
THE OCTAGON



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Lehigh Valley Section of the American Chemical Society

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September Meeting Announcement: 797th LVACS Meeting: Lafayette College

Date: September 20, 2007

Location: Faculty Dining Room, Lafayette College

Dinner: 6:00 PM

Meeting: At the conclusion of dinner

Talk: At the conclusion of the meeting

Menu: Frenched Chicken Breast – (Sautéed with a Whole Grain Dijon Mustard Sauce), Mixed green salad served with rolls, Garlic Mashed Potatoes, Seasoned Green Beans, Vegetarian Option – Portabella Torte, (A Thick tort made from layers of portabellas, oven roasted tomatoes, spinach, fresh mozzarella and roasted peppers), Chocolate Cake, Coffee/Tea

Cost: members \$15, students & retirees \$10.00

Contact: Debbie Bastinelli at (610) 330-5213 or bastined@lafayette.edu by September 14

Directions: on the web at <http://www.lafayette.edu/community/directions.html>

Speaker: Joel P. Schneider

Dr. Joel Schneider is associate professor of Chemistry at the University of Delaware. A native of Ohio, Joel received his BS from the University of Akron in 1991 and his Ph.D. from Texas A&M in 1995. He was the George W. Raiziss Postdoctoral Fellow at the University of Pennsylvania for three years. He began his independent career at the University of Delaware in 1999, working in the fields of bioorganic and materials chemistry. He has a wide range of research interests (<http://www.udel.edu/chem/Schneider/>) including the development of antibiotics and self-assembling hydrogels useful as tissue scaffolds. He has recently been the recipient of the DuPont Young Faculty Award and the National Science Foundation Career Award.

Talk: De Novo Designed Peptide-based Materials

Our research interests are centered on developing biological materials for use in delivery and tissue regenerative therapies.

We are developing peptide-based hydrogels, heavily hydrated materials, which are finding use in the delivery of therapeutics (e.g. small molecules, biomolecules, and cells) and as extracellular matrix substitutes. Specifically, we have designed “smart” peptides that undergo sol-gel phase transitions in response to biological media enabling minimally invasive delivery of the material *in-vivo*. When dissolved in aqueous solutions, these peptides exist in an ensemble of random coil conformations rendering them fully soluble. The addition of an exogenous stimulus results in peptide folding into α -hairpin conformation. This folded structure undergoes rapid assembly into a highly crosslinked hydrogel network whose nanostructure is defined and controllable. Peptides can be designed to fold and assemble in response to changes in pH or ionic strength, the addition of heat or even light. In addition to these stimuli, DMEM cell culture media is able to initiate folding and consequent self-assembly. DMEM-induced gels are cytocompatible towards NIH 3T3 murine fibroblasts, mesenchymal stem cells, hepatocytes, osteoblasts and chondrocytes. As an added bonus, many of these hydrogels possess broad spectrum antibacterial activity suggesting that adventitious bacterial infections that may occur during surgical manipulations and after implantation can be greatly reduced. Lastly, when hydrogelation is triggered in the presence of a therapeutic, gels become impregnated with the therapeutic. A unique characteristic of these gels is that when an appropriate shear stress is applied, the gel will shear-thin, becoming an injectable low viscosity gel. However, after the application of shear has stopped, the material quickly self-heals producing a gel with mechanical rigidity nearly identical to the original hydrogel. This attribute allows

therapeutic-impregnated gels to be delivered to target tissues via syringe where they quickly recover complementing the shape of the tissue defect. Therapeutic release, whose rate can be possibly controlled, follows. If cells have been impregnated into the gel, this shear-thin delivery method is a convenient way to introduce cells to wound sites.

In addition to gel design, we are also interested in designing peptides that fold into bioactive conformations at material surfaces such as hydroxyapatite. For these peptides, the material surface triggers intramolecular folding. This allows function to be potentially turned on with spatial resolution only at the material's surface.

2007-2008 LVACS Meetings

October 24 - DaVinci Center
November - Lehigh
January - Muhlenberg
February Cedar Crest
March 21- DeSales-
High School Teachers Night
April - Moravian
Student Awards and Poster Session
May - East Stroudsburg - Pub Night

Kids - Bring your parents or grandparents!



Celebrate National Chemistry Week with LVACS at the Da Vinci Center!

Activities for kids and private access to the Science Center! Make a National Chemistry Week Poster and get a prize!

No kids to bring? Come anyway - the Da Vinci center is fun for all ages.

Mark Your Calendar!

Wednesday, October 24, 6-8 PM

Snacks and beverages provided. Goodie bags for the kids. Details in the October issue of the Octagon.

LVACS Officers - 2007

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This Month in Chemical History

Harold Goldwhite, California State Univ. Los Angeles

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Prepared for SCALACS, the Journal of the Southern California, Orange County, and San Geronimo Sections of the American Chemical Society

A towering giant of the physical sciences, and yet one of the most modest and unassuming of men, was born on September 22, 1791, in Surrey, England, third child of a blacksmith and a farmer's daughter. Michael Faraday has always been one of my scientific heroes. He was essentially self-educated, and born and raised in humble circumstances. By force of character and intellect he became a leader among chemists and physicists. His life is an exemplary one, and well worth recounting.

The Faraday family moved to London when Michael was only 5, and when he was still in his teens his father died. His early education was fragmentary: "consisting of little more than the rudiments of reading, writing, and arithmetic at a common day school" to quote the man himself. At the age of 13 he became an errand boy in the shop of a bookbinder and stationer, and at 14 became an apprentice in the same shop. "Whilst an apprentice I loved to read the scientific books which were under my hands, and among them delighted in [Mrs.] Marcet's *Conversations in Chemistry* and the electrical treatises in the *Encyclopedia Britannica*. I made such simple experiments in chemistry as could be defrayed in their expense by a few pence per week, and also constructed an electrical machine ..." We see here the themes of chemistry and electricity which were to become the center of Faraday's scientific work.

In 1812 a customer took Faraday to hear some lectures by Sir Humphrey Davy, Professor at the Royal Institution. Inspired by these, and by his own reading, Faraday made careful copperplate notes of the lectures, embellished with drawings, and eventually sent them to Davy with a request to be considered for a position. Davy interviewed Faraday, gave him a realistic appraisal of the prospects of a career in science: "telling me that science was a harsh mistress and in a pecuniary point of view but poorly rewarding those who devoted themselves to her service"; and eventually appointed him as a laboratory assistant. Davy had recently married a rich widow, and was reducing his involvement with the Royal Institution. In 1813 he and Lady Davy, accompanied by Faraday, made an extended tour of Europe and in Florence, Faraday assisted Davy in combustion of diamond at the focus of a large burning lens. Faraday was promoted in 1815, and in 1816 gave his first course of lectures and published his first paper, analyzing the

native caustic lime of Tuscany. In 1817 six publications of Faraday's appeared. His early chemical work included a variety of analyses, and experiments on novel alloys of iron. In 1821 Faraday was promoted again, to the post of superintendent of the laboratory, and this allowed him to marry, since living quarters were furnished for him at the Institution.

By 1824, when he was 33, Faraday had been elected to the Royal Society, had collaborated with Davy on the liquefaction of chlorine and ammonia, and had begun his work on the relationship between magnetism and electricity. He was also involved in some more practical matters. The Royal Society asked him to work on improving optical glasses. Faraday was a hard worker, and unsparing of himself. His laboratory notebooks, which have been published and which are models of note-taking, show how hard he drove himself. In 1827 he published a book on *Chemical Manipulation* which went through four editions, and is a wonderful source of information about how early nineteenth-century chemistry was actually done.

He took few holidays, and suffered periodically from fatigue and exhaustion. In 1833 and 1834, turning to electrical conduction, he established the principles of electrochemistry in what we now call Faraday's Laws. Seeking a nomenclature for this new subject he turned to Whewell at Cambridge, and they coined the terms so familiar to us all: electrode, ion, electrolysis etc.-- all derived from impeccable classical roots. Towards the end of the 1830's Faraday took on yet more public responsibilities, including acting as an elder in his church. The weight of his burdens broke him for a while. He had to stop his scientific work for a year, and for four years he greatly reduced his lecturing and research. However he maintained one important tradition of the Royal Institution, namely the presentation of a lecture course around Christmas time to a juvenile audience. One of these lecture series is one of the classics of popular science, and has remained in print continuously from the time it was first given. I refer, of course, to Faraday's *Chemical History of a Candle*. If you haven't yet read it, you have a treat in store.

Faraday's last years as a researcher were devoted to studying the effects of magnetic fields on light, and he did further work on gas liquefaction. The last decade of his life saw a great diminution of his scientific work, but he had well earned his retirement. He died on August 25, 1867. Let me end with a quotation from J. R. Partington, the eminent historian of chemistry. "In his time Faraday was a model for scientific men. Of humble origin, he rose by his genius to the highest rank of scientific eminence, and his moral character and integrity were on the same level."

Celebrate the 20th Anniversary of National Chemistry Week!



This year's celebration of National Chemistry Week, with the theme, "The Many Faces of Chemistry," will be a very special celebration! 2007 marks the 20th anniversary of NCW. The mission of NCW is to reach the public, particularly students, with positive messages about chemistry and to provide a means of effectively mobilizing ACS local sections.

When former ACS President, George Pimentel, conceived the idea of celebrating National Chemistry Day in 1987, he never could have predicted where his idea would lead. From a one-day celebration, National Chemistry Day grew into National Chemistry Week. From a biennial celebration, the celebration became an annual event in 1993. The program has been the recipient of several prestigious public relations and association awards.

Join with ACS this October 21- 27, in this 20th anniversary year of National Chemistry Week to celebrate "The Many Faces of Chemistry," emphasizing the diversity of the discipline and its practitioners.

ChemShorts for Kids:

Reprinted with permission from Dr. Kathleen A. Carrado, Chicago Local Section.

An archive of previously published ChemShorts is available at: <http://membership.acs.org/C/Chicago/home.html>

Super Sorting Challenge

The Elementary Education Committee of the ACS Chicago Section presents this column. They hope that it will reach young children and help increase their science literacy. Please share with children and local teachers.

Kids, how do you think recyclers separate all that stuff they get in their bins? Materials can be grouped or separated by how they look and/or by the material of which they are made. These qualities are called properties of the materials. Some recyclers use special properties of materials to group recyclables. In this activity, you will separate materials based on their special properties.

You will need: a magnet, a plastic straw or coffee stirrer, blunt-end scissors, metric ruler, 1 latex balloon, 1 square of aluminum foil (5 x 5 centimeters), 1 square of paper towel (5 x 5 centimeters, cm), 5 small metal paper clips, 1 piece of

window screening (20 x 30 cm), and a rectangular cake pan (about 32 x 23 x 5 cm).

Here is what to do:

1. Cut the plastic straw into five pieces (any size) using the scissors.
2. Cut or tear the aluminum foil and the paper towel into 5 pieces each (any size).
3. Roll each piece of paper towel into a ball between your thumb and index finger.
4. Place the pieces of straw, aluminum foil, paper towel, and the paper clips together in a pile on the screen.
5. Move the magnet through the pile (you may need to bring it very close to the objects). Put any objects picked up by the magnet aside in a pile. Record the objects picked up.
6. Inflate the balloon and tie it closed (your adult lab partner may need to help you). Rub the balloon back and forth on your hair. Hold the balloon close to the pile and see what happens to the objects. Put everything that is attracted to the balloon in a second pile. Record these items.
7. Now fill the cake pan with water. Take the screen with the remaining objects on it and dip it into the water so that the screen touches the bottom of the pan. Pick off any floating materials and put them in a third pile. Record these items.
8. Now lift the screen and put the remaining objects in a fourth pile. Record these items.
9. Thoroughly clean the work area and wash your hands.

Where's the Chemistry? Materials have different chemical and physical properties that make them easy to separate. Recycling plants use machines that vibrate to sort paper from wood and cardboard. They use magnets to pull out tin and steel that is mixed with aluminum and plastic. Paper, glass, plastic, and metal each has its own chemical make-up and its own way of being recycled. It is important that each is separated from the other items before recycling. Paper is cut up, bleached and pulped. Some metals can be picked up by magnets and other metals cannot. Some materials are attracted to each other because of static electricity, which involves positive and negative charges. The hollow plastic straw pieces float because they spread their weight out and can float on the water's "skin." This skin forms because water tends to stick to itself, which is called cohesion. Materials with properties that are alike get cleaned, cut up, melted down and then made into new products. Some recycling plants are starting to use these different properties to help them sort out materials. They make machines to separate out recyclable materials just like you did but their process is on bigger scale!

Be sure to do this activity with an adult! Reuse/recycle as many of the materials as possible! Check your reuse/recycle plans with your adult lab partner first.

Reference:

American Chemical Society's website for kids, see "Milli's Super Sorting Challenge", at:

http://acswebcontent.acs.org/celebrate_chemistry/2007/MillisSortingChallenge.pdf

News From National

International Chemistry Olympiad Team Chosen

The USNCO "Omega team" who will represent the USA at the 39th IChO in Moscow, Russia on July 15-24, 2007 was selected at the closing ceremony in Colorado Springs on June 16, 2007.

The four students selected as the traveling team are:

- * Brian Lee, North Jersey Local Section
- * Justin Koh, Southern California Local Section
- * Sofia Izmailov, Trenton Local Section
- * Kenneth Brewer, Central Utah Local Section

Two students selected as alternates are:

- * Matthew Nubbe, North Alabama Local Section
- * Patricia Widener, Orange County Local Section

Last Chance to Register for the 2007-2008 National Directory of Scientific Experts

ChemInsight™ is preparing to publish the National Directory of Scientific Experts this fall. Members wishing to get into this directory are advised to register at <http://www.ChemInsight.org> before August 31, 2007. This directory will be sent out to 60,000 legal, forensic accounting and consulting firms free of cost, so that they have a ready reference source to find scientific experts when their business demands. Members who register by this date are also eligible for a free copy of Dan Poynter's acclaimed book *The Expert Witness Handbook* (a \$40 value).

Regional Meetings, Short Courses and Resources

MIDWEST REGIONAL MEETING, NOVEMBER 7 – 10,
INTERCONTINENTAL HOTEL,
KANSAS CITY, MISSOURI

Programming on animal health, inorganic and organic chemistry; a look at the hot topic of green chemistry, with more to come. Their theme is "Bringing Chemistry to Life". Advance registration is still open and may be reached on their website, along with the option to reserve a room at <http://membership.acs.org/m/mwrm2007/index.html>.

SOUTHEASTERN REGIONAL MEETING, OCTOBER 24 – 27, HYATT, GREENVILLE, SC

SERMACS offers the promise of great fall weather—and an outstanding meeting, as well. Step out of the Hyatt onto the city's charming Main Street with its outdoor cafés, a city park with a rushing river, and restored buildings that are now unique restaurants and shops. The program includes a talk on "Chemistry's Essential Tensions: A Different Look at Science" by the well-known Roald Hoffman. SERMACS' theme, "Chemistry in Motion", encompasses many diverse topics. Additionally, the meeting offers a number of unique events and workshops. Register early, view the program, and reserve your room at their website, <http://www.sermacs2007.org/>.

SOUTHWEST REGIONAL MEETING, NOVEMBER 4 – 8, HOLIDAY INN, LUBBOCK, TX

SWRM takes place in Lubbock, the home of Texas Tech, and is well known for cotton-growing, fine wines, and being the birthplace of Buddy Holly. Visit his museum and stop by his statue in the center of town. Their website, <http://www.depts.ttu.edu/chemistry/SWRM07/>, describes a unique meeting that includes time to visit the restaurants, museums, and shops in downtown Lubbock, as well as offering a winery tour and tasting.. "Fueling the Future" is their theme, reflecting presentations on new frontiers in electrochemistry and much more. There is still time to take advantage of the early registration rates, and to reserve a hotel room at the specially negotiated rate.

WESTERN REGIONAL MEETING, OCTOBER 9 – 13, DOUBLETREE HOTEL, SAN DIEGO, CA

WRM promises great chemistry and memorable events, starting with dinner, a plenary talk, and a tour on the SS Midway overlooking San Diego Bay. Their meeting theme is "Frontiers in Chemistry, Biopharmaceuticals, and Biotechnology" and the presentations should offer timely information because this meeting is in the center of a region that specializes in these areas! See what they have planned on their website, <http://www.wrmacs.org/>.

Building Skills, Creating Leaders with the American Chemical Society's Leadership Development System

In your leadership role how often have you experienced the difficulty of...

- * Scoping the responsibilities of a project?
- * Matching a person's talent to a volunteer opportunity?
- * Getting others to step up?

As you know, these areas can often impede your ability to accomplish the goals of your group. While we are experts in the field of chemistry, many of us have not had the training

to help us effectively lead situations such as these. It is the goal of ACS and the Board Oversight Group on Leadership Development, with the formation of the Leadership Development System, to provide volunteer leaders with the understanding, tools, and processes to more effectively lead the Society and its members. Therefore, we are extending a special invitation to you to join other ACS leaders to participate in one of the newly developed courses that addresses these skills. The course that will be conducted at the ACS Western Regional Meeting in San Diego, CA on October 13th is designed for leaders, like yourself, who are volunteering as ACS local section officers. Please take a look at the program being offered -- we encourage your participation.

New ACS podcast debuts with science news for broad general audience

The American Chemical Society (ACS) Office of Communications has launched a podcast that will make cutting-edge scientific discoveries from ACS journals available to a broad public audience at no charge. The podcast, Science Elements, (http://chemistry.org/science_elements.html) describes research reported in ACS's prestigious suite of 35 peer-reviewed scientific journals and Chemical & Engineering News, ACS's weekly news magazine. Those journals, published by the world's largest scientific society, contain about 30,000 scientific reports from scientists around the world each year. The reports include discoveries in medicine, health, nutrition, energy, the environment and other fields that span science's horizons from astronomy to zoology.

Those discoveries improve peoples' lives, and Science Elements will make that information more widely available. The podcast draws on an Office of Communications product, PressPac, which initially was developed to assist science journalists in researching and reporting news.

The podcaster for Science Elements is Steve Showalter, Ph.D., a chemist at the U. S. Department of Energy's Sandia National Laboratories in Albuquerque, New Mexico. Showalter's work at Sandia focuses on the design and development of new batteries. "As an active member of the ACS since 1987, I view these podcasts as part of a broader commitment to improving public understanding of chemistry," Showalter said. He also works toward that goal as a member of the ACS Committee on Public Relations and Communications and as a councilor for the Central NM Section, ACS.

Podcasting is an increasingly popular way of accessing news, information, and entertainment content from the Internet. The term was derived from Apple's "iPod," a portable digital audio and video player, and "broadcasting." Podcasts allow users to subscribe to a "feed" and receive new files automatically whenever posted to the Internet. New installments of Science Elements will be posted weekly and available without charge.

Take an ACS Webcast Short Course This Fall

On-time performance of airlines has reached an all-time low and unless there's a sun-drenched beach or a cultural adventure on the other end of that flight, traveling can be more trouble than it's worth. So save your time and money and take a look at the courses available online through ACS. ACS offers a wide variety of webcast short courses and our fall schedule is open for registration now.

ACS Webcast Short Courses provide the same quality training that ACS has long been known for, but, because the courses are presented over the Internet, they offer added convenience and flexibility.

Small Class Sizes and In-Depth Personal Attention – The average class has 10 participants, and our instructors are available by email in-between sessions so you will have ALL your questions answered.

Interactive – We've chosen a great technology that allows you to participate just as in a live class; you can even write on the whiteboard.

Ready when you are – Scheduled class sessions are the best way to get the most out of your experience. But if you miss a session, it's okay. All class sessions are recorded and ready for viewing when you're available.

More Application Time – Instead of getting all the information in a few days, you have time between sessions to apply what you've learned and come back to class with your burning questions. Overall, an extended learning schedule means more impact for you.

There are expanded course offerings in analytical, organic, pharmacology, engineering, toxicology, and other areas. For the full list of Webcast Short Courses and more information, visit <http://chemistry.org/elearning>

2007 Fall Webcast Schedule

- * HPLC Basics - Sept 7–Oct 19
- * Modern HPLC in Pharmaceutical Analysis - Sept. 11–Oct. 23
- * Essentials of Organic Chemistry - Sept 24–Oct 29
- * A Pharmacology Primer for Chemists - Sept 4–20
- * Chemistry and Action of Therapeutic Drugs - Sept. 4–20
- * Gas Chromatography Basics -Sept 7–Oct 19
- * Fourier Transform Infrared Spectroscopy -Sept 17–21
- * Infrared Spectral Interpretation, Basic - Sept 17–21
- * Toxicology for Chemists - Sept 19–Oct 24
- * Effective Technical Writing - Sept 24–Oct 29
- * Infrared Spectral Interpretation, Intermediate - Oct 1–2
- * Infrared Spectral Interpretation, Special Topics -Oct 11–12
- * From Beaker to Barrel: Chemical Engineering for Chemists - Oct 12–