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National Historic Chemical Landmarks Awarded to Merck & Co.



At the Awards Presentation — From left to right top to bottom: Top row: Rich Tillyer, Alan Cooper, Ron Kong, Luciano Mueller, Landon Greene. Bottom Row: Steven Silverman, Amjad Ali, Jeannette Brown.

(Photo courtesy of Merck & Co. Inc.)

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THIS MONTH IN CHEMICAL HISTORY

Harold Goldwhite, California State University, Los Angeles • hgoldwh@calstatela.edu

This column will again be drawn from Volume XIV of the Annual Reports on the Progress of Chemistry for 1917 issued by The Chemical Society of London (now The Royal Society of Chemistry). This rather slim volume is prefaced by the statement that “The continuance of war conditions has led to a further diminution of published research...” In 1917 the U.S. entered the war on the side of Britain and France against Germany and its allies, and much of the research carried out by both sides during the conflict was war-related and not published at the time. Another sign of the times is the poor quality of the paper used in publishing this volume. My copy has all its pages yellowing and cracking, a sure sign that inferior acidic paper, rather like newsprint, was used in its production. I don't expect it to last until 2117!

In looking over the section on organic chemistry I was struck by the perceptive insights that Robert Robinson displayed in two areas that were to become of increasing importance. The first of these was mechanisms of organic reactions. Robinson was studying alkaloid chemistry, and in explaining some reactions of the alkaloid cotarnine he put forward a hypothesis of an addition step in which “the two reagents come within each other's reaction sphere, and that each reagent is assumed to display certain partial valencies”. In essence, to use anachronistic terminology, Robinson is suggesting a multi-centered transition state in which bond breaking and bond making are occurring either simultaneously or sequentially.

The second area in which Robinson was a pioneering influence was in the synthesis of natural products, especially alkaloids, by reactions occurring under biologically reasonable conditions. “The mechanism by means of which certain plants are able to synthesise complicated structures of the alkaloidal type has hitherto baffled the ingenuity of most chemists. It is self-evident that the processes employed in our laboratories are not akin to those employed in the natural formation of the alkaloid class ... Robinson has put forward a series of suggestions as to the manner in which many of the familiar alkaloidal skeletons may be produced in the course of comparatively simple reactions...”

In these pioneering articles Robinson advanced biosynthetic schemes by which alkaloids in many classes including pyrrolidine, piperidine, quinoline, and isoquinoline, may be made in plants. Robinson's reactions are simple: the aldol condensation; and an analogous reaction in which carbinolamines condense with carbonyl compounds.

The section on physiological chemistry has some insights into nutrition that again remind us of the period in which this report was written. “The present shortage in the food supply of the world makes important every detail of knowledge concerning human nutrition.” The report evaluates the important contributions that cereals make to the food of mankind. However wheat, though so significant in the diets of Western Europe, is not an ideal food for many animals. Horses, cows, and pigs do not thrive on wheat-based diets unless supplements are added. Maize (corn) is similarly incomplete as an animal food. For human nutrition wheat flour of only 80% extraction (containing more wheat germ and bran) is measurably improved as a nutrient over flour of 90% extraction. “Of the total calories contained in the diet comprising the 80% bread, 96.14 % (!) were on the average digested.” The reporter concludes, after reviewing a wide range of nutrition studies, that factors of unknown nature, “the vitamins”, are present in many natural foodstuffs at very low concentrations, and are essential to growth.

In my last column I referred to the X-ray crystallographic method of Debye and Scherrer (the powder method) by which aggregates of crystals, rather than a single crystal, can give useful structural information. “Unfortunately, these publications are not at present accessible for detailed study, so that a full appreciation of this remarkable advance must be postponed.” There can be no more poignant closing observation on the advance of science in wartime.

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Address advertising correspondence to Advertising Manager. Other correspondence to the Editor.

February Calendar

NEW YORK SECTION

Thursday, February 2, 2017

Long Island Subsection

See page 12.

Tuesday, February 7, 2017

New York Nanoscience Discussion Group

See page 12.

Wednesday, February 8, 2017

Westchester Chemical Society

See page 13.

Friday, February 10, 2017

New York Section Board Meetings

See page 12.

Friday, February 10, 2017

High School Teachers Topical Group

See page 14.

Thursday, February 23, 2017

Long Island Subsection Board Meeting

See page 14.

also

Thursdays, March 2, and April 6, 2017

Long Island Subsection Seminars

See page 14.

Thursday and Friday, March 2 and 3, 2017

Dr. Joseph Nagyvary Series of Lectures

See pages 15 and 16.

Friday, March 3; Wednesday, April 12;

Tuesday, May 2, 2017

Westchester Chemical Society

See pages 14 and 15.

Fridays, March 17, April 21, and May 19, 2017

High School Teachers Topical Group

See page 15.

Friday, March 24, 2017

Nichols Symposium

See pages 10 and 11.

Thursdays, March 30, April 27, and May 5, 2017

Long Island Subsection Board Meetings

See page 14.

Friday, March 31, 2017

The Inaugural Edward J. McNelis Lecture in Chemistry - at NYU

See page 16.

Friday, April 21, Saturday, May 6, and Tuesday, May 9, 2017

Long Island Subsection Other Events

See page 15.

Fridays, April 28, June 9, September 15, and November 17, 2017

New York Section Board Meetings

See page 12.

Saturday, May 6, 2017

65th Annual Undergraduate Research Symposium

See page 9.

Tuesday, June 6, 2017

New York Nanoscience Discussion Group

See page 12.



NORTH JERSEY SECTION

Monday, February 13, 2017

Careers in Transition

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Monday, February 27, 2017

North Jersey Executive Meeting

See page 7.



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NATIONAL HISTORIC CHEMICAL LANDMARKS AWARDED TO MERCK & CO.

On December 2, 2016, two National Historic Chemical Landmark designations were conferred by the American Chemical Society at Merck Research Laboratories in Rahway, New Jersey, for the discovery of ivermectin (Mectizan®) and research on the vitamin B complex. Combined with a previous award for the company's work to produce penicillin during World War II (shared with six other institutions), Merck Research Laboratories now hosts the largest collection of NHCL awards of any company or institution.

The ceremony and symposium took place at the Max Tishler Auditorium/Merck Building 80K. Speakers at the ceremony were Roger Perlmutter, M.D., Ph.D., (Executive Vice President, President, Merck Research Laboratories) and P. Roy Vagelos, M.D. (Retired Chief Executive Officer and Chairman, Merck & Co., Inc.) and John C. Chabala, Ph.D. (Vice President of Chemistry, Oculogics, Inc.). Presentation of the plaques were by Alan Rocke, Ph.D. (Distinguished University Professor Emeritus and Henry Eldridge Bourne Professor Emeritus of History, Case Western Reserve University, and Chair, ACS National Historic Chemical Landmarks Subcommittee). Receiving the plaques were Rich Tillyer, Ph.D. (Senior Vice President and Head of Global Chemistry, Merck Research Laboratories) and Joseph P. Miletich, M.D., Ph.D. (Senior Vice President, Discovery Research, Preclinical Sciences and Early Development, Merck Research Laboratories). Closing remarks were by Ken Frazier, J.D. (Chairman and Chief Executive Officer, Merck & Co., Inc).

Merck's vitamin B research, conducted largely in the 1930s and 1940s, followed new insights into the role of nutritional deficiencies in diseases. Merck scientists, working with Bell Laboratories' Robert Williams (1886-1965), successfully synthesized vitamin B1 (thiamine) in 1936. Within a few years, Merck was producing thiamine commercially as a treatment for beriberi. Vitamin-enriched foods, particularly bread flour, were popularized as a means to reinstate nutrition lost during grain processing. Merck scientists, particularly Max Tishler and Karl Folkers, continued working on the B vitamins, eventually establishing the first industrial synthesis of B2 (riboflavin) and B5 (pantothenic acid); the isolation, structure determination and industrial synthesis of B6 (pyridoxine), and the isolation of B12 (cobalamin). The result has been dramatic improvements in human and animal nutrition, and the near-elimination of vitamin B-deficiency diseases in the developed world. This research was an outstanding example of the rapid advances in biochemistry and organic chemistry during the early 20th century.

The Plaque for vitamin B complex read as follows:

In the 1930s and 1940s, Merck scientists reported a series of advances in the study of the vitamin B complex, a group of nutrients that is essential to cell functioning. This included the first industrial synthesis of B1 (thiamine), B2 (riboflavin) and B5 (pantothenic acid), and the isolation, structure determination and industrial synthesis of B6 (pyridoxine, pyridoxamine and pyridoxal); and the isolation of B12 (cobalamin). Availability of these vitamins resulted in dietary supplements and vitamin-enriched foods that encouraged healthy growth and development, as well as treatments for diseases caused by nutritional deficiencies. These achievements were outstanding examples of the rapid advances occurring in the fields of biochemistry and organic chemistry during this era and led to notable improvements in human and animal health and nutrition.

The development of ivermectin by Merck in the 1970s and 1980s provided a breakthrough treatment against infectious diseases transmitted by parasites. This discovery resulted from an international collaboration that screened hundreds of natural products to identify a promising lead compound. Merck scientists synthesized thousands of analogs of this lead and tested them. The result, ivermectin, offered a highly effective treatment for several parasitic diseases affecting a variety of animals. Following its approval for human use in 1987, Merck established a worldwide program to donate ivermectin as Mectizan® to treat onchocerciasis (river blindness), greatly reducing the prevalence of this debilitating disease. In 2015, Merck scientist William Campbell shared the Nobel Prize in Physiology or Medicine for his role in developing ivermectin.

(continued on page 6)

LANDMARKS AWARDED TO MERCK & CO.

(continued from page 5)

The Plaque for Ivermectin read as follows:

The synthesis and development of ivermectin by Merck in the 1970s and 1980s provided a breakthrough treatment against infectious diseases transmitted by parasites. This discovery resulted from an international collaboration that screened hundreds of natural products to identify a promising lead compound. Merck Scientists synthesized thousands of analogs of this lead and tested them. The result, ivermectin, offered a highly effective treatment for several parasitic diseases affecting a variety of animals. Following its approval for human use in 1987, Merck established a worldwide program to donate ivermectin as Mectizan® to treat onchocerciasis (river blindness), greatly reducing the prevalence of this debilitating disease in 2015. Merck scientist William Campbell shared the Nobel Prize in Physiology or Medicine for his role in developing ivermectin.

The ACS established the National Historic Chemical Landmarks program in 1992 to recognize seminal events in the history of chemistry and to increase awareness of the contributions of chemistry to the well-being of society. In order to qualify as an ACS landmark, each subject must have occurred at least 25 years ago; represent a seminal achievement in the chemical sciences; and evidence a significant contribution to society and the chemical profession. Past landmarks in New Jersey and New York include the development of streptomycin and other antibiotics at Rutgers University, the development of MRI at Stony Brook University, and Thomas Edison's work in chemistry, among several others. For more information, visit www.acs.org/landmarks.

Both stories are described on the ACS website, and the PDFs are available for download:

Vitamin B: <https://www.acs.org/content/acs/en/education/whatischemistry/landmarks/vitamin-b-complex.html>

Ivermectin: <https://www.acs.org/content/acs/en/education/whatischemistry/landmarks/ivermectin-mectizan.html>



Vitamin B Plaque

ivermectin Plaque

(Photos courtesy of Merck & Co. Inc.)

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, February 27, 2017

Time: 6:30 PM

Place: Location TBD & Teleconference
(See www.njacs.org for details)



CAREERS IN TRANSITION MEETINGS

Job Hunting??

Resume & LinkedIn writing and key word search rules are changing. To be found, come and utilize our latest insights. Our ACS trained Career Consultants offer assistance at Students2Science to help members with their job search on the second Monday of each month. Topics at this free workshop are:

- Techniques to enhance resume effectiveness
- Interview practice along with responding to difficult questions
- Networking to find hidden jobs
- Planning a more effective job search

Date: Monday, February 13, 2017

New from now on is a second CIT meeting in East Windsor on the third Monday. Contact Bill for details.

Times: Meeting 2:30 - 5:00 PM

Place: Students 2 Science, Inc.
66 Deforest Avenue
East Hanover, NJ

Cost: No charge

Reservations: at www.njacs.org/careers.html

A job board and networking assistance is offered at most topical group meetings. Appointments with Bill can be arranged for

personal assistance at (908) 875-9069 or billsuits@earthlink.net.

See www.njacs.org under the Career tab for Jobs hidden from sight and relevant blogs.



NJACS PARTNERS WITH STUDENTS2SCIENCE

Members are encouraged to volunteer at their East Hanover facility and explore their website at www.students2science.org to learn more about this innovative program.

S2S continues to expand their exciting laboratory experience the disadvantaged children. Many of our members continue to volunteer as mentors. At their 2 million dollar analytical lab, every 40 kids are assisted by 16 professional volunteer mentors. The experiments performed really make chemistry and science come alive using state of the art analytical equipment working with students starting in 6th grade up to HS seniors. Each day is optimized for grade level and curriculum.

Now the program has further expanded with internet video and experiments performed in the classroom for 4th & 5th grades. Internet allows views of the lab in operation and relates to simpler experiments setups done in the classroom with their teacher and a partnering chemist.

North Jersey members who volunteered benefited in many ways. Those in transition expanded their network and received job finding assistance. Retired chemists met up with old friends and made many new friends. Those with jobs used the volunteer hours as part of the company outreach programs and team training. All feel great about making a difference in the lives of the youth who may have never met a scientist or considered a career in the sciences.

Please consider volunteering and discovering more about this innovative program. If you want to learn more, you can speak with Don Truss at (908) 334-8435

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NORTH JERSEY 2017 AND 2016 CHAIRS



Luciano Muller (right) North Jersey Section Chair 2016, handing off the gavel to incoming chair Landon Greene (left).

(Photo courtesy of Alan Cooper)

ResMed: Residential School on Medicinal Chemistry and Biology in Drug Discovery
 June 12-16, 2017
 Drew University, Madison, NJ

This graduate level course concentrates on the fundamentals that are useful in drug discovery spanning initial target assay evaluation through clinical development. Several case histories of recent successful drug development programs will also be presented. The five-day program covers:


Principles of Med Chem	DMPK
Cheminformatics	Toxicophores
Lead ID & Optimization	GPCRs
Epigenetics	Kinase Inhibitors
Fragment-based Drug Design	Ion Channels
Structure-based Drug Design	Enzyme Inhibitors
Drug-like Properties	Bioisosteres
Plasma Protein Binding	Preclinical Tox
Molecular Modeling	Clinical Dev
Protein-Protein Interactions	Case Histories
Antibody-Drug Conjugates	

W. Greenlee, V. Gullo and R. Doll –Co-organizers

Attendees will be staying at The Madison Hotel
www.drew.edu/resmed
 e-mail: resmed@drew.edu
 phone: 973/408-3787; fax: 973/408-3504

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

Deadline for items to be included in the March 2017 issue of The Indicator is **January 28, 2017**

 <p>ACS Chemistry for Life®</p>	<p>65th</p>	<p>ANNUAL UNDERGRADUATE RESEARCH SYMPOSIUM</p>
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The Student Activities Committee of the New York Section of the American Chemical Society

Saturday, May 6th, 2017 at Fordham University

8:00 am – 3:00 pm (breakfast, luncheon and award reception included)

Sign up as an attendee at <http://www.newyorkacs.org/meetings/urs/urs.php>

Keynote Speaker: Dr. Jin Kim Montclare

NYU Tandon School of Engineering

Jin Kim Montclare is an Associate Professor in the Department of Chemical and Biomolecular Engineering (CBE) at NYU Tandon School of Engineering (NYU SoE), who is performing groundbreaking research in engineering proteins to mimic nature and, in some cases, work better than nature. Prior to joining NYU SoE, Jin was an NIH postdoctoral fellow at the California Institute of Technology in the Division of Chemistry and Chemical Engineering in the Tirrell lab. She received a Bachelor of Science in Chemistry from Fordham University as a Goldwater and Clare Boothe Luce undergraduate fellow, a PhD in Bioorganic Chemistry from Yale University as an NSF and Pfizer predoctoral fellow. In 2015 began serving as Graduate Studies Director for CBE and Associate Director for Technology Advancement for the NYU Materials Research Science and Engineering Center, while leading the multidisciplinary Center for Innovation and Entrepreneurship at NYU SoE. Among her many honors and awards are the 2016 ACS WCC Rising Star Award, 2015 Agnes Faye Morgan Research Award from Iota Sigma Pi, 2014 Executive Leadership in Academic Technology and Engineering Fellowship, and 2014 Distinguished Award for Excellence, Dedication to Invention, Innovation and Entrepreneurship.



Keynote Address

Intelligent Self-Assembling Biomaterials

Through centuries of evolution, nature has developed biopolymers capable of folding and assembling into discrete structures with a functional consequence. Inspired by this, our lab focuses on engineering “intelligent” protein materials with entirely new properties and function. In particular, our lab has fabricated protein-derived nanomaterials: helix-elastin block polymers and coiled-coil fibers. We investigate the fundamental self-assembly and molecular recognition capabilities of these systems. More importantly, we are able to harness these structure as well as others to interface with small molecule therapeutics, genes, cells and inorganic metals. Central to this work is the integration of stimuli-responsive domains through rational design.

SIGNIFICANT DATES FOR 63rd URS

Deadline for Abstract Submission - **March 20, 2017** Abstract acceptance notification – April 3, 2017

Deadline for Symposium Advanced Registration – April 21, 2017

<p>2017 Co-chair Dr. Paul Sideris Queensborough CC - CUNY psideris@qcc.cuny.edu</p>	<p>2017 Co-chair Dr. Ipsita Banerjee Fordham University banerjee@fordham.edu</p>	<p>2017 Co-chair Dr. Naphtali O'Connor Lehman College - CUNY naphtali.oconnor@lehman.cuny.edu</p>	<p>2017 Co-chair Dr. Meredith Foley New Jersey City University mfoley@njcu.edu</p>
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FREE Registration for student members of the National ACS, faculty mentors who register in advance and sponsors. For non-ACS members and guests, the registration is \$35 in advance. All on-site registration is \$45 for faculty, staff and guests. Checks for the registration fee should be made out to: “NY ACS URS” and sent to: Prof. Paul Sideris, Queensborough Community College, Department of Chemistry, Science Building S-445, 222-05 56th Avenue, Bayside, NY 11364.



2017 WILLIAM H. NICHOLS MEDAL DISTINGUISHED SYMPOSIUM AND AWARD DINNER



Symposium: IMPROVING LIFE THROUGH ADVANCES IN CHEMISTRY AND NANOSCIENCE

Award Recipient: **PROFESSOR CHAD A. MIRKIN**
Northwestern University

Date: Friday, March 24, 2017

Time: 12:30 PM Registration 1:00 PM – 5:30 PM Symposium
5:45 PM Reception 6:45 PM Award Dinner

Place: Crowne Plaza Hotel, White Plains, NY

PROGRAM

- 1:00 PM Welcome Professor Brian R. Gibney
2017 Chair, ACS, New York Section
Brooklyn College and Graduate Center of CUNY
- 1:05 PM Opening of the Distinguished Symposium Professor Joseph M. Serafin
2017 Chair-elect, ACS, New York Section
St. John's University
- 1:15 PM Dynamic Droplets: Biosensors from Changes in Orientation and Morphology of Complex Liquids Professor Timothy M. Swager
Massachusetts Institute of Technology

This lecture will focus on the design of systems wherein reconfiguration of complex liquid emulsions (droplets) can be triggered chemically or biochemically. The utility of these methods is to generate new transduction mechanisms by which chemical and biological sensors can be developed. Complex liquid droplets behave as optical lens systems and small changes in surface tensions can change focal lengths or cause systems to switch between optically transmissive or scattering states. Central to this scheme is that the fluids in the droplets have different densities and hence are aligned by the earth's gravity. The induced optical changes can be triggered with chemical, photochemical, or biochemical stimuli and thereby create new generations of sensors. Demonstrations of these methods for the detection of enzyme concentrations and pathogens will be presented.

- 2:00 PM Molecular Imaging of Transition Metal Signaling in the Brain and Beyond Professor Christopher J. Chang
University of California, Berkeley

Metals are essential for all forms of life, and the traditional view of this bioinorganic chemistry is that mobile fluxes of alkali and alkaline earth metals like sodium, potassium, and calcium are used as dynamic signals and transition metals like copper and iron must be buried and protected as static metabolic cofactors to prevent oxidative stress. We have identified a new paradigm of transition metal signaling, using copper as a primary example to show how such elements can influence neural circuitry and regulate fundamental behaviors such as eating and sleeping.

- 2:45 PM Shape-Shifting Drug Carriers for Targeting Cytotoxins and Immunotherapeutics to Cancer Professor Nathan C. Gianneschi
University of California, San Diego

Nanoparticle targeting strategies have largely relied on the use of surface conjugated ligands designed to bind overexpressed cell-membrane receptors associated with a given cell-type. We envisioned a targeting strategy that would lead to an active accumulation of nanoparticles by virtue of a supramolecular assembly event specific to tumor tissue, occurring in response to a specific signal. For this purpose, we utilize enzymes as stimuli, rather than other recognition events, because they are uniquely capable of propagating a signal via catalytic amplification. We will describe the preparation of highly functionalized polymer scaffolds utilizing ring opening metathesis polymerization, their development as *in vivo* probes and their utility as a multimodal imaging platform and as drug carriers capable of targeting tissue. Furthermore, we will describe new methods and approaches for characterizing this kind of dynamic material at the nanoscale, including by liquid cell transmission electron microscopy and combined isotopic and optical nanoscopy.

3:30 PM Coffee Break

- 4:00 PM Metal-oxos in Chemistry and Biology Professor Harry B Gray
California Institute of Technology

The dianionic oxo ligand occupies a very special place in coordination chemistry, owing to its ability to stabilize high oxidation states of metals. The ligand field theory of multiple bonding in metal-oxos was published in two papers in the first volume of *Inorganic Chemistry*. The theory, which accounts for the ground state electronic structures and spectroscopic properties of these complexes, predicts that an

“oxo wall” separates Fe-Ru-Os and Co-Rh-Ir in the periodic table. I will review this early work, then discuss the roles metal-oxos play in two of the most important chemical reactions on planet Earth, hydrocarbon oxygenation catalyzed by cytochrome P450, and solar-driven water oxidation catalyzed by photosystem-II.

4:45 PM Unlocking the Potential of Spherical Nucleic Acids
in Biology and Medicine

Professor Chad A. Mirkin
NICHOLS MEDALIST

A fundamental tenet of nanotechnology is that bulk materials, when miniaturized, exhibit new and interesting chemical and physical properties. These properties often positively impact the development of new technologies, especially in the areas of biology and medicine where frontier advances require rapid changes in how living systems are probed and regulated. Spherical nucleic acids (SNAs), nanostructures typically made by chemically templating short strands of DNA or RNA on the surface of a particle, display extraordinary architecture-dependent properties. Unlike conventional nucleic acids, SNAs can rapidly enter cells without the need for transfection agents, and they can be utilized as novel intracellular probes and efficacious agents for regulating gene expression and immune system response. Consequently, SNAs constitute an entire new class of therapeutics that are being utilized to attack diseases and disorders, including autoimmune diseases and many forms of cancer, at their genetic roots.

5:45 PM Social Hour

6:45 PM William H. Nichols Medal Award Dinner

Professor Harry B. Gray will introduce
Professor Mirkin, Nichols Medalist

More information on the William H. Nichols Medal Events is available on the New York Section’s website at <http://www.NewYorkACS.org>.

Tickets may be reserved using the following form, or preferably through the New York Section website that accepts credit cards or Paypal. <http://www.NewYorkACS.org>.

***** RESERVATION FORM *****

2017 WILLIAM H. NICHOLS DISTINGUISHED SYMPOSIUM & MEDAL AWARD BANQUET in honor of Professor Chad A. Mirkin

Return to: ACS, New York Section, c/o Dr. Neil D. Jespersen, Department of Chemistry, St. John’s University, 8000 Utopia Parkway, Queens, NY 11439 (516) 883-7510

- Please reserve _____ places for the symposium & banquet at \$125/person ACS member
 _____ places for the symposium only at \$45/person ACS member
 _____ places for the banquet only at \$115/person ACS member
 _____ places for the symposium & banquet at \$155/person Non-member
 _____ places for the symposium only at \$65/person Non-member
 _____ places for the banquet only at \$125/person Non-member
 _____ places for the symposium only at \$30/person, Students, Retired, Unemployed
 _____ places for the symposium only complimentary - for 50 year + ACS members

(For table reservations of 8 or more, use the ACS member \$125/person rate for combination tickets)

Reserve a table in the name of: _____

Names of Guests	E-mail Address
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Indicate numbers in your group who choose:

- Chicken _____
 Prime Rib _____
 Salmon _____
 Vegetarian _____

Mail Tickets to:

Name: _____
 Address: _____

BANQUET RESERVATION DEADLINE: MARCH 13, 2017

Please make checks payable to: ACS, NEW YORK SECTION

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New York Meetings

www.newyorkacs.org

NEW YORK SECTION BOARD MEETING DATES FOR 2017

The dates for the Board Meetings of the ACS New York Section for 2017 have been selected and approved. The meetings are open to all – everybody is welcome. All non-board members who would like to attend any of the meetings should inform the New York Section office by emailing Mrs. Marilyn Jespersen at njesper1@optonline.net or by calling the Section office at (516) 883-7510.

All 2017 Board Meetings will be held at The Graduate Center, Science Center, Room 4102, 365 Fifth Avenue, New York, NY 10016, except for the January 21 Section-wide Conference and March 24 Nichols Symposium. Prof. Brian Gibney will chair all meetings. Refreshments will be available starting at 6:00 PM while the actual meeting will start at exactly 6:30 PM.

The board meetings dates for 2017 will be
Friday, February 10, 2017

Friday, March 24, 2017 — William H. Nichols Symposium and Medal Award Dinner at the Crowne Plaza Hotel, White Plains, NY.

Friday, April 28, 2017

Friday, June 9, 2017

Friday, September 15, 2017

Friday, November 17, 2017

More information will be posted in future monthly issues of *The Indicator* and on the New York website at

<http://www.NewYorkACS.org>.



LONG ISLAND SUBSECTION

Explorations in Substrate Space

Speaker: Dr. Emily Mundorff
Hofstra University

Enzymes are nature's catalytic machines. Massive increases in rates of reactions may be achieved through specific interactions between the enzyme and its substrate. We now have the ability to harness the catalytic power of enzymes and put them to work in a

variety of applications. Enzymes are currently used in laundry detergent, food production, bioremediation, biofuels and synthesis of pharmaceuticals. But what do you do when you can't find an enzyme to work with the reaction you want to catalyze? You need to alter the enzyme in order to generate activity on new substrates. I will describe the generation of novel substrate specificity in both the alanine dehydrogenase and the haloalkane dehalogenase enzyme systems.

Date: Thursday, February 2, 2017

Time: 5:30PM

Place: Queensborough Community College, S-112



NEW YORK NANOSCIENCE DISCUSSION GROUP

2017 Sessions

*Hosted by the New York University
Department of Chemistry*

Speakers and details to be announced.

The NYNDG is an ACS Topical Group that meets in the New York University Department of Chemistry. Sessions feature three 30-minute presentations on nanoscience, one each with strong orientation in biology, chemistry, and physics/applied mathematics. Presentations will be focused on discussion of recent work, although speakers will place the work in a context understandable to a broad audience.

Dates: Tuesdays, February 7 and June 6, 2017

Times: Refreshments at 7:00 PM
Science at 7:30 PM

Place: New York University, Silver Center
31 Washington Place (between
Washington Square East and
Greene Street)
Room 1003 (10th floor)

For more information, contact: James Canary (james.canary@nyu.edu)

Topical Group History: <http://www.nyu.edu/projects/nanoscience>

WESTCHESTER CHEMICAL SOCIETY

Special Seminar – “Yes, But Why Sulfuric Acid? - Young William H Nichols Entry into 19th Century Chemical Industry”

Speaker: Peter Corfield, PhD
Department of Chemistry
Fordham University
Bronx, NY

William H Nichols was a remarkable man who had great influence on the young New York chemical industry. He and his friend Charles Waters started manufacturing mineral acids when he was only eighteen. He eventually founded the General Chemical Company, which after many mergers and acquisitions became the Allied Chemical Corporation. He was noted for his entrepreneurial spirit, for bringing scientific principles into manufacturing, and for high ethical standards. As a mature industrial chemist, Nichols funded the gold medal for the New York Section's new annual research award in 1902. This became the first national award of the American Chemical Society, now known as the William H. Nichols Medal Award. The presentation will explore Nichols' contributions in the context of the state of chemical industry in New York during the latter part of the nineteenth century.

Peter Corfield has taught as a full-time Lecturer at the Chemistry Department of Fordham University from August 2011 to the present. He engages also in research with undergraduate students, and has published a dozen papers on old and new work since joining Fordham, making 62 publications in all. Previously, he was Director of the Center for Science and Math Education at Purchase College, SUNY for sixteen years,

where he developed the Center's Mission to support excellence in K-16 science and math education, and to offer outreach programs for middle and high school students. He prepared grant proposals and contracts to fund all the programs he managed, with a total of over seven million dollars. Prior to that, he taught at The King's College, NY for twenty one years, as professor of chemistry and chair of the Division of Math and Science.

Date: Wednesday, February 8, 2017
(Note: Because of scheduling difficulties, this is a change from the date reported in the January issue of *The Indicator*.)

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

Further Information: Paul Dillon
PaulWDillon2@hotmail.com
(914) 393-6940

Note: Inclement Weather: Cancellation Due to Inclement Weather

Should Westchester Community College's Valhalla campus close due to inclement weather (or has delayed opening or closes early) the meeting will be cancelled. Decisions about delay/closure are made around 6:00 AM for day courses and 3:00 PM for evening courses. The college will communicate delays, closings or early dismissals on their website (www.sunywcc.edu), Facebook, Twitter, and the (914) 606-6900 phone line.



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HIGH SCHOOL TEACHERS TOPICAL GROUP

The Feynman Picture of Quantum Confinement of Small Molecules

Speaker: Joseph Gendagorta
and

Computational Chemistry Methods for Crystal Structure Prediction

Speaker: Dr. Leslie Vogt
NYU.

Date: Friday, February 10, 2017

Times: Social and Dinner — 5:45 PM
Meeting — 7:15 PM

Place: Social & Dinner — DoJo Restaurant
14 West 4th St. (@Mercer Street)
New York, NY
Meeting — New York University
Silver Center for Arts and
Sciences, Room 207
Enter from 32 Waverly Place
South-east corner Washington
Sq. East or Washington Place
New York, NY



LONG ISLAND SUBSECTION

Board Meeting

Date: Thursday, February 23, 2017

Time: 6:30PM

Place: Nassau Community College
Life Science Building
Chemistry Dept, 2nd Floor



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.

LONG ISLAND SUBSECTION

FUTURE MEETINGS CALENDAR

Board Meeting Dates

Thursday, March 30, 2017

Thursday, April 27, 2017

Thursday, May 25, 2017

Time: 6:30PM

Place: Nassau Community College
Life Science Building
Chemistry Dept, 2nd Floor

Spring Seminars

Thursday, March 2, 2017 (Tentative)

Speaker: Dr. Joseph Nagyvary
Professor Emeritus
Texas A&M University

Tentative title: Stradivari's Secrets

Abstract: TBA

Thursday, April 6, 2017

Speaker: Dr. Fabiola Barrios Landeros
Yeshiva University

Title and abstract: TBA

OTHER EVENTS:

Friday, April 21, 2017

Chemistry Challenge

Saturday, May 6, 2017

Undergraduate Research Symposium

Tuesday, May 9, 2017

High School Awards



WESTCHESTER CHEMICAL SOCIETY

FUTURE MEETINGS

Special Seminar – “From Mixing Molotov Cocktails to Mining Stradivari’s Secrets”

Speaker: Joseph Nagyvary, PhD
Professor Emeritus
Texas A&M University

Tentative

Date: Friday, March 3, 2017

See also Dr. Nagyvary article on pages 15-16.

Special Seminar – “Cutting and Pasting with DNA: Genome Editing”

Speaker: Evan Merkhofer, PhD
Assistant Professor (Biology)
Mount Saint Mary College

Date: **Wednesday, April 12, 2017**

Times, Place, Cost and Further Information:
See under February meeting, page 13.

* * * * *

Distinguished Scientist Award and Student Achievement Awards Dinner Meeting:

Topic to Be Announced

Date: **Tuesday, May 2, 2017**

Times: Social Hour - 5:00 PM
Lecture and Awards - 6:00 PM
Dinner - 7:00 PM

Place: Pace University
861 Bedford Road – Entrance #2
Pleasantville, NY
The Campus Center
Butcher Suite

Cost: To be announced



HIGH SCHOOL TEACHERS TOPICAL GROUP

FUTURE MEETINGS:

Preparing an Application for the Math for America Master Teacher Fellowship

Speaker: Lena Douris
<clenadouris@gmail.com>

I will share information about my experience in the MfA Master Teacher program. The details of the application process and the benefits of being involved in the wonderful MfA community. Note: MfA covers the Chemistry program in New York City.

Date: **Friday, March 17, 2017**

For times and place, see under February meeting, above.

* * * * *

“Demo Derby II”

Date: **Friday, April 21, 2017**

For times and place, see under February meeting, above.

* * * * *

The Development of Carolacton-derived Macrolactones for the Perturbation of Bacterial Biofilms

Speaker: Dr. Americo J. Fabroni
Department of Chemistry
Temple University
Philadelphia, PA.

Date: **Friday, May 19, 2017**

For times and place, see under February meeting, above.



JOSEPH NAGYVARY LECTURES

From Mixing Molotov Cocktails to Mining Stradivari's Secrets

Dr. Joseph Nagyvary, Professor Emeritus at Texas A&M University, will give a series of lectures in the New York area **March 2 and 3, 2017**. He recently published his memoir of Hungary that describes the lives of chemistry students during the period of the Cold War, and their participation in the 1956 uprising and fight for freedom. As noted by Dr. Nagyvary “some great chemists, Olah, Somorjai, Pavlath, etc. came out of Hungary in 1956.” His presentations will be based on his book, published in October to coincide with the sixtieth anniversary celebrations of the 1956 events and now available at Amazon:

<https://www.amazon.com/Violence-Violins-Making-Hungarian-Refugee/dp/1536894060/>

For more information on its content, go to www.violenceandviolins.com and see the news release from Texas A&M University:

<http://today.tamu.edu/2016/10/13/violence-and-violins-prof-recalls-his-role-in-hungarian-revolution/>

Many students living under a communist dictatorship picked a major in chemistry because it was best for survival there, but also because it offered a good career path if they would make it to the west. This talk will describe what members of Dr. Nagyvary's class did during the three weeks of the 1956 uprising (there will be some exciting video footage), and his escape to Zurich, Switzerland, which then was the Mecca of natural products chemistry.

Dr. Nagyvary will also discuss his research (which has received international recognition) into the Stradivarius violin, inspired by a childhood passion for classical music. In 1976, he proposed that the chemicals used to treat the wood – not Stradivarius' violin-making skills – were responsible for its unique, pristine sound. His theory caused

(continued on page 16)

JOSEPH NAGYVARY LECTURES

(continued from page 15)

considerable outrage in music circles, but was indeed correct (Nature, 444, 30 Nov. 2006, p.565).

Dr. Nagyvary studied chemistry in his native Hungary at the University of Budapest. During the 1956 uprising, he escaped to Austria and ended up in Switzerland. He earned his doctorate at the University of Zurich, where his dissertation on curare alkaloids won the annual prize of the Swiss National Foundation (1962). He did post-doctoral work, with Lord Todd, at Cambridge University. After Cambridge, he emigrated to the United States in 1964. Following temporary positions at the University of Connecticut and Creighton, he taught biochemistry at Texas A&M University from 1968 to 2003. His field was nucleotide chemistry but in 1985, he gave that up in favor of his study of Stradivari violins, proving that chemists can do almost anything. In addition to his Swiss National Foundation prize, he has won a career development award from US Public Health in 1967 and the Gold Medal of the Japanese Society for Industrial Physics in 2005. He lives in Jonestown, Texas, with his wife, Mary Ann. He has four children.

The presentations will be made at

- St. John's University, March 2, 2:00 PM (contact information: Dr. Neil Jespersen, jespersn@stjohns.edu)
- Queensboro Community College, March 2, 3:30 PM (contact information: Dr. Dominic Hull, DHull@qcc.cuny.edu)
- Nassau Community College, March 3, 2:00 PM (contact, information: Dr. Daniel Resch, Daniel.Resch@ncc.edu)
- Westchester Community College, March 3, 5:30 PM (contact information Dr. Paul Dillon, PaulWDillon2@hotmail.com).



SPRING 2017 SEMESTER AT NYU

Mark Your Calendars

The Inaugural Edward J. McNelis Lecture in Chemistry

Speaker: John F. Hartwig
University of California/Berkeley

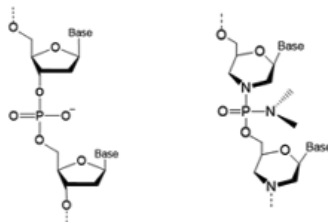
Date: Friday, March 31, 2017
Times: 3:30 PM
Place: New York University, Silver Center Hemmerdinger Hall, Room 102
31 Washington Place (between Washington Square East and Greene Street)

For more information, contact: James Canary (james.canary@nyu.edu)



WESTCHESTER CHEMICAL SOCIETY

On December 8, 2016 Ms. Ursula Koniges spoke on the "Effects of Overhanging Analyte Oligo Tails in Model DNA and Morpholino Arrays". Ms. Koniges' talk described the use of a DNA-analog as a probe for detecting specific DNA sequences using chip array technology. Morpholino is a polymer in which morpholine moieties replace the deoxy ribose moieties, and in which a phosphamid linkage (uncharged) replaces the phosphate linkage (which is anionic), in DNA (diagram courtesy of Ms. Koniges):



DNA

Morpholino (MO)

Like DNA, morphos form double helices with complementary DNAs. Because it is uncharged there is less repulsion between the anionic target DNA and a morpho probe than there is with an anionic DNA probe. This allows stronger binding (as shown by higher melting temperatures) and greater sensitivity to detect target DNAs. Target DNA in a sample will often be longer than the desired target sequence (they may have "tails" at either, or both, ends. In this work, the probes each have 25 bases. Target DNAs are prepared with 25 complementary bases plus an additional 18 bases (poly-T, the tail). Taking advantage of the directionality of DNA, two target types are prepared. One has the poly-T at the surface end of the probe and is end-conjugated with a fluorophore. This tail must remain near the surface of the chip. The other has the tail at the far end of the probe (where it will extend into solution). A tail-free control target is also

tested. In the last two cases, the fluorophores are conjugated to the target DNA at its "chip-end". Thus, all fluorophores are near the chip surface. Detection is by TIRF (Total Internal Reflectance Fluorescence) Imaging (eliminating signal from unhybridized species in solution) combined with a heat-flow cell. Melting curves are also obtained in solution, where the three targets have similar probe-dependent melting curves, with morpho probes having higher melting temperatures. The DNA-DNA melting temperatures, in solution, increase as ionic strength (which provides electrostatic shielding) increases but the morpho-DNA melting curves are essentially unaffected. Melting curves on chips indicate that there are penalties (lower melting temperatures) associated with tails; greater with surface-oriented vs. solution-oriented, tails. Again, increasing ionic strength increases DNA-DNA melting temperatures but not those for morpho-DNA. Follow-up work, for example on the effects of tail length, is planned.

There was interesting discussion with the audience during and after Ms. Koniges' talk, given at the Westchester Community College in Valhalla, N.Y. Ms. Koniges earned dual bachelor's degrees in biochemistry and chemical engineering, with a minor in international studies (she is currently active in NYU's Science Diplomacy Club and in the State Department's USAID program) from the University of Washington in Seattle. She is completing her Ph.D. in Chemical Engineering at New York University's Tandon School of Engineering in the Department of Chemical and Biomolecular Engineering. Her doctoral work is supervised by Dr. Rastislav Levicky, and focuses on the development of DNA-based biosensors. After the talk several of the attendees enjoyed a dinner together at a nearby restaurant. The photo below is of Ms. Koniges, her mentor, Dr. Rastislav Levicky, and the WCS board members who attended the meeting.



Peter Corfield, Paul Dillon, Ursula Koniges, Joan Laredo-Liddell, Rastislav Levicky, Rolande Hodel, Jean Delfiner, and Kay Whiten

(Photo courtesy of Rolande Hodel)



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Call for Nominations

COMMITTEE ON THE HISTORY OF THE NEW YORK SECTION

Over the past twenty-three years the New York Section has participated in the designation of seven National Historic Chemical Landmarks and four New York Section Historic Chemical Landmarks. A brief description of these National and local section landmarks may be found on the NY Section Home Page at newyorkacs.org, under the Committee on the History of the NY Section. These landmark programs recognize achievements in the chemical sciences and related areas, in order to enhance public appreciation for the contributions of the chemical sciences to modern life.

Please consider making a nomination for an historic chemical landmark. The Committee on the History of the NY Section will consider all nominations. In addition to a particular achievement, an historic library, building or association may be worthy of this distinction.

Please send your nomination, with supporting documentation, to the Chair of the Committee, Dr. John B. Sharkey, at johnbsharkey@me.com.



WESTCHESTER CHEMICAL SOCIETY DISTINGUISHED SCIENTIST AWARD 2017

The Westchester Chemical Society is accepting nominations for the "WCS Distinguished Scientist Award 2017". Scientists who live or work in Westchester or the Bronx qualify. The awardee is expected to attend the Awards Dinner (April/May time-frame) and to present aspects of his or her work. Self-nominations are acceptable. Nominations are not carried over from previous years. New and possibly updated nominations should be submitted. Please send a cover letter stating why your nominee should receive the award along with the nominee's resume **by January 31, 2017** to:

Dr. Paul Dillon at PaulWDillon2@hotmail.com or
67 Matthes Road, Briarcliff Manor, NY 10510

or to: Dr. Peter Corfield at pwrc@earthlink.com

For further information, see pages 14-15.

Call for Applications

WILLIAM H. NICHOLS FELLOWSHIP

The New York Local Section of the American Chemical Society is proud to announce the continuation of a summer research opportunity for undergraduates, the William H. Nichols Fellowship. The Nichols Fellowship is open to all college students majoring in chemistry (broadly defined) who will perform research over the summer before graduation at an institution in the NY Local Section geographic area. Each Nichols Fellow receives a stipend of \$5,000 to support them as they perform their research, and is expected to submit a two-page written report at the end of the summer and present their work at the 2018 Undergraduate Research Symposium. In addition, each Nichols Fellow and their mentor will be invited as honored guests to the 2018 William H. Nichols Award Banquet.

Applications are available online at www.newyorkacs.org/NicholsFellowship.php and are **due December 15, 2016**. All applicants will be notified **by March 1, 2017**.



FREDDIE AND ADA BROWN AWARD

This Award recognizes and encourages high achieving middle- and high-school students, of African American and Native American heritage, to further develop their academic skills, with views on careers in the chemical sciences

Award Amounts

Middle School \$100.00 Check and \$50.00 gift certificate : High School \$200.00 Check and \$100.00 gift certificate

Who is Eligible

Middle School students enrolled in a science class : High School students who have completed a chemistry course

Grades

Middle School B Average or better in Science, B Average overall : High School B Average in Chemistry, B Average overall

Letter of Recommendation

Math or Science/Chemistry Teachers or

Guidance Counselor

Statement

Middle School "Why I Like Science" : High School "Why I Like Chemistry"

Selection Criteria

Applicants must be African American (Black) or Native American (including Pacific Islander) or of mixed race.

Transcript

Official transcript required.

Financial Need

Not Required.

Applications available on the web:
www.njacs.org/freddieadabrown
 or from your school guidance office.

Return Application To

Freddie and Ada Brown Award, NJACS
 Section Office, 49 Pippens Way, Morristown,
 NJ 07960

Due Date

Completed Applications must be post-
 marked no later than **March 31 Annually**

Questions: Contact Jeannette Brown
Jebrown@infionline.net or (908) 239-1515

Call for Volunteers

OPPORTUNITY FOR ACS MEMBERS TO AID STUDENTS 2 SCIENCE IN A HYBRID VIRTUAL LAB PROGRAM

Can you spare a few hours of your time? Do you like working with students and would you like the opportunity to share your science knowledge in a classroom? Students 2 Science is seeking volunteers to aid in our Virtual Lab program. We have a series of elementary, middle, and high school experiments that we will be running in various schools across New Jersey. Members are especially needed to help with the North Jersey section's IPG funded project to bring hands-on science to South Jersey. We need professionals to help in the classroom with the students. It's great fun, a wonderful way to give back, and only requires a few hours of your time. Opportunities begin in November. For more information, contact Fran Nelson, frannelson@students2science.org and visit our website at Students2Science.org

Others

IATA Dangerous Goods Regulations Updated

By Neil McCulloch, Senior Manager, International Product Development, Labelmaster

Businesses need and want predictability – particularly when it comes to government regulations. So the fact that the International Civil Aviation Organization (ICAO) updates its Technical Instructions for the Safe Transport of Dangerous Goods every two years is both a blessing and a curse. A blessing because industry knows the changes that are coming and a curse because there are changes coming.

With the recent concerns over certain types of phones and tablets, the 2017 update to the regulations has a direct impact on almost every business everywhere.

Through their global trade association IATA, the airlines develop their own procedures based on government regulations to ensure that aircraft are as safe as possible. So it's not surprising that 2017 will see the 58th edition the IATA Dangerous Goods Regulations (DGR) published.

Every day about \$18.6 billion worth of goods are transported by air. We take our laptop computers, cell phones, hair spray and even our duty free liquor for granted. But each of those has significant hazards if mishandled, poorly manufactured or simply in the wrong place at the wrong time. Consequently, ICAO, the airlines and the government have identified them as "dangerous goods" and places a number of restrictions on their carriage by air.

So, what has changed for 2017? And how will it affect your business?

Well, if you ship any kind of lithium battery powered device, these changes will affect you and your shipping operations. If you conduct any kind of dangerous goods training, ICAO is giving advance warning of changes to how training will be evaluated in the future and you would be advised to study these changes. If you ship aerosols, the so-called packing instructions for these have been changed. If you ship any type of machinery, the way these are described on the shipping papers is changed. And many other changes will affect such products as stabilized materials and even uranium hexafluoride.

In short, the 58th edition of the IATA DGR manual is a comprehensive update on the regulatory requirements for the carriage of many substances and articles and should be considered required reading by anyone responsible for transport compliance in your organization.

About the Author: Neil McCulloch is senior manager, International Product Development for Labelmaster, which provides dangerous goods and product regulatory support to customers worldwide. McCulloch may be reached via email at nmcculloch@labelmaster.com. More information on shipping DG compliantly is available at www.labelmaster.com or by calling 800.621.5808.

Professional/Product Directory

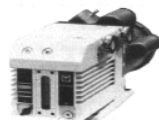
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