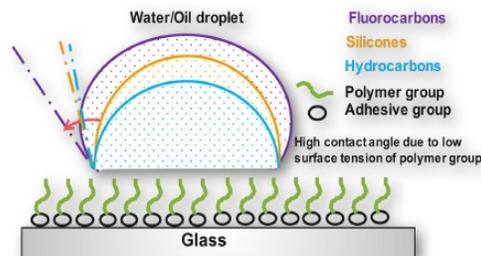
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## Amphiphobic Coatings for Easy To Clean Surfaces: Presentation and Dinner — May 22, 2019

*Contributed By Jim Garner*

With the ever-growing usages of hand-held electronic devices and touch-screen displays, keeping surfaces free of fingerprints and oil residues, as well as making them easier to clean, is an active field of research and technology development. The success of easy-to-clean (ETC) surfaces deals with the formulation, design and deposition of low surface energy amphiphobic coatings that repel both water and oil. Currently, commercial ETC coatings are applied from liquid phase by spraying, dipping.... While it is an attractive low-cost technology, these coatings don't meet optical clarity and aging requirements. To servethese needs, Von Ardenne is developing new economical and reliable coating systems and procedures to take into account not only the hydro/oleophobicity function but also the long-term durability of such coatings. A technology based upon vacuum thermal evaporation of fluoro-silicon chemistry produces ultra-thin (~10nm) defect-free, uniform and optically clear coatings well bonded to AR coated glass surfaces.

Join the SCCAVS on May 22, 2019 at the Holiday Inn Buena Park for networking, dinner, and the talk by Bernard Coll, Senior Applications Engineer at Von Ardenne North America in Phoenix, AZ.



Bernard will discuss recent trends in the development of durable and environmentally resistant vacuum deposited ETC coatings; including the technology, materials, applications, and some of the fundamentals. Their performance will be reviewed and compared to alternative commercially available solutions.



Born in France, Bernard graduated with a Dipl-Ing in nuclear physics and mechanical engineering. He pioneered hard and wear resistant coatings specializing in vacuum arc and other PVD/PECVD techniques. Moving abroad, he joined IonBond to develop DLC by filtered arc technology. In 1994, he joined Motorola to develop NEA thin films and CNT for field-electron emission displays. He led Motorola Labs' Display R&D group specializing in novel functional materials for visual displays and optics for mobile applications. He was named Distinguished and Master Innovator by Motorola in 2003 and 2009.

Bernard's extensive experience in semiconductor processing, display technologies and nanotechnology, led him to work in the development of solid state thin films for  
(Continued on page 2)

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### *(Continued from page 1) Amphiphobic Coatings for Easy to Clean Surfaces*

Lithium ion battery and Hydrogen storage in various startups from 2011 to 2017 prior to joining Von Ardenne. Bernard holds 43 US patents and has published 45 technical papers.

The event will be held at the Holiday Inn Buena Park, 7000 Beach Boulevard in Buena Park, CA 90620 and will begin with networking at 6pm followed by a three course dinner at 6:30 and talk beginning at 7:15pm. The cost is \$25 per person (\$10 students/seniors). To register, complete the following form and send with payment **by May 8, 2019 via** Paypal to [Chair@sccavs.org](mailto:Chair@sccavs.org) or by mail to SCCAVS, 616 Hartford Avenue, Huntington Beach, CA 92648:

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**Upcoming Events**

SVC TechCon 2019  
Long Beach  
Convention Center  
Long Beach, CA  
April 27-May 2, 2019



ICMCTF 46th Annual  
Conference  
Town & Country Resort  
San Diego, CA  
May 19-24, 2019

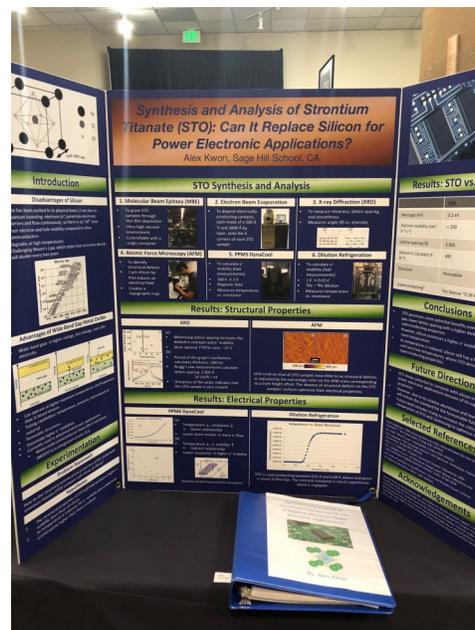
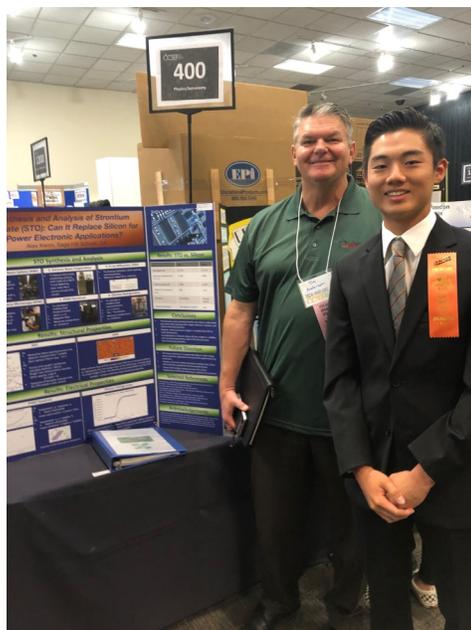


**Chapter Activities**

**Orange County Science & Engineering Fair March 21, 2019**

The 64th Annual Orange County Science and Engineering Fair was held at the Business Expo Center in Anaheim, CA from March 20-22, 2019. The Fair hosts students grades 6-12 presenting projects in Science, Technology, Engineering, and Math. Corinne D'Ambrosio of Von Ardenne and Tom Anderson of NPB Technology Group served as Special Awards Judges for the SCCAVS. They awarded a First Prize of \$200 and Second Prize of \$100 with certificates and letters to be presented to the winners at the Awards Ceremony March 22, 2019. The Award is the Dan Coursen Memorial Award, in recognition of his years of service to the SCCAVS and commitment to educational outreach in vacuum science.

The First Prize Special Award Winner was Alexander Kwon for his project titled; "Analyzing the Electrical Properties of Strontium Titanate: Can It Replace Silicon for Power Electronic Applications?" Alexander is an 11th Grade student at Sage Hill High School who worked with Dr Susanne Stemmer's Research Group on a Research Mentorship Program. He used both Molecular Beam Epitaxy and Electron Beam Evaporation in his preparation and analysis of samples and found that STO possesses some potential benefits over Silicon, including wider band-gap, lower lattice spacing with a higher dielectric constant, and superconducting properties. Si still possesses a higher  $e^-$  mobility than STO at room temperature, however STO demonstrates superconducting properties at very low temperatures. Due to its relative abundance and low cost, Si will remain the standard for the foreseeable future but Mr. Kwon plans future work to increase the critical temperature of STO to optimize its properties. Alexander was recently awarded a spot in the Storybrook Simons Summer Research Program (SSRP) and plans to be a Chemistry major.



First Prize SCCAVS Special Award Winner Alexander Kwon of Sage Hill High School

(Continued on Page 5)



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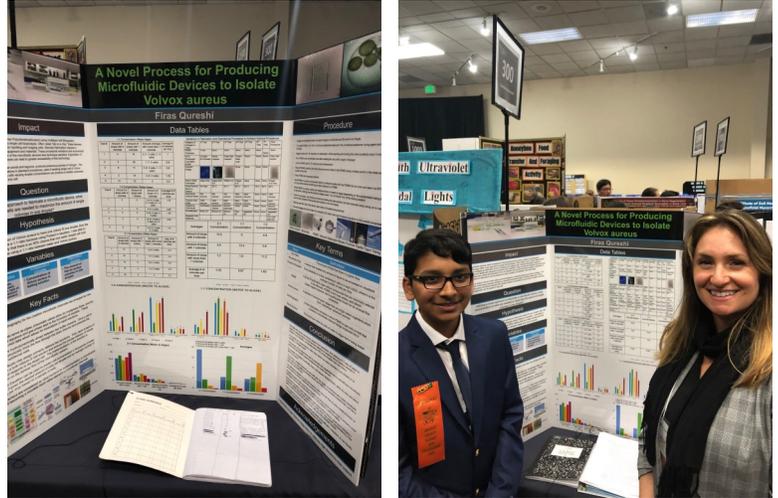


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## OCSEF Winners (Continued from page 3)

The Second Prize SCCAVS Special Award Winner was Firas Qureshi of Valencia High School. This 9th grader's project was titled, "A Novel Process for Producing Microfluidic Devices to Isolate *Volvox aureus*," and utilized a vacuum desiccator to remove bubbles (i.e., degas) the liquid PDMS mixture he used to create his samples, which he designed in AutoCAD and SolidWorks. PDMS is Polydimethylsiloxane and is an elastomer used to make microfluidic devices using multilayer soft lithography technology, which offers a new approach to single cell bioanalysis. They are a "lab on a chip" and have emerged as an alternative tool for handling and imaging cells. Mr. Qureshi used *Volvox aureus*, found in freshwater pools and lagoons which produces poisonous plumes of Nitrogen. His hypothesis was that using a 1:1 ratio of water to algae in a testing solution would be most effective in isolating *Volvox aureus* colonies in droplets. The purpose of his experiment was to exemplify the capabilities of his cost-effective microfluidic device and test its ability against commercially made devices. He found he was able to produce his chip for about \$275 compared to \$2500-3000 for lab-made chips and wishes to do further research to determine more efficient, consistent, and cost friendly microfluidic designs that isolate colonies of algae. Applications of this technology range from cancer to our water supply, and Firas intends to pursue his interest in biomedical engineering.



Second Prize SCCAVS Special Award Winner Firas Qureshi of Valencia High

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## Short Course Program at the SCCAVS Expo September 30-October 2, 2019 |

The SCCAVS will hold its annual Equipment Exhibition, Short Course Program and Poster Session at the Holiday Inn Hotel and Convention Center in Buena Park, CA from September 30 to October 2, 2019. The Equipment Exhibition will be held on Tuesday October 1st and registration is now OPEN for exhibitors at <https://www.sccavs.org/exhibitinfo.htm>

The following Short Course Program will be offered and a link for course descriptions can be found online at <https://www.sccavs.org/symposium2019.html>

Online registration for short courses will be available by the end of May. For more information or to be placed on our early interest list please email [info@sccavs.org](mailto:info@sccavs.org).

Monday, September 30	Tuesday, October 1	Wednesday, October 2
Overview of Vacuum Technology (Day 1) <b>Tim Gessert</b>	Overview of Vacuum Technology (Day 2) <b>Tim Gessert</b>	Controlling Contamination in Vacuum Systems <b>Tim Gessert</b>
Introduction to Surface Analysis <b>Tom Christenson</b>	Vacuum and Cryogen Safety <b>Roger Schrouf</b>	Atomic Layer Deposition: Basic Principles, Characterization, and Applications <b>Robert Grubbs</b>
	An Introduction to Ion Sources: Principles & Techniques <b>Abe Ghanbari</b>	Introduction to Spectroscopic Ellipsometry <b>Harland Tompkins</b>

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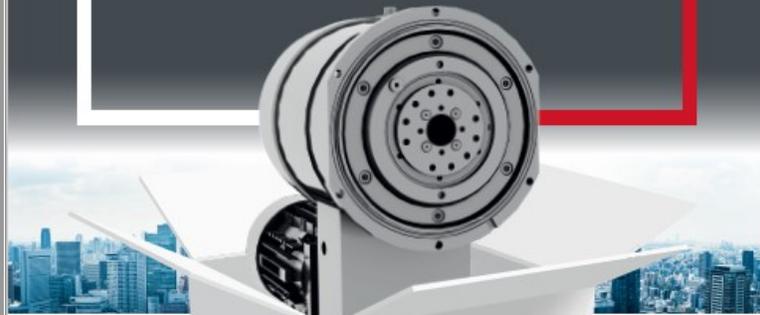
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Sun	Mon	Tue	Wed	Thu	Fri	Sat
24	25	26	27	28	29	30
31	1	2	3	4	5 ● <i>New Moon</i>	6
7	8	9	10	11	12	13
14	15	16	17	18	19 ○ <i>Full Moon</i>	20
21 <i>Happy Easter</i>	22	23	24	25	26	27
28	29	30				

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