Monthly Meeting
George Whitesides to speak at
Takeda-Millennium, Cambridge, MA

Summer Scholar Report
By Leonard Sprague and Edward J. Brush, Bridgewater State University

Report from Rabat: Malta VII
By Morton Z. Hoffman

NESACS at Fenway Park
May 11, 2016
The Nucleus March 2016

The terrorist attacks in Beirut and Paris a few days earlier, the ongoing Israeli-Palestinian conflict, and the continuing humanitarian crisis in Syria and Iraq served as the backdrop for the seventh biennial Malta Conference (Malta VII) on scientific research and education in the Middle East, which was held at the Sofitel Hotel in Rabat, Morocco, on November 15-20, 2015.

The six previous Malta Conferences took place in Valletta, Malta (2003, 2005, 2013), Istanbul, Turkey (2007), Amman, Jordan (2009), and Paris, France (2011 at UNESCO headquarters as part of the celebration of the International Year of Chemistry). The Malta Conferences Foundation (MCF), a 501(c)(3) charitable organization incorporated in Washington, DC, organizes the Conferences and raises money for their support.

The recent horrifying events within the Middle East and around the world led to an increased determination by the more than 90 participants at Malta VII to unite with one another to build collaborations as a bridge to peace. With scientists and science educators from universities and national institutes, including students and early-career scientists, from 15 Middle East and North Africa (MENA) countries (Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Morocco, Palestinian Authority, Qatar, Saudi Arabia, Syria, Turkey, and the United Arab Emirates), as well as speakers and meeting organizers from U.S. and Europe, the Conference featured plenary lectures by four Nobel Laureates, workshops on topics of importance to the participants from the region, oral and poster presentations, and opportunities for everyone to make personal and professional connections.

Amazingly, given the declared and undeclared states of war and political animosities among the MENA countries, only one person, a representative from Libya, was denied a visa to enter Morocco. Even the Syrians and Iraqis, who received their visas on the day before the Conference was to begin, were able to come and tell us first-hand about the hardships they encounter on a daily basis in their lives and professional work as well as the obstacles they faced to make the trip to Morocco.

The plenary lectures were given by chemistry Nobel Laureates Ada Yonath (Israel, 2009), Borderless Science; Dan Shechtman (Israel, 2011), Technological Entrepreneurship: Key to World Peace and Prosperity; Roald Hoffmann (U.S., 1981), Two New Games for Carbon; Martin Karplus (U.S., 2013), Motion: Hallmark of Life From Marsupials to Molecules.

Presentations were also made by Yvonne Pope (Chemical Abstracts Services, U.K.), SciFinder – The Choice for Chemistry Research; Olli Vuola (Aalto University, Finland), Entrepreneurship and Innovation; Nicholas Anthis (U.S. Agency for International Development, U.S.), The Middle East Regional Cooperation (MERC) Program; Lev Sydnes (University of Bergen, Norway), Chemical Safety and Security; Jonathan Forman (Organization for the Prohibition of Chemical Weapons, The Netherlands), Educational Resources From OPCW; Fadila Boughanemi (European Commission on Research and Innovation, E.U.), E.U. Builds Bridges Through Science Diplomacy; Mohamed Ismail (Ain Shams University, Egypt), Software Demonstration of Molecular Modeling and Computer Aided Drug Design; Donna Nelson (President-Elect, American Chemical Society), The Science Behind “Breaking Bad.”

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Keynote speaker: Mireya Dinca, MIT

Cover: March speaker, George M. Whitesides, Woodford L. and Ann A.
Flowers University Professor, Harvard University. Photo courtesy of Professor
Whitesides.

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The NUCLEUS

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The ACS Committee on Education has selected the following student chapters in the Northeastern Section to receive special recognition for the programs and activities described in their 2014-2015 reports:

**Outstanding**
- Northeastern University, Boston, MA; Jaime Conway and William Timson, chapter co-presidents; Prof. Kathleen Cameron, faculty advisor.

**Commendable Recognition**
- Gordon College, Wenham, MA; Daruenie Andujar and Logan Walsh, chapter co-presidents; Prof. Irvin Levy, faculty advisor.
- University of Massachusetts Lowell, Lowell, MA; Megan Lulsdorf and Tyler Harrison, chapter co-presidents; Prof. Kwok-Fan Chow, faculty advisor.

**Honorably Mention**
- Keene State College, Keene, NH; James Kraly and Denise Junge, chapter co-presidents; Prof. James Ulcickas, faculty advisor.
- Saint Anselm College, Manchester, NH; Catherine Muldoon and Charles Dooley, chapter co-presidents; Prof. Nicole Eyet, faculty advisor.
- Simmons College, Boston, MA; Caitlin Horgan and Nina Chen, chapter co-presidents; Prof. Changqing Chen, faculty advisor.
- Suffolk University, Boston, MA; Salina Shrestha and Janice Bautista, chapter co-presidents; Prof. Edith Enyedy, faculty advisor.

**Community Interaction Grants**
- Plymouth State University, Plymouth, NH; Albert Lamonda, student project director; Prof. Anil Wage, faculty advisor. Project title: Chemistry in Art.
- University of Massachusetts Lowell, Lowell, MA; Megan Lulsdorf and Tyler Harrison, chapter co-presidents; Prof. Kwok-Fan Chow, faculty advisor.

**New Activities Grants**
- Suffolk University, Boston, MA; Janice Bautista, student project director; Prof. Edith Enyedy, faculty advisor. Project title: Chemistry of Smell and Taste.

Student involvement in applying green chemistry principles and practices is essential to the integration of environmentally benign technologies in academia and industry. The ACS Green Chemistry Institute recognizes ACS student chapters that have engaged in at least three green chemistry activities during the academic year. Listed below are the 2014-2015 Green Chemistry Award recipients located within the Northeastern Section.
- Gordon College, Wenham, MA
- Northeastern University, Boston, MA

All chapters receiving special recognition will be honored at the 251st ACS National Chemistry Meeting in San Diego, CA, on Sunday, March 13, 2016.

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**ResMed: Residential School on Medicinal Chemistry and Biology in Drug Discovery**
June 5-10, 2016
Wyndham, Florham Park, NJ

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

- **Principles of Med Chem**
- **Chemoinformatics**
- **Lead ID & Optimization**
- **Epigenetics**
- **Fragment-based Drug Design**
- **Structure-based Drug Design**
- **Drug-like Properties**
- **Plasma Protein Binding**
- **Molecular Modeling**
- **Protein-Protein Interactions**

W. Greenlee, V. Guilo and R. Doll - Co-organizers

For more information and application forms: www.drew.edu/resmed

Phone: 973/408-3787; Fax: 973/408-3504

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**New Members**

**Invitation to attend a meeting**

You are cordially invited to attend one of our upcoming Section meetings as a guest of the Section at the social hour and dinner preceding the meeting.

Please call Anna Singer at 781-272-1966 between 9am-6pm, or email: secretary(at)nesacs.org by noon the first Thursday of the month, letting her know that you are a new member.

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**Meeting Hosts**

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**Booey our Savings**

When you tell our advertisers that you saw their ads here they have more confidence in our newsletter’s viability as an advertising medium. They advertise more. This supports our many activities.
Monthly Meeting

The 959th Meeting of the Northeastern Section of the American Chemical Society

Thursday – March 3, 2016

Takeda-Millennium
40 Landsdowne St, Cambridge, MA 02139

4:30 pm NESACS Board Meeting (Seminar Room-1st floor)
5:30 pm Social Hour (Cafeteria, 1st floor)
6:30 pm Dinner (Cafeteria, 1st floor)
7:30 pm Welcome, Dr. Jerry Jasinski, NESACS Chair (Auditorium, 1st floor)
7:45 pm Evening program with Professor George M. Whitesides, Woodford L. and Ann A. Flowers University Professor, Harvard University

For those who would like to join us for dinner, register by noon, Thursday, February 25, 2016 using PayPal: 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. Dinner reservations not cancelled at least 24 hours in advance must be paid.

If you wish to join us for this meeting and not eat dinner, please register by noon, Thursday, February 25, using PayPal: http://acssymposium.com/paypal.html. Select “Seminar only”. The fee is $1. New members or those seeking additional information, contact the NESACS administrative coordinator, Anna Singer, at secretary@nesacs.org or at (781) 272-1966 during regular business hours only. *note the office is open on a part-time basis.

THE PUBLIC IS INVITED TO THE EVENT. ATTENDEES NEED TO BE AWARE THAT THE HOST FACILITY IS A PRIVATE FACILITY WITH ITS OWN SECURITY AND GUIDELINES FOR ADMISSION. IT IS REQUIRED BY THE HOST SITE THAT ALL ATTENDEES BE REGISTERED IN ADVANCE. THOSE WHO FAIL TO REGISTER IN ADVANCE MAY NOT BE ADMITTED TO THE PROGRAM.

Directions to Takeda-Millennium:
By subway: Kendall Square T stop (Red Line)
Parking: Parking at 80 Landsdowne Street, with validation stickers/stamps available from security at the time of check-in at Takeda. Additional parking is available at 55 Franklin Street and after 6 PM on the adjacent streets in metered parking.

Special Thanks to:
• Mark Ashwell: mashwell@gmail.com
• Alexis Arakelian: Alexis.Arakelian@takeda.com
• Samantha Smiley: Samantha.Smiley@takeda.com
• Leland Johnson: ljjohnson@theconditasgroup.com
• Tracie Smart (Whitesides Group)
• Kelly Le and Brenden Meisinger (Aramark @ Takeda)

Biography

Most recently, Professor Whitesides gave the Fred Kavli Innovations in Chemistry Lecture, entitled, “Problems, Puzzles, and Inevitabilities in Research” during the Fall ACS National Meeting here in Boston.

George M. Whitesides was born August 3, 1939 in Louisville, KY. He received an A.B. degree from Harvard University in 1960 and a Ph.D. from the California Institute of Technology (with J.D. Roberts) in 1964. He was a member of the faculty of the Massachusetts Institute of Technology from 1963 to 1982. He joined the Department of Chemistry of Harvard University in 1982, and was Department Chairman 1986 to 1989, and Mallinckrodt Professor of Chemistry from 1982 to 2004. He is now the Woodford L. and Ann A. Flowers University Professor.

We encourage younger chemists to speak with Professor Whitesides during and after the meeting at Takeda.

Webstreaming of the March Meeting

Ajay Purohit, NESACS Board of Publications

Dear members: In the January 2016 edition of the Nucleus we announced that going forward NESACS will be live streaming its monthly meetings. Unfortunately we were unable to roll this feature out starting with the January meeting due to an upgrade that the service provider was implementing. I, on behalf of the board of publications, am happy to announce that we now have this issue resolved. Beginning with the March 2016 meeting, members will be able to participate in these meetings via WebEx either on their computers or using their mobile device.

To join please go to http://www.videoserversite.com/go/8350179/nesacsmeetings and click on “Guest”. Enter your name to join in to the meet-continued on page 12
The NESACS 2016 Nominating Committee recommends the following slate of candidates for the 2016 NESACS election. Candidates may be submitted by petition until March 13, 2016.

**Chair-Elect**
- Dr. Mukund S. Chorghade
- Dr. Mindy Levine

**Trustee**
- Dr. Robert Lichter
- Dr. Dorothy J. Phillips

**Treasurer**
- Dr. Ashis Saha

**Director-at-Large**
- Dr. Michael Filosa
- Dr. David Harris
- Dr. John Neumeyer
- Mr. James Phillips
- Dr. Myron S. Simon
- Ms. Vivian K. Walworth

**Nominating Committee**
- Dr. Thomas R. Gilbert
- Mr. James Phillips
- Dr. Mary Jane Shultz
- Dr. Sophia Su

**Norris Committee**
- Dr. R. Christian (Chris) Moreton
- Dr. George O’Doherty
- Dr. Samuel Pazicni
- Dr. Ajay Purohit

**Councilor/Alternate Councilors**
- Mr. Raymond E. Borg
- Dr. Mukund S. Chorghade
- Dr. Thomas R. Gilbert
- Dr. Patrick M. Gordon
- Dr. Jerry P. Jasinski
- Mr. Leland L. Johnson, Jr.
- Dr. Robert Lichter
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- Dr. Lisa Marcarella
- Dr. Kenneth C. Mattes
- Dr. R. Christian (Chris) Moreton
- Dr. Carol Mulrooney
- Dr. Ajay Purohit
- Dr. Raj (SB) Rajur
- Ms. Sofia Santos
- Dr. Marietta Schwartz
- Dr. Mary Jane Shultz
- Dr. Michael Singer
- Dr. Sonja Strah-Pleynet

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**Call for Nominations**

*The 2016 James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry*

**Deadline: April 15, 2016**

Nominations are invited for the 2016 James Flack Norris Award, which consists of a certificate and an honorarium of $3,000 and is given annually by the Northeastern Section (NESACS). The presentation will take place at a ceremony and dinner in November 2016, and will include a formal address by the awardee. The Award was established in 1950 by NESACS to honor the memory of James Flack Norris (1871-1940), a professor of chemistry at Simmons College and M.I.T., chair of NESACS in 1904, and ACS President in 1925-26.

Nominees should have served with special distinction as teachers of chemistry at any level: secondary school, college, and/or graduate school. With the presentation of the first Award in 1951, awardees have included many eminent teachers at all levels whose efforts have had a wide-ranging effect on chemical education. The recipient will be selected from an international list of nominees who have served with special distinction as teachers of chemistry with significant achievements.

A nomination in the form of a letter should focus on the candidate’s contributions to and effectiveness in teaching chemistry. The nominee’s curriculum vitae should be included and, where appropriate, a list of honors, awards, and publications related to chemical education. Seconding letters may also be included; these should show the impact of the nominee’s teaching for inspiring colleagues and students toward an active life in the chemical sciences, and attest to the influence of the nominee’s other activities in chemical education, such as textbooks, journal articles, or other professional activity at the local, national, and international level.

The nomination materials should consist of the primary nomination letter, supporting letters, and the candidate’s curriculum vitae. Reprints or other publications should NOT be included. The material should not exceed thirty (30) pages, and should be submitted electronically in Adobe PDF format through April 15, 2016 to Ms. Anna Singer, NESACS Administrative Secretary <secretary@nesacs.org>.

For more information about the Award, see <http://www.nesacs.org/awards_norris.html>.

Questions about the Award or the nomination process should be directed to the Chair of the Norris Award Committee, Professor Patricia A. Mabrouk, <p.mabrouk@neu.edu>.

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**Announcement**

*NESACS - Chemists Celebrate Earth Day, Theme: The Great Indoors - The Home Ecosystem*  

**April 10, 2016 - Museum of Science Boston**

NESACS will be celebrating Chemists Celebrate Earth Day Event at Blue Wing of MoS on Sunday April 10, 2016 from 12 - 4 pm. There will be hands-on activities from various institutions. The theme for this event is “The Great Indoors - The Home Ecosystem” covering topics pertaining to indoor air and water quality of the home.

NESACS will be participating in ACS sponsored CCED illustrated poem contest for students in Kindergarten - 12th grade.

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**Petition Candidates:** Any group comprising 2 per cent or more of the Northeastern Section may nominate candidates . . .” See NESACS website for details.

Respectfully submitted, NESACS 2016 Nominating Committee:
- Katherine Lee, Chair, John Burke, Andrew Scholte, Anna Sromek, John Williams
**NESACS at Fenway Park May 11**

This year our NESACS Red Sox outing is on Wednesday, May 11 for the 7:00 Red Sox vs. Oakland Athletics game. Bring your colleagues, friends, and family for a great ACS evening at Fenway. Home plate, grandstand seats are $38.00 and can be purchased at the NESACS PayPal link: http://acssymposium.com/paypal-redsox.html.

This traditional NESACS event, the Wally Gleekman Memorial Sum-merthing, is always a sellout, and we hope to see you there! ☀️

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**Stem Journey III**

By Jack Driscoll and Jennifer Maclachlan, NESACS Public Relations Committee

April 2, 2016 at Cape Cod Community College

The third STEM Journey event consists of the following: enthusiastic volun-teers, keynote speakers, hands on science demonstrations and the earning of Boy Scout Merit Badges.

**History:**

Our first event was on: March 29, 2014: “Space Lab to Zero G” and we attracted more than 750 people (http://www.nesacs.org/pub_nucleus/2014/Dec14.pdf).

The second event on March 28, 2015 was on Oceanography- “Great White Sharks to Deep Ocean Exploration”. It is described in (http://nesacs.org/section_act/STEM/2015/STEMJourneyII_715a.pdf).

STEM Journeys I-III are free events at Cape Cod Community College. In 2015, we had more than 1100 visitors, 100 volunteers, 30 organizations and 500 people who signed up to listen to our keynote speakers. All of this was on a snowy day in March. This event was described in the Dec. 2015 issue of the Nucleus. http://nesacs.org/pub_nucleus/2015/Dec15NUCLEUS.pdf.

We did get TV, radio and Cape Cod Times coverage for this event, which is the largest STEM event on the South Shore. (https://www.youtube.com/watch?v=SeLRGsB7xYU

http://www.capecodtimes.com/article/20150329/NEWS/150329409/0/SEARCH

This year our theme will be Transportation and the title is “STEM Journey III: Transportation: Air, Ground and Sea.” One of our keynote speakers will be discussing autonomous vehicles. We expect to have 50 organizations, 150 volunteers and 1,500 visitors on April 2, 2016 at Cape Cod Community College.

**Mission Statement:**

The STEM Journey program was organized in 2014 by the Cape Cod Council of the Boy Scouts of America, the North-continued on page 13
**Summer Scholar Report**

**Applying $^1$H NMR spectroscopy to develop a kinetic model for the transesterification of glycerol fatty acid triesters**

Leonard Sprague and Edward J. Brush, Department of Chemical Sciences, Bridgewater State University, Bridgewater, MA 02325

**Introduction**

Biodiesel (Fatty Acid Methyl Esters, FAME) is an alternative fuel made from renewable vegetable oils that can be used in diesel vehicles without engine modifications. Biodiesel is a possible replacement for petroleum diesel due to reduced greenhouse gas emissions, unburned hydrocarbons, carbon monoxide, particulate manner and nitrogen oxides. A diesel engine can run on an 80/20 (B20) mix of petroleum diesel to biodiesel, and with adjustments (to avoid possible clogging) can run 100% (B100) biodiesel. Over the past 10 years our research group has been studying the chemistry of small-scale (500mL-4L) biodiesel synthesis by base-catalyzed transesterification of vegetable oils, and determined that this process is highly inefficient and wasteful. A detailed model of the kinetics and mechanism for glyceryl fatty acid transesterification has not been developed. A better understanding of this chemical process could be important in solving these issues through the application of green chemistry principles in modifying reaction parameters, and in the design of specific catalysts for transesterification.

$^1$H NMR spectrometry is a rapid, quantitative instrumental method for time-based monitoring of transesterification reactions based on the integration of select proton signals. Although vegetable oil transesterification into methyl esters has been studied by $^1$H NMR, very little work has been done studying the reaction progress and kinetics by this method. The goal of this work was to develop a $^1$H NMR experimental method to study the time course of vegetable oil transesterification, that may eventually lead to a detailed kinetic model that would identify whether rate limiting transesterification occurs at C1-C3 or C2 as the glyceryl triester is converted into the di- and mono-ester, and finally free glycerol.

**Methodology**

**General.** All reagents were purchased from Sigma-Aldrich or Fisher Scientific and used without further purification. Transesterification reactions were conducted using store bought brand name soybean oil. All glassware was washed with Micro-90 cleaner, and then rinsed with deionized water and acetone before oven drying at 80°C.

**Transesterification Procedures.** Transesterification reactions were run at constant temperature (60°C or 25°C) using a standard 25 mL batch method with 3:1 mole ratios of methanol:ester (25.1 mmole triglyceride), and 2.51 mmole potassium hydroxide as catalyst. Aliquots were removed at timed intervals and quenched by dilution in acetone-d6 containing 0.05% TMS. The molecular mass of the triglyceride (vegetable oil) and biodiesel product were estimated based on the molecular mass of oleic acid as a model fatty acid.

**Sampling and Sample Preparation.** Good signal-to-noise ratios were obtained using 1.0 mL of acetone-d6 to quench 25 µL reaction aliquots. Aliquot volumes were measured with gas-tight syringes, flushed thoroughly between each aliquot to avoid contamination. $^1$H NMR spectra were obtained immediately after being quenched, and then scanned again twenty-four hours later. No changes in NMR spectra were observed over a 24-hour period.

**Instrumentation and Analysis.** Nuclear Magnetic Resonance (NMR) spectra were obtained on a JEOL ECX-400 MHz instrument. Quantitative NMR (qNMR) was used to determine reaction progress based on theoretical percent yield. In qNMR the quantity of a particular analyte (biodiesel) is determined by comparing the integrated value of an analyte signal of known number of protons to the integrated value of a known internal standard (Figure 3, equations 1 and 2). Maleic acid was used as the reference standard (vinyl protons at 6.3 ppm, 2H), to quantitate the biodiesel formed based on the appearance of the -OCH$_3$ methyl ester signal at 3.6 ppm (3H).

Continued on page 9
Calibration Curves and Data Handling. Maleic acid was kept constant at 25 mL of a 0.689 M stock solution (0.0172 mmole), and an aliquot of pure biodiesel was added (5, 10, 15, 20, and 25 µL) to create five standards. qNMR analysis with normalization of the maleic acid signal for each sample resulted in integrations of the –OCH₃ methyl ester signal (3.6 ppm) for comparison to theoretical integration. A straight line with good correlation R² = 0.9749 was obtained (data not shown).

Results and Discussion

Acetone-d₆ was found to effectively and completely quench the transesterification reaction, with no evidence of side reactions over a 24 hour period. Also, maleic acid functions as a suitable internal reference for qNMR quantification due to a clear signal downfield from all other signals of interest, resulting in easy and accurate calculations of methyl ester concentration.

The rates of triacylglyceride transesterification were examined at 60°C and 25°C. We initially attempted to study the transesterification kinetics at 60°C as this is the typical temperature for biodiesel production. However, it was found that the initial rate of transesterification at 60°C was too fast to measure by our sampling method, and that equilibrium was reached within one minute (data not shown). At 25°C a rapid initial rate was clearly observed that was linear for approximately 25-30% of the reaction as shown by the concentration-time data graphed in Figure 4. The rapid initial rate was followed by a slower reaction phase which reaches equilibrium in approximately 3 hours.

To our knowledge, this is the first time a rapid initial phase has been reported for vegetable oil transesterification. As our data suggest that this rapid phase accounts for approximately 25-30% of maximum yield, it is tempting to speculate that this implies a rapid exchange of a C1 glyceryl methylene ester group, followed by slower (rate limiting) exchange of the remaining two glyceryl esters, Figure 2. At this time we were not able to determine the equilibrium product composition based on the signals of the C1-C3 glyceryl methylene protons (4.1-4.4 ppm). Furthermore, the C2 methine proton signal (5.25 ppm) overlaps with the fatty acyl olefinic proton signal (5.35 ppm), Figure 5, making it difficult to accurately integrate the two signals. The equilibrium concentration of biodiesel produced at 25°C is approximately 60% of completion, and underlies the importance for using an excess of methanol and removing the glycerol product to “force” the reaction to completion.

Conclusions and Future Work

We have developed a simple, efficient and reproducible qNMR analytical method to monitor the transesterification of fatty acyl triglycerides. This method will be used to continue our work to better understand the kinetics and mechanism of small-scale biodiesel synthesis, and facilitate the optimization of reaction parameters and screening of new catalysts. Our results also suggest that room temperature (25°C) is preferred for rate studies on fatty acyl transesterification reactions, but more must be done in order to finalize rate analysis and determining reaction order. Our ongoing work is focused on determining the product distribution over the reaction time course. The complex mixture may contain tri-, di-, and mono-
In the Fall of 2015, the NSYCC received a grant from the ACS Committee on Community Activities to host an outreach event. The goal was to give back to the community in some way to spread science to a wider audience and engage the future generation of scientists. We had two successful endeavors in 2015 and it has inspired us to seek out more events like this in the future. Thanks to our Career Chair, Ray Borg, we collaborated with graduate student Jerry Gilligan who has fostered connections with local schools, especially East Boston High School. He works closely with Dr. Kristen Cacciatore’s Advanced Placement Chemistry class to bring a more diverse and interactive perspective to the science curriculum. The three of us spent an afternoon in November performing demonstrations of chemistry kits from Flinn Scientific such as “The Disappearing Rainbow” and “Amorphous Monster Foam.” These same kits will be used by the students for their annual Science Day where they will conduct and explain the experiments in front of the parents and teachers. We hope to continue this connection with Jerry and East Boston High School and visit again!

For our main outreach event of the year, we hosted an event titled “The Magic of Science” at the Brighton Public Library on December 5th 2015 with over 50 children in attendance. Valerie Ivancic, NSYCC Webmaster, designed four experiments for the participants that were simple and safe for ages 12 and under. Each table was decorated like the four Hogwarts houses: Gryffindor, Ravenclaw, Hufflepuff, and Slytherin. At the Gryffindor table Matt Rosienski and Alicia Lee (Clark University) showed the kids how to make their own silly putty using cornstarch, Elmer’s glue, Borax, and food coloring dye. Meanwhile at the Slytherin table Felicia Lucci (NSYCC Chair) had set up a nanoscience demonstration with toy fuel cell cars and a scanning tunneling microscope that showed students atoms. Valerie was at the Hufflepuff table showing the iodine clock reaction using apples for the Vitamin C and the potatoes as starch. Last but not least the Ravenclaw table had a milk dispersion experiment with food coloring dye and dish soap demonstrated by Sarah Lach and Astha Bilimoria (Clark University). Each child was provided their own pair of glasses and glove to be “safe like a real scientist”. There was also arts and crafts table where they could paint their own magic wands and decorate their safety glasses.

It was great to see the children show so much enthusiasm with the different experiments! Several kids said they want to be scientists someday; to quote one “I want to be an Ologist and study everything that ends in -ology!” Approximately six different K-8 schools were represented, many from Winship Elementary which is a block away from the library. We received great feedback from parents and children alike and we already looking to plan another one for 2016!

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

www.nesacs.org/awards
National Historic Chemical Landmark Site

By Vivian Walworth

The American Chemical Society celebrated its designation of the historic building at the northeast corner of Main and Osborn Streets in Cambridge as a National Historic Chemical Landmark. It is the site of the office and laboratory of Dr. Edwin H. Land, founder of Polaroid Corporation and inventor of Instant Photography. Dr. Land’s contributions span a wide range, from the invention of sheet polarizers and their application to display of stereoscopic images to one-step photography, innovative imaging chemistry, and new insights into color perception. The celebration took place on August 13 at the nearby MIT Museum which holds the major collection of Polaroid photographic images and materials from the early experimental stages onward. On August 14 the MIT Museum hosted a public celebration that included both Land’s work and contemporary instant photography. A session on August 16 during the ACS National Meeting in Boston centered on the chemistry and production of Polaroid’s SX-70 film.

The historic building is recognized by the City of Cambridge as a landmark, the oldest intact industrial complex in the city. First constructed in the early 1800s as a brick store, the building was occupied by the Davenport Car Works in 1842. Soon afterward the company added six one-story workshops, and in 1848 added two 2-story brick wings behind the front building. Davenport pioneered the design and construction of railroad passenger cars with center aisles and reversible seats, and constructed freight cars and a few steam locomotives. A plaque on the Main Street
Report from Rabat
Continued from page 2

Greetings were offered at the opening ceremony by Zafra Lerman (President, MCF), Rachid Bennokhtar Benabdellah (Minister of National Education, Morocco), Dwight Bush, Sr. (U.S. Ambassador to Morocco), Karen Betts (U.K. Ambassador to Morocco), Anne Vasara (Finland Ambassador to Morocco), Are-Jostein Norheim (Norway Ambassador to Morocco), Lahcen Haddad (Minister of Tourism, Morocco), Fadila Boughanemi, and Donna Nelson. Evening receptions were held during the week at the residences of Ambassadors Bush, Vasara, and Norheim. The Moroccan Ministry of National Education, the Academy of the Kingdom, and the Hassan II Academy of Science and Technology hosted a farewell cocktail dinner.

The following multi-session workshops, which were chaired by the listed organizers, were held:

• Organic, Organo-metallic, and Medicinal Chemistry: Cathy Costello (U.S.), Masoud Mehrgard (Iran), Mohammed El-Khatib (Jordan)
• Energy, Materials, and Nanotechnology for Resource Sustainability: Marwan Mousa (Jordan), Ron Naaman (Israel), Pierre Karam (Lebanon)
• Environment: Air and Water Quality: Chuck Kolb (U.S.), Abdelrahman Amarah Tamimi (Palestinian Authority), Abdullah Husein Malkawi (Jordan), Yossi Guttman (Israel)
• Science and Technology Education: Rachel Mamlok-Naaman (Israel), Morton Hoffman (U.S.)

A total of 54 oral presentations were made during the workshop sessions; 21 posters were on display throughout the entire meeting. At the end of the conference, the workshop organizers provided summaries of the talks and discussions in their sessions. Proposals were presented for future action, including the continuation of existing collaborations on water and education and the development of new ones, the dissemination of the information from the workshops to a broader audience, and the search for funding to provide research and international exchange opportunities for students and faculty. In the closing session, the participants, many of whom had attended previous Malta Conferences, enthusiastically endorsed the motion that Malta VIII be held in 2017.

Among the sponsors of Malta VII were the Organization for the Prohibition of Chemical Weapons (OPCW), Recipient of the 2013 Nobel Peace Prize, the United Nations Educational, Scientific and Cultural Organization (UNESCO), ACS and the Division of Chemical Education (CHED), the American Association for the Advancement of Science (AAAS), and the Committee of Concerned Scientists (CCS). Significant financial support was received from the Carnegie Foundation of New York, the Rockefeller Brothers Fund, and the Alexander von Humboldt Foundation. The members of the MCF Board of Directors who attended Malta VII were Zafra Lerman (President, U.S.), Ann Nalley, (Vice President, U.S.), Iona Black (Secretary, U.S.), Morton Hoffman (Treasurer, U.S.), Cathy Costello (U.S.), Chuck Kolb (U.S.), Leiv Sydnes (Norway), and Hassan Bazzi (Qatar). More information about MCF and the Malta Conferences can be found at http://maltaconferencesfoundation.org/.

Donna Nelson offered her perspectives about Malta VII and referenced the views of participants from the Middle East in her ACS Comment, “Building Relationships, Building Trust,” C&EN, Vol. 93 (48), Dec. 7/14, 2015, p. 45.
Chemical Landmark
Continued from page 11

face of the building commemorates the Davenport plant.

The next occupant was an iron foundry, Allen & Endicott, which rented out space to others, including J.J. Walworth & Company, early manufacturer of plumbing fittings and the iconic Stillson wrench. On October 9, 1876, Alexander Graham Bell and his assistant, Thomas Watson, used the Walworth telegraph line between the Cambridge plant and the Walworth office in South Boston to make the first long-distance telephone call. The Telephone Pioneers of America later mounted a celebratory plaque on the Main Street face of the building.

In 1927 the Kaplan Furniture Company, maker of fine furniture, purchased the building. That company rented some of its space to the Polaroid Corporation during the early 1940s. Founder Edwin Land opened a laboratory there and also established a training school on the second floor to train military personnel to make Polaroid Vectograph stereoscopic images in the field. Polaroid provided field kits, and Vectograph images were used throughout WW2 in support of aerial reconnaissance.

Dr. Land conducted the first experiments in one-step photography in his Kaplan building laboratory, and he continued work in his office and laboratory there until his retirement from Polaroid in 1982. Polaroid had occupied the entire building by 1960, and facilities there included black-and-white and color research labs, a projection room, and several additional research laboratories and darkrooms. Supporting research facilities, offices, workshops, engineering departments, and a research library occupied nearby buildings. Polaroid purchased the Kaplan building in 1988 and sold it to MIT in 1998. In 2014 the Polaroid Retirees Association added a plaque commemorating Dr. Land’s achievements.

MIT has fully preserved the external facade of the building, renovated the interior, and constructed an 80,000 square foot addition. Completed in 2002, the project received a Preservation Plaque commemorating Dr. Land’s highly productive research contributions, will join the earlier plaques on the building.

Keynote Speakers:
Ground-MIT Professor John Leonard (Mechanical and Ocean Engineering). Professor Leonard has been a key person in MIT’s participation in the 2007 DARPA program on robotic vehicles. His interests are artificial intelligence, robotics, and autonomous vehicles. His talk will be on “Autonomous Cars.”

Air-Massachusetts State Senator Dan Wolf or Linda Markum, President of Cape Air (the only woman President of a North American Airline). The talk will be about “Advances in Aviation.”

Water-Meghan Carroll of the Woods Hole Oceanographic Institute will speak on “Autonomous Underwater Vehicles (AUV)”

Organizers:
The Cape and Islands Council of the Boy Scouts of America, Northeastern Section of the American Chemical Society and Cape Cod Community College.

Award from the Cambridge Historical Commission in 2003. The building is now managed by MIT and occupied by modern Pfizer biotech research and several development laboratories.

The ACS plaque, which commemorates Dr. Land’s highly productive research contributions, will join the earlier plaques on the building.

Stem Journey III
Continued from page 7

eastern Section of the American Chemical Society and Cape Cod Community College to provide a stimulus and introduction to the sciences for K-12 students from the Cape and Islands and the South Shore. We feel that the US needs to improve science, technology, engineering, and math (STEM) education to remain competitive with the rest of the world. This will not be truly effective unless we inspire young students through programs like STEM Journey.

Summer Scholar
Continued from page 9

glycerides, free glycerol, biodiesel (methyl ester) and unreacted methanol. Furthermore, we need to conclusively determine the sequence of transesterification for the methylene vs methine carbons to conclusively identify reaction intermediates. Due to the complexity of the C1-C3 methylene signals, and overlap of C2 methine signal with fatty acyl olefinic protons (Figure 5), we will investigate whether 2D NMR can be employed to resolve these signals.

Acknowledgements
This research was supported by a Norris-Richards Summer Scholarship from the Northeastern Section of the American Chemical Society, the Bridgewater State University Adrian Tinsley Program, and a grant from the EPA P3 program (SU835696). The JEOL ECX-400 MHz NMR was obtained through NSF-MRI grant 0421081.

References
6. Guillen, Maria; and Ruiz, Ainhoa.
Call for Nominations

*Philip L. Levins Memorial Prize*

Nominations for the Philip L. Levins Memorial Prize for outstanding performance by a graduate student on the way to a career in chemical science should be sent to the NESACS Administrative Secretary, 12 Corcoran Rd., Burlington MA 01803 by April 8, 2016.

The graduate student’s research should be in the area of organic analytical chemistry and may include other areas of organic analytical chemistry such as environmental analysis, biochemical analysis, or polymer analysis. Research emphasis must be on novel uses of analytical methods, not routine analysis.

Nominations may be made by a faculty member, or the student may submit an application. A biographical sketch, transcripts of graduate and undergraduate grades, a description of present research activity and three references must be included. The nomination should be specific concerning the contribution the student has made to the research and publications (if any) with multiple authors.

The award will be presented at the May 2016 NESACS meeting.
Summer Scholar

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High resolution $^1$H nuclear magnetic resonance in the study of edible oils and fats. *Trends in Food Science & Technology*. **2001**, 12, 328-338


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Calendar

Check the NESACS home page for late Calendar additions: http://www.NESACS.org

Note also the Chemistry Department web pages for travel directions and updates. These include:
http://www.bc.edu/schools/cas/chemistry/seminars.html
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http://chemistry.harvard.edu/calendar/upcoming
http://chemistry.mit.edu/events/all
http://chem.tufts.edu/seminars.html
http://www.chem.umb.edu
http://www.umassd.edu/cas/chemistry/
http://www.unh.edu/chemistry/events

March 1
Dr. Keith Faucher (Maquet Getinge Group)
“The Importance of Chemistry in the Design and Manufacture of Medical Devices.”
UNH, Room N104, 11:10 am
Prof. Liz Nolan (MIT)
“Explorations of a host-defense peptide that self-assembles and entraps bacterial pathogens.”
Boston College, Merkert 130 4:00 pm

March 2
Prof. Konstantin Sokolov (Univ. Texas-Austin)
“Clinical translation of plasmonic nanosensors: design, synthesis, and applications.”
Boston Univ., Life Sciences and Engineering Building, Rm B01 4:00 pm
Prof. Christopher Chang (UCal-Berkeley)
Harvard, Pfizer Lecture Hall 4:15 pm

March 7
Prof. Peter Zhang (Boston College)
“Metalloradical Catalysis for Homolytic Radical Chemistry.”
Brandeis, Gerstenzang 121 4:00 pm
Prof. Yi Cui (Stanford)
Harvard, Pfizer Lecture Hall 4:15 pm
Prof. Joshua Price (BYU)
Boston College, Merkert 130 4:00 pm

March 8
Prof. Joshua Price (BYU)
Tufts, Pearson, Room P-106 4:00 pm
Prof. Emily Pentzer (Case Western)
UNH, Room N104, 11:10 am

March 9
Prof. Thomas Gunnane (Univ. of Virginia)
Harvard, Pfizer Lecture Hall 4:15 pm

March 10
Prof. Xiang Wang (U. Colorado-Boulder)
“Bio-Inspired Synthesis of Functional Molecules.”
Boston Univ., Life Sciences and Engineering Building, Rm B01 4:00 pm

March 17
Dr. Michael Z. Hoemann (AbbVie Bioresearch Center)
Boston College, Merkert 130 3:30 pm
Prof. Matthew S. Sigman (Univ. of Utah)
Boston College, Merkert 130 4:45 pm

March 18
Prof. Brian Crane (Cornell)
Brandeis, Gerstenzang 121 4:00 pm
Prof. Jonathan Weissman (UCSF)
Harvard University, Pfizer Lecture Hall 4:15 pm

March 21
Prof. Amanda Jones (Wake Forest University)
UNH, Room N104, 11:10 am

March 23
Prof. David Beratan (Duke)
“Does Evolution Care About Quantum Mechanics? Electrons, Bioenergetics, and Life.”
Boston Univ., Life Sciences and Engineering Building, Rm B01 4:00 pm

March 24
Dr. Molly O’Hagan (Pacific Northwest National Laboratory)
Harvard, Pfizer Lecture Hall 4:15 pm
Prof. M. Kevin Brown (Indiana)
MIT, Room 6-120 4:00 pm

March 29
Prof. David Christianson (Penn)
“Structural Biology and Chemistry of Histone Deacetylases in Human Disease and Drug.”
Tufts, Pearson, Room P-106 4:00 pm
Prof. Kevin Rice (Colby College)
UNH, Room N104, 11:10 am
Prof. Jason E. Gestwicki (UCal-San Francisco)
Boston College, Merkert 130 4:00 pm

March 30
Prof. Eric Heller (Harvard)
“The Looming Battle over Raman Scattering in Graphene and Related Carbon Compounds: Chemistry vs. Physics Perspectives.”
Boston Univ., Life Sciences and Engineering Building, Rm B01 4:00 pm
Prof. Daniel Kahne (Harvard)
Worcester Polytechnic Institute, Gateway Park 1002 12:00 pm

Notices for The Nucleus Calendar of Seminars should be sent to:
Xavier Herault, email: xherault(at)outlook.com ◇