



ISOTOPICS

The Cleveland Section of the American Chemical Society

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On Deck:

Wed Sept. 18
T.B.A.

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May Meeting Notice

Edward W. Morley Award

Wed. May 15, 2019

Michaelson & Morley Restaurant

110387 Bellflower Rd., Cleveland, OH 44106

4:30 pm	Executive Committee Meeting
5:30 pm	Social/Networking
5:45 pm	Dinner
7:00 pm	Award presentation and Address

2019 Morley Address: BIOROBOTICS: An Emerging Field at the Boundary between Biology, Chemistry, and Engineering

By Prof. Daniel A. Scherson, Frank Hovorka Professor of Chemistry, Director of the Ernest B. Yeager Center for Electrochemical Sciences, CWRU

Over the last 2 decades, ingenious devices have been developed for converting chemicals present in biofluids into electrical energy in living organisms with potential application in a variety of areas of fundamental and practical relevance. Efforts in our laboratories have focused on the development of such biofuel cells that could be implanted into insects and provide the power required not only for the operation of electronics for sensing, information storage and wireless communication, but also for the stimulation of the nervous system, a strategy that will ultimately allow control of certain aspects of the insect behavior. An attractive feature of this approach is that it provides a continuous and autonomous source of power, thereby avoiding the need for an external battery as implemented recently by other groups who succeeded in controlling wirelessly the path of motion of a cockroach. To this end, we designed, constructed and successfully tested an implantable biofuel cell incorporating a bienzymatic anode capable of dissociating trehalose, a disaccharide found at concentrations of up to tens of mM in the hemolymph of insects, to yield glucose, which is then oxidized to gluconolactone by the enzyme glucose oxidase. This type of biofuel cell can generate up to 15.6 $\mu\text{W}/\text{cm}^2$ when implanted in a live cockroach and power a transmitter attached to its body capable of sending radio signals wirelessly to a distant receiver.

DINNER RESERVATIONS Please RSVP by Friday May 10, 2019, by emailing Mark Waner (mwaner@jcu.edu) *with your entree selection* (chicken, scallops or vegetarian-see menu below). At the event, we take credit cards, checks made out to "Cleveland ACS", or cash. The cost is \$20 for members, non-members and guests, \$10 for retirees or unemployed, and \$5 for students.

Parking:

The restaurant is located inside of the Tinkham Veale University Center on the Case Western Reserve University Campus. The building has an attached parking garage (<https://case.edu/universitycenter/about/directions>).

Dinner menu:

Chef's Mixed green salad

Entrée choices:

- 1) Citrus herb chicken/spinach/ artichoke/ feta/red pepper/Israeli couscous/apricot almond glaze
- 2) Seared Sea Scallops/cheddar grits /sauteed spinach/candied pancetta/ smoked beet puree
- 3) Mushroom meatballs/zucchini noodles/ caramelized fennel/oil-cured olives /tomato basil sauce

Chef's choice dessert.

Morley Award Winner Biography

Currently, Daniel Alberto Scherson is the Frank Hovorka Professor of Chemistry, and Director of the Ernest B. Yeager Center for Electrochemical Sciences, Case Western Reserve University. Professor Scherson earned his initial degree from the University of Chile. He went on to the University of California, Davis to earn his Ph.D. he did post-doctoral fellowships at UC Berkeley, Lawrence Berkeley Laboratory and Case Western Reserve University. He has been a faculty member at Case Western Reserve University since 1983. His research has focused on experimental and theoretical aspects of electrocatalysis, in-situ and ex-situ spectroscopic techniques for the study of solid-liquid interfaces and the electrochemistry of single crystal metals and supported clusters. He has authored more than 250 papers and holds 10 patents. Dr. Scherson has been awarded the Vittorio de Nora - Diamond Shamrock Postdoctoral Fellowship

(1981), a Max Planck Gesellschaft Fellowship (1982-83), the IBM Faculty Development Award (1983-85), a Japan Society for the Promotion of Science Fellowship (1993-94), David C. Grahame Award of the Physical Electrochemistry Division of ECS (2000), Alexander von Humboldt Senior Fellowship Award (2002), Faraday Medal of the Electrochemistry Groups of the Royal Chemical Society (2004), Japan Society for the Promotion of Science Travel Fellowship (2007), Fellow of the Electrochemical Society (2007) and has been Chair of the Gordon Conference in Electrochemistry (2012). Dr. Scherson has also been active in the leadership of the Electrochemical Society, as well as the Cleveland American Chemical Society.

Announcement: 50th CERM of the ACS

The 50th Central Regional Meeting of the American Chemical Society will be held in Midland, Michigan, from June 4 – 8, 2019, at the H Hotel (111 W. Main Street, Midland). The theme of the Meeting is “Molecules to Materials” and it recognizes the 100th anniversary of the Midland Local Section. Registration is open. MEALS ARE INCLUDED with registration (breakfast and lunch only). To get information about CERM, including a preliminary program and registration information, go to <https://acscerm2019.org>.

“You Be The Chemist” Competition

The “You Be the Chemist” state-wide competition was held on Saturday, April 26, in the Reinberger Auditorium at the Great Lakes Science Center. Several Cleveland ACS members were present to assist. Twenty-seven fifth-through-eighth-graders from around Ohio competed in four rounds, answering questions using classroom-style “clickers”. The winners are:

1st Place: Sherry Du (Hudson Middle School) She is the Champion and moving on to the National Challenge.

2nd Place/Alternate: Antonio Gojevic (Wickliffe Middle School)

3rd Place: Umayna Magsi (Lucas County Challenge)

4th Place: Yikun Zhou (Lee Burneson Middle School, Westlake)

“You Be The Chemist” is a program of the Chemical Education Foundation (www.chemed.org), an industry-supported organization whose mission is “[t]o build the excitement and value of chemistry and STEM careers with K-8 students through accessible science programs and hands-on experiences.”

Councilor Notes

The 257th National Meeting of the ACS was held in Orlando, FL, March 31-April 4. Over 15,000 attendees registered for the meeting. Both Dwight Chasar and Mike Kenney attended the Meeting and represented the Cleveland Local Section at the Council Meeting.

Major actions of the Council include:

- Candidates for President- Elect:
H.N. Cheng and Carole A. Duane
- Candidates for District II Director:
Christina C. Bodurow and Dawn Mason
- Amendment to ACS Constitution and Bylaws – by a significant margin the Council approved a Petition to Streamline the ACS Governing Documents. This petition reorganizes the current ACS Constitution and Bylaws and creates three documents; Constitution, Bylaws, and Standing Rules. The intent of these changes is to allow the society to respond to market forces more easily than is currently allowed by the governing documents. The approved changes must be approved by the Board of Directors and by the Membership of the Society. The vote to make these changes will be on the ballot, subject to approval by the Board of Directors, in the fall when balloting for President-Elect and District II Director also will occur.
- Annual membership dues will remain constant at \$175.

Additionally, the total membership of the

Society realized a small increase in the past year. This is the first year in over a decade that membership has grown. The Society continues to post positive financial results based on the performance of Chemical Abstracts Service and the ACS Publications as well as from expense management for the operations of the society.

Finally, any member interested in becoming involved in the work of national committees of the Society is encouraged to contact Dwight Chasar or Mike Kenney for specific guidance. National committees have representation from Councilors and the general membership and many provide support for travel.

2019 Heller-Dabrowski Award:

Congratulations to Richard Kawolics for winning this year’s Heller-Dabrowski Award, an award the Cleveland section sponsors every year in recognition of outstanding high school chemistry teachers. Richard has taught at Laurel School in Shaker Heights for 17 years. He is a strong advocate for girls in science and uses a standards-based assessment geared towards an emphasis on demonstrating knowledge and skills over grades. The students who wrote support for his nomination commented that this “took the pressure off of pursuing a high grade in the class and got [them] to focus on learning the material”. In addition to teaching Chemistry, Richard founded and directs the Speech and Debate program helping his students find their voice.

ACS Discoveries: Bacteria from a worm can degrade plastic

Environmental Science & Technology

Plastic is well-known for sticking around in the environment for years without breaking down, contributing significantly to litter and landfills. But scientists have now discovered that bacteria from the guts of a worm known to munch on food packaging can degrade polyethylene, the most common plastic. Reported in the ACS journal *Environmental Science & Technology*, the finding could lead to new ways to help get

rid of the otherwise persistent waste, the scientists say.

Jun Yang and colleagues point out that the global plastics industry churns out about 140 million tons of polyethylene every year. Much of it goes into the bags, bottles and boxes that many of us use regularly — and then throw out. Scientists have been trying to figure out for years how to make this plastic trash go away. Some of the most recent studies have tried siccing bacteria on plastic to degrade it, but these required first exposing the plastic to light or heat. Yang's team wanted to find bacteria that could degrade polyethylene in one step.

The researchers turned to a plastic-eating moth larva, known as a waxworm. They found that at least two strains of the waxworm's gut microbes could degrade polyethylene without a pretreatment step. They say the results point toward a new, more direct way to biodegrade plastic.

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