

National Chemistry Week

October 21-27, 2018



See NoJ Activities on page 6.

See NY Activities on page 12.

THIS MONTH IN CHEMICAL HISTORY

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

In a recent column I mentioned my recent purchase of a textbook, "Kane's Chemistry edited by Draper" published in 1845. I also described the careers of these two eminent mid-19th. century scientists. In this column I will begin the examination of chemistry in 1845 as described in the 700 pages of small print in this comprehensive text. But first a little context. Putting ourselves into the mid-19th. century we recall that it is only 40 years since Dalton proposed his new idea of the chemical atom with its important property of mass. It is also about the same time since Avogadro proposed his hypothesis. While Dalton's ideas permeate this text Avogadro is not mentioned. It would be about another 20 years, after Cannizzaro's masterly exposition of the use of Avogadro's hypothesis in assigning atomic weights at the Karlsruhe conference of 1860, before chemists began to pay attention to these novel ideas.

The arrangement of Kane's "Chemistry" will seem unusual to those of us used to current introductory general chemistry books. After 2 pages on the origin and objects of chemistry (rather short shrift to this chemical historian!) the initial chapter is on gravity and cohesive forces and includes a discussion of crystals and crystallization. Chapter II is on "the properties of light as characterizing chemical substances" and includes a discussion of polarized light. The text comes down firmly on the theory of light being the vibrations of an exceedingly attenuated medium, the luminiferous ether. In view of Draper's later work in photography it is interesting that the text discusses briefly the way in which light can decompose certain classes of chemical substances including the salts of silver, gold, platinum, and mercury.

Chapter III is on "Heat Considered as Characterizing Chemical Substances" and is entirely about physical changes associated with heat including expansion; specific heat; liquefaction; vaporization; and conduction. This chapter includes a discussion of infrared radiation (though not named as such) as a form of heat including the observation that infrared radiation exhibits double refraction in some crystals, just like visible light. Chapter IV on "Electricity Considered as Characterizing Chemical Substances" covers static and current electricity including galvanic batteries and their construction. Other than copper plating there is no discussion of electrochemistry in this chapter! Humphrey Davy's work on the isolation of the alkali metals is mentioned later in the discussion of the metals themselves. I must quote, in fairness, some of the closing sentences of this chapter. "To the chemist, therefore, the most useful property of electricity is the power which it possesses of modifying, annulling, or superseding chemical affinity.....the question whether electrical influence and affinity are identical, or what are their exact relations,.....still remain."

Chapter V is the inevitable description of chemical nomenclature. The table of elements included in this chapter has 55 entries; the period following the discovery of electrochemistry saw a rapid expansion in the discovery of new elements. Beryllium is still called glucinum (symbol G) at this time. The authors credit Lavoisier and Guyton (but fail to add Berthollet and Fourcroy; all 4 were the authors of the "New Method of Chemical Nomenclature") for reforming nomenclature into the basis of the system we use today in inorganic chemistry. They also discuss the name of oxygen, mistakenly given to the element by Lavoisier who believed that all acids contain oxygen, which means acid-former. Citing the work of Davy who showed that "oxymuriatic acid" contains no oxygen they embrace the new name of hydrochloric acid as more correct.

I plan to conclude my discussion of this most interesting glance at mid-19th. century chemistry in a future column.

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The monthly newsletter of the New York & North Jersey Sections of the American Chemical Society. Published jointly by the two sections.

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November	September 28
December	October 28
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

Visit Uswww.TheIndicator.org

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

October Calendar

NEW YORK SECTION

Tuesday, October 2, 2018

Westchester Chemical Society
See page 8.

Thursday, October 4, 2018

Chemical Marketing & Economics Group
See pages 9-11.

Thursday, October 4, 2018

Long Island Subsection
See page 9.

Friday, October 12, 2018

High School Teachers Topical Group
See page 9.

Sunday, October 21, 2018

New York Celebrates National Chemistry Week
See pages 12-13.

Tuesday, October 21, 2018

Biochemical Topical Group
See page 13.

Tuesday, October 30, 2018

NY Section Society for Applied Spectroscopy
See page 14.

Thursday, October 25, 2018

Hudson-Bergen Chemical Society
See pages 14-15.

Saturday, October 27, 2018

Teaching Students with Disabilities
See page 16.

also

November 2018

NY Section Society for Applied Spectroscopy
See page 18.

Thursday, November 1, 2018

Long Island Subsection
See page 20

Thursday, November 15, 2018

Westchester Chemical Society
See page 18.

Wednesday, December 5, 2018

NY Section Society for Applied Spectroscopy
See page 18.

Thursday, December 6, 2018

Westchester Chemical Society
See page 18.

Thursday, December 6, 2018

Long Island Subsection - Holiday Seminar
See page 20.



NORTH JERSEY SECTION

Monday, October 22, 2018

North Jersey Executive Committee Meeting
See page 5.

Saturday, October 20, 2018

Chem Expo at Liberty Science Center
See pages 5-6.

also

Thursday, November 29, 2018

Organic Chemistry Topical Group
See pages 5 and 7.

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**Deadline for items to be included in the
November 2018 issue of *The Indicator* is**

September 28, 2018

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

www.TheIndicator.org

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.

Tentative Information:

Date: Monday, October 22, 2018

Time: 6:30 PM

Place: Rice Lounge

Fairleigh Dickinson University
Florham Campus
285 Madison Avenue
Madison, NJ 07940

(See www.njacs.org for any changes.)

For reservations please call NJACS secretary Bettyann Howson (973) 822-2575 or email chemphun@gmail.com or register online at <http://www.njacs.org> prior to **Wednesday, October 17, 2018.**



CHEM EXPO AT LIBERTY SCIENCE CENTER

Date: Saturday, October 20, 2018

(See flyer on page 6 for full details.)



CAREERS IN TRANSITION MEETINGS

There will be no Careers in Transition Meetings until further notice.



NORTH JERSEY SECTION ORGANIC TOPICAL GROUP

Award for Creativity in Molecular Design and Synthesis

Date: Thursday November 29, 2018

(See flyer on page 7 for full details.)



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CHEMEXPO

at Liberty Science Center

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NJACS needs your help to make ChemExpo a success. If you or your organization would like to sponsor the event or volunteer as a participant, please visit <https://tinyurl.com/NJACSnow>

Save the date
Saturday, 10/20/18
10 am - 2 pm

College Students:
Please join us for a post-ChemExpo mixer immediately following the event.

The ACS North Jersey Section Organic Topical Group Presents
Award for Creativity in Molecular Design and Synthesis

2018 Award Recipient
Dr. Ann Weber

Thursday, November 29, 2018

The Palace at Somerset Park, 333 Davidson Ave, Somerset, New Jersey



Dr. Ann Weber
 Kallyope Inc.

Keynote Presentation:

*Adventures in Drug
 Discovery*



Prof. Vy Dong
 University of
 California-Irvine

*A Few of My Favorite
 Rings: Catalysis with
 Metal-Hydrides*



Prof. Jon Ellman
 Yale University

*New Bond Connections
 by C-H Functionalization
 for the Convergent
 Synthesis of Bioactive
 Molecules*



Dr. Emma Parmee
 Merck Research
 Laboratories

*The Importance of
 Lead Identification in
 Drug Discovery*



Prof. Christina Woo
 Harvard University

*Discovery of small
 molecule binding site
 hotspots using photo-
 affinity labeling chemical
 proteomics*



Prof. Greg Fu
 California Institute of
 Technology

*Nucleophilic Substitution
 Reactions: A Radical
 Alternative to S_N1 and
 S_N2 Reactions*

Due to limited seating, registration and payment are required by November 19, 2018
 Registration fee: Symposium (including breakfast and lunch) \$120.00. Students: \$45.00 (limited number of seats)

Sign in will begin at 8:00 am, the symposium at 9:00 am, and lunch at 12:00 pm.

For information and on-line registration, please visit our website: <http://www.njacs.org/organic.html>

**Organizing Committee: Ken Fraunhoffer (Chair, BMS), Steve Silverman (Past-Chair, Merck),
 Sue Zultanski (Chair-Elect, Merck), Enver Izgu (Rutgers University), Michael Smith (BMS),
 Yalan Xing (William Paterson University), Michael Zacuto (Celgene)**

New York Meetings

www.newyorkacs.org

ACS, NEW YORK SECTION BOARD OF DIRECTORS

MEETING DATES FOR 2018

The dates for the Board of Directors Meetings of the ACS New York Section for 2018 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 ought to 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.

The remaining board meeting will be held at St. John's University, 8000 Utopia Parkway, Queens, NY. The meeting room will be posted on the New York Section website at www.NewYorkACS.org. Dr. Joseph Serafin will chair all meetings. Refreshments will be available starting at 6:00 PM and the board meeting will start at exactly 6:30 PM.

The final Board Meeting date for 2018 is:

Friday, November 16, 2018

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



WESTCHESTER CHEMICAL SOCIETY

Special Seminar – “Living in the Polymer World: Polymers and Macromolecules in Our Daily Lives”



Speaker:
Joseph W.
Krumpfer, PhD
Assistant
Professor of
Polymer and
Inorganic
Chemistry,
Department of
Chemistry &
Physical Sciences
Dyson College of
Arts and Sciences
Pace University
861 Bedford Rd.
Pleasantville, NY

Abstract: Polymers are the single most important material currently used by humanity. They comprise everything from construction materials to cosmetics and can be found in nearly every aspect of daily life. This talk will offer a brief introduction into what polymers are and how they are made, both synthetically and industrially. Applications of these polymers and their unique properties are also discussed. Furthermore, a historical overview on the increasing importance of polymers to human development is presented. Finally, the effect of the environmental impact of polymers, both positive and negative, along with recent advances in mediating polymer waste problems and renewable energy devices, gives a brief outlook into how these materials can solve many of the most pressing problems facing our society.

Biography: Dr. Joseph W. 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.

Date: Tuesday, October 2, 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
Phone 1-914-393-6940

CHEMICAL MARKETING & ECONOMICS GROUP

Chemical Industry Digitalization, Innovation and Growth

Speaker: Duane Dickson
Deloitte Consulting
(see flyers for affiliations)

Date: Thursday, October 4, 2018

Times: Registration and Networking
11:15 AM - 12:00 Noon
Luncheon 12:00 Noon - 1:00 PM
Talk - Webcast 1:00 - 2:00 PM

Cost: Luncheon \$120 non-members
\$90 members
Webcast \$30. Free webcast recording for ACS members

(See flyers on pages 10-11) for all details.



LONG ISLAND SUBSECTION

Rethinking Asymmetric Synthesis: The Development of General Metal-Catalyzed Cross-Coupling Reactions That Enable the Use of Optically Active Nucleophiles

Speaker: Dr. Mark R Biscoe
Chemistry & Biochemistry
Department
City College of the
City University of New York

Abstract

The development of transition metal-catalyzed cross-coupling reactions has greatly influenced the manner in which the synthesis of complex organic molecules is approached. A wide variety of methods are now available for the formation of C(sp²)-C(sp²) bonds, and more recent work has focused on the use of C(sp³) electrophiles and nucleophiles. The use of secondary alkyl nucleophiles in cross-coupling reactions remains an outstanding challenge because of the propensity of these alkyl groups to isomerize under the reaction conditions. In principle, enantioenriched secondary alkyl organometallic nucleophiles can undergo cross-coupling reactions with transfer of the original stereochemistry, thus enabling a new approach to the preparation of enantioenriched molecules. In this seminar, we will describe new methods for the use of configurationally stable, optically active alkyltin and alkylboron nucleophiles in stereospecific Pd-catalyzed cross-coupling reactions. Such processes enable the rapid

generation of libraries of non-racemic drug candidates from a single optically active precursor.

Date: Thursday, October 4, 2018

Times: Refreshments 5:00 PM
Meeting 6:00 PM

Place: S-112 Queensborough Community College, 222-05 56th Avenue
New York, NY 11364



HIGH SCHOOL TEACHERS TOPICAL GROUP

Demo Derby 1 — Attendees Provide Demonstrations That Should be Brief (5 to 8 minutes maximum)

Date: Friday, October 12, 2018

Time: Social Hour and Dinner — 6:00 PM (Dutch treat)

Place: DoJo Restaurant
14 West 4th Street
(at the corner of Mercer St.)
New York, NY

Time: Meeting — 7:15 PM

Place: New York University
Silver Center, Room 207
32 Waverly Place
(also 31 Washington Place)
(near NE corner of Washington Square Park)
New York, NY

Security at NYU requires that you show a picture ID to enter the building. In case of severe weather, call John Roeder, (212) 497-6500, between 9:00 AM and 2:00 PM to verify that the meeting is still on or (917) 848-9397 (Bob Drake) for other info. Note: Street parking near the Silver Center is free after 6:00 PM, but construction continues to limit availability.

Claim your presentation order by writing your name on the board when you enter. We have moved a Demo Derby to the beginning of the academic year by popular demand because some of these demos should be useful immediately. (Demo Derby 2 will occur at the April, 2019 meeting.) Please provide printed instructions for attendees with contact information to help your colleagues replicate your procedures. Remember that our refurbished room 207 no longer has gas, water, or hood. You are responsible for safety, procedures, and cleanup. Please bring enough safety glasses for front row observers.



CHEMICAL INDUSTRY DIGITALIZATION, INNOVATION AND GROWTH

CME ACS NY Luncheon/Webcast • October 4, 2018 • Penn Club

Abstract

As the chemical industry thrives and contributes over \$800 billion in revenue to the US economy, today's chemical industry leaders are faced with an expanding set of issues to achieve growth, manage uncertainties, embrace new digital technologies, and experiment with solutions to be more innovative.

This discussion will share insights into the strategic choices confronting chemical leaders. How will a digital transformation redefine a business, accelerate product development, and help to understand customers' current and future needs? What are the key technologies, offerings, and profit models that will increase the company's differentiation advantage to achieve revenue goals? What new capabilities including data science, artificial intelligence, advanced computing, and multi-disciplinary science are needed to solve tough challenges and support lasting value creation?

Join us on October 4th to hear what lies ahead for the chemical industry, its ecosystem, and end markets, while understanding market dynamics that will heavily influence change.



Deloitte.

Duane Dickson is a Vice Chairman and principal in Deloitte Consulting LLP's Energy Resources & Industrials Industry group, as well as the US Oil, Gas & Chemicals Sector Leader and the Global Oil, Gas & Chemicals Consulting leader. Additionally, he is the former Global Chemicals & Specialty Materials Sector Leader for Deloitte Global. Duane served as a World Economic Forum's (Forum) Project Advisor and the Forum's Chemical Community Lead, Chemistry and Advanced Materials. He focuses on providing services in corporate and growth strategies; acquisitions, divestitures, and carve-outs; and management, working primarily with chemicals, materials, industrial products, consumer packaged goods, medical devices, and safety equipment industries.

Duane has more than 38 years of business and consulting experience in senior leadership positions in major industrial and healthcare products companies. Duane also has extensive experience serving as a senior executive focusing on operations and transactions. He has led major transformational programs in four major chemical companies, all yielding in excess of US\$200 million in profitability and more than US\$1 billion of shareholder value. As a former VP/General Manager of a US\$1 billion division of an industrial chemical company, he led the



Event Schedule

Location:

Penn Club
30 W 44th Street, NYC

Event Times: (ET)

11:15 am - 12:00 noon

Registration and

Networking

12 noon - 1 pm Luncheon

1 pm - 2 pm Talk - Webcast

Luncheon Fees

\$120 for non-members

\$90 for members

Check for Early-bird savings

Webcast : \$30. Free webcast

recording for ACS members

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December 4, 2018

www.cmeacs.org



CHEMICAL INDUSTRY DIGITALIZATION, INNOVATION AND GROWTH

CME ACS NY Luncheon/Webcast • October 4, 2018 • Penn Club



Deloitte.

Continued Biography

complete restructuring of the division, drove significant profitability improvement, and co-developed synergy capture plan and asset divestiture plans in support of a large merger. Also, as a former VP of Corporate Ventures (M&A), Duane developed significant experience in transaction support, negotiation, JV (Joint Venture) management, divestitures, and corporate development. He has also led Corporate Strategy and Global Marketing for a global manufacturer of medical products.

Duane is well-known and respected in the Oil, Gas & Chemicals sector and has been invited to present his insights on Advanced Material Systems, Future of Chemicals, and corporate strategies at major global chemicals events including those sponsored by the Forum and Société de Chimie Industrielle. He has been published in the *Wall Street Journal* for a leading-edge point-of-view on chemical industry cyclicalities, receiving coverage on the front page.

Duane is the primary author of the Deloitte Global studies, [The chemical multiverse 4.0](#), [The talent imperative in the global chemical industry](#), [The feedstocks prism](#), *Driving Innovation: Advanced Materials Systems*, *Reigniting growth: Advanced Materials Systems*, *The chemical multiverse*, and *The decade ahead*. He served as the contributing author to [Digital opportunities for chemical enterprises](#); [Creating lasting value](#), [2018 Global chemical industry mergers and acquisitions outlook](#) and *End market alchemy*. Duane holds a bachelor's degree in Business Administration from Southern Methodist University. He also completed the Advanced Management Program at London Business School. For more information, please visit Duane's page on [LinkedIn](#). Follow Duane on Twitter at @Duane_Dickson



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December 4, 2018

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Help the New York Section of the American Chemical Society to celebrate National Chemistry Week 2018 with the theme

Chemistry is Out of This World!

- When:** Sunday, October 21, 2018 (11 AM – 4 PM)
Where: [New York Hall of Science \(NYSCI\)](#), Flushing, Queens
What: Over 20 tables of hands-on experiments, activities, demonstrations, and giveaways. Special photo opportunities.
Who: Last year, activities were presented by 250 volunteers and engaged more than 1,200 community youth and parents. Participants included some of the most prestigious colleges, universities and industries, and the Program received the esteemed American Chemical Society **Partners for Progress and Prosperity Award 2017!**

The New York Section needs your help to make this year's National Chemistry Week (NCW) Celebration another success! If you and your organization are interested in participating in or sponsoring an activity table at the event, please visit the New York Section's NCW website at http://www.newyorkacs.org/meetings/NCW/2018_ncw.php. The site also links to **online registration, which is open until Friday, September 28, 2018.**

For more information, please contact Dr. Ping Furlan (furlanp@usmma.edu), Dr. Ivan Hyatt (ihyatt@adelphi.edu), Dr. Shivnath Mazumder (shivnath.mazumder@hostra.edu), or Mrs. Erin Wasserman (illustrated poem contest coordinator, ewasserman602z@gmail.com). We look forward to your participation and your organization's sponsorship as we celebrate the important roles chemistry plays in our everyday lives and how it can be FUN! Please include activities highlighting the yearly theme, "Chemistry is Out of This World!" Volunteers' parking at NYSCI is FREE. Please **share your NCW photos** at: <https://www.facebook.com/events/1358895557578080/>

You can also find additional information about NCW on the American Chemical Society's website at <https://www.acs.org/content/acs/en/education/outreach/ncw.html>.



New York Local Section, American Chemical Society, <http://www.newyorkacs.org/>

NY SECTION CELEBRATES NATIONAL CHEMISTRY WEEK

Chemistry is Out of This World!

Date; Sunday, October 21, 2018

(See flyer on page 12 for full details.)



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

**New Therapeutic Strategies to Combat
Antibacterial Resistance**

Organizers: Eric Brown, PhD
McMaster University

Junjun Gao, PhD
Boehringer Ingelheim

John Hambor, PhD
Boehringer Ingelheim

Deborah Hung, MD, PhD
Broad Institute of MIT
Harvard Medical School

Eric Pamer, MD
Memorial Sloan Kettering
Cancer Center

Sara Donnelly, PhD
The New York Academy of
Sciences

Sonya Dougal, PhD
The New York Academy of
Sciences

Keynote Speaker: Helen W. Boucher, MD
Tufts University School
of Medicine

Speakers: Sean Brady, PhD
The Rockefeller University

Eric Brown, PhD
McMaster University

Lynette Cegelski, PhD
Stanford University

Paul J. Hergenrother, PhD
University of Illinois

Deborah Hung, MD, PhD
Broad Institute of MIT
Harvard Medical School

Victor Nizet, MD
University of California
San Diego

Richard P. Novick, MD
NYU School of Medicine

Eric Pamer, MD
Memorial Sloan Kettering
Cancer Center

Elizabeth Sockett, PhD
University of Nottingham

Helen I. Zgurskaya, PhD
University of Oklahoma

This symposium will focus on the current challenges that basic and translational researchers are facing to fight antimicrobial resistance, as well as offering perspectives on emerging therapeutic strategies to address this global health threat.

Date: Tuesday, October 23, 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).

This symposium will also be available via webinar for those who cannot attend the symposium in person, and ACS and NYAS members will receive discounted admission rates.

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

www.nyas.org/antibacterial2018

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



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NEW YORK SECTION SOCIETY FOR APPLIED SPECTROSCOPY

A Comparison of Structural and Functional Optical Coherence Tomography Systems for Assessment of Hard Dental Tissues



Speaker: Christine Sahyoun
Rutgers University

Abstract: In clinical dental practice, visual inspection is highly subjective and X-ray imaging exposes the patient to radiation. Therefore, there is a need for safe, non-invasive methods that can be used to better detect and quantify early dental lesions. Optical coherence tomography (OCT) provides cross-sectional images of tissue extending up to 2 mm in depth, allowing visualization of the enamel and dentin layers in teeth. Most previous investigations of OCT in dentistry have used commercial systems operating in the 1,325 nm wavelength region with low NA optics. However, there are many modifications to this standard configuration that can potentially reveal additional structural and / or functional information. In this study, we examined the effect of light source center wavelength by acquiring 3D volumetric data in vivo with OCT systems operating at 1,325 nm and at 827 nm. We examined the effect of sample arm NA on transverse resolution in en face reconstructions by using objective lenses with varying NA (0.04, 0.15). We also assessed the additional information that can be obtained by polarization-sensitive OCT. These system configurations were used for imaging healthy dental tissue in vivo, as well as ex vivo specimens with indications including demineralization, cracks, caries, and white spot lesions. Our results indicate that different OCT configurations can be employed to enhance sensitivity to dental hard tissue

Biography: Christine Sahyoun is currently pursuing her PhD in Biomedical Engineering at Rutgers University under the guidance of her advisor, Dr. Mark Pierce. Her work focuses on developing and using optical imaging methods such as OCT and short-wave infrared (SWIR) imaging for the assessment and quantification of tissue health and disease, specifically focusing on oral health. Christine received her BS (2014) and MS (2016) in Biomedical Engineering from Rutgers University.

Date: Tuesday, October 30, 2018
Check with the NYSAS website (www.nysas.org) for possible changes to the date or other details.

Time: 5:15-5:30: Arrive
5:30-6:30: Dinner, networking, and dessert
6:30-7:30: Welcome & presentation
7:30-8:00: Q&A and Wrap up

Place: Horiba Scientific*
20 Knightsbridge Road
Piscataway, NJ 08854

Cost: \$15 (members), \$5 (students)

*Note that Horiba has moved their location from their historical facility. Condensed directions are: take Route 287 to Exit 8, or take Route 18 North straight. It becomes Hoes Lane, then go left onto Knightsbridge. Go around the circle to the Horiba building on the left or use your GPS or Mapquest or Google Maps to get directions from your location.

Our website is: www.nysas.org. Please consult the website regularly for updates about the meeting details, as well as possible changes as well as information about future meetings. If you plan to attend a meeting, please notify the NYSAS secretary debperu@outlook.com beforehand so we can make arrangements for the expected number of people. Your name will then also be added to our e-mail list for future meeting announcements unless you request not to be added.



HUDSON-BERGEN CHEMICAL SOCIETY and THE SCHOOL OF NATURAL SCIENCES OF FAIRLEIGH DICKINSON UNIVERSITY

*In celebration of NATIONAL CHEMISTRY
WEEK Invite you to the lecture*

**Phosphostasis and Cell Fate –
Phosphorylation States of PEA-15 and
Regulation of Cell Proliferation and
Apoptosis**

Speaker: Dr. Yufeng Wei
Department of Chemistry
New Jersey City University
Jersey City, NJ

Abstract: Cell fate is determined by the relative tendency of cell proliferation and cell death. PEA-15 (phosphoprotein enriched in astrocytes, 15 kD) is a small, non-catalytic, death-effector domain (DED) containing protein that regulates both proliferation and apoptosis through protein-protein interactions under specific phosphorylation states. PEA-15 is widely expressed in different tissues and highly conserved among mammals, and the overall expression level of PEA-15 is almost constant in most tissues. PEA-15 contains two phosphorylation sites on the C-terminal tail, Ser104 and Ser116, and the phosphorylation states of these two serine residues vary significantly depending on cell and tissue types and/or cellular environment and conditions. Unphosphorylated PEA-15 inhibits extracellular signal-regulated kinase (ERK)-dependent cell proliferation, while the doubly phosphorylated protein binds to Fas-associated death domain (FADD) and blocks death receptor mediated apoptosis. Using advanced nuclear magnetic resonance (NMR) techniques, we revealed a surprising conformational change of the PEA-15 DED upon interaction with ERK2. In addition, DED conformation is significantly modulated by the phosphorylation of the C-terminal serine residues, which switches binding specificity from ERK1/2 to FADD. Based on our most recent results, we propose a phosphorylation homeostasis (or phosphostasis) model, in which the balance between phosphorylated and unphosphorylated PEA-15 is strictly regulated in different cell types and tissues and controls the cell fate, any disruption of the delicate balance could lead to various diseases, such as cancers and neurodegenerative diseases. We are trying to substantiate the phosphostasis model using various techniques, including NMR, quantitative Western blot, and cell cul-

ture functional assays, to study the conformational changes of PEA-15 upon phosphorylation and the effects of phosphorylation on apoptosis and proliferation.

Biography: Dr. Yufeng Wei graduated from Peking University in Beijing with a B.S. in Chemistry. He went to Columbia University in the City of New York for his graduate study, and received PhD in Biochemistry and Biophysics. Then he did a short post-doctoral training at the University of Michigan before he moved back to New York City as a Research Associate at the Rockefeller University, where he started his research on molecular biology and biophysics of cancer-related projects. Later he became a faculty member of Seton Hall University, and moved to New Jersey City University, where he is now an Assistant Professor of Biochemistry, and continued with cancer and drug abuse research at the interface of biochemistry and molecular and cellular biology. He has published over 20 peer-reviewed articles in top scientific journals, including Nature Structural and Molecular Biology, Molecular Cell, and the Journal of American Chemical Society. He is a recipient of National Institutes of Health grants and presented his research at international conferences and several universities and institutes in the U.S., China, and the Philippines.

Date: Thursday, October 25, 2018

Times: Refreshments 5:00 PM

Lecture 5:30 PM

Place: Fairleigh Dickinson University
Dickinson Hall Room 4468
Teaneck, NJ 07666

Cost: Free

Reservations required: Dr. Mihaela Leonida
(201)692-2338, e-mail:

mleonida@fdu.edu, by October 18, 2018.



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TEACHING STUDENTS WITH DISABILITIES

A 2017 NSF report (Women, Minorities and Persons with Disabilities in Science and Engineering) reports that 6% of the US population ages 18-34 is estimated to have a disability, and that in 2012 about 11% of the undergraduate population reported a disability. Nearly 25% of these students enroll in a science or engineering field. Do you feel knowledgeable about including students with physical disabilities requiring mobility, visual or hearing accommodations in the laboratory setting?

The New York Section has received an Innovative Projects Grant (IPG) to hold a day-long symposium on methods for adapting laboratory experiences for students with disabilities. Our target audience includes high school and college science faculty, graduate teaching assistants, and disability service administrators. The program is being co-sponsored by the national ACS Committee on Chemists with Disabilities and the CUNY Graduate Center, and will be free to attendees.

The program will be held on **Saturday, October 27** in Manhattan, at the CUNY Graduate Center, Fifth Avenue and 34th Street, tentatively from 9:30 AM to 3:00 PM. In addition to the live audience, we plan to videotape the symposium and livestream it on Facebook Live.

Potential topics will include, but not necessarily be limited to:

- safety considerations in the lab environment
- adapted lab equipment and procedures
- electronic data collection in the laboratory
- adaptations for written handouts, computer resources, and evaluative materials
- ACS materials and programs
- service dogs in the laboratory environment

Registration information will be available in September, but if you have questions or want to ensure you are on the mailing list, please contact the symposium organizer, Dr. Patricia Redden, at predden@saintpeters.edu. If you have expertise in any of the topics, please contact Dr. Redden to be included in the program.

Date: Saturday, October 27, 2018

Times: 9:30 AM - 3:00 PM

Place: CUNY Graduate Center
Fifth Avenue and 34th Street
New York, NY

The registration website for the Teaching Students with Disabilities symposium is <http://www.newyorkacs.org/meetings/Symposium/Symposium.php>



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.



Obituary



Richard D. Cassetta, Professor Emeritus of the College of New Rochelle, died peacefully at his home in Rye, New York on July 21, 2018. Professor Cassetta was eighty-one years old.

Professor Cassetta was born in Bronx, New York on May 1, 1937. He attended Manhattan College, where he graduated with a B.S. degree in Chemistry in 1959, earned a M. S. degree in Chemistry from St. John's University in 1961 and did doctorate work at Tufts University.

Professor Cassetta taught physical and organic chemistry at the College of New Rochelle for 47 years until his retirement in 2009. He taught and mentored generations of future chemists, teachers, doctors, nurses, and business people during his time at the college. He was an active member of the American Chemical Society and

served as Chair of the New York Section of the American Chemical Society and as its Councilor for several years.

He is survived by his wife Carole of 56 years, their six children Richard P. Cassetta, Monique Class, Paul R. Cassetta II, Dr. Michael Cassetta CDR, Stephen Cassetta (USNR, Ret.) and Christine Kenny; sons-in-law Eric Class and Mike Kenny; daughters-in-law Tonia Jane Veazey Cassetta, Maureen Cassetta, Ann Cassetta; and brothers Douglas Cassetta and John Cassetta. He was a devoted grandfather to 14 grandchildren.

Professor Cassetta lived in Rye, NY for forty-eight years. He was a member of Resurrection Parish and was an active member of the community. Professor Cassetta served for a number of years as a little league baseball coach and was an avid boater, having kept a boat at Rye Marina throughout the time he lived in Rye

Professor Cassetta, very much, enjoyed being a member of the ACS New York Section - for over 50 years. He served on numerous committees and attended an extraordinary amount of Section events. He was a highly respected and dedicated ACS volunteer. His kindness, his interest in others and his perseverance will always be remembered. Professor Cassetta was a true and loyal friend to many and is greatly missed.

PROFESSOR RICHARD D. CASSETTA: AMERICAN CHEMICAL SOCIETY SERVICE

NATIONAL ACS ACTIVITIES:

Steering Committee for 202nd ACS National Meeting, NYC, 1990-91
Councilor 2011-2013, 1994-96, 1990-92, 1987-89, 1983-85
Alternate Councilor 1997, 1993, 1996-2001, 2004-06, 2008-10, 2014-17

NEW YORK SECTION ACTIVITIES:

Chair 1984
Chair-elect and Program Chair 1983
Outstanding Service Award 1989
Outstanding Service Award Committee 1989-92, Chair 1992;
Long Range Planning Committee Member since 1981, Chair 1986-2008
Councilor 1983-85, 1987-89, 1990-92, 1994-96, 2011-13
Alternate Councilor 1993, 1997-2001, 2004-06, 2008-2010, 2014-17
Director-at-Large 1976-77
Nichols Medal Jury Member 1983-87, Chair 1987
Program Chair, Metrochem 1985
Educational Activities, Chair 1981-82
Membership Committee 1977-80
Student Affiliate Committee Member since 1976, Chair 1979-80
Chemical Education Committee 1975-88, Chair 1980-81
Salute to Excellence Award 2007

WESTCHESTER CHEMICAL SOCIETY ACTIVITIES:

Chair 1972, 1982

MIDDLE ATLANTIC REGIONAL MEETING ACTIVITIES:

MARM '93 & MARM '97 Planning Committees
MARM Representative 1988-date
MARM '93 & MARM '97 Planning Committees; MARM Representative since 1988

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:

November, 2018 – EAS Gold Medal Award Program honoring Professor Igor Lednev, University of Albany sponsored by NY/NJ SAS and EAS. – held in conjunction with the Eastern Analytical Symposium (EAS), November 11-14, 2018

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 photo-thermal 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 as soon as they become available. Please consult the website regularly for updates about the meeting details, as well as possible changes and information about future meetings. If you plan to attend a meeting, please email the NY/NJ SAS secretary at 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

FUTURE MEETINGS

Note that the meeting tentatively scheduled for Tuesday, November 6, 2018 must be postponed until a Winter/Spring 2019 time frame.

Special Seminar – “Chemistry in Cameroon: Quality Control of Drugs”



Speaker:
Rolande Hodel, PhD
Adjunct Lecturer
Department of
Chemistry
Westchester
Community College
Valhalla, NY

Founder and
President of
AIDSfreeAFRICA
Ossining, NY 10562
RRHodel@aol.com

Abstract: AIDSfreeAFRICA's mission is to implement and advance pharmaceutical drug production in Sub-Saharan Africa. Although AIDSfreeAFRICA has been working in Cameroon since 2005, the organization has only recently decided to tackle the problems that arise because of the general lack of basic laboratory services in the African nation.

AIDSfreeAFRICA is often approached and asked to take samples of pharmaceutical drugs to the USA and test them for their composition and/or quality. The import of pharmaceuticals in Cameroon is largely unregulated. Much of the imported drugs are brought into the country from Nigeria by salespeople who buy and sell drugs with little regard for the origin of the drugs. Additionally, the salespeople are not educated on how to transport or store drugs properly. We suspect that the main problem with drug quality in Cameroon is degradation due to heat and humidity rather than the counterfeit drugs. However, without the ability to quality control drugs on a large scale, it is hard to say.

In this talk Dr. Hodel will discuss the efforts underway to bring quality control to Cameroon.

Date: Thursday, November 15, 2018

Times, Place, Additional Information, see under October meeting, page 8.

**Special Seminar – “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

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

Date: Thursday, December 6, 2018
Times, Place, Additional Information, see
under October meeting, page 8.

WESTCHESTER CHEMICAL SOCIETY

The Treasurer and Education Secretary of the Westchester Chemical Society, Dr. Peter Corfield, of the Department of Chemistry at Fordham University, gave a talk at the Annual Meeting of the American Crystallographic Association in Toronto, Ontario, July 20-24, which covered several years of research at Fordham University. The title of the talk was: **Mixed-Valence Copper Cyanide Polymers – Successes, Surprises and Disappointments.**

WESTCHESTER CHEMICAL SOCIETY

On Wednesday, August 22, 2018, the co-chair of the Westchester Chemical Society, Dr. Rolande Hodel, of the Department of Chemistry at Westchester Community College and President and Founder of the non-profit AIDSfreeAFRICA, had the honor of giving her third talk (previously 2011 and 2015) to the Hudson Valley Science Café on her work with AIDSfreeAFRICA in Cameroon. She spoke on “Chemistry in Cameroon: Quality Control of Drugs and Water Safety”. For those unfamiliar with them, a Science Café is a gathering in a Café, Pub or Restaurant, open to the public, with a short presentation of a topic followed by discussion. The essence of a Science Café is informality, with groups seated around tables with food and drink to encourage conversation. The café was held at The Flaming Grill & Buffet in the Newburgh Mall, Newburgh, NY. The photo is of Ellen Engelson, an AIDSfreeAFRICA volunteer and Donations Manager, Dr. Hodel, Maryna Kyriak, an AIDSfreeAFRICA volunteer, and Dr. Toby Rossman, chair of the Hudson Valley Science Café.



Ellen Engelson, Rolande Hodel, Maryna Kyriak and Toby Rossman.

(Photo courtesy of Rolande Hodel)

LONG ISLAND SUBSECTION**FUTURE MEETINGS**

Clean Direct Use of Biomass for Thermal Applications

Speaker: Dr. Rebecca Trojanowski
Farmingdale State University
Brookhaven National Laboratory

Date: Thursday, November 1, 2018

Time: (Refreshments start at 5:30 PM
6:00 PM to 8:00 PM

Place: Queensborough Community
College, Room 112
222-05 56th Avenue
Queens NY 11364

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

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 CO₂ 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.



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 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 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 Applications

OPEN-NJ Scholarship Program Department of Chemistry and Biochemistry



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Receive one of the scholarships (\$10,000/year for 2 or 3 years) to enter one of the following programs at Montclair State University

- *Masters in Pharmaceutical Biochemistry*
- *Masters in Chemistry*
- *Masters in Chemistry with a Concentration in Biochemistry*

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Information: <https://www.montclair.edu/csam/open-nj/>

<https://www.montclair.edu/graduate/news/article.php?ArticleID=16127>

Requirements for Program

- Minimum overall 3.0 GPA (B.S. or B.A. degree)
- Completed General Chemistry I (with lab), General Chemistry II (with lab), Organic Chemistry I (with lab), Organic Chemistry II, Calculus I and II and a year of Physics.
- US citizen, national, admitted refugee or permanent resident
- Enrolling full time in an MSU Department of Chemistry and Biochemistry M.S. program
- Financial aid eligible as determined by the Office of Financial Aid.
- Committed to participating in all OPEN-NJ meetings including networking events.

Apply

Apply to the Graduate Program at Montclair State University (<http://www.montclair.edu/graduate/>) AND email Dr. Nina Goodey (goodeyn@mail.montclair.edu) to indicate interest in the OPEN-NJ Scholarship Program. The OPEN-NJ Selection Committee will use your graduate school application.

Questions?

Please, email Dr. Nina Goodey (goodeyn@mail.montclair.edu).



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. Neil Jespersen, at jespersen@stjohns.edu.

National

PROGRAM IN A BOX

The countdown has begun to our next live ACS Program-in-a-Box!

Voyage to Mars: Red Planet Chemistry

Gather a group on Mole Day to celebrate National Chemistry Week as host Sam Lemonick of Chemical & Engineering News guides you and your attendees through the chemistry and challenges of long-term space travel as well as the materials, biochemistry, and astrochemistry that will make a manned mission to Mars possible.

Register your group by Friday, September 28th to receive your FREE box** of raffle prizes, handouts, and other hosting materials to make this your easiest event of the Fall!

What You Will Learn

How the Curiosity Rover has revealed the geologic history of Mars, and how this knowledge can help inform us about the environments that existed on the surface of

Mars, and even Earth, during the time when life evolved

The unique challenges of long term space travel and a profile of the current work to ensure that humans can survive the voyage

What is the current state recycle waste research that will help sustain valuable materials for astronauts during long deep-space missions using biopharmaceutical production

*This event is aimed at collegiate-level students and above, though it may be appropriate for certain high school groups. Contact the ACS PIB team at multimedia@acs.org if you have any questions about the event content.

Meet the Experts

Kirsten Siebach
Rice University

Brett A. McGuire
National Radio Astronomy Observatory

Mark Blenner
Clemson University

Mary Ann Meador
NASA Glenn Research Center

Michael Meador
NASA's Game Changing Technologies Program

Susanna Widicus-Weaver
Emory University

What is ACS Program-in-a-Box?

ACS Program-in-a-Box is the easiest event you'll ever host because "it's all in the box." With very little effort (acquire the space and gather the crowd), you can host an energetic science event that engages chemistry students and early career chemists.

Register now to receive a physical box of materials and resources delivered directly to you at no cost and a link to join the live interactive video on October 23rd at 6:45pm ET.** Learn more and sign up at www.acs.org/PIB

**Physical boxes are an exclusive benefit for ACS-affiliated groups (Student Chapters, ChemClubs, Local Sections, etc...) All other groups will receive a digital download of box materials. Physical boxes can only be shipped to non-P.O. Box addresses in the United States, Mexico, Canada, and US Territories. If you have any questions about your group's eligibility for receiving a box, please contact us at multimedia@acs.org.

In the News

INDIANA UNIVERSITY-PURDUE UNIVERSITY INDIANAPOLIS

Serendipitous Discovery by IUPUI Researchers May Lead to Environmentally Friendly Lubricant

INDIANAPOLIS -- Seed oil components of an ornamental flower could provide a direct pathway for designing a new class of environmentally friendly lubricants.

Researchers at the School of Science at IUPUI identified the compound in the seed oil of the *Orychophragmus violaceus*, which is produced in a manner unlike any other fatty acid. The study was published online today in the journal *Nature Plants*.

The *Orychophragmus violaceus* plant is a purple flower native to China; it's commonly referred to as the February orchid. While collaborating on the *O. violaceus* plant's biology and genetic makeup, researchers at Huazhong Agricultural University in Wuhan, China, and the University of Nebraska-Lincoln encountered a bit of a mystery: All plant seeds contain oils as energy reserves for later growth, but researchers noticed the February orchid seed oils were unusual.

They called upon IUPUI bioorganic chemist Robert Minto, who specializes in identifying natural products and unknown compounds.

"This was a serendipitous discovery because we didn't think there were any unusual compounds in the plant," Minto said. "It turned out that almost half of the seed oil is these unusual fatty acid compounds that had never been identified."

Minto and IUPUI researcher Alicen Teitgen determined the major compound's structure, a process complicated by the plainness of a portion of the molecule. This result led the research team to the realization that the way the *O. violaceus* plant's seed oil is made is extraordinary. The seed oil contains a fatty acid, which is a long linear molecule made when some two-carbon units are added to the end of the molecule over and over again. Each of these elongation steps requires a four-reaction cycle to add the carbon units. During normal fatty acid production, no reaction in the set of four is left out. In *O. violaceus*, researchers discovered, one of those cycles is only partially completed,

leading to the unusual compounds.

"This the first time it's ever been observed in any fatty acid biosynthesis that a partial cycle happens and then more cycles occur afterward," Minto said. "There are many natural products, such as certain common antibiotics, that are made using a chemically similar process that leaves out steps in nearly every cycle. Alternately, there are fatty acid biosynthetic pathways where all the steps are completed. But there has been nothing in between.

"The biosynthesis of this seed oil compound is finally an example of the in-between."

These discoveries could provide clues as to what chemically makes the *O. violaceus* seed oil a superior lubricant. Compared to castor oil, a common bio-based lubricant used in engine oils, researchers found that February orchid seed oil demonstrates better friction and wear reduction and withstands higher temperature stability. Lubricant performance testing was conducted on steel surfaces at the University of North Texas.

"Commercially, it may be prove to be a really good biorenewable component of lubricants," Minto said.

"Discontinuous Fatty Acid Elongation Yields Hydroxylated Seed Oil with Improved Function" is published in the Aug. 27 issue of *Nature Plants*. Co-corresponding authors are Minto; Edgar Cahoon, University of Nebraska-Lincoln; and Chunyu Zhang, Huazhong Agricultural University, Wuhan, China. Additional authors are Xiangjun Li; Alicen M. Teitgen, IUPUI Ph.D. graduate; Asghar Shirani; Juan Ling; Lucas Busta; Rebecca E. Cahoon; Wei Zhang; Zaiyun Li; Kent D. Chapman; and Diana Berman, University of North Texas.

About the School of Science at IUPUI

The School of Science at IUPUI is committed to excellence in teaching, research and service in the biological, physical, computational, behavioral and mathematical sciences. The school is dedicated to being a leading resource for interdisciplinary research and science education in support of Indiana's effort to expand and diversify its economy.

The seed oil components of the February orchid, native to China, may lead to a new class of environmentally friendly lubricants.