

THE MIDLAND CHEMIST

A publication of the Midland Section of the American Chemical Society

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From the Chair

My World and Welcome to It

Here it is, April 2011 and the time is just moving along. There is quite a lot of activity in our section. Let's see, we have had members going to Pittcon, to the Spring National ACS meeting in Anaheim, California, and around here in the section we have had a number of events—such as Coffee Cafés at various high schools in the region, an Educator's Day at the Saginaw Spirit home game, a fantastic event on February 28 at the Midland Center for the Arts, events for Kids & Chemistry, events for Big Brothers and Big Sisters (NanoDays at Central Middle School, Fabric Dying at Bullock Creek High School and Central Middle School)... ah, the list goes on and on.

That's just what has been done... there is more to come. For instance, there is a Forensic Scavenger Hunt at

CMU on April 16. The Turner Alfrey Visiting Professor, Timothy Lodge of the University of Minnesota will be at MMI May 16–19, and will speak at a lecture following dinner on Wednesday, May 18. Kids & Chemistry will be doing things such as more events for Big Brothers and Big Sisters, Girl Scouts Camp, and Beal City Elementary coming up on April 26... and there is even more!

Each of you has a tremendous possibility, here, to get involved, to be involved, to stay involved. So why don't you read the rest of this issue, find the things you would like to be involved with, and get out there and



John (Pat) Cannady

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Calendar for April/May

April 4 Chemistry of Cooking
April 16 Forensic Scavenger Hunt
April 21 MMTG Lunch-and-Learn
April 25 Rubinstein Seminar
May 16-19 TAVP Course, Dinner

help. Your time will be greatly appreciated and you just might find that you enjoyed it!

John P. Cannady

Steve Keinath, Director

2011 Turner Alfrey Visiting Professor Course

Block Copolymer Self-Assembly: The Flexible Route to New Functional Materials

Professor Timothy P. Lodge

May 16–19, 2011
Monday–Thursday, 2:30–6:00 p.m.

Lecture Hall
Michigan Molecular Institute
1910 West St. Andrews Road, Midland, MI 48640

Professor Timothy P. Lodge is the McKnight Distinguished University Professor, Department of Chemistry and Department of Chemical Engineering and Materials Science, University of Minnesota, Min-



neapolis, MN 55455

Fee: There is no fee for auditors if they belong to organizations that are financial sponsors of the Turner Alfrey Visiting Professor program: The Dow Chemical Company, Dow Corning Corporation, Central Michigan University, Michigan State University, Saginaw Valley State University, Mid-Michigan Section of the SPE, and Midland Section of the ACS. For all others, a course fee of \$400 will be required at registration. All participants, however, must pre-register.

Registration: Pre-registration is required no less than one week in advance with the Registrar by visiting www.mmi.org, e-mailing registrar@mmi.org, or by calling (989) 832-5555, ext. 571.

Course Abstract

The next generation of valued-added polymeric materials will often incorporate two or more monomeric ingredi-

ents, and will feature the control of structure on the nanometer scale. Block copolymers serve as natural structure-directing agents via self-assembly, and offer great promise in a wide variety of applications.

Recent advances in synthetic technique, especially controlled radical polymerization, enable cost-effective access to many block architectures. Theoretical understanding of the factors that control the equilibrium self-assembled structure is highly advanced, as are the necessary experimental characterization tools. This is true both in the bulk, and in solutions of micelles.

However, the tendency of block polymers to become trapped in metastable states is ubiquitous, due to restricted chain mobility and sizeable thermodynamic barriers. These issues will all be discussed in detail. The lec-

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tures will conclude with a discussion of a particular application space, namely, the production of functional membranes from block copolymer materials.

Lecture Topics Outline

Topic #1 – *Attributes of Self-assembly*: (a) General advantages and disadvantages; (b) Particular features of the block polymer approach; (c) Technological examples and possibilities

Topic #2 – *Synthesis of Block Polymers*: (a) General strategies; (b) Anionic polymerization; (c) Controlled radical polymerization

Topic #3 – *Block Copolymer Phase Behavior*: (a) Competition between interfacial energy and chain entropy; (b) Characterization by TEM, SAXS, and SANS; (c) Self-consistent mean-field approach; (d) The double gyroid phase: A case study in complexity; (e) Persistent puzzles: FCC or BCC? Orthorhombic phase? Perforated layer phase?; (f) Extension to ABC triblock terpolymers; (g) Extension to solutions in neutral and selective solvents

Topic #4 – *Order-Disorder and Order-Order Transitions*: (a) Detection by rheology and birefringence; (b) Fluctuation effects near the ODT; (c) Epitaxial pathways, metastability, and kinetics; (d) Importance of SAXS/SANS in flow; (e) Use of polarized optical microscopy

Topic #5 – *Dynamics in Self-assembly and Processing*: (a) Rouse/Zimm and reptation models for homopolymer liquids; (b) Block copolymer diffusion; (c) Block copolymer rheology

Topic #6 – *Micelles in Solution*: (a) Factors that dictate micelle size and shape; (b) Characterization by dynamic light scattering and cryo TEM; (c) Stimuli-responsive micelles; (d) Multicompartment micelles; (e) Equilibration and metastability in micelles

Topic #7 – *Membrane Applications*: Targeting Bi- and Tri-continuous Phases: (a) Network phases in AB and ABC systems; (b) Bicontinuous microemulsions; (c) Nanoporous materials; (d) Templating

Biographical Sketch of Professor Timothy P. Lodge

Tim Lodge was born in Manchester, UK, in 1954, and emigrated to the US in 1968. After graduating from Harvard University in 1975 with a BA (cum laude) in Applied Mathematics, he began graduate research in Chemistry at the University of Wisconsin, working with Professor John Schrag.

Following his PhD in December 1980, Dr. Lodge spent 20 months as a National Research Council Postdoctoral Fellow at NIST, collaborating with Dr. Charles Han. Since 1982, he has been on the Chemistry faculty at the University of Minnesota, and was promoted to Associate Professor in 1988 and to Professor in 1991.

In 1995, he also became a Professor of Chemical Engineering & Materials Science at the University of Minnesota. In addition, he also was named a McKnight Distinguished University Professor in 2001, an Institute of Technology Distinguished Professor in 2004, and the Lloyd H. Reyerson Professor of Chemistry in 2007.

Prof. Lodge was a co-recipient of the 1993 George Taylor Alumni Award for excellence in research, given by the Institute of Technology, and in 1994 he was named a Fellow of the American Physical Society. He received the Arthur K. Doolittle Award from the Polymeric Materials Science & Engineering Division of the American Chemical Society in 1998. He was a co-recipient of the Society of Rheology Publication Award in 2003, and in 2004 he received the Polymer Physics Prize from the American Physical Society and the Paul Flory Research Award from POLY-CHAR.

In 2007, he was recognized with the Nelson Taylor Award in Materials Science from Pennsylvania State University. He was elected a Fellow of the American Association for the Advancement of Science in 2009, and he received the International Scientist Award from the Society of Polymer Science, Japan the same year. More recently, Prof. Lodge was the recipient of the 2010 Prize in Polymer Chemistry from the American Chemical Society, and he also was elected a Fellow of the ACS in 2010.

From 1994 to 2000, Prof. Lodge served as Regional Editor for Macromolecular Chemistry and Physics, and since 2001 he has been the Editor of the ACS journal, *Macromolecules*. He is currently serving, or has served, on the Editorial Boards for *Macromolecules*;

Journal of Chemical Physics; *Journal of Polymer Science*, *Polymer Physics Edition*; *International Journal of Polymer Analysis and Characterization*; *Critical Reviews in Analytical Chemistry*; *Macromolecular Chemistry and Physics*; and *Polymer*.

Prof. Lodge served as Chair of the Division of Polymer Physics, American Physical Society (1997-1998), and as Chair of the Gordon Research Conferences on Colloidal, Macromolecular and Polyelectrolyte Solutions (1998) and Polymer Physics (2000). He served on the Council of the American Physical Society from 2001 to 2006, and as a Member-at-Large on the Executive Committee of the Society of Rheology from 2003 to 2007.

He has been a visiting professor at Kyoto University, the University of Mainz, the University of California at Santa Barbara, and the University of Leeds. Since 2005, he has been the Director of the National Science Foundation supported Materials Research Science & Engineering Center at the University of Minnesota.

Prof. Lodge's research interests center on the structure and dynamics of polymer liquids, including solutions, melts, blends, and copolymers, with particular emphases on rheology, diffusion, scattering, and microscopy techniques. He has authored or co-authored over 280 papers in the field of polymer science, and has advised or co-advised over 50 PhD students to date.

Steve Keinath, MMI Director

TAVP Dinner

Joint Technical Society Dinner Meeting

Polymer Micelles And Gels In Ionic Liquids: New Opportunities In Science And Engineering

Professor Timothy P. Lodge

McKnight Distinguished University Professor, Department of Chemistry and Department of Chemical Engineering and Materials Science, University of Minnesota, MN 55455

Date: Wednesday, May 18, 2011

Time: Social 6:30 p.m. Dinner 7:00 p.m. Program 8:00 p.m.

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Location: NADA Center, Northwood University, 4000 Whiting Drive, Midland, MI 48640, Phone: (989) 837-4277

Cost: \$25 for SPE and ACS members (or members of other professional societies such as AIChE, ASM, etc.) and guests, \$15 for students.

Note: Mid-Michigan SPE will charge individuals who make reservations and do not attend the meeting.

Reservations: Reservations can be made via phone, fax, or e-mail to Dawn Wright at MMI.

Reservations must be received no later than Wednesday, May 11, 2011.

Phone: (989) 832-5555, ext. 571,
Fax: (989) 832-5560, E-mail:
wright@mmi.org

Abstract

Block polymers provide a remarkably versatile platform for achieving de-

sired nanostructures by self-assembly, with length scales varying from a few nanometers up to several hundred nanometers.

Ionic liquids are an emerging class of solvents with an appealing set of physical attributes. These include negligible vapor pressure, high chemical and thermal stability, tunable solvation properties, high ionic conductivity, and wide electrochemical windows.

For various applications it will be necessary to solidify the ionic liquid into particular spatial arrangements, such as membranes or gels, or to partition the ionic liquid in coexisting phases, such as microemulsions and micelles.

We have begun a systematic exploration of ways to achieve this by block copolymer self-assembly. In so doing, a number of fascinating physical phenomena have emerged which will be described in this talk. Applications of ionic liquid gels to organic electronics and gas separation will also be highlighted.

Steve Keinath, Director

John P. Barker Distinguished Professor and Polymer Expert Visits Midland

Michael Rubinstein received his B.S. with honors in physics from Caltech in 1979, M.A. in 1980, and Ph.D. in physics from Harvard University in 1983, specializing in soft condensed matter theory in the group of D. R. Nelson.

Between 1983 and 1985 he was a post-doctoral fellow with E. Helfand at AT&T Bell Laboratories in Murray Hill, NJ where he started his research in polymer physics.

In 1985 Dr. Rubinstein joined Research Laboratories of Eastman Kodak Company in Rochester, NY where he worked for 10 years in different areas of polymer theory.

He received the C.E.K. Mees Award "In Recognition of Excellence in Scientific Research and Reporting" in 1987.

In 1994 he was Juliot Curie Visiting Professor at Ecole Supérieure de Physique et de Chimie Industrielles in Paris.

Dr. Rubinstein moved to the University of North Carolina at Chapel Hill in 1995, where he is currently a John P. Barker Distinguished Profes-

sor in the Department of Chemistry and Curriculum of Applied Sciences and Engineering. He is also a member of the Program in Molecular and Cellular Biophysics and of the Institute for Advanced Materials, Nanoscience and Technology.

In 1998 he was Visiting Professor at College de France. In 2001 Dr. Rubinstein was elected a Fellow of the American Physical Society.

From 2001 through 2004 he was an Associate Editor of *Macromolecules*. In 2003 he published a textbook "Polymer Physics" with R. H. Colby.

In 2004 he was a co-chair of the Gordon Research Conference on *Macromolecular, Colloidal and Polyelectrolyte Solutions*.

From 2008–2009 he was a Chair of the Division of Polymer Physics of the American Physical Society.

In 2010, Michael Rubinstein received the *Polymer Physics Prize* of the American Physical Society.

Dr. Rubinstein will give a seminar on Tension and Spreading of Highly Branched Polymers at Central Michigan University on April 25, 2011.

Steve Keinath, Director

Dr. Rubinstein to Give Polymer Seminar at CMU

Dr. Michael Rubinstein

Tension and Spreading of Highly Branched Polymers

Central Michigan University

April 25, 2011

1:00 p.m.

We propose a systematic method of designing branched macromolecules capable of building up high tension in their covalent bonds, which can be controlled by changing solvent quality. This tension is achieved exclusively due to intramolecular interactions by focusing lower tensions from its numerous branches to a particular section of the designed molecule.

The simplest molecular architecture, which allows this tension amplification is a so-called pom-pom macromolecule consisting of a relatively short linear spacer and two z-arm stars at its ends. Tension developed in the stars due to crowding of their branches is amplified by a factor of z and focused to the spacer.

There are other highly branched macromolecules, such as molecular brushes - comb polymers with high density of side branches, that have similar focusing and amplification properties.

In addition molecular brushes transmit tension along their backbone. Adsorption or grafting of these branched molecules on a substrate results in further increase in tension as compared to molecules in solution.

Molecular architectures similar to pom-pom and molecular brushes with a high tension amplification parts can be used in numerous sensor applications. Unique conformations of molecular brushes in a pre-wetting layer allow direct visualization by atomic force microscope.

Detailed images of individual molecules spreading along the surface enable critical evaluation of theories of chain dynamics in polymer monolayer. Strong spreading of densely branched macromolecules on a planar substrate can lead to high tension in the molecular backbone sufficient to break covalent bonds.

MC Editor; Photos provided by Eva Li, Publicity Co-chair and Photographer

Meet the 2011 Midland Section Leaders

The 2011 Midland Section ACS Board members are listed below:

Chair-Elect: Gina Malczewski

Secretary: Abhijit Sarkar

Treasurer: Darren Hansen

Chair, Nominations and Elections

Committee: Brian Pate

Councilor: Wendy Flory

Alternate Councilor: Gretchen Kohl

Directors: (3-year term) Wendell Dilling, Steve Keinath, Janet Smith. Dave Stickles was also elected by the Board to serve as director this year in Gina Malczewski's (chair elect) place.

For more information, including Board and Committee Chair contact information, please visit:

<http://midlandacs.org/index.php?page=board-members>

<http://midlandacs.org/index.php?page=committee-chairs>



Section Officers (l-r): John Blizzard (past chair), Pat Cannady (chair), Gina Malczewski (chair elect), Darren Hansen (treasurer), Abhijit Sarkar (secretary), Brian Pate (N&E chair)



Councilors: Wendy Flory and Bob Howell



Alt. Councilors: Gretchen Kohl, Dale LeCaptain



Directors (l-r): Gang Lu, Wendell Dilling, Tina Leaym, Ann Norris, Janet Smith, Steve Keinath, Dee Strand, Dave Stickles (not pictured, Jennifer Dingman)

Gina Malczewski, Chair-Elect and Outreach Group Leader

Spring is Almost Here and K&C/Outreach is in Bloom

Activities with schools are "blossoming," and there is still time to volunteer for Big Brothers Big Sisters activities (we can help with supplies and ideas). Please contact Lisa for scheduling information.

Angelo Cassar and Gina invited Windover Chemistry and culinary students to "Have a Cup of Chemistry" on Feb 24—about 60 people attended and all enjoyed participating in the roasting, grinding, and drinking of coffee. Another similar event is scheduled at Senior Center on May 13.

Our open house ("365/24/7: Celebrate Chemistry in 2011!") on Feb 28 was very successful. The museum lobby at MCFTA was at capacity; we had lots of good food, and great coffee courtesy of Angelo Cassar.

The Young Chemists and MMTG had a display, and Sue Perz did a wonderful job with info about Marie Curie. One very happy individual won a \$50 gift certificate to Café Zinc.

Our IYC focus extended to demos, and we had lots of interested participants who investigated the properties of water in honor of the global water experiment being conducted this year.

Dave Stickles organized our participation in Education Day March 1 with the Saginaw Spirit—please see the separate article on that event (page 7).

We also have developed some new demo material—some focused on



Sue Perz teaches students about solar science during Education Day at the Dow Event Center.

"nano" concepts, and the other around a carnival theme.

The former has been a big hit with BBBS audiences. The latter was done with first and second graders at Hem-meter elementary in Saginaw, where they learned about the science of lemonade, popcorn and cotton candy on SPARK day, March 4. (Free samples were of course part of the lesson!)

Our March 5 activity with chef Jaime Jeffrey (the Table) had to be postponed; we hope to reschedule in April

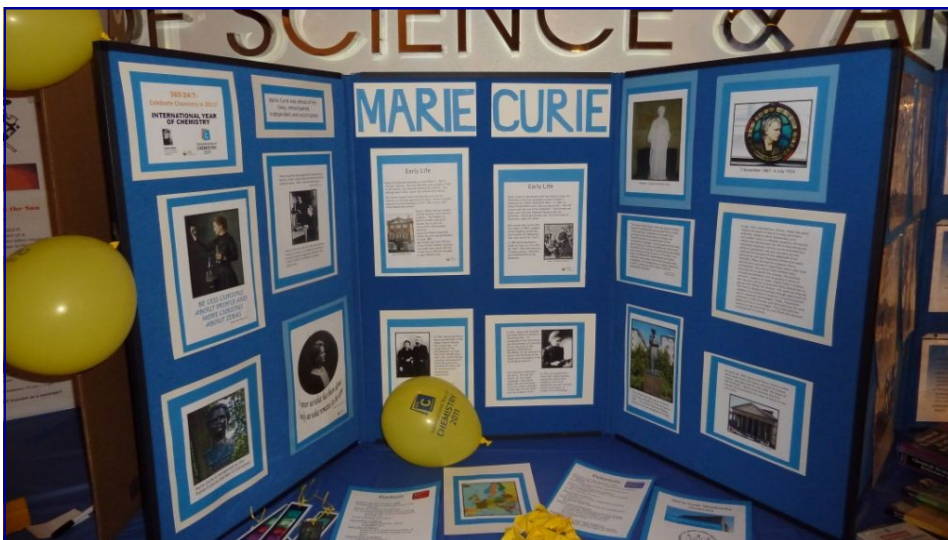
or May. Please see the announcement (page 8) about the science café on April 4 with chef Aaron Gaertner, however!

We did not do our anticipated teacher training at MSTA due to the low number of registrants—we understand there was some confusion as to what had to be done in advance. The Beaverton presentation of "Bringing Science to Life" by Mike Ferritto and Joan McMahon, however, was a tremendous success, as well as their discussion about doing a session for parents!

Earth Day is April 23; we have Explore Day coming up May 6 at St. Thomas in Saginaw. Stay tuned for more info. We hope to have more demo training and a "brainstorming session" about demos soon—we are trying to keep electronic records of all our presentations to make their utility as broad as possible.

INVENTORY and organization is scheduled for April 22 (Good Friday) at Central Warehouse (2410 Schuette Rd) at 10 a.m. Assistance is appreciated!

Please contact either Lisa at Lisa.thackery@dowcorning.com or Gina at Gina.malczewski@dowcorning.com to volunteer or ask questions.



In honor of the 100th Anniversary of Marie Curie's Nobel Prize in Chemistry, Sue Perz put together a nice informational display for presentation at the Midland Section's "365/24/7: Celebrate Chemistry in 2011!" International Year of Chemistry Kick-off celebration at MCFTA.

Dale LeCaptain, Alternate Councilor

Join The Mole Incident Scavenger Hunt

The Mole Incident
Forensic Scavenger Hunt
April 16, 2011
5:30–8:30 p.m.
CMU Dow Science Building

Walk, hike, drive, bike your way around the CMU campus solving the mystery of mysteries! The clues are tougher than titanium; more slippery than silicon oil. It will challenge your proof, your carbon respiration, and most likely tickle your funny bone.

Celebrate the International Year of Chemistry (IYC) by joining a scavenger hunt in and around the CMU campus. Clues will be based on general science, and targeted to young adults, old adults, and everyone in between. The event will be at 1023 Ottawa Court—just outside the Dow Science Building—at Central Michigan University in Mt. Pleasant.

Check-in / registration is at 5:30 p.m. The Hunt begins at 5:45 p.m. A Social and "awards" ceremony will be held at 8:00 p.m. Social provisions for early-retiring teams will be provided.

Teams can pre-register for a reduced rate (\$20) by April 8. There is a four person maximum per team. Individuals are welcome (\$5 per person) and we will find you a team. After April 8, registrations will be accepted until the event (\$30/team), space permitting. Checks can be made to: ACS CMU student members.

Mail the registration form and pre-registration fee to:

ACS CMU Student Members
 % Dale LeCaptain
 Dept. of Chemistry
 CMU
 Mount Pleasant, MI 48859

For questions, contact Dale (lecap1dj@cmich.edu) or Sharyl (major1sa@cmich.edu).

Jeff Seifferly, MMTG Chair

MMTG to Host Lunch-and-Learn

Motivation and Goal-Setting
April 25, 2011
Dow Corning
Corp. Cafeteria Conference Room
RSVP by April 21

MMTG announces their first "Lunch and Learn Seminar" of 2011. On April 25th, 2011 they will host a DVD presentation entitled "Motivation and Goal-Setting."

The event will be held at Dow Corning, and lunch will be provided. The presentation is free and open to current MMTG members and prospective new members.

If interested, you must RSVP by Thursday, April 21st, to MMTG Chair Jeff Seifferly at jeff.seifferly@dowcorning.com. For further information about the seminar, or MMTG in general, contact Jeff (989-496-4239).

Jeannie Phillips, 42nd Central Regional Meeting Committee Chair

42nd Central Regional Meeting: Call for Papers

Cultivating Chemistry at the Crossroads of America

Present your work at the 42nd Central Regional Meeting of the American Chemical Society (cern_regional.sites.acs.org/) June 8–10, 2011 at Indianapolis University–Purdue University Indianapolis (IUPUI), University Place Conference Center, Indianapolis, Indiana. Abstract submission and advance registration are NOW OPEN.

Key Dates

February 7 Abstract submission and advanced registration opens.

April 13 Abstract submission closes.

May 20 Advance registration closes.

Papers are requested for a comprehensive set of symposia which cover a diverse array of interests:

Agrochemicals: Systems Biology, Natural Products, Flavors, Foods and Nutrition

Analytical: Bioanalytical, Mass Spectrometry, Imaging, Chemometrics, Forensic Chemistry

Environmental: Chemistry of the Great Lakes, Sustainability

Education: Digital Resources, Organizing Coursework, Research and Practice, Curricular Reforms

Inorganic: Organometallics, Transition Metals, Bio-Inorganic

Medicinal: Peptides, Lead Generation, Neuroscience, Molecular Imaging, Third World Medicine

Organic: Technology Enabled Organic Synthesis

Physical: QM Methods, Computer-Aided Drug Design, Nanotechnology, Lipid and Protein Dynamics

Polymer: Biotech Applications, Green Polymers and Devices, Optical and Nano-composite materials

Small Business: Stories of Success, Best Practices, Advanced Materials and much more...

Other Conference Highlights

- Plenary lectures highlighting the Chemistry themes
- Dawn Shiang Associate Director, Sustainable Technologies & Innovation Sourcing
- The Dow Chemical Company
- John C. Lechleiter Chairman, President and Chief Executive Officer Eli Lilly and Company
- Michael A. Evans Founder, President and Chief Executive Officer AIT Laboratories
- Teacher and Career Development Workshops
- Poster Sessions Featuring the Ram Brewery's "Molecular Malt"
- Undergraduate Research Symposia Exposition showcasing vendors' latest products and materials
- Tour of Indianapolis Museum of Art Science Laboratory
- Women Chemists Committee luncheon featuring current CEO of ACS, Madeleine Jacobs
- Cultivating Connections Networking Event with live entertainment

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Dave Stickles, Director and Gina Malczewski, Chair-Elect

Education Day Provides Fun—and Science—on Ice!

Dave Stickles led our efforts to celebrate "Energy is Everywhere!" on Education Day with the Saginaw Spirit, held March 1 at The Dow Event Center. Game attendance was 5,527 people, with students from Bay, Midland, and Saginaw County schools.

Dow Chemical and the Midland Section ACS were sponsors, along with Dow Corning, Duperon, Covenant Health, and the Saginaw Spirit. Students received free transportation and game admission, along with some food and drinks.

Our booth offered many activities, including some relating to solar power, and also energy in the electromagnetic spectrum. One teacher commented that her students were not looking forward to having to learn science before the game, but then said they had a blast learning what we and the other sponsors had to offer.

Dave sadly did not win the Shoot Out—his first shot went wide right—with the other sponsors and principals from the various schools. However, he did get a Spirit Jersey with "ACS" printed on the back, so all was not lost.

On another sad note, the Saginaw Spirit lost the game to the Plymouth Whalers 4–1, but not due to the lack of cheering!



Michelle Rivard (front), Sue Perz (middle) and Cassie Hale (back) show students from Bay, Midland and Saginaw counties that "energy is everywhere" with hands-on demos including water tension and adsorption; paper and beads demonstrating the effects of UV light exposure, with and without sunblock; and solar powered objects transforming light into electricity, powering a motor.

More info on the game can be found at:

<http://www.ontariohockeyleague.com/schedule/show/game/1211>

<http://www.wnem.com/slideshow/news/27036264/detail.html>

<http://www.wnem.com/slideshow/news/27039254/detail.html>

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- Younger Chemists Committee/ Student Affiliates Luncheon featuring Brian Fahie, Senior Director, Bulk Analytical R & D, Eli Lilly and Company
- 42nd Central Regional Awards Reception featuring former ACS president, Joe Francisco

Come celebrate the International Year of Chemistry with us, in the well-appointed City of Indianapolis. Enjoy the convenience, relatively low cost and friendly atmosphere of a regional meeting, while still getting a high quality scientific program.

CERM2011 features a diverse array of topics customized to meet the needs of scientists in the Central Region.

Consult cerm_regional.sites.acs.org for the most up-to-date information.

We'd like to thank our Major Sponsors for their generous support of the meeting:

**Dow AgroSciences
The Dow Chemical Company
Eli Lilly and Company**



Jeff Seifferly oversees tables offering Moon Sand, play dough, magnetic toys and laser light toys to help engage the students on Education Day with the Saginaw Spirit at The Dow Event Center.

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Above, Dave Stickles fires the smoke cannon at Education Day for a dramatic—and fun—display. Thanks to Beth Moeller of St. Charles Schools, and to Vicki Popp, of Duperon, for providing photos. Below, the cannon is reloaded and Dave takes aim before employing the smoke cannon's energy to remove the cup perched on a brave student's head.



Thanks to our Education Day volunteers: Michelle Rivard, Cassie Hale, Jeff Seifferly and Sue Perz!

Bob Howell, Councilor

Lane Speaks at Woodlands Academy

Woodlands Academy in Lake Forest, Illinois, recently hosted Tom Lane as part of the school's Celebrating Women in Science Speaker Series.

For more information, please see the TribLocal article: <http://triblocal.com/lake-forest/community/stories/2011/01/woodlands-academy-hosts-esteemed-chemist/>

Amy Tesolin-Gee and Eva Li,
Publicity

The Art and Science of Cooking

Science Café

The Art and Science of Cooking

With Chef Aaron Gaertner

April 4, 2011

7–8:30 p.m.

Bay City Central High School

FREE and open to the public

Can you imagine THREE different ways to make ice cream? How about jam that POPS instead of quietly snuggling up to peanut butter on your sandwich?!

Learn about these things and more as you explore the culinary side of chemistry with the Midland Section of the American Chemical Society and Chef Aaron Gaertner of Shari's!

Chef Aaron, a Bay City Central graduate, will lead us on an exploration of the chemistry of the foods we love, while explaining the role of gluten in creating scrumptious cookies and how vinaigrette makes saucy salads.

He will demonstrate the surprising role chemistry plays in creating fine cuisine by showing how and why the design and execution of cooking methods impacts taste and texture.

Gina Malczewski, a Dow Corning biochemist, will provide some additional information on the science behind his ingredients and techniques.

Be sure to bring your scientific curiosity and your exploratory taste buds, as there will be samples of these experimental delights for all!

The event will take place on April 4, 2011, from 7:00–8:30 p.m. at:

Bay City Central High School
1624 Columbus Ave.,
Bay City, MI 48708

This event is FREE and open to the public.

For more information, contact: Gina Malczewski (989)631-4038;
gina.malczewski@dowcorning.com

Dale LeCaptain, Alternate Councilor

NOVA Making Stuff Premier Party Spans Three Locations

Will people come out on a cold January night? Sure enough, people started showing up. The appetizers were a great idea and people loved them. The door prizes hit all the participants by surprise (in a good way) and all in all, everyone seemed to enjoy the event.

The NOVA Making Stuff premier, hosted by David Pogue, quickly followed and was all about materials—strong materials—from steel cables, to spider silk, and all the way to carbon nano-fibers.

Ironically, technology was the lone set-back of the evening as the live video conference linking all three parties, well, just didn't happen. BUT, the parties went on.

Mt. Pleasant checked in with plenty of students and faculty from Central Michigan University. "I really hope that we do something similar to this again, if not bigger!"

Midland hosted several local science professionals from Dow Chemical and Dow Corning. "Plenty of food, good times... it was a success, lots of great conversations and it brought out the geek in all of us."

The Saginaw Bunnigans was a success too! However, they were unable to actually watch the video, as



One group pauses for a photo at the Saginaw Making Stuff Premier Party.

Photo provided by Anthony Lucio.

satellite TV got the best of them. "Even without the show, everyone had a good time and the door prizes were a hit!"

All said and done: 3 parties, 40+ partiers, 1 awesome show! Many thanks to the site hosts, Katie Martin and Samik Upadhaya in Mt. Pleasant,

Dale LeCaptain in Midland, and Anthony Lucio in Saginaw. Further thanks to the event sponsors: NOVA, WCMU, and ACS Midland Section. And last, but not least, thanks NOVA for another great show!

Jeff Seifferly, MMTG Chair

Mid-Michigan Technician Group Presents at IYC Kick-off

Mid-Michigan Technician Group (MMTG) presented a poster at the recent International Year of Chemistry (IYC) ACS Kick-off event at the Midland Center for the Arts on February 28, 2011.

The poster detailed some of the 2010 activities of MMTG and their plans for 2011.

There were also detailed slides from 14 of the 20 past chairs of MMTG in which they answered questions about their MMTG membership:

"How did you get involved?"

"How has MMTG helped your career?"

"What are you doing now?"

There were many more MMTG members in attendance assisting with the event. The event, sponsored by the Midland Section of the ACS, was free and open to the public.



Jeff Seifferly, MMTG Chair, and Jason Suhr, Treasurer, presented a poster on behalf of MMTG.

Rusty Govitz, MMI Communications Director

Oxazogen's Fuel Cell Research Solves Membrane Mysteries

As fuel cell technology works its way toward viable commercial application in automobiles, researchers at Oxazogen, Inc. are doing their best to help push the science along.



Dr. Dennis Hucul

Dr. Dennis Hucul, lead scientist on the project at Oxazogen, says the early returns on the study "Oxidation Resistant Carbon Supports for Fuel Cells" show much promise. The two-year project, funded through a \$472,000 Small Business Innovation Research grant from the National Science Foundation, began in September.

"There's a need in the marketplace for improved durability in fuel cells," Hucul said. "Fuel cells that use polymer electrolyte membrane (or PEM) technology offer a source of power that is environmentally friendly, since their only emissions are heat and water. But the membranes' performance is hindered by catalyst deactivation, which limits the cells' lifetime."

The catalyst causes the oxygen and hydrogen to react in a useful way. Deactivation, Hucul said, causes two problems—the catalyst support is subject to oxidation, and the active metal component, usually platinum, sinters during use. Hucul said Oxazogen's approach may help manage both problems.

"Through a combination of new technology from the ceramics, electronics and catalyst industries, we're able to produce new support materials which are much more resistant to degradation," Hucul said. "What we've been able to do is replicate our initial results and extend them further. Initially, our catalysts were able to survive about 30,000 cycles. Now we've improved the durability of our catalysts so that we're above 50,000 cycles. That's very good, because a standard catalyst loses its activity in about 5,000 cycles. And we think we can still do better."

Hucul said the improvements have been assisted by a technique called X-ray Photoelectron Spectroscopy, or XPS. Using XPS, Hucul has been able to characterize what's happening on

the surface of the catalyst at the atomic level. The improvements haven't come at the expense of higher cost for materials, Hucul said, which is key.

"One of the real benefits of our method of making these catalysts is that it only adds a cost of about one percent to the process," he said. "The cost of platinum is still the most problematic piece of the economics for fuel cells, but even with that, sales are strong for fuel cell-powered forklifts, which is the focus of our project."

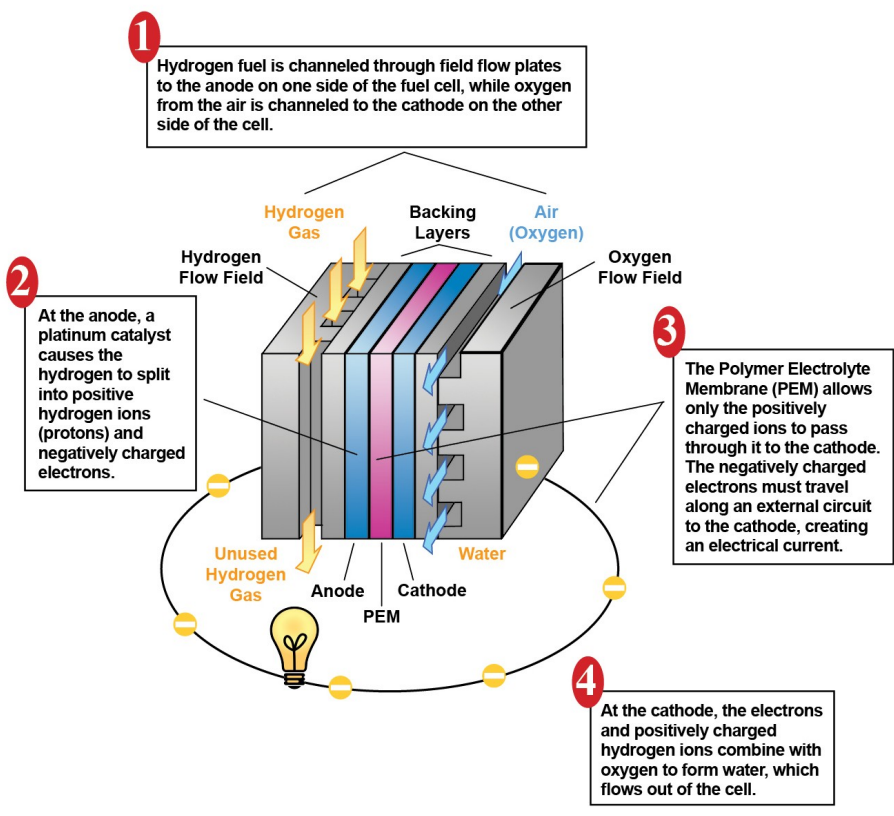
"The industry has sold about 2,000 of these fuel cell forklifts, and the economics look promising," he added. "They're still expensive - it costs between \$20,000 and \$30,000 - but with an improved lifetime, that's manageable; you can refill them in a matter of 60 seconds. On the other hand, battery switch-out on typical rechargeable forklifts is a long, complex operation. They're not like automobile batteries - they weigh a ton, so you need a winch system to take them out, you need battery storage areas, you need recharge areas, you have to handle acid, you have to send them to an EPA-

certified processor. With a fuel cell forklift, you eliminate all that, on top of all the green advantages offered, like no greenhouse gas emissions."

While the advances thus far are very encouraging, Hucul said what's to come should prove to be even more exciting. "Our project goal is to make a commercial fuel cell-powered 20-to-30 kilowatt device and have it tested within two years," he said. "We're working closely with a fuel cell manufacturer and we're currently testing larger samples. We can certainly duplicate our best results to date, but we're hopeful that we can still do even better."

Oxazogen is an employee-owned company that works with Michigan Molecular Institute (MMI) to secure grant funding; its mission is to commercialize advanced films, coatings and specialty materials for a variety of applications. For more information, visit www.oxazogen.com and www.mmi.org. Contact Dr. Hucul at 989.832.5590 or email hucul@oxazogen.com.

How A Polymer Electrolyte Membrane Fuel Cell Works



Rusty Govitz, MMI Communications Director

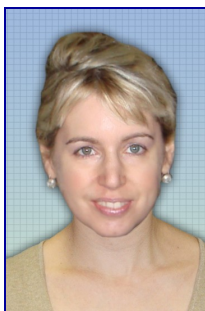
MMI Researcher Spearheads New Polymer Book

A groundbreaking book about the applications of polyhedral oligomeric silsesquioxanes is out, and a researcher at Michigan Molecular Institute (MMI) is at the center of it.

Applications of Polyhedral Oligomeric Silsesquioxanes, the third volume of publisher Springer's "Advances in Silicon Science" series, is edited by MMI research scientist Claire Hartmann-Thompson. She also contributed one of the book's nine chapters.

"This is the first book to provide a comprehensive review of the applications of polyhedral oligomeric silsesquioxanes, or POS," Hartmann-Thompson said. "POS is an area that has not been fully reviewed until now, but has become increasingly important as POS materials have become cheaper and available in large volumes in recent years."

POS is a class of silicon material with properties intermediate between those of silica (quartz, for example) and silicones (flexible polymers, elas-



Dr. Hartmann-Thompson

tomers, sealants, etc). Hartmann-Thompson said POS materials are being used in such diverse areas as catalysis, plastics processing and formulation, composite materials, superhydrophobic surfaces, medical devices and dental materials, space materials, electronics, sensors and fuel cells.

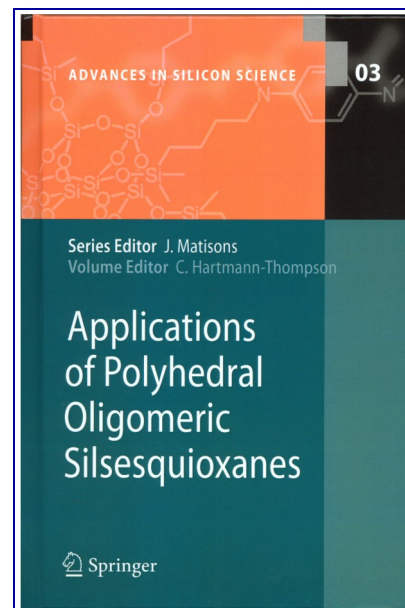
"The audience for this book is essentially anyone with a commercial or academic interest in these areas," she said. "The contributors are an international Who's Who of experts in this field of study, true pioneers in the POS world. We would've been hard-pressed to find a set of authors more qualified to discuss this particular subject."

Hartmann-Thompson contributed a chapter covering electronic and energy applications based on MMI expertise in sensors, fuel cells and batteries as a foundation, and also covering LED and liquid crystal and lithographic technologies.

The book is available from the publisher at springer.com; it is also available at amazon.com.

Michigan Molecular Institute, founded in 1971, is a non-profit organization dedicated to polymer research and education. In addition to its research activity, MMI has served as the incubator for several successful businesses, including Dendritech, the world

leader in commercial dendrimer production; Impact Analytical, a premier analytical testing lab; Oxazogen, a supplier of advanced specialty films, coating materials and polymers; and MITCON, which serves the information technology needs of more than 35



local non-profit organizations. For more information, visit www.mmi.org.

National ACS

Seeking Heroes of Chemistry

Who are our heroes today? The popular media recognizes athletes and entertainers, as well as policemen and firefighters as heroes. At the American Chemical Society (ACS), we appreciate that chemical scientists are everyday heroes who impact our world in ways both great and small.

At the 2011 ACS Fall National Meeting in Denver, ACS will be honoring Heroes of Chemistry for the vital role these industrial chemical scientists and their companies play in improving human welfare through successful commercial innovations and products.

It presents an ideal opportunity to enhance the public image of the chemical and allied industries. Each year, Heroes of Chemistry are nomi-

nated by their own companies to recognize their talent, creativity, and innovation.

Previous Heroes of Chemistry have excelled in innovation at prominent international corporations and developed many commercial products that demonstrate strong financial performance.

The commercial success of their products in the marketplace is an important criterion for this honor, because ACS recognizes that good business results follow good science.

More information can be found at www.acs.org/industry. After reading the information in the nomination form, please consider submitting a nomination package for an individual or a team.

National ACS

Teacher Resource

The Education Division of the ACS has developed a new middle school chemistry resource called Middle School Chemistry: Big Ideas about the Very Small.

This six chapter resource is available for free at <http://middleschoolchemistry.com> and can serve as either a stand-alone chemistry unit or as a supplement to any middle school science curriculum.

A hands-on inquiry approach is used, along with specially designed molecular model animations, to take students from concrete experiences to an understanding of the abstract world of atoms and molecules.

Please share this free resource developed by your professional organization with the middle school teachers you know.

Wendell Dilling, Director and Historian

In Past Issues of *The Midland Chemist*

40 Years Ago This Month

In *Second Careers And The Identity Crises* by John Abbott: "Our nation has come to a stage in its history where unemployment has permeated almost every socio-economic level, forcing breadwinners to seriously appraise their careers. One haunting thought which usually predominates throughout this self-appraisal is the question 'are my current skills and knowledge saleable in today's fast changing world or do I need a 'second career'.'"

30 Years Ago This Month

In *Chairman's Column* by Jack P. Arrington: "The Continuing Studies Committee held a very successful two-day Safety Seminar at Delta College on March 13 and 14, which was attended by approximately 55 high school and

college teachers from the central part of Michigan. This is an example of a professional-public service activity, and I think all of us can be proud of this program, which was organized by Art Smith."

20 Years Ago This Month

In *Seventh Authors' Night - Monday April 22, 1991 - Michigan Molecular Institute*: "Once again, Authors' Night acknowledges all Midland Section members of the ACS who have published scientific papers, books or who have been granted patents in 1990. The schedule of events for Authors' Night will be similar to last year with the initial portion of the evening consisting of the presentation of student awards. The recipients of these awards are students who have shown excellence at universities and colleges located within the Midland Section of the

ACS. Everyone attending will then be invited to view and discuss posters with those presenting. Refreshments will be provided."

10 Years Ago This Month

In *Chair Column - Dinner with Camp Successful, Informative* by George Eastland: "Eighteen people were in attendance for the dinner with, and talk by, U.S. Representative Dave Camp on February 21 at the Valley Plaza Convention Center. It was a most enjoyable evening. My most sincere congratulations to Walt Rupprecht (Chair, Government Affairs Committee) and Pat Cannady (Program Chair) for developing a great program. Those of you out there who could have gone, but didn't, should feel pangs of regret for missing the event."

John Kutsch, Executive Director, Thorium Energy Alliance

Thorium Energy Alliance Focuses on "Future of Energy"

Promising the "Future of Energy," the Thorium Energy Alliance convenes its Third Annual Conference May 12, 2011, at the Top-of-the-Hill Conference Center in Washington, D. C. Executive Director John H. Kutsch says the 2011 program features ongoing modules that build upon the need, the ability, and the commitment of U.S. interests to develop the Thorium Energy Cycle as a new, proven, non-proliferating source of atomic power to enhance America's portfolio for future energy needs.

National Laboratory Pedigree

"The 'Sputnik Moment' that President Obama and Energy Secretary Chu keep talking about is hiding in plain sight," John Kutsch explains. "Thorium's ability to produce low-cost energy was proven in nearly 20-thousand hours of safe operation of a molten salt reactor (MSR) at Oak Ridge National Laboratory through the 1970s," Kutsch notes. "The People's Republic of China representatives visited Oak Ridge in 2010 and announced in January, 2011, their intention to develop their own Thorium Molten Salt Reactor (TMSR) to lessen that country's reliance on pollution-causing fossil fuels. China recognizes the need for Thorium Energy," Kutsch emphasizes.

"The big question is, 'What will the U.S. do?'" he asks.

Need, Ability and Commitment Challenged

Countries outside of the U.S. are accelerating their exploration of Thorium Energy but looking to America for leadership, according to Kutsch. "The ability to advance Thorium scientific research is well-supported in places as far-flung as India, Norway, South Africa, Japan, and Russia," Kutsch observes. "Half-a-dozen U. S. universities are eager to partner with U.S. national laboratories and the world community," Kutsch adds, "to stimulate a renaissance in molten salt chemical power plant science."

Salvaging Thorium from Rare Earths Concentrates

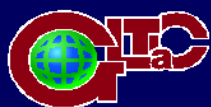
Thorium has a long commercial history and is an excellent source of energy, says Kutsch. "The TEA May 12th Conference agenda is loaded with military officers, economists, business leaders and scientists with convincing reasons to meet the challenges coming from China," Kutsch offers. "Interestingly, the Thorium question arises at a time when rare earths—where Thorium occurs naturally as a byproduct—are making front-page news," Kutsch ob-

serves. "The U.S. Senate is now grappling with national security, energy and industrial policy decisions where the Thorium Energy Cycle can emerge as part of a useful solution to advance U.S. interests. TEA supports a sustainable alternative energy program that can safely convert current nuclear waste into clean electrons and help restore American self-sufficiency."

Seeking Attendance and Financial Support

"It is no secret that alternative energy platforms need support," Kutsch readily admits. "The Thorium Energy Alliance, in less than two years, has relied on a 100%-volunteer force to be heard," Kutsch explains. "We need all of our supporters to come to D.C. or, at the very least, send a small financial contribution to help us. The best part would be for every interested person to come to the May 12th Conference," Kutsch suggests. "The investment community is looking to Congress to give the Green Light to what we are calling 'Clean Nuclear Energy™,'" Kutsch concludes. "It's our Sputnik Moment."

For more information, contact: thorium_conference@thoroumenergyalliance.com; phone: 312-303-5019.



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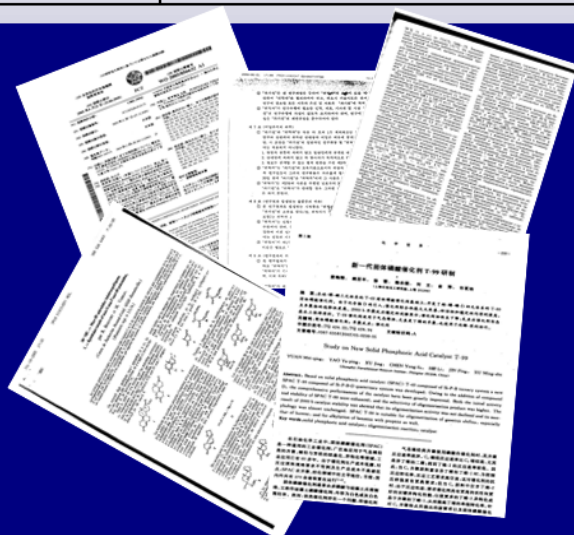
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