



## **THIS MONTH IN CHEMICAL HISTORY**

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

Here's a piece of publishing history you may be unaware of. A long time ago (over 30 years) I began contributing a column on history of chemistry to SCALACS, the Journal of the Southern California and San Geronio Sections of the ACS. (Many of those early columns are collected in a volume pretentiously titled "A Chemical Chrestomathy" that is available on-line from Amazon). Some of my columns were also published on-line by the ACS in a scrap-book feature.

A few years ago your Editor requested my permission to also publish my column in "The Indicator", the Journal of the New York and North Jersey Sections of the ACS. I have been for a while a bi-coastal essayist. The reason why I have seen fit to make this disclosure now is that a few weeks ago a colleague of mine was cleaning out his garage and came across the March 1955 issue of "The Indicator" (Vol. XXXVI No.3). I will share some of the contents of this piece of chemical history with you this month.

The cover story of this issue is the award of the 1955 William H. Nichols medal to Wendell Mitchell Latimer. Latimer was to be honored at a dinner at the Hotel New Yorker (tickets at \$8.00). Latimer was being recognized for his pioneering studies on the thermodynamics of electrolytes, especially the entropies of ions in aqueous solutions. He had a distinguished career at U.C. Berkeley, earning his Ph.D. in 1919. He became full professor in 1931; served as Dean of the College of Chemistry from 1941 – 1949; and Chair of the Department of Chemistry from 1945 – 1949. He was elected to the National Academy of Sciences and received a Presidential Certificate of Merit for contributions during World War II.

Latimer made many important contributions to chemistry. Perhaps the most important, in retrospect, is his recognition of the hydrogen bond in a paper he wrote with a colleague, W. H. Rodebush, in 1920. His over 100 publications were mostly on thermodynamics, but his diverse interests included dielectric constants; geochemistry; thermoelectricity; and radioactivity. He was the first U.S. scientist to liquefy hydrogen, and explored physical chemistry at low temperatures. He authored the influential monograph on "The Oxidation States of the Elements and their Potentials in Aqueous Solutions" published in 1938 and in a revised edition in 1952. He also co-authored a general chemistry text with Bray, and a reference book of inorganic chemistry with Hildebrand.

In the 1930s Latimer started a seminar at Berkeley on nuclear chemistry that attracted attendees including Libby, Seaborg and Wahl. During World War II from 1943 – 1947 he was a director of a Manhattan Project group working at Berkeley on the chemistry of the recently discovered plutonium in which oxidation potentials played an important role.

The Nichols medal was an appropriate additional recognition of Latimer's contributions to chemistry. Prior to 1955 the medal had been awarded to, among others, Nieuwland, Midgley, Baekeland, Seaborg, and Pauling. (Each of these scientists deserves a column – who knows?)

Sadly Latimer died only a few months after receiving this award in July 1955.

I will conclude my reportage on this interesting copy of "The Indicator" in a future column, but let me close this month with a glance at some of the advertisements. Baker and Company are offering a new booklet on platinum metal catalysts for use in manufacture of industrial chemicals and pharmaceuticals. Whatman is offering filter papers (what else?). BIOS labs. has over 5100 chemicals to offer. U.S. Stoneware has introduced Tygon tubing. Fisher scientific has a new method of packaging small quantities of reagents: the Gram-Pac. Owens-Illinois offers accurate Kimble thermometers and hydrometers. My favorite advertisement in this issue is the offer by Harshaw Scientific of a new device, the Rinco Rotating Vacuum-type Evaporator (patent applied for) at the affordable price of \$96.50 (you supply the glassware and the vacuum pump).

**THE INDICATOR****Manager / Editor** - LINDA ATKINS139 Hudson Avenue, 1st Floor, Totowa, NJ 07512  
973-981-4383[indicator.linda@gmail.com](mailto:indicator.linda@gmail.com)**Acting Advertising Manager****DR. NEIL JESPERSEN**Chemistry Dept., St. John's University  
8000 Utopia Parkway, Queens, NY 11439  
718-990-5221[njespersn@stjohns.edu](mailto:njespersn@stjohns.edu)**INDICATOR COMMITTEE****Chair, DR. LES MCQUIRE**17 Crown Drive, Warren, NJ 07059  
908-334-5473[Les@LesMcQuire.org](mailto:Les@LesMcQuire.org)**New York Section Rep.****DR. NEIL JESPERSEN**Chemistry Dept., St. John's University  
8000 Utopia Parkway, Queens, NY 11439  
718-990-5221[njespersn@stjohns.edu](mailto:njespersn@stjohns.edu)**North Jersey Section Rep.****JACQUELINE ERICKSON**GSK, 184 Liberty Corner Rd., Warren, NJ 07059  
973-713-8303[jacqueline.a.erickson@gsk.com](mailto:jacqueline.a.erickson@gsk.com)**Web Masters****NY Section - DR. BRIAN R. GIBNEY**[postmaster@newyorkacs.org](mailto:postmaster@newyorkacs.org)**NoJ Section - PAUL TUKEY**[ptukey@njacs.org](mailto:ptukey@njacs.org)**NEW YORK SECTION**

Marilyn Jespersen, Office Administrator

<http://newyorkacs.org>**Chair, DR. JOSEPH M. SERAFIN**Dept. of Chemistry, St. John's University  
8000 Utopia Parkway, Queens, NY 11439  
718-990-5226 • [serafinj@stjohns.edu](mailto:serafinj@stjohns.edu)**Chair-Elect, DR. JUSTYNA WIDERA-****KALINOWSKA**Dept. of Chemistry, Adelphi University  
1 South Street, Garden City, NY 11530  
516-877-4135 • [widera@adelphi.edu](mailto:widera@adelphi.edu)**Secretary, DR. DANIEL AMARANTE**Division of Natural Sciences, College of Mount  
Saint Vincent, 6301 Riverdale Avenue,  
Riverdale, NY 10471 • 718-405-3389[daniel.amarante@mountsaintvincent.edu](mailto:daniel.amarante@mountsaintvincent.edu)**Section Office**St. John's University, Chemistry Dept.  
8000 Utopia Parkway, Queens, NY 11439  
516-883-7510; Fax 516-883-4003[njesper1@optonline.net](mailto:njesper1@optonline.net)**NORTH JERSEY SECTION**<http://www.njacs.org>**Chair, DR. MIRIAM GULOTTA**1 Parkside Terrace, Apt. 2D, Woodland Park, NJ  
07424-2750973-345-7111 • [mgulotta@njacs.org](mailto:mgulotta@njacs.org)**Chair-Elect, DR. AMJAD ALI**Senior Principal Scientist, Merck and Co. Inc.  
2000 Galloping Hill Road, Kenilworth, NJ 07033  
908-740 3407 • [amjad\\_ali@merck.com](mailto:amjad_ali@merck.com)**Secretary, BETTYANN HOWSON**49 Pippins Way, Morris Township, NJ 07960  
973-822-2575 • [chemphun@gmail.com](mailto:chemphun@gmail.com)**Section Office**49 Pippins Way, Morris Township, NJ 07960  
973-822-2575 • [chemphun@gmail.com](mailto:chemphun@gmail.com)**THE Indicator** The monthly newsletter of the New York & North  
Jersey Sections of the American Chemical  
Society. Published jointly by the two sections.**CONTENTS**

Advertisers' Index . . . . .	4
Call for Applications . . . . .	32
Call for Nominations . . . . .	31
Call for Volunteers . . . . .	32
Education . . . . .	28
In the News . . . . .	33
New York Meetings . . . . .	8-19
New York Section-Wide Conference . . . . .	7
North Jersey Meetings . . . . .	25

**EDITORIAL DEADLINES**

January 2019	November 28, 2018
February 2019	December 28, 2018
March	January 28, 2019
April	February 28
May	March 28
June	April 28
September	July 28
October	August 28
November	September 28
December	October 28

**Visit Us**[www.TheIndicator.org](http://www.TheIndicator.org)

*The Indicator* (ISSN0019-6924) is published on-line monthly except July and August by the New York and North Jersey Sections of the American Chemical Society, Office of Publication, 139 Hudson Avenue, 1st Floor, Totowa, NJ 07512.

All views expressed are those of the editor and contributors and do not necessarily represent the official position of the New York and North Jersey Sections of the American Chemical Society unless so stated. Distributed electronically to members through the website [www.TheIndicator.org](http://www.TheIndicator.org). Non-members are invited to read it online. Members should register their email addresses at [www.acs.org/editmyprofile](http://www.acs.org/editmyprofile).

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

---

## December Calendar

---

### NEW YORK SECTION

**Tuesday, December 4, 2018**

Chemical Marketing & Economics Group  
See pages 8-16.

**Tuesday, December 4, 2018**

Biochemical Topical Group  
See page 17.

**Wednesday, December 5, 2018**

NY Section Society for Applied Spectroscopy  
See pages 17-18.

**Thursday, December 6, 2018**

Westchester Chemical Society  
See pages 18-19.

**Thursday, December 6, 2018**

Long Island Subsection - Holiday Seminar  
See page 19.

*also*

**Saturday, January 19, 2019**

NY Section-Wide Conference  
See page 7.

**Friday, February 15, 2019**

Board of Directors Meeting  
See page 8.

**Tuesday, February 19, 2019**

Biochemical Topical Group  
See page 20.

**Wednesday, February 20, 2019**

Organic Topical Group  
See page 21.

**Friday, April 12, 2019**

Nichols Symposium and Dinner  
See page 8.

**Friday, March 15, 2019**

**Friday, June 7, 2019**

**Friday, September 13, 2019**

**Friday, November 15, 2019**

Board of Directors Meetings  
See page 8.



### NORTH JERSEY SECTION

**Monday, December 10, 2018**

North Jersey Executive Meeting  
See page 25.

---

## Ad Index

---

Eastern Scientific .....	21
Micron .....	8
Robertson .....	24
Rutgers University - Newark.....	28

**Deadline for items to be included in  
the January 2019 issue of  
*The Indicator* is**

**November 28, 2018**

***The Indicator* is posted to the  
web around the 15th of the  
previous month at**

**[www.TheIndicator.org](http://www.TheIndicator.org)**

---

## New York Section's 2019 Chair's Message

---

Dear Members:

I would like to express my sincere gratitude to the New York Section of the American Chemical Society for electing me as the 2019 Chair. I am deeply honored to be given a chance to serve all of the members of the New York Section of the American Chemical Society. I view this as an opportunity to share, with others, my love, passion and experience with chemistry.

On behalf of the New York Section of the American Chemical Society, I would like to thank all of the volunteers for their service! As a volunteer organization, we are only as strong as our volunteers make us, and only as successful as we allow our volunteers to be. Thanks to our dedicated and enthusiastic members, the NY Section provides public outreach services to promote the professional development of our members, to increase scientific literacy among regular citizens and to develop a next generation of professionals who are knowledgeable and passionate about chemistry.

The United Nations proclaims 2019 as the International Year of the Periodic Table of Chemical Elements (2019 IYPT). The International Year of the Periodic Table of Chemical Elements in 2019 will coincide with the 150th anniversary of the discovery of the Periodic system by Dmitry Mendeleev in 1869. It is a unique tool enabling scientists to predict the appearance and properties of matter on Earth and in the Universe. The development of the Periodic Table of the Elements is one of the most significant achievements in science with broad scientific implications in Chemistry and other areas of science such as: Astronomy, Physics, Biology, etc. The events presented by the NY ACS will enhance the understanding and appreciation of the Periodic Table and chemistry among the public.

Some of the premier events by the New York Section for 2019 include:

- January 19th – Sectionwide Conference at Queensborough Community College (QCC). There will be a keynote presentation by Monona Rossol M.S., M.F.A., Industrial Hygienist, and the NY Section's committees will hold planning sessions for the year. All are welcome and those interested in volunteering are encouraged to attend.
- April 12th – William H. Nichols Distinguished Symposium and Medal Award Dinner (White Plains, NY). The 2019 medalist is Dr. Vickie Grassian from the University of California San Diego, and the theme is *"Interfacial and Multiphase Chemistry Relevant to the Environment."*

In addition, to promote and celebrate the significance of the Periodic table of elements and its applications to society, during 2019, a wide variety of truly amazing events will be held, sponsored by the various Topical Groups, Subsections and Committees such as Chemists Celebrate Earth Day's walk, Chemagination, High School Teachers' "Demo Derby", National Chemistry Week celebrations, Chemical Marketing and Economics' Leadership Awards, and the Sustainability Symposium to name just a few of the events.

It is critical that the brightest young minds continue to be attracted to chemistry in order to ensure the next generation of scientists, engineers and innovators in this field that will carry on the development of the Periodic Table journey.

I encourage our members to stay in touch with the NY ACS in various ways:

- regularly visit the New York Section website for information about upcoming events. The website address is [NewYorkACS.org](http://NewYorkACS.org).
- add the New York Section to your Facebook account to receive regular updates as well as multimedia presentations of past events
- continue to read *The Indicator* for more information about the Section
- please consider attending a meeting of a Topical Group, Subsection, or Committee or at least review their activities in the annual reports to see if you may be interested in what they do or if you can offer a new perspective
- think about some new ways the New York Section can better serve you and let us know your ideas.

The key to the future success of the Section is the creation of the sense of inclusive atmosphere. We will welcome everybody who would like to participate in the ACS events: chemists, chemical educators, chemistry students and non-chemists as well. We will solicit new ideas and opinions from all of these groups on how to improve our service to our current members and the next generation of potential members. We will try to train the new ACS leaders by allowing students to be a part of the boards of the local subsections, in order for them to learn from the current more mature and experienced leading members.

I would like to thank, again, the New York Section of ACS for this opportunity and I look forward to continuing to work with the entire NY Section membership to make our section even more vibrant and exemplary nationwide for the next generations.

Please feel free to contact me at [widera@adelphi.edu](mailto:widera@adelphi.edu) with any thoughts, ideas, or suggestions for the Section or if you are looking for service opportunities.

Sincerely,

Justyna Widera-Kalinowska, 2019 Chair of the New York Section

[www.newyorkacs.org](http://www.newyorkacs.org) • Email: [Chair2019@newyorkacs.org](mailto:Chair2019@newyorkacs.org)

# To All Potential Advertisers

*The Indicator* is actively seeking new advertisers from academia, industry, suppliers and service groups.

Effective with the January 2019 issue our new rates, which we believe you will find both attractive and competitive, will apply.

For a copy of our new rate sheet and reply form, please e-mail the editor at [indicator.linda@gmail.com](mailto:indicator.linda@gmail.com).

To advertise in the **January 2019** issue, the deadline for e-mailing both your reply form and your high res (300 dpi) ad, in either jpeg, tiff, or pdf format, is **November 28, 2018**.

## AMERICAN CHEMICAL SOCIETY'S NEW YORK SECTION 2019 SECTION-WIDE CONFERENCE



### PLEASE REGISTER AT

<http://www.newyorkacs.org/meetings/sectionwide/sectionwide2019.php>

**Date:** SATURDAY, JANUARY 19, 2019 **FREE TO ALL**  
**Times:** 9:30AM – 1:00PM  
**Place:** CUNY - QUEENSBOROUGH COMMUNITY COLLEGE, NY – OAKLAND ROOM  
 222-05 56th Avenue, Bayside, NY 11364  
**Directions to QCC:** <http://www.qcc.cuny.edu/about/getting-here.html>  
**Campus Map:** <http://www.qcc.cuny.edu/about/campus-map.html>

### PROGRAM

- 9:30 AM **ARRIVAL AND REFRESHMENTS.**
- 10:00 AM **GREETINGS FROM THE ACS NEW YORK SECTION 2019 CHAIR** **Dr. Justyna Widera-Kalinowska**  
Adelphi University
- 10:10 AM **AWARD PRESENTATIONS.**  
 Service Plaque and Pin to the 2018 New York Section Chair **Dr. Joseph M. Serafin**  
St. John's University  
 New York Section Outstanding Service Award for 2018 **Dr. Paul Sideris**  
CUNY - Queensborough  
Community College  
 Nichols Foundation H.S. Chemistry Teacher Award for 2018 **Dr. Stephanie O'Brien**  
Commack High School
- 10:30 AM **PRESENTATION OF CANDIDATES FOR THE 2019 ELECTIONS.** **Dr. Ruben M. Savizky**  
2019 Chair Elect, ACS New York Section  
The Cooper Union
- 10:45 AM **KEYNOTE SPEAKER: MONONA ROSSOL M.S., M.F.A., INDUSTRIAL HYGIENIST, PRESIDENT: ARTS, CRAFTS & THEATER SAFETY, INC.**  
**"Chemical Safety Issues in the Film Industry," Chemists Are Needed EVERYWHERE: Especially in the Entertainment Industry.**  
 People in theater, film and television work with chemicals every day. As a child, Monona worked in variety entertainment (Vaudeville), and saw chemicals used in magic acts that caused things to flash into flame, disappear or change color. Today she deals with chemicals ranging from those used to paint faces (makeup) or to paint scenery, to explosive chemicals used to blow up cars. The program will start with a short video showing how pyrotechnic chemicals are used to simulate bullets hitting walls or people and then she'll discuss a host of other chemical issues in the entertainment industry.
- 11:45 AM **COFFEE BREAK.** There will be poster presentations by the New York Section Project SEED Students.
- 12:00 PM **ACS, NEW YORK SECTION COMMITTEE PLANNING SESSIONS FOR 2019.**  
**Educational Activities:** (Chemagination, Chemists Celebrate Earth Day, Continuing Education, High School Chemistry Olympiad, National Chemistry Week, Nichols Foundation Teacher Award, Project SEED, Student Membership)  
*Chair:* Dr. Alison G. Hyslop  
**Member Affairs:** (ACS Fellows, Awards, Employment and Professional Relations, History of the New York Section, *Indicator*, Membership, Outstanding Service Award)  
*Chairs:* Dr. Ralph Stephani and Dr. Joseph Serafin  
**Program Review:** (Subsection and Topical Discussion Group Chairs)  
*Chair:* Dr. Anne T. O'Brien  
**Public Affairs:** (Academe and Industrial Relations, Environmental Chemistry, Fund Raising, Government Affairs, Information Technology, Public Relations, Speakers Bureau)  
*Chair:* Dr. Robert P. Nolan
- 12:45 PM **REPORTS FROM THE CHAIRS OF THE COMMITTEE PLANNING SESSIONS.**
- 1:00 PM **CONCLUSION OF THE MEETING.** Join with colleagues for lunch at a local restaurant.

To inquire about the Section-wide Conference, please call the New York Section Office at (516) 883-7510 or e-mail Marilyn Jespersen, Office Administrator, at: [njesper1@optonline.net](mailto:njesper1@optonline.net).

## New York Meetings

[www.newyorkacs.org](http://www.newyorkacs.org)

### ACS, NEW YORK SECTION BOARD OF DIRECTORS

#### MEETING DATES FOR 2019

The dates for the Board of Directors Meetings of the ACS New York Section for 2019 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](mailto:njesper1@optonline.net) or by calling the Section office at (516) 883-7510.

Dates and locations of the meetings are posted below and on the New York Section website at [www.NewYorkACS.org](http://www.NewYorkACS.org). Prof. Justyna Widera-Kalinowska will chair all meetings. Refreshments will be available starting at 6:00 PM and the board meetings will start at exactly 6:30 PM.

The Board Meeting dates and locations for 2019 are:

**Friday, January 19, 2019 (Section Wide Conference), Queensborough Community College, NY**

Friday, February 15, 2019 (Electronic Board of Directors Meeting), Adelphi University, NY

Friday, March 8, 2019 (Board of Directors Meeting), Adelphi University, NY

Friday, April 12, 2019 (Nichols Symposium and Dinner), Crowne Plaza, White Plains, NY)

Friday, June 7, 2019 (Board of Directors Meeting), St. Johns University, NY

Friday, September 13, 2019 (Board of Directors Meeting), Adelphi University, NY

Friday, November 15, 2019 (Board of Directors Meeting), Adelphi University, NY

More information will be posted in future monthly issues of *The Indicator* and on the New York website at <http://www.NewYorkACS.org>

#### St. John's University

8000 Utopia Parkway, Queens, NY

#### Directions

<https://www.stjohns.edu/campuses/queens-campus/directions>

#### Adelphi University

1 South Avenue, Garden City, NY 11530

#### Directions

<https://visit.adelphi.edu/travel-info/directions/>



### CHEMICAL MARKETING & ECONOMICS GROUP

#### 2018 Leadership Awards

**Date: Tuesday, December 4, 2018**

*(See flyers on pages 9-16 for all details.)*



## Micron Analytical Services

**COMPLETE MATERIALS CHARACTERIZATION  
MORPHOLOGY CHEMISTRY STRUCTURE**

**SEM/EDXA • EPA/WDXA • XRD XRF • ESCA • AUGER • FTIR • DSC/TGA**

Registered with FDA • DEA GMP/GLP Compliant

3815 Lancaster Pike Wilmington DE, 19805

E-Mail [micronanalytical@compuserve.com](mailto:micronanalytical@compuserve.com)

Voice 302-998-1184, Fax 302-998-1836

Web Page: [www.micronanalytical.com](http://www.micronanalytical.com)



2018  
LEADERSHIP  
*Awards™*



**Corporate  
Reinvention**

**Edward  
Breen**

DowDuPont CEO  
and advisory board  
member of New  
Mountain Capital.



**Lifetime  
Achievement**

**Henry  
Kravis**

KKR Co-Founder,  
Co-Chairman, Co-  
CEO. The Business  
Council Chairman.



**STEM  
Philanthropy**

**James  
Simons**

Simons Foundation  
Chairman. Founder  
of Renaissance  
Technologies.

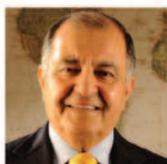


**STEM  
Philanthropy**

**Marilyn  
Simons**

Simons Foundation  
President. Cold  
Spring Harbor  
Laboratory Board VP.

December 4, 2018 • 11:30 am – 2:30 pm • Metropolitan Club • [www.cmeacs.org](http://www.cmeacs.org)



**Event Co-Chair**

**Seifi  
Ghasemi**

Air Products  
Chairman, President  
and CEO.



**Event Co-Chair**

**Jim  
Fitterling**

The Dow Chemical  
Company CEO-Elect  
and COO.



December 4, 2018  
11:30 am – 2:30 pm

Metropolitan Club  
1 E 60th St, New  
York, NY 10022

Schedule

11:30 am - 12:00 pm  
Registration  
12 pm - 1 pm  
Luncheon  
1 pm - 2:30 pm  
Awards Presentation

[info@cmeacs.org](mailto:info@cmeacs.org)

ACS NY

ACS was founded in New York City in 1876, and the New York Section was the first to give a National Prize. Since 1903, the prestigious Nichols Award has been given to 110 scientists, 16 went on to receive a Nobel Prize.

[WWW.CMEACS.ORG](http://WWW.CMEACS.ORG)



PROGRAM

REGISTRATION

LUNCHEON

INTRODUCTION

ACS CEO – Thomas Connelly

Event Co-Chair – Jim Fitterling

MUSICAL INTERLUDE

Performer – Ava Della Pietra

AWARDS PRESENTATION

CME Host – George Rodriguez

Corporate Reinvention – Edward Breen

STEM Philanthropy – Marilyn & James Simons

Event Co-Chair – Seif Ghasemi

Lifetime Achievement – Henry Kravis

CLOSING REMARKS

CME Co-Chair – Adam Closson

ANNUAL STEM AWARDS

Inspiring leadership has been the hallmark of the Chemical Marketing and Economic Group (CME) of ACS NY, a topical group founded in 1954. Established in 2012, the Leadership Awards™ are the highest honors given by CME to leaders of industry, investments, and other sectors, for their contributions to science, technology, engineering and mathematics initiatives.

CME organizes monthly luncheons and webcasts in Manhattan where industry leaders present cutting-edge outlooks on energy, materials & life science.

Founded in 1876 and Chartered by the U.S. Congress, ACS is the world's largest scientific society with 158,000 members. This ACS ChemLuminary award-winning event is a fundraiser to help advance STEM programs.

CELEBRATE TODAY'S LEADERS - ENABLE THOSE OF TOMORROW



## PAST HONOREES

2017

David Skorton  
SmithsonianChris Pappas  
TrinseoJohn Kellest  
Shionogi Inc.Roque Benavides  
Buenaventura

2016

Len Blavatnik  
Access IndustriesJP Clamadieu  
SolvayDavid Cote  
HoneywellCharles Bolden  
NASA

2015

Roy Vagelos  
Regeneron/MerckEnk Fyrwald  
UnivarScott Wolff  
American  
SecuritiesTracy Day and  
Brian Green WFS

WWW.CMEACS.ORG




## STEM BUSINESS &amp; INNOVATION

## CORPORATE REINVENTION



**Edward Breen** – CEO of DowDuPont. Key architect of the largest merger in the chemical industry. He became the chair of the board and CEO of DuPont on Nov. 9, 2015. He joined the DuPont Board of directors in Feb. 2015. He served as chairman and CEO of Tyco International from 2002 until 2012. He transformed Tyco into a strong market leader, reviving the company from near bankruptcy and overseeing successful spin-offs including Covidien and ADT. He worked at Motorola from 2000 to 2002, including as president and COO leading the company back to profitability. From 1994 to 2000, he held senior positions at General Instrument. He serves as a director of Comcast and in the advisory board of New Mountain Capital. Ethisphere named him one of the "100 Most Influential People in Business Ethics."

## LIFETIME ACHIEVEMENT



**Henry Kravis** – Co-founded KKR in 1976 and is KKR Co-Chairman and Co-Chief Executive Officer. He serves on the boards of First Data Corporation and ICONIQ Capital, LLC. He also serves as a director, chairman emeritus or trustee of several cultural, professional, and educational institutions, including The Business Council, Columbia Business School, Mount Sinai Hospital, Partnership Fund for New York City, Rockefeller University, Sponsors for Educational Opportunity and Tsinghua University School of Economics. He earned a B.A. from Claremont McKenna College in 1967 and an M.B.A. from the Columbia Business School in 1969. He has vast experience financing, analyzing, and investing in public and private companies, as well as serving on the boards of a number of KKR portfolio companies.

CELEBRATE TODAY'S LEADERS

ACS NY Section  
**CME**

2014

Andrew Liveris  
 Dow Chemical  
 Thomas Connelly  
 DuPont  
 Thomas Kirchlner  
 OEP/JPMorgan  
 Chase  
 Anna Powers  
 NYU

2013

Jon M. Huntsman  
 Huntsman Corp.  
 Fernando Musa  
 Braskem  
 Peter and David  
 DeLeeuw  
 Lion Chemical  
 Partners

2012

Peter McCausland  
 Airgas  
 Juan Pablo  
 del Valle  
 Mexichem  
 John Televantos  
 Arsenal Capital  
 Partners  
 Chris Hillenbrand  
 Regis High School

WWW.CMEACS.ORG

LEADERSHIP  
*Awards*<sup>TM</sup>

ACS  
 Chemistry for Life®

#### STEM PHILANTHROPY



**Marilyn Hawrys Simons** - President of the Simons Foundation, one of the country's leading private funders of basic scientific research. She has more than 25 years of experience actively supporting nonprofit organizations in New York City and Long Island. She has been involved in K-12 education for underserved communities. Simons is vice president of the board of Cold Spring Harbor Laboratory, an outstanding U.S. research facility specializing in molecular biology and genetics, and a board member of the Turkana Basin Institute that supports projects in Kenya, the LearningSpring School which helps autistic children and the East Harlem Scholars Academy in New York City. Simons received a B.A. and Ph.D. in economics from The State University of New York at Stony Brook.



**James Simons** - Simons Foundation Chairman and board chair and founder of Renaissance Technologies. Prior to his financial career, Simons was chairman of the mathematics department at Stony Brook University, taught mathematics at MIT and Harvard, and was a cryptanalyst at the Institute for Defense Analyses in Princeton, New Jersey. He holds a B.S. from MIT and a Ph.D. from the University of California, Berkeley. In 1976, he won the Veblen Prize of the American Mathematics Society for his work in geometry. He is a trustee of the Stony Brook Foundation, Rockefeller University, MIT, Brookhaven National Laboratory, the Mathematical Sciences Research Institute, New York Genome Center and the Institute for Advanced Study, and is a member of the National Academy of Sciences, the American Academy of Arts and Sciences and the American Philosophical Society.

ENABLE THOSE OF TOMORROW

ACS NY Section  
**CME**

ACS FOR LIFE

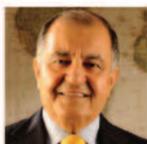
Public Outreach  
Elementary/Middle High School  
High School  
Community College  
Undergraduate  
Graduate  
Young Professionals  
Professionals  
Educators

ACS STEM  
RESOURCES

American Association of  
Chemistry Teachers  
ACS Scholars  
K-12 Chemistry  
Festivals  
K-12 National Chemistry  
Week  
9-12 SEED Summer  
Internships  
International Chemistry  
Olympiads  
CME STEM Student  
Business Luncheons

WWW.CMEACS.ORG

EVENT SPEAKERS



**Air Products Chairman, President & CEO**

**Seifi Ghasemi** – he sets the strategy and policies developing leadership. He is chairman of Versum Materials. He served as chairman and CEO of Rockwood Holdings. He held leadership roles at GKN, and BOC (now part of Linde AG). M.S. degree in mechanical engineering from Stanford University.



**Dow Chemical CEO-Elect and COO**

**Jim Fitterling** – Also, COO for the Materials Science Division of DowDuPont. Recently appointed CEO of the intended Materials Science Company, to be called Dow, upon its separation from DowDuPont. Committed to diversifying the Company's global talent. Board member of NAM, Chemical Financial, and Sadara Chemical. B.S. Mechanical Engineering.



**ACS Executive Director and CEO**

**Thomas M. Connelly, Jr.** – Executive Director and CEO of the American Chemical Society since February 2015. Former DuPont Executive VP, Chief Innovation Officer. Joined DuPont in 1977 and played key roles in Delrin®, Kevlar®, Sorona® and Teflon®. B.S. and Ph.D. in Chemical Engineering.



**CME Past Chair and Host**

**George Rodriguez** – Advisor on growth strategy and innovation. Served at Pfizer, Asahi Glass, Nagase. Creative producer of original events including CME Leadership Awards, ACS NASA Mars Symposium to inspire and help STEM students worldwide. B.S. Chemical Engineering, M.S. Industrial Management.



**CME Co-Chair**

Adam Closson is Research Fellow at IFF focused on the chemical processes and the invention of new fragrance ingredients. Before joining IFF in 2006, he held research fellowships with the US Navy and at Stockholm University after receiving his doctorate at the University of California in San Diego.

CELEBRATE TODAY'S LEADERS

ACS NY Section  
**CME**

#### STEM SUPPORT

ACS Scholars program awards scholarships to minority students. Over 1,500 STEM students have graduated with a bachelor's degree since 1996. 42% went on to graduate school.

CME student leadership development to sharpen communication skills and give views of the broad range of the industries of chemistry

ACS Chemistry Festivals for K-12 students worldwide

Student travel overseas to help the progress of CME ACS activities

Development of tools for teachers and professors

Expansion of ACS International Chapters for STEM student programs

[awards@cmeacs.org](mailto:awards@cmeacs.org)

[WWW.CMEACS.ORG](http://WWW.CMEACS.ORG)

LEADERSHIP  
*Awards*™



#### 2018 AWARDS MUSICAL PERFORMANCE



Ava Della Pietra has performed on Broadway in the original cast of *School of Rock*, as well as national tours of *Les Misérables* and *White Christmas*. She has appeared on the 70th Annual Tony Awards, *Good Morning America*, *Sesame Street*, and *Last Week Tonight with John Oliver*, and has sung the National Anthem at Madison Square Garden in front of 20,000 Knicks fans. A multi-instrumentalist who plays piano, bass, guitar, violin, fiddle, and ukulele, Ava is also an independent recording artist and songwriter who began penning her own songs at age five. She has about 30 written and is gearing up to release her debut EP of original music, including her first single "Rising Star," produced by Brian Malouf.

Did we mention that Ava is 13 years old?

#### CME – DEDICATED TO STEM EDUCATION SINCE 1954



ACS scholars, mentors and sponsors celebrate CME 60 years of service on December 4, 2014.

CELEBRATE TODAY'S LEADERS

ACS NY Section  
**CME**

## PIONEER

Since 1954 CME has:  
Addressed the needs of  
the broad range of  
industries of chemistry.

Organized over 500  
events on the business  
of chemistry.

Became ACS Scholars  
National Partner.

Organized the first ACS  
NASA Journey to Mars  
Symposium

Founded leadership  
awards for chemistry  
stakeholders.

Helped ACS NY receive  
7 distinguished ACS  
ChemLuminary Awards  
(Collaboration, Global  
Engagement and  
Performance).

Supported over 1000  
free student luncheons.

Championed one of the  
first two International  
Chapters of ACS in  
South America.

Helped organize ten  
International Chemistry  
Festivals.

Offered webcasts of  
monthly presentations  
since 2009.

WWW.CMEACS.ORG

LEADERSHIP  
*Awards*™

ACS  
Chemistry for Life®

## FESTIVE. WARM. INSPIRATIONAL.



Juan Pablo del Valle,  
2012 honoree, and family.

Jon Huntsman, 2013 honoree,  
granddaughter Kate and son Paul.

2015 honoree Roy  
Vagelos and wife Diana



Since 2011 CME has helped over 1000 STEM students develop networking and leadership skills.



Sonneborn and Peroxichem executives celebrating the  
Diamond Jubilee of CME Group of ACS New York.



2012 Chemistry Olympiad US Gold  
Medalist Chris Hillenbrand (center left)

ENABLE THOSE OF TOMORROW



## CME Cutting-Edge STEM Programs



ACS NASA Space Symposium • 256th ACS National Meeting

... on August 21 we go to Space!



Advances in  
Human Space Exploration

ACS President Recommends PMSE Symposium - Westin Boston Wft  
Chemistry, Industry Technology & Jobs. info: [www.cmeacs.org](http://www.cmeacs.org)



800 attendees at First ACS Space Symposium in Washington, DC, organized by CME, POLY and NASA.

In association with  
**NASA**

**BIOCHEMICAL TOPICAL  
GROUP – JOINT MEETING WITH  
THE NYAS BIOCHEMICAL  
PHARMACOLOGY DISCUSSION  
GROUP**

**Phagocytes in Health and Disease**

*Organizers:* Dianne Cox, PhD  
Albert Einstein College of  
Medicine

John Hambor, PhD  
Boehringer Ingelheim

Jim King, PhD  
Boehringer Ingelheim

Sara Donnelly, PhD  
The New York Academy  
of Sciences

Sonya Dougal, PhD  
The New York Academy  
of Sciences

*Speakers:* Keynote Speaker  
Miriam Merad, MD, PhD  
Icahn School of Medicine  
at Mount Sinai

Yasmine Belkaid, PhD  
National Institute of Allergy  
and Infectious Diseases

Nina Bhardwaj, MD, PhD  
Icahn School of Medicine  
at Mount Sinai

Marco Colonna, MD  
Washington University  
School of Medicine

Karim el Kasmi, MD, PhD  
Boehringer Ingelheim

Daniel Mucida, PhD  
The Rockefeller University

Carla Rothlin, PhD  
Yale School of Medicine

Richard Zigmund, PhD  
Case Western Reserve  
University

This symposium will bring together leaders in diverse fields of immunology, cancer biology and tissue regeneration to highlight emerging roles for phagocytes in health and disease and develop new conceptual frameworks to integrate macrophage and dendritic cell functions with mammalian development, physiology and tissue biology.

**Date:** Tuesday, December 4, 2018

**Time:** 9:00 AM – 5:00 PM  
(reception to follow)

**Place:** New York Academy of Sciences  
7 World Trade Center  
250 Greenwich Street – 40th Floor  
New York, NY 10007

**Cost:** This event has reduced-rate registration for ACS and NYAS members, at \$60 or \$25 (for students and post-docs). Please select the appropriate non-member Registration Category and use the Priority Code ACS. Non-members may attend for a fee of \$160 (corporate), \$105 (non-profit or academic) or \$70 (students and post-docs).

For more information and to register for the event, go to: [www.nyas.org/phagocytes2018](http://www.nyas.org/phagocytes2018)

To become a Member of the Academy, visit [www.nyas.org/benefits](http://www.nyas.org/benefits)



**NEW YORK SECTION –  
SOCIETY FOR APPLIED  
SPECTROSCOPY**



**New York SAS Section Announces the  
Forthcoming Meetings**

The New York/New Jersey section of the Society for Applied Spectroscopy is pleased to announce the new meeting schedule coinciding with the next academic year, which began in September 2018. The following speakers will be presenting their work, as well as others for future meetings:

**Wednesday, December 5, 2018** – Curtis Marcott, Ph.D - Special Tour Speaker Meeting. Title: “Perspectives on the Future of IR Spectroscopy: IR beyond the diffraction limit at submicron and nanoscale spatial resolutions via photothermal techniques”

Due to the required lead times for publication, we have to make this announcement before we have all the details of the meetings arranged. Everyone interested in attending a meeting will find the meeting details posted on the NYSAS website: [www.nysas.org](http://www.nysas.org) as soon as they become available. Please consult the website regularly for updates about the meeting details, as well as possible changes and information.

(continued on page 18)

## NEW YORK SECTION — SOCIETY FOR APPLIED SPECTROSCOPY

(continued from page 17)

about future meetings. If you plan to attend a meeting, please email the NY/NJ SAS secretary at [debperu@outlook.com](mailto:debperu@outlook.com) beforehand so we can make arrangements for the expected number of people. Your name will also then be added to our e-mail list for future meeting announcements unless you request to not be added.



## WESTCHESTER CHEMICAL SOCIETY

**Special Seminar – “Mitochondrial Reactive Oxygen Species Non-Toxic Integrative Anticancer Therapy Option for Solid Tumors Unresponsive to Traditional Therapy: Palladium/Lipoic Acid Complex”**

*Speaker:* Edward J. Neren  
Biomedical/Pharmaceutical  
Consultant/Contractor  
Neren & Co. / NerenPossible  
Services  
3 Belvedere Path  
Suffern, NY 10901



### Background:

Metal compounds (Platinum, etc.) have been investigated as potential cancer therapies; however, patient toxicity resulted. ROS (superoxide, hydrogen peroxide, hydroxyl ions) have

also been investigated. Dr. M. Garnett (1960-1990) encapsulated palladium in alpha lipoic acid and it was found to be non-toxic in treating mouse, cat, and dog tumors. Dr. R. Falk (1992) determined human safety and found patient improvement/remissions in gravely advanced cancer cases. Since then, more than 200 U.S. physicians have used the Palladium/Lipoic Acid Complex (PdLAC = PolyMVA) and Coenzyme Q10 (COQ10), as an integrative late stage cancer therapy.

**Objective:** To provide a non-toxic integrative therapy option and mechanism for physician monitored late stage cancer

patients to determine if the PdLAC/CoQ10 is appropriate for the given patient.

**Methodology:** Cell line studies (NCI protocol apoptosis/48 hours: Brain [Glioblastoma/35.8%, Astrocytoma/38.3%], Lung [Non-Small Cell Carcinoma/37.5%], Breast [Adenocarcinoma/41.4%], Prostate [DU-145/22.7%]) were conducted by Calvert Laboratories. The PdLAC/CoQ10 is administered orally. PdLAC (water/Fat soluble) impacts both cancer and normal cells. CoQ10 (Ubiquinol) dose is four 100mg soft-gels/day. PdLAC dose is 8-12 teaspoons (in juice) 4-times/day based on patient body weight (1-teaspoon/30 pounds). Positive clinical response (tumor growth [slowed/stopped/reduced] and improved patient energy/quality of life) is expected within three months. Patient progress is monitored with traditional clinical chemistries, tumor markers, and imaging. This therapy seeks a balance between therapy, nutrition, detoxification and energy enhancement.

**Mechanism:** The PdLAC enters cancer/normal cells and the mitochondrial outer membrane at the voltage dependent anion channel, and then through the inner membrane at the Complex 1. In cancer cells, the oxidative phosphorylation channel (OXPHOSC) produces low levels of adenosine triphosphate (ATP) due to deficient CoQ10. The deficient CoQ10 results in the PdLAC donating electrons generating excessive ROS.

In cancer cells (damaged OXPHOSC); excessive ROS builds up between the outer and inner mitochondrial membranes. When the outer membrane ruptures, ROS, Cytochrome C, and the Procaspases 2, 3, and 9 enter the cancer cell and anaerobic cytoplasm and apoptosis occurs. In normal cells, PdLAC (acting as an electrical shunt) donates electrons to the OXPHOSC producing more ATP/patient energy.

**Results:** James Forsythe, MD/HMD (2004-2012) conducted clinical outcome studies (500 Stage IV patients/5-year survival 33%). He reported improvement in quality of life issues directly proportional to overall response rate and that stable disease can be tolerated/transformed into a chronic livable condition.

**Conclusion:** Scientific and clinical documentation provides evidence that a non-toxic adjuvant integrative nutritional therapy option for advanced (Brain/Lung/Breast/Prostate) cancer patients, when tra-

ditional therapies are exhausted. Physician referrals to physicians with PdLAC/CoQ10 clinical experience are justified to determine if this therapy/monitoring is appropriate for a given patient. This therapy is not intended to circumvent traditional therapies, is administered orally as a nutritional (not a “drug or cure”), prescription is not required, 3-month cost \$3000, positive results within three months, is within good medical practice/medical ethics/FDA guidelines, and should meet physician/hospital/hospice legal obligations. The PdLAC/CoQ10 proposed mechanism focuses on the creation of excessive ROS acting as a natural chemotherapy/anti-cancer agent when entering the cancer cell anaerobic cytoplasm. PdLAC/CoQ10 represents an application of mitochondrial medicine, with the potential of a patient tolerated stable/chronic livable disease condition. A PdLAC cell line study correlation with adult cell line studies warrants a protocol development adapting the adult therapy dosage to children’s solid tumors (relapsed neuroblastomas/carcinomas/sarcomas/glioblastomas). This presentation provides a documented understanding and real option for end stage solid tumor patients who have been told by their oncologist:

1. That they have 3-6 months to get their affairs in order
2. That traditional therapy has now been exhausted;
3. That they will no longer return to this office and are given the name of a palliative care physician that will provide future needed care.

The speaker can provide contact information to palliative care physicians who will provide future needed care.

**This presentation** is based on Mr. Neren’s presentation at the UMDF Mitochondrial Medicine 2018 Symposium, Nashville, TN, June 27-30, 2018 (“Mitochondrial Reactive Oxygen Species (ROS) as a Non-Toxic Adjuvant Integrative Anticancer Therapy Option for Adult Stage IV Solid Tumor Patients (Brain, Lung, Breast, and Prostate) When Traditional Therapy Options Have Been Exhausted: Palladium/Lipoic Acid Complex and Coenzyme Q10 Impacting the ROS Production and Apoptosis”). It was presented in memory of Bernard Statland, M.D., Ph.D., J.D. (1942-2004).

**Biography:** Mr. Edward J. Neren received his B.S. from Temple University, Philadelphia, PA. He was a Research

Associate in the Department of Biochemistry at the Temple University School of Medicine and in the Department of Hematology at the Temple University Hospital. He subsequently worked at the Technicon Instruments Corp. (now Siemens Healthineers), the BMC Corporation, the Garnett McKean Laboratories and the American Association for Clinical Chemistry (AACC). In 2008, he became president of Balneology Products, Inc. He also founded Neren & Co./Neren Possible Services, to which he currently devotes his time. His contact information is:

- Phone: 1-845-357-6039
- E-Mail: [eneren@optonline.net](mailto:eneren@optonline.net)

**Date:** Thursday, December 6, 2018

Times: Refreshments - 5:30 PM

Lecture - 6:00 PM

Place: Westchester Community College  
Gateway Building Room 110  
75 Grasslands Road  
Valhalla, NY 10595

Cost: Free and Opened to the Public

For further information: contact Paul Dillon  
E-Mail [PaulWDillon2@hotmail.com](mailto:PaulWDillon2@hotmail.com)  
Phone 1-914-393-6940.



## LONG ISLAND SUBSECTION

### 2018 Holiday Seminar — “The History and Chemistry Associated with the Use of Lethal Gas Weapons During World War I”

*Speaker:* Professor Paris Svoronos  
Chemistry Department  
Queensborough Community  
College  
Queens, NY

**Abstract:** The use of lethal gas during World War I (1914-1918) was the first case in history where a massive scale of this weapon was employed. The historical sequence as well as the description of the biological effect of the most commonly used gases during this war will be described.

**Date:** Thursday, December 6, 2018

Time: 6:00 PM – 8:00 PM

Place: Nassau Community College  
CCB Room 251/252  
Uniondale, NY

## 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](mailto:hessytaft@hotmail.com).

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



## BIOCHEMICAL TOPICAL GROUP – JOINT MEETING WITH THE NYAS BIOCHEMICAL PHARMACOLOGY DISCUSSION GROUP

### Extracellular Vesicles in Diagnostics and Therapeutics

*Organizers:* Richard A. Cerione, PhD  
Cornell University  
Jemy A. Gutierrez, PhD  
Pfizer  
Jorge Schettini, PhD  
Pfizer  
Claire Steppan, PhD  
Pfizer  
Gregory Tesz, PhD  
Pfizer  
Theresa Wilson, PhD  
Pfizer  
Alissa Weaver, PhD  
Vanderbilt University School  
of Medicine  
Alison Carley, PhD  
The New York Academy of  
Sciences  
Sonya Dougal, PhD  
The New York Academy of  
Sciences

*Keynote Speaker:* Xandra Breakefield, PhD  
Harvard University

*Speakers:* Elena V. Batrakova, PhD  
University of North Carolina,  
Chapel Hill  
Richard A. Cerione, PhD,  
Cornell University  
David C. Lyden, MD, PhD,  
Weill Cornell Medical College  
Harmeet Malhi, MBBS  
Mayo Clinic  
Susmita Sahoo, PhD  
Icahn School of Medicine at  
Mount Sinai  
Johan Skog, PhD  
Exosome Diagnostics, Inc  
Alissa Weaver, PhD  
Vanderbilt University School of  
Medicine

In this symposium, we will review the most  
recent advances in extracellular vesicles  
(EV) research and their increasing impact  
on diagnostics and drug development for  
cancer, neurodegenerative disease, meta-  
bolic disease, and cardiovascular disease.

**Date:** Tuesday, February 19, 2019

**Time:** 8:30 AM – 5:00 PM (reception to  
follow)

**Place:** The New York Academy of  
Sciences  
7 World Trade Center  
250 Greenwich Street – 40th Floor  
New York, NY 10007

**Cost:** ACS and NYAS members save  
\$50 or more on this event. Please  
select the appropriate non-member  
Registration Category and use the  
Priority Code “ACS”. **The Early  
Bird Discounted Registration  
deadline is January 8, 2019.**

For more information and to register for  
the event, go to: [www.nyas.org/EV2019](http://www.nyas.org/EV2019)

To become a Member of the Academy, visit  
[www.nyas.org/benefits](http://www.nyas.org/benefits)



**ORGANIC TOPICAL GROUP —  
JOINT MEETING WITH THE  
NEW YORK ACADEMY OF  
SCIENCES CHEMICAL BIOLOGY  
DISCUSSION GROUP**

**Phase Separation in Biology and  
Disease**

*Organizers:* Clifford Brangwynne, PhD  
Princeton University  
Jason Imbriglio, PhD  
Merck  
Neal Zondlo, PhD  
University of Delaware  
Sara Donnelly, PhD  
The New York Academy of  
Sciences  
Sonya Dougal, PhD  
The New York Academy of  
Sciences

*Speakers:* Clifford Brangwynne, PhD  
Princeton University  
Zhijian “James” Chen, PhD  
University of Texas,  
Southwestern  
David Cowburn, PhD  
Albert Einstein College of  
Medicine  
Abby Dernburg, PhD  
University of California,  
Berkeley  
Nicolas Fawzi, PhD  
Brown University

Martin Jonikas, PhD  
Princeton University  
Tanja Mittag, PhD  
St. Jude Children’s Research  
Hospital

Rohit Pappu, PhD  
Washington University in  
Saint Louis

Geraldine Seydoux, PhD  
Johns Hopkins University  
School of Medicine

This one-day symposium will bring together scientists from academia and industry to dissect the latest advances in the field of biological phase separation and discuss the implications for human disease.

**Date: Wednesday, February 20, 2019**

**Time:** 8:30 AM – 4:30 PM (reception to follow)

**Place:** The New York Academy of Sciences  
7 World Trade Center  
250 Greenwich Street – 40th Floor  
New York, NY 10007

**Cost:** ACS and NYAS members save \$50 or more on this event. Please select the appropriate non-member Registration Category and use the Priority Code “ACS”. **The Early Bird Discounted Registration deadline is January 11, 2019.**

For more information and to register for the event, go to

[www.nyas.org/PhaseSeparation](http://www.nyas.org/PhaseSeparation)

To become a Member of the Academy, visit [www.nyas.org/benefits](http://www.nyas.org/benefits)



**Eastern Scientific**

[www.easternsci.com](http://www.easternsci.com)

781-826-3456

***Vacuum Pump Problems?***

Eastern Scientific specializes in the repair and precision rebuilding of all makes of mechanical vacuum pumps.

*Free pick-up & delivery  
Restrictions apply*



## WESTCHESTER CHEMICAL SOCIETY

On October 2, 2018 Dr. Joseph W. Krumpfer spoke on "Living in the Polymer World: Polymers and Macromolecules in Our Daily Lives." Dr. Krumpfer is an Assistant Professor of Polymer and Inorganic Chemistry in the Department of Chemistry and Physical Sciences at the Dyson College of Arts and Sciences of Pace University in Pleasantville, NY. He briefly defined what polymers are, how they are made both synthetically and industrially, their unique physical properties and their real-world applications. He then discussed their impacts, which, despite all of the coverage of the negative aspects of polymeric waste, have many important positive contributions. Finally, he discussed ways that these materials can help solve many of the pressing problems facing society and the role of chemists in developing new polymers, and processes, that will enable the benefits of polymers while minimizing their negative environmental impacts.

Dr. Krumpfer received his B.S. in Chemistry at Seton Hall University in South Orange, NJ and his M.S. and Ph.D. in Polymer Science and Engineering at the University of Massachusetts - Amherst. His post-doctoral research in the field of carbon fiber precursor polymers was performed at the Max Planck Institute for Polymer Research in Mainz, Germany where he was awarded an Alexander von Humboldt Post-Doctoral Researcher Fellowship. Currently, he is an assistant professor of Inorganic and Polymer Chemistry at Pace University in Pleasantville, NY. His current research interests include conductive and light-emitting polyquinolines, silicone-inorganic oxide equilibration reactions, and pre-ceramic polymers and materials for high temperature applications. There was lively discussion during and following the talk, which was given at the Westchester Community College in Valhalla, N.Y.

After the talk Dr. Krumpfer and several of the attendees enjoyed a dinner together at a nearby restaurant. The photo below is of Dr. Krumpfer and the other WCS board members who attended the meeting.



Peter Corfield, Joan Laredo-Liddell, Paul Dillon, Joseph Krumpfer, Jean Delfiner and Rolande Hodel

*(Photo courtesy of Paul Dillon)*



## **WESTCHESTER CHEMICAL SOCIETY**

On October 17, 2018 the Westchester Chemical Society (WCS) held a joint seminar with the Manhattan College Chapter of the NY Water Environment Association (MC-NYWEA). A joint meeting had been suggested by Hossain Azam, Ph.D., an Assistant Professor in the Dept. of Civil and Environmental Engineering at Manhattan College and a member of the WCS Board. The seminar was organized by Ms. Megan DiGeronimo, vice-president of the student group of MC-NYWEA, with the help of the WCS co-chair and Program Director, Paul Dillon, Ph.D., Ms. Jamila Thompson, president of the student group of MC-NYWEA, and Dr. Azam. The seminar was entitled "Pharmaceuticals in the Environment: Status and Treatment Alternatives," and was presented by Joseph Cleary, P.E., B.C.E.E and Daniel W. Elliott, Ph.D., Senior Consultants at Geosyntec, an environmental consulting firm based in Princeton, NJ.

The speakers introduced the problems associated with micro-constituents in the environment, especially wastewater, with emphasis on pharmaceuticals. Micro-constituents are usually present in low concentration but may have strong effects on humans, domestic animals and wildlife. Particularly important are endocrine disrupting compounds (EDCs) and antibiotics or other antimicrobials. As an example of the impact of EDCs, they mentioned that a study conducted over ten years ago showed that approximately 80% of the flounders in Jamaica Bay (Queens, NY) are now female. Environmental antibiotics can encourage the development of antibiotic resistant strains of bacteria.

These materials are difficult, at best, to treat in municipal water treatment facilities because their chemical structures cause them to be recalcitrant in traditional biological treatment plants and their concentrations tend to be much lower than sewage related carbonaceous wastes. Other contributing factors include improper disposal of unused pharmaceuticals either in sewage or runoff (from disposal in landfills). Mitigation is best done at facilities having higher micro-constituent concentrations, namely pharmaceutical plants and hospitals. Various approaches to mitigation (e.g., trapping in membranes or absorbent beds), and study tools (such as computer modeling) were discussed. They have done comparative studies, particularly in Puerto Rico and Ireland, of mitigation processes in pharmaceutical plants. These have led to process improvements resulting in more efficient mitigation. There was lively discussion following the presentation, which was given at Manhattan College in the Bronx, NY.

*(continued on page 24)*



**Joseph Cleary**



**Daniel Elliot**

## WESTCHESTER CHEMICAL SOCIETY

(continued from page 23)

Mr. Cleary is a national leader regarding micro-constituents in wastewater and has more than 40 years' experience in environmental engineering consulting specializing in industrial wastewater treatment and hazardous waste remediation. He has directed projects from treatability studies, process selection and design through engineering design and construction, plus operation and maintenance services. His wastewater experience includes many major pharmaceutical, refinery, food and beverage, paper and electric and gas utility clients. He is a professional engineer in several states and is a board-certified environmental engineer (B.C.E.E.) by the American Academy of Environmental Engineers. He is truly one of the gurus of industrial wastewater treatment, especially for the pharmaceutical, food & beverage, refinery, and chemicals industries. His legacy ties directly back to the titans of the field, many of whom have ties to Manhattan College.

Dr. Elliott is a highly experienced environmental engineer with more than 25 years of environmental affairs experience from the diverse perspectives of industry, consulting, and a major research university. At Merck & Co., Inc., he managed the 1.5 MGD industrial wastewater pre-treatment program for the Merck Chemical Manufacturing Division (MCMD) complex in Rahway, NJ which featured five full-scale Active Pharmaceutical Ingredient (API) manufacturing facilities for human and animal health pharmaceuticals. He also served as Corporate Environmental Engineer for American Standard Inc., managing environmental affairs for 100 manufacturing sites around the globe. As a consultant, he works for Clients in the chemical and pharmaceuticals industries.



Peter Corfield, Rolande Hodel, Joseph Cleary, Paul Dillon, Jamila Thompson, Megan DiGeronimo, Daniel Elliot and Hossain Azam

(Photo courtesy of Paul Dillon)



## Robertson Microlit Laboratories

*Where speed and accuracy are elemental*

Elemental CHN, S, X, Analysis (same day service)

Metals by ICP-OES, ICP-MS, A/A

FTIR, UV/VIS Spectroscopy

Ion Chromatography

GC-MS

Polarimetry

DSC, TGA, melting point

KF Aquametry, Titrimetry

1705 U.S. Highway 46 • Suite 1D • Ledgewood, NJ 07852 • 973.966.6668 • F 973.966.0136

www.robertson-microlit.com • email: results@robertson-microlit.com

**Rapid Results • Quality • Accuracy • Competitive Pricing**

---

## 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, December 10, 2018

**Time:** 7:00 PM

**Place:** Rice Lounge  
Fairleigh Dickinson University  
Florham Campus  
285 Madison Avenue  
Madison, NJ 07940

All are welcome but please let Amjad Ali (at 908-740 3407) know if you plan on attending so he can give security your name.

(See [www.njacs.org](http://www.njacs.org) for any changes.)

For reservations please call NJACS secretary Bettyann Howson (973) 822-2575 or

email [chemphun@gmail.com](mailto:chemphun@gmail.com) or register online at <http://www.njacs.org> prior to **Wednesday, December 5, 2018.**



### **NORTH JERSEY ACS ELECTION RESULTS**

Congratulations to the following officers, councilors and alternate councilors.

#### **CHAIR-ELECT (2019)**

Cecilia Marzabadi

#### **COUNCILORS/ALTERNATE COUNCILORS (2019-2021)**

##### **COUNCILORS**

Diane Krone  
Monica Sekharan  
Michael Miller  
Miriam Gulotta

##### **ALTERNATE COUNCILORS**

John Piwinski  
Susan Fahrenholtz  
Ron Kong  
Ray Baylouny

Bettyann Howson  
Secretary, Councilor, Education Chair  
North Jersey Section ACS

---

### **NMR TOPICAL GROUP**

On Monday, September 24th at Princeton University in Frick Chemistry Laboratory, the NMR Topical Group hosted its annual Symposium during the afternoon and evening hours. Record attendance was set for the event this year with nearly 95 attendees to take part in six afternoon talks and an evening Keynote session shared with the Princeton local Section of the ACS. The afternoon speaker lineup included Nate Traaseth (NYU), Rafael Bruschweiler (OSU), Clark Ridge (FDA), Andrew Lee (UNC), Paola Di Lello (Genentech), and David Rovnyak (Bucknell University). The shared Keynote address was delivered by honored guest speaker Dorothee Kern of Brandeis University. We thank our sponsors, guest speakers, and attendees for making the event a huge success!

New to the event this year was a concurrent Student Career Forum, organized in collaboration with PACS. The purpose of the Forum was to educate students about the types of employment opportunities offered by industry, the requirements and expectations of industrial employers, and to provide advice on how to best prepare and market themselves for these opportunities. The course was made available to both undergraduate and graduate students in chemistry degree-granting programs local to New Jersey, New York, and Pennsylvania. The Forum was comprised of an ACS Career Pathways Course, a resume building session, and Chemistry Career Conversations (i.e. speed networking) with representatives from local companies.

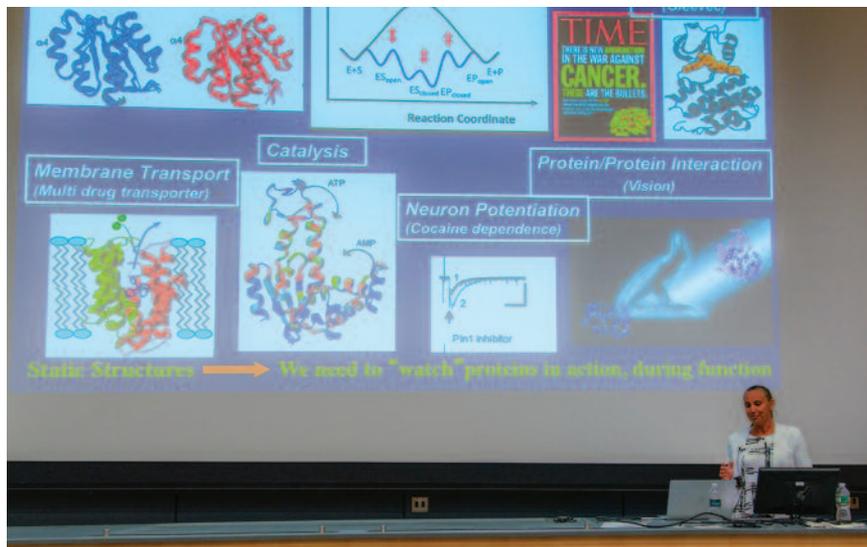
The final NMR Topical Group meeting of 2018 will be held at Rutgers University on Tuesday, November 13th. A buffet dinner will be served at 6:00 pm followed by guest speaker Nathaniel Nucci at 7:00 pm in CABM 010. Dr. Nucci is an assistant professor at Rowan University and former graduate student/fellow of the Wand Lab at the University of Pennsylvania. Nathaniel will speak on "Resolving the dynamic dance between proteins and

*(continued on page 26)*

## NMR TOPICAL GROUP

(continued from page 25)

solvent using NMR and reverse micelles". Please see our website for additional information and to register for the event.



Honored guest speaker Professor Dorothee Kern delivers the evening Keynote Address, an event shared between NJACS and PACS.



Attendees enjoy filling their plates from the dinner buffet.

(Photos courtesy of Allen Jones (of PACS)).



Wine, dinner, and networking closed out the evening of a successful NMR Symposium and Student Career Forum in the Frick Atrium.

## **NORTH JERSEY CHROMATOGRAPHY GROUP**

### **Annual Symposium – The Modernization of Chromatography**

The annual symposium for the North Jersey Chromatography Group (NJCG) was held on September 26th at the Double Tree Hotel in Somerset, NJ. Approximately 90 people from academia and industry attended the symposium. The attendees experienced an agenda filled with expert speakers from academia, pharma, instrumentation companies, and contract research organizations who provided presentations focusing on various aspects of the modernization of chromatography, including chromatographic method development, high-throughput screening, optimization, trace level analysis, and method modernization. Additionally, the 2018 Chair of the North Jersey ACS, Miriam Gulotta provided an overview of the North Jersey ACS and its impact on the local scientific community (see full speaker list and topics below).

#### **2018 North Jersey Chromatography Group Presenters**

<b>Speaker</b>	<b>Presentation</b>
Ying Hu Ascendia	Method Development and Validation for Non-Chromophoric Compounds
Michael Hicks Merck	Screening and High-Throughput Analytical (SHA) Laboratory at Merck Research Labs (MRL)
Miriam Gulotta North Jersey ACS	Overview of the North Jersey ACS
Brian He BMS	Developing Robust Reversed-Phase HPLC Methods with Chromatographic Modeling Tool - DryLab
David Liu Celgene	Analytical Challenges in Testing Trace Level Pharmaceutical Impurities
Nicholas Snow Seton Hall University	Six Dimensions of Separation: A Renaissance in Gas Chromatography
Kenneth Berthelette Waters Corporation	Migration of Isocratic and Gradient USP Methods to Modern Column Technology

The symposium also featured a poster session with 12 presenters and a vendor show featuring 15 companies spanning a wide array of fields in the chromatography industry. Attendees had the opportunity to vote for their favorite posters, and the top 2 posters were rewarded with a \$50 Amazon gift card. Additionally, a few lucky attendees were awarded raffle prizes throughout the event. A free cocktail hour courtesy of the event's premier sponsor, Waters Corporation, capped off a wonderfully successful symposium.

*(More pictures on page 28)*



**Attendees take in the presentations at the 2018 North Jersey Chromatography Group Annual Symposium.**

**NORTH JERSEY CHROMATOGRAPHY GROUP**

(continued from page 27)



Dr. Ying Hu (left) and Dr. Michael Hicks (right) presenting at the 2018 North Jersey Chromatography Group.

(Photos courtesy of Jinjian Zheng)

## Rutgers University — Newark Spring 2019 Graduate Courses

### 540 *Principles of Spectroscopy*

Dr. Piotrowiak

Mon 6:00-9:00 pm, [Smith Hall](#) Room 240

### 512 *Organic Photochemistry*

Dr. Galoppini

Tue 6:00-9:00 pm, [Smith Hall](#) Room 240

### 579 *Coordination Chemistry Applied to Catalysis*

Dr. Prokopchuk

Thu 6:00-9:00 pm, [Smith Hall](#) Room 240



To apply to our Masters or PhD program please see  
<http://chemistry.rutgers.edu/grad/admissions-info>.

Up to 2 graduate courses can be taken on a non-degree basis.

For more information, see <http://chemistry.rutgers.edu/grad/graduate-program>  
or contact Prof. Galoppini at [galoppin@newark.rutgers.edu](mailto:galoppin@newark.rutgers.edu).

## **NJACS HOSTS SUCCESSFUL CHEM EXPO IN CELEBRATION OF NATIONAL CHEMISTRY WEEK**

*By Sandra Keyser*

To celebrate National Chemistry Week 2018, NJACS partnered with Liberty Science Center (LSC) to successfully host the 24th ChemExpo in Jersey City, New Jersey on Saturday, October 20th from 10 am to 2 pm in the Jennifer Chalsty Center of LSC in Jersey City, New Jersey.

Approximately 250 volunteers from eight local colleges, three high schools, several nonprofit organizations, and companies presented a variety of demos that related to the theme, "Chemistry is Out of This World".

A variety of demonstrations were presented to the pre-K and elementary school children, which included the fluorescence of rocks, the collapse of stars using balloons and aluminum foil, the effects of UV light on UV-sensitive beads, the ability of sunscreen to protect against UV light, how a vacuum impacts different materials, the density of planets, and the emission spectra of hydrogen and helium. A local Girl Scout Troop 80268 and other young volunteers also engaged the children outside the Jennifer Chalsty Center by offering temporary tattoos of moles and NCW logos as well as viruses from the PDB.

The college and university chemistry chapters competed in the Sister Marian José Smith Undergraduate Public Outreach Award. Judges Tomeka Thompson, Donovan Thompson, Debra Hazard-Sweet, Mei Ping Yang, Keisha Stephen, Mirlinda Biba, evaluated the demonstrations and selected the winners in the college and high school competitions, while Miriam Gulotta coordinated the judging during the event.

New Jersey City University won the first place in the college competition. Debra Hazard-Sweet, who served as a judge, said "The model car was an excellent model used to demonstrate how electrolysis could be used to fuel a vehicle, be it a car on earth or a rocket... [Their] Rocket Launch demo was original and related very closely to this year's theme."

Drew University won second place for their demonstrations that related the effects of atmosphere on the impact of meteors, associated the densities of the planets with their composition, and exhibited the effects of sunscreen on UV-radiation.

*(continued on page 30)*



## NATIONAL CHEMISTRY WEEK – CHEM EXPO

(continued from page 29)

J.P. Stevens High School won the inaugural award for the high school competition in which they vacuum-sealed the museum visitors, displayed the fluorescence of rocks and high-lighters, and presented the iron content in cereals.

The event was enjoyed by the museum visitors as well as the volunteers. Darcy Riley, a parent and member of Liberty Science Center, said “I love this program, and many of the booths gear their activities towards my child.”

Judge Mei Ping Yang explained, “This is my 3rd year serving as a judge. I enjoyed the time I spent with the students, enjoy how they try to explain a chemistry concept with everyday objects and simple demonstrations. If I like a demo, I will “steal” it for use in the classroom too. I learned much from these student groups; even if I know a concept, having it explained in a different way drives the meaning home.”

“My favorite part today was seeing the kids’ reactions to everything. You heard screams of joys, oohs and aahs, and ‘I want to do that’...I think that’s the whole point, getting kids excited about chemistry,” said Mosam Naik, a student volunteer with Fairleigh Dickinson University Science Club.

Marina Hahn from Drew University Chemistry Society said, “It’s really great to give the kids an experience in chemistry,” and Ryan Aschoff, a volunteer from The College of New Jersey, added, “I think it’s nice that the parents take [the children] here to give them the exposure to science.”

Hillary Volk, volunteer said, “Children and parents alike had an enjoyable time listening to the outreach students, and I heard on several occasions that the exhibit was the best they’d been to.”

Financial support from the NJACS, and the corporate sponsors, Infineum USA L.P., and BASF, made the event possible. Lauren Castelli, advisor for the Younger Chemists Committee (YCC) of NJACS, did a significant amount of work with the volunteers during and after the event, and organized the social that followed ChemExpo. The event was also successful due to the support of the volunteers, NJACS Executive Board members, retired chemists, chemistry teachers at the participating schools, representatives from various chemical companies, and the ChemExpo 2018 Steering Committee: Monica Sekharan, Mita Chaki, Miriam Gulotta, and Sandra Keyser.



*(Photos are provided,  
courtesy of Sandra  
Keyser.)*



## 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](http://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. Neil Jespersen, at [jespersn@stjohns.edu](mailto:jespersn@stjohns.edu).



### WESTCHESTER CHEMICAL SOCIETY DISTINGUISHED SCIENTIST AWARD 2019

The Westchester Chemical Society is accepting nominations for the "WCS Distinguished Scientist Award 2019". Scientists who live or work in Westchester or the Bronx qualify. The awardee is expected to attend the Awards Dinner (April/May timeframe) 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, 2019** to:

Dr. Paul Dillon at [PaulWDillon2@hotmail.com](mailto:PaulWDillon2@hotmail.com) or  
67 Matthes Road, Briarcliff Manor, NY 10510

or to: Dr. Peter Corfield at  
[pwrc@earthlink.com](mailto:pwrc@earthlink.com)

### 2019 GOLD MEDAL AWARD: SOCIETY FOR APPLIED SPECTROSCOPY, NEW YORK SECTION

Nominations are being sought for the 2019 Gold Medal Award of the New York Section of the Society for Applied Spectroscopy. This coveted award was established in 1952 to recognize outstanding contributions to the field of Applied Spectroscopy. The Gold Medal will be presented at a special award symposium, arranged in honor of the awardee, at the 2019 Eastern Analytical Symposium. A nominating letter describing the nominee's specific accomplishments should be submitted along with a biographical sketch **by January 15, 2019**.

Please e-mail all materials as well as questions and inquiries to Dana Garcia at [dana.garcia@arkema.com](mailto:dana.garcia@arkema.com).



### KAVLI EMERGING LEADER ORLANDO

The Kavli Foundation has agreed to sponsor The Kavli Foundation Emerging Leader in Chemistry Lecture through 2025 featuring two lectures at each ACS national meeting. The Kavli Foundation Emerging Leader in Chemistry Lecture is awarded to an outstanding chemical scientist who is less than 10 years past receipt of his or her Ph.D. and will be under 40 years of age as of Monday, April 1, 2019, the date of the lecture. The candidate is a distinguished younger scientist who is highly regarded by his or her peers for significant contributions to an area of chemistry or related multidisciplinary area of chemistry.

The Multidisciplinary Program Planning Group (MPPG) is pleased to host the lecture at the Spring ACS National Meeting in Orlando, FL. We invite ACS Divisions and Committees to submit candidate nominations.

Please reach out to your members to consider sending recommendations for this award. All nominations must be submitted by the Division or Committee, after approval from the respective Chair, and using one of the forms below.

## 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 2Science (S2S) is seeking volunteers to support its V-Lab program. S2S has a series of elementary, middle, and high school experiments that run in various schools across New Jersey. Members are especially needed to mentor students in participating schools to help with experiments. It's great fun, a wonderful way to give back, and only requires 1-2 hours of your time. Experiments include CO<sub>2</sub> to the Rescue, Curious Crystals, Mystery of M&Ms, Thermochemistry: *Exothermic and Endothermic Chemical Reactions*, and *Glow it Up: The Chemistry of Luminol*. All are age-appropriate and volunteers are provided with instructions on how to support in the classroom prior to your scheduled volunteer day.

For more information, contact Cyndi Roberson, Director of Corporate Relations, at (973) 947-4880 ext. 516 or visit the website to register for the upcoming school year: [www.students2science.org](http://www.students2science.org).



### SEMINAR SPEAKERS WANTED

The New York Section of the ACS is in search of speakers that we can add to our Speakers Bureau database of interested local area speakers who are available for Section-wide seminars and symposia. If you have an area of research or interest that would provide an interesting talk appropriate for our Section members, and would like to be included in our Speakers Bureau, please contact the New York Section Office at (516) 883-7510 or send an email to [njesper1@optonline.net](mailto:njesper1@optonline.net) with the following information that will be posted on the Section's website: your name, affiliation, a title, and 5-6 words briefly summarizing your area of specialty. We look forward to hearing from you about topics that you wish to share with our other members!

## Call for Applications

### 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](http://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](mailto:Jebrown@infionline.net) or (908) 239-1515

---

## In the News

---

### UNIVERSITY OF TEXAS AT SAN ANTONIO

#### UTSA discovers how to make plastics cheaper and less energy intensive

(San Antonio, October 25th, 2018) — Researchers at The University of Texas at San Antonio have discovered a filtering material that may reduce the environmental cost of manufacturing plastic. The discovery was created by Libo Li, Ruibiao Lin, both post-doctoral students, and Professor Banglin Chen, Dean's Distinguished Chair Professor of Chemistry and Microsoft President's Endowed Professor at UTSA, along with other scientists at the National Institute of Standards and Technology (NIST) and China's Taiyuan University of Technology. The scientific advance can extract the key ingredient in the most common form of plastic from a mixture of other chemicals — while consuming far less energy than usual.

The material is a metal-organic framework (MOF), a class of substances that have been used to separate individual hydrocarbons from the organic molecules produced during the oil refining process. MOFs hold crucial value for the plastic and petroleum industries because of this capability, which could allow manufacturers to perform these separations far more cheaply than standard oil-refinement techniques demand.

This promise has made MOFs the subject of intense study at UTSA and elsewhere, leading to MOFs that can separate different octanes of gasoline and speed up complex chemical reactions. However, one major obstacle has been how to extract ethylene—the molecule used to create polyethylene—the plastic used to make shopping bags and other everyday containers. Yet, this particular MOF finding was found so promising that it's featured today in the prominent journal *Science*. In the paper, the team shows that a modification to a well-studied MOF enables it to separate purified ethylene out of a mixture with ethane.

Making plastic takes lots of energy. Polyethylene, the most common type of plastic, is built from ethylene, one of the many hydrocarbon molecules found in crude oil refining. The ethylene must be highly purified for the manufacturing process to work, but the current industrial technology for separating ethylene from all the other hydrocarbons is a high-energy process that cools down the

crude to more than 100 degrees below zero Celsius.

Ethylene and ethane constitute the bulk of the hydrocarbons in the mixture, and separating these two is by far the most energy-intensive step. Finding an alternative method of separation would reduce the energy needed to make the 170 million tons of ethylene manufactured worldwide each year.

Scientists have been searching for such an alternative method for years, and MOFs appear promising. On a microscopic level, they look a bit like a skeleton of a skyscraper of girders and no walls. The girders have surfaces that certain hydrocarbon molecules will stick to firmly, so pouring a mixture of two hydrocarbons through the right MOF can pull one kind of molecule out of the mix, letting the other hydrocarbon emerge in pure form.

The trick is to create a MOF that allows the ethylene to pass through. For the plastics industry, this has been the sticking point.

A turning point came in 2012, when the creation of the MOF-74 seemed like a good filter for separating a variety of hydrocarbons, including ethylene. UTSA researchers and the rest of the team analyzed previous approaches but an idea from biochemistry finally sent them in the right direction.

“A huge topic in chemistry is finding ways to break the strong bond that forms between carbon and hydrogen,” said UTSA professor Banglin Chen, who led the team. “Doing that allows you to create a lot of valuable new materials. We found previous research that showed that compounds containing iron peroxide could break that bond.”

The team reasoned that to break the bond in a hydrocarbon molecule, the compound would have to attract the molecule in the first place. When they modified MOF-74's walls to contain a structure similar to the compound, it turned out the molecule it attracted from their mixture was ethane.

The team brought the MOF to the NCNR to explore its atomic structure. Using a technique called neutron diffraction, they determined what part of the MOF's surface attracts ethane — a key piece of information for explaining why their innovation succeeded where other efforts have fallen short.

“Without the fundamental understanding of the mechanism, no one would believe our results,” Chen said. “We also think that we can try to add other small groups to the surface, maybe do other things. It's a whole new research direction and we're very excited.”

Written by Chad Boutin @ NIST