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NESACS

THE NUCLEUS

January 2019 *Vol. XCVII, No.5*

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By Katherine Ann Rubino, NESACS Board of Publications, Patent Attorney, Caldwell Intellectual Property Law

Recently on September 30th, 2018, a pending trade agreement was informally agreed upon known as the United States-Mexico-Canada Agreement (USMCA). Once implemented in the second half of 2019, this legislation will replace the North American Free Trade Agreement (NAFTA). NAFTA, which went into effect on January 1, 1994, was significant because it was the first trade agreement to implement intellectual property (IP) provisions.

The key changes to IP that will affect drug makers and drug developers involves uniform standards of regulatory data protection (RDP), as well as amendments to patent term restoration. Currently, for drug manufactures to obtain approval by a governmental agency such as the FDA, manufactures must show evidence of safety and efficacy of the compound. When the compound is a generic drug and/or a biosimilar, safety and efficacy data from brand name drugs may be used. Protection of this data, known as RDP is generally kept confidential for a certain term of years. RDP precludes others from using data for a same or similar product for a specific period of time without consent of the original party. RDP is frequently relied upon, because often trials with the brand compound can be difficult to perform and the brand name product needed to perform such trials is often still protected by a patent.

The USMCA looks to streamline protection of RDP in all three countries so that any one country is not at a disadvantage. Under NAFTA, chemical pharmaceutical products such as small molecules, were given RDP protection for five years. Biological pharmaceutical products were not addressed in NAFTA, because they were not widely developed at the time when NAFTA was negotiated and implemented in the early 1990's. Currently, the U.S maintains the five year protection window set out in NAFTA for chemical pharmaceutical products, and provides twelve years of RDP protection for biological pharmaceutical products. Canada provides eight years of

Current Protection Granted In Each Country

Country	Chemical Pharmaceuticals	Biological Pharmaceuticals
	5 years	12 years
	8 years	8 years
	5 years	Not addressed

RDP protection for both chemical pharmaceutical products and biological pharmaceutical products. Mexico currently provides five years of RDP only for chemical pharmaceutical products.

The USMCA creates uniformity of RDP protection in all three member countries, by providing for five year RDP protection for chemical pharmaceutical products and ten years of protection for biological pharmaceutical products. These time periods will run from the date of first marketing approval of a novel product in a relevant country. It is to be noted, that the ten year RDP for biologics is shorter than the twelve years of protection in the U.S. but longer than the eight and zero years of protection in both Canada and Mexico, respectively. In addition, the USMCA provides avenues for the U.S. to enforce longer RDP time periods in both Canada and Mexico. Furthermore, Canada and Mexico will be granted a transition period of five years to fully implement these new provisions.

The second major change to IP rights by this new trade agreement includes adjustments to patent terms for unreasonable delays caused by a patent office. Currently patent terms in the U.S., Canada, and Mexico last for 20 years from earliest filing date. Legislation in the USMCA will allow inventors to benefit from an adjusted patent term when there has been an "unreasonable" delay by the patent office, defined as a minimum of 5 years from the date of application filing, or 3 years after the request for an examination, whichever is later. This

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Protection Under NAFTA Vs. USMCA

Trade Agreement	Chemical Pharmaceuticals	Biological Pharmaceuticals
N.A.F.T.A.	5 years	Not addressed
U.S.M.C.A.	5 years	10 years

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Editorial Deadlines: *March 2019 Issue: January 22, 2019*
April 2019 Issue: February 22, 2019

THE NUCLEUS

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2019 Chair's Statement

Dear NESACS members,

2018 was a great year for this section, as we hosted the national ACS meeting again in August and also witnessed a considerable increase in our membership to almost 6600 members.

It was great to work with the current NESACS chair, Mindy Levine. 2019 is shaping up to be an exciting year as well. 2019 has been designated as the International Year of the Periodic Table (IYPT). This coincides with the 150th anniversary of Dmitry Mendeleev's published periodic table in 1969. In February, the women's chemist committee (WCC) will be planning a special breakfast to celebrate women in chemistry, in conjunction with other global events for IYPT.

One of my goals for being chair is to increase scientific literacy with the public. As chemists, we can take a lead in communicating with our elected officials and provide examples on how science has impacted our society and is improving the life of Americans.

Furthermore, I would like to build on the innovation panel that was organized this fall. Two more sessions will follow, the first one on how start-ups in the chemical enterprise can be supported and, finally, one concentrating on the entrepreneur.

This section has a diverse membership and the NESACS board hopes that we can showcase this through the events that the section organizes throughout the year. If you are interested in helping with this goal please reach out to me or anyone else on the executive committee.

We have also received funding to use technology to increase member engagement, and we are looking forward to rolling out more live streaming of monthly meetings and other important events.

I am looking forward to leading NESACS in 2019 and working with everyone to make this even a better section. As with any ACS section we are only as strong as our volunteers and the section would benefit immensely from your participation. Reach out to me (ascholte@gmail.com) or contact any of the board members for more information.

Looking forward to working with everyone in 2019!

Andrew Scholte, Ph.D.
NESACS Chair 2019 ◇

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Monthly Meeting

The 984th Meeting of the Northeastern Section of the American Chemical Society

Thursday, January 10, 2019

Alnylam Pharmaceuticals
300 Third Street, Cambridge, MA 02142

5:00 pm NESACS Annual Meeting (Bella B, 4th floor)

5:30 pm NESACS Board Meeting (Bella B, 4th floor)

6:00 pm Social Hour (Bella A, 4th floor)

7:00 pm Dinner (Bella A, 4th floor)

7:45 pm **Keynote Speaker:** Bonnie Charpentier, President of the American Chemical Society
Title: *A Conversation with ACS President, Bonnie Charpentier: the ACS Community and Priorities for 2019*

YOU MUST REGISTER IN ADVANCE TO ATTEND THE MEETING
THERE IS NO REGISTRATION FEE TO ATTEND THE MEETING
DINNER RESERVATIONS ARE REQUIRED.

THE PUBLIC IS INVITED

- For those who would like to join us for dinner, register by noon, Thursday, January 3, at https://bonnie-charpentier-president-acs.eventbrite.com. Cost: Members, $30; Non-members, $35; Retirees, $20; Students, $10. Dinner reservations not cancelled at least 24 hours in advance will not be refunded. For additional information, contact the Administrative Coordinator, Anna Singer, via e-mail at secretary@nesacs.org.
- If you wish to join us for this meeting and not eat dinner, please register by noon, Thursday, January 3, at https://bonnie charpentier-president-acs.eventbrite.com Select "Seminar only".

Directions to Alnylam Pharmaceuticals: 1. From Route 90 take exit 18 toward Cambridge onto Cambridge Street for 0.6 miles 2. Turn right onto Memorial Drive and continue for 3.1 miles. 3. Turn left onto Binney Street (0.3 miles) and left onto Third Street. Alnylam will be on the left. 4. Parking is available for $10 after 4pm at Kendall Square South Garage (0.2 m) and Kendall Center Green Garage (0.3m). Directions for parking and entrance will be displayed.

From Kendall Square South Garage: Head west on Kendall St toward Third St (first intersection); turn right and continue 3 blocks to Alnylam.

From Kendall Center Green Garage: Head southeast on Broadway to Main St/Third St (0.1 m); turn left onto Third St and head to Alnylam: 5 blocks (0.2 m).

Attendees requiring handicapped parking should contact Ms. Anna Singer (secretary@nesacs.org) prior to the meeting for parking accommodations. ◇

Biography:

Bonnie Charpentier is President of the American Chemical Society. She previously served on the ACS Board of Directors, including as the Chair of the Board. She has served on and chaired a variety of Society committees and task forces at national levels, as well as being active in local sections, divisions and regional meetings. At the local level, she has been instrumental in establishing chemistry workshops for teachers, workshops on interviewing skills for students, and an outreach program for hands-on chemistry with children in homeless shelters.

She is currently Senior Vice President of Regulatory and Compliance at Cytokinetics, Inc., in South San Francisco, California, a company dedicated to the discovery and development of novel small molecule therapeutics that modulate muscle function. In that role she is responsible for Regulatory, Quality and Drug Safety Departments.

Prior to Cytokinetics, Bonnie worked in drug research and develop-

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Abstract:

A Conversation with ACS President, Bonnie Charpentier: the ACS Community and Priorities for 2019

The over-arching theme for the ACS presidential year of 2019 is collaboration. In keeping with that theme, this presentation is meant to be an interactive discussion of ACS priorities and programs. The presentation will include an introduction to ACS Presidential areas of focus for 2019, including Advocacy for chemistry and science education, safety and the environment, and plans for the International Year of the Periodic Table of Chemical Elements (IYPT). Ideas for collaborations across ACS, and with other societies in this country and internationally will be explored for the benefit of our members, and for the world. The input, ideas, and suggestions from section members will be solicited. ◇

Announcement

Norris-Richards Undergraduate Summer Research Scholarships
March 29, 2019 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 2019. The student stipend is $3000 for a minimum commitment of ten weeks of full-time research work. The remaining $500 of the award is for 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, 2019 for publication in The Nucleus. They are also required to participate in the Northeast Student Chemistry Research Conference (NSCRC) in April 2020.

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, 2019.

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 2019:
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, 2019. Please note that applications via email (PDF format) are strongly preferred. Applicants will be notified of the results by email by April 12, 2019, with written confirmation to follow.

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

Q. Exactly, how many awards and scholarships does NESACS sponsor?
A) One b) Two c) Many
www.nesacs.org/awards

Your one-stop source to career-related links in the Chemical Sciences
WWW.NESACS.ORG/CAREERS

The NESACS Nominating Committee Wants You

By Michael P. Filosa

The first and most important duty of the Immediate Past Chair is to head the Nominating Committee starting in January. This year Mindy Levine will lead the Nominating Committee in its task of coming up with a list of candidates for the May election. This list should be completed in time to publish in the March edition of *the Nucleus*.

The main job of the committee is to come up with at least two candidates for Chair-Elect and a large number of candidates for Councilor and Alternate Councilor. Each year NESACS elects 5 councilors and 5 alternate councilors for 3 year terms. It is a big challenge to find approximately 15 candidates to run for these positions. If you are interested in involvement in ACS governance at the national level, election as a councilor is the primary way to do this.

Councilors can serve on committees which do much of the work of the ACS Council between National Meetings. Councilor is also a step towards higher office in within the American Chemical Society. There is also a substantial reimbursement available to councilors to attend ACS Meetings to make the cost minimal.

The Nominating Committee encourages you to approach us and discuss running for election. You are welcome to self-nominate.

In addition to the positions of Chair and Councilor/Alternate Councilor, the nominating committee also nominates candidates to run for Trustee, Directors-at-Large, and the various award committees: The Richards Award Committee, The Esselen Award Committee and the Norris Award Committee. Two members are also elected to serve for a

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November 2018 Meeting

Photos by Brian D'Amico

Mindy Levine (NESACS Chair) opening the Norris Award meeting

Mark Tebbe (Chair, Norris Award Committee) speaking about James Flack Norris and the Award

Christopher Cummins (M.I.T.) introducing the Norris Awardee

Gerard Parkin (Columbia University), at left, receiving the James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry from Mark Tebbe.

Have you checked out the NESACS website yet?

Updated frequently. Late-breaking news, position postings and back issues of the Nucleus

WWW.NESACS.org

Summer Scholar Report

An investigation of the synthesis and transmetalation chemistry of tris(aryl)tren ligands

Diego R. Javier-Jimenez and David R. Manke
Department of Chemistry and Biochemistry, University of Massachusetts Dartmouth, North Dartmouth, MA

Introduction

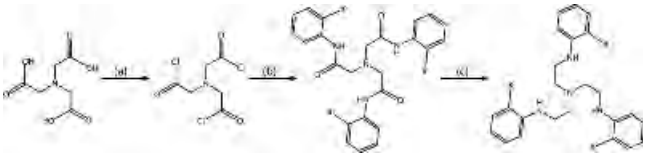
Tripodal ligands based on the tris(2-aminoethyl)amine (TREN) backbone have been used for more than 25 years to support a wide variety of interesting coordination compounds.[1] When fully deprotonated, the ligand is trianioinic, possessing three amido coordination sites and one amino coordination site, providing a tetradentate metal binding pocket. The ligand is able to stabilize metals in the +3 oxidation state, and favors a C_3 symmetric coordination environment, leaving an open coordination site on the metal at an axial position of a trigonal bipyramid (Figure 1). These ligands have been used to stabilize molybdenum compounds able to reduce dinitrogen,[2] zirconium compounds able to catalyze insertion reactions,[3] and novel actinide complexes.[4]

Figure 1. *The generic structure of the TREN ligand set, showing a metal bound in the tetradentate, tripodal tris(amido)amine binding pocket.*

To date, all TREN ligands possess a symmetric substitution pattern, with the same group on each of the three amido nitrogens of the ligand. A search of the Cambridge Structural Database reveals 436 metal complexes of TREN ligands. The vast majority of these complexes are tris(silyl)trens, where each amido nitrogen possesses trialkyl- or triaryl- silyl group. The synthesis of these ligands begins with the parent tris(2-aminoethyl)amine followed by a condensation with a chlorosilane.[1] Less common, but still studied, are tris(aryl)tren ligands (81 of 436 structures). The general synthesis of these ligands also begins with the parent tris(2-aminoethyl)amine and proceeds with a Buchwald-Hartwig coupling to generate the TREN ligands.[5] This synthesis is effective, though it requires the use of expensive catalysts and extensive purification.

Ligand Synthesis

In our lab, we have developed an alternative synthesis for TREN ligands, which rather than starting from the parent tris(2-aminoethyl)amine, starts from the significantly less expensive nitrilotriacetic acid.[6,7] We first convert nitrilotriacetic acid to nitrilotriacetic chloride through the use of phosphorus (V) chloride. This triacid chloride is then coupled with an aniline, using triethylamine as a sacrificial base, resulting in a nitrilotriacetamide. The nitrilotriacetamide is then reduced with lithium aluminum hydride or borane to generate the tris(aryl)tren ligand. The benefit of this synthesis, beyond the less expensive starting materials, is that it can be easily modified. By simply changing the aniline in the synthesis, the aromatic group on the tren ligand is altered. This synthesis offers many benefits, including a low cost, a scalable synthesis (>10 grams), simple purification steps, and is outlined in Scheme 1.



Scheme 1. *The modular synthesis of tris(aryl)tren ligands, where (a) is phosphorus (V) chloride, (b) is 3 equivalents of 2-X-aniline (X = H, Cl, Br, I, SMe, SPh), 3 equivalents of triethylamine and (c) is lithium aluminum hydride or borane.*

Figure 2 shows the crystal structures for some of the products of this synthesis. The initial product of the aniline coupling is a nitrilotriacetamide, which can itself function as a ligand.[8] The structures observed for the nitrilotriacetamides tend to be splayed out, with the three arms spread in a relatively planar fashion. There are N–H···O intermolecular hydrogen bonds in these ligands that enforce this geometry in the solid state. By contrast, the structures of the reduced TREN ligands demonstrate a C_3 symmetric crystal structure. There are three N–H···N intramolecular hydrogen bonds that hold the three arms up from the nitrogen of the tertiary amine. The NMR of both the nitrilotriacetamides and the TREN ligands demonstrate three equivalent arms in the solution phase.

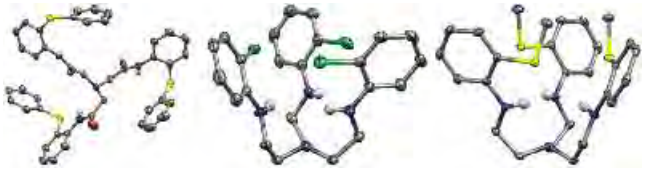


Figure 2. *The solid state structures of the nitrilotriacetamide formed from 2-(phenylthio)aniline (left), of the TREN formed from 2-chloroaniline (center) and the TREN formed from 2-(methylthio)aniline (right).*

When less electronegative anilines were used in the ligand synthesis, we began to observe the formation of a side-product in the aniline coupling to the nitrilotriacetic chloride. We were able to isolate one of these compounds, which turned out to be a dioxopiperazine compound, where there was a dangling amide arm and a six-membered ring in the product. In the synthesis, only two anilines replaced the chloride on the acid chloride; one of the amides that formed continues to attack the third acid chloride in a ring-closing reaction. This is observed with less electron rich aromatic rings because the rate is slowed, allowing for the intramolecular attack and ring-closing to occur. We can avoid this side-product by running

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Summer Scholar

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the reaction in an excess of aniline, adding six equivalents or more, such that it functions as both the reagent and the sacrificial base.

Alternatively, we can intentionally generate this side-product and avoid the formation of the nitrilotriacetamide by adding just two equivalents of aniline with excess sacrificial base (triethylamine) to the nitrilotriacetic chloride (Figure 3). This also allows for the formation of this product with electron-rich anilines, where the side-product was not previously observed. The solid state structures of these dioxopiperazines show a single intramolecular N–H···N hydrogen bond, with one structure shown in Figure 3. These compounds shows two equivalent methylene groups in the six membered ring, on which there are two diastereotopic hydrogens, giving rise to a quartet in the ^{1}H NMR.

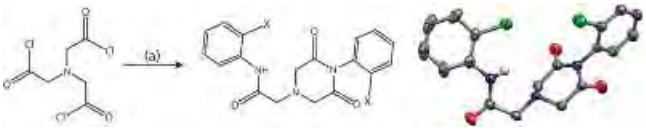

Figure 3. *The direct synthesis of dioxopiperazine products, where (a) is 2 equivalents of 2-X-aniline (X = H, Cl, Br, I, SMe, SPh), 4 equivalents of triethylamine. The solid state structures of the dioxopiperazine formed from 2-chloroaniline is shown at right.*

Metalation Chemistry

The TREN ligands, once synthesized can be deprotonated to generate viable transmetalation agents. The treatment of the TREN ligands with either *n*-butyllithium or *tert*-butyllithium leads to the formation of the trilithium salt of the tris(amido)amine. The structures of these complexes depend upon the steric bulk of the substituted aryl group. If Lewis basic groups are present at the 2-position of the aromatic rings, they interact with the bound lithium ions. There are also coordinated tetrahydrofuran solvent molecules present in the crystalline product. The structure of the 2-chlorophenyl variant of TREN is shown in Figure 4.

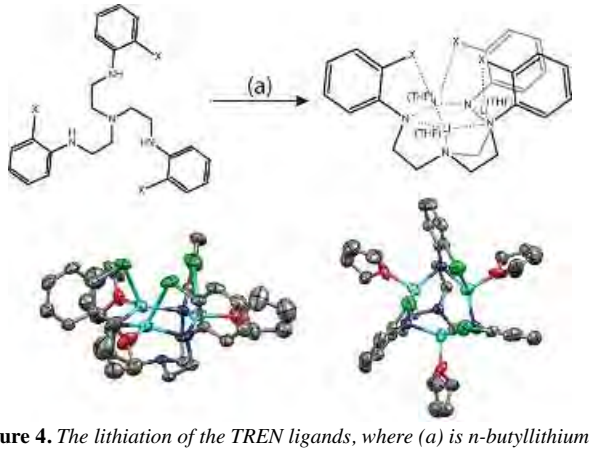

Figure 4. *The lithiation of the TREN ligands, where (a) is n-butyllithium or t-butyllithium. The solid state structure of the trilithium complex of the TREN formed from 2-chloroanline is shown with a side view (left) and a top view (right).*

The trilithium salts can be used as transmetalation agents with metal halide salts. One example of this transmetalation is the reaction of the trilithium complex of the 2-phenylthioaniline variant of TREN with antimony (III) chloride. This transmetalation gives the antimony TREN complex, with the antimony bound with a N_4 coordination pocket. There are three thioether ligands that remain uncoordinated above the antimony center. It is of note that this ligand design allows for the inclusion of different functional groups into the secondary coordination sphere of TREN ligands, as the thioethers above antimony demonstrate.

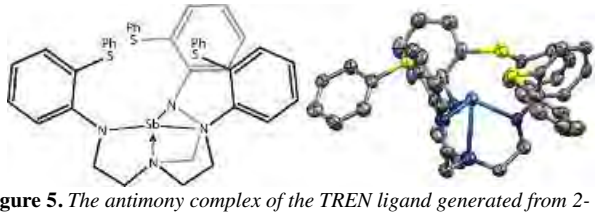

Figure 5. *The antimony complex of the TREN ligand generated from 2-(phenylthio)aniline, with the crystal structure shown at right.*

Future Directions

Moving forward, we have been exploring the reactivity of these ligands, in particular, examining other metalations and the reaction of internal aryl halides on the ligand for intramolecular cross-couplings. We have begun to study the dioxopiperazine complexes as precursors for the generation of TREN ligands with varied substitution at the amido nitrogens. We should have two publications coming soon to expand these syntheses, the metalation chemistry, and the reactivity therein.

Acknowledgements

Research conducted by Diego Javier-Jimenez was funded by the Norris-Richards Undergraduate Summer Research Scholarship awarded by NESACS. He would like to thank his research advisor Dr. David Manke for guidance and support. He would also like to thank former graduate student Velabo Mdluli for previous work on the project, Ava Kreider-Mueller for helpful advising and Dr. James A. Golen for his contribution in the determination of crystal structures. The work was also supported by two NSF instrumentation grants (CHE-1229339 and CHE-1429086).

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National Chemistry Week 2018

By Ray Lam, Massachusetts Maritime Academy

NCW 2018 Volunteers at Museum of Science, Boston (Photo Credit: Ray Lam)

National Chemistry Week (NCW) 2018 marks the third year I helped organized as chair. Many people, myself included, have asked me why I would want to take up such a task; communicating between two major museums, recruiting over 200 volunteers, making t-shirts, securing sponsors, promoting the events, ordering chemicals, multiple supermarket runs, and managing the budget. I assure you the list goes on. Indeed, after every single event, there was always a little voice in my head saying, "not again!". So why do I keep doing it? First, I owe it to my mentor and my friend, our beloved Dr. Christine Jaworek-Lopes, who passed me the torch before she lost her battle with cancer in 2016. Chris, who showed me and countless others what true passion and courage look like, left some very big shoes to fill. But the main reason is perhaps better phrased by one of our volunteering veterans, Jenn Scarborough;

"My first NCW event was a few days after my first college chemistry exam. Like most college students, I was stressed and less than in love with the discipline at that moment. Volunteering at NCW reminded me what wonder felt like. Curiosity was what had made me a scientist at age six, and curiosity is what pulled me back in. Somewhere between my post-test groans and a five-year old's gasps, I remembered why I wanted to be a scientist in the first place"

The theme for NCW 2018 was "Chemistry is Out of This World". We have significantly ramped up our advertising effort this year. In addition to the advertising channels of both Boston Children's Museum and the Museum of Science, Boston, our events were also advertised on Science Friday,

Visitor participating in "Ice Orb" activity at Museum of Science, Boston (Photo Credit: Eric Workman)

Boston Parents Paper, Boston Tech Mom, as well as in *the Nucleus* and on our Facebook Page.

NCW Events at the Museum of Science Boston

The first NESACS National Chemistry Week 2018 public event was held at the Museum of Science, Boston on Sunday October 21. Over 100 guest educators from local high schools and universities volunteered to run hands-on activities throughout the day. The museum had approximately 3900 visitors that day and conservatively 1000 of them visited our activities. The enthusiasm and energy from our guest educators really shined though and our visitors thoroughly enjoyed our event. Among the highlights of the day were the two Phyllis A.

National Chemistry Week

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Visitor participating in "Rocket Reactions" activity at Museum of Science, Boston (Photo Credit: Eric Workman)

Visitor participating in "Sublimation Bubbles" activity at Museum of Science, Boston (Photo Credit: Eric Workman)

Brauner Memorial lectures, presented by Prof. Bassam Z. Shakhashiri, Professor of Chemistry at the University of Wisconsin-Madison who performed live chemistry demonstrations in the museum's theater to an excited and enthusiastic audience.

NCW Events at the Boston Children's Museum

Our second public event was at the Boston Children's Museum on Saturday, October 27. Approximately 50 volunteers were divided into two shifts. Visitors were given a stamp sheet as they entered our activity area, so they could collect space-related stamps at each station. In addition to NCW-themed activities, the museum also invited ambassadors from NASA. Each ambassador brought with them different activities suitable for the age group of our target audience, the highlight of

NASA ambassador with "UV Beads" activity Boston Children's Museum (Photo credit: Alissa Daniels)

Image 6 Visitors exploring "Sublimation Bubbles" activity at Boston Children's Museum (Photo credit: Alissa Daniels)

which was the NASA space-suits for visitors and volunteers to put on and have pictures taken next to a NASA flag. Boston Children's Museum live-streamed our preparation day on their Facebook page to highlight our event. We also live-streamed one of our activities on our NESACS NCW Facebook page on Saturday.

Both museums received the Explore Science: Let's do Chemistry Kits and the majority of the activities were taken directly from the kit. The Explore Science: Let's Do Chemistry kit is designed to stimulate interest, sense of relevance, and feelings of self-efficacy about chemistry among public audiences. Many of the activities use materials that are low-cost and easy to find, and all of the activities include safety guidelines to ensure a fun and safe chemistry experience. The digital kit is available as a free download at nisenet.org/chemistry-kit.

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National Chemistry Week

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Visitors exploring "Sublimation Bubbles" activity at Boston Children's Museum (Photo credit: Alissa Daniels)

Visitor exploring "Zeolites" activity at Boston Children's Museum (Photo credit: Alissa Daniels)

The activities and demonstrations that were performed throughout NESACS NCW 2018 include: molecules in motion, sublimation bubbles, rocket reactions, spectroscopes, producing oxygen, pencil hydrolysis, comet mystery box, elemental atmospheres, building a battery, cleaning oil spills with chemistry, chemistry is colorful, chemistry makes scents, nature of dye, ice orbs, investigating clouds, UV beads, zeolites, and what's in the water.

Acknowledgements

NESACS NCW 2018 would not have been possible without the help of the volunteers from Alnylam Pharmaceuticals, Amegen, Arlington High School, Beyond Benign, Dartmouth College, Dow Dupont, Emmanuel College, Malden Catholic High School, Kaleido Biosciences, Massachusetts Maritime Academy, Millipore Sigma, Northeastern University, NSYCC, Rhode Island Hospital, Salem State University, Stonehill College, Suffolk University, Toxikon Corp, University of Massachusetts Boston, University of Massachusetts Dartmouth, and University of Massachusetts Lowell. The author apologizes in advance if anyone has been inadvertently omitted from these acknowledgements. Special thanks to Boston Children's Museum and Museum of Science, Boston for hosting the events, and to our sponsors Massachusetts Maritime Academy and Millipore Sigma for their generous donations.

Visitors with NASA flight suits at Boston Children's Museum (Photo Credit: Lily Wu)

NCW Illustrated Poem Contest

Children, grades K-12, were able to participate in the NCW 2018 poem competition. We received 21 entries this year. Congratulations to Ms. Ashmita Prajapati for winning the 6th – 8th Grade category and Ms. Rachael Soper for winning the 9th – 12th Grade category. Our winners were submitted to the national contest and we were excited to announce that Ms. Prajapati is the winner for the 6th – 8th Grade category in the national contest. ◇

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National Chemistry Week

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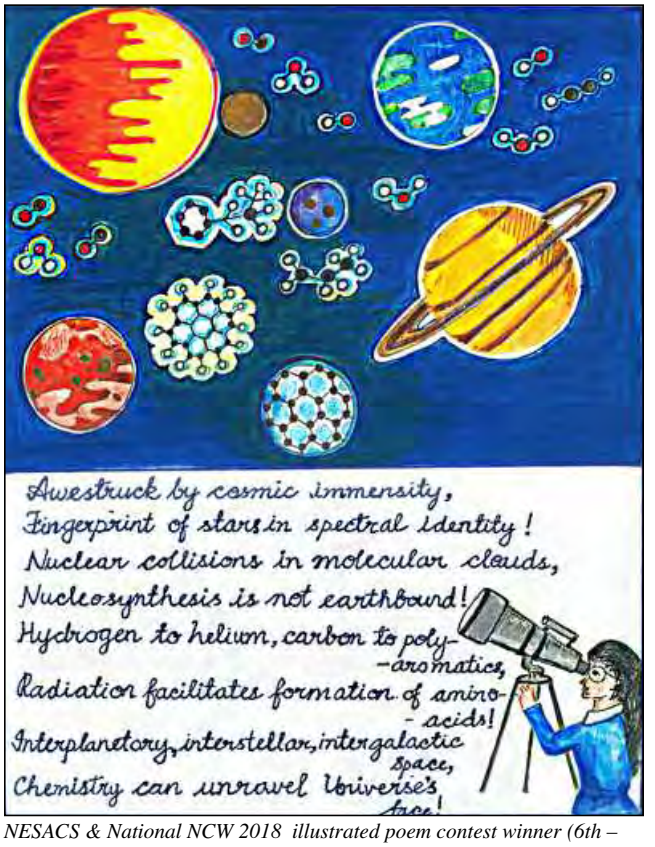

NESACS & National NCW 2018 illustrated poem contest winner (6th – 8th Grade) from Ms. Ashmita Prajapati

NESACS NCW 2018 illustrated poem contest winner (9th – 12th Grade) from Ms.Rachael Soper

It's fun to enjoy Sidney Harris's cartoons at their most basic level. But Harris's cartoons typically include several levels of humor that are particularly relished by "insiders." Regarding the chemicals mentioned in this cartoon, Harris "think[s] these actually are from canned soup. Maybe more than one. Generally I make up names that I don't even know exist. Once I had an equation in a cartoon for the New Yorker, and they wanted me to assure them that it was gibberish. If it wasn't, they said they'd get a lot of angry and critical mail."

-- Jeffrey I. Seeman, University of Richmond

Changes to NAFTA

Continued from page 2

is especially important for biological pharmaceutical products because the technology involved can take several years for a patent to be fully prosecuted and eventually granted.

Looking ahead, the USMCA is expected to be implemented in the second half of 2019. Both Canada and Mexico will be given a five-year grace period to fully comply with some of these IP regulations. Once ratified and implemented by each country, the USMCA will be reviewed by all three countries after six years. For now, we must wait and see how these provisions will be enacted and implemented, including other industries that may be affected by USMCA including the dairy industry, as the USMCA has proposed new labeling and naming of cheese exports leaving the U.S. For now we can hold onto asiago, but maybe not for too long! ◇

NESACS Nominating Committee

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year on the Nominating Committee. The Secretary and the Treasurer are also elected positions which serve two-year terms.

If you are interested in any or all of the elected positions of the Northeastern Section please make your interest known as soon as possible to Mindy Levine at mindy.levine@gmail.com or Michael P. Filosa mpf1952@gmail.com ◇

Looking for seminars in the Boston area?

Check out the NESACS Calendar

www.nesacs.org/seminars

Summer Scholar

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7072.

5. Greco, G. E.; Popa, A. I.; Schrock, R. R. "Synthesis of Aryl-Substituted Trisamidoamine Ligands and Molybdenum (IV) Complexes that Contain Them" *Organometallics* **1998**, *17*, 5591-5593.
6. Mdluli, V.; Hubbard, P. J.; Kuznicki, A.; Golen, J. A.; Rheingold, A. L.; Manke, D. R. "A tripodal aminothioether ligand scaffold: Synthesis, and coordination to zirconium and hafnium" *Polyhedron* **2017**, *121*, 264-268.
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8. Ray, M., Yap, G. P. A., Rheingold, A. L. and Borovik, A. S. "Synthesis and Characterization of a Trigonal Monopyramidal Nickel (II) Complex" *Journal of the Chemical Society, Chemical Communications*, **1995**, 1777-1778. ◇

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or contact Michael Filosa with any suggestions at filosam@verizon.net

Biography

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ment at other companies, including Syntex and Roche, and as an analytical chemist at the Procter and Gamble Co. She holds a B.S. degree in anthropology and a Ph.D. in Plant Physiology.

In her ACS work, Bonnie has emphasized the importance of communicating the value of chemistry through public outreach and education. She is a strong advocate for high quality services for members including career services and continuing education. She supports ACS programs that focus on expanding ACS's legislative advocacy through member involvement, and on increasing effective collaboration between industry and academia, and between ACS and other professional societies. She is passionate about the importance of public service, and about turning molecules into medicines. ◇

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

A) One b) Two c) Many

www.nesacs.org/awards

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These include:
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http://www.unh.edu/chemistry/events
https://www.wpi.edu/academics/departments/chemistry-biochemistry

January 22

Prof. Holly Guevara (Grove City College)
Univ. New Hampshire, Parsons N104
11:10 am

Dr. Thomas Jaramillo (Stanford)
Tufts, Pearson, Room P-106 4:30 pm

January 23

Dr. Yuxuan Lin (MIT)
Boston University, Metcalf, Room SCI 512
2:00 pm

January 24

Prof. Jie He (UConn)
Boston College, Merkert 130 4:00 pm

Prof. Catherine Leimkuhler Grimes (U. Delaware)
MIT, Room 6-120 4:00 pm

January 25

Prof. Samuel Gellman (U. Wisconsin-Madison)
Boston College, Merkert 130 4:00 pm

January 28

Prof. Ian Tonks (Minnesota)
Boston University, Metcalf, Room 113 4:00 pm

Dr. Yogesh Surendranath (MIT)
"*Molecular Control of Inner-Sphere Interfacial Electrochemistry*"
Harvard, Pfizer Lecture Hall 4:15 pm

January 29

Prof. Leila Deravi (Northeastern)
Tufts, Pearson, Room P-106 4:30 pm

Prof. Thomas Mallouk, (Penn. State University)
Univ. New Hampshire, Parsons N104 11:10 am

January 30

Prof. Ronald Raines (MIT)
Boston College, Merkert 130 4:00 pm

Prof. Benedetta Mennucci (University of Pisa)
Boston University, Metcalf, Room SCI 512
2:00 pm

January 31

Prof. Andy McNally (Colorado State)
MIT, Room 6-120 4:00 pm

Prof. Suljo Linic (U. Michigan)
Tufts, Pearson, Room P-106 4:30 pm

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Samurdhi Wijesundera, Email:
samu.amameth@gmail.com ◇

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