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National Chemistry Week

Chemistry— Our Health, Our Future!"

October 16-22, 2011

See pages 16, 18-19, 24

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THE INDICATOR
Manager / Editor - LINDA ATKINS
1 Milbark Court West, Homosassa, FL 34446
973-981-4383; Fax 352-503-7613
linatkins@tampabay.rr.com
Advertising Manager - VINCENT GALE
MBO Services, PO Box 1150
Marshfield, MA 02050-1150 • 781-837-0424
vincegale@mboservices.net
INDICATOR COMMITTEE
Chair, DR. LES McQUIRE
17 Crown Drive, Warren, NJ 07059
908-334-5473, **Les@LesMcQuire.org**
New York Section Rep.
DR. NEIL JESPERSEN
Chemistry Dept., St. John's University
8000 Utopia Parkway, Jamaica, NY 11439
718-990-5221, **jespersn@stjohns.edu**
North Jersey Section Rep.
DR. ANITA BRANDOLINI
TAS, Ramapo College, 505 Ramapo Valley Rd.,
Mahwah, NJ 07430 • 201-684-7753
abrandol@ramapo.edu
Web Masters
NY Section - DR. BRIAN GIBNEY
postmaster@newyorkacs.org
NoJ Section - PAUL TUKEY
tukey@verizon.net
NEW YORK SECTION
http://newyorkacs.org
Chair, DR. HIROKO I. KARAN
Department of Physical, Environmental and
Computer Sciences, Medgar Evers College, CUNY
1638 Bedford Avenue, Brooklyn, NY 11225
718-270-5168; Fax 718-270-6197
hiroko@mec.cuny.edu
Chair-Elect, DR. JAIMELEE IOLANI RIZZO
Department of Chemistry and Physical Science
Pace University, 1 Pace Plaza, New York, NY 10038
212-346-1761 • Fax212-346-1256
jrizzo@pace.edu
Secretary, DR. BRIAN GIBNEY
Dept. of Chemistry, Brooklyn College - CUNY
2900 Bedford Avenue, Brooklyn, NY 11210
718-951-5000 x6636 Fax: 718-951-4607
brg33@newyorkacs.org
Section Office
St. John's University, Chemistry Dept.
8000 Utopia Parkway, Jamaica, NY 11439
516-883-7510; Fax 516-883-4003
njesper1@optonline.net
NORTH JERSEY SECTION
http://www.njacs.org
Chair, DR. JIWEN CHEN
Bristol-Myers Squibb Company, 3B 0.01
311 Pennington-Rocky Hill Rd., Pennington, NJ 08534
609-818-6319
jiwen.chen@yahoo.com
Chair-Elect, DR. AMBER CHARLEBOIS
Fairleigh Dickinson University
285 Madison Ave., M-SB1-01, Madison, NJ 07940
973-443-8761
charleb@fdu.edu
Secretary, BETTYANN HOWSON
49 Hillside Avenue, Madison, NJ 07940-2612
973-822-2575; **chemphun@optonline.net**
Section Office
49 Hillside Avenue, Madison, NJ 07940-2612
973-822-2575; **chemphun@optonline.net**

THE Indicator

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CONTENTS

EDITORIAL DEADLINES

November	September 15
December	October 15
January 2012	November 15
February	December 15
March	January 15, 2012
April	February 15
May	March 15
June	April 15
September	July 15
October	August 15

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October Calendar

NEW YORK SECTION

Tuesday, October 4, 2011
Westchester Chemical Society
See page 11.

Thursday, October 6, 2011
Chemical Marketing & Economics Group
See page 12.

Thursday, October 20, 2011
Long Island Subsection
See page 13.

Friday, October 21, 2011
High School Teachers Topical Group
See page 13.

Tuesday, October 25, 2011
Biochemical Topical Group
See pages 13-14 .

NORTH JERSEY SECTION

Saturday, October 1, 2011 and Monday, October 10, 2011
CHEMJOBS (formerly Careers in Transition Group) and CNJSTEM
See page 17.

Wednesday, October 5, 2011
Mass Spectrometry Topical Group
*See **www.njacs.org**.*

Monday, October 24, 2011
NoJ Executive Committee Meeting
See page 17.

***The Indicator* is posted to the web on the 15th of the previous month at www.TheIndicator.org**

Deadline for items to be included in the November 2011 issue of *The Indicator* is September 15, 2011.

THIS MONTH IN CHEMICAL HISTORY

By Harold Goldwhite, California State University, Los Angeles

In early March 1896 Henri Becquerel made one of those seminal discoveries that change the whole face of science — and of society. It was, to some degree, a serendipitous discovery, but Becquerel had the background, training, and genius to appreciate its significance, and he became the first investigator in a completely new area of science.

Henri Becquerel was born on December 15, 1852, into a distinguished family of scientists. His grandfather, Antoine Cesar Becquerel, was a pioneer student of electrical phenomena early in the nineteenth century, making important contributions to piezoelectricity, thermo-electricity, conductivity, and primary cells. Henri's father, Edmond Becquerel, became, at the age of 18, assistant to Antoine, and devoted his career to studies of both electricity and light. He was among the first to record, by photography, ultraviolet spectra — in 1842! — and devised a color photography system. He was a major investigator of phosphorescence phenomena, and this undoubtedly had its influence on his son's major discovery. In 1852, when Henri was born, his father Edmond had succeeded his father, Antoine, as Professor at the National Museum of Natural History in Paris.

So Henri grew up in the environs of a laboratory, and with his heritage he was predestined for a career in science. He studied at the Polytechnic School in Paris, and then studied engineering for three years, while serving in the Army Corps of Bridges and Roads. He became a Demonstrator at the Polytechnic School in 1875, and later, in 1895, became Professor at that School. In 1878, after his grandfather Antoine died, Henri took the position of Assistant at the museum where his father was Professor. Henri succeeded him in 1892. Henri had been elected to the Academy of Sciences in 1889.

Henri Becquerel's first researches were on the Faraday effect, the interaction between light and magnetic fields. He established the effect in gases, and worked on empirical and theoretical relationships between field strength and the magnitude of the effect. He then started a more general study of magnetic phenomena in metals and gases. He also was an early student of infrared spectra, examining such spectra of the sun, metal vapors, water, and compounds of the lanthanide elements (the "rare earths"). In the early 1890's he returned to one of his father's themes, studying in more detail the phosphorescence of uranium salts, including some striking new observations of phosphorescence produced when certain minerals are heated.

In late 1895 Wilhelm Roentgen, Professor at Wurzburg, startled the scientific community with his announcement of the discovery of X-rays. The remarkable properties of this new form of radiation, including its ability to penetrate materials quite opaque to visible light, set off a flood of new investigative work. Henri Poincare showed some of Roentgen's radiographs at a meeting of the Academy of Sciences in Paris in January 1896, and Becquerel was most interested in a reply to one of his questions, that the source of the X-rays might be the luminous spot on the wall of the cathode ray tube. Perhaps there was a connection between phosphorescence and X-rays? Becquerel told Poincare that he would begin some experiments to test this idea.

On February 24, 1896, Becquerel described some initial experiments at a meeting of the Academy of Sciences, but the results were inconclusive. He then began new experiments using, as his phosphorescent material, potassium uranium sulphate, a salt which has a very strong phosphorescence. He placed the crystalline material on photographic plates wrapped in black paper, and put the assemblage in sunlight to excite the phosphorescence of the salt. After a few hours exposure he developed the plates and saw a faint impression of the crystals which had somehow penetrated the black paper. He seemed to be on the right track. More experiments were planned in late February, and the plates with attached crystals were made up — but the weather did not cooperate. The sun refused to shine, which is really not surprising for late February in Paris. Becquerel put the prepared plates away in a drawer for a few days and then, as a good scientist should, decided to treat these plates as controls. On March 1, 1896 he developed the plates expecting to find only very weak impressions. To his surprise the impressions were extremely strong; whatever was producing them was continuing to act in the dark of a laboratory drawer. Phosphorescence clearly had nothing to do with the phenomena Becquerel had observed. He had discovered a new kind of radiation which had no obvious excitational cause. He soon established that the new radiation was to be found in every uranium compound he examined, and he discovered a new detector for it. A charged gold-leaf electroscope was discharged by the action of this novel radiation — but we might as well give it its recognized name. Becquerel had discovered radioactivity. His new electroscope detector was well-suited to quantitative measurements of the phenomenon. A young doctoral candidate at the School of Physics and Chemistry, Marie Sklodovska Curie, decided to follow up Becquerel's discoveries and use the electroscope to establish the fundamentals of radioactivity, with results that are surely well-known to all my readers.

Becquerel continued his studies on radioactivity in parallel with those of Marie Curie, who was later joined in her investigations by her husband, Pierre Curie. Becquerel and the Curies were jointly awarded the Nobel Prize in Physics in 1903 for their work on radioactivity, work which led to a complete revolution in our understanding of the nature of matter, and to a range of new products and industries, both beneficial and deadly.

.*OCTOBER HISTORICAL EVENTS IN CHEMISTRY*

By Leopold May, The Catholic University of America, Washington, DC

September 1, 1909
Rohm & Hass Co. was founded on this date.

September 4, 1913
Stanford Moore who was born on this date, did research on enzymes. He shared the Nobel Prize in Chemistry in 1972 with William H. Stein for their contribution to the understanding of the connection between chemical structure and catalytic activity of the active centre of the ribonuclease molecule and Christian B. Anfinsen for his work on ribonuclease, especially concerning the connection between the amino acid sequence and the biologically active conformation

September 6, 1906
Luis J. Leloir who isolated glucose 1,6-diphodphate and uridine diphosphate glucose; was born on this day. He also synthesized trehalose with E. Cabib in1953 and sucrose with C. Cardini and J. Chiriboga in 1955. He received the Nobel Prize in Chemistry in 1970 for his discovery of sugar nucleotides and their role in the biosynthesis of carbohydrates.

September 9, 1877
Aleksandr E. Arbuzov , who was born on this date, studied organophosphorous compounds and the rearrangement of phosphite esters (Michaelis-Arbuzov reaction).

September 13, 1886
One hundred and twenty-five years ago on this date, Robert Robinson was born. He was a researcher in plant pigments, alkaloids and phenanthrene derivatives and received the Nobel Prize in Chemistry in 1947 for his investigations on plant products of biological importance, especially the alkaloids.

September 14, 1961
Fifty years ago on this date, Analtech, Inc., the manufacturer of products for thin layer chromatography, was founded as Custom Service Chemicals. Its name was changed on January 8, 1965 to Analtech, Inc.

September 14, 1936
Seventy-five years ago on this date, Ferid Murad, a researcher in the role of NO and cyclic GMP; was born. He shared Nobel Prize in Physiology or Medicine in 1998 with Robert F. Furchgott and Louis J. Ignarro for their discoveries concerning nitric oxide as a signaling molecule in the cardiovascular system.

September 19, 1861
One hundred and fifty years ago on this date, Alexandre M. Butlerov presented the first definition and use of term, chemical structure, before Speyer Congress.

September 24, 1895
André Frédéric Cournand, who performed the first clinical cardiac catheterization, was born on this date. He shared the Nobel Prize in Physiology or Medicine in 1956 with Werner Forssmann and Dickenson W. Richards for their discoveries concerning heart catheterization and pathological changes in the circulatory system.

September 26, 1886
One hundred and twenty-five years ago on this date, Archibald V. Hill, a researcher on oxygen consumption of muscular action, was born. In 1922, he shared the Nobel Prize in Physiology or Medicine for his discovery relating to the production of heat in the muscle and Otto F. Warburg for his discovery of the fixed relationship between the consumption of oxygen and the metabolism of lactic acid in the muscle.

September 28, 1852
One hundred and twenty-five years ago in 1886, Henri Moissan discovered fluorine (F, 9). He invented an electric furnace in which he prepared metal carbides and silicon carbides. In 1906, he received the Nobel Prize in Chemistry in recognition of the great services rendered by him in his investigation and isolation of the element fluorine, and for the adoption in the service of science of the electric furnace called after him. He was born on this date.

Additional historical events can be found at Dr. May's website, at
http://faculty.cua.edu/may/ChemistryCalendar.htm.

THE CHEMISTRY TRICKS BEHIND OUR HALLOWEEN TREATS

By Kevin Olsen, Montclair State University

Scientists in general, and chemists in particular, are often accused of making things far more complicated than they need to be. Perhaps it is appropriate that this October essay addresses one of the most complicated holidays of the year, Halloween.

Scholars examining the holiday note that it is a curious mixture of the sacred and the secular. Few modern holidays have retained so many pre-Christian customs, while at the same time the celebrations that modern Americans would recognize as "traditional" only date to the 1940s.

Before examining the chemistry tricks behind our Halloween candy treats, it is worth taking a moment to look at the history of the holiday. Writers in the second century B.C., noted that the Celtic Druids ended their year on October 31. October 31st is what astronomers refer to as a "cross-quarter day." If the calendar is divided into eighths, each of the 4 cross quarter days will fall halfway between a solstice and an equinox. (Groundhog Day, February 2nd is also a cross quarter day.) The Celts believed that on the 31st, the souls of all persons who died in the previous year were assembled by the Lord of the Dead. The souls were allowed to briefly visit their relatives. They would usually play tricks on the living and so the Druids appeased them with sacred gifts and ritual offerings. (Trick or treat?)

In the Celtic world, October 31st became a time when the boundaries between the living and the dead dissolved and to Christianize this deeply ingrained tradition, Pope Gregory IV placed Halloween on the church calendar in the ninth century. The day was set aside to honor holy martyrs and, in time, ordinary people who had died and gone to heaven. In the 15th century, Halloween became associated with darker forces. Ghosts, who were by definition not safely in heaven, roamed the earth, witches flew on broomsticks, and the Devil practiced unholy rites. Among the Scottish peoples, All Hallows E'en, was when witches and warlocks were supposed to reign over the land and play tricks on the people.

Officially, in the Catholic, Anglican, and Lutheran Churches, Halloween was, and still is, a solemn religious celebration. The mostly protestant early settlers in the United States largely ignored the holiday. However, there were many folk customs associated with Halloween celebrations in rural areas of Ireland, Scotland, Wales, and parts of England. Bobbing for apples, telling scary stories, fortune telling, games, special foods, and playing pranks were all part of the celebrations.

The Scottish poet Robert Burns published a poem titled Halloween in 1786. It is credited by many with bringing the traditional folk celebrations to the wider English-speaking world. Many of the fortune-telling games described in the poem involved love, courtship and marriage. In one game, two or more persons would join hands, close their eyes, and walk until coming to a kail plant, which is a type of cabbage. They pull up the plant examine it. The amount of dirt clinging to the roots determined the fortune of their future husband or wife, the taste of the stem's heart indicated their disposition, and the name of the future spouse could be found by placing the stems over an outside door. The name of one of the persons entering the house that day would be the same as that of the future spouse.

Some games involved nuts. In one, several nuts were given the names of young men and women. They would then be placed in a fire. If two nuts burned quietly, then the two people who they were named for would have a placid courtship. If on the other hand, the nuts hissed, sputtered, and sparked, the courtship would be considerably more …er… interesting.

In another game a person sat alone in front of a mirror and ate an apple, sometimes combing their hair, and the face of their future spouse would appear over their shoulder. This custom became more complicated once it came to America. While looking in a mirror, walking backwards down a staircase, looking over their left shoulder, and eating an apple, the face of their sweetheart could be seen in the mirror. A number of people have pointed out that a person was far more likely to see the face of their beloved in the hospital.

These and other Halloween customs crossed the Atlantic with Scottish and Irish immigrants. There are numerous press reports from 1866 onward about immigrant social clubs holding "traditional" celebrations. Songs, scary stories, special foods, bobbing for apples, and fortune telling games were the focus of these celebrations just as they were in the old world. It should come as no surprise that as early as 1876 some people were already grumbling that Halloween celebrations had descended into "decadence."

Americans in the latter half of the 1800s seem to have embraced the idea of Halloween pranks with far greater enthusiasm than the other aspects of the celebration. Press reports from 1894 describe

(continued on page 8)

THE CHEMISTRY TRICKS BEHIND OUR HALLOWEEN TREATS

(continued from page 7)

how “harmless” pranks of previous years gave way to “rowdyism.” Putting flour in socks and gently hitting people with them to leave a white mark was an established custom. But on Halloween in Washington D.C., large groups of boys and young men carried sacks of flour through the streets showering pedestrians with the flour and leaving white colored trails. Several streetcars were attacked and in some cases the motormen and conductors were dragged off.

This was somewhat less dangerous than an 1888 pipe bomb detonated on the grounds of a Washington D.C. convent. The bomb consisted of a 2-foot long pipe filled with gunpowder. The ends were stuffed with rags. No one was injured and the Mother Superior of the convent dismissed the incident as a harmless joke.

In 1900, in the town of Patchague, Long Island, a group of boys and young men stole tombstones from a marble dealer and planted them on the lawn of Mr. and Mrs. Ira Terry. The astonished couple woke the next morning to find their home surrounded by a graveyard. Mrs. Terry’s screams woke up several school teachers who boarded with the couple. (This may be why the house was targeted.) Once the family and the teachers remembered that the previous night was Halloween, everyone was reported to have had a good laugh. The marble dealer was not amused.

Halloween also became a popular celebration on college campuses at this time, and since many readers will fondly remember their own campus celebrations, we will pause to point out that the earliest mention of college students suspended after a too-successful Halloween Party were J.A. Heinson and C.M. Moffatt. They were two freshmen at Michigan State who were accused of roughing up sophomores at a party in 1886.

The 1887 Halloween celebrations at Lafayette College included a number of pranks. The college’s horse was found the next morning on the first floor of McKeen Hall, the keyholes on the chapel doors were filled with molten lead. Inside the chapel, seats were smeared with molasses and both hymnals and bibles were missing. Other campus facilities suffered minor vandalism. Worst of all, the balls were stolen from the faculty tennis courts. Campus Halloween parties seem to be a special activity among sophomores, and freshmen appear to have used the opportunity to play pranks and shift the blame to the sophomores.

An 1892 news report from Vassar College notes that it was the usual custom for the seniors to host parties for the freshmen and the juniors to host parties for the sophomores. There was no mention of pranks being played.

As these activities became more outlandish, adults attempted to channel such youthful energy into more innocent activities. This desire eventually gave rise to the modern practice of trick of treating where the home owner at least had a chance of bribing youngsters to leave property undamaged. The custom of handing out candy treats was born.

While some historians state that the custom of Trick or Treat began in the late 1800s, it appears that it did not become widespread until the mid to late 1940s, just in time for the baby-boom generation to make Halloween its own.

Mass Produced Candy

There were many confectionary shops and small candy makers in the United States prior to the Civil War but industrial scale production of candies really began with the Wunderle Candy Company of Philadelphia that created Candy Corn in the 1880s. William Wrigley quickly followed with Juicy Fruit gum in 1893. Tootsie Rolls were invented by Austrian immigrant, Leo Hirshfield, at his New York City store in 1896. (Today the company produces 64 million Tootsie Rolls a day.) The Hershey milk chocolate bar was introduced in 1890.

If one reads the label on a typical candy product the ingredients will be listed in descending order of concentration. Usually they are for flavor, texture, color, stability, shelf life and nutrition. One ingredient that will feature prominently will be corn syrup. Today there is a wide-ranging debate over the role of corn syrups in our diet and in the role of corn in Farm Policy (and in energy policy but that is a subject for another time). In 2010 a number of producers petitioned the FDA to allow changing the words “corn syrup” on food labels to “corn sugar.” Almost exactly one hundred years earlier there was another controversy over labeling corn syrup. During the 1910s “glucose” was used interchangeably with dextrose to describe the primary sugar in corn syrup. There was considerable debate whether this product was as safe as sugar produced from sugar cane. In the early 1910s, sugar producers vigorously opposed a bill before Congress allowing corn syrup producers to use the phrase “corn syrup” on food labels instead of the more unfamiliar “glucose.” Apparently some consumers were confusing it with "glue."

Corn first became an industrial feedstock in 1811 when chemists learned to extract starch from it. During the 1800s a wet milling process was developed that could separate the gluten, starches, and sugars. After steeping in a dilute sulfuric acid solution, the grinding operation removed oil and oil cake from the germ, the hull and the endosperm provided starch, gluten, and bran. Corn syrup was obtained from the starch. The gluten and the bran were combined with the materials dissolved in the steeping liquor to make gluten-based feeds. (The basic wet milling process remains essentially the same today.) Corn syrup was already in wide use when mass-production of candies began.

The first mass-produced candy, candy corn, was at first manufactured largely by hand and seasonally between March and November. The ingredients, sugar, water, and corn syrup were heated in a large kettle. The liquefied mixture was then poured into hand-held buckets called runners. Each of these could hold 45 pounds of liquid candy. Workmen known as stringers then walked backward while pouring the liquid into kernel-shaped molds. Each color, yellow, orange, and white required a separate pour.

Some idea of the industry's growth comes from a press report from 1910. The Corn Products Refining Company took control of the Novelty Candy Company whose manufacturing plant was located in Memphis, Tennessee. At the time, the plant could produce about 150,000 pounds of candy a day. Corn Products Refining doubled the plant's capacity to 300,000 pounds a day and made it clear that it would confine its operations to making "wholesome, cheap candy." At that time, cheap, or novelty, candy typically contained 50% corn syrup. While this seems like a lot of corn syrup, sucrose, and to a lesser extent other sugars, dominated the sweetener market. Corn syrup did not achieve a 10% market share until 1964.

And just what is corn syrup anyway? In a word, sugars. Corn syrup is produced by the partial hydrolysis of corn starch with either dilute acids or enzymes. The principle sugars produced are dextrose, maltotriose, maltotetrose, dextrin, and sometimes fructose. The degree of hydrolysis is referred to as the dextrose equivalent (DE) which is a measure of sweetness. Corn syrup has a number of characteristics that make it a versatile food ingredient. It is used to control crystallization in candy making. It can retain moisture, ferment, and produce a high osmotic pressure that can aid in preservation.

High Fructose Corn Syrup (which is sweeter than sucrose) had its origins in 1957 when an enzymatic process was discovered that would convert the majority of dextrose into fructose. After a decade of development, industrial-scale production of High Fructose Corn Syrup (42% fructose) was begun by the Clinton Corn Processing Company. The conversion process was capable of producing a syrup that was 90% fructose but as this was too concentrated for most uses, it is usually sold in a solution of around 50%.

The widespread adoption of corn-based sweeteners was accelerated by an unexpected spike in sugar prices in the early 1970s. In October of 1973 a six ounce bag of miniature Hersey chocolate bars for Halloween cost 43 cents. A year later the same bag cost 80 cents. The soft drink industry consumed 859,000 tons of raw sugar in the first quarter of 1974 alone. The industry was already reeling from the ban on cyclamates, the first artificial sweetener found to be carcinogenic. Manufacturers of high fructose corn syrup ramped up production in response. The soft drink industry began switching from sucrose to High Fructose Corn Syrup between 1980 and 1985.

Sweeteners, regardless of their source, do more than provide taste. They influence a candy's cohesiveness, humectancy, hygroscopicity, sheen, and stability. Starches in the form of hydrocolloids are used to control gelling, thickening, and textural stability, especially in jelly candies, coated candies, hard gums, caramels, toffees, and nougats.

Chocolate

About 93% of American children go trick-or-treating and chocolate is the most popular treat with 68% of children citing it as their favorite. Some 90% of parents admit to sneaking candies from their children and the most popular item is snack-size chocolate bars (70% of parents sneak these) and the second most popular item among adults are candy-coated chocolate pieces (40%).

Chocolate is a very simple food, consisting of cocoa, sugar, and fats in the form of cocoa butter and milk fat. The wonderful mouth feel of chocolate comes from the transformation from solid to liquid that occurs in the mouth. The process of chocolate production begins on the cacao farms where the cacao beans are allowed to undergo a partial fermentation. Once this occurs, the beans are promptly packed and shipped. It is at this time that the paths of high quality and cheap chocolates diverge. Proper fermentation requires time and effort. The flavor, overall quality, color, and texture of the final product depends on the quantity of cocoa. Bitter chocolate, with 60% cocoa is the highest grade of

(continued on page 10)

THE CHEMISTRY TRICKS BEHIND OUR HALLOWEEN TREATS

(continued from page 9)

chocolate while “sweetened dairy chocolate” contains only 25% cocoa. In addition to their low cocoa content, cheap chocolates also contain more vegetable oils and other chemicals.

Because chocolates contain anti-oxidants the cocoa content also governs the shelf life. Dark chocolate can last for up to 9 months while milk chocolate only lasts about half that long. The ideal storage conditions are in an environment with a maximum relative humidity of 70% and a temperature between 54°F and 68°F (12°C and 20°C). Exposure to moisture can cause whitening on the surface of chocolate. A thin film of water on the surface allows sugars to dissolve and then re-crystallize.

Another popular candy flavoring is caramel. Their brown color and sweet taste are the result of the Maillard Reaction between amino acids and reducing sugars. The reaction is typically run at about 300f and allowed to proceed until the desired flavor and color are produced. Milk is added to stop the reaction and control the texture of the final product. Softer caramels have a high moisture content and as sometimes requires a preservative such as potassium sorbate to protect it from bacteria.

Many popular Halloween treats are novelty candies, vampire fangs made of wax, bags of candy blood, and other gruesome treats, the more gruesome the better. For these and other candies, colors are needed. The colors used in modern candies include FD&C (Food, Drug, and Cosmetic) Blue Numbers 1 and 2, FD&C Green Number 3, FD&C Red Number 3 and 40, FD&C Yellow Numbers 5 and 6, Orange B, and Citrus Red Number 2. Other colors are annatto extract, beta-carotene, grape skin extract, cochineal extract or carmine, paprika oleoresin, caramel color, fruit and vegetable juices, and saffron. For readers unfamiliar with color additives, we should explain that they can be categorized as either dyes or lakes. Dyes are water soluble and are sold as powders, granules, or liquids. Lakes are the water insoluble form of the dye. They are more stable than dyes and suited for products that contain fats and oils. They are also used for products that do not contain sufficient moisture to dissolve dyes.

While the food chemistry is interesting, Halloween has attracted the interest of scholars from the humanities and social sciences. Scholars who study consumer behavior are interested in what trick-or-treating reveals about consumerism among children. Specialists in gender studies study what the choice of costumes reveals about childhood perceptions of gender roles. Folklorists and communications scholars are endlessly fascinated with the transmission of stories about adulterated candies and poisoned treats.

Like so much else in life, Halloween is subject to change. Today there are efforts to make the Holiday more environmentally friendly. No one is quite certain how much candy is given out or collected on Halloween but National Public Radio has reported that the average child collects ten pounds of candy and no one knows what percentage of that candy ends up in landfills. The Green Halloween movement is urging parents to cut back on the candy and spend more time on other activities. A Halloween party with special treats, scary stories, and fortune telling games may be the celebrations of the future, just as they were in the time of Robert Burns. Perhaps we should give him the last word. The last stanza of the poem describes the end of Halloween celebrations when the guests have had a final drink before going home:

"Wi' merry sangs, and friendly cracks,
I wat they didna weary;
And unco tales, and funny jokes,
Their sports were cheap and cheery;
Till butter'd so'ns, wi' fragrant lunt,
Set a' their gabs a-steerin';
Syne, wi' a social glass o' strunt,
They parted aff careerin'
Fu' blythe that night."

Happy Halloween!

Kevin Olsen
Montclair State University

Special thanks to Professor Mary Lou West of the Montclair State Department of Physics for her explanation of cross quarter days and to Professor John Specchio of the Montclair State Department of Nutrician and Food Science. A number of excellent documents on various aspects of candy chemistry is available from the American Association of Candy Technologists. (**http://www.aactcandy.org**)

New York Meetings

www.newyorkacs.org

NEW YORK SECTION BOARD MEETING DATES FOR 2011

The dates for the Board Meetings of the ACS New York Section for 2011 were chosen and approved at the June 2010 Board Meeting. The meetings are open meetings; all are welcome. If non board members would like to attend the meeting, please let the New York Section office know by emailing Mrs. Marilyn Jespersen at **njesper1@optonline.net** or calling the office at (516) 883-7510. Refreshments are served at 6:00 PM and the meeting is held at 6:45 PM.

The 2011 Board Meetings will be held on the following Fridays in the library of St. John's University, 8000 Utopia Parkway, Jamaica, NY. Dr. Hiroko I. Karan will chair the meetings.

Friday, November 18, 2011

WESTCHESTER CHEMICAL SOCIETY

Special Seminar: Chemistry's Role In Nuclear Power

Speaker: Patrick Falciano
Nuclear Renaissance Services

In a nuclear power plant, the safe and efficient production of electrical energy requires the marriage of Chemical and Nuclear Engineering. From water quality to the regulation of neutron populations during the fission process, the importance of Chemistry cannot be overstated.

Mr. Falciano has been working in the nuclear industry for almost 41 years. The majority of his experience has been at the Indian Point Nuclear Generating Station. Some of the positions that he has held include Instrument and Controls Technician, Senior Health Physics Technician and Senior Training Instructor.

In February, 2008, he began a consulting firm, Nuclear Renaissance Services. This has given him the opportunity to speak to several Fortune 500 Companies, Colleges and Universities, as well as to local governments and emergency services regarding Nuclear Energy. His work has earned him significant recognition including "Friend of IEEE" and the "2007 Szabo Speaker of the Year"

He is currently working as the Outreach Education Coordinator at the Indian Point Energy Center as well as continuing his participation in NYAREA as a representative of the Nuclear Industry.

Date: **Tuesday, October 4, 2011**
Times: Refreshments 5:30 PM
Lecture 6:00 PM
Place: Westchester Community College
Gateway Building Room 110
75 Grasslands Road
Valhalla, NY
Cost: Free and Open to the Public

For more information, contact Paul Dillon:
E-Mail **paul.dillon@siemens.com**
Phone 1-914-524-3313

ACS NY Section CM&E | The Chemical Marketing & Economics Group
A topical group of the American Chemical Society's New York Section

The Transformation of DuPont

Luncheon/Webcast of October 6, 2011 at Aureole Restaurant in New York

Abstract

This presentation will address how intellectual assets support the transformational strategy of DuPont, including:

- How is DuPont reinventing its business from a traditional chemical company?
- What are the future challenges and areas for growth at DuPont?
- How is its intellectual assets strategy going to shape DuPont going forward?

DuPont has been at the forefront of some extraordinary changes in the chemical industry. DuPont operates as a science and technology company worldwide in eight segments: Agriculture, Nutrition & Health, Electronics & Communications, Performance Chemicals, Performance Coatings, Performance Materials, Safety & Protection, and Industrial Biosciences. With the recent acquisition of Danisco over half of DuPont's revenues are food related including its thriving seeds business and agrochemicals. Over the last decade, DuPont has also created a formidable array of technologies and creative supply partnerships. DuPont is actively pursuing licensing deals to strengthen business units, maximize value from its intellectual assets and help bring innovative products into the marketplace.

Join us and take advantage of a rare opportunity to meet and talk with DuPont's head of licensing and hear about the exciting transformation at this legendary chemical company.

Speaker

Charles 'Chip' Murray, Global Managing Director of Intellectual Assets & Licensing

Biography

Charles 'Chip' Murray has P&L responsibility for all out-licensing activities at DuPont. In addition, he assists many DuPont businesses to pursue in-licensing opportunities and form strategic supply alliances or original business relationships with its licensees. Since he assumed this position in April 2002, his goal has been to leverage and extract value for DuPont's technology, intellectual property and knowledge. Prior to his current position, he held management positions in DuPont's Polyester Enterprise, including assignments as Global Technology Director and Director of Strategic Planning for Dacron®. His over 34-year career with DuPont has included assignments at many DuPont locations, and a variety of disciplines including Engineering, Marketing & Sales, Manufacturing and Technical leadership. While Director of Strategic Planning for Dacron®, Chip negotiated strategic alliances or JV's with Unifi in USA, Akra Group in Mexico, Suzhou in PR China and Sabanci in Europe. Chip graduated with a B.S. in Engineering from Virginia Polytechnic Institute. Prior to DuPont, he worked for Shell Oil as a power systems engineer at the Norco, Louisiana refinery and chemical plant. Chip currently resides in West Chester, Pennsylvania with his wife and two children. Chip is an avid golfer who also enjoys tennis, basketball and traveling with his family.

Register now using the link: www.cmeacs.org

Chemical Marketing & Economics Group
A sub-section of the American Chemical Society's New York Section, Inc.
www.cmeacs.org • cmeglobal@gmail.com • T: (212) 488-1798

International Year of CHEMISTRY 2011

Sponsors

Licensing Executives Society (U.S.A. and Canada), Inc.

Schedule

Location:

Aureole Restaurant

135W 42nd Street , NYC (between 6 & 7 Av)

Event Times: (EDT)

11:15 am - 12:00 noon Registration and Networking

12:00 noon - 1:00 pm Luncheon

1:00 pm - 2:00 pm Presentation & Webcast

Luncheon Fees:

$70 for 2011 members of CM&E, BACC, NYSCC, or CPPA .

$90 for Non-Members Early-bird rates discount Check for Early-Bird Discounts and Save.

Webcast : $30 for all. $15 discount if reserved by Friday prior to event.

About CM&E

The Chemical Marketing & Economics Group organizes monthly luncheons and webcasts where industry leaders present original research and cutting-edge outlooks on business, economy, and technology in energy, materials & life science.

LONG ISLAND SUBSECTION

Personalized Medicine and the Biopharmaceutical Industry

Speaker: Frank L. Douglas
Austen BioInnovation Institute in Akron

Date: Thursday, October 20, 2011
Times: Social 6:00 PM
Seminar 6:30 PM
Place: Hofstra University
Breslin Hall, Room 103
Cost: Seminar is free and open to all.
Dinner: following the seminar at a nearby restaurant ($25.00)

Please visit the LI-ACS webpage at **http://www.newyorkacs.org/sub_island.php** for details, updates, and directions.

HIGH SCHOOL TEACHERS TOPICAL GROUP

An Underwater Holocaust

Speaker: Dr. James M. Cervino
Visiting Scientist
Woods Hole Oceanographic Institute, MA

The "hot" truth about global warming, and its impacts on the global oceans and tropical coral reefs will be presented.

Date: Friday, October 21, 2011
Time: Social and Dinner — 5:45 PM
Place: M&G Pub (Murphy and Gonzales)
21 Waverly Place (at Green Street, North-east corner)
New York, NY
No reservations required
Time: Meeting 7:15 PM
Place: New York University
Silver Center Room 207
32 Waverly Place (South-east corner Washington Sq. East)
New York, NY

Security at NYU requires that you show a picture ID to enter the building. In case of unexpected severe weather, call John Roeder, 212-497-6500, between 9 AM and 2 PM to verify that meeting is still on; 914-961-8882 for other info.

Note: Street parking is free after 6:00 PM. For those who prefer indoor attended parking, it is available at the Melro/Romar Garages. The entrance is on the west side of Broadway just south of 8th Street, directly across from Astor Place. It is a short, easy walk from the garage to the restaurant or meeting room.

Submit photos of your meeting or event (remember to include captions and photo credits) for use in *The Indicator* by e-mailing Photos@TheIndicator.org

BIOCHEMICAL TOPICAL GROUP — JOINT MEETING WITH THE NYAS BIOCHEMICAL PHARMACOLOGY DISCUSSION GROUP

Brain Barriers: A Hurdle for Drug Discovery

Organizers: JoAnn Dumin, PhD

Joel Pachter, PhD
University of Connecticut Health Center

Mercedes Beyna, MS
Pfizer Global Research and Development

Jennifer Henry, PhD
The New York Academy of Sciences

Speakers: David Begley, PhD
King's College London

Adam Chodobski, PhD
The Warren Alpert Medical School of Brown University

Damir Janigro, PhD
Cleveland Clinic

Brian Kaspar, PhD
Research Institute at Nationwide Children's Hospital

Elisa Konofagou, PhD
Columbia University

Joel Pachter, PhD
University of Connecticut Health Center

Manoj Rajadhyaksha, PhD

Barriers protect the brain from toxins and infection, and maintain ionic and volumetric environments. Inefficient function can limit the treatment of neurological diseases. This symposium covers scientific advances and tackles therapeutic challenges.

Call for Poster Abstracts

The deadline for abstract submission is **Friday, October 7, 2011**. For complete abstract instructions, please send an e-mail to: **BrainBarriers@nyas.org**. Type the words "Abstract Information" in the subject line-there is no need to type a message. Instructions will be forwarded automatically. Any questions, please call 212-298-8611.

Date: **Tuesday, October 25, 2011**
Time: 9:00 AM – 5:00 PM
Place: New York Academy of Sciences
7 World Trade Center
250 Greenwich Street – 40th Floor
New York, NY 10007
Cost: This event is has reduced-rate registration for ACS and NYAS members, at $25 or $10 (for students and post-docs). Please use the Priority Code SPN1-ACS1. Non-members may attend for a fee of $80 (corporate), $60 (non-profit or academic) or $40 (students and post-docs).

For more information and to register for the event, go to: **www.nyas.org/BrainBarriers**

To become a Member of the Academy, visit **www.nyas.org/benefits**

WESTCHESTER CHEMICAL SOCIETY

SPECIAL SEMINAR – Quantitative Applications of X-ray Microtomography – Examining Porosity, Compaction, and the Physical Properties of Meteorites

Speaker: Jon M. Friedrich
Department of Chemistry
Fordham University and the Department of Earth and Planetary Sciences
American Museum of Natural History

The 3D imaging technique x-ray microtomography allows for the internal examination of materials at resolutions of up to about 1 micron/voxel (a voxel is a 3D pixel or volume element). Some background of the technique will be presented. Several quantitative applications of this 3D technique will be discussed including investigations into the porosity and degree of compaction of primitive meteorites. These investigations inform us about the impact history of a meteorite's asteroidal parent body. The use of x-ray microtomography for the determination of particle size distributions will also be discussed.

Dr. Friedrich is an Assistant Professor in the Department of Chemistry at Fordham University and a Research Associate of the

Department of Earth and Planetary Sciences at the American Museum of Natural History. Dr. Friedrich specializes in the chemical analysis of primitive meteorites called chondrites and the examination of the physical properties of meteorites and their components. Dr. Friedrich's research is focused on questions relating to the chemical diversity of the early solar system.

Date: Tuesday, November 8, 2011
Times: Refreshments 5:30 PM
Lecture 6:00 PM
Place: Westchester Community College
75 Grasslands Road
Gateway Building Room 110
Valhalla, NY
Cost: Free and open to the public

For more information, contact Paul Dillon:
E-Mail **paul.dillon@siemens.com**
Phone 1-914-524-3313

LONG ISLAND SUBSECTION

LI-ACS Events Schedule for Fall 2011

October 20, 2011
"Personalized Medicine and the Biopharmaceutical Industry"
Speaker: Frank L. Douglas
Austen BioInnovation Institute in Akron

Place: Hofstra University

* * * * *

November 17, 2011
"Magnetic Carbon Nanotubes: Materials Development and Property Characterization"
Speaker: Dereje Seifu
Morgan State University
Place: Hofstra University

* * * * *

December 8, 2011
LI-ACS Annual Holiday Party & Board Elections

"Biological Sensors based on Advanced Materials: Preparation, Characterization and Practical Applications"
Speaker: Silvana Andreescu
Clarkson University

Place: Nassau Community College
Cost: Seminars are free and open to all

Please visit the LI-ACS webpage at **http://www.newyorkacs.org/sub_island.php** for details, updates, and directions.

EMPLOYMENT AND PROFESSIONAL RELATIONS COMMITTEE OF THE NEW YORK SECTION

To Human Resources Departments in Industry and Academia

The Employment and Professional Relations Committee maintains a roster of candidates who are ACS members seeking a position in the New York metropolitan area. If you have job openings and would like qualified candidates to contact you, please send a brief job description and educational/experience background required to **hessytaft@hotmail.com**.

Candidates from our roster who meet the requirements you describe will be asked to contact you.

NEW YORK SECTION — NATIONAL CHEMISTRY WEEK

The New York Section of the American Chemical Society will be celebrating National Chemistry Week on **Saturday, October 22, 2011** from 11:00 AM to 4:00 PM at the Viscusi Gallery in the New York Hall of Science, Flushing, Queens.

This day-long event will showcase chemistry principles using demonstrations performed by local college students and volunteers from industrial companies including PepsiCo, IFF, VWR, and ACE Glass, for children of all ages. We will also be hosting a "Chemistry Bingo" in the auditorium of the NYHOS with cool chemistry gifts for the winners! Dr. Met (The NY Mets Mascot, Mr. Met in a lab coat) will be there volunteering his time to take photos and sign autographs with participants. The Section is also participating in the national poster competition as sponsored by the ACS for students in Kindergarten - Grade 12. Students are asked to create posters with the National Chemistry Week theme.

This year's theme is "CHEMISTRY - OUR HEALTH, OUR FUTURE!" Explore the positive impacts of chemistry as it relates to nutrition, hygiene, and medicine.

To download a flyer, to see specifics of the Poster Contest, for directions, and to view photos of last year's fun please visit our official NCW website:
http://www.newyorkacs.org/meetings/NCW/2011_ncw.php

Please join us in celebrating one of our favorite weeks of the year!!!

Pictures from NY Section 2010 National Chemistry Week Celebration

(Photos Courtesy of JaimeLee Iolani Rizzo)

North Jersey Meetings

http://www.njacs.org

NORTH JERSEY EXECUTIVE COMMITTEE MEETING

Section officers, councilors, committee chairs, topical group chairs, and section event organizers meet regularly at the Executive Committee Meeting to discuss topics of importance to running the section and representing the membership. All ACS members are welcome to attend this meeting and to become more involved in section activities.

Date: **Monday, October 24, 2011**
Time: 6:00 PM
Place: Rutgers University
Wright-Rieman Labs, Room 260
Busch Campus, 610 Taylor Road
Piscataway, NJ 08854
Cost: $5.00 - pizza dinner

Directions can be found using mapquest and the address above. A map of the campus can be found at **http://maps.rutgers.edu/maps/default.aspx?campus=4**.

Reservations: call (732) 463-7271 or email **njacsoffice@aol.com** prior to **Wednesday, October 19, 2011.**

Dinner at the Section Meeting is payable at the door. However, if you are not able to attend and did not cancel your reservation, you are responsible for the price of your dinner.

CHEMJOBS (FORMERLY CAREERS IN TRANSITION GROUP) AND CNJSTEM MEETINGS

Job Hunting??

Are you aware that the North Jersey Section holds monthly meetings at Students 2 Science, Inc. in East Hanover, NJ to help ACS members? Topics covered at these cost-free workshops are:

- The latest techniques in resume preparation
- Ways for improving a resume
- Answers to frequently asked interview question and
- Conducting an effective job search

The next meeting for Chemjobs will be held **Monday, October 10, 2011**, at Students 2 Science, Inc., 66 Deforest Avenue, East Hanover, NJ. The meeting will start at 5:30 PM and end at 9:00 PM. Networking, Informational Surveys, LinkedIn Optimization, Resume writing, and Interview Practice will provide the program with considerable interaction among the participants. A pizza snack and soda will be served at 6:30 at a cost of $5.

A second monthly session will be held on the first Saturday of the month with a group called CNJSTEM led by Don Truss from 8:30 AM to 11:30 AM. There the format will differ from Chemjobs with a networking and job lead sharing, followed by a topical talk and demonstration. Participants are encouraged to bring their lap tops for hands on exploration of LinkedIn and other resource sharing. Coffee and Donuts will be shared for a small donation.

Date: **Saturday, October 1, 2011**
Times: 8:30 AM - 11:30 AM
Cost: Donation for coffee and donuts
Date: **Monday, October 10, 2011**
Times: 5:30 - 9:30 PM
6:30 PM Pizza snack and soda
Cost: $5.00
Place: Students 2 Science, Inc.
66 Deforest Avenue
East Hanover, NJ

Please contact **billsuits@earthlink.net**, if you plan on attending these meetings.

MASS SPECTROMETRY DISCUSSION GROUP

CPSA/MSDG Joint Meeting

Date: **Wednesday, October 5, 2011**
Place: Sheraton Bucks County Hotel

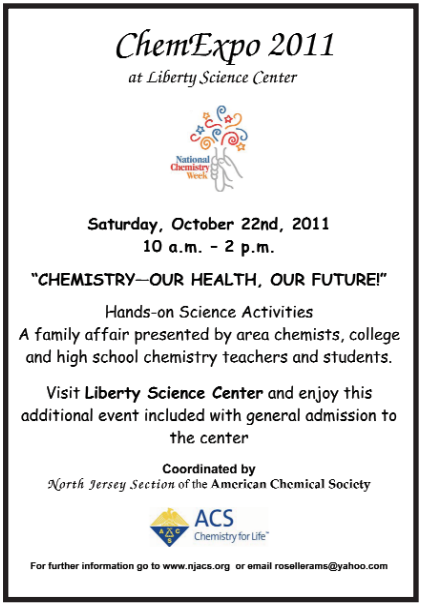
*See **www.njacs.org** for more information.*

Learn more about the North Jersey Section at www.NJACS.org

SURPRISE

our editor by calling and saying you appreciate the quality and content of our newsletter. Our editor works hard to maintain a publication of interest to our membership. Oh, and by the way, you could also give credit to our advertisers who financially support us.

COME JOIN US AT THE LIBERTY SCIENCE CENTER



Last year The North Jersey Section celebrated National Chemistry Week at the Liberty Science Center. We had a great time and the attendees really appreciated all of our efforts. Why don't you join us this year? On Saturday, October 22, the North Jersey Section will be holding its annual ChemExpo in celebration of National Chemistry Week. As usual we will have many tables offering all kinds of hands-on activities for budding scientists. You can set up your own table or help out at another table. We need you to help us make a difference!

The theme for this year is "Chemistry—Our Health, Our Future!" Come explore the positive impacts of chemistry as it relates to nutrition, hygiene and medicine. Check out the National Chemistry Week web page at **http://portal.acs.org/** to get some ideas for hands-on activities that you might want to present.

Your activities should be geared for 8 to 12 year olds. As usual our first priority is safety. Preferably presenters should use household materials to demonstrate a scientific principle. We would like the students to be able to redo these experiments at home and at school so it would be very helpful if you had handout instructions to distribute.

To minimize duplication of the presentations, we will need to know by October 1 the activity you would like to conduct at your table. Individuals contacting us first with their idea(s) will be given priority, so please let us hear from you as soon as possible. Contact Bobbi Gorman at **roselleram@yahoo.com**. to let her know what activities you will be doing at your table or if you want to volunteer at the Expo.

We also value and look forward to receiving financial support to help cover many of the expenses associated with the Section's NCW activities. If you would contact the appropriate individuals at your company, the Section would be most grateful. A donation of $500.00 indicates Gold Sponsorship, a $250.00 gift indicates Silver Sponsorship and a $100.00 gift indicates a Bronze Sponsorship. Checks should be made out to the North Jersey ACS Section with a memo of "NCW" and sent to Jacqueline Erickson, 33 Ronald Road, Lake Hiawatha, N, 07034-1121.

Please fill out the following forms and return them to Bobbi Gorman at **roselleram@yahoo.com**.

Form 1.

Count me in.

My name is: _____

I am volunteering to work on: **Saturday, Oct. 22**, 10:00 AM – 11:30 AM,
11:30 AM – 2:00 PM, or
10:00 AM – 2:00 PM (Underline times).

I can be reached at:
(work phone number)_____

My complete address is: _____

_____

I am an employee at: _____

_____

The activities at my table will be: _____

_____

In addition to a table, I also need: _____

_____

I will be bringing handouts on activities that the students can do at home. Yes No

I will need more than one table. Yes No
How many additional tables will you need?

_____

_____

Form 2.
My company would like to support these efforts.

The following company/individuals are willing to help defray the costs of these events:

_____
_____
_____

An acknowledgement letter for this contribution should be sent to (name and full address):

_____
_____
_____
_____
_____

Form 3.
I will be joined at my table by the following volunteers.

Complete Name: Institution: Address (snail mail):_____

_____ _____ _____

Activity _____ Time Volunteering ____ _____

* *

Complete Name: Institution: Address (snail mail):_____

_____ _____ _____

Activity _____ Time Volunteering ____ _____

* *

Complete Name: Institution: Address (snail mail):_____

_____ _____ _____

Activity _____ Time Volunteering ____ _____

* *

Acknowledge letters should be sent to: _____

_____

Thanks very much for all of your help. The Section is most appreciative of your efforts.
Bobbi Gorman and Valerie Kuck

2011 LEO HENDRIK BAEKELAND AWARD WINNER

Congratulations to the 2011 Leo Hendrik Baekeland Award Winner, **Professor Peidong Yang**, University of California, Berkeley.

Baekeland Award Symposium — "Materials & Energy"

Speakers: Prof. Charles M. Lieber
Harvard

Prof. Omar M. Yaghi
UCLA

Prof. Thomas E. Mallouk
Penn State

Prof. Galen D. Stucky
UofC SB

Date: **Wednesday, October 12, 2011**
Times: 12 noon - 5:30 PM
Place: Rutgers University,
Fiber Optics Auditorium
Busch Campus
Piscataway, NJ
Cost: Admission is free!

Pre-Registration Required
Please visit: **www.njacs.org**

RESULTS OF INTERNATIONAL CHEMISTRY OLYMPIAD 2011

The North Jersey Section is proud and honored to announce that **Elmer Tan** of JP Stevens High School, was chosen to be one of a team of four to represent the USA in the 43rd International Chemistry Olympiad, which was held in Ankara, Turkey, during July 9–18, 2011.

Elmer, a student of Paul Sekuler, received a silver medal at the world competition, involving about 75 counties. The remaining team earned 2 gold and 1 bronze medals.

The entry marks the 8th consecutive year that the NoJ Section placed a team member in the International Chemistry Olympiad.

Others

RECOGNIZING AND PREVENTING A HOSTILE WORK ENVIRONMENT

On Monday, March 28 at the Spring 2011 National Meeting in Anaheim, the American Chemical Society's Women Chemists Committee sponsored a symposium on recognizing and preventing a hostile work environment. The symposium featured speakers from the pharmaceutical industry, academia, and the legal profession. They compared hostile and non-hostile work environments, discussed the origins of unequal treatment, and listed some strategies for dealing with this situation.

The half-day symposium focused on ways to recognize and prevent a hostile environment in the workplace. Before recognizing a hostile work situation, it is important to be able to recognize a peaceful and supportive work environment where the employees are fulfilled by their jobs. An example of a peaceful laboratory environment has enthusiastic, capable, engaging, and emotionally intelligent leadership, driven by a strong moral compass (both personal and corporate), where meaningful work is being conducted. When employees feel comfortable in their work environment, they pride themselves on the contributions they make to a project or team. They are willing to discuss their challenges, problems, and mistakes with their boss as well as with coworkers, and are comfortable seeking assistance to address issues. While the absence of one of these positive indicators does not indicate a hostile work environment, it could mean that trouble is "brewing" and management might want to investigate before it becomes more serious.

The other key message of the symposium was to know your rights as an employee and to understand your employer's policies on harassment and workplace violence. If an employee has questions about specifics and details in their company, university or agency in their specific state, the best source of information is the human resource department. In most cases employers require formal harassment or discrimination training for all employees and those training sessions are usually based in the human resource departments. One panelist indicated that generally hostile work environments are not illegal, however if the hostile treatment is directed specifically toward one group of people (typically an underrepresented group), then it becomes illegal. In any case, if employees find themselves being treated with hostility, they can stand up for themselves and take some action to make it stop.

One way that we can all help prevent a work environment from becoming hostile is by avoiding group-think. Employees should recognize that it is important to form their own opinions of colleagues. It is also important to understand that discrimination is often motivated by fear rather than hate. One panelist proposed that this underlying fear-provoked hostile environment can inhibit the co-workers from intervening, even if they observe the behavior. The coworker may like the "hostile" employee, and may know this person well, and may therefore have a difficult time believing or understanding the hostile actions. Because the observer knows that hate is not involved, the behavior is not seen as hostile. The pan-

(continued on page 22)

HOSTILE WORK ENVIRONMENT

(continued from page 21)

elists reiterated, however, that whatever the basis for the hostile environment, it is unhealthy and should be avoided and/or stopped.

The two attorneys on the panel offered general advice about what to do if you find yourself in a hostile work environment, and provided a few specific examples of what a hostile environment looks like. They agreed that if you are the victim of this hostile treatment the first step is to report it to your direct supervisor. If the problem is not resolved, then the Human Resources Department would be the next step. The Human Resources Department should initiate a formal process and should directly address the inappropriate conduct. If the problem is still not resolved, then contacting an attorney may be advisable. Both lawyers reminded the conference attendees that consulting with a lawyer is not the same as filling a lawsuit. Just speaking with an attorney, does not commit you to any further action, but it does inform you about your legal options.

After the presentations, there was an emotion-filled discussion between the audience members and symposium speakers. Questions from the audience came from people in many different situations, ranging from an undergrad student being treated unfairly at a part-time restaurant job, to a laboratory supervisor being treated unfairly by subordinates, to an underrepresented minority who was currently deep in a very hostile work environment. The panel provided their ideas/advice/support to each of the participants. The question most often asked was, "Is what I am experiencing considered a hostile work environment?" In other words, many times a victim of a hostile work environment feels that maybe their situation is not bad enough to be considered a full-out hostile work environment. It seemed that the audience members of this symposium wanted to have their situations validated; they wanted someone to tell them that they were being treated unfairly, even though in their hearts, they already knew it to be true. The panel's advice was; if you are not being treated the same as your colleagues of equal rank or you feel like you are being harassed in any way, or you feel you are being treated unfairly, then you should contact your Human Resources Department as soon as possible, in an attempt to make it stop.

The session ended on a positive note as a representative from the COACh Workshops shared what COACh (Committee On the Advancement of women in Chemistry) is all about. Several of the attendees indicated that they had already attended one of these workshops and found it to be instrumental in their professional success. COACh provides training in the area of professional development, leadership training, institutional transformation, effecting change and recruiting and retaining a diverse faculty of top scholars. So if you find yourself in a hostile work environment (or not) a COACh workshop can provide you with some of the tools necessary to stand up for yourself and the empowerment you may need to fight back (**http://coach.uoregon.edu/**).

Finally, the panel reiterated that if you think you are in a hostile environment at your workplace, that it is crucial to involve your Human Resources Department. However, if traditional channels at your workplace fail to address the unfair treatment, obtaining legal counsel from outside the company may be a viable option.

NJIT — OTTO H. YORK DEPARTMENT OF CHEMICAL, BIOLOGICAL AND PHARMACEUTICAL ENGINEERING

Graduate Seminar Series – Fall 2011

October 10
"Preparative Chromatography for the Purification of Pharmaceutical Intermediate and API"
Professor Kathleen Mihlbachler
Otto H. York Department of Chemical, Biological and Pharmaceutical Engineering
Newark, NJ

October 31
"Catalysis and Energy"
Professor Umit S. Ozkan
Chemical and Biomolecular Engineering
The Ohio State University
Columbus, OH

November 7
"No Equations, No Variables: Modeling and

Computation for Complex Systems"
Professor Ionnis Kevrekidis
Dept. of Chemical and Biological Engineering and Program in Applied and Computational Mathematics
Princeton University
Princeton, NJ

November 21
"The CVB Heat Pipe Experiment — on Earth and in Space"
Professor Joel Plawsky
Chemical Engineering
Rensselaer Polytechnic Institute
Troy, NY

Times: Refreshments 2:30 PM
Seminars 2:45 PM
Place: Room 210, Kupfrian Hall
Cost: Open to the Public

Seminar Coordinator: Professor Laurent Simon, 973-596-5263,
laurent.simon@adm.njit.edu

YOUNG PROFESSIONALS IN HEALTHCARE (YPH)

Dear Fellow ACS members!

Are you looking to meet and network with over 500+ young professionals in the life science/healthcare industry? If so, please become a member of YOUNG PROFESSIONALS IN HEALTHCARE (YPH) at **www.yphprinceton.com**.

At no cost, members will receive updates on upcoming

- Happy Hour/Networking events
- Career Panels and Fairs
- Charity Benefit Galas
- Guest Speaker Presentations

And MORE!

Call for Poster Abstracts

NY SECTION — BIOCHEMICAL TOPICAL GROUP

Brain Barriers: A Hurdle for Drug Discovery

(For details, see article on page 14.)

The deadline for abstract submission is **Friday, October 7, 2011**. For complete abstract instructions, please send an e-mail to: **BrainBarriers@nyas.org**. Type the words "Abstract Information" in the subject line-there is no need to type a message. Instructions will be forwarded automatically. Any questions, please call 212-298-8611.

Call for Nominations

EDWARD J. MERRILL AWARD FOR OUTSTANDING HIGH SCHOOL CHEMISTRY TEACHER FOR 2011

Now is the time to begin thinking about nominations for the Edward J. Merrill Award, North Jersey Section, for Outstanding High School Chemistry Teacher for the year 2011.

Go to the web site, **njacs.org** under education and obtain your preliminary nomination form and guidelines. The full packet takes time to do a good job!

We all know an outstanding high school chemistry teacher. Perhaps one from your town, your son's or daughter's teacher or just one that you have heard about or worked with at some point. The award carries $500 for the teacher, $500 in supplies for the teacher's classroom and a plaque to display at home or in the classroom.

Any questions or help needed contact Bettyann Howson,
chemphun@optonline.net.

2012 ESSELEN AWARD FOR CHEMISTRY IN THE PUBLIC INTEREST

The Northeastern Section of the American Chemical Society is pleased to invite nominations of worthy candidates for the Gustavus John Esselen Award for

(continued on page 24)

CALL FOR NOMINATIONS

(continued from page 23)

Chemistry in the Public Interest. This award recognizes a chemist for outstanding achievement in scientific and technical work that contributes to the public well-being. The award consists of a $5,000 prize and a medal of recognition. The presentation takes place at an award ceremony in April at Harvard University, followed by a formal address by the awardee. The tentative date for this ceremony is April 19, 2012.

The award was established in 1987 to honor the memory of Gustavus John Esselen, a distinguished member of the Northeastern Section. The first awardees were F. Sherwood Rowland and Mario J. Molina, who subsequently received the Nobel Prize. Several other recipients of the Esselen Award have also been Nobel awardees.

Any field of chemistry or affiliation is appropriate as long as the scientific work has been an important contribution to the public well-being and its significant value to society has become apparent within the last five years.

This announcement details the nature of the award and the criteria and procedure for nominations. Further information is available at **www.nesacs.org/awards_esselen.html**. This announcement is to seek nominations of colleagues whose work meets the criteria and purpose of the award.

The deadline for nominations is **October 15, 2011.**

Call for Volunteers

Help a Teacher in Your Community

Who inspired you to be a scientist? Inspire the next generation by partnering with a middle or high school science teacher this school year.

Assist a teacher by answering questions from students, planning instructional demonstrations, or assisting students as they conduct a lab. ACS will donate $500 to the school where you volunteer so that you and your partner teacher can purchase science supplies to support your projects.

Find out more at **www.acs.org/Science Coaches**. Contact ACS staff at **Science Coaches@acs.org** with questions and to enroll in the program. Participation is limited to 75 coach-teacher teams this year and enrollment ends on **Monday, October 31, 2011**.

Created by Kate Sellar in Volunteer Support and Engagement - View the full blog post **https://communities.acs.org/servlet/JiveServlet/downloadImage/38-2450-4192/191-138/SCoaches_WebImage.jpg**

Call for Demonstrators

National Chemistry Week 2011

ATTENTION STUDENT CHAPTERS

"CHEMISTRY—OUR HEALTH, OUR FUTURE!"

Come to the Chemistry Expo at the Liberty Science Center
Saturday, October 22nd from 10:00 AM - 2:00 PM with your best Undergraduate Hands-on-Demonstration.
The Student Chapter with **the best** interactive demonstration that applies to the theme of our health, our fututre will receive a **$175** cash prize and the title of
"National Chemistry Week Undergraduate Student Chapter 2011"
(second place gets **$75**).

For details check the website
http://www.njacs.org/ncw2011.html.
Student Chapters must register by October 8th to be considered for the title and the cash awards. Look for registration forms online or send an email to
roselleramS@yahoo.com

liberty science center

ACS Chemistry for Life

Grants Available

American Brain Tumor Association Seeks Novel Ideas That Push the Boundaries For Brain Tumor Diagnosis and Treatment Approaches

Letters of Intent for 2012-2013 Discovery Grant Program Due October 3, 2011

CHICAGO — Researchers now have an opportunity to receive grant funds for proof of concept studies and other explorations that push the boundaries of traditional brain tumor diagnostic or treatment approaches. The American Brain Tumor Association is

currently accepting letters of intent for its Discovery Grants.

"Our goal is to improve medical outcomes for the 600,000 Americans living with a brain tumor diagnosis," said ABTA Research Director Deneen Hesser.

The Scientist recently applauded the Discovery Grant program, placing it with the Gates Foundation Grand Challenges and NIH New Innovator Awards as unique, high-impact, 'high-risk' research alternatives.

Concepts presented in Discovery Grant projects can involve any type of brain tumor, including primary, metastatic, adult and pediatric. One of four ABTA research funding programs, the Discovery Grant program welcomes ideas originating in non-biology fields such as mathematics, physics, and biophysics.

ABTA Discovery Grants support high risk/high impact projects that have the potential to change current diagnostic or treatment paradigms for either adult or pediatric brain tumors.

ABTA seeks proposals addressing all types of brain tumors, benign or malignant, primary or secondary.

Investigators from sciences outside traditional tumor biology fields are encouraged to apply.

This program offers one-year grants not to exceed $50,000 each in direct costs.

For grant details and LOI instructions, visit the ABTA Funding Opportunities page at the ABTA website.

Questions can be directed to Alex Sierra, Research Project Assistant, at **grants@abta.org**.

LOIs must be submitted in PDF format to **grants@abta.org**.

Press Releases

ToxCast

WASHINGTON— The U.S. Environmental Protection Agency's (EPA) ToxCast chemical screening program has awarded contracts to four United States-based companies to test up to 10,000 chemicals for potential toxicity to people and the environment. ToxCast is designed to determine how chemical exposures affect human health. When fully implemented, ToxCast will be able to screen thousands of chemicals in fast, cost-effective tests.

Read full release:
http://yosemite.epa.gov/opa/admpress.nsf/d0cf6618525a9efb85257359003fb69d/3c0261040fda74c9852578e200563066!OpenDocument

More information on ToxCast:
http://epa.gov/ncct/toxcast/

More information on ToxCast database:
http://actor.epa.gov/actor/faces/ToxCastDB/Home.jsp

MIT: Oxygen's Watery Past

New Research Shows Evidence of Early Oxygen on Our Planet.

CAMBRIDGE, Mass. — Today, oxygen takes up a hefty portion of Earth's atmosphere: Life-sustaining O_2 molecules make up 21 percent of the air we breathe. However, very early in Earth's history, O_2 was a rare — if not completely absent — player in the turbulent mix of primordial gases. It wasn't until the "Great Oxidation Event" (GOE), nearly 2.3 billion years ago, when oxygen made any measurable dent in the atmosphere, stimulating the evolution of air-breathing organisms and, ultimately, complex life as we know it today.

Now, new research from MIT suggests O_2 may have been made on Earth hundreds of millions of years before its debut in the atmosphere, keeping a low profile in "oxygen oases" in the oceans. The MIT researchers found evidence that tiny aerobic organisms may have evolved to survive on extremely low levels of the gas in these undersea oases.

In laboratory experiments, former MIT graduate student Jacob Waldbauer, working with Professor of Geobiology Roger Summons and Dianne Newman, formerly of MIT's Department of Biology and now at the California Institute of Technology, found that yeast — an organism that can survive with or without oxygen — is able to produce key oxygen-dependent compounds, even with only miniscule puffs of the gas.

The findings suggest that early ancestors of yeast could have been similarly resourceful, working with whatever small amounts of O_2 may have been circulating in the oceans before the gas was detectable in the atmosphere. The team published its findings recently in the Proceedings of the National Academy of Sciences.

Contact: Caroline McCall, MIT News Office, E: cmccall5@mit.edu

PRESS RELEASES

(continued from page 25)

A Laboratory in a Pipeline Pig

MIC Corrosion Tek, LLC introduces “MIC-Pig” which is a unique pipeline pig that gathers information on internal corrosion and black powder as it travels down a pipeline.

Internal corrosion and its components are an increasing concern in the operational cost for pipelines. Internal pipeline corrosion reduces a pipeline’s integrity along with threatening lives plus possible damages to the environment, if a leak develops. MIC-Pig is a pig which samples pipeline’s in-situ gas, oil, water and black powder components to determine internal corrosion causes and appropriate mitigation methods, based on analytical results.

For more information go to
http://www.mic-tek.com/mic_pig

Mimicking Biological Complexity, in a Tiny Particle

New MIT technology could lead to better drug delivery and artificial tissues that imitate natural tissue.

CAMBRIDGE, Mass. — Tiny particles made of polymers hold great promise for targeted delivery of drugs and as structural scaffolds for building artificial tissues. However, current production methods for such microparticles yield a limited array of shapes and can only be made with certain materials, restricting their usefulness.

In an advance that could broadly expand the possible applications for such particles, MIT engineers have developed a way to make microparticles of nearly any shape, using a micromold that changes shape in response to temperature. They can also precisely place drugs into different compartments of the particles, making it easier to control the timing of drug release, or arrange different cells into layers to create tissue that closely mimics the structure of natural tissues.

The new technique, described in a paper published online July 18 in the *Journal of the American Chemical Society*, also allows researchers to create microparticles from a much more diverse range of materials, says Halil Tekin, an MIT graduate student in electrical engineering and computer science and lead author of the paper.

Currently, most drug-delivering particles and cell-encapsulating microgels are created using photolithography, which relies on ultraviolet light to transform liquid polymers into a solid gel. However, this technique can be used only with certain materials, such as polyethylene glycol (PEG), and the ultraviolet light may harm cells.

Another way to create microparticles is to fill a tiny mold with a liquid gel carrying drug molecules or cells, then cool it until it sets into the desired shape. However, this does not allow for creation of multiple layers.

The MIT research team, led by Ali Khademhosseini, associate professor in the MIT-Harvard Division of Health Sciences and Technology, and Robert Langer, the David H. Koch Institute Professor, overcame that obstacle by building micromolds out of a temperature-sensitive material that shrinks when heated.

The mold is first filled with a liquid gel that contains one kind of cell or drug. After the gel has solidified, the mold is heated so the walls surrounding the solid gel shrink, pulling away from the gel and creating extra space for a second layer to be added. The system could also be modified to incorporate additional layers, Tekin says.

So far, the researchers have created cylindrical and cubic particles, as well as long striped particles, and many other shapes should be possible, Tekin says. Their starting material was a gel made of agarose, a type of sugar.

The long striped particles would be particularly useful for engineering elongated tissues such as cardiac tissue, skeletal muscle or neural tissue. In this study, the researchers created striped particles with a first layer of fibroblasts (cells found in connective tissue), surrounded by a layer of endothelial cells, which form blood vessels. Researchers also created cubic and cylindrical particles in which liver cells were encapsulated in the first layer, surrounded by a layer of endothelial cells. This arrangement could accurately replicate liver tissue.

Such gels could also be embedded with proteins that help the cells orient themselves in a desired structure, such as a tube that could form a capillary. The researchers are also planning to create particles that contain collagen, which constitutes much of the body's structural tissues, including cartilage.

Eventually, the researchers hope to use this technique to build large tissues and even entire organs. Such tissues could be used in the laboratory to test potential new drugs. "If you can create 3-D tissues which are functional and really mimicking the native tissue, they are going to give the right responses to drugs," Tekin says.

This could speed up the drug discovery process and decrease the costs, because fewer animal experiments would be needed, he says.

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