# THE OCTAGON

Volume 91, No. 8 , November 2008 Lehigh Valley Section of the American Chemical Society

*In This Issue:*



## *Reminder 803rd Meeting of the LVACS Wednesday, Nov. 29 Kutztown University*

see the October issue of the Octagon for Details

## *804th Meeting of the LVACS*

### Lehigh University

**Date:** November 12, 2008
**Location:** Lehigh University, Asa Packer Dining Room
**Reception:** 6:00 PM
**Dinner:** 6:30 PM
**Meeting**:7:30
**Talk:** At the conclusion of the meeting
**Menu:** *NYC Restaurant Special*
Waldorf Salad with Frisee Lettuce, Chicken in a Wild Mushroom Parmesan Cream Sauce, Spinach Torta with Fresh Herbs and Mozzarella Cheese, Buttermilk and Chive Mashed Potatoes, Oven Roasted Asparagus
NY Style Cheesecake
**Cost:** $20 Members; $10 Students and Retirees
**Contact:** JoAnn DeSalvatore, 610-758-3471, jmd207@Lehigh.EDU
**Directions:** On the web at http://www3.lehigh.edu/about/maps/default.asp

**Talk: Strengthening our Academic Foundations:** Report from an NSF ADVANCE Project On the Status of Women Chemistry Faculty in Doctoral Granting Universities

**Speaker:** Sally Chapman, Professor of Chemistry, Barnard College

Concerned by the paucity of tenured women faculty members in doctoral granting universities, the ACS with the financial assistance of an NSF Grant undertook Project Progress. Dr. Chapman served as PI on the grant and supervised the study. Written surveys and oral interviews in focus groups and were conducted with 877 men and women, including administrators, faculty members, postdoctoral associates, and graduate students, during one-day site visits at chemistry and chemical engineering departments in 28 Ph.D.-granting institutions. A preliminary review of the perceptions of the climate for women scientists based on the data collected during these visits has been completed. Discrimination on both the individual and institutional level still persists, and changing this reality presents a serious challenge to advocates of gender equity. Some recommendations are offered by the team which performed the study.

Dr. Sally Chapman was educated at Smith College and received her PhD from Yale. After postdoctoral experiences at UC Irvine and UC Berkeley she joined the faculty of Barnard where she has served multiple terms as Department Chair and has been the holder of the Ann Whitney Olin professorship. Sally has also chaired the ACS Committee on Professional Training and the Petroleum Research Fund Advisory Board. She has more than 30 publications mostly on the thermodynamics and kinetics of gas phase reactions.

## *2008 Meeting minutes*

### September 2008 Meeting Minutes

The 805th meeting of the Lehigh Valley section of the ACS was held at Lafayette college on September 24, 2008. Approximately forty attendees were present.

Chair Julie Ealy called the meeting to order at 7:30 PM. A brief business meeting and announcement of future activities was led by the chair. Scott Sieburth from Temple University then talked about the intriguing possibility of using Silicon as substitute for quaternary Carbon to take advantage of its potential to favorably alter the biological activity of small molecule pharmaceuticals. The meeting was adjourned at 9:00.
Respectfully submitted,
Paul Andre Bouis secretary LVACS

**April 2008 Meeting Minutes**

The 803rd meeting of the Lehigh Valley section of the American Chemical Society was called to order on Tuesday, April 22, 2008 by Chair Julie Ealy at Moravian College.

Treasurer John Freeman presented the financial report and indicated that the chapter is meeting budgetary goals.

Prior to the meeting, the Annual Student Poster Session was held. A travel award was presented to Amanda Lashua from Cedar Crest College for her submission and presentation.

Bill Suits announced MARM scheduled for the week of May 20th.

The 2008 Lehigh Valley ACS Student Awards were presented to the following students:
Albright College – Mark Steger, Julie Kogut
Cedar Crest College – Heather New, Tara Ness
DeSales University – Michael Allen, Jr.
East Stroudsburg University – Deborah Lipman
Kutztown University – Jessica Pietruch, Carly Kline
Lafayette College – Jaryd Freedman, Ashley Jermusyk
Lehigh University – Kumar Shah, Michael Stern
Moravian College – Lisa Morkowchuk
Muhlenberg College – Julia Lehman, Gregory Pask

The Section was honored to have the Executive Director of the American Chemical Society speak, Madeline Jacobs. She first thanked all of the students for their excellent posters and all of their work they had done. She pointed out that she was honored to be speaking on Earth Day.
She spoke on three topics:

1. The importance of teachers.
2. The importance to prepare students for careers in science, math, and engineering.
3. Lessons on how to have a rewarding career.

The lessons on how to have a rewarding career are:

1. Never do anything just to please your mother.
2. Follow your intuition.
3. Never take "No" for an answer.
4. Believe in yourself.
5. Never burn bridges, but know when it is time to move on.
6. Never allow yourself to be a martyr.
7. Get a life. (in addition to your professional life)
8. Take a job for something other than money.
9. Carpe Diem.
10. Remember the importance of cultivating personal relationships.

She closed with a song by Cole Porter, "Experiment"

**Experiment**, by Cole Porter

*Before we leave these portals, to meet our paramortals, there's just one final massage I would give to you.*
*We all have learned reliance on the sacred teachings of science, so I hope through life you never will become, in spite of philistines, defiant, to do what all good scientists do.*
*Experiment.*
*Make it your motto day and night.*
*Experiment.*
*And it will lead you to the light.*
*The apple from the top of the tree is never too high to achieve.*
*So take an example from me.*
*Experiment.*
*Be curious, though interfering friends may frown.*
*Get furious, at each attempt to hold you down.*
*If this advice you'll only employ, the future can offer you infinite joy and merriment.*
*Experiment, and you'll see.*

The meeting was adjourned after the talk.
Respectfully submitted, Chester Crane

## *Chem Shorts for Kids*


by Dr. Kathleen A. Carrado, Argonne National Labs
kcarrado@anl.gov

**Science of Soap Bubbles**

Kids, did you ever wonder what a turtle shell, a bee's honeycomb, a soccer ball, a chicken wire fence, and a bag full of bubbles have in common? All you will need to find out is a quart size zip-lock bag, a plastic straw, and a bubble solution. To make the bubble solution, mix 4 parts of water to 1 part of liquid detergent. For example, measure 1 cup of water and add 1/4 cup of detergent. Add the detergent to the water, and stir gently. Adding about 1/2 teaspoon of sugar makes longer lasting bubbles.

Place 1 tablespoon of bubble solution in the plastic bag. Close the bag almost completely, leaving just enough room to slip the straw into the bag. Gently blow through the straw to fill the bag with bubbles. Now study the bubbles that formed. Are the sides of the bubbles curved or flat? How do their sizes and shapes compare? Do most of them have the same number of sides?

You'll find that many of the bubbles inside your bag should have six-sides, which makes them hexagons. Many hexagon shapes can be found in nature. Spider webs, some insect's eyes, and certain plant stems are based on this shape.

How thick is a soap bubble? The film is one of the thinnest things that we can see without using a magnifying glass. It is about 5000 times thinner than a human hair! What's inside the bubbles? It is always a gas, and most have ordinary air inside. The bubbles that you blow contain more carbon dioxide because this is a gas that we exhale. Bubbles in soda pop are filled with carbon dioxide, and those in boiling water are filled with vaporized water or steam.

[Since different detergents have different bubble-making abilities, you may have to experiment by using different amounts of detergent, water, and sugar until you get the nicest, longest-lasting bubbles.]

**The "Bad" Taste of O.J.**

Kids, does orange juice taste awfully bitter to you right after brushing your teeth? If so, you are one of about 2/3 of the population who has a taste gene on your tongue that allows you to detect certain bitter compounds. The other 1/3 of you lacks this gene. When one of you who has the gene brushes your teeth with a toothpaste that contains sodium lauryl sulfate (or SLS), you notice this bitterness effect. SLS reduces the sweet taste of sucrose (sugar) and at the same time strengthens the bitterness of citric acid (responsible for the sour and bitter taste of orange juice) by about ten times! If you would like to see if you inherited this gene or not, select a toothpaste that contains SLS in the list of ingredients. Take a sip of orange juice and note the relative strength of the sweet, sour, and bitter tastes. Rinse your mouth with water, then vigorously brush your teeth with the toothpaste. Rinse with water again, then taste the orange juice again. Are the relative intensities of the tastes very different now?

Taste begins with an ion or molecule docking in receptors on the tongue or palate. The substances that trigger sweet and bitter tastes are usually large, complex organic molecules that fit these receptors like keys in a lock. In contrast, salty and sour tastes are triggered by tiny positive ions. SLS is one of the most widely used detergent molecules. It is a large organic molecule found in toothpaste, laundry detergents, and specialty detergents such as Woolite®. The reason why some of you won't notice the taste effect of SLS is because you may be insensitive to the bitter tastes of compounds called phenylthiourea and propylthiouracil, and less sensitive to bitter flavors such as caffeine, potassium chloride, and certain preservatives. These people have failed to inherit a gene from their parents that makes them sensitive to bitter tastes. Some people have inherited the gene from just one parent, and they experience the bitterness effect to a lesser degree.

**The Colors of Light**

Kids, why does the light from the sun make rainbows some of the time but not all of the time? It is because raindrops in the air can break up the sun's light into the different colors of light that we can see in a rainbow. You may have seen a rainbow on a day when the sun came out while rain was still falling. You may also have seen one at a waterfall where the water splashed up into a mist, or even in the water from a lawn sprinkler on a sunny day. In this activity, you can try making your own rainbow show! All you need is an adult partner, a garden hose, and a sunny day.

With your adult partner, turn on a hose and make a fine spray using a nozzle or your thumb. Move so that you are looking at the water with the sun behind you. Spray harder or softer and higher or lower until you see a rainbow. Try changing your position so that the sun hits your water from a different angle. Or try having your

partner spray the water while you view from different angles and distances. If you are successful, note the order of the colors.

Light is an electromagnetic wave of energy. Some electromagnetic waves have higher energies than others. The whole range is called the electromagnetic spectrum. Waves in this spectrum include X-rays, microwaves, radio waves, visible light, and others. The waves of visible light, which is what we can see, are in the middle of this spectrum. Their energies are lower than those of X-rays, but higher than those of microwaves and radio waves. The colors appear in order according to their energy. From the lowest energy to the highest energy the colors appear as **red, orange, yellow, green, blue, indigo, and violet.** Remember it as Roy G. Biv. The waves just beyond red and out of sight are called infrared, while the waves just beyond violet and also out of sight are called ultraviolet. Now that you are done with your lesson, I'm sure that you can think of another way to really enjoy that garden spray in our hot Chicago summer!

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Reference: WonderScience 1995, vol. 9, number 4.

**A Real Lifesaver**

Kids, did you have any idea that crushing certain lifesavers in your mouth can set off sparks? This experiment will demonstrate how light can be given off by a simple chemical reaction. All you need is a roll of wintergreen mint Life Savers® with the green-speckled centers, a very dark room, and a partner.

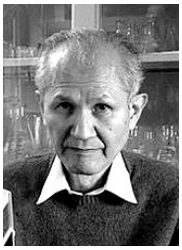
With your partner in a dark room, crunch the mint with your teeth with your mouth open. Your partner should see sparks of light generated when you bite on the candy. Reverse the roles so that you can see the sparks in your partner's mouth. If your partner is an adult, have them hit the candy with a hammer on a hard surface to observe the same quality of sparks.

What is going on here? When the candy is crushed, the friction of unlike charges (positive and negative, or + and -) causes loose particles called electrons to start a series of interactions between the nitrogen in the air, sugar, and candy molecules. This type of light is called triboluminescence.

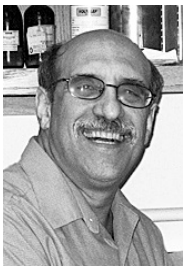
Reference: Wacky Science: A Cookbook for Elementary Teachers by Phil Parratore, 1994, Kendall-Hall Publishing Co., Iowa, page 77.

## *2008 Nobel Prize in Chemistry*

**For the discovery and development of the green fluorescent protein, GFP**



**Osamu Shimomura**
Marine Biological Laboratory (MBL)
Woods Hole, MA, USA; Boston University Medical School
Massachusetts, MA, USA



**Martin Chalfie**
Columbia University
New York, NY, USA

**Roger Y. Tsien**
University of California
San Diego, CA, USA; Howard Hughes Medical Institute

The discoveries awarded the 2008 Nobel Prize in Chemistry are a shining example of how fundamental research in one area of science can sometimes lead to highly beneficial applications in another. In this case, finding the key to how a marine organism produces light unexpectedly ended-up providing researchers with a powerful array of tools with which to visualize cell biology in action.

The story begins with Osamu Shimomura's research into the phenomenon of bioluminescence, in which chemical reactions within living organisms give off light. While studying a glowing jellyfish in the early 1960s he isolated a bioluminescent protein that gave off blue light. But the jellyfish glowed green. Further studies revealed that the protein's blue light was absorbed by a second jellyfish protein, later called green fluorescent protein (GFP), which in turn re-emitted green light. The ability of GFP to process blue light to green (its fluorescence) was found to be integral to its structure, occurring without the need for any accompanying factors.

In 1988, Martin Chalfie heard about GFP for the first time, and realized that its ability for independent fluorescence could perhaps make it an ideal cellular beacon for the model organisms he studied. Using molecular biological techniques, Chalfie succeeded in introducing the gene for GFP into the DNA of the small, almost transparent worm C. elegans. GFP was produced by the cells, giving off its green glow without the need for the addition of any extra components, and without any indication of causing damage to the worms. Subsequent work showed that it was possible to fuse the gene for GFP to genes for other proteins, opening-up a world of possibilities for tracking the localization of specific proteins in living organisms.

The opportunities offered by GFP were immediately obvious to many, as was the desirability of extending the range of available tags. Roger Tsien first studied precisely how GFP's structure produces the observed green fluorescence, and then used this knowledge to tweak the structure to produce molecules that emit light at slightly different wavelengths, which gave tags of different colours. In time, his group added further fluorescent molecules from other natural sources to the tag collection, which continues to expand. Complex biological networks can now by labelled in an array of different colours, allowing visualization of a multitude of processes previously hidden from view.

By Adam Smith, Editor-in-Chief, Nobelprize.org

## *News from National ACS*

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