



THE NUCLEUS

March 2018

Vol. XCVI, No.7



Monthly Meeting

At the Boston Museum of Fine Arts. MFA staff to speak on the science of art conservation

A Chain Reaction for Peace

By Zafra Lerman and Ben Margolin

Photos from the January Meeting

By Morton Z. Hoffman

A Report on the 2017 NESACS Process Chemistry Symposium

Chemistry Is Showcased at the 2017 NESACS Process Chemistry Symposium

By Katherine Lee, Matthew Maddess, Steven Mennen, Erin O'Brien, Scott Plummer, and Stefanie Roeper

Over 200 people from over 50 different companies and academic institutions convened for a day of top-notch science at the annual NESACS Process Chemistry Symposium, held at Merck Research Labs in Boston, MA on October 12, 2017.

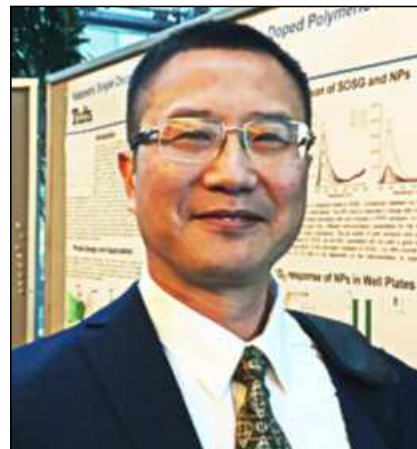
The symposium showcased 8 speakers who represented academic institutions from across the United States and biotech and pharmaceutical companies from the local scientific community: Stephen Buchwald, MIT; Timothy Curran, Vertex; Jamie McCabe Dunn, Merck; Steven Mennen, Amgen; Sarah Reisman, California Institute of Technology; Richmond Sarpong, University of California, Berkeley; Corinna Schindler, University of Michigan; and Jim Yang, Biogen.

The program featured real-life examples of process chemistry problem-solving from speakers from industry on topics including process development of a bicyclic β -amino acid synthon, phos-



Timothy Curran (Vertex)

phoramidate prodrugs, a high complexity BACE inhibitor, and phosphorothioate oligonucleotides; and invigorating lectures by academic speakers on cutting-edge organic synthesis methodologies such as carbonyl-olefin metathesis and asymmetric hydrofunctionalization, as well as strategies for the synthesis of



Jim Yang (Biogen) All photos by Katherine Lee

complex polycyclic alkaloid natural products. A new feature of the NESACS Process Chemistry Symposium in 2017 was the presentation of posters by selected students from local academic institutions.

In addition to delivering a powerful scientific program, the day-long symposium fostered many opportunities for attendees to interact with each other and for the representatives from symposium sponsor companies to connect with potential clients over breakfast, lunch and coffee breaks, as well as at a lively networking reception at the close of the day.

The 2017 NESACS Process Chemistry Symposium was made possible thanks to gracious financial support from Amgen Inc., Biogen, Merck, Novartis, Vertex Pharmaceuticals, Johnson Matthey, SK Life Science, Mettler Toledo, Laviana, PCI Synthesis, J-Star Research, Inc., Navin Fluorine, Strem Chemicals, Inc., Flamma, and Cambrex.

The 2017 NESACS Process Symposium Committee included Katherine Lee, Pfizer; Matthew Maddess, Merck; Steven Mennen, Amgen; Erin O'Brien, Biogen; Scott Plummer, Novartis; and Stefanie Roeper, Vertex. The committee would like to thank Merck for hosting the symposium, and dedicated individuals including Anna Singer, Jim Piper, Ashis Saha, and Ken Drew from NE-

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NORTHEAST STUDENT CHEMISTRY RESEARCH CONFERENCE

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A Chain Reaction for Peace

*This is a guest editorial by **Zafra Lerman**, president of the Malta Conferences Foundation, and **Ben Margolin**, a volunteer writer for the Malta Conferences Foundation.*

Given the tumultuous political situation in the Middle East, it is important - perhaps now more than ever - to foster new grassroots collaborations in the region. Imagine a room with Israeli, Palestinian, and Syrian scientists collaborating on regional issues while also building friendships. For many, this seems impossible. At the Malta Conferences, this is the norm.

The eighth Malta Conference (Malta VIII) was held Dec. 10-15, 2017, in Malta. Malta VIII had workshops that focused on chemical, biological, and nuclear security; air and water quality; sustainability of energy and materials resources; medicinal chemistry, organic and biochemistry, biophysics and biotechnology; science and technology education at all levels; and entrepreneurship and innovation.

A total of 26 oral and 39 poster presentations were given in the workshop sessions by participants from the Middle East and Morocco. During the workshop on entrepreneurship and innovation, participants dove in and envisioned companies that would require cross-border collaboration. For example, Israeli and Gazan participants developed the concept of a start-up company, Every Drop Counts, for the conservation of water resources.

Every two years since 2003, top scientists from throughout the Middle East have come together to tackle regional issues despite the hostility among their governments. At the Malta Conferences, the goal is to create a critical mass of scientists to start a chain reaction for peace, to stop demonizing the unknown other, and to resolve regional problems. More than 600 Middle East scientists and 15 Nobel laureates are now in the network.

Politicians see national boundaries; the environment does not. Many aquifers in the Middle East are shared, and pollution knows only one sky. Therefore, no matter how polarized politics can get,

there are many environmental issues that one nation alone cannot solve - only regional collaboration can truly have an impact.

So at this year's conference, a resolution concerning water quality in Gaza was drafted and approved overwhelmingly by the participants from the Middle East. This resolution, coauthored by scientists from Israel and Gaza, addressed the most critical aspects of the humanitarian water crisis in Gaza while calling on "the international community to establish a task force that will be able to overcome the political difficulties and will enable professional treatment of the water and environment."

As a result of the relationships developed at the conference, Israelis, Palestinians, Jordanians, and Syrians were able to work together toward a common goal. An Israeli participant said, "Do you know what it means for us to spend five days talking to scientists from countries that otherwise we would never have a chance to meet? We de-

continued on page 10

ResMed: Residential School on Medicinal Chemistry and Biology in Drug Discovery
June 10-15, 2018
Drew University, Madison, NJ

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

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

Bill Greenlee, Vince Gullo & Ron Doll - Co-organizers

Attendees will be staying at the Madison Hotel

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Monthly Meeting

The 977th Meeting of the Northeastern Section of the American Chemical Society

Thursday, March 29, 2018

Boston Museum of Fine Arts

Avenue of the Arts
465 Huntington Avenue
Boston, Massachusetts 02115

Please join us for a special monthly meeting at the Museum of Fine Arts! Register early to guarantee your spot! Your registration fee will include a special presentation by MFA staff on the Science and Chemistry of Art at the MFA. Entrance to the Museum (**\$25 value**) will be included in your registration with a special reception before the event. Please note only light snacks/appetizers will be served. Restaurants will be open in the MFA if you are looking for something more substantial.

4:30 pm NESACS Board Meeting

6:30 pm Social Hour/Reception

7:30 pm Andrew Scholte., NESACS Chair-Elect, Presiding

Speakers:

Richard Newman, Head of Scientific Research: *Introduction/overview of chemical analysis at the museum*

Michele Derrick, Schorr Family Associate Research Scientist: *Dye analysis and identification of dyes used in 19th century Japanese woodblock prints*

Abigail Hykin, Objects Conservator: *Treatment of the "Guanyin", a Chinese polychrome sculpture from the 12th century* (http://www.mfa.org/collections/conservation/feature_guanyin), including radiocarbon dating and wood identification, along with ongoing study of two other figures, "Guanyin's companions" acquired by the MFA at the same time as the Guanyin and said to be from the same temple.

YOU MUST REGISTER IN ADVANCE TO ATTEND THE MEETING: THE PUBLIC IS INVITED

- For those who would like to join us for this meeting, register by noon, Thursday, March 22, 2018 at the NESACS Eventbrite page: <https://chemistry-of-art-at-mfa.eventbrite.com> Cost: Members, \$30; Non-members, \$35; Retirees, \$20; Students, \$10.

If you have any questions or require additional information, contact the Administrative Coordinator, Anna Singer, via email at secretary@nesacs.org. ◇

The NESACS website

Updated frequently · Late-breaking news · Position Postings
Back issues of the Nucleus · Career-related Links · Awards and Scholarships

www.nesacs.org

Jennifer A. Doudna to Receive 2018 Esselen Award

Jennifer A. Doudna, Ph.D., Howard Hughes Medical Institute Investigator, Li Ka Shing Chancellor's Chair in Biomedical and Health Sciences, Professor, Departments of Molecular & Cell Biology and Chemistry at the University of California - Berkeley; Executive Director, Innovative Genomics Institute is being presented with the Gustavus John Esselen Award for Chemistry in the Public Interest for her work on the structural and mechanistic analysis of the CRISPR system.

Dr. Doudna's work on the groundbreaking Crispr process utilizes the Cas9 enzyme to splice DNA with pinpoint reliability, allowing precise editing of the genome. This has been recognized universally as a watershed moment in science. Scientists around the world are using the process to explore applications such as crop management, control of insect-borne diseases, cancer treatment, and alleviation of human genetic anomalies.

While these applications are still in development, Dr. Doudna is raising her voice in support of international discussions that recognize the potential for both advancement and abuse of this technology, and the need to develop a consensus on the direction we want to proceed as a society.

The Gustavus John Esselen Award for Chemistry in the Public Interest honors outstanding scientific achievement in scientific and technical work which contributes to the public well-being and has, thereby, communicated the positive values of the chemical profession.

The award is presented annually by

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January Meeting

New Bylaws Passed Unanimously

The January Meeting was held at Nova Biochem in Waltham. Nova is one of several companies that have hosted multiple NESACS section meetings in the last five years. This is a very valuable contribution by local companies and is greatly appreciated.

The January Meeting is special because the Annual Meeting precedes the regular monthly meeting of the NESACS Board. At the end of the Annual Meeting the Chair for the preceding year passes leadership to the incoming chair. Lee Johnson completed his year as chair and Mindy Levine replaced Lee as Chair and hosted the remainder of the meeting.

The speaker at the January Meeting is often the incoming President of the American Chemical Society. The 2017 ACS President, Alison Campbell, was guest speaker at the January 2017 Meeting. The 2018 ACS President, Peter Dorhout, was our guest speaker for this meeting. He gave an interesting talk about his passion for leadership and his pathway to ACS President.

At each table at the meeting was a copy of the old Constitution and Bylaws and a copy of the newly proposed Bylaws for the Section. Lee Johnson explained the reasons for the changes and the team who had worked on the new bylaws. He then conducted a vote of the NESACS members in attendance and the new bylaws were passed unanimously. These new bylaws were mainly enacted to allow electronic balloting in future NESACS elections. The new streamlined and updated bylaws are also more in line with current ACS practices than the historic "Constitution" and its bylaws. ◇

Photos from the January 2018 Meeting

By Morton Z. Hoffman



(l-r) Lee Johnson (NESACS Immediate Past-Chair), Jack Driscoll (Chair, NESACS Public Relations Committee), Peter Dorhout (ACS President), Mindy Levine (NESACS Chair).



Peter Dorhout (ACS President) speaking on "Challenges With and For Chemistry - Being Prepared."



Lee Johnson (NESACS Immediate Past-Chair) presenting the revisions to the NESACS bylaws.



Mindy Levine (NESACS Chair) presiding over the evening's program.



Jack Driscoll (PID Analyzers) introducing the distinguished speaker.

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WWW.NESACS.ORG/CAREERS

Photos from the January 2018 Meeting

Continued from page 6



Peter Dorhout (at left) and Tom Gilbert.



(l-r) Brian D'Amico (NESACS Membership Chair), Mindy Levine (NE-SACS Chair), Peter Dorhout (ACS President).



(l-r) Jens Breffke (Boston Electronics), Peter Dorhout (ACS President), Matthias Eberstadt (Takeda Pharmaceuticals), Hicham Fenniri (North-eastern University).



(l-r) Jackie O'Neil (Alkermes, Inc.), Wayne Jones (University of New Hampshire), Bob Lichter (Merrimack Consultants).



ACS Directors-at-Large: Dorothy Phillips (Waters Corporation - retired), Wayne Jones (University of New Hampshire).



Dinner in the Nova Biochem Cafeteria

Announcement

The Norris-Richards Undergraduate Summer Research Scholarships

March 29, 2018 Deadline

The Northeastern Section of the American Chemical Society established the James Flack Norris and Theodore William Richards Undergraduate Summer Scholarships to honor the memories of Professors Norris and Richards by promoting research interactions between undergraduate students and faculty.

Research awards of \$3500 will be given for the summer of 2018. The student stipend is \$3000 for a minimum commitment of ten weeks of full-time research work. The remaining \$500 of the award can be spent on supplies, travel, and other items relevant to the student project.

Institutions whose student/faculty team receives a Norris/Richards Undergraduate Summer Research Scholarship

are expected to contribute toward the support of the faculty members and to waive any student fees for summer research. Academic credit may be granted to the students at the discretion of the institutions.

Award winners are required to submit a report (~5-7 double-spaced pages including figures, tables, and bibliography) of their summer projects to the Editor of *The Nucleus* by November 1, 2018 for publication in *The Nucleus*. They are also required to participate in the Northeast Student Chemistry Research Conference (NSCRC) in April 2019.

Eligibility:

Applications will be accepted from student/faculty teams at colleges and universities within the Northeastern Section. The undergraduate student must be a chemistry, biochemistry, chemical engineering, or molecular biology major in good standing, and have completed at least two full years of college-level chemistry by Summer, 2018.

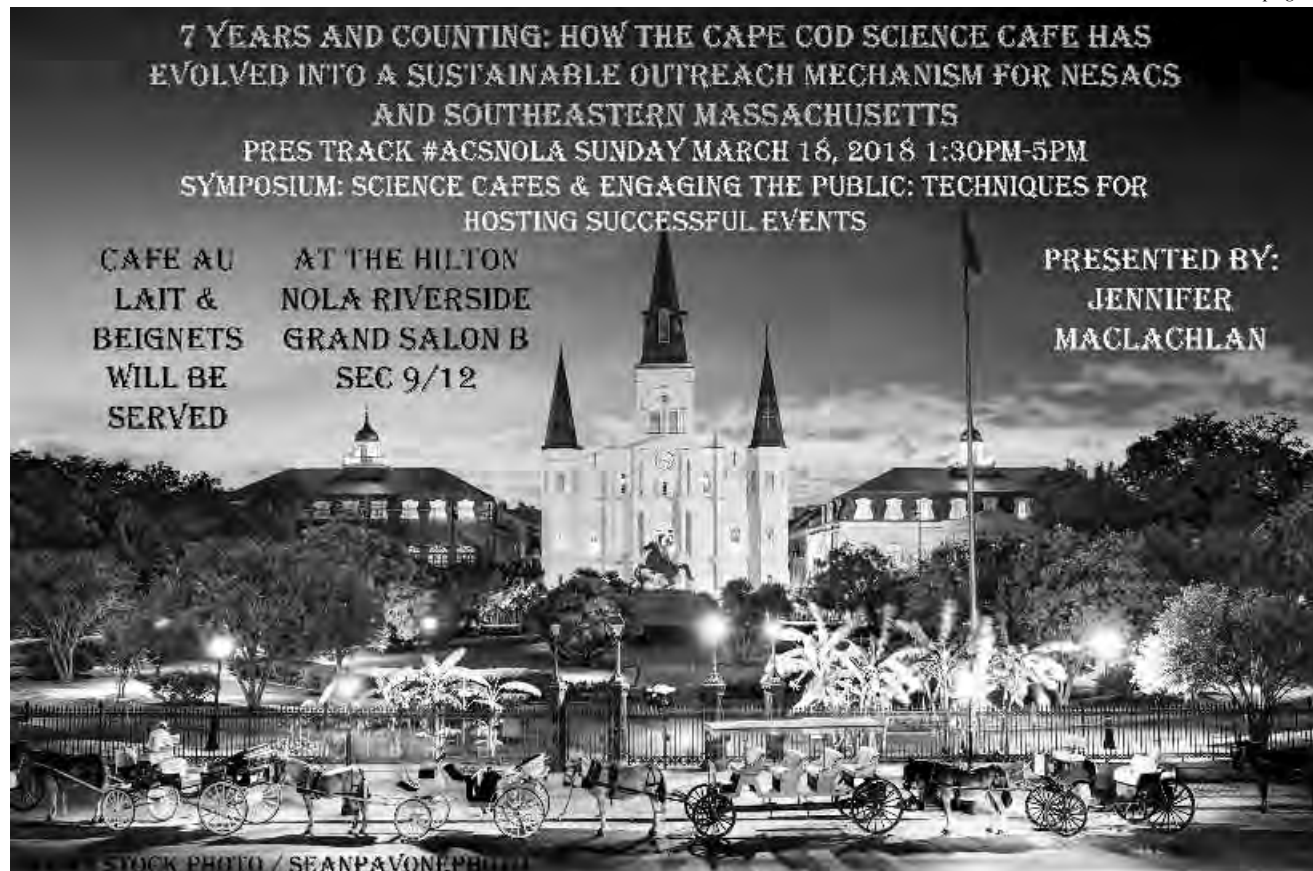
Criteria for Selection:

- scientific merit - important factors include the originality of the project, the depth of the investigation, the significance of the scientific questions you pose, and the methods you propose to use.
- feasibility - evidence must be provided to demonstrate that the project can be completed by you in the time available and with the facilities at your disposal.
- preparation - your academic record, your ability to handle the project, and the background study you have made on your research problem will be taken into consideration.
- commitment - the depth of your commitment, and that of your department, faculty, and institution to independent research as a vital component of science education will be assessed.

Application for 2018:

- Announcement Letter
- Instructions
- Student Application Form

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7 YEARS AND COUNTING: HOW THE CAPE COD SCIENCE CAFE HAS
EVOLVED INTO A SUSTAINABLE OUTREACH MECHANISM FOR NESACS
AND SOUTHEASTERN MASSACHUSETTS
PRES TRACK #ACSNOLA SUNDAY MARCH 18, 2018 1:30PM-5PM
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CAFE AU LAIT & BEIGNETS WILL BE SERVED AT THE HILTON NOLA RIVERSIDE GRAND SALON B SEC 9/12

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Richards Scholarship

Continued from page 8

- Faculty Information Form

Application available at http://www.nesacs.org/awards_norris-richards.html

Completed applications are to be **received** by the Chair of the Selection Committee no later than **March 29, 2018**. Please note that applications via email (PDF format) are strongly preferred. Applicants will be notified of the results by email by April 13, 2018, with written confirmation to follow.

Selection Committee Chair:

Email: jonathan.rochford@umb.edu
Professor Jonathan Rochford
Department of Chemistry
University of Massachusetts Boston
100 Morrissey Boulevard
Boston, MA 02125-3393 ◇

Q. Exactly, how many awards and scholarships does NESACS sponsor?

- A) One b) Two c) Many

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Keynote Address: Andrew Reichel, iRobot

Opening Remarks: Dr. Dorothy Phillips, "Women in STEM"

[facebook.com/STEMJourney](https://www.facebook.com/STEMJourney)

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ROBOTICS

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in the 21st Century

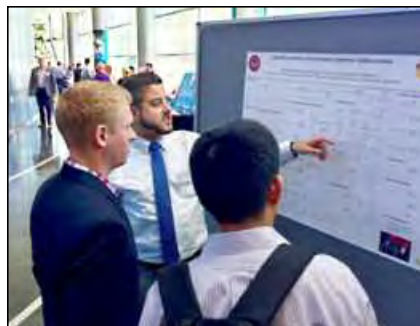
Process Chemistry Symposium

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SACS; Luigi Anzalone, Angie Angeles, and Suzie Opalka; and Johnny Bennet, LC Campeau, Tom Lyons, Aaron Sather, and Jeanne Callinan from Merck for helping to make the symposium a success. ◇



Professor Sarah Reisman (California Institute of Technology) with poster presenter Xiaowei Wu (Boston University)



Poster presenter Adam Szymaniak (Boston College)



Poster presenter Reem Telmesa (Boston University)

Chain Reaction

Continued from page 4

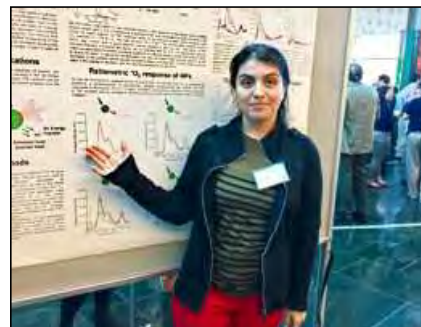
velop friendships and collaborations. Where else can we do it?"

The Malta Conferences continue to face a number of logistical challenges. One of the toughest is finding a host country that will issue a visa to all participants. There are scientists coming from Iraq, Syria, Iran, Egypt, Bahrain, Israel, Jordan, Kuwait, Lebanon, Libya, Oman, Qatar, Saudi Arabia, Turkey, United Arab Emirates, the Palestinian Authority, and Morocco. For Malta VIII, I [Lerman] was up at 3 a.m. before the conference began to ensure that Iranian and Syrian scientists would be able to attend.

At the end, all invited participants received a visa. Other obstacles include securing all the funding needed for each conference and dealing with the lack of money to employ paid staff. All the fundraising and the organizing of the conference is done by volunteers who serve on the Malta Conferences Foundation Board of Directors.

Despite all obstacles and against all odds, the Malta Conferences continue to play a crucial role for science diplomacy in the Middle East.

This article was reprinted with permission from C&EN; it originally appeared in the January 22, 2018, issue, p. 2. Ben Margolin graduated from Brandeis University in 2017. ◇



Poster presenter Fanny Frausto (Tufts University)

Jennifer A. Doudna

Continued from page 5

the Northeastern Section of the American Chemical Society and has honored such publicly renowned chemists as F. Sherwood Rowland and Mario J. Molina (effect of chlorofluorocarbons on the ozone layer), Carl Djerassi (birth-control drugs), and Kary Mullis (polymerase chain reaction).

The Esselen Award is given to honor the memory of G. J. Esselen, past chair of the Northeastern Section and founder of Esselen Research Corporation.

In recognition of her contributions, Dr. Doudna will receive the Gustavus John Esselen Award for Chemistry in the Public Interest on Friday, April 27, 2018, in a ceremony at Harvard University's Mallinckrodt Chemistry Laboratories at 8 p.m.

Free and open to the public, Dr. Doudna's award lecture, to follow the presentation, is entitled "Re-writing the Code of Life: The Impacts and Ethics of Genome Editing."

Further information concerning the award can be found at the Northeastern Section's website, www.nesacs.org. ◇



Poster presenter Dina Lloyd (Tufts University)

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<http://www.NESACS.org>

Note also the Chemistry Department web
pages for travel directions and updates.
These include:

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<http://chemistry.harvard.edu/calendar/upcoming>
<http://www.northeastern.edu/cos/chemistry/events-2/>
<http://chemistry.mit.edu/events/all>
<http://chem.tufts.edu/seminars.html>
<http://engineering.tufts.edu/chbe/newsEvents/seminarSeries/index.asp>
<http://www.chem.umb.edu>
<http://www.umassd.edu/cas/chemistry/>
<http://www.uml.edu/Sciences/chemistry/Seminars-and-Colloquia.aspx>
<http://www.unh.edu/chemistry/events>
<https://www.wpi.edu/academics/departments/chemistry-biochemistry>

March 1

Prof. Richard Anderson (U. Wisconsin-Madison)
WPI, Gateway Park, Room 1002
12:00 pm

Dr. Kevin Campos (Merck)
Dartmouth, Steele, Room 006
10:30 am

March 2

Prof. Ou Chen (Brown)
UMass-Lowell, Olney Hall, Room 218
3:30 pm

March 5

Prof. Edward Boyden (MIT)
MIT, Room 4-270 4:00 pm

Prof. Noah Burns (Stanford)
Boston College, Merkert 130 4:00 pm

March 6

Prof. James Rusling (Connecticut)
Tufts, Pearson, Rm. P106 4:30 pm

Prof. Dmitry Polyansky (Brookhaven National Lab)
U. of New Hampshire, Parsons N104
11:10 am

March 7

Prof. Colin Nuckolls (Columbia)
MIT, Room 4-370 4:15 pm

Prof. Jianfeng Cai (South Florida)
Boston College, Merkert 130 4:00 pm

March 8

Prof. Clemens Heske (Nevada)
Boston College, Merkert 130 4:00 pm

March 9

Prof. Matthew Kanan (Stanford)
Boston College, Merkert 130 4:00 pm

March 12

Prof. Susan Marqusee (UCal-Berkeley)
MIT, Room 4-270
4:00 pm

Prof. Christian Whitman (U. of Texas-Austin)
Boston University, Metcalf, Rm 113
4:00 pm

March 13

Prof. Sachdev Sidhu (Univ. of Toronto)
Tufts, Pearson, Rm. P106 4:30 pm

Prof. Susan Marqusee (UCal-Berkeley)
Brandeis, Gerstenzang 121 4:00 pm

Prof. Ib Chorkendorff (Technical University of Denmark)
"Water Splitting and the Making of Renewable Chemicals."
MIT, TBA 4:15 pm

Prof James Skinner (Chicago)
"Supercooled water: Simulations, theory and experiments in no man's land and the liquid-liquid critical point."
MIT, TBA 4:30 pm

March 14

Prof. Ib Chorkendorff (Technical University of Denmark)
"A Surface Science Approach for the Making of Heterogeneous Catalysts."
MIT, 4-370 4:15 pm

Prof. Bo Li (North Carolina-Chapel Hill)
Boston College, Merkert 130 4:00 pm

March 15

Prof. Shigehiro Yamaguchi (Nagoya University)
MIT, 6-120 4:00 pm

March 16

Prof. Shigehiro Yamaguchi (Nagoya University)
MIT, 6-120 4:00 pm

March 19

Prof. Anna Mapp (Michigan)
Harvard, Pfizer Lecture Hall 4:15 pm

Prof. Noah Burns (Stanford)
Boston University, Metcalf, Rm 113
4:00 pm

March 20

Prof. Anatoly Kolomeisky (Rice)
"Understanding Molecular Mechanisms of Biological Error Correction."
MIT, 6-120
4:30 pm

Prof. David Nicewicz (North Carolina-Chapel Hill)
Boston College, Merkert 130
4:00 pm

Dr. Thomas J. Bruno (National Institute of Standards and Technology)
"Vapor Sampling for Arson Investigation: at the Intersection of Physical and Analytical Chemistry."
U. of New Hampshire, Parsons N104
11:10 am

March 22

Prof. Ming Lee Tang (UCal-Riverside)
Boston College, Merkert 130
4:00 pm

March 23

Prof. Amit Basu (Brown)
UMass-Lowell, Olney Hall Room 218
3:30 pm

March 26

Prof. Wenshe Liu (Texas A&M)
Brandeis University, Gerstenzang 121
4:00 pm

Prof. Rienk Van Grondelle (University of Amsterdam)
MIT, TBA
4:30 pm

Prof. Aaron Beeler (Boston University)
Boston University, Metcalf, Rm 113
4:00 pm

March 27

Prof. Kyle Plunkett (Southern Illinois)
Tufts, Pearson, Rm. P106
4:30 pm

Prof. Tristan Lambert (Columbia)
Boston College, Merkert 130
4:00 pm

March 28

Prof. Stefan Hell (Max-Planck-Institute)
Harvard, Pfizer Lecture Hall
5:00 pm

March 29

Prof. Jennifer A Prescher (UCal-Irvine) & Dr. Ke Chen (Bristol-Myers Squibb)
MIT, 6-120
4:00 pm

Prof. Erwin London (Stony Brook)
"Using Cyclodextrins to Control and Investigate the Lipid Composition, Asymmetry and Domain Forming Properties of Artificial Vesicles and Living Cells."
WPI, Gateway Park Room 1002
12:00 PM

Prof. Jeffrey S. Moore (U. of Illinois-Urbana-Champaign)
Dartmouth, Steele, Room 006
10:30 am

**Notices for The Nucleus
Calendar of Seminars should be sent to:**

Xavier Herault, email:
xherault@outlook.com ◇