Monthly Meeting

Education Night at Tufts University

Esselen Award Address

By Eric N. Jacobsen

Summer Scholar Report

By Yue Ren, Harvard University

NESACS Election 2015

Candidate Statements
Encapsulation of Motor Particles in Vesicles using Microfluidic Devices

By Yue Ren, Harvard University

The interior of a cell is filled with organelles, macromolecules, proteins, sugars, microtubules of the cytoskeleton, and a host of other biochemicals; it is complex, dynamic, and crowded. For a living cell, an issue of scale arises when considering the transport of molecules and macromolecules. In eukaryotic cells, where translational diffusion rates of molecules across the cell are on the order of tens or hundreds of seconds, the cell employs transport proteins to enable molecule transport on faster time scales. Furthermore, the aggregate motion of motor activity in cells directly affects the motion of molecules, macromolecules, and supramolecular structures. We aim to examine the underlying physics of these interesting dynamics by building a model system.

The most basic requirement for a cell is an artificial membrane to define the boundary of the cell. As a result, we looked at vesicles, since vesicles are simply fluid enclosed by a lipid-membrane. In order to build a foundation for more complexity and a domain to encapsulate cellular machinery, we created vesicles for characterization. There are a few methods of creating vesicles, but we desired a method to produce stable, monodisperse, and relatively pristine inverted emulsion precursors and vesicles. In particular, we looked to microfluidics to produce vesicles of these desired qualities. Reliability of vesicle production allows more definite characterization of the vesicles and offers a foundation to build more complexity when vesicles are used to encapsulate proteins and small organelles. From there, we introduced swimming or faster-than-diffusion Janus particles in vesicles to simulate aggregate effects of motor activity in living cells. In this way, we hope to understand the role of random motion in cellular transport. We have been able to successfully encapsulate silica Janus particles using a PDMS (polydimethylsiloxane) microfluidics technique and non-swimming, polystyrene particles via glass capillary microfluidics in addition, they provide a relatively easy way to introduce desired materials into the inner solution of the inverted emulsion or double emulsion. The difference between a double emulsion and a vesicle is a layer of oil between the two layers of phospholipid. In our experiments, we let this layer of oil evaporate so that vesicles form. Since the PDMS microfluidics techniques form inverted emulsion, a pull-through technique is used to add on the second layer of phospholipids to form a vesicle. This all physically happens in small chips that have either PDMS channels or glass capillaries that run an aqueous solution and oil to a juncture where the flow and shear forces produce either inverted emulsion or double emulsion, respectively (Figure 1).

As the oil and aqueous phase is pumped into the PDMS device, the two laminar flows of liquid meet at the junction of the device (Figure 1A). After fine adjustments to the flow rates of the syringe pumps for the aqueous and oil phase, the oil phase, flows at a rate in which the oil flow shears and pinches off droplets of aqueous phase forming stabilized inverted emulsions. The droplets are surrounded by a single layer of phospholipid, which stabilizes these droplets. The high-speed Phantom camera allows us to capture the formation of inverted emulsions, and fluorescence allows us to verify the production of inverted emulsions. We see that the produced inverted emulsions are monodisperse, with a diameter of 50μm (Figures 1B and 1C). Although the majority of these inverted emulsions appear stable over the length of the device through which they travel, we have observed multiple instances where the droplets will merge with each other and form larger inverted emulsion droplets. The frequency in which merging occurs is rather unpredictable, but roughly 1 in 5 to 1 in 20 droplets merge by the time droplets exit the PDMS device.

After the inverted emulsion is collected and centrifuged to produce vesicles, thin samples of vesicles are studied via

Figure 1. (A) Labels for the direction of flow of the oil and aqueous phase from the inlets. (B) Brightfield image of the formation of inverted emulsion droplets containing 200mM sucrose, 100mM Bis-Tris, 0.7mg/mL sulforhodamine B, and silica Janus particles. (C) Laser-induced fluorescence image of the formed inverted emulsion. Figures 1B and 1C are viewed from a 10x objective.

Figure 2. (A) DIC (differential interference capture) image of a vesicle encapsulating three polystyrene particles. (B) Fluorescence image of the vesicles with the polystyrene particles tagged with Nile Red dye excited with 485nm light. (C) DIC image with fluorescence to excite the HPTS (8-hydroxypyrene-1,3,6-trisulfonate) with a 407nm light. A white circle is used to indicate the vesicle of interest. The vesicles was formed from an aqueous phase of 200mM sucrose, 100mM Bis-Tris, 0.7mg/mL HPTS, and 10μL of polystyrene particles tagged with Nile Red dye to simulate Janus particles. Figure 2A, 2B, and 2C are viewed with a 100x objective.
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Title: Contractile Electroactive Polymeric Materials and Activators for Prosthetics and Robotics

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Cover: NESACS Candidates for 2016 Chair Elect. (L-R) Leland L. Johnson, Jr. and Raj (SB) Rajur (Photos courtesy of the candidates)

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Catalysis lies at the heart of areas as critical and far-ranging as biological function and misfunction, the environment, chemical and pharmaceutical manufacture, and energy generation and consumption. Since its inception, my research group has been fascinated by the question of how to discover new catalysts and understand how they work. We have focused much of our attention on trying to design small molecules that promote reactions of interest by mimicking loosely the principles of enzymatic catalysis. In this manner, we have identified several new classes of chiral catalysts, and some of these have found widespread application in industry and academia. These include metal-salen complexes for asymmetric epoxidation, conjugate additions, and hydrolytic kinetic resolution of epoxides; copper-diimine complexes for asymmetric aziridination; chromium-Schiff base complexes for a wide range of enantioselective pericyclic reactions; and organic hydrogen bond-donor catalysts for activation of neutral and cationic electrophiles. These synthetic catalysts are orders-of-magnitude times smaller than enzymes, and can be prepared and varied in a relatively straightforward and systematic manner. While the small-molecule catalysts do not match the activity and specificity of their biological counterparts in reactions for which the enzymes have evolved, they can be much more versatile in their applications to synthetically challenging problems.

We have applied the most advanced techniques of experimental and computational physical-organic chemistry to the analysis of several of the catalyst systems we have discovered. Our approach is premised on the principle that enantioselectivity in catalytic reactions provides a powerful and sensitive probe into the mechanism of reactions, because the ratio of enantiomers is a direct reflection of the energy difference in competing stereoisomeric transition structures. Consistent correlation between stereochemical models derived from kinetic and computational analyses and the large amounts of experimental enantioselectivity data available from optimization and scope studies has afforded extraordinarily detailed insights into the precise mechanisms of catalysis.

One of the principal themes we have uncovered through our work is the importance of cooperativity effects in selective catalysis. For example, we established through kinetic, structural, and computational studies that stereoselective (salen)metal-catalyzed epoxide-ring-opening reactions discovered in our labs involve cooperative mechanisms where different (salen)metal units activate both the nucleophile and...
Biography

Lenore Rasmussen is the Chair of Board, CTO, and founder of Ras Labs, LLC. Her corporate experience is with Johnsons & Johnson. She double majored in biochemistry and chemistry at Virginia Tech, publishing in organic chemistry, and then worked with viruses at Purdue University (MS Biology, Biophysics specialty).

While at Purdue, Dr. Rasmussen’s cousin suffered a traumatic farm injury, and she investigated prostheses, but was disappointed with what was available in the marketplace. She began working independently on electroactive materials, and returned to Virginia Tech because of the strong polymer program (Ph.D. Chemistry, Polymer Chemistry specialty), eventually founding Ras Labs to harness this technology. Agreements were put into place between Ras Labs and the US Department of Energy’s Plasma Physics Laboratory at Princeton University in 2007 and with US Army in continued on page 22

Abstract

Ras Labs makes Synthetic Muscle™ – electroactive polymer (EAP) materials that quickly contract and expand at low voltages – producing life-like motion. The Ras Labs mission is to use Synthetic Muscle™ for robotics and prosthetics, particularly for the hand, that work, feel, and appear human. Ras Labs is currently funded through the Children’s Hospital of Philadelphia and the Philadelphia Pediatric Medical Device Consortium to create extremely comfortable, self-adjusting prosthetic liners using these shape-morphing materials. Ras Labs also received an award through the MassChallenge Center for Advancement of Science in Space (CASIS), with the purpose of the Synthetic Muscle Experiment to test the radiation resistivity of Synthetic MuscleTM, and to make these materials even more radiation resistant. Several Synthetic MuscleTM formulations withstood continued on page 22

Monthly Meeting

The 951st Meeting of the Northeastern Section of the American Chemical Society

Thursday, May 7, 2015
Tufts University, International Center
58 Winthrop Street, Medford, MA

4:00 pm NESACS Monthly Board Meeting
5:00 pm Reception
6:00 pm Dinner

7:00 pm Award Meeting, Dr. Katherine Lee, NESACS Chair, Presiding
   Evening Lecture: Dr. Lenore Rasmussen, Ras Labs
   Title: Contractile Electroactive Polymeric Materials and Actuators for Prosthetics and Robotics

7:45 PM Presentation of the Education Night Awards
   Philip L. Levins Memorial Prize
   James Flack Norris/Theodore William Richards Awards for Excellence in Teaching at the Secondary School Level
   Undergraduate Summer Research Fellowships
   Undergraduate Grants-In-Aid
   Undergraduate Research Symposium, Phyllis Brauner Book Award
   Project SEED Students
   Induction of New Members into Aula Laudis
   Simmons College Prize
   Avery A. Ashdown Chemistry Examination Awardees

Dinner registrations are required by NOON, Thursday, April 30, using Pay-Pal services: http://acssymposium.com/paypal.html. Select the pay with credit or debit card option and follow the additional instructions on the page.

Cost: Members, $30; Non-members, $35; Retirees, $20; Students, $10. If you are making a reservation for someone other than yourself, or if you require a vegetarian meal, please note that in the “Instructions to Buyer” section.

Dinner reservations not cancelled at least 24 hours in advance will not be refunded. New members or those seeking additional information, contact the NESACS administrative coordinator, Anna Singer, at secretary@nesacs.org (preferred) or at (781) 272-1966, 9 AM - 6 PM. Please do not call after hours.

THE PUBLIC IS INVITED - RESERVATIONS ARE REQUIRED (for both Dinner and/or Symposium)

Directions with Campus Map: http://www.tufts.edu/home/visiting_directions/medford_somerville/
VIA MBTA (See ‘Directions’ link above)
From the West/Massachusetts Turnpike (See ‘Directions’ page above) Parking: Parking will be free after 4:00 PM in the Dowling Hall Parking Garage at 419 Boston Avenue (within one block of 58 Winthrop Street; the event site is on the corner of Winthrop Street and Boston Avenue) Push the visitor’s button when entering the garage to open the gate.

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NESACS 2015 Election

Chair- Elect

Leland L. Johnson, Jr.

Education: Virginia Tech, B.S., 1993; Virginia Commonwealth University, M.S. 2003; Boston University, M.A. 2008


Honors/Awards: Member, Alpha Chi Sigma, Gamma Iota, 1990-present; Sigma Xi, member, 2004; Chemluminary Award to NSYCC, Outstanding or Creative Local Section Younger Chemists Committee Event 2007; Member, German Exchange, 2006, to Konstanz; Top Ten Poster, JCF-Frühjahressymposium, Konstanz, Germany 2006.

Service in NESACS/NSYCC offices: ACS, member, 1998; Co-Chair, Exchange Program to Germany, 2014-present; Exchange Program to Jena, Germany, director/co-traveler, 2014; Alternate Councillor, 2014-present; Councillor, 2011-2013; Fundraising Committee Member, 2013-Present; Public Relations Chair, 2009-2011; YCC Chair, 2008-2009; YCC Career Chair, 2007-2008; Organized Novartis/ NESACS Future of Chemistry Town Hall, FEB-2010, Schlumberger/ NESACS/Henry A. Hill Award Meeting, OCT-2011, Novartis/NESACS Future of Chemistry-II, NOV-2014.

Statement: The Chair of NESACS must apply his or her collaborative and networking experiences, volunteerism and leadership to the position within the framework of the by-laws of the Northeastern Section, and I wish to thank those who have nominated me to do just that. I will continue to dedicate time and effort to increasing the number of ways that NESACS brings scientists together, enabling them to succeed in their current and future careers.

The NESACS-defined region is home to countless experts in our field. Whether in academia, government, industry, or other chemistry-related professional fields, experienced chemists are here. I have had the pleasure of developing my professional career in the Northeastern Section with the help of members of NESACS.

Collaborative and networking experiences: I moved to Boston, started graduate school at Boston University, and, in 2004, found myself at the Northeast Student Chemistry Research Conference (NSCRC). This was my first introduction to NESACS and our local section Younger Chemists Committee. In the fall of 2005 I was selected to travel with eleven other NESACS students to Konstanz for the 2006 Exchange with Germany Program. Introductions to NESACS are made through monthly meetings, The Nucleus, professional/networking opportunities, or other events. The NSCRC connected me to NESACS, another group striving "to advance chemistry, both as a science, and as a profession (from the Objects of Alpha Chi Sigma)." I was ready to volunteer for NESACS.

Volunteerism: Working with the NSYCC after my return from Konstanz, I served as YCC Career Chair in 2007, earning national recognition through a Chemluminary award for the work of volunteer students from BU, UMass Boston and Tufts. This was a great introduction into the way corporations, academia, and individuals can work together with NESACS to advance the careers of younger chemists. In the year before the financial crisis, we raised several thousands of dollars and garnered the support of 13-15 corporations for our YCC efforts, ending up “in the black” for those events.

Leadership and Professional Networking: As YCC Chair, I led a group of student volunteers from across our section, establishing university-based representatives to the local YCC. This allowed efficient distribution of information and opportunities to all the represented schools. As Public Relations Chair for NESACS, I restarted the efforts to reach out to our members, growing the NESACS LinkedIn group and standardizing monthly communications. As member of the German Exchange Steering Committee, I traveled with students to Germany, liaised on behalf of NESACS, and invited those I met in Germany to visit the Boston area in the future. Professor Wilhelm Boland recently accepted this invitation.

In 2007, a chair of NESACS reached out on my behalf when I transitioned from Boston University. His efforts convinced four companies to grant interviews, and those interviews led to my position at Novartis. And when I was ready to leave the bench and focus on business development, it was (ironically, but not surprisingly) Dr. Raj Rajur who answered my call. With that opportunity, I successfully made the transition. After working with Dr. Rajur, I started my own company to apply learned principles to a broad array of biotechnology services.

If elected, I will build upon the great examples of leadership within our section and work with members to expand what we have developed here. Our programs have provided many opportunities for the next generation of chemists, from grade school to graduate school and into our careers. Influencers have initiated and supported programs like the German Exchange, the YCC, Public Relations, STEM programs, and publications. I will strive to expand member involvement within our section and assist in all efforts to maximize publicity, fundraising, and corporate support of
society activities. Finally, I will remember to thank our volunteers for their work and seek to establish a monthly meeting to recognize their efforts.

**Raj (SB) Rajur**

**Education:** Ph.D. in Organic/Medicinal Chemistry, Karnataka University, Dharwad, India (1988); Postdoctoral Fellow, University of Texas Southwestern Medical Center, Dallas (1988-1990); and Boston College, Chestnut Hill, MA (1990-1992)

**Professional Experience:** Instructor, Massachusetts General Hospital, Harvard Medical School, and Shriners Burns Institute (Boston, MA). Adjunct assistant professor, Northeastern University (Boston), Group leader Millipore Corporation (Bedford, MA), Project leader, ArQule, Inc. (Woburn, MA). Founding member and co-chair of Massachusetts Biotechnology Council CRO/CMO forum. Presently, Founder, Chairman and CEO CreaGen Biosciences, Inc, (Woburn, MA), (Founded 2002) and CreaGen Life Science Incubator (Founded 2013)

**ACS/NESACS Service:** Program Chair, Medicinal Chemistry Division, NESACS (2003-present); Alternate Councilor, NESACS (2005-present); NESACS Nominating Committee (2008); NESACS election committee (2014), member of Organizing Committee, NESACS, IUPAC and RSC-US-Sponsored Advances in Chemical Sciences Symposium Series (2007-20110). ACS Carrier consultant (2013-present)

**Membership/Honors:** ACS Organic Chemistry Division, ACS Medicinal Chemistry Division AAAS, and Indian Chemical Society. Reviewer, journal of pharmaceutical sciences (ACS journal), Reviewer, BU ignition award, Listed in Who’s Who in Science and Engineering. Invited speaker at several international conferences. Serving on advisory board of many Indian cultural and community organizations.

**Statement:** It would be an honor to serve as Chair-Elect to our local section. As an entrepreneur, scientist, educator and active collaborator I would bring an impressive amount of expertise and leadership to our section.

**Scientific impact:** I have been serving as the program chair for the medicinal chemistry section of NESACS since 2001. In my tenure as program chair, my mission has been to bring quality drug discovery science to our May, September and December annual symposia. The purpose of bringing good pharmaceutical science to our very active local section audiences is multifaceted. Our territory now houses the biotech hub of the world, and has become a location where every multinational pharmaceutical company wants to partner, headquartered at establish a Center of Excellence. We, as a section, need to be exposed to cutting edge science. We, as a section, need to be exposed to a cross section of the science that is ongoing in the industry. Our meetings are venues for the exchange of ideas between industrial and academic participants. And, most importantly, our meetings are places where students from our many prestigious colleges and universities can network with professionals and lean from the symposia topics that feature cutting edge science.

Since 2001 I have been serving as an Alternate Councilor for our section. I have regularly attended the NESACS monthly meetings and contributed several new ideas and inputs to these meetings. I have also regularly represented NESACS at national ACS meetings and participated in governance meetings.

Moving forward, as Chair-Elect, I will continue to support and encourage NESACS meetings that bring topnotch science to our audiences of academic and industrial professionals and students. I also plan on initiating the Medicinal Chemistry Prize and also an exchange program with Indian universities similar to the German Exchange program.

**Leadership and collaborations:** Having worked in the biotech industry for the last 20 years in various leadership positions and having established my own company CreaGen Biosciences in 2001, I recognize the value of networking and collaboration. In 2010 I helped the Massachusetts Biotechnology Council establish a CRO/CMO Forum that represents all the Contract Research Organizations in Massachusetts. As the founding member and co-chair of this division, I have worked with committee members, volunteers and industry leaders to raise funds and organize annual CRO/CMO symposia. These symposia bring more than 500 companies and leaders under one roof to exchange ideas, establish dialogue and address the needs of the pharmaceutical and biotechnology industries.

If elected, I will bring the same enthusiasm, spirit, top quality programs and collaborative efforts to our local section. Such programs can help our
members participate actively in our monthly meetings and also network with speakers, attendees and decision makers. I would also establish collaborations between Massachusetts Biotechnology Council, Massachusetts Life Science Center and other local life science organizations to expand the collaborations and visibility of NESACS.

Finally, the history of our section is immense and impressive. I hope to add to this legacy if elected. Thank you for your consideration and support.

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**Secretary**

**Michael Singer**

**Education:** B.S., State University of New York at Stony Brook (1986); M.S., Brandeis University (1988); Ph.D., Brandeis University (1993)


**ACS Service:** ACS Joint Board-Council Committee on Chemical Abstracts Service, Associate member 2004, Member 2005-2007; Local Section Activities Committee, Associate Member 2007, Member 2008 – 2013; Meetings and Expositions Committee, Associate Member 2014, Member 2015

**Professional Recognition:** Henry Hill Award – 2008

**Statement for Secretary:** During my tenure as Secretary for the NESACS, I have worked consistently to increase the amount of knowledge communicated within the section. Current Board related activity is being managed via electronic communications. This has allowed for more detailed record keeping of activities within NESACS. Meeting minutes, announcements and activities are now promptly posted on our section website (www.nesacs.org) enabling our NESACS members to be up to date on all section activity. These next few years will see an increase in electronic communication within NESACS. Ensuring that the appropriate information gets to our members, in a timely, but not overwhelming fashion will be one of my goals.

These past three years, I have been actively working with the NESACS archivist on developing a long term plan for the storage and indexing of the section archives. I was able to arrange for the short term storage of the NESACS archives while the long term plan is being implemented.

As with any volunteer organization, the organization is only as strong as the membership and those volunteer members that actively participate in the planning and execution of the various events. The strength of the NESACS lies in its membership. For the membership to be strong, communication is critical. With your support for another term as Secretary for the NESACS, I will strive to increase the flow of communication between all facets of our section membership.

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**Trustee**

**John N. (Jack) Driscoll**

**Education:** Franklin Institute, AE, Chemical Engineering; Suffolk University; BS, Chemistry, 1965; Boston University, MA, 1967, Physical Chemistry (M. Hoffman), Northeastern University, Theoretical Physical Chemistry, 1969.

**Professional Experience:** (1973-2003) Founder, President & Treasurer, HNU Systems, Inc.; (1976- present) a Founder, board member, and Treasurer (1976-83), Audit committee (1990-present) Nova Biomedical; (1988-present); Chairman HNU-Nordion, Ltd, OY (Helsinki, Finland); (1988-1994), IMV Ltd, a founder & board member; (1990-95) Environmental Business Council of New England; (2003-present) a founder, President, then Chairman; PID Analyzers, LLC.

**ACS Service:** Member since 1967, Member SCHB, Environmental, Analytical Div., ACS Environmental Div. Session organizer at the ACS National Meeting 2011-present; Associate Member of the ACS Committee on Environmental Improvement (CEI), 2014 , Asked by the ACS to help organize the ACS Entrepreneurial Forum East held at Nova Biomedical Corp. in April 9, 2014

**NESACS Service:** Public Relations Chair 2011-present. Started the Cape Cod Science Café with Jennifer Maclachlan in 2011 for IYC and have run 12 science cafes over the past 4 years. Started the association with the Cambridge Science Festival in 2012 with Jennifer Maclachlan. Started the cooperation with the SE MA STEM region in 2012. National Historic Chemical Landmark (NHCL) Committee Chair 2014-present, working on the first NHCL in MA “Edwin Land + Instant Photography.” Started the cooperation with the Cape Cod Council of the Boy Scouts of America. Received a ChemLuminary Award for an Outstanding Collaboration Between a Local Section and a Division during 2012 which was presented to NESACS and SCHB at the Chem-Luminary Ceremony, at the ACS National Meeting in Indianapolis. Received a second Chemluminary for cooperation between NESACS and ACS environmental Div. in 2014. Responsible for starting the NESACS Facebook page with Jennifer Maclachlan. Responsible for the NESACS Linkedin page. Worked with the SE MA subgroup to plan and hold our first meeting at UMass Dartmouth in Oct. 2013 and have held a second SE MA subsection meeting at Woods Hole Oceanographic Institute in Falmouth on May 15, 2014; worked with the CCC of the Boy Scouts, NESACS and Cape Cod Community College to organize the “STEM Journey: Spacelab to Zero G” with 2 astronauts.

1992-97 (appointed by the US Secretary of Commerce)

**Honors:** Outstanding Achievement Award (2011) from NESACS for development of the PID. Suffolk University, DCS 1993 (Hon.). University of MA-Environmental Business Person of the year 1992. Chairman Emeritus, Environmental Business Council of NE. Five IR100 Awards; one R&D100 award in 2013.

**Statement:** While I have no degree in finance, I prepared all the P&L’s, balance sheets and cash flows for HNU Systems and Nova Biomedical for Bank of Boston. I prepared all the projections for the three companies acquired by HNU. I also review the financials for our Finnish subsidiary. I negotiated all the line of credit agreements with the Bank (up to $25M). Based on my 40+ years of actual financial experience running companies, I believe that I am capable of performing the duties as a NESACS trustee.

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**Peter Meltzer**

**Education:** B.Sc. (Hons.) Univ. of the Witwatersrand, S. Africa. (1972); Ph.D. Univ. of the Witwatersrand, S. Africa, (1976).

**Professional Experience:** Lecturer and Teaching Assistant, Univ. of the Witwatersrand, S. Africa (1971-1976); Research Associate, Univ. of the Witwatersrand, (1976-1977); Research Associate, Massachusetts Institute of Technology (1977-1978); Group Leader, Senior Chemist, Research Associate, SISA Inc. (1978-1983); Vice-President of Research and Development, Director of Chemistry, SISA Inc. (1983-1986); President, Co-founder and member of the Board of Directors. Organix Inc. (1986-present).

**NEACS Service:** Member, American Chemical Society (1977 – present); Associate Editor, The Nucleus, (NEACS) (1981-1983); Chairman-Elect, Medicinal Chemistry Group, NEACS (1983); Chairman, ACS Symposium: “The Pharmaceutical Industry to the Turn of the Century”, (1983); Chairman, ACS Symposium: “Chemistry and Immunology,” (1984); Chairman, Medicinal Chemistry Group, NEACS (1985,1985); Member, Nominating Committee, NEACS (1987/9); Member, Long Range Planning Committee, NEACS (1990)

**Honors:** Johannesburg City Council Scholarship (1968-1971); Senior Bursar of the University of the Witwatersrand (1972); South African Council for Scientific and Industrial Research Scholarship (1972); University of the Witwatersrand Senate Research Grant (1975).

**Statement:** I am currently Chairman of the Board of Trustees of the Northeastern Section of the American Chemical Society. I am standing for re-election. My experience over the past few years has enabled me to interact with the Section’s financial advisors and manage the Section’s funds in collaboration with the Board of Trustees. As president of a chemistry corporation I have gained skills and experience in financial management. As a trustee of the retirement and profit sharing funds of Organix, I have gained experience that has enabled me to interact with the Section’s financial advisors and manage the Section’s funds. I will continue to work with the Board and section members to aid them to achieve the goals that have been established for NESACS.

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**Auditor**

**Patrick Gordon**

**Education:** B.Sc. University of Guyana (1977); M.Sc., University of New South Wales, Australia (1982); Ph.D., University of Manitoba, Canada (1987)

**Professional Experience:** Post Doctoral Associate, Kansas State University, (1987-1988); Organix Inc., Woburn, MA (1988-1991); Senior Scientist, Polaroid Corporation (1991-2001); Arqule Inc. (2001-2002); Polymer Laboratories, (2003-2004); MCPHS University, Adjunct Assistant Professor.


**NESACS Service:** NERM Chair of the Symposium on Cannabinoids, (1989); Centennial Committee Co-Chair (1998); Member, Board of Publications (1999-2004); Secretary, Board of Publications, 2000; Chair, Board of Publications, 2002, 2004; Alternate councilor (*’94-*’94 and ’97-*’0, ’00-’01, ’06-’08).

**Statement:** I am happy to serve the section as auditor! Thanks for your continued support.
Councilor / Alternate Councilor
Michaeline Chen

Education: Clark University, B.A. in Chemistry; Boston College, M.S.
Experience: US Army Research Laboratory - Materials Directorate (retired); Member of ACS since 1976

NESACS Activities: 1984-Present: Member of the Board of Directors NESACS; 1987-Present: Councilor of NESACS (except 2003, 2010, 2011 and 2012; Alternate Councilor); 2001-Present: Chair of the Membership Committee; 2014–Present, Chair of Senior Chemists Social Group; 2010, Served on the Committee of the ACS National Meeting in Boston; 2007, Member of the Planning Committee for the ACS National Meeting in Boston; 1999–2000, Chair of International Chemistry Celebration for Y2K (NES); 1988–1998, Member of the Professional Relations Committee; 1998, Worked for National Meeting & Centennial Celebration for Y2K (NES); 1988–1994, Member of the Economic and International Activities Committee; 1989–1993, Member of the Economic Status Committee; 1988, Associate member of the Board of Directors NESACS (except 2003, 2010, 2011 and 2012); Alternate Councilor); 2001-Present: Chair of the Membership Committee; 2014–Present, Chair of Senior Chemists Social Group; 2010, Served on the Committee of the ACS National Meeting in Boston also served as Public Relations Chairperson; 1988, Chair of the Public Relations Committee; 1984–1987, Chair of the Hospitality Committee, incl. the IUPAC Meeting in Boston.

ACS Activities: 2014-present, Member of Senior Chemists Committee; 2012–2013, Associate Member of Senior Chemists Committee; 2009 – 2012, Member of the Senior Chemists Task Force; 2000–2009, Member of the Council Committee on Admission; 1998–1999, Associate Member of the Council Committee on Admission; 1995–2006, Associate Member of the International Activities Committee; 1994, Member of the Economic and Professional Affairs Committee; 1989–1993, Member of the Economic Status Committee; 1988, Associate member of the Economic Status Committee; 1987-1988, Associate member of the Public Relations Committee.

Statement: I have a strong sense of commitment and enthusiasm for the activities of both the Northeastern Section and the American Chemical Society. I served on the Admissions Committee at the National ACS for 12 years, and I have been the Chair of the Membership Committee of the Local Section for 15 years. I would very much appreciate your vote. If elected, I would continue to broaden the Northeastern Section’s influence on National ACS policy decisions, increase interactions between our Section and the National Society, and increase the involvement of the membership in its activities. I shall continue to devote my time and energy for our local members. I would truly be honored and grateful to receive your support and your vote so that I may serve you as a Councilor.

Ayaj Purohit


NESACS Service: Member of the Board Of Publications, 2015-.

Memberships: Member of the ACS, 1996-.

Statement: I have enjoyed being a member of the Northeastern Section of the American Chemical Society (NESACS) and have had the pleasure of knowing and working with several members over the last several years during meetings and symposia.

Recently I was appointed as a member of the Board Of Publications (BOP). In this capacity I am working with Kathy Lee, Chair of NESACS as well as other members of the BOP to outline the publication strategy for our newsletter, The Nucleus as well as on updating our current website. I am truly excited about the upcoming changes.

In the past I have also volunteered at certain events and have enjoyed it very much.

I am looking to get more involved with NESACS activities and am eager to give my time and energy into making this a better organization. I hope to bring a new and a fresh perspective and it will be an honor to represent the NESACS at the National level. I am excited about running for Councilor and welcome the opportunity. I would appreciate your vote. Thank you very much!

Katherine Lee


Honors/Professional Activity: Department of Defense, Office of Naval Research Predoctoral Fellowship, 1991-1994; MIT Department of Chemistry Teaching Award, 1995; Wyeth Team of the Year Award (to project team), 2001; Wyeth/MIT Lecture Committee, 2003-2006; Pfizer BioTherapeutics Chemistry Team of the Year Award (to project team), 2011; Mentor in Healthcare Businesswomen’s Association, Boston Chapter, 2009-2010.

ACS Service: Member of Organic and Medicinal Chemistry Divisions of the ACS; Chair, NESACS Host Local Section Committee, 2009-2010; Member of NESACS Symposium Committee, 2009, 2010; Councilor, NESACS, 2012-2014; Member, Committee on Economic and Professional Affairs, 2013-present; Member-at-Large, Division of Organic Chemistry Executive Committee, 2011-present; Chair-Elect and Program Chair, NESACS, 2014; Chair, NESACS, 2015.
Statement: It would be an honor to serve as a NESACS Councilor. If elected, I would bring my expertise as a scientist and leader to this role and apply my hands-on experience as a NESACS Councilor (2012-2014), Chair-Elect (2014) and Chair (2015) to continue to support our local section.

My areas of focus are: 1) to increase engagement and participation among NESACS members and our area chemistry community, through support of diverse scientific talks, better communication of volunteer opportunities, and special events; 2) to provide career-oriented programming and networking opportunities for the NESACS community; and 3) to improve communication by exploring various methods of sharing information, for example, by instituting the NESACS Newsflash, a monthly electronic communication, and supporting the Board of Publications' efforts to update the NESACS website.

In addition, through my work as a Member-at-Large of the ACS Division of Organic Chemistry Executive Committee and Member of the ACS Committee on Economic and Professional Affairs, I bring a broader perspective to NESACS.

Thank you for your support.

Jerry P. Jasinski

Education and Honors: B.A., 1964, M.S.T. (Alexander Amell), 1968 in Chemistry, University of New Hampshire; M.N.S. in Natural Science, Chemistry, University of New Hampshire; M.S.T. (Alexander Amell), 1968 in Chemistry, University of New Hampshire; Ph.D. in Chemistry, 1974, University of Wyoming (Smith L. Holt); NATO Summer Research Associate, 1972, Chimb Lab-4 University of Copenhagen, Denmark (Carl J. Ballhausen); Los Alamos Scientific Laboratory (LASL), Associated Western Universities (AWU) Predoctoral Research Fellow (1973-74) (Larned B. Asprey & John H. Wood); Postdoctoral Fellow, 1974-1975, University of Virginia (Paul N. Schatz); Vermont Sigma Hero’s Award (1995); 1st Recipient of the Keene State College Award for Faculty Distinction in Research and Scholarship (2001); Marquis Who’s Who in America, the World, Science & Engineering (2010-2015); Presidential Who’s Who (Chemistry Professor of the Year and Hall of Fame, 2011, 2012); Cambridge Who’s Who (Professional of the Year in Scientific Research & Education, 2010-2011); Towle High School Athletic Hall of Fame (2011); American Institute of Chemists (AIC-Board of Directors 1999-01, 2007-2009, President 2009-2011, Chair of the Board 2011-Present); 2013-2014 Fulbright-Nehru Scholar (Hemmige S. Yathirajan).

Professional Experience: Keene State College: Assistant Professor (1978-83), Associate Professor (1983-89), Professor (1989-Present), Chair, Department of Chemistry, (1999-2005); Chair, Department of Physics, (2003-2005); High School Chemistry/Physics Teacher (1964-70, 1975-78); (New England Institute of Chemists, NEIC, Treasurer, 1988-Present); Coeditor of Acta Crystallographica, Section E (2009-Present); Editorial Board Member of the Journal of Crystallography (2012-Present); Coauthor of over 575 refereed papers in major chemical research journals.

Research and Interests: Physical-Bioinorganic, Bioorganic and Structural Chemistry; Synthesis and X-ray crystallography of pharmaceutically active molecules, laser dye molecules and transition metal thiosemicarbazones. Local, regional and international collaborator utilizing single crystal X-ray crystallography as a tool for structural investigation of molecular compounds. Co-developer of a web-based tutorial entitled “Symmetry and Space Groups” (Dr. Bruce Foxman). Introduction of Process Oriented Guided Inquiry Learning (POGIL) techniques in the chemistry curriculum.

ACS Service: Member since 1970. Member of INOR division. NESACS: Nominating Committee (2000-01, 2007-08); Alternate Councilor (2007-09, 2010-15); Norris Award Committee (2009-2012, Chair 2012); Richards Award Committee (2013-2016); Chair-Elect of NESACS (2015).

Memberships: American Chemical Society (ACS), New England Section of the American Chemical Society (NESACS), American Crystallography Association (ACA), American Institute of Chemists (AIC), New England Institute of Chemists (NEIC), Council for Undergraduate Research (CUR), New England Association of Chemistry Teachers (NEACT).

Statement: I would consider it an honor to serve as Councilor of the Northeastern Section of the American Chemical Society (NESACS). In my tenure as Alternate Councilor, member of the Nominating, Norris Award and Richards Awards Committees and as the 2015 Chair-Elect of NESACS, I welcome the opportunity to serve our section, its members and the broader Society in this venue. In my current role as 2015 Chair-Elect of NESACS and Chair of the New Hampshire section, I am continuing to encourage the building of relationships within the outreach areas of our own membership extending toward the geographical boundaries of our organization. As a longtime educator, researcher, leader and active collaborator on a local, regional and international scale, I would continue to bring an impressive amount of experience, expertise and dedication to our local section. As your Councilor, I will continue to encourage the participation of academic and industrial professionals and students within the outreach and goals of the NESACS. I would actively support the values and craft of networking and collaboration when working with friends, colleagues and professionals and encourage the spirit of volunteerism in keeping the NESACS at the forefront of professionalism. I ask for your vote as Councilor and thank you for your consideration and support.

Catherine E. Costello

Catherine E. Costello is William F. Warren Distinguished Professor at Boston University with appointments in Biochemistry, Biophysics and Chemistry. The Center for Biomedical Mass Spectrometry, which she founded and directs, is located on the Medical School campus.

Education: A.B. (Chemistry), Emmanuel College; M.S. and Ph.D. (Organic Chemistry), Georgetown University. Postdoctoral fellow, MIT.

Professional Experience: Associate Director of MIT Mass Spectrometry Resource >20 y; Professor at BUSM (1994-). Research interests in determination of structures and functions of biopolymers, with particular emphasis on glycobiology, post-translational mod-
ifications of proteins and protein folding disorders, as well as scientific education and fostering of international collaborations. Author/coauthor of about 325 scientific papers.

**ACS Service:** ACS Councilor representing Northeastern Section for 26 years. Current member of the Senior Chemists Committee and board member of Malta Foundation for Research and Education in the Middle East. Past member of the Constitution and Bylaws and Ethics Committees and several award committees; member and chair of the International Activities Committee.

**NESACS Service:** NESACS Chair (2014); chair of NESACS Bylaws Committee (1997-); served multiple terms on Publications, Budget and Nominating Committees.

**Relevant Memberships:** Current President of International Mass Spectrometry Foundation. Past President of Human Proteome Organization (2011-12) and American Society for Mass Spectrometry (2002-04). Board member of US-HUPO and Human Proteomics/Glycomics Initiative. Editorial boards of several journals; member of academic and institutional advisory committees in US, Canada and Europe.

**Honors:** ACS Fellow, ACS Field and Franklin Award, NESACS Henry A. Hill Award, PhD (h.c.), Emmanuel College, Thomson Medal (IMSF), Distinguished Achievement in Proteomics (HUPO).

**Statement:** I would like to continue to bring my interests in basic research, education and international activities to the Council on behalf of the members of NESACS. NESACS is one of the largest sections within the Society and has a long record of innovation and leadership. To carry this proud record forward, the section needs to preserve its strong foundation and to incorporate new approaches and activities into its programs. As a Councilor, I will continue to advance the interests of the NESACS at the national level and will remain an active Board member at the local level. I am working with the Board on substantial revisions that will update and clarify our Bylaws and continue to look for opportunities to improve our organizational structure. I will be very attentive to the employment needs of members and will encourage career-related activities at the national and local level. For senior members, I will look for ways that help them to remain financially secure and to contribute their expertise to younger members and to the community, through workshops, one-on-one counseling, and the involvement of local industrial partners. At the college and high school levels, and even earlier, I will support expanded NESACS efforts on both curriculum development and extracurricular activities that will encourage and aid the next generation of science students and develop science-aware citizens. I will support and participate in NESACS efforts to engage selected representatives to pass laws and establish policies that further scientific interests and educational opportunities.

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**Jackie O’Neil**

Jackie O’Neil graduated from Northeastern University in 2010 with a B.S. and M.S. in Chemistry. She is currently a Scientist in the Pharmaceutical Chemistry and Formulations group at Alkermes Inc and where she has been developing crystallization methods and isolations of intermediate and final APIs for late-stage clinical compounds. She has been an active NESACS Councilor since her election in 2013, and has held executive positions in the local Younger Chemists Committee (YCC) since 2011, helping lead the group through by-law revisions, directed the increasing growth and visibility of the YCC in the local section, as well as nationally and worldwide, through participation with the National YCC group, the German Exchange Program and the European Younger Chemists Network. She was recently appointed as a member of the Membership and Expositions (M&E) committee. If elected, she hopes to continue serving the local, national and international interests of the NESACS chemists through increases in diverse technical and social programs by continuing her work 1) At integrating younger chemists into the ACS family, 2) To increase overall participation of the large number of local chemists who call Boston home, and 3) To support novel technical and social programming for NESACS members to offer alternative ways for traditional NESACS members to become involved.

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**Leland L. Johnson, Jr.**

(See qualifications and statement under Chair-Elect)

**R. Christian (Chris) Moreton**

**Education:** Nottingham, UK, B.Pharm, 1971, Strathclyde, UK, MSc, 1987, Wales – Cardiff, UK, PhD, 1992.


**ACS Service:** None.


**Honors:** None.

**Statement:** I would be honored to serve as a Councilor/Alternate Councilor for NESACS. Our Section is one of the largest ACS Sections. It is important to maintain contact with our members, and to keep them informed and engaged. NESACS has done and continues to an excellent job in this respect with the monthly meetings, the Nucleus and the different awards meetings that the Section hosts. Going forward, as social media and other innovations will have a greater impact on our lives, NESACS will need to continue to adapt, and I am sure it will. ACS is the largest professional scientific society in the country, and we have to play our part in remedying the decline in US STEM
education. As professional scientists, out members are well positioned to make a local impact, and I would like to see the Section make even more progress in this respect. If elected, I would be looking to continue the good work that has already been initiated by the Section and to continue to develop our efforts with the State governmental organizations and to encourage our involvement in local STEM initiatives. In addition, I would be looking to maintain our excellent relationship with the larger ACS organization.

Ruth Tanner

Education: B.S. Purdue University, PhD (Organic Chemistry) University of Cincinnati

Professional Experience: Research Fellow, Duke University (C. R. Hauser) (1965); Massachusetts State College at Lowell, Chair, Chemistry Department (1966-1974); University of Massachusetts Lowell, Professor (1975-2012); President of the University Faculty (1975); Representative for the Joint Council on Food and Agricultural Sciences of USDA (1979-1985); Visiting Scientist, MIT (1978-1980); Director of Women in Science and Engineering (WISE) Program (1996 – 2005); Professor Emeritus, University of Massachusetts Lowell (2007 – Present)

NESACS Service: NESACS Chair, 2012; Councilor (2009 – 2014); Member of the NESACS Board of Directors (1996 – Present); Trustee (2014); Chair of the Education Committee (1996-2009); Chair of Connections to Chemistry program, (1998 – 2009); On-Site Coordinator, ACS TV Satellite Seminar Series: Teaching Chemistry, National Chemistry Week, UMass Lowell (1996 – 1999); Committee Member, NESACS–JCF/GDCh Chemistry Student Exchange Program to Germany (2001 – Present); Co-Chair for High School/College Interface Symposium, CHED Division, 2007 National ACS meeting

Relevant Memberships: ACS Divisions: Organic Chemistry, Chemical Education; New England Association of Chemistry Teachers; American Association for the Advancement of Science; American Association of University Professors; ACS, American Association of Chemistry Teachers.

Honors: Department of Chemistry Teaching Award (1998); Council on Diversity and Pluralism Award (1999); The Boston Club Advancement Award for the Women in Science and Engineering (WISE) Program (2000); Henry A. Hill Memorial Award (2007) for Outstanding Service to NESACS, the ACS, and the Profession of Chemistry

Statement: I am honored to be nominated to the position of Councilor for the Northeastern Section. I have had the privilege of serving the Northeastern Section as the Chair for 2012, and as a member of the Board of Directors since 1996. The role of Councilor is an important one to the Section The councilors represent the Section to the National Council which is the governance body of the Society, and communicate decisions by the Council back to their local sections. The position of Councilor affords me the opportunity to represent the Section at national meetings. In addition, Councilors become members of one of the Committees of the Governance Council and participate in their discussions and decisions. Since 2009, I have been a member of the Committee on Membership Affairs (MAC) and have represented our Section at the ACS Council meetings. As a member of MAC, I have been the Liaison to the Advisory Board for the recently established ACS American Association of Chemistry Teachers (AACT). Your vote will permit me to continue to be an active voice for the Northeastern Section, and to work for policies that represent the interests of our broad and diverse membership.

Ray Borg

Education: B.S. Biochemistry, 2014, University of Southern Maine (USM); Master’s candidate, 2015, UMass Boston

Honors/Professional Experience: USM Undergraduate Research Opportunity Program award recipient 2014-2015; USM Department of Chemistry Outstanding Chemistry Senior in Chemistry 2013-2014; Graduate Research Assistant, UMass Boston (2014-present); Graduate Teaching Assistant, UMass Boston (2014-present)

ACS Service: ACS Member (2011-present); President, USM ACS student chapter (2013-2014) Social Chair, NSYCC (2014-present)

Statement: I appreciate the opportunity to represent NESACS as a councilor. Being an E-board member of the NSYCC has shown me the value of effective communication between the YCC and NESACS. As a councilor my main focus will to be finding ways to get YCC and NESACS to collaborate. My communication skills, enthusiasm, and passion for chemistry qualifies me to serve as a NESACS councilor.

Since being appointed social chair of the NSYCC I have had the pleasure of planning and hosting several events. I am currently working with members of the NPYCC to organize a symposium for the 2015 ACS National conference in Boston. The symposium aims to introduce young chemists to careers that incorporate green chemistry. I have contributed to this symposium by designing the program goals, inviting speakers, and fund-raising.

I have also been working with NESACS members to organize a Candy Chemistry themed event for the 2015 Cambridge Science Festival.

Over the last year, NESACS has provided me with resources, opportunities and a network of people that has lead me in the direction of success. By attending board meetings I have seen the positive impact that the Northeast ACS Section has on the local and national chemical community. For this reason I would very much appreciate the opportunity to serve as a NESACS Councilor. I am grateful for your support.

Andrew Scholte

Education: B. Sc. (Biochemistry; 1st Class Honors) Simon Fraser University, 2000; Ph.D. (Chemistry) University of Alberta, 2006;

Professional Experience: Genzyme, a Sanofi Company, Medicinal Chemistry Department, Staff Scientist II, 2012-present; Genzyme, a Sanofi Company, Medicinal Chemistry Department, Staff Scientist I, 2008-2012; Boston College, Chemistry Department, NSERC Postdoctoral fellow with Prof. Marc Snapper, 2006-2008.

Honors/Awards: ACS Leadership Chapter Development Award (2010); Natural Sciences and Engineering Research
Council of Canada (NSERC) PDF (2006-2008); Outstanding Oral Presentation-Canadian Society for Chemistry (2005); Canada Graduate Scholarship (2003-2005); NSERC Postgraduate Scholarship A (2001-2003); Alberta Heritage Studentship (2000-2005); Faculty of Science Graduate Entrance Scholarship (2000); Department of Chemistry Entrance Scholarship (2000); Walter H. John Scholarship (2001-2005); Mary Louise Imrie Graduate Student Award (2004); Alfred Bader Scholarship-Canadian Society for Chemistry (2000).

Service to the Chemistry Community (USA and Canada): Member of the ACS since 2006; Alternate Councilor (Jan. 2012-present), Vice Chair of the NSYCC (2010-2011). Member on the NESACS committee for the 2010 ACS meeting in Boston, MA (Katherine Lee-Chair); President of the 1st Banff Symposium on Organic Chemistry Organizing Committee; Member of the Canadian Institute of Chemistry since 2000.

Statement: I am honored to be nominated for election as a NESACS councilor. For the past 15 years I have been actively involved with serving the scientific community in the United States and Canada. During my undergraduate studies at Simon Fraser University, I was the President of the Biochemistry and Chemistry Undergraduate Student Union. As president I initiated a career symposium program where students could learn more about potential career opportunities in both academic and industrial fields. During my graduate school training at the University of Alberta I established a new conference for graduate students in Chemistry. The Banff Symposium on Organic Chemistry is held every two years in Banff, Alberta and aims to highlight graduate student’s research while providing an opportunity to discuss their work with industrial, post-doctoral, and faculty researchers.

For the past few years I have been involved with NESACS. In the winter of 2010 I was a member of the NESACS committee for the 2010 ACS meeting in Boston. On this committee I was responsible for recruiting student volunteers working during the national meeting. More recently, I was elected as vice chair of the Younger Chemists Committee within NESACS (NSYCC) for year of 2011. With-in this role I was involved in planning of events hosted by the NSYCC and acted as a moderator and scientific judge for the annual graduate research conference (2011). Last year I was fortunate enough to be re-elected as an alternate councilor for the NESACS (2014-2016) and I am running again to be elected as a councilor on the NESACS board.

I am looking forward to build upon my experiences with NESACS and to take on a more active role within the local section here in the Northeast. If elected as a councilor, I will continue to my work with the younger chemists. Younger chemists can learn from the experiences of our members and bring fresh and new ideas to the section. It is imperative for the future of NESACS and the ACS that we actively engage the younger chemists of our society. I ask for your vote and thank you in advance for your support.

Kenneth Mattes


Relevant Memberships: Boston Area Group for Informatics and Modeling, American Chemical Society, American Association for the Advancement of Science, International QSAR and Molecular Modeling Society.

Honors: Massachusetts State Referee Committee Soccer Referee Instructor of the Year, 2008; Rochester Section Award Recipient, 1995; Phoenix Award Winner, ROCi/ACS National Chemistry Week, Malls Chairman, 1990-91.

Statement: If elected to the position of councilor for NESACS, I would strive to represent at the national level those issue of most importance to NESACS. I would also strive to support the changes and challenges faced by the American Chemical Society to raise the image of chemistry and stress the importance of chemistry to solve the problems of the future. Specific goals would be to support the Local Section Activities Committee programs and contribute to the National Chemistry Week program. As scientific and professional problem solvers, members of the ACS need to help improve the educational and professional opportunities afforded by one of the largest professional societies.

Mukund S. Chorghade

Education: B.Sc. 1971; M. Sc. 1973 (1st Class Honors) University of Poona, India; Ph.D. (Organic Chemistry), 1982, Georgetown University.

Professional Experience: Research
June has been a member of the ACS and NESACS since 2007. She has presented her research work locally at three ACS National Meetings, the Boston Women in Chemistry Symposium at Harvard University, and the Northeast Student Chemistry Research Conference. She had the privilege of representing the NSYCC in Erlangen, Germany, when she participated in the JCF-GDCh/NESACS-YCC Germany Exchange Program in 2011 and presented internationally at the JCF-Frühjahrsymposium. She joined the NSYCC executive board and served as Career Chair from 2012-2014 and organized the Career Symposium at Boston University for 2014. She is also involved with the NESACS German Exchange Steering Committee.

Statement: I am honored to have been nominated for Director-at-Large for NESACS. If elected for Director-at-Large for NESACS, I will represent the section using experiences garnered as a graduate student member of BUWIC, YCC member, YCC executive board member and civilian employee. I would like to extend my involvement at NESACS by promoting more women in chemistry and involving young chemists at local section events. I look forward to promoting the growth of NESACS, organizing events, and participating in local chapter activities.

**Director-at-Large**

**June Lum**

**Biography:** June Lum earned her B.S. in Chemistry in 2006 from California Lutheran University. She then enrolled at Boston University, receiving her Ph.D. in Chemistry in 2013. June studied synthetic inorganic chemistry in the Doerrer group, her interests included the synthesis of late transition metal complexes and studying the dioxygen reactivity of Cu(I) complexes. She joined the Biological Science and Technology Team at the Natick Soldier Research Development and Engineering Center as a postdoctoral research associate. She was hired as a Research Chemist in October 2014. Currently, her projects focus on the biomimetic precipitation of titania, and improving textiles by studying functionalities such as flame retardation, antimicrobial coatings, and chemical decontamination.

June has been a member of the ACS and NESACS since 2007. She has presented her research work locally at three ACS National Meetings, the Boston Women in Chemistry Symposium at Harvard University, and the Northeast Student Chemistry Research Conference. She had the privilege of representing the NSYCC in Erlangen, Germany, when she participated in the JCF-GDCh/NESACS-YCC Germany Exchange Program in 2011 and presented internationally at the JCF-Frühjahrsymposium. She joined the NSYCC executive board and served as Career Chair from 2012-2014 and organized the Career Symposium at Boston University for 2014. She is also involved with the NESACS German Exchange Steering Committee.

**Statement:** I am honored to have been nominated for Director-at-Large for NESACS. If elected for Director-at-Large for NESACS, I will represent the section using experiences garnered as a graduate student member of BUWIC, YCC member, YCC executive board member and civilian employee. I would like to extend my involvement at NESACS by promoting more women in chemistry events and involving young chemists at local section events. I look forward to promoting the growth of NESACS, organizing events, and participating in local chapter activities.

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**Ioannis A. Papayannopoulos**

**Education:** A.B. Chemistry (Bowdoin College), Ph.D. Organic Chemistry (Massachusetts Institute of Technology)

**Professional Experience:** Principal Scientist, Targanox, Inc. (2013-present); Principal Scientist & Director, Proteomics Core Facility, Koch Institute of Integrative Cancer Research at MIT (2006-2013); Associate Director, Ana-


Statement: I am honored to be nominated for the position of Director-at-Large. Having been an ACS member since college, an ASMS member for almost as long, and also a long-time NESACS member, I have great appreciation for the work these professional organizations have done and continue to do in representing us, their members, as well as educating the public. Yet, in spite of the efforts of our professional organizations, chemistry and chemists, especially in popular media, are often portrayed inaccurately, frequently are poorly understood, and many times are regarded suspiciously. It is my belief that this is due in part to the inadequate instruction primary and secondary education students receive in science in general and especially in chemistry. I have had many opportunities to discover through the progress of my children (one a recent high school graduate, the other a current high school student) that the public school curriculum, especially at the lower grades, pays scant attention to chemistry education. In frequent discussions with my wife, a public school elementary teacher, it has also become apparent to me that well meaning and dedicated teachers at times need access to specialized expertise and suitable instruction aides and materials in order to carry out this very important work.

I believe that there exists an opportunity for NESACS to become more actively involved in shaping Massachusetts public education policies with regard to allocating more hours in school curricula and focusing greater attention to teaching chemistry, starting at the lower grades. As a chemists’ professional organization NESACS can offer direct assistance to schools through tapping the expertise of experienced chemists and by establishing a clearinghouse for unused equipment and laboratory supplies and reagents that can be donated to and used by public schools. Additionally, we can offer support to state education professionals and local school committees with NESACS members actively engaged in the effort to advance chemistry education, whether in our local communities or as interested and involved parents. Such activities can be supported and effectively coordinated by NESACS and I would be delighted if I were given the opportunity to help formulate and carry them out.

Christine Jaworek-Lopes

Education: B.A, Tufts University (1992); Ph.D., Tufts University (2000)

Professional Experience: Associate Professor, Emmanuel College (2010-present); Assistant Professor, Emmanuel College (2000-2010)

ACS Service: Member since 1992; Member of Committee of Community Activities (2006-present); co-chair Volunteer Recognition and Engagement subcommittee for Committee of Community Activities (2009); Chair of Volunteer Recognition and Engagement Subcommittee for Committee of Community Activities (2010-present); Member of Chemical Education (CHED) Programming Committee (2011-present); co-chair for CHED programming 247th ACS National Meeting, Dallas, TX.

NESACS Service: National Chemistry Week (NCW) Chair (2003-present); Member of the Phyllis A. Brauner Committee (2003-present); Councilor (2006-2008; 2015-present); Alternate Councilor (2009-2014); assist in Education Night Organization (2013-present).

Awards: Recipient of the 2008 E. Ann Nalley Northeast Regional Award for Volunteer Services; 2015 Local Section Outreach Volunteer of the Year Award

Statement: It is an honor and a privilege to be nominated for Director-at-Large for NESACS. If elected to this position, I would collaborate with the Board in developing additional diverse volunteer experiences in which our members may participate. These opportunities will provide an additional venue for growth of our Section as well as maintain the vibrancy of our Section.

Nominating Committee

Anna Waclawa Sromek


ACS Service: Member since 1997; currently member of Organic Division, Medicinal Chemistry Division, Nuclear Chemistry and Technology Division, and Northeast Section.

NESACS Service: Member as of 2009; member, Esselen Award Committee, 2009-2013; chair, Esselen Award Committee, 2013; Alternate Councilor, 2015-2017; Nominations Committee, 2015

Statement: I am honored to be nominated for election to the Nominations Committee. I have enjoyed my tenure in the Esselen Award Committee, Nominations Committee, and as Alternate Councilor, and I wish to continue my service to the ACS and NESACS. If elected, I will actively work to promote chemistry to the general public, and to foster interest and participation of the chemistry community. Thank you for your consideration.

John Williams

Andrew Scholte

(See qualifications and statement under Councilor/Alternate Councilor)

James E. Phillips

Education: Tennessee State University, B.S., 1968; University of Cincinnati, M.S., 1972.

Professional Positions: Research Chemist at Sheppard Chemical Company in Norwood, Ohio; Technical Service Engineer at the Dow Chemical Company in Midland, Michigan; Chemical Supervisor at Corning Medical in Medfield, MA; Laboratory Supervisor at Muro Pharmaceutical Company in Tewksbury, MA; Waters Corporation, (retired); Sr. Support Engineer

Service in ACS Offices: 20-year Member ACS.

Northeastern Section: Director-at-Large (2009-2015), Board of Publications (2013-Present), Nucleus Photographer

Member: ACS Divisions: Medicinal, Analytical Chemistry, Waters’ booth staff at ACS National Meetings

Related Activities: Mentor for the New England Board of Higher Education (NEBHE) Science Network for students who are traditionally underrepresented in Science, Technology, Engineering and Mathematics (STEM); Lovewell Farm for Autistic Young Adults / Board Member

Statement: I am honored to be running for Nominating Committee for the Northeastern Section of ACS (NESACS). I hope to make a contribution in this position and be effective in helping the local section. I look forward to working with members who have been in the Section for a long time. I anticipate growing in this position and helping NESACS achieve its goals.

Committee on Awarding of Theodore William Richards Medal:

Sheila Hauck

Education: B.S. Youngstown State University; Ph.D. in synthetic organic chemistry, Wesleyan University, 1998 (with Peter Jacobi); Post-doctoral Research Associate, Yale University 1998-2000 (with John Hartwig).


Honors/ Awards: American Chemical Society Graduate Student Award, 1994; Dr. Max Tishler Teaching Award, 1995; AstraZeneca Exceptional Team Contribution to Infection, 2002; AstraZeneca Outstanding Team Achievement Award, 2005; Candidate Drug/ First Time in Man Infection Discovery Award, 2006.

Professional Societies/Activities
American Chemical Society Division of Medicinal Chemistry; Session Chair for 2012 Heterocycles Gordon Conference; Member of NESACS Richards Medal Committee, (2012-present).

Statement: I have had the pleasure of being involved with the NESACS by becoming an elected member of the Richards Medal Committee in 2012. I had not served in any capacity for the ACS prior to this, and I wanted to volunteer in order to give back to the community, to help recognize my fellow chemists for their significant contributions to society. It has been a very rewarding experience and I have met a lot of interesting and talented chemists by working on this committee, and I would be honored to continue for another four years.

John Caradonna


Professional Experience: Associate Professor, Chemistry Department, Boston University (1998 – Present), Affiliated faculty member Molecular Biology, Cell Biology, Biochemistry Program, Boston University (2000 – Present) and Materials Science and Engineering Program (2012 – Present). Associate Professor, Yale University (1993-1998), Assistant Professor, Yale University (1987-1993).

**NESACS Election**

*Continued from page 17*


**Position Statement**: I would be honored to serve as a participant of the Richards Medal Award Committee as part of the Northeastern Section of the American Chemical Society.

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**Mary Jane Shultz**

**Education**: B.S. (Honors) 1970 University of Wisconsin, Madison; Ph.D. 1975 Massachusetts Institute of Technology.

**Professional Experience**: Visiting Professor, Chinese Academy of Sciences (2013-to date); Chair, Department of Chemistry, Tufts University (2000-2006); Assistant, Associate, Professor, Tufts University, (1979-to date); Assistant Professor, University of Massachusetts, Boston (1978-1979); Research Associate/Lecturer, Boston College (1977-78); Radcliffe Fellow (1976-77); postdoctoral associate, University of California, Berkeley (1975-76).

**ACS Service**: Member since 1979. Women’s Chemists Committee (2012-date); Alternate Councilor, Physical Chemistry Division (2010-2013); Executive Committee, Physical Chemistry Division (2010-2013); Rising Star Award Committee (Chair 2011-2014); Representative Multidisciplinary Program Planning Group (2010); Physical Chemistry Poster Session Judge, (2006). Session chair: 2011, 2010; Presidential symposium committee (2010); Symposium co-organizer (2006).

**NESACS Service**: Councilor Northeastern Section American Chemical Society (2011-date); James Flack Norris Award committee (2007-2014, 1988-1991); Board of Directors, Northeastern Section (2009-to date)

**Memberships**: American Chemical Society; Divisions Physical Chemistry, Colloid and Surface, Chemical Education, Environmental Chemistry; American Association for the Advancement of Science; American Physical Society; Sigma Xi; Iota Sigma Pi (ISP)

**Honors**: AAAS (American Association for the Advancement of Science) Fellow; ACS (American Chemical Society) Fellow; US representatives to the International Congress: Chemical Sciences and Society, Kloster Seeon, Germany (2009); Outstanding Faculty Award, Tufts University (Chemistry, 2006, 1999); National Science Foundation Visiting Professorship (1985-86); Mellon Grant Faculty Development Award (1983); Tufts University Faculty Research Fellow (1980); Brandeis University Research Fellow (1979); Research Fellow, Division of Engineering and Applied Physics, Harvard University (1976-77); Radcliffe Fellow (1976-77); Greenlaw Fellow, M.I.T. (1975); Honors Graduate, U. of Wisconsin (1970).

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**Esselen Award Committee**

**Karen N. Allen**


**Relevant Memberships**: American Chemical Society, American Society of Biochemistry and Molecular Biology, American Crystallographic Association, Protein Society


**Statement**: I have been a member of the Northeastern Section of the ACS since I first joined the Society and have been very active at the National Level. I would like to become more involved in local ACS activities. If I am elected, I will endeavor to ensure the inclusion of the many worthy chemists in the greater Boston area and that the nominees reflect the diversity of the Society’s membership. Thank you for the opportunity to serve the Northeast Section.

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**Mukund S. Chorghade**

(See background and statement under Councilor/Alternate Councilor)

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**David R. Walt**

David R. Walt is University Professor, Robinson Professor of Chemistry, Professor of Biomedical Engineering, Professor of Genetics, and Professor of Oral Medicine at Tufts University and is a Howard Hughes Medical Institute Professor. Dr. Walt is also Director of Tufts Institute for Innovation. Dr. Walt is the Founding Scientist of both Illumina, Inc. and Quanterix Corporation and is a Director and Chairman of the Scientific Advisory Boards of both companies.

He has received numerous national and international awards and honors for his fundamental and applied work in the
Brian Provencher


ACS Service: Member since 2003; Member of the Northeast section since 2003

Personal Statement: I am honored to be nominated for the Esselen Award Committee. I would love to be more involved in NESACS and look forward to serving on the committee.

Our approaches to catalyst discovery will be illustrated in some of our most recent work aimed toward the development of catalysts for stereocentered glycosylation. Through an approach that was both mechanistically-guided and serendipitous, we...
Summer Scholar

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brightfield, DIC, fluorescence, and digital holography imaging. To ensure that we are observing vesicles, we encapsulate an aqueous fluorescent dye inside the vesicles and image fluorescently. A higher intensity of emitted light indicates a higher concentration of dye. It is clear from the shape and intensity of the emitted turquoise light that we are observing vesicles (Figure 2C). The phospholipid membrane clearly contains the fluorescent aqueous phase of the vesicle. We also tagged the polystyrene particles with Nile Red dye so we could easily determine if the particles were encapsulated or not. We see three distinct red-spots indicative of material tagged with Nile Red (Figure 2B). In addition, these particles are localized in the position of the vesicle visible as pictured in Figures 2A and 2C. Since standard microscopy views distinct planes along the z-axis, particles may appear to be moving inside the vesicles whereas after careful inspection the particles are moving close to the surface of the vesicle. Therefore, we adjusted the focus of the microscope to ensure that the particles move inside the vesicle for all planes along the z-axis. We used digital holography to produce a light-scattered image of the vesicle (Supplemental information 1). Using an optical trap, we held the particle at a certain position in three-dimensional space while moving the sample stand. When we try to move the particle outside of the bilayer membrane, the membrane blocks the movement of the vesicle past the membrane. We moved the particle along all three axes to show that the polystyrene particle is indeed encapsulated.

The reason we substituted HPTS with sulforhodamine B is because we desired to obtain better 2-channel fluorescence measurements. In fact, we could see the background fluorescing lower intensity, light turquoise upon excitation with the solid state illuminator. Although there appears to be some fluorescing sulforhodamine B in background images, the intensity appears to be lower and thus, making sulforhodamine B a better fluorescent dye. Background fluorescence of the medium may indicate that vesicles have burst or that droplets did not form vesicles upon crossing the interface during the pull-down process. The observed vesicles in sample slides are often polydisperse, filled-with substructures, and often smaller than 50μm which were the observed diameter of the inverted emulsion. Thus, the observations seem to suggest bursting or dividing vesicles. The main source of this may very well be the centrifugation to pull through vesicles in which high forces may strain and cause loss of vesicle stability, or it may be a lack of osmotic matching between the inner and outer aqueous phases.

We observe multiple vesicles containing Janus particles and other substructures (Supplemental information 2). Upon addition of hydrogen peroxide the Janus swimmers exhibit rapid, random translational motion. This distinguishes them from surrounding substructures, which do not follow similar movements upon addition of hydrogen peroxide. In addition, we see in brightfield images that Janus particles seem to alternate between dark and light, which is the optical result of particles half-coated in platinum. The vesicles are polydisperse and the internal environment of the vesicles is dynamic with substructures of oil or even smaller vesicles enclosing high concentrations of fluorescent dye.

We see inverted emulsion moving from the right, injection capillary across the juncture and into the left, collection capillary (Figure 3). There is flow from an outer aqueous phase that shears and pinches off double emulsion droplets in a similar manner to that of the oil phase in the PDMS microfluidic device. The dark spots in the images are polystyrene particles that are encapsulated in the double emulsions. These double emulsions become vesicles when the chloroform-hexane layer evaporates. However, it is precisely this process that leaves a permanent oil scar on the phospholipid membrane, which makes accurate digital holography difficult; it interferes with successful tracking of encapsulated particles. Despite this, we have shown that particle encapsulation is possible with multiple techniques.

We have developed a method of creating relatively clean and stable vesicles via PDMS microfluidics, subsequently encapsulated Janus particles, and observed swimming or faster-than-diffusion motion of these particles. With the glass capillary microfluidics, we have shown that particle encapsulation is possible with other methods, which facilitates future endeavors to actively employ a variety of techniques to encapsulate motor particles. In the vein of studying cellular transport rates, further study of the physics of the effect of aggregate motion of motor particles will allow us to answer questions about how such mechanics affects rates of many chemical reactions such as protein transcription, DNA synthesis, and more. It seeks to answer how a cell is able to function given such a crowded internal environment in which crowding would seem to hinder, not facilitate, efficient transport of cellular material on reasonable time scales. Understanding the underlying physics will enable scientists to exercise greater control and mastery over different elements in the construction of an artificial cell.

Acknowledgements:

I would like to thank my mentors Viva R. Horowitz, Thomas G. Dimiduk, and Jesse W. Collins from the Manoharan Lab at Harvard University. In addition, I would like to especially thank Vinothan N. Manoharan as my first...
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lab Principal Investigator who introduced me to the world of research with the facilities and mentorship from his lab. Finally, I would like to thank Laura R. Arriaga for providing incredible research insights and techniques that helped forward the scientific endeavor of my project.

Resources

Esselen Address
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have found that cyclic, dimeric thiourea derivatives can mimic the behavior of certain glycosylase enzymes by promoting stereospecific, invertive substitution at the anomeric position of glycosyl chlorides. In an alternative strategy, we have found that we can generate highly reactive oxocarbonium ions from sugars in the presence of a carefully designed chiral ion-pairing catalyst. The a/b selectivity in subsequent nucleophilic additions to the intermediate is controlled by the stereochemistry of the catalyst, albeit still only to a moderate extent.

While the identification and understanding of useful catalysts represents an immediate goal of our work, our broader objective is to uncover general principles that may allow prediction of the possible functions of a molecule. Despite the organic chemists’ advanced understanding of structure, bonding, and reactivity principles, the discovery and optimization of functional molecules of any type (catalysts, medicines, materials) remains a largely empirical endeavor.

With the goal of identifying general design principles, we apply the methods of physical-organic chemistry to elucidate the mechanism of action of effective catalysts, with an emphasis on learning about the attractive and destabilizing interactions in transition structures. We have shown that this can lead to insights into how to devise either improved catalysts for known reactions, or new catalysts for novel applications. In the long term, we hope this knowledge will help molecular scientists reach the still-distal goal of learning how to carry out the rational design of functional molecules.

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Biography
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2012. Ras Labs was a MassChallenge 2013 Global Finalist, received funding through the Center for Advancement of Science in Space Award in 2014, and selected samples of Synthetic MuscleTM will be tested on the International Space Station in 2015. Rasmussen is published in peer review journals, edited the book “Electroactivity in Polymeric Materials” (Springer-Verlag © 2012), and co-wrote and owns the patents to the synthetic muscle project.

Abstract
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gamma radiation testing at the US DOE’s Princeton Plasma Physics Laboratory (PPPL) at Princeton University, with excellent results. Synthetic MuscleTM will be further tested on the International Space Station (ISS) for 90 days in 2015. Materials that can survive extreme environments – high radiation, low pressure, extreme cold and heat – are needed for deep space exploration. Ras Labs Synthetic MuscleTM, which mimics the unique gentle-yet-firm nature of human tissue, promises to transform prostheses and robots, allowing for the treatment, reduction, and prevention of injury and fatalities, and to further our exploration by land, sea, air, and space.

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May 4
Prof. Seth Herzon (Yale)  
Boston College, Merkert 130  
4:00 pm

Prof. Matthew Sigman (Utah)  
Harvard, Pfizer Lecture Hall  
4:15 pm

Prof. Elizabeth Kujawinski (Woods Hole)  
Boston Univ., Metcalf, Rm 113  
4:00 pm

May 5
Prof. Scott Phillips (Penn State)  
Tufts, Pearson, Rm P-106  
4:30 pm

May 7
Prof. Ryan Shenvi (Scripps)  
MIT, 4-270  
4:00 pm

May 11
Prof. Laura Gagliardi (Minnesota)  
Boston Univ., Metcalf, Rm 113  
4:00 pm

May 12
Prof. Jeffrey Moore (Univ. Illinois-Urbana)  
“Self-Healing Polymers”  
Brandeis, Rm G121  
3:30 pm

Prof. Justin Ragains (LSU)  
Tufts, Pearson, Rm P-106  
4:30 pm

May 13
Prof. Chad Mirkin (Northwestern)  
MIT, 4-370  
4:15 pm

May 18
Prof. Guy Lloyd-Jones (Univ. Edinburgh) and Dr. Chris Sfouggatakis, (Bristol-Myers Squibb)  
Harvard, Pfizer Lecture Hall  
4:15 pm

May 21
Prof. Jeremiah A. Johnson (MIT)  
Univ. of New Hampshire,  
Rm N104  
11:10 am

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The 952nd Meeting of the Northeastern Section of the 
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Thursday, June 11, 2015
Nova Biomedical  
200 Prospect Street, Waltham, MA
4:30 pm Board Meeting, Long-Range Planning, 2nd floor board room
5:30 pm Social Hour
6:30 pm Dinner
7:30 pm Welcome, Dr. Katherine Lee, NESACS Chair

Topic: Studying Biomolecules with Super-Resolution Fluorescence Microscopy
Speaker: 2014 Nobel Laureate W.E. Moerner

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