

# THE OCTAGON



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Lehigh Valley Section of the American Chemical Society

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***Meeting Announcement:***  
***794<sup>th</sup> LVACS Meeting:***  
***DeSales University***  
***High School Teacher's Night***

**Date:** Friday, March 23<sup>rd</sup>

**Reception:** 5:15 PM, Trexler Room

**Dinner:** 6:15 PM, Trexler Room

**Meeting:** 7:15 PM, Trexler Room

**Talk:** At the conclusion of the meeting, Trexler Room

**Menu:** Reception - assorted cheeses and crackers, fresh strawberries and grapes, nonalcoholic champagne, and assorted sodas Dinner - salad, baked ham, white fish with fresh, tomatoes and spinach, garnish, chicken medallions, pasta, rice pilaf, fresh green beans, baby carrots with cinnamon butter, tarismu, chocolate cheese cake, strawberry shortcake and beverages

**Cost:** \$ 18.50, spouses, students and retirees \$10.00

**Contact:** Reservations are made with Mrs. Renee Fair at 610-282-1100, Ext.1386 or Renee.Fair@desales.edu

Reservation deadline: Tuesday, March 20, 2007, at 4:00 p.m.

**Directions:** Directions available at:

<http://www.desales.edu/default.aspx?pageid=645>

campus map available at:

<http://www.desales.edu/default.aspx?pageid=849>

**Speaker:** Mr. Gerard Caprio, M.S.

Mr. Caprio is a Forensic Scientist I at the New Jersey State Police – Office Of Forensic Sciences, Central Regional Laboratory. He received his Master of Science degree (M.S.) in Biotechnology from William Paterson University of New Jersey. Wayne, NJ in 2001 and a Bachelor of Science Degree in Biology and Chemistry from DeSales University in 1999.

**Talk: A Killer Presentation: Forensics Utilizing Chemistry and Mitochondrial DNA Biology.**

In forensic cases where nuclear DNA testing is not an option due to the nature of the evidence, it can be beneficial to pursue mitochondrial DNA testing. Due to its abundance in our cells, mitochondrial DNA can be tested in samples that lack cellular material such as teeth, bones, and hair shafts. Since crime scenes reveal evidence of this nature, its demand in forensics has escalated, which consequently, has caused a backlog for cases requiring mitochondrial DNA testing. For that reason, the FBI decided to establish a program that would alleviate the backlog for mitochondrial DNA case submission while offering no cost testing to outside agencies. This presentation will outline the FBI Regional Mitochondrial DNA Program, discuss mitochondrial Biology and its forensic applications, and also discuss chemical principles relevant to mitochondrial DNA analysis.

## *Spring Meeting Schedule*

**April 24 - Moravian College -  
Student Awards and Poster  
Session**



**May 16 -  
East Stroudsburg  
University  
Pub Night Rescheduled!**

## ***LVACS Officers - 2007***

**Chair:** Paul Bouis  
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& T. Michelle Jones-Wilson (see above)

**Octagon Editor & Webmaster:**  
T. Michelle Jones-Wilson (see above)

## ***This Month in Chemical History***

Harold Goldwhite, California State Univ. Los Angeles  
[hgoldwh@calstatela.edu](mailto:hgoldwh@calstatela.edu)

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

To increase my supply of background material for these columns, I bought a useful book: "The Illustrated Almanac of Science, Technology, and Invention" by Raymond L. Francis (Plenum Press, 1997). I plan to dip into its pages for the first column of the new year, since this book is arranged day by day

throughout the year. The connections with chemical history will vary from close to tenuous, depending on my whim!



On January 1, 1801 the Italian astronomer Giuseppe Piazzi discovered the first and the largest of the asteroids, and called it Ceres after a Roman deity. In 1803 William Hyde Wollaston, an English chemist, while working on the purification of platinum isolated a new metal from platinum ores. Following an old tradition of associating metals with planets, that dates back to alchemical days, Wollaston at first thought of calling his new metal ceresium after the newly discovered asteroid. Apparently ceresium just didn't sound right to him, and luckily another new asteroid had just been discovered and named Pallas. Deciding that in this case second thoughts were best Wollaston in his initial announcement of the new metal (in an anonymous handbill offering samples for sale, but that's another story) called it palladium, a name it has retained.



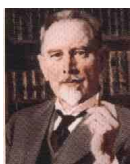
On January 2, 1902, one of the greatest of popular science writers, Isaac Asimov, was born in Russia. When he was three his family emigrated to the United States. Asimov earned his Ph. D. in chemistry from Columbia University in New York, then taught biochemistry at Boston University, but soon found that writing was his preferred way of teaching. He published some 500 books in virtually every genre imaginable. Perhaps he is best known for his science fiction, but he wrote a vast amount of non-fiction including a lively (and occasionally misleading) short history of chemistry and a very valuable biographical dictionary of scientists that I have frequently made use of in writing these columns. Carl Sagan called him "...one of the master explainers of the age..."

On January 3, 1888, one of the all-time great inventions received its first U.S. Patent – the artificial drinking straw. Marvin D. Stone, concerned about the use of potentially unsanitary natural rye straws in the imbibing of liquids, devised a process for coating manila paper with paraffin wax, a product of the young petroleum industry, and hand rolling them into straws. The first machine-rolled straws came off the production line some seventeen years later.



On January 4, 1896, Wilhelm Roentgen reported his discovery of a remarkable new radiation, which had the power to penetrate matter, to the Berlin Physical Society. He had been studying the tubes that generated cathode rays (electrons) and discovered that if the cathode rays struck metal targets the new penetrating radiation was emitted. It had the power to penetrate glass, paper, cardboard, and thin sheets of aluminum, but was stopped by lead. The new rays

made a screen coated with barium hexacyanoplatinate fluoresce, and also affected photographic plates. With commendable modesty, since he was uncertain of the nature of the new radiations, Roentgen called them X-rays, where X is an unknown as in algebra. His colleagues tended to call them Roentgen rays.



On January 9, 1868, the Danish biological chemist Soren Sorensen was born in Havrebjerg. In 1886 he enrolled at the University of Copenhagen where he studied chemistry and medicine. After completing his Master's degree he taught at a Technical High School and became a consulting chemist to the Danish navy. Returning to University he completed work for his Ph. D. in inorganic chemistry and was then appointed Director of the Carlsberg Laboratory, succeeding Kjeldahl. There Sorensen began his life's work on amino acids, enzymes, and other proteins. He devised a method for titrating amino acids by blocking the amino group with formaldehyde. This method became a standard technique for many years; I recall doing Sorensen titrations during my undergraduate laboratory classes, but perhaps that just shows how out-of-date my university was at the time. Sorensen is best known today for his devising of the pH scale. The level of hydrogen ion concentration is critical to the rate of enzyme reactions, and Sorensen devised methods for controlling acidity. To express the actual values of hydrogen ion concentration, which can vary over many powers of ten, he decided to use a negative of the logarithm of the hydrogen ion concentration. He was also one of the first chemists to work on electrometric methods of measuring pH.

### ***ChemShorts for Kids: Metal Mania - Parts I & II***

*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>

(This ChemShort was originally published in March and April of 2006 for the Chicago section of the ACS)

**Part I - Pennies Kids**, do you think you could make pennies change from dull to shiny to green right before your eyes? Over the course of two chemshorts, we'll learn about metals using pennies, nails, and a few simple household ingredients to explore some of the properties of metals.

For this experiment you will need: 10-20 dull pennies, 1/4 cup white vinegar (dilute acetic acid,  $\text{CH}_3\text{COOH}$ ), 1 teaspoon salt (sodium chloride,  $\text{NaCl}$ ), a shallow, clear glass or plastic bowl (not metal), water, plastic gloves, and paper towels.

For "Shiny Clean Pennies", pour the salt and vinegar into the bowl. Stir until the salt dissolves. Dip a penny halfway into the liquid and hold it there for 10-20 seconds. Remove the penny from the liquid. What do you see? Dump the rest of the

pennies into the liquid. The cleaning action will be visible for several seconds. Leave the pennies in the liquid for 5 minutes.

After the 5 minutes, take half of the pennies out of the liquid and place them on a paper towel to dry. Remove the rest of the pennies and rinse them well under running water. Place these pennies on a second paper towel to dry. Write labels on your paper towels so you will know which towel has the rinsed pennies. Allow about an hour to pass and take a look at the pennies you have placed on the paper towels. Are they different?

Pennies get dull over time because the copper in the pennies slowly reacts with moist air to form hydrated copper carbonate (which is greenish). When you place the pennies in the salt and vinegar solution, the acid from the vinegar dissolves this "patina", leaving behind shiny clean pennies. The copper from the patina stays dissolved in the liquid. You could use other acids instead of vinegar, like lemon juice. Rinsing the pennies with water stops the reaction between the salt/vinegar and the pennies. They will slowly turn dull again over time, but not quickly enough for you to watch.



On the other hand, the salt/vinegar residue on the unrinsed pennies starts another reaction between the copper and the oxygen in the air. Let the pennies dry overnight; the resulting blue-green copper substance is called "verdigris", which is one of several copper acetates (e.g.  $\text{Cu}(\text{CH}_3\text{COO})_2 \cdot \text{CuO} \cdot 6\text{H}_2\text{O}$ ). You may even see this stain on the towel. (Since most copper salts, including the carbonates and acetates here, are considered to be irritants, an adult partner should handle the verdigris pennies with gloves and dispose after use).

**TRIVIA:** Some copper carbonate minerals ( $\text{CuCO}_3$ ) in nature are malachite and azurite. Copper acetate (verdigris) is used as a dye, and it can form on copper pots that are used to cook acidic foods such as tomatoes.

Keep the liquid that was used to clean the pennies stored safely until next month. We will use it in Part II to make "Copper Plated Nails".

## Part II - Copper plated iron nails.

Kids, have you ever seen a copper-colored nail? In this month's activity you will make one of your own. First you will need the solution left over from the last experiment (Metal Mania – Part I). If you didn't save the solution or if it has degraded, have fun repeating that experiment now!

While you are waiting for the pennies to do their thing on the paper towels, use the salt and vinegar solution to make some "Copper Plated Nails". Place one clean ungalvanized iron screw or nail so that it is half in and half out of the solution you used to clean the pennies. If you have a second nail or screw, let it sit out on a counter for comparison (your "control experiment"). We also placed a masonry nail entirely in the solution. Do you see bubbles rising from the nail or the threads of the screw? Allow 10 minutes to pass and then take another look. Does the metal have two different colors? If not, return the nail or screw to its position and check it again after an hour.

Eventually, the copper in the solution from the pennies will coat the nail or screw. How does that happen? Copper exists in the salt/vinegar solution as positively charged copper ions.



The reaction between iron metal and copper(II) ions is called an oxidation-reduction reaction. Iron is more active than copper in this reaction, which means it loses electrons more easily than Cu. In other words, copper(II) will take iron's electrons, causing it to plate

out as metal (it is "reduced") on the iron nail (which gets "oxidized"). At the same time, the reactions involving the hydrogen ions from the acid and the metal produce some hydrogen gas, which bubbles up from the site of the reaction - the surface of the nail or screw. When you take the nail out of the solution, the copper will be somewhat sticky; you can set it on a paper towel to dry. Your nail might not be entirely coated, but it will have enough copper on it to see.

You might try this experiment again using only pennies made before 1982. These contain 95% copper as opposed to only 2.5% Cu in pennies since then. Did the nail get a copper coating more quickly or in the same amount of time? Was it a more complete coating? What happens if you use a stainless steel nail? Come to think of it, what exactly is "stainless" steel? First, steel is iron with some carbon added to make it harder and stronger. Adding a minimum of 12% chromium to the steel makes it resist rust, or stain 'less' than other types of steel. The chromium combines with oxygen in the atmosphere to form a thin, invisible layer of chrome-containing oxide,

making a passive film. So, what does that tell you to expect from a copper plating experiment using a stainless steel nail?

NOTE: The accompanying photo on the website version of this article shows two types of iron nails and their controls; one was placed entirely in the solution and the other was in 1/3 of the way.

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Reference:

Dr. Anne Marie Helmenstine at:

<http://chemistry.about.com/cs/demonstrations/a/aa022204a.htm> and

<http://www.hometrainingtools.com/articles/metals-iron-conductivity-science-projects.html>

### *LVACS Scholarship Opportunities Organic Chemistry Scholarship*

The Lehigh Valley Section of the American Chemical Society's Scholarship for Organic Chemistry Competition takes place on Saturday April 28, at Moravian College Bethlehem, PA, Collier Hall of Science - Dana Lecture Hall 9:00AM-10:30AM. The competition entails taking the ACS Organic Chemistry Examination (50%), a letter of recommendation from the student's organic chemistry professor (10%), and an essay on a topic in organic chemistry (40%). The value of the scholarship is \$1000. Additionally the top essay will receive \$100. Details for the letter and the essay follow below. The student should be below the junior level currently enrolled in organic chemistry attending college at an institution in the section. The student also must be a chemistry biochemistry or chemical engineering major. Students should indicate their interest in the scholarship in advance to John Freeman at 522 Raub St Easton PA 18042 , [jcf2@rcn.com](mailto:jcf2@rcn.com)

**Letters of Recommendation:** When writing a letter of recommendation on behalf of a student who is applying for Lehigh Valley ACS Scholarship, please speak to the student's skills in lecture and laboratory from Organic Chemistry I and Organic Chemistry II. In addition to performance on written exams and a course grade for Organic Chemistry I, it would be helpful to comment on the student's proficiency in organic lab and his or her participation in recitations. We would also like, if possible, the letter to address the students' quantitative skills by commenting on their performance in quantitative analysis or its local equivalent. Please place your letter of recommendation in a sealed plain envelope and place your signature over the seal. The student will be required to bring the sealed letter to the ACS Organic Chemistry Standardized Exam on 9 AM April 28, 2007. Please email Dr. Freeman at [jfreeman@po-box.esu.edu](mailto:jfreeman@po-box.esu.edu) if you plan to attend and compete for the scholarship.

**Essays:** The student should choose a molecule, a group of molecules or a process in organic chemistry including its synthesis or structural elucidation for a molecule or a representative molecule of a group or a number or examples and mechanism for a process. Judicious use of structures is expected. The essay should address the impact of the molecule or process on society, and the student's personal interest in the process or molecule. The essay should run approximately 3 pages +/- a quarter page of text, not including figures in times new roman 12 point font or equivalent with 1 inch margins on all sides. The students name a brief title and page number should appear in the header of each page. An additional page with references should be included. References should be presented as end notes according to the style of the Journal of Biological chemistry.

(See <http://www.jbc.org/misc/ifora.shtml> ).

**The essay will be rated on:**

- 20% - Ease of reading, including grammar, spelling, and logical flow of the material.
- 40% - Appropriate depth of coverage on the development of the molecule.
- 30% - Appropriate depth of coverage on the impact on society and student's interest.
- 10% - Appropriate use of references.
- 5% - Adherence to the formatting rules provided.

**Adjunct Instructors Needed**

**Organic Chemistry**

Cedar Crest College is accepting applications for a position of Adjunct Instructor to teach Organic Chemistry during its summer session, May 14 through August 15, 2007.

Candidates for the position must have at least a Master's degree in a Chemistry-related discipline. Send your resume to Dr. Pamela Kistler, Department of Chemical and Physical Sciences either by mail at Cedar Crest College, 100 College Dr, Allentown, PA 18104, or via e-mail to [pdkistle@cedarcrest.edu](mailto:pdkistle@cedarcrest.edu)

**Physics**

The Department of Chemical and Physical Sciences of Cedar Crest College is seeking applicants for an adjunct faculty position in Physics for the summer term from May 14<sup>th</sup> through August 15<sup>th</sup> . For this part-time position, preference will be given to applicants having a post-baccalaureate degree in Physics. The teaching assignment is an undergraduate course in Physics with laboratory. Please submit letter of application, curriculum vitae, and a list of names and contact information for references to: Dr. Pamela Kistler, Department of Chemical and Physical Sciences either by mail at Cedar Crest College, 100 College Dr, Allentown, PA 18104, or via e-mail to [pdkistle@cedarcrest.edu](mailto:pdkistle@cedarcrest.edu)

**Member Get a Member Rewards**

The 2007 Periodic Table of the Elements Throw can be yours FREE when you recruit a new ACS member for 2007!

Starting January 1, 2007 a new Periodic Table of the Elements Throw will be available to all current ACS members who nominate an eligible new paid member.

As an added bonus, at year's end, the ACS member who recruits the most new members in 2007 will win a trip in 2008 to an American Chemical Society National Meeting. You will receive: roundtrip airfare for one, hotel for five nights, free meeting registration.

Just pick your 2008 meeting destination -- New Orleans, LA (April) or Philadelphia, PA (August)

Use the online nomination form available at [www.acs.org](http://www.acs.org) to send an email membership invitation to a prospective member. The email will direct your nominee to a personalized online membership form. OR Download the PDF nomination form, complete your portion, sign and give to your nominee.

Once your nominee is accepted for membership, and pays their dues, you'll receive this one-of-a-kind, handsome throw.

• The 2007 ACS Member-Get-A-Member campaign runs until December 31, 2007.

• For the current ACS nominating member to be eligible for the free gift they must fill out the official MGM application. Remember, your name must appear on the official MGM form.

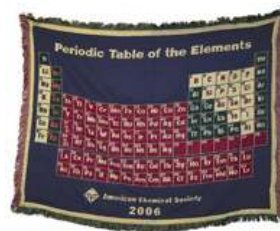
• Your nominee must also be an eligible candidate for membership. Nominees for membership can be former members who left the Society in 2005 or before.

• Nominate as many eligible candidates as you like during the campaign, using a separate MGM application for each nominee. Again, YOUR name must be on each official MGM application.

• Once your first nominee has been accepted for membership and has paid their dues, you will receive the 2007 Periodic Table of the Elements Throw. In addition, you will be enrolled in the ACS President's Club and your name will appear in an early 2008 issue of Chemical & Engineering News..

• The Throw is 100% acrylic (high bulk), machine washable but for best results dry clean. Throw will not fade or shrink.

MCM form available at : <http://www.chemistry.org/portal/a/c/s/1/acdisplay.html?DOC=membership\mgm.html>



## Undergraduate Research Poster Session

Sponsored by The Lehigh Valley Section of The American Chemical Society

**April 24, 2007**  
**Moravian College**  
**5:00-6:15 PM**

Preceding the 795th meeting of the Lehigh Valley Section of the ACS  
(Meeting details will be published in the April Octagon)

### Who may participate?

Undergraduates attending a college or university within the Lehigh Valley section of the ACS. Research may have been done at the student's home institution with a chemistry or chemical engineering faculty member or during a summer research experience elsewhere.

### To participate

Submit an abstract by **April 16, 2007**, as a Microsoft Word attachment to an email to [cblibby@cs.moravian.edu](mailto:cblibby@cs.moravian.edu). Please indicate "LVACS Poster Session" in the subject line of your email header.

### Abstract format

Times font

TITLE (all capitals)

Authors' names, authors' institutions and addresses

Abstract of research, 150 words maximum

### Travel Award

One poster session participant will be chosen to receive a \$250 award to support travel to present research at a national or regional ACS or AIChE meeting.

### Other requirements and information

! Poster presenters must provide their own pins and poster board (preferably 30 x 40 inch foam core, available at A. C. Moore, Michael's craft stores, or art supply dealers). Easels will be provided for displaying the posters.

! "Tips for Effective Poster Presentations" can be found in Chapter 2 of the ACS Style Guide (2<sup>nd</sup> Edition).

! Abstracts will be acknowledged by an email message that will include details about meeting room, set-up time, and the travel award.

If you do not get a response within two days of abstract submission or you have any other questions, contact Carol Libby, [cblibby@cs.moravian.edu](mailto:cblibby@cs.moravian.edu), 610-861-1629