THE VORTEX

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March 2013

Prof. Dr. Sorin Rosca, President of the Romanian Chemical Society

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THE VORTEX

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Chair's Message

Wally Yokoyama

I have been getting better at remembering to take the reusable shopping bags out of my truck and into Safeway or Target for my weekly shopping trips. This change is an inconvenience for an older person like myself who has been habituated for 40 years to free bags. I don't think younger people have as much of a problem. But I do believe it is a good law to reduce waste. Other countries have also made changes in their basic institutions. In China where about 45 billion chopsticks are used each year the government placed a 5% tax on their use to encourage reusable utensils and save some of the millions of trees chopped down for their production. The world is changing because we have realized our resources are limited, including the ability of the earth to renew itself. Chemistry is being applied to this problem because we need to invent new chemistries to convert unconventional raw materials into usable monomers or polymers. The section has organized several talks in the past year to understand the problems and promise of these new technologies. Last April we had a talk by Dr. Charles Lee about converting cellulosic biomass into sugars, a tour last October of the Energy Biosciences Institute and next month Dr. Max Miri is going to talk about developing sustainable polymers at the Pyramid Alehouse, Berkeley on Thursday, March 21. At the national level there will be a focus on Green Chemistry at the New Orleans meeting in April.

Since old habits are more difficult to break, communities are teaching children to conserve bags, energy, and water. I am proud of the section's activities for over a decade in bringing science demonstrations to many elementary and middle schools each year. We need the next generation of scientists to continue to develop sustainable polymers and fibers, new renewable energy sources, better solar panels, and possibly biodegradable shopping bags from a renewable source so we can get them free again. But meanwhile think reusable and conserve.

Celebrate Earth Day

"Our Earth: Handle with Care!" April 20, 2013

The California Section will again join with other community groups for a combined celebration of Earth Day and John Muir's Birthday on 20 th April 2013 on the grounds of the John Muir National Historic Site in Martinez, CA. (10 AM- 4 PM). This celebration will allow interaction with

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"*Plastics for the Future – On the Way to Sustainable Polymers*"

Massoud J. Miri, Ph.D.
Associate Professor, School of Chemistry and Materials Science, Rochester Institute of Technology, Rochester, NY

Date: Thursday, Mar 21, 2013. Reception: 5:00, Dinner: 6:00, Talk: 7:00
Place: Pyramid Alehouse, 901 Gilman Street, Berkeley CA 94710. (510)528-9880
Cost: $28 (Students $15). Reservations at office@calacs.org (510-351-9922). Pay at door.
RSVP: By Thursday, Mar 14, 2013
Meal: Mixed Green Salad, Sautéed Seasonal Vegetables, Roasted Red Potatoes & Gravy, Roasted Pork Loin or Citrus Alaskan Cod. Assorted Petit Fours for dessert
Directions: : from I-80 or I-580; Take Gilman St. exit and go East, restaurant is between 7th and 8th St on the left.

Abstract:

As in the case of fossil fuel energy, consumers have become dependent on petroleum based plastics and would find it difficult to live without them. The massive problems of the limited resource of fossil fuels and their use for plastics force us to develop novel materials which are sustainable. In this talk the principal chemical and energy criteria to achieve sustainable polymers, will be discussed. The life cycle assessment and carbon footprint for any polymer candidate needs to be evaluated for it to become economically viable. The recyclability, renewability and biodegradability of sustainable polymers are also critical economic factors. Some of the main challenges of converting biological monomers into polymers to the synthetic chemist will be discussed. Specific examples of sustainable polymers developed at our research laboratories, including both chain-addition and condensation polymers will be described. These include polyethylene/starch hybrids, polyesters made with biodiesel based glycerol, and copolymers of ethylene with renewable co-monomers such as eugenol.

Biography:

Dr. Massoud J. Miri earned his B.S. 1977, M.S. 1980, Ph.D. 1985, at the University of Hamburg, Germany. In 1983, he was a visiting scientist at University of Akron. From 1985 to 1992, he was a research scientist at Uniroyal Chemical. He was a consultant in the area of polymerization catalysis and an adjunct professor in Connecticut from 1992 to 1996. In 1996 he became an Assistant Professor in the Department of Chemistry at the Rochester Institute of Technology, where he is currently an Associate Professor in the School of Chemistry and Material Science.

Dr. Miri is a member of the American Chemical Society, including its Division of Polymer Chemistry, POLYED Committee, POLY Membership Committee, and the Division of Polymeric Materials Science and Engineering (PMSE). He is also a member of the Sigma Xi Research Society, and of the Bioenvironmental Polymer Society (BEPS). Among the more recent awards he received are the UAC (University Affairs Committee) grant from Xerox Corp. and from NYSERDA (New York State Energy Research and Development Authority) on clean energy education. He has published over twenty journal articles, is the author and co-author of textbooks, and developed software programs related to polymer science. He is a member of the Editorial Board of Modern Research in Catalysis, and Material Science and Engineering Progress. His research is mainly on the synthesis of sustainable and renewable polymers, polymerization catalysis, polymer nanocomposites and copolymerization mechanisms.

April ACS-ECS Joint Meeting
"AUTHENTICATION OF ROMANIAN WINES USING SPECTROSCOPIC AND CHROMATOGRAPHIC METHODS"
Prof. Dr. Sorin Rosca, Politehnica University of Bucharest, President of Romanian Chemical Society
By Invitation of ACS President Marinda Wu, the ACS California Section and San Francisco Section of Electrochemical Society
Tours at Lawrence Berkeley Laboratory
Battery Laboratories Advanced Light Source (Synchrotron)

Date: Saturday, April 13, 2013
Time: 11:30 AM, lunch: LBL building 54, Bay View Cafeteria
1:00 PM: talk, Perseverance Hall, building 54 (cafeteria), room 130
2:00 pm Tours at LBL
Place: Lawrence Berkeley National Laboratory; 1 Cyclotron Road; Berkeley, CA 94720 Building 54 Room 130. **Security Requirements: LBL requires an RSVP with name and nationality at least one week prior to the meeting date. This requirement is for all who plan to attend either the talk or tour. No walk ins without the one week prior RSVP Site access: for US residents - a photo ID is required. Otherwise - a passport with Visa.**
Directions: www.lbl.gov/Workplace/Transportation.html Access through Blackberry gate: go all the way up Hearst Ave in Berkeley, then follow the signs. (www.lbl.gov/Workplace/lab-site-map-flash.html)
Parking: in front of the building 54 (cafeteria)
Lunch: Thinly-Sliced Roast Beef, Maple Ham, House-Roasted Turkey Breast, Natural Cheddar, Natural Swiss and Provolone Cheeses, with Condiments on Freshly-Baked Baguettes, served with Wavy Chips. Soft Drinks, Mineral and Spring Water, Juices.
Cost:

	Lunch and Talk	Talk Only
ECS/ACS Members	$12	Free
Non-Members	$12	Free
Students	$6	Free

RSVP: office@calacs.org (510-351-9922). By 1pm Friday, March 29, 2013

Romanian Wines

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The Dirt on Dry Cleaning Part 2

Bill Motzer

In Part1 (December 2012 Vortex) I described the early history of dry cleaning that was essentially invented by the ancient Greeks and perfected by the Romans. Their method used urine fermented to ammonia to clean spots and burning sulfur (SO_2) as a whitening agent, and it persisted into the beginning of the modern industrial era of the 18th and 19th centuries. However, as clothing became fancier, so did the cleaning methods. The first reference for using an organic solvent was in 1690, when spirits of turpentine was used to spot clean fat and oil stains on clothing. Chlorinated-based solvents were developed in the early 19th century; in 1820, Michael Faraday first synthesized tetrachloroethene (C_2Cl_4), previously known as perchloroethylene (PCE) and commonly called "perc." In 1839, carbon tetrachloride (CCl_4), also known as tetrachloromethane and carbon tet, was synthesized by the French chemist Henri Victor Regnault by reacting chloroform with chlorine. However, both PCE and carbon tet were not widely known or used outside of academic and experimental chemistry.

In the 1840s, scientists in Britain began producing an illuminant from the distillation of coal. Dr. Abraham Gesner, a Canadian geologist, distilled the first successful North American coal oil from New Brunswick bituminous coal. Gesner named it "keroselain" from the Greek word for "wax" and "oil." It was soon commonly called kerosene, but its main use was mostly for illumination, until an accidental discovery in 1845 by a maid employed by Jean-Baptist Jolly, a French textile maker who actually started modern dry cleaning. According to the story, the maid had inadvertently knocked over a kerosene lamp onto a linen tablecloth and Jolly was surprised that when the linen had dried, the spill area was cleaner than the rest of the tablecloth. Being an enterprising man, Jolly quickly included this discovery as part of his business, opening the first Parisian commercial dry cleaning firm of Jolly-Belin with kerosene as its primary cleaning agent. This service was called "nettoyage à sec" or dry cleaning. (There's no indication of whether the maid received any of the benefits from this discovery.) Soon other commercial cleaners began experimenting with hydrocarbon-based solvents (i.e., benzene, camphene, camphor oil, kerosene, naphtha, turpentine, and white gasoline) to remove grease and dirt out of fine woolens, silks and other fabrics that could not stand up to regular washing.

Most of these substances were still produced from coal. However, with the drilling of the first commercial oil well by Edwin Drake at Titusville, Pennsylvania, by the end of 1859, oil wells sprouted throughout the oil country. Those pioneer wells produced about 4,500 barrels of oil that first year. In 1860, oil wells in northwestern Pennsylvania had produced several hundred thousand barrels and by 1862 production reached three million barrels. The nation's oil bonanza had begun, huge fortunes would soon be made, and large stocks of inexpensive hydrocarbons became readily available for distillation to gasoline and other solvents.

Throughout the latter part of the 19th century, European inventors and industrialists continued experimenting with kerosene- and gasoline-based cleaning solutions. By 1879, the U.S had at least one operating dry cleaning plant using the flammable liquids listed above. (Naphtha was the 1901 "new process" dry cleaning solvent described in the 1976 western "The Shootist" starring John Wayne and Lauren Bacall.) Clothing was commonly washed and rinsed in tubs of these solvents and then hung in a warm room to dry. In 1898, Ernest C. Klipstein began importing carbon tetrachloride (CCl_4) from Germany; it was sold as a dry cleaning and spot-removing agent under the trade name of Carbona. By the early 1900s, white gasoline had become the primary U.S. dry cleaning solvent and by 1915, the average U.S. dry cleaner was using 12,000 gallons of gasoline a year.

However, in the same manner that urine-based "dry" cleaning was not an ideal cleaning method, neither was immersing

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clothing in highly flammable liquids, and the subsequent dry cleaning plant fires and explosions resulted in insurance companies refusing to insure such establishments. Local and federal government agencies also began regulating dry cleaners by initially siting plants well away from residential areas. Businesses therefore began searching for better alternatives, and one enterprising American dry cleaner, William J. Stoddard, is credited as the first to develop a successful non-gasoline-based solvent. In 1924, Stoddard working with Lloyd E. Jackson of the Mellon Institute of Industrial Research, experimented and ultimately developed Stoddard solvent (CAS 8052-41-3), a paraffin-derived clear, transparent liquid. It is actually a mixture of aliphatic and alicyclic C_7 to C_{12} hydrocarbons with a maximum content of 25% of C_7 to C_{12} aromatic hydrocarbons. The advantage of the Stoddard solvent was that it had flash points (depending on its different mixtures) ranging from 21 to 55 °C. On March 1, 1928, the U.S. Department of Commerce required that dry cleaners use petroleum-based dry cleaning solvents with a minimum flash point of 100 °F (37.8 °C). Dry cleaners rushed to Stoddard solvent mixtures with their lower flash points, and it soon became the predominant U.S. dry cleaning agent until the late 1950s.

After World War I, dry cleaners rediscovered chlorinated solvents that were much less flammable than petroleum solvents and had improved cleaning power. In 1930, trichloroethene (TCE or C_2HCl_3) was introduced as a U.S. dry cleaning solvent. However, problems with dye bleeding and equipment corrosion limited TCE's usage. In 1934, PCE was introduced and cleaners soon found their best success with PCE because it was considered as relatively safe, non-flammable, fast, able to be repeatedly reused and recycled, and able to function in small, compact machines about the same size as conventional home washing machines. By 1939, PCE had become the most popular cleaning solvent both because of increasing petroleum shortages caused by World War II and because of its inflammable nature. This also allowed professional cleaners to move back into residential and commercial areas. Chlorinated solvent usage continued to increase and by 1940, the U.S. dry cleaning industry usage was estimated at 45 million pounds of carbon tetrachloride, 12 million pounds of PCE, and 5 million pounds of TCE. By 1950, PCE usage had increased to 67.5 million pounds but carbon tetrachloride usage declined to 15 million pounds and its use continued declining until it was discontinued in the mid 1950s because of toxicity and equipment corrosion problems. By 1955, the U.S. dry cleaning industry was still consuming an estimated 145 million gallons of Stoddard solvent annually, but by 1962, PCE had become the U.S. dry cleaning industry's solvent of choice accounting for approximately 90% of PCE consumption.

Subsequently, health and environmental problems were discovered with chlorinated solvent usage, and by the late 1970s and early 1980s increasing environmental investigations and regulations began curtailing their uses. I will discuss these in a future article.

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hundreds of families, kids, and adults, at the Cal ACS canopy location. The hands-on demonstrations and activities will be consistent with the ACS Earth Day theme of "Our Earth: Handle with Care!" The 10th anniversary theme focuses on the general topics of water, air, plants/soil, and recycling. We will show you ways to be environmentally conscious by using renewable materials, and how this relates to chemistry and the roles chemists play.

We are looking for volunteers. Write our Section office, office@calacs.org or Sushila Kanodia sushila.kanodia@gmail.com" (Earth Day Coordinator)

For directions to John Muir National Historic Site, 4202 Alhambra Ave. Martinez, CA 94553 check the link:

www.nps.gov/jomu/planyourvisit/maps.htm

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Abstract:

The aim of the research reported in this presentation was to authenticate Romanian wines from the point of view of grape varieties, geographical origin and crop year, using experimental techniques that involve an almost complete lack of sample preparation. The 1H NMR method proved to give excellent results in this respect. The spectral data (used either to deduce the concentrations of individually identified compounds or simply to provide series of integral values for narrow spectral windows) were subjected to statistical analysis (mostly PCA) to give bidimensional diagrams showing a clear discrimination between areas representing grape varieties, geographic origin or crop year, respectively. For the cases where a convenient discrimination

Hills at Bran, Romania

was not achieved, an original optimization method was developed, without requiring additional experimental work. A specific chromatographic method demanding a minimum of sample preparation (HS-SPME-GC-MS) provided also reliable results in the authentication of Romanian wines. Another useful result concerns the successful simultaneous authentication of 11 grape varieties by 1H NMR or FT-IR data of grape seed oil.

The study comprised authentication of a total of 15 varieties of Romanian red and white wines including both classical types (e.g. ''Pinot Noir'', ''Merlot'', ''Sauvignon Blanc'' etc.) and original Romanian wines (''Columna'', ''Mamaia'', ''Cristina'', "Cadarca'', ''Feteasca Neagra''), The authentication required only 20-30 minutes of experimental work.

Biography:

Dr. Sorin ROSCA is a Professor of Organic Chemistry, Emeritus of "Politehnica" University Bucharest and is the President of the Romanian Chemical Society. He holds a PhD in Organic Chemistry from Polytechnic Institute of Bucharest and a Dr. Honoris Causa title from Ovidius University, Constanta (Romania). His academic career in the Department on Organic Chemistry, Politehnica University includes, in different periods, positions of Head (Chair) of the Department, Dean of the Faculty and Vice Rector (Vice Chancellor) of the University. His research interests concern organometallic chemistry, enantioselective reactions, mechanisms of organic and electoorganic reactions, authentications of food products by modern

Orsova town on Danube River, Romania

physical methods. He was Visiting Professor at "Paul Sabatier" University Toulouse (France), and Kyu-shu University Fukuoka (Japan) and has made numerous scientific presentations atuniversities from USA, UK, Japan, France, Germany, Greece, Turkey, etc. Prof. Rosca is a member of Romanian Academy of Technical Sciences and a corresponding member of the Academy of Sciences from Toulouse. He was co-director of PhD theses at the universities of Paris Sud, Orleans, Caen and Toulouse. His awards include Romanian ("Ordinul Muncii" si "Serviciu Credincios") and French ("Palmes Academiques") scientific decorations, Opera Omnia Award of the Politehnica University, the Prize of the chemical journal "Revista de Chimie" and others.

FOR IMMEDIATE RELEASE

WASHINGTON--Marinda Li Wu, of Orinda, Calif., is the 2013 president of the American Chemical Society (ACS), the world's largest scientific society with more than 163,000 members, ACS is the world's largest scientific society.

As part of her presidential theme, Partners for Progress and Prosperity, Wu's priorities include:

Concentrating on members' needs and interests
Collaborating to enhance the global chemistry enterprise
Communicating the value and benefits of chemistry to society
Celebrating diversity and inclusivity

As president-elect in 2012, Wu commissioned a task force, Vision 2025: Helping ACS Members Thrive in the Global Chemistry Enterprise, with the goal of helping chemists to find jobs and succeed in the changing world marketplace. The task force recommendations will be widely shared at the ACS national meeting this spring in New Orleans, and a number of presidential events and symposia will also take place at that meeting.

Wu also has long had a passion for promoting public outreach and STEM (science, technology, engineering and mathematics) education. She was inspired many years ago to launch the first "Family Science Night" with a successful partnership between the Orinda Union School District and the local California Section of ACS. Since 1997, the California Section of ACS has worked with school districts around the Bay Area to offer popular Family Science Night programs to many hundreds of school age children and parents.

Wu also introduced popular Science Café programs for the general public in Orinda restaurants several years ago. More recently, in a partnership between the Lafayette Library and Learning Center Foundation (LLLCF) and the California ACS Section, monthly Science Café programs attract large crowds to the Lafayette Library Community Hall with popular topics ranging from the "Science of Steinway and Sound" to "The Science of Art Conservation and the Sacred Art of Bhutan."

Wu graduated from Ohio State University, with a B.S. cum laude with distinction in chemistry in 1971 and earned her Ph.D in inorganic chemistry from the University of Illinois in 1976. She lives in Orinda, Calif., with her husband, Norm. Their two grown children, Lori, who is married to Stanford classmate Evan Malahy, and Will recently moved back to the San Francisco Bay Area to work, after earning their PhD and B.S. degrees respectively.

WCC March Meeting Saturday, March 30, 2013

Title: Visualizing Protein Interactions to Understand Huntington's Disease
Speaker: Christie Canaria, Biology Research Scientist at Lawrence Berkeley National Laboratory
Cost: $16.00 Lunch (Students and Unemployed Chemists $8.00). Presentation is free.
Reservations: Required by March 25 and Photo ID required to attend either lunch talk. by email to office@calacs.org, or by phone 510.351.9922. If mailing a check in advance, Please make payable to "California Section ACS" and send to Cal Section Office, 2950 Merced Street #225, San Leandro, CA 94577, postmarked no later than March 25, 2013.
Driving Directions: Please call office or check on www.calacs.org

Abstract:
Canaria work focuses on imaging cellular systems and neural networks in murine models to study neurodegenerative diseases, such as Huntington's disease. As with Alzheimer's and Parkinson's diseases, these neurodegenerative disorders are rooted in aberrant protein interactions.

Biography:
Canaria earned her PhD in chemistry from the California Institute of Technology (Caltech) in 2008 under the tutelage of Prof. Scott Fraser. She earned her Bachelor Degree in chemistry from the University of California, San Diego where she focused on the chemistry and photoluminescent properties of porous silicon.

From the ACS President
Marinda Li Wu

Happy 2013 to my fellow ACS colleagues of the California Section!

I continue to try to attend our local ACS Executive Committee meetings at the Mandarin Garden Restaurant in Berkeley the first Tuesday of each month if I am in town. If you want to get involved or learn more about our local ACS section, you are welcome to attend if you call our local ACS office at (510) 351-9922. We had a couple of newcomers visit our last meeting.

It will be an exciting year for ACS, not only at the national level but also for our local California Section. The spring national ACS meeting in New Orleans will feature a Presidential Globalization Symposium and Global Collaboration Roundtable discussions on April 8-9. Top thought leaders from academia, industry, government, and small business will participate to share their views and ideas. I am also honored that eleven presidents of chemical societies will speak at my Presidential Symposium and participate in the Roundtable to discuss common challenges we face and explore how we might work together to address global challenges. Our goal is to develop some action plans and solutions based on a diverse set of perspectives from around the globe.

After the national meeting in New Orleans, we are fortunate to host the President of the Romanian Chemical Society who will visit our local section and share his fascinating research on wines from the beautiful Romanian wine country on April 13 so mark your calendars for this very special California Section program!

My presidential Task Force "Vision 2025: Helping ACS Members to Thrive in the Global Chemistry Enterprise" will engage various committees and divisions at the meeting in New Orleans to discuss pertinent recommendations to gather more input for next steps. We will engage the Council in a special discussion topic:

What else should ACS do to help members to thrive in the global chemistry enterprise?

In other words, what new resources not currently provided by ACS could help our members better thrive in this ever more global chemistry enterprise? If you have any suggestions or ideas, please email me at m.wu@acs.org

I truly believe we are all working together as "Partners for Progress and Prosperity" which is my presidential theme for 2013. We must partner to take action, so please join me in exploring new opportunities to build a better Vision 2025 for all of us!

Jan. Meeting speaker, Dr Michael Dong, of Genentech. presenting the Essence of Modern HPLC/UHPLC Perspectives, trends and opportunities

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