THE MIDLAND CHEMIST
Vol. 44, No. 5 October 2007

DECISION 2007
Section leadership candidate profiles begin on page 11

2007 Fall Scientific Meeting
Chemistry and the Greatest Challenges of the 21st Century: Energy, Water, and Food

Midland Section of the American Chemical Society

63rd Fall Scientific Meeting
11:00 a.m. to 5:00 p.m.
October 19, 2007

Keynote Speaker: Dr. Catherine Hunt, president of the American Chemical Society
Keynote Topic: Sustainable Chemistries: Environmentally Friendly and Economically Viable Innovations

Midland Center for the Arts
Midland, Michigan

FSM program begins on pg. 28. An updated program and event details can be found on the Midland Section website at http://membership.acs.org/m/midl/committees/fsm/fsm07/about.htm

THE MIDLAND CHEMIST

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In This Issue...

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Please submit all articles and photographs to the editor, Ann Birch. Instructions for article submission are on the Midland Section web site, as is contact information for other staff members. Authors can also contact Ann directly with any questions.

Neither *The Midland Chemist*, nor the Midland Section, nor the American Chemical Society assumes any responsibility for the statements and opinions advanced by contributors of or to *The Midland Chemist*.

Chair Column

Transforming the World!

Dee Strand, Chair
ACS Midland Section

Did you ever believe you would have an opportunity to be a part of transforming the world? The 2007 strategic direction of the American Chemical Society has just such a focus on the "challenges and opportunities at the intersection of chemistry and society that improve the quality of human life." Your membership and activity in the ACS can, therefore, make a global difference.

How? Let's start with our very own local section Fall Scientific Meeting scheduled for Friday, October 19, at the Midland Center for the Arts. The theme this year is "Chemistry and the Greatest Challenges of the 21st Century: Energy, Water, and Food." The ability for our population to have adequate sustainable supplies of energy, clean water, and healthy foods represents a key global challenge. This meeting is a great opportunity for you to hear from a diverse set of speakers on these challenges and the opportunities to meet those challenges through chemistry. Many of you also may be working on a research project relevant to these areas. This might be your chance to present a poster on your work and motivate others to contribute in these areas. Ralph Waldo Emerson said that "Our knowledge is the amassed thought and experience of innumerable minds." It is our collective knowledge and efforts that will solve these challenges. Our Fall Scientific Meeting is one such mechanism to bring about collective knowledge and efforts. So please attend this meeting and help be a part of transforming the world!

Are there other ways? What about the many upcoming activities for National Chemistry Week? Many of these activities are aimed at students, who might one day be key scientists working in research activities aimed at transforming the world. Wouldn't it be cool if the next Albert Einstein reflected back on the key educators or experiences and named *you* as the person who turned them on to science? Here's your chance. ACS annually sponsors Sci-Fest with Delta College, which exposes kids to a wide variety of scientific topics and hands-on experiments. There are other opportunities to get involved as part of National Chemistry Week at other local schools. Contact me (Dee Strand, strandda@dow.com) on how to get involved.

Through the collective efforts of ACS with all of us contributing, we truly have the opportunity to transform the world. We, as chemists, engi-

neers, and scientists, are fortunate to have the education and skillsets to make a difference in our future—so take advantage of it and get involved. As Ben Franklin states, "Hide not your talents, they for use were made. What's a sundial in the shade?"

News from MMTG

By Deb Mendrick

By the time you read this, the Mid-Michigan Technician Group (MMTG) will have hosted our luncheon talk entitled *Employment Trends for Chemical Technicians*. This event was held on September 25, at the Dow Corning Corporate cafeteria and our guest speaker was Grant Thomas, Partnered Staffing Manager for Kelly Scientific Resources, on site at Dow Chemical.

In October our members will be voting for our 2008 board of directors. *If you are a member, please vote!* This is *your* organization and we *want* your input. Specific information on candidates and dates will be sent to members via e-mail.

We are proud to announce that MMTG received the *Best Local Section/Technician Affiliate Group (TAG) Interaction Award* from TECH based on our programs focusing on networking, training, and special topics of interest for the 2006 programming year. MMTG members also participated in the 2006 Central Regional Meeting (CRM), for which the Midland Section and TECH received a ChemLuminary award. It was the collaboration and dedication by members of MMTG, TECH, and the Midland Section that made this possible.

YCC and Friends "Kick It in the Park"

By Joel Kern

On July 21, the Midland Section's Younger Chemists Committee and other groups for younger professionals kicked off the first "Kickin' It in the Park." This fundraiser for the American Cancer Society's Relay for Life featured a barbecue, kickball competition, kids' games, and all-around fun for the family. Held at the St. Charles Ball Diamonds in Midland, there were eight teams of players and lots of kids in tow. Over $1000 was raised for Relay for Life while everyone had a good time. From Amy (Scalise) Frisbee, Relay for Life contact: "Just wanted to send a quick thank you for all of the work that you did for Kickin' It in the Park and Relay for Life. I'm still waiting on the final numbers for our fundraising, but this tournament was the largest fundraiser that our team had this year." Plans are in place to make this event even bigger and more family-focused next year. We are shooting for 16 teams in the kickball tournament and to

Dale LeCaptain (left), Buford Lemon (front), Wendy Flory (right, with son Henry), and the rest of the CMU Student Affiliates of ACS congratulate the Younger Chemists Committee on a game well played.

raise $2000 for Relay For Life. The date for 2008 is July 19, the weekend before the Relay for Life walk.

Kickin' It in the Park couldn't have come together without a tremendous amount of work by several talented and dedicated individuals. The core steering team consisted of Nick Beck, Kylee Wackerle, Wendy Flory, Dale LeCaptain, Buford Lemon, Amy (Scalise) Frisbee, and Lisa Callender. Special thanks also go to Lynn Sygnecki, Mindy Keefe, the Kirk family (Hal, Sue, Randall and Veronica), Tammy Dominowski, and Scott Hill.

Hal Kirk (head grillmaster) easily handles the task of feeding 200+ participants and spectators.

7th Annual Professionals Day at the Midland County Fair

By Jennifer Dingman

The Midland Section of the ACS, with the help of the MMTG and YCC, hosted its annual Professionals Day at the Midland County Fair on Thursday, August 16. The event was held in the Brown Picnic Building at the north end of the fairgrounds next to the grandstand.

It was a gorgeous day to be at the fair. Members and their families were provided with free drinks, hot dogs, popcorn, and sno-cones in addition to live science demonstrations and a Moonwalk for the kids. Midland County Fairgrounds graciously provided our members with a discounted "VIP ride bracelet" for unlimited ride access for 9 fun-filled hours, and we had over 140 people take advantage of that deal. It was estimated that over 400 people dropped in during the course of the 3.5 hour event. We were able to significantly boost attendance this year by increased advertising and offering more incentives (hot dogs, etc.), and we changed the day of the week.

Thank you to all the members who attended—you're the reason for events like this! And, as always, Professionals Day could not have been pulled off without the time and energy of volunteers. I would like to thank those people formally here. At a time when no one seems to have a free minute, these folks took hours out of their schedules to help out with this event. Until next year... See you at the fair!!!

Volunteers:

Dave Stickles
Bill Warren
Bob Oldinski
Grant Thomas
Cheryl Wizda
Sue Perz
Gerald Nowaczyk and daughter
Jessica Bell
Mike and Marianna Ferritto
Debra Mendrick
Liz Smith
Diane Noonan
Karmen Asch
Cassie Hale and son

2008 CRM Planned for Columbus

By Jimmy Cowan, General Chair, CERMACS 2008

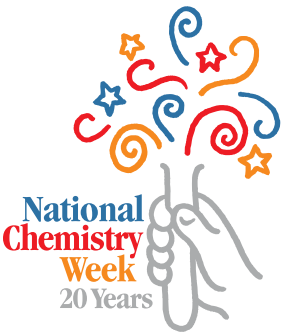
The 40th Central Regional Meeting (CERM) of the American Chemical Society will be hosted by the Columbus Section in June of next year. The meeting will be held at the Hyatt Regency Columbus from the evening of June 10 to June 14, 2008. Details can be found on the website www.cermacs2008.org, which will be updated regularly as plans develop. In addition to an outstanding core scientific program there will also be a focus on education and selected industry/business topics.

There are several awards for which we are actively seeking nominations (http://www.cermacs2008.org/site/?q=awards). Please consider nominating individuals that might fit the criteria for these awards. One specific award that will be posted soon is the ACS Division of Chemical Education Central Regional Award for Excellence in High School Teaching. Watch the website for more information.

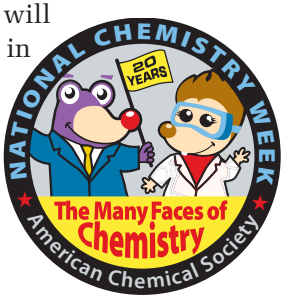
Celebrate National Chemistry Week at Sci-Fest

"The Many Faces of Chemistry"

Delta College, Pioneer Gym
October 27, 2007
10:00 a.m.–2:00 p.m.



Delta College, MidMichigan Technician Group, and the Midland Section of the American Chemical Society are proud to sponsor the 2007 National Chemistry Week Sci-Fest, focusing on the importance of chemistry to our quality of life. Through hands-on student and family activities, the event will highlight the many careers in our local area that make outstanding contributions in many different ways to chemistry or sciences related to chemistry. Admission is free. For more information, call Dave Stickles (989) 496-3273, Angelo Cassar (989) 631-7128, or Joan Sabourin (Delta) (989) 686-9250.



Midland Section Receives Two ChemLuminary Awards!

By Ann Birch

At the 234th ACS National Meeting and Exposition held from August 19–23 in Boston, the Midland Section continued to be recognized for its programs and people. The Section received the Outstanding Performance by a Local Section, Medium Size award and, along with the Division of Chemical Technicians (TECH), the Interaction Between a Local Section and a Division award. Congratulations to all the members of the Midland Section and Mid-Michigan Technician Group who made these awards possible!

(l-r): Barbara Moriarty (representing the Divisional Activities Committee), Will Lynch (chair of the Local Section Activities Committee), Janet Smith (Midland Section member and past chair of the Division of Chemical Technicians), Tom Lane (Midland Section member and councilor, member of the Budget and Finance committee and Corporation Associates committee), and Bruce Bursten (president-elect of the ACS).

National ACS Election Coming Up

Ballots for the National ACS election will be mailed on Sept. 24. The deadline for return of marked ballots to the ACS executive director is close of business on Nov. 2. See president-elect candidate statements on pages 8 and 9.

ACS President-Elect Candidate for 2008

Thomas H. Lane

Strengthening the Bonds: Chemistry, Members, the World—Together

I am deeply honored for the opportunity to serve the American Chemical Society as candidate for president-elect. I believe in the ACS, our vision, and the power of our membership. The complexities of the issues before us require proactive listening, clear, concise communication, and decisive actions. The very fiber of the chemical enterprise is changing. We must leverage our strength and the power of our membership to influence the future of our discipline.

Educating a new workforce, enhancing the public face of chemistry, shaping public policy, ensuring funding for discovery, and managing the globalization of the chemical enterprise will require new levels of collaboration within the ACS and new relationships beyond our borders to bring about measurable change. As your president, this is where I will focus our collective efforts.

Education

- I pledge to keep Education and Science Literacy at the forefront of our thinking and pivotal in our actions.

Relationships

- I pledge to keep an open mind, to hear all voices, and practice tolerance and acceptance as the ACS continues to reach out, building new and productive relationships that support our strategic plan.

Outcomes

- I pledge to help develop outcome-based metrics to guide the ACS on our journey.

I am fully committed and ready to lead this work on behalf of the ACS membership. I offer my 33 years of experience, my passion for chemistry, and my productive, career-long involvement with the ACS, as evidence that I have the necessary background, capability, and determination to lead this Society forward. Likewise, I encourage each of you to renew your commitment to our profession and to ACS—its governance, vision and direction. We're compelled to seek the future together.

www.thomaslane.org

ACS President-Elect Candidate for 2008

Howard M. Peters

The ACS President represents the members, the council, and the board as the public face of chemistry. To do this well, one must understand the history, workings, and thinking of these groups. My background as a chemist, service as a long-term councilor, member of the board of directors, active committee member, leader in a large local section, and founder of an active division have prepared me well for this opportunity.

I will be an active advocate to advance the vision and goals of our Society and those professionals who perform every day to improve people's lives through chemistry, e.g., (1) Innovation/Invention, (2) Inclusion/Engagement, and (3) Internationalization/Globalization. My planned initiatives include:

Improving Our Communications

- Increase interactions among the ACS board, council, and members with the public.
- Support our publications to become the premier supplier of chemical information.
- Enhancing ACS regional meetings with funding, support, etc.

Honoring Our Commitments

- Increase ACS programs to assist all members in career development and transitions.
- Build strategic alliances with related national and international scientific and engineering entities.
- Expand ACS engagement with community colleges and four-year, non-Ph.D. granting colleges and universities.

Nourishing Our Diversity

- Create active committees for women/younger/minority/diversity and senior chemists.
- Support ACS engagement of high school teachers and community college professors.
- Increase involvement of ACS with science and engineering fairs.

If elected, I will work cooperatively with the board, council, staff, and members to be the public voice for chemistry, innovation, sustainability, and competitiveness.

Scientists Mentor Middle School Students

By Bob Belfit

This year Dee Strand, Midland Section ACS Chair, along with the math and science teachers at Northeast and Central middle schools, led a pilot mentoring program. It was a rewarding experience for all of us. Mentoring consists of reviewing science and math concepts and providing help on solving problems.

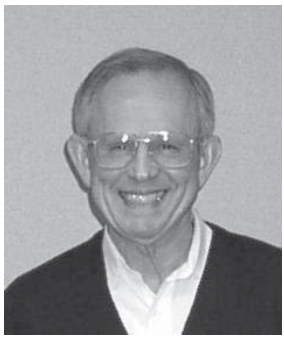
I was invited into Christine Brillhart's science classroom at Northeast Middle School to present an hour-long presentation and discussion on the current energy topic of "Chemicals from Petroleum versus Chemicals from Soybeans." The focus of this presentation was for students to relate science topics to their world. This presentation was given to seven science classes.

The response was outstanding based on the feedback from the students and four teachers. The experience was rewarding and beneficial to all who were involved.

Currently, Christine is preparing a more formal approach with the community partnership which will meet the state and federal academic requirements. The purpose of this program is to develop an academic intervention mentor program as a joint venture with middle schools and the community. This will further assist the schools in developing strong, innovative, collaborative partnerships with the community while helping students in science and math courses.

Section Member Shines at Senior Olympics

Adapted from Midland Daily News *with permission*



Wendell Dilling, an ACS (and Midland Section) member since 1959, competed in 11 events and won seven medals at the Michigan Senior Olympics in Rochester. Competing in the men's 70–74 age division, Wendell earned silver medals in the high jump, 400-meter dash, 800-meter run, and 1500-meter run, while picking up bronze medals in the long jump, triple jump, and 200-meter dash.

Wendell also placed fourth in the shotput, discus, and javelin, and fifth in the 100-meter dash. Last year, Wendell set a state record for his age division in the hammer throw. Congratulations from all your colleagues in the Midland Section!

2008 Midland Section ACS Elections

Exercise Your Rights! Vote!

By Brett Zimmerman

Candidates for 2008 Midland Section offices are listed on subsequent pages by position and then alphabetically. These individuals are willing to spend their personal time working for you. *Please respond by taking your time to vote for the candidates of your choice using the ballot on page 24.*

Candidates for Chair-Elect

Angelo Cassar

Candidate Statement: Why should I run for the office of chair of the Midland Section of the ACS? The simple answer is that I enjoy contributing to our local community in an efficient and positive way. Back in 1996, my wife, Gretchen Kohl, asked that I assist her in our Section's Sci-Fest event. I discovered that participating as a volunteer in this educational outreach program was so much fun that I joined the core group of the Sci-Fest planning committee. As I became more involved in the Midland Section, I realized that the effect of this Section's activities on the local community was greater than I would have imagined. I reasoned that the Section was effective (as evidenced by the plethora of awards) because of the dedication of the people actively involved. Good and hard-working people with good ideas make an award-winning ACS Section. And if elected as chair of the Section, the fun of contributing to our local community will continue, only in a different capacity.

What would my goals be if elected as chair of the Midland Section? First of all, when it comes to programs that are working well, my philosophy is "if it's not broken, don't try to fix it." I will continue to support these programs in ways as suggested by the committee chairs. Second, we are a "chemical sciences" professional organization. And as such, we are an organization that has many different needs, which we meet by various programs and committees, such as the Fall Scientific Meeting, Younger Chemist Committee, Awards Committee (for educational and for professional achievement), educational enhancement opportunities, dinner speakers, and even taking your family to the Midland County Fair. And as a chemist progresses in their career, their needs change. From preparing for the first day of work (Student Affiliates) to planning what you are do-

ing in your retirement, our Section continues to offer opportunities for expression. If elected chair, I would like to hear any new ideas that you have as to how we could address your needs better. And if you have suggestions as to how we could improve the existing programs and events, again, I would like you to share your suggestions with me.

Good people with good ideas make a good ACS Section. We already have both in the Midland Section. If elected chair, I hope to continue to support the programs that are in place and work well, with my eyes and ears open to new and engaging programs and ideas. Although I appreciate your support, I really appreciate the time you have taken to read my statement and to take the time to actually vote. By voting, you are participating in a very important aspect of our Section. By voting, it shows that you care! Thank you!

Current Position: Retired Dow Corning chemist

Professional Experience: Quality Assurance, Analytical Science, Process Analysis and Chemometrics all at Dow Corning Corporation

Education: M.A. Chemistry, Central Michigan University; B.S. Chemistry, Saginaw Valley State University; B.S. Physics and Mathematics, Wayne State University

ACS Activities: Local—Member of Midland Section since 1990; National Historic Chemical Landmark Committee Member for the H.H. Dow Museum Site, 1997; Sci-Fest Committee Member, 1997–present; Awards Committee, 1998; Co-Chair National Chemistry Week, 2001–present; Publicity Committee and/or Chair, 2002–present; Alternate Councilor, 2003–2006

National–Treasurer of Industrial and Engineering Chemistry, 2004–2006; Chemist Celebrate Earth Day (CCED) Committee, 2004–2006

Other Information: Member of the Midland Music Teacher Association

Tina Leaym

Candidate Statement. It's been almost ninety years—the Midland Section has been a success story for nearly a century. We have won an amazing number of awards, we have support at the highest level from local industry and academia, and our outreach programs are some of the best in the world. We are wildly successful. Let's take a step back…and appreciate the connections and expertise we have built.

But sometimes we don't feel successful; where is everyone? I get it—people are crazy-busy with career and family responsibilities. Who has time? But as scientists and innovation seekers, we can't afford to neglect the Midland Section. Innovation happens at interfaces,

right? Local activities are a shortcut to these interfaces, actually saving time and making your job easier. Maybe there's a retiree who once tackled a similar problem. At the Fall Scientific Meeting, we can bump into something new, talk to people we've never met. When we are charged with innovating, and that's what pays the bills, the more "collisions" of the science-type the better!

As chair, my goal would be to pack all the value we can into local interfacing/innovation opportunities. We'll continue with quality programming, and "kick it up a notch" both on career relevancy and event promoting. "What's in it for me?" is indeed a reasonable question. When the answer is "tools to do the job," we all can leverage the Midland Section for a clear advantage.

Current Position: Product Development Specialist, Dow Corning Corporation, Specialty Chemical Business

Professional Experience: 1999–present: Dow Corning Corporation, Resin Development Group, commercializing new siloxane resin-based technology; 1996–1999: Dow Corning Corporation, Resin Technology Platform, synthesizing siloxane resins and derivatives. Completed B.S. degree during this time, promoted from technician to chemist; 1990–1996: The Dow Chemical Company, Central R&D Ziegler Catalysis Group; chemical technician responsible for catalyst synthesis and subsequent polymerizations. Also worked in Central R&D's Electrochemistry Group.

Education: B.S. Chemistry, Saginaw Valley State University

ACS Activities: Chair of ACS Division of Chemical Technicians National Chemical Technician Award, 2005–2007; Advisory Board member for magazine *Reaction Times*, and now named *Chemistry*, 1997–present; Secretary for Midland Section ACS, 2000; Editor of ACS Division of Chemical Technicians newsletter, ConnecTECH, 1996–1998; ACS member since 1996

Other Activities: Advisory Board for Delta College's Chemical Technology program, 1998–present.

Candidates for Secretary

Michelle Cummings

Professional Experience: Development Scientist at Dow Corning Corporation, currently working on emerging technologies in thermal management. Joined Dow Corning in 1998. 2001–2006 development of protective materials for LED's and other electronic devices. 1998–2001 Interlayer dielectrics. 1995–1998 Dow Chemical Corporation; materials characterization.

Education: B.Sc. from Central Michigan University 2006.

ACS Activity: Joined in 2007.

Other Information: Member of Dow Corning's Scientists in the Classroom teaching local students about science and how integrated it is to our daily lives.

Beth Nichols

Professional Experience: Senior Research Chemist, The Dow Chemical Company July 2006–present; Teaching Assistant (University of Wisconsin 2001, Bradley University 1998–2001); USDA-Agricultural Research Service Intern, Plant Polymer Laboratories (Peoria, IL 1999–2000).
Education: Ph.D. Analytical Chemistry, University of Wisconsin-Madison, 2006; B.S. Chemistry/Biochemistry, Bradley University (Peoria, IL), 2001
ACS Activities: Joined ACS 2001; Secretary, Midland MI local chapter, 2007; Chair, Bradley University Student Affiliate 2000–2001; Presentations at National and Regional ACS meetings; High School Chemistry Contest—Peoria Local Section ACS, (Proctor 1999–2001, Participant 1996–1997).
Other Information: Served as Analytical Division Representative (2002–2004) and Chair (2003–2004) of departmental graduate student committee at UW; College for Kids instructor (UW, 2004–2005); Children's Education Volunteer (Olbrich Botanical Gardens, Madison, WI 2002–2006); enjoy volunteering with science outreach programs, especially for K–5.

Candidates for Treasurer

Greg Becker

Professional Experience: Associate Development Specialist in the Global Conductive Materials Platform, Dow Corning Corporation. Joined Dow Corning in 1998 in Electronic Materials Research and Development group. Previously had been with Dow Chemical from 1992–1997 in Electronics R&D and with DowElanco (Dow's former Ag unit) from 1989–1991.
Education: B.Sc. Chemistry Central Michigan University, A.A.S. Industrial Chemistry Ferris State University.
ACS Activities: Joined ACS in 1997.
Other Information: Coauthored eight external publications and have five combined patents.

Brian Marinik

Professional Experience: Program Manager, Federal Business Development Group, Dow Corning Corporation, 2005–present; Technician, Health and Environmental Operations, Dow Corning Corporation, 2000–2005; Chemist, Chemtron Corporation, 1999–2000. Coauthor of 15 Dow Corning technical reports and one external Dow Corning publication.

Education: B.S., Biology, University of Dayton, 1999; M.B.A., Management, Central Michigan University, 2004.
ACS Activities: Treasurer, 2006 ACS Central Regional Meeting.
Other Information: Pretty good at adding and subtracting, and have even been known to hum a tune now and again.

Candidates for Chair, Nominations and Elections Committee

Kevin Lewis

Professional Experience: Senior Chemist, Organofunctional Technology Platform, Dow Corning Corp. 2005–present. Coauthor of two Dow Corning technical reports, five refereed publications. Member of the American Chemical Society, Polymer Chemistry and Polymeric Materials Division.
Education: B.S. Chemistry (emphasis in Polymers and Coating Science), University of Missouri-Rolla, 2000; M.S. Chemistry, University of Michigan, 2005; Ph.D. Materials Chemistry, University of Michigan, 2005.
ACS Activities: Joined ACS in 1998; President Schrenk Society (ACS student affiliate, University of Missouri-Rolla) 1999–2000.
Other Information: University of Michigan IGERT Fellow (Program for Molecularly Designed Electronic, Photonic, and Nanostructured Materials); National Merit Scholarship (sponsored by U.S. Corp. and Nine West Corp.); University of Missouri-Rolla Distinguished Scholar; Wouter Bosch Chemistry Department Scholarship (University of Missouri-Rolla).

Kevin Weir

Professional Experience: Senior Materials Engineer in the Business & Technology Incubator, Dow Corning Corporation, 2006–present.
Education: B.S. Chemistry, Michigan Technological University, 2000; M.S. Polymer Science & Engineering, University of Massachusetts, 2001; Ph.D., Polymer Science & Engineering, University of Massachusetts, 2006.
ACS Activities: Joined in 2004.
Other Information: Participated in science outreach program for local school children while in Massachusetts.

Candidates for Councilor

Kurt Brandstadt

Professional Experience: Senior Research Specialist, Dow Corning Corporation, 1991–present: Silicon Bioscience Team Leader, Business & Technology Incubator, 2006–present; Silicon Bioscience, Business & Technology Incubator, 2000–present; Chemical/Polymer Characterization

Group, Analytical Sciences, 1991–2000; General Motors Corporation, 1990; E.I. Du Pont De Nemours & Company, 1989.
Education: B.Sc. Chemistry & B.Sc. Cellular Molecular Biology, The University of Michigan, Ann Arbor, MI, 1991; M.Sc. Chemistry, Central Michigan University, Mount Pleasant, MI, 1999; Ph.D. Chemistry, The Open University, Milton Keynes, England, 2003.
ACS Activities: Joined ACS in 1989 (student) & 1993 (member). ACS Central Region Board Chair-Elect, 2005; Chair, 2006; Past-Chair, 2007; 2007 NSF Pan-American Advanced Studies Institute on Sustainability and Green Chemistry Instructor; 2006 ACS Central Regional Meeting & 39th Silicon Symposium, General Chair, 2003–2006; ACS Midland Section Fall Scientific Meeting Session Chair, 1999.
Other Information: Adjunct Assistant Professor, Department of Chemistry, Central Michigan University, 2005–present; Member of the Royal Society of Chemistry (MRSC), 2005–present; Dow Corning Science & Technology Seminar Program Chair, 2000–2002; Educational Outreach 1994–present; Alpha Chi Sigma Chemistry Fraternity; Boy Scouts of America Eagle Scout.

Connie Murphy

Professional Experience: The Dow Chemical Company, Sr. Administrative Supervisor, 2006–present; Sr. R&D Specialist, 2003–2006; R&D Technologist Leader, 2000–2003; Sr. R&D Technologist, 1994–2000; Research Technologist, 1980–1994.
Education: Milwaukee Area Technical College, A.A.S. in Chemical Technology, 1980.
ACS Activities: Member ACS since 1992. Division of Chemical Technicians: Councilor, 1998–2006; Membership Chair, 1997; Chair, 1996; Chair-Elect, 1995; Strategic Planning Committee, 2000–2001; Webmaster, 1996–2004; Member-at-Large, 1994; Nominations and Elections Committee, 1993; Regional Coordinator, 1992–95. Midland Section: Elected Board Member, 2000–2008; Membership Chair, 1999–present. Mid-Michigan Technician Group: Elected Delegate, 1992–1993, 1997–1999; Chair, 1995; Chair-Elect, 1994; Steering Committee, 1991. Honors: Midland Section ACS, Outstanding Chemical Technician Award, 1997; Dow Central Research Scientists Organization, Outstanding Technologist Achievement Award, 1994; Phi Theta Kappa. Service in ACS National Offices: ACS Bylaw Councilor, 2007. Committee on Committees, 2004–2007; Committee on Membership Affairs, 1999–2004, Committee Associate, 1998; Committee on Technician Affairs, 1997–1999, Consultant, 1999–2006; Chemical Technology Program Approval Service (Subcommittee of the Society Committee on Education), 1997–2005, Consultant 2006–2007. Member:

ACS Divisions: Chemical Technicians; Industrial & Engineering Chemistry; Polymer Chemistry; Polymeric Materials: Science and Engineering.
Other Information: ACS National Meeting Symposium Chair, Spring 2001; National Visiting Committee Chair for National Science Foundation Supported Project in Industry-Based Chemical Technology Curriculum Development, 2000–2001; Chemical Technology Program Advisory Board, Delta College, 1995 to date; Chemical Technology Program Advisory Board, Grand Rapids Community College, 2000–present, Co-Principal Investigator for National Science Foundation supported project to incorporate workplace readiness and safety skills in high school chemistry content, 2001–2003; hold five patents in monomer/polymer synthesis and polymer processing.

Candidates for Alternate Councilor

Gretchen Kohl

Professional Experience: Customs and International Trade Specialist, Dow Corning Corporation
Education: B.S., Chemistry, Grand Valley State University, 1975
ACS Activities: National ACS Activities: Joined 1975; Division of Professional Relations, 1975–present; Member of National Task Force Addressing B.S. Chemists' Needs, 1989–1990; Member of ACS Books Advisory Board, 1990–1995; and Chair of the Pollution Prevention Subcommittee, 1997–2000; Membership Chairman of Preventative Pollution Prevention (P3) Subdivision of Industrial & Engineering Chemistry Division, 1994–1997 Member of Committee on Environmental Improvement, 1993–2004; District II Councilor Caucus Secretary, 1997–2004; Liaison to Committee on Local Section Activities, 2000–2003; Committee Associate on Committee on CAS, 2001–2003; Chemists Celebrate Earth Day (CCED) Committee 2003–2006.
Midland Section ACS Activities: Editor of *The Midland Chemist*, 1982–1985; Section Treasurer, 1986; Director, 1987; Chair-elect, 1988, 1992; Chair, 1989, 1993; Past-chair and Chair of Long Range Planning Committee, 1990, 1994; Director, 1991; Chairman of Teacher Affiliate Committee, 1995; Section Councilor, 1996–2004, Alternate Councilor 2005–present; NCW Co-chair, 2000–present, Member of N&E Committee 1999–2001.

Mike Owen

Professional Experience: Mike enjoyed a 35-year career with Dow Corning Corporation and was a Senior Research Scientist when he retired as Scientist Emeritus in 2000. He is an Adjunct Professor at MMI and a volunteer with NSF. His scientific interest is the surface chemistry of sili-

cones with emphasis on fluorosilicones and surface modification techniques.
Education: B.Sc., Ph.D. and D.Sc. degrees from the University of Bristol, UK
ACS Activities: Mike joined ACS in 1975 when he transferred to Midland from Barry, Wales. He is an active member of the Midland Section and the Polymer Division. He was the Midland Section Treasurer for four years (1996–1999), Alternate Councilor for three (2000–2002), Chair-Elect (2002), Section Chair (2003) [an award-winning year for the section; Outstanding Local Section, three other ChemLuminary Awards, four Certificates of Excellence, plus an award to MMTG], Past Chair (2004) and currently Director (2005–2007) and Resident Agent. He received the 2005 section award for Outstanding Achievement and Promotion of the Chemical Sciences. He is also co-organizer of a series of symposia on Silicones and Silicone-Modified Materials at national ACS meetings, the fifth of which will be in Washington, DC in 2009.
Other Information: He is a Fellow of the Royal Society of Chemistry and recipient of the de Bruyne Medal from the Society for Adhesion and Adhesives.

Candidates for Director

Doug Beyer

Professional Experience: Currently Research Associate, Saran Products & Specialty Films R&D, The Dow Chemical Company; various research positions within The Dow Chemical Company, 1975–present; various research appointments, Dow Corning Corporation, The Dow Chemical Company, Swedish Forest Products Research Institute, 1969–1974.
Education: M.S. Organic Chemistry, University of Wisconsin, 1975; B.S. Chemistry, Michigan State University, 1974
ACS Activities: Joined 2000. Director, 2004–2005; Midland Section treasurer, 2001–2004; served on various scientific meeting committees.
Other Information: Volunteer, business, and finance advisor, Junior Achievement, Midland, 20 years.

Wendell Dilling

Professional Experience: The Dow Chemical Company, Special Assignments Program, 1962-1964, Britton Research Laboratory, 1964–1974, Environmental Sciences Research Laboratory, 1974–1985, Organic Specialties Laboratory—Central Research, 1986–1992; Central Michigan University, Department of Chemistry, Visiting Scientist, Temporary Instructor, Adjunct Professor, 1992–present. Author or coauthor of 57 publi-

cations, 15 presentations at national ACS meetings, 29 presentations at regional ACS meetings, 15 presentations at other national and international meetings. Member of the American Chemical Society, Divisions of Organic Chemistry, Environmental Chemistry, Polymer Chemistry, Professional Relations; Chemical Society (London); Sigma Xi; American Association for the Advancement of Science; Inter-American Photochemical Society; American Society for Photobiology; European Photochemistry Association; Royal Society of Chemistry; International Union of Pure and Applied Chemistry.

Education: B.A., Chemistry, Manchester College, 1958; Ph.D., Organic Chemistry, Purdue University, 1962.

ACS Activities: Joined ACS 1959; Midland Section: Director, 1997–present; Executive Committee, 1997–2004, 2007, Chairman, 2000; Historian, 1997–present; Scholarship Committee, 2002–present; Fall Scientific Meeting, General Chairman, 1978, General Co-chairman, 2006, Program Committee, 1970, 1977, 1987, 1994, 1997, Chairman, 1977, Symposium Organizer, 1980, 1997, 2001, Long Range Planning Committee, 1993, Consultant, 1994, Program Booklet Committee, 1995; Immediate Past Chairman, 2001; Nominations and Elections Committee, 1976, 1994, 1995, 1999, 2001; Long Range Planning Committee, 1996, 2001, Chairman, 2001; Section Chairman, 2000; Government Affairs Committee, 1999, 2000; National Chemistry Week Committee, 2000; Industry Relations Committee, 2000; Science Promotions Committee, 2000; Chairman-Elect, 1999; Program Committee, Chairman, 1999; Personnel Committee, Chairman, 1997–1999; Midland County Fair Booth Volunteer, 1994–1995, 1997, 1999; Project SEED Co-preceptor, 1990–1993, 1998; Membership Growth Committee, 1998; Councilor, 1976–1996; 29th Central Regional Meeting Advisory Board, 1994–1995; 75th Anniversary Celebration Committee, 1993–1994; Project SEED Committee, 1994; Committee to Consider a Major Award Sponsored by the Midland Section, 1991–1994; Authors' Night Committee, 1983–1992, Chairman, 1983–1985; 22nd Cen-

tral Regional Meeting Committee Consultant, 1987–1990; National Chemistry Day Committee, 1987; 14th Central Regional Meeting Committee, General Chairman, 1976–1982; *The Midland Chemist*, Co-editor, 1969–1973; Membership Education Committee, 1966–1967; Seminar Committee, 1963–1966, Chairman, 1964–1966; Central Region: Steering Committee, 1981–1983, Chairman-Elect, 1981–1982, Chairman, 1982–1983; National: Council Committee on Committees, 1990–1994, Secretary, 1994, Liaison to Council Committee on Public Relations, 1990, 1993–1994, Liaison to Council Committee on Women Chemists, 1990, Subcommittee to Review the Governance Streamlining Study, 1990–1991, Liaison to Council Standing Committee on Meetings and Expositions, 1991–1992, Liaison to Joint Board-Council Committee on Professional Training, 1991, Subcommittee to Consider Alternative Governance Structures for Public Affairs and Public Relations, 1991–1993, Subcommittee to Consider Alternative Governance Structures for Science-Related Committees, 1991–1992, Subcommittee to Consider Alternative Governance Structures for Education-Related Committees, 1991–1993, Liaison to Council Committee on Project SEED, 1992–1993, Liaison to Society Committee on Publications, 1993–1994, Subcommittee on Joint Board-Council Operations, 1993–1994, Reviewer of Committee on International Activities, 1993–1994; Joint Board/Council Committee on Economic Status, 1987–1989, Subcommittee on Personnel Policies, Chairman, 1987–1989, Subcommittee on Experienced Chemists/Chemical Engineers, 1987–1989, Joint Task Force on Sabbaticals for Non-Academic Chemical Professionals, 1988-1990, Subcommittee on Career Development, 1989; Council Committee on Meetings and Expositions (Associate), 1985–1987, Subcommittee on Regional Meetings, 1985–1987; Joint Board/Council Committee on Copyrights (Associate), 1987; Council Committee on Publications, 1977; Society Committee on Publications, 1978–1984, Subcommittee on Journals Monitoring, 1978, Subcommittee on New Journals, 1978, Subcommittee on Journals, 1979–1982, Task Force to Monitor Chemical Reviews, 1979–1980, Task Force to Monitor Biochemistry, 1980–1982, Subcommittee on New Products and Services, 1979–1984, Chairman, 1984, Task Force on New Journal on Organometallic Chemistry, 1979–1980, Task Force on New Journal on Photochemistry, Chairman, 1981–1983, Chemical and Engineering News, Editorial Board, 1982–1983, Task Force to Monitor Industrial and Engineering Chemistry: Fundamentals—Process Design and Development—Product Research and Development, 1983–1985, Subcommittee on Monitoring, 1984, Task Force to Monitor Environmental Science and Technology, 1984–1986.

Other Information: Midland Section ACS Awards for Outstanding Service to the American Chemical Society, 1992, and for Outstanding Achieve-

ment and Promotion of the Chemical Sciences, 1982. Midland Chapter Sigma Xi Award for Outstanding Research Publication, 1974.

Bob Dion

Professional Experience: Applied and fundamental research including polymer synthesis, impact modification, product development, process development and determination of process- structure- property relationships for styrenics, engineering thermoplastics and composites at the Dow Chemical Company. R&D Leader in Engineering Polymers or Polystyrene Product R&D, 2004–present; R&D Leader in the Polymer Chemistry Group in Core R&D, 1996–2004; Assorted R&D positions in Designed Thermoplastics Research, 1985–1996.
Education: Yale University, Postdoctoral Fellow-Organometallic Chemistry; Yale University-Heyl Fellow, M.S. 1979, Ph.D. Organic Chemistry 1983; Kalamazoo College B.A. Chemistry 1978 ACS Activities: ACS member since 1978.
Other Information: Authored >90 technical reports; Authored 21 publications in refereed journals/ books; Presented ten external talks or posters (ACS or Gordon Conference); Proposed and monitored two external R&D projects (Reactive compatibilization at the University of Minnesota/Polymer fracture fundamentals at Washington State University); Authored six issued/allowed U.S. patents and 14 filed but pending patents; Occasional guest lecturer on polymer chemistry topics at University of Minnesota, Washington State University, Kalamazoo College, Zurich International School, and Jefferson Intermediate School; Sigma Xi officer in mid-1980s.

Petar Dvornic

Professional Experience: Institute of Chemistry, Technology and Metallurgy of the University of Belgrade 1980–1993: Research Scientist (1980–83), Senior Research Scientist (1983–1988), Head of Polymeric Materials Department (1988–1993). Department of Chemistry of the University of Belgrade: Associate Professor of Polymer Chemistry 1985–1993. Michigan Molecular Institute, MMI, Midland, 1993–present: Associate Scientist (1993–1994), Senior Associate Scientist (1994–1995), Research Scientist (1995–1999), Senior Research Scientist (1999–present). U.S. Army Dendritic Polymers Center of Excellence: Co-Director (1995–1997) Michigan Molecular Institute, Midland, MI: Professor of Polymer Chemistry (1999–present). Central Michigan University, Mount Pleasant, MI: Adjunct Professor (1993–present). Michigan Technological University, Houghton, MI: Adjunct Professor (1993–present). Dendritech Inc., Midland, MI, Board of Directors: director 2001–present.
Education: B.S., Chemical Technology and Metallurgy, University of

Belgrade, 1972. M.S., Macromolecular Chemistry, University of Belgrade, 1975. M.S., Polymer Science and Engineering, University of Massachusetts, Amherst, 1977. Ph.D., Polymer Science and Engineering, University of Massachusetts, Amherst, 1979. Postdoctoral fellow, Polymer Science and Engineering, University of Massachusetts, Amherst, 1979–1980. Visiting Scientist, Polymer Science and Engineering, University of Massachusetts, Amherst, 1985–1990.
ACS Activities: Member: Polymer Division 1977–present, PMSE 1995–present. Midland Section Awards Committee: chairman 2003–2005, member 2003–present. Midland Section Board of Directors: director 2004–2006. Midland Section Fall Scientific Meeting: mini-symposium chair "Nano-Scaled Building Blocks and Nanostructures" 2005, Symposium Technical Co-Chair 2007.
Other Information: Publications: two books, one university textbook notes, eight book chapters, five review papers, 90 papers, 18 issued or pending patents, 167 lectures and presentations of which over 100 by invitation. Awards: Serbian Chemical Society, Division of Polymer Chemistry, Chairman 1988–1993, Presidency, member 1992–1993. Belgrade Scientific Foundation: Award for Contribution to Science and Technology 1990. Serbian Chemical Society: Award for Contribution to the Society 1990, Deserving Member Award 1992. European Polymer Federation Comity: member 1991–1995. The Midland Chapter of Sigma Xi: Annual Best Paper Award 1999. "Silicon Chemistry": Editorial board, Editor for *Dendrimers and Dendritic Polymers* 2001–present. University of South Australia, Adelaide: Visiting Professor 2002.

Steve Keinath

Professional Experience: Current position: Research Scientist and Associate Professor, Michigan Molecular Institute.
Education: B.S., Chemistry and Physics, Saginaw Valley State College, 1976; M.S., Polymer Science, University of Massachusetts, 1978; M.B.A., General Business, Saginaw Valley State College, 1981; M.A., Education, Central Michigan University, 1985; Ph.D., Chemistry, Michigan Technological University, 1992.
ACS Activities: Joined 1977; Co-editor, *The Midland Chemist*, 1984–1985; Editor, *The Midland Chemist*, 1986–1987; Printing Chairman, 22nd ACS Central Regional Meeting, 1987–1990; Co-chairman, Awards Committee, 1992; Member, Awards Committee, 2003–2007; Alternate Councilor, 1993-98, 2002-04; Member, Nominations and Elections Committee, 1994–97; Chairman, Nominations and Elections Committee, 1999–2001; Member, Auditing Committee, 1995, 1998; Director, 2005–2007; Member, Executive Committee, 2007; Session Moderator/Symposium Chair at Mid-

land Section hosted meetings: Fall Scientific Meetings, 1996–1997, 2007. Papers/posters presented at Midland Section hosted meetings: Fall Scientific Meetings, 1975, 1984, 1986, 1989, 1990, 2000, 2003–2005, 2007; 22nd ACS Central Regional Meeting, 1990; Authors'/Awards Night, 1991.

Dave Stickles

Professional Experience: Senior Technologist. Dow Corning Corp. 1973–2005, mostly in Paper Release Coating, Technical Service in Development. Retired from Dow Corning in March of 2002. I worked for Dow Corning as a contractor through Adecco 2002–2005 in Paper Release Coating, Technical Service in Development. Nine Patents.
Education: Graduated from Ferris State University in 1974 with AAS Degree in Industrial Chemistry Technology.
ACS Activities: Joined ACS in 1993; I have been on the Board of Directors for the Midland Section of the American Chemical Society, serving as secretary, and director. I have been chair of the Fair Booth, and the Sci-Fest Committees (Since 1996) for the Midland Section of the American Chemical Society, and am current Sci-Fest co-chair. I have been involved with MMTG since in inception in 1990 and have had several board positions, Chair, Chair-Elect, Secretary, Director, and Elected Delegate. I am currently an elected delegate. I have also been on the Board for the TECH Division of the American Chemical Society, serving as Secretary for 2002.
Other Information: I have been a Big Brother since 1974. I have been on the Board of Huntington's Disease Society of America Michigan Chapter Serving as Secretary 2003–2004, Vice President in 2004, and President from 2005–present.

Ballot for Election of 2008 Midland Section ACS Officers

1. Vote for the candidate of your choice, selecting one for each office except as noted.
2. IMPORTANT: To maintain anonymity, **do not sign** the **ballot** or the **inner** ballot **envelope**.
3. Place the ballot in the ballot (inner) envelope. Place the ballot envelope in the return envelope and sign and print your name on the return (outer) envelope. You **must sign** your name on the **outer envelope** to have your ballot counted. See #4 below.
4. In order to vote, you must be a member or associate member in good standing with the ACS. Affiliates are ineligible to vote according to National ACS bylaws.
5. Ballots must be received at the address below **on or before October 26, 2007.**

Attn: Brett Zimmerman
Nominations and Elections, Midland Section of the ACS
Dow Corning Corporation
Mailstop C042D1
2200 W. Salzburg Rd.
Midland, MI 48686

BALLOT

CHAIR-ELECT (vote for one)

❑ Angelo Cassar ❑ Tina Leaym

SECRETARY (vote for one)

❑ Michelle Cummings ❑ Beth Nichols

TREASURER (vote for one)

❑ Greg Becker ❑ Brian Marinik

CHAIR, NOMINATIONS & ELECTIONS COMMITTEE (vote for one)

❑ Kevin Lewis ❑ Kevin Weir

COUNCILOR (vote for one)

❑ Kurt Brandstadt ❑ Connie Murphy

ALTERNATE COUNCILOR (vote for one)

❑ Gretchen Kohl ❑ Mike Owen

DIRECTORS (vote for three)

❑ Doug Beyer ❑ Wendell Dilling ❑ Bob Dion
❑ Petar Dvornic ❑ Steve Keinath ❑ Dave Stickles

ACS Tour Speaker

Forensic Chemistry and the Private Sector

By Ann Birch

The Central Michigan University Department of Chemistry and the Midland Section of the American Chemical Society are pleased to present the Fall 2007 ACS Tour Speaker, Charles K. Deak from C.K. Deak Technical Services, Inc. The seminar title is "Forensic Chemistry and the Private Sector." The presentation will be made on Monday, October 8, at 4:00 p.m., Dow Science Building, Room 175, Central Michigan University.

Abstract

The role of the scientist, particularly the chemist involved in litigation, civil or criminal, is discussed. Expert witness testimony in court cases is described, including required qualifications and the qualifications process. More interesting or unusual case histories involving the author are discussed in some detail. These case histories include cases involving counterfeit gold coins, product liability, vehicular homicide, domestic cases, and a first degree murder trial. Methods used are discussed, such as atomic absorption for detection of traces for evidential purposes and thin layer chromatography (TLC) for the identification of ballpoint and felt pen inks. Application of microscopy is discussed in conjunction with some cases. The "common sense" approach is emphasized.

Biographical Sketch

Charles Deak earned his bachelor's degree in 1948 in Budapest, Hungary. After spending several years at Paris at the Sorbonne and working on the development of chemical fire-fighting agents, he immigrated to the United States in 1955. Mr. Deak developed analytical procedures for the analysis of secondary metals and alloys. He established and became manager of Analytical Associates in 1973 and its president when it was incorporated in 1979. He specializes in chemical analysis of aerospace metals such as titanium, nickel, and cobalt base superalloys with emphasis on the determination of trace level impurities in these metals and the investigation of failures of metals. He regularly performs forensic and criminialistic testing and has testified as an expert witness in criminal and civil trials in both state and federal courts. He retired after 35 years with Analytical Associates, Inc., and its parent company in 1992 and started C.K. Deak Technical Services, Inc.

In Past Issues of *The Midland Chemist*

By Wendell L. Dilling, Midland Section Historian

- **40 Years Ago This Month**—In Free Radicals Short Course to be Offered in Midland by Dr. D.S. Lehman: "The Membership Education Committee reports that the short course, "Free Radicals", will be given November 30 and December 1 at Northwood Institute's Jordan Hall. Dr. Earl Huyser of the University of Kansas will be the instructor."
- **30 Years Ago This Month**—The October 1977 issue of *The Midland Chemist* was the first issue to contain an entire Fall Scientific Meeting program booklet. Keynote speaker Dr. Anna J. Harrison spoke on "What Does Society Have the Right to Expect from Chemical Education?" "Successful in her third campaign for the ACS presidency last fall, Anna became the first woman to be chosen as an ACS President-Elect in the Society's 101 year history."
- **20 Years Ago This Month**—In National Chemistry Day—Nov. 6, 1987 by J. P. Arrington: "Our goal throughout our planning has been to spread the message of chemistry's benefits to as many of our young people as possible. Most of our efforts will be devoted to programs in junior high school science classes. We are actively seeking volunteers to present demonstrations on Nov. 6; call me at 636-2939 if you wish to participate."
- **10 Years Ago This Month**—In From the Chair... by Joan Sabourin: "Over the years our Section name has bothered me, as I worked out of Saginaw County. I often felt that activities of the Section were primarily targeted for the Midland area. In the ensuing years, I have seen the benefits of Section activities spread throughout the five counties. With this in mind, it is time to make a Section name change. Presently the names of the Michigan Sections are: Detroit, Huron Valley, Kalamazoo, Michigan State University, Midland, Western Michigan, and Upper Peninsula. We have polled our northern and eastern neighbors, with the possibility of enlarging our Section to include members from these counties. Perhaps they, and our counties other than Midland, would feel a stronger affiliation with our Section if we changed our name from the Midland Section to the MidMichigan Section.

63rd Fall Scientific Meeting

Chemistry and the Greatest Challenges of the 21st Century: Energy, Water, and Food

Friday, October 19, 2007
11:00 a.m.–5:00 p.m.
Midland Center for the Arts

The Midland Section of the American Chemical Society would like to invite you to attend the 63rd Fall Scientific Meeting. The theme for this year's Fall Scientific Meeting is "Chemistry and the Greatest Challenges of the 21st Century: Energy, Water, and Food." The general chair for the meeting is Dale Meier, a scientist at Michigan Molecular Institute. Program chair responsibilities are being shared by Pat Smith, a scientist formerly with The Dow Chemical Company and now retired, and Petar Dvornic, a scientist at Michigan Molecular Institute. Please preregister, particularly if you would like to attend the lunch. You will find a link to the meeting on the Midland Section home page http://membership.acs.org/m/midl/ and from the FSM home page you can access the Registration page (and other FSM pages) by clicking on the appropriate link.

A lunch will be provided to those preregistered who have indicated they will attend lunch. Major Midland Section awards will be presented after lunch, including awards honoring members who have been ACS for 50 years or more. Dr. Catherine (Katie) Hunt, president of ACS, will present the keynote address. A poster session will provide participants with an overview of research being conducted not only by Midland Section industry and academia, but other institutions as well. There will also be a vendor exposition throughout the afternoon. The poster session will be followed by three symposia running simultaneously that will reflect the energy, water, and food theme of the meeting.

After the meeting, a social hour will be offered to meeting attendees at

the Main Street Sports Pub. Later in the evening, a speakers banquet will be held for presenters at the meeting. A schedule is given below with details following on keynote, awards, symposia, and posters. Come and join us!

Dale Meier, 989-832-5555 x577, meier@mmi.org
Pat Smith, 989-839-0839, patrickbsmith@sbcglobal.net
Petar Dvornic, 989-832-5555 x550, dvornic@mmi.org

2007 ACS FSM Committee Volunteers

Chair	Dale Meier
Keynote Speaker	Dee Strand
Program	Pat Smith, Petar Dvornic
Registration	Dale LeCaptain
Vendors	Brett Zimmerman, Eric Joffre
Posters	Joel Kern, Brad Fahlman
Publicity	Angelo Cassar, Ann Birch, Rusty Govitz
Energy symposium	Steve Keinath
Food symposium	Scott Young
Water symposium	Pat Smith, John Blizzard
Ad Hoc Steering Committee	Dee Strand, Pat Smith, Petar Dvornic, Greg Potter, Dale Meier

Schedule and Locations

Time	**Event**	**Location**
11:30 a.m.–3:00 p.m.	Registration	Brick Lobby
11:00 a.m.–12:00 p.m.	Lunch	Garden Room
12:00–12:45 p.m.	Welcome/Awards	Little Theatre
12:45–1:45 p.m.	Keynote Presentation	Little Theatre
1:45–2:00 p.m.	Break	
2:00–3:00 p.m.	Posters/Vendor Exposition	Brick Lobby
3:00–5:00 p.m.	Energy Symposium	Founders Room
	Food Symposium	Lecture Room
	Water Symposium	Garden Room
5:15–6:30 p.m.	Meeting Social	Main St. Sports Pub
7:00 p.m.	Speakers' Banquet	Tuscany Banquet Hall

Awards

Outstanding Achievement and Promotion of the Chemical Sciences

Each year the Midland Section honors an individual residing within the Section's geographical area who has demonstrated outstanding achievement and promotion of the chemical sciences. This award recognizes dedication and service to the chemical profession.

Outstanding Service to the American Chemical Society

The Section sponsors an annual award to a member to recognize outstanding service to the Midland Section of the ACS. This award recognizes achievement in the promotion of the goals of ACS.

Outstanding Chemical Technician

The Section presents an annual Outstanding Chemical Technician Award to an individual who has demonstrated an extremely high degree of professionalism as a chemical technician.

Midland Section Scholarship

Each year the Section presents a college scholarship from an endowed fund inaugurated in 2003.

Members of ACS for 50 Years or More

60 Years

Dr. C. Kenneth Bjork Sr.	Charles Burton	Gilbert Frantz
Ralph Friedrich	Dr. David Kellom	Richard McDonald
Dr. A. Lee Smith	Dr. Alfred Steinhauer	Dr. David Young

50 Years

Joseph Bevirt	Dr. Thomas Gillespie	Dr. Dale Meier
Dr. Wendell Meyer	Dr. Richard B. Moreau	Walter Rupprecht

We were sorry to hear of the passing of John H. Davidson in September. John had been a member of ACS for 70 years.

Keynote Speaker

Sustainable Chemistries: Environmentally Friendly and Economically Viable Innovations

Dr. Catherine T. (Katie) Hunt

Leader, Technology Partnerships, Rohm and Haas Company, and
2007 President, American Chemical Society

Environmental and economic goals are not mutually exclusive and more to the point can be fully aligned through the application of green chemistry and green engineering principles. Moving forward, successful companies, universities, and governments will understand that scientific collaboration and innovation are essential to making breakthroughs in the development of environmental and economic sustainability. Rohm and Haas is a two-time winner of the Presidential Green Chemistry Challenge Award. This award not only focuses attention on the fundamental work being done in our companies and universities but also celebrates the scientists and technologists, managers, and leaders responsible for bringing these concepts from ideation through to commercial reality. I will discuss how we reviewed our research and development portfolio within the context of the principles of green chemistry and green engineering and identified specific opportunities where being environmentally friendly could, and has, increased our competitiveness. Special attention will be given to the role of collaboration and innovation in green chemistry research and development.

References:

Anastas, P, and J. Warner. 1998. Green Chemistry: Theory and Practice. London: Oxford University Press.

Anastas, P., and J. Zimmerman. 2003. Design through the 12 Principles of Green Engineering. Environmental Science and Technology 37(3): 94A–101A.

Biographical Information

Dr. Catherine T. "Katie" Hunt is Leader, Technology Partnerships, for Rohm and Haas Company. Accelerating the pace of innovation across the company by fostering collaboration with industry, academia, national

laboratories, government agencies, and foundations is her main role. Since creating the unit in 2002, she has helped secure multimillion dollar grants from federal agencies to improve collaboration across all sectors. Katie began her career as a senior scientist at Rohm and Haas Company after completing an NIH Postdoctoral Fellowship at Yale University. She holds an A.B. in chemistry (*Cum Laude*) from Smith College and a Ph.D. in chemistry from the University of California, Davis.

Dr. Hunt is president of the American Chemical Society, the largest scientific society in the world, with over 160,000 members. Katie serves on the Board of Directors of the Council for Chemistry Research and is an organizing member of the Vision 2020 Nanotechnology Roadmap. Recently, Dr. Hunt was named one of Pennsylvania's "50 Best Women in Business" by Governor Ed Rendell and was awarded the Smith College Medal from the their Board of Trustees.

Katie currently lives in Upper Dublin, Pennsylvania, with her husband, Wes, and their son, James. In her spare time, she enjoys yoga, judging science fairs, mentoring students, and serving on the Upper Dublin Library Board.

Energy Symposium

Chair: Steve Keinath, Michigan Molecular Institute

Energy: The Lifeblood of Civilization

Hans-Georg Elias
Adjunct Professor, Michigan Molecular Institute, Midland, Michigan

The global supply, production, consumption, and demand of primary energy are discussed for the various sectors of society. The various forms and sources of energy from coal, crude oil, and natural gas to renewables in terms of availability, reserves, resources, cost, economics of scale, and projected global warming with special emphasis on the philosophy and impact of the Kyoto protocol are also discussed.

Alternative Fuels: Why They Are Not the Solution Their Advocates Would Have Us Believe

John Wilson
TMG/Energy, Detroit, MI and NextEnergy Center, Detroit, MI

The U.S. uses about 140 billion gallons of gasoline annually, 63 billion gallons of diesel fuel, and about 30 billion gallons of jet fuel (a.k.a. kerosene). Almost all of this fuel (which represents about 25% of total global consumption) is manufactured from crude oil in the U.S. or elsewhere. Any attempt to replace even a small fraction of it in the interests of energy security or emissions reduction is a mind-boggling task. Unlike gasoline and diesel fuel, there are major near-term limitations imposed by the availability of alternate fuel feedstocks.

Current production of fuel ethanol nationwide totals about 6.5 billion gallons annually, biodiesel about 200 million gallons, while the amount of fuel hydrogen produced is negligible. (The oil industry, however, produces very large quantities of hydrogen for refining use.)

The alternate fuels industry faces additional problems, some of which are only just becoming apparent. As a transportation fuel, hydrogen is unlikely to be economically viable. Ethanol has some troublesome technical characteristics when used as anything more than a 5-10% oxygenated gasoline additive (to replace MTBE). Biodiesel has experienced major quality problems, e.g., with oxidative stability in storage and with flow characteristics in cold climates. As a result, the oil industry is threatening to move onto biodiesel's turf with a significantly superior biofuel product.

This presentation will evaluate and quantify these problems and the resulting competitiveness of alternate fuels and also present an energy outlook both for the conventional and alternative fuels we know and those with which we are less familiar.

Engineering Advanced Materials for the New Photovoltaic Energy Era

Ethan Good and Greg Bausch
Dow Corning Corporation, Midland, MI 48686

Within the past decade, photovoltaics (PV) has experienced a renaissance as demand from developed and emerging economies continue to strain an energy portfolio dominated by non-renewable natural resources. As a direct result of providing a clean, accessible, and ample source, the potential of solar energy was highly speculated at its discovery. The relatively recent consideration as a meaningful component in meeting global energy demands was facilitated by the retooling of manufacturing practices and implementation of new technologies—all targeted at delivering more cost-effective PV. In select markets, solar power generation is beginning to reach grid parity with traditional generation methods. Rapid growth has caused feedstock shortages and posed questions on sustainable and environmentally friendly precursors. However, many of the challenges hindering widespread dissemination of solar cells are related to fundamental limitations surrounding the energy conversion efficiencies inherent to the materials used in the device. Intensive research is underway to expand the current capabilities of materials able to convert sunlight into electricity, as well as for enabling materials and designs for packaging and building integration. This presentation will discuss various PV applications, and the status and relative capabilities of a range of existing and emerging technologies for active and enabling materials for current and future photovoltaics.

Current Deployment and Remaining Challenges for Fuel Cell Vehicles

Chris Sloane
General Motors Corporation, Warren, MI

An overview of the progression from technical research and development to applied engineering to commercialization of fuel cell vehicles will be presented. The focus of the presentation will be on current performance challenges and vehicle deployments, and primary material requirements and research challenges.

Food Symposium

Chair: Scott Young, The Dow Chemical Company

Future Trends in the Food Industry

Kirk Dolan, Ph.D., Associate Professor
Food Science & Human Nutrition, Michigan State University, E. Lansing, Michigan

Two of the strongest trends in the food industry are health and wellness foods and convenience foods. These foods that provide health benefits beyond basic nutrition are called “functional foods” or “nutraceuticals.” The U.S. functional food market was $20 billion in 2000 and is expected to triple by 2010, and constitutes 10% of the global food market. Nearly two-thirds of grocery shoppers report that their purchase decisions are driven by their desire to either reduce the risk of, or manage, a specific health

condition. As a result, many of the largest global food companies have created "health and wellness" divisions. We will give examples of the various functional foods around the world and their health-promoting or disease-preventing properties. To meet the demand for higher quality foods that can be prepared easily, food researchers in academia and in industry continue to develop and improve new processing technologies. The goal of these novel technologies is to optimize nutrient content while still ensuring food safety. We will compare the following processing methods and their future applications to functional foods:

- Thermal processing—aseptic, extrusion, ohmic, and microwave
- Non-thermal processing—irradiation, high pressure, pulsed electric fields, and ultrasonics

Healthy Oils and Oilseed Improvement

Tom Patterson
Dow AgroSciences, Indianpolis, Indiana

Numerous studies on the role of fats in human nutrition have demonstrated the importance of diets low in saturated fats and trans-fats. Historically, the desire to lower saturated fats in the diet led to the reduction in the use of animal fats and their replacement with polyunsaturated vegetable oils. The need to improve the functionality of polyunsaturated oils led to the widespread use of partial hydrogenation, resulting in the production of trans-fatty acids. With new labeling guidelines and legislation, the demand for trans-fat-free oils as a replacement for partially hydrogenated oils is growing. Dow AgroSciences has developed high oleic, low linolenic vegetable oils from canola and sunflower through a combination of mutation and conventional breeding. The Omega-9™ oils are high stability oils that do not require partial hydrogenation, which eliminates this source of trans-fats. In addition, these oils have excellent functional properties in terms of frying stability, giving longer frying life and excellent sensory characteristics to the cooked food. Ongoing studies with Omega-9™ oils are directed towards optimizing the use of these oils in commer-

cial practice. Additionally, improvements in the genetics of canola and sunflower are directed towards improved agronomic performance as well as the development of the next generation of novel oil products.

Soluble Fibers and a Healthy Lifestyle

Kerr Anderson, Ph.D, Scientist
DowWolff Cellulosics, The Dow Chemical Company, Midland, Michigan

Obesity and its clinical consequences, such as Type 2 diabetes and cardiovascular disease, are a major emerging health problem in the world. In 2006, the U.S. government reported 22 states where more than 25% of the population was obese. The incidence of obesity in adults has increased from 15% in the late 1970s to over 32% in 2003 and continues to increase. Globally, 1 billion people are estimated to be overweight and suffering from related diseases. 350 million individuals have Type 2 diabetes – a number expected to double by 2030. A very high percentage of these individuals are found in emerging economies such as China and India where dietary habits are changing.

The beneficial effects of a high fiber diet have been well recognized for many years and are reflected in a U.S. Government RDA of at least 25g per day, a level very few people attain. It is less widely understood that a subset of dietary fibers, soluble or viscous fiber ,can measurably and specifically reduce levels of total plasma cholesterol, LDL and VLDL (but not HDL), and glucose and insulin levels. These effects are driven by a number of interrelated mechanisms including formation of a gel barrier in the intestine.

Dow has developed a non-fermentable modified soluble cellulose, Fortefiber™, which has been shown to mediate these beneficial effects while not causing side effects seen with other naturally derived soluble fibers. Fortefiber™ is an optimized HPMC formulation available in two viscosities, which are efficacious and well tolerated in trials.

We will describe the data from trials which support the effect of dietary fibers, and Fortefiber™ in particular, in support of a healthy lifestyle.

Relationship between Mass Transfer of Permeants and Polymer Processing in Food Packaging

Maria Rubino, Ph.D., Assistant Professor
School of Packaging, Michigan State University, E. Lansing, Michigan

Assessing the mass transfer of permeants through a polymer material is of key importance when determining the packaging/product shelf life. Mass transfer of permeants by polymer membranes strongly depends on polymer morphology. Since the conversion of polymer materials into packaging materials impacts the polymer morphology, our objective is to evaluate the relationship between mass transfer of permeants and the conversion process. Organic vapors, gases, and moisture are being considered as permeants. Different approaches are being used by our group in order to assess the mass transfer of films and containers.

In our current research we have used a gravimetric system, including a Rubotherm electrobalance, to demonstrate important differences in the solubility parameters of organic vapors on polypropylene resin, sheet, and a thermoformed container. Also we have used small angle neutron scattering (SANS) to evaluate changes in morphology as organic vapors, such as benzaldehyde, desorbed from polymer films.

In other research we are also measuring the mass transfer of chlorine dioxide on different polymer films. Chlorine dioxide is a strong oxidizing agent, an effective surface bactericide, and has a substantial antimicrobial effect against several important pathogenic microorganisms, and so a packaging application is being considered. An innovative permeation system has been developed, and we have determined the diffusion and solubility coefficient of chlorine dioxide on different polymer films.

Water Symposium

Co-Chairs: Pat Smith, The Dow Chemical Company;
John Blizzard, QuadSil Inc.

Saginaw Bay Coastal Initiative

Charles Bauer, Environmental Quality Analyst
Water Bureau, Michigan DEQ, Lansing, MI

The Saginaw Bay Coastal Initiative is a new partnership effort focused on developing innovative approaches to expanding local tourism and economic development while achieving resource and environmental protection within the Saginaw Bay coastal area. An overview of the recent activities of the Saginaw Bay Coastal Initiative will be given. The discussion will focus on environmental issues affecting Saginaw Bay and how the Saginaw Bay Coastal Initiative is working to address those issues.

Emerging Trends in the Water Market

Dianne Maughon, New Business Director
Dow Water Solutions, The Dow Chemical Company, Midland, MI

The global water market is over $400B and growing. Demands from increasing population and industrial growth are placing more and more pressure on traditional sources of water. At the same time these traditional sources are being challenged by pollution and overuse. While industrial and potable water use gets a lot of press coverage, other uses such as agricultural irrigation make up the majority of water withdrawal. Re-

duction of these withdrawals provide a significant opportunity for arid areas. Issues such as the impact of conservation, water reuse, and water production from nontraditional sources will be discussed. Also the impact of the debate on water as a human right vs status as a commodity and the issue of water pricing as a mechanism to impact behavior will be presented.

Emerging Water Purification Technologies

David Moll, Research Scientist
Dow Water Solutions, The Dow Chemical Company, Midland, MI

Global population growth, continuing contamination of water supplies, and increased awareness of the dangers of trace contaminants are driving technical innovation in water purification. Major companies like GE, Siemens, and Dow Chemical, along with leading universities and national laboratories, are focusing research efforts on lower cost, more efficient technologies for purifying water. The innovation in this area spans a large range of applications and scale of production. A large water purification plant may now process more than a trillion pounds of water per year at a cost of $0.00001/pound. At this scale, purified water is truly a commodity. A family without access to electricity or a community water distribution system, on the other hand, needs only a few gallons of drinking water per day. The technologies appropriate for these extremes of scale are vastly different. This presentation will highlight recent technical advances in desalination, wastewater treatment, drinking water filtration, and trace contaminant removal.

Water, Water Everywhere, But…

John Blizzard
QuadSil Inc.

The Saginaw Bay watershed encompasses an area of over 8500 square miles and comprises the largest watershed in Michigan. An ACS program was initiated where high school chemistry students would test areas in this watershed every week throughout the year from the headwaters to Saginaw Bay for a variety of potential pollutants. With ACS assistance, equipment, and materials, water analysis laboratories were set up in each of 10 area school science laboratories throughout the watershed. As a student-led project, the students were responsible for selecting the test sites (under teacher advisement), learning analytical techniques, chain of custody, scheduling, testing, and recording and analyzing the results. The testing, results, and interaction of the schools with ACS and local businesses will be discussed in this presentation.

Poster Abstracts

[1]

Measuring the Sizes of Amphiphilic PAMAM Dendrimers in Solution via Diffusion NMR Spectroscopy

Nicole E. Chamberlain,[1] Minghui Chai,[1] Tracy Zhang,[2] and Steven Kaganove[2]
[1]Department of Chemistry, Central Michigan University, Mt. Pleasant, MI
[2]Michigan Molecular Institute, Midland, MI

In this work, the diffusion coefficients of 0-6 generation PAMAM dendrimers with opened epoxide group connecting to hydrophobic C12 tails were measured in deuterated chloroform solution using diffusion NMR spectroscopy. Hydrodynamic radii (R_H) of these dendrimers were then calculated based on the Stokes-Einstein equation using the obtained diffusion coefficients, the experimental temperature (held constant at 25°C), and solvent viscosities. The results from this study clearly demonstrate that the hydrodynamic radii of these dendrimers are increased with the generation of the PAMAM dendrimers. For the 6th generation PAMAM dendrimer, the hydrophobic tails seemed more extended than those in 4th and 5th dendrimers, leading to a tight packing on the surface of the 6th generation dendrimer because of the steric hindrance.

[2]

High Sensitivity Detection of Patulin in Apple Juice

Steve Watts, David Jorissen
Hitachi High Technologies America, Inc., San Jose, CA

Patulin is a mycotoxin produced by certain species of *Penicillium, Aspergillus, Byssochylams* molds that can occur at dangerously high levels in apple juice if damaged, moldy apples are used in production. The FDA believes that if processors do not implement controls for patulin, apple juice consumers may not be protected from potential adverse effects due to long-term exposure to patulin from the consumption of apple juice. As a result, the FDA has established an action level of 50 micrograms per kilogram (50 ppb) or less for patulin in apple juice, apple juice concentrates and apple juice products. In order to meet this requirement, methodology for high sensitive detection of patulin in apple juice was developed including the added benefit of real-time spectral confirmation.

[3]

Electron Withdrawal and the Meta Effect: The Synthesis and Photolysis of 3,5-Dinitrophenylacetic Acid

Amber Janda

Arylmethyl compounds with leaving groups ($ArCH_2$-LG) are of considerable interest for both mechanistic reasons and in synthetic studies for their potential applications in functional group protection chemistry. A photochemical reactant, 3,5-dinitrophenylacetic acid, was synthesized in three steps and then photolyzed. First, 3,5-dinitrobenzoic acid was refluxed in thionyl chloride to give 3,5-

dinitrobenzoyl chloride. The acid chloride was then reacted with diazomethane to yield the acyl diazoketone, 3,5-dinitrobenzoyl diazomethane. This intermediate was subjected to Wolff rearrangement to give the desired 3,5-dinitrophenylacetic acid. The acid was then photolyzed for 15 minutes in benzene using ultraviolet light of wave length 310 nm. Proton NMR spectra of the material after two separate attempts at photolysis revealed that no reaction had occurred in either case. The reason for this observation is not known, but a possible explanation is contamination of the photolysis well with oxygen and subsequent quenching of any triplets. However, triplet reactivity was initially not anticipated because of the ionic processes proposed to be involved in the mechanism. A second possibility is a slow reaction, and a third but quite remote possibility is that the starting material was actually the corresponding carbinol and not the phenylacetic acid. Further investigations are necessary to develop a complete understanding of the reasons behind these unexpected results.

[4]

Phospholanes Containing Both Bromine and Phosphorus

Young J. Cho and Bob A. Howell
Center for Applications in Polymer Science
Department of Chemistry, Central Michigan University, Mt. Pleasant, MI

Treatment of 1,2-diols with dichloro(phenyl)phosphine generates the corresponding 2-phenyl-1,3,2-dioxaphospholane containing a strained heterocyclic ring. If the substituents on the diol are sterically bulky the carbon-carbon bond in the phospholane should undergo thermolysis readily. Phospholanes containing both bromine and phosphorus have been synthesized and fully characterized. The thermal stability of these compounds has been assessed using thermogravimetry. These compounds decompose at modest temperatures to generate a diradical capable of initiating styrene polymerization.

[5]

Raman Spectroscopy of Biodiesel Production

Michael Todd, Brian Hales, Gordon Grzybowski, Mary Beth Seasholtz, and Dale LeCaptain
Department of Chemistry, Central Michigan University, Mount Pleasant, MI

Biodiesel is a product of the transesterification of vegetable oils and animal fats. Oil and alcohol and reacted in the presence of an acid or base catalyst to produce biodiesel (alkyl monoesters). Monitoring reaction conditions is an integral part of production if continuous reaction conditions are to be used. In order to effectively control the reaction the concentrations of the starting materials need to be monitored during the reaction. Raman spectroscopy was used to monitor the concentrations of the soy bean oil, methanol, and the final biodiesel product during the reaction. The Raman spectra were inputted into chemometrics for data analysis. Raman and other spectroscopic methods provide a quick, easy, and nondestructive means of in process monitoring of the reaction.

[6]

A Nanotechnology Approach to Environmentally Benign Antifouling Coatings

Abhijit Sarkar,[1] Joseph Rousseau,[1] Claire Hartmann-Thompson,[1] S. Emery Scheibert,[2] Christopher Maples,[3] Joe Parker,3 John I. Scheide,[4] Paul Joyce,[5] and Petar R. Dvornic[1]

[1]Michigan Molecular Institute, Midland, MI; [2]Dendritech Inc., Midland, MI; [3]Gougeon Brothers, Bay City, MI; [4]Department of Biology, Central Michigan University, Mount Pleasant, MI; [5]Sea Education Association, Falmouth, MA

A novel approach to environmentally benign antifouling coatings was developed using hyperbranched polymer nanotechnology. The hyperbranched polymers included organo-inorganic hybrids prepared by siliconization of polyureas obtained by bimolecular nonlinear polymerization. They were crosslinked into hard and robust coatings using sol-gel chemistry involving moisture hydrolysis of alkoxysilanes and subsequent silanol condensation reactions. The coatings contained secondary-bonded biocides in their polyurea nano-domains encapsulated into organo-siloxane matrix. Their antifouling properties were evaluated in marine and fresh water environments while leaching studies and effects on the health of zebra mussels were studied in the laboratory. The results obtained showed that these coatings can perform as well as some of the best commercial competitors while significantly reducing biocide leaching into environment.

[7]

Reduce Biofouling of Reverse Osmosis Membranes by Surface Modification

Abhijit Sarkar, Adrian Merrington, Joseph L. Rousseau, Apurba Chakrabarti, Peter I. Carver, Tracy Zhang, Steven E. Keinath and Petar R. Dvornic
Michigan Molecular Institute, Midland, MI

The applications for reverse osmosis (RO) are numerous and varied. Desalination of seawater or brackish water for drinking purposes, wastewater recovery, food and beverage processing, biomedical separations, purification of home drinking water and industrial process water are some of these applications. However, membrane fouling caused by the growth of bacteria on the membrane surface often leads to significant permeate flux decline and loss of product quality in RO systems. Thus, prevention of biofouling of RO membranes has become most imperative. MMI has developed a unique coating system for RO membranes that make the surface extremely hydrophilic. This, in turn, provides protection of the RO membranes from biofouling. Most importantly, the increase in antifouling property via surface modification does not compromise the permeate flux and salt rejection efficiencies of the membranes. The preparation and morphology of surface modified RO membranes along with their dynamic properties will be reported.

[8]

The Atomic Comic: Student-made Storyboards and Animations in Chemical Education

Bernadette Harkness[1], Donald Southwell[1], and Brian Aldrich[2]
[1]Delta College, University Center MI; [2]Heritage High School, Saginaw MI

To encourage to general chemistry students to go beyond what they see in reaction flasks and what they write as symbols to what they think is happening on a more visual molecular-level, we have introduced storyboard and animation exercises that promote an increase in student understanding of chemical concepts and the connections between the macroscopic, symbolic and molecular views of chemistry. These exercises or "atomic comics" compelled students to incorporate the particulate view of matter, Lewis structure and bonding concepts simultaneously to give a pictorial molecular representation of the chemical reactions they observed in the laboratory. For the animations, an easy to use and freely downloadable program called Chemsense was used by the students to show the dynamic nature of the particles involved. Examples of student work will be presented as well as opportunities for visitors to experience the Chemsense program to create similar animations.

By the very nature of the storyboard or animation assessment, students will be increasing their connection from the macroscopic to the molecular view forcing them to assimilate all of the above criteria into their illustrations.

[9]

Comparison of a Charged Aerosol Detector with an Evaporative Light Scattering Detector for the Analysis of Surfactants and Other Polar Compounds

Bethany A. Bierlein and John T. Roy
Impact Analytical, Midland, MI

The analysis of solutions that contain surfactants such as household cleaners presents challenges for the chromatographer because a wide variety of surfactants may be in a product. Many of the surfactants that may be present do not have good chromophores for detection by an ultraviolet detector. As a result, other detectors are required for monitoring a chromatographic separation. An evaporative light scattering detector (ELSD) is one of the detectors that has been used for monitoring the separation of surfactants. Recently, a charged aerosol detector (CAD) has been introduced as a detector that is more sensitive than the ELSD. This project has compared the sensitivity of these two detectors for the analysis of surfactants and other polar compounds that may be found in cleaner products. The results that were obtained for this detector comparison will be presented.

[10]

Comparison of Columns for the Analysis of Polar Compounds by Liquid Chromatography-Mass Spectrometry

Matthew T. Hall and John T. Roy
Impact Analytical, Midland, MI

The analysis of solutions that contain surfactants such as household cleaners presents challenges for the chromatographer because a wide variety of surfactants

may be in a product. Many surfactants are polar molecules that do not have good retention for chromatographic separation. As a result, these compounds are poorly separated on standard reversed-phase chromatographic columns. Several different approaches can be used to achieve chromatographic separation prior to mass spectrometry. In the past, ion-pairing reagents have been used to afford more retention for polar compounds, but these reagents are not compatible with the mass spectrometer and these reagents are inconvenient to use.

Specialty columns have been recently introduced to provide more retention for polar compounds. Three different columns were examined in this study to determine column performance for the analysis of polar compounds and surfactants. These columns are targeted for applications that involve high concentrations of aqueous eluents that would cause phase collapse with ordinary reversed-phase chromatographic columns. A fourth column was evaluated for polar compounds by hydrophilic interaction chromatography (HILIC). The analysis of polar compounds by HILIC is analogous to normal phase chromatography with aqueous eluents, and this technique has received increased attention over recent years. The results that were obtained for these column comparisons will be presented.

[11]

Development of Novel Materials for High Power Lithium Ion Batteries

T. Gregory, M. Newsham, D. Brune, S. Tang, S. Webb,
M. van Heeringen, J. Anderson, M. Malanga
The Dow Chemical Company, Midland, MI

Lithium-ion batteries for high power applications such as cordless power tools and hybrid electric vehicles represent the fastest growing segment of the rechargeable battery market. Performance requirements for these applications are more challenging than those for the more mature high energy battery market for portable electronic devices. High power lithium-ion batteries must exhibit improved power density safety performance (particularly for large format batteries), and operating temperature range. This provides opportunities for material suppliers to develop improved components for lithium-ion batteries that directly impact the gaps presented by the emerging high power applications. While considerable effort has been devoted to discovery and development of new electrode materials for lithium-ion batteries, comparatively little emphasis has been placed on improved electrolytes and separator membranes. The Dow Chemical Company seeks to become a supplier of cost-effective, performance-advantaged separators and electrolytes to this industry through joint development activities with external partners as well as internal development programs using our considerable polymer, processing, organic synthesis and manufacturing expertise. This presentation will highlight these activities, focusing on battery material needs for the hybrid electric vehicle market, characteristics of improved materials, and paths to develop, test, and market such materials.

[12]

Proton-conducting Polyhedral Oligosilsesquioxane (POSS) and Cyclic Phosphazene Nanoadditives for Hydrogen Fuel Cell Proton Exchange Membranes (PEMs)

Claire Hartmann-Thompson,[1] Douglas L. Keeley,[1] Steven E. Keinath,[1] Peter I. Carver,[1] Ken Bruza,[1] Adrian Merrington,[1] Joseph Rousseau,[1] Denise M. Katona,[2] Pasco R. Santurri,[2] Joseph Mausar[2]
[1]Michigan Molecular Institute, Midland, MI; [2]Chemsultants International, Mentor, OH

Polyhedral silsesquioxane (POSS) and cyclic phosphazene nanoadditives functionalized with proton conducting sulfonic acid groups were synthesized and characterized by IR, NMR and mass spectrometry. These nanoadditives were then formulated into sulfonated polysulfone-based proton exchange membranes (PEMs). Relative to the industry standard, Nafion, the membranes showed improved dimensional stability and strength, and comparable proton conductivity.

[13]

One and Two-photon Fluorescent Polyhedral Oligosilsesquioxane (POSS) Nanosensor Arrays for the Remote Detection of a Broad Range of Analytes in Clouds, in Solution and on Surfaces

Claire Hartmann-Thompson,[1] Douglas L. Keeley,[1] Kathleen M. Pollock,[1] Petar R. Dvornic,[1] Steven E. Keinath,[1] Marcos Dantus,[2] Tissa Gunaratne,[2] Dale J. Lecaptain,[3] Thomas J. Randall,[1] and Michael J. Skiba[3]
[1]Michigan Molecular Institute, Midland, MI; [2]Department of Chemistry, Michigan State University, Lansing, MI; [3]Department of Chemistry, Central Michigan University, Mount Pleasant, MI

A series of polyhedral oligosilsesquioxane (POSS) nanosensors functionalized with fluorophores that change their wavelength of emission in response to their chemical environment has been synthesized and characterized by IR, NMR, UV, one- and two-dimensional fluorescence spectroscopy, MALDI-TOF MS and electrospray MS. When each nanosensor in an array of *n* nanosensors is functionalized with a different wavelength shifting fluorophore, the array can generate a unique fingerprint comprised of *n* emission wavelength data points $\{\lambda_1, \lambda_2, \lambda_3, \ldots \lambda_n\}$ in response to a given chemical warfare agent (CWA) simulant or toxic industrial chemical (TIC). One-photon fluorescence fingerprints were constructed by measuring the fluorescence spectra of nanosensor-analyte pairs in solution. Two-photon fluorescence fingerprints were then generated by remotely interrogating nanosensor-analyte pairs using a femtosecond IR laser and a remote fluorimeter. Two-photon fingerprints were obtained for analytes in solution, on a surface and in cloud form. The array could differentiate a homologous series of alcohols, and could also distinguish G and VX classes of nerve agent simulant.

[14]
Investigation of Amphiphilic PAMAM Dendrimers as Components in Biomimetic Interfaces

Tracy Zhang, Steven N. Kaganove, and Petar R. Dvornic
Michigan Molecular Institute, Midland, MI

Living cells carry out many vital functions using membranes that consist mainly of a lipid bilayer and membrane proteins. These functions can be reproduced in the laboratory using biomimetic interfaces, whose structure mimics that of a cell membrane. Monolayers fabricated from amphiphilic PAMAM dendrimers have excellent potential as a component of biomimetic interfaces due to their well-defined, monodisperse architecture, and controllable nanoscaled thickness of fabrication. Six PAMAM generations with three different hydrophobe attachment groups, as well as G2 and G4 PAMAM monodendrons with C_{12} hydrophobic tails were synthesized, fabricated into Langmuir-Blodgett (LB) films, and studied as supports for phospholipid bilayers. Selected amphiphiles deposited as LB films on mica and gold were probed by AFM and electrochemical impedance analysis, respectively. Because of their wedge-like shapes, the monodendron amphiphiles were found to pack more efficiently as LB. films, and consequently, functioned more effectively as supports for biomimetic interfaces.

[15]
Determination of Molecular Interactions of Succinic Based Plasticizers and PVC

Megan McCallum, Jason Smith, Fan Daming,
Dale LeCaptain, Choon Lee, and Dillip Mohanty
Department of Chemistry, Central Michigan University, Mount Pleasant, MI

Recently plasticizers have been under increased scrutiny. The most commonly used plasticizer for PVC, di-(2-ethylhexyl) phthalate (DEHP), along with other phthalate plasticizers have been linked to many health and environmental problems and are produced from nonrenewable petroleum based sources. This problem has lead to the research of benign and effective plasticizers that are produced from bio-based materials, which are potentially cost competitive. These bio-based plasticizers are being synthesized from low molecular weight carboxylic acids and alcohols. This research uses FT-IR, TGA, and DSC to determine the interaction between the plasticizer and the PVC as well as identifying the molecular functionality responsible for the interaction.

[16]
Mid Michigan Technician Group in 2006

Deb Mendrick,[1] Dana Fuerst[2]
[1]Biocides Process Research and Development, Dow Chemical Company, Midland, MI; [2]Inorganic Chemistry & Catalysis, Dow Chemical Company, Midland, MI

Although Mid Michigan Technician Group (MMTG) had another very challenging year in 2006, it was still a very successful year. MMTG held two lunchtime seminars. The first seminar featured Gene Anderson and was titled *Endings, Beginnings—And Bumps In Between;* followed by a demonstration of radio con-

trolled airplanes and helicopters by the Midland Radio Control Modelers Club. In conjunction with the Central Regional Meeting, we also had a dinner talk hosted by Annie Walker titled *Bragging Rights for Technicians*.

MMTG was also very active in public outreach programs, with members participating in National Chemistry Week, Sci-Fest 2006, Fall Scientific Day, and many chemistry demonstrations at local fairs and schools. We also participated in the Salvation Army's Adopt-A-Family program.

MMTG strives to provide chemical technicians with opportunities to learn, develop and expand their life skills.

[17]

Development of Advanced sp^3 Carbon Materials as an Electrocatalyst Support for PEMFCs

Ayten Ay,[1] Vernon M. Swope,[1] and Greg M. Swain[1]
[1]Department of Chemistry, Michigan State University, East Lansing, MI

The objective of this study was improving properties of dimensionally stable, high surface area and electrically conducting diamond powder (DP) as an advanced electrocatalyst support materials for PEMFCs. Microstructural and morphological suitability of conductive DP for the use of electrocatalyst support was assessed by surface area measurements (Brunauer-Emmett-Teller (BET) method), Raman spectroscopy and scanning electron microscopy (SEM). Raman spectroscopy and BET results show that from 8-12 μm to 100 nm diameter size DP can be successfully coated by boron doped layer via microwave plasma-assisted chemical vapor deposition (CVD) with surface area of 8-52 m^2/g. Anodic polarization at 1.4 V vs. Ag/AgCl for 30 min in acidic media at 80°C was performed in comparison with glassy carbon powder (GC) and Vulcan powder with Nafion binder to test morphological and microstructural stability. The total charge passed during polarization was largest for the Vulcan (880 mC/mg) and smallest for conductive diamond powder (1 mC/mg). SEM images taken of conductive diamond powder after polarization showed no evidence of microstructural degradation, while significant morphological and microstructural changes were seen for the GC and Vulcan powder.

Electrochemical properties of well packed conductive DP without binder was recorded for $Fe(CN)_6^{3-/4-}$ redox system. ΔEp values of 60-70 mV at 100 mV/s were similar like high-quality microcrystalline boron-doped diamond thin-film electrodes. ΔEp values are indicator of high boron doping level, better particle-particle connectivity which increases the charge carrier mobility.

[18]

Conductive Diamond Powder: A New Electrocatalyst Support Material for the Polymer Electrolyte Membrane Fuel Cell

V. Matt Swope and Greg M. Swain
Department of Chemistry, Michigan State University, East Lansing, MI

An ideal electrocatalyst support for a polymer electrolyte membrane fuel cell (PEMFC) should have good electrical conductivity (>10 S/cm), high surface area (≥100 m^2/g), chemical stability in acidic environments, and thermal stability up

to 150°C. Carbon blacks currently used as the PEMFC electrocatalyst support undergo degradation that leads to loss of performance and reduction in fuel cell lifetimes. The goal of this research is to develop a high surface area, corrosion resistant, electrically conductive material for use as the electrocatalyst support. To achieve this, we are taking readily available industrial grade diamond powder and overcoating it with a thin layer of conductive boron-doped diamond (BDD) by chemical vapor deposition.

Previously we reported synthesis of ~ 1 m^2/g conductive diamond powder. We now demonstrate preparation of higher specific surface area BDD powders ranging from 8 to 52 m^2/g. Additionally, electrical resistance measurements show these powders are as conductive (2.4 S/cm) as Vulcan XC-72R carbon black powder. Cyclic voltammetric i-E curves for $Fe(CN)_6^{3-/4-}$ were recorded to evaluate the electrochemical properties of the BDD powder. *In situ* Raman spectroscopy combined with anodic polarization in 0.1 *M* perchloric acid at 2.0 V vs Ag/AgCl was performed to evaluate the morphological and microstructural stability of the BDD powder.

Concurrent to this work we are decorating these BDD powders with Pt for incorporation into a polymer electrolyte membrane assembly.

[19]

Determination of Norepinephrine Levels in Different Chambers of the Rat Heart by Capillary Electrophoresis Coupled with Amperometric Detection.

M. Novotny, D. Babankova, E.A. Wehrwein, D.L. Kreulen, G.M. Swain

A sensitive, reliable and stable method for detecting norepinephrine (NE) in the different compartments of a rat heart was developed. The regional distribution of NE in the left and right ventricle, ventricular septum and left and right atrium was determined by capillary electrophoresis with end-column amperometric detection (CE-EC). Keys to the method were an optimized SPE procedure for sample clean-up and the application of a diamond microelectrode for sensitive, reproducible and stable detection. Three animal models were used in this work: control (normotensive), sham (normotensive) and DOCA-salt (hypertensive). A linear dependence between the oxidation current and the NE concentration was obtained with a correlation coefficient of 0.999. The limit of detection was 51 nM (0.05 pg, S/N=3). Solid phase extraction (SPE) using an Oasis MCX, mixed-mode cation-exchange and reversed-phase polymeric sorbent, was applied prior to separation. An NE recovery of 95.1% (5.6%, n=6) was obtained. The NE concentration in the atria was 3-5 times higher than in the ventricles and the ventricular septum of control rats. The effect of the neurotoxic agent, 6-hydroxydopamine (6-OHDA), on NE levels in heart was also investigated. 6-OHDA treatment significantly reduced NE in the left ventricle, right ventricle and ventricular septum, while in left and right atrium only moderate reduction of NE concentration was observed. The method was also used for the determination of NE levels in surgically sympathectomized rat hearts.

[20]
Synthesis and NMR Characterization of Platinum(II) Complexes Based on Salicylic Acid and Its Derivatives

Gary W. Wilks,[1] Ryan D. Paul and Minghui Chai[2]
Department of Chemistry, Central Michigan University, Mt. Pleasant, MI
[1]Summer research student from John Glenn High School, Bay City, MI;
[2]Corresponding author and advisor for the research

Cisplatin has been a revolutionary drug for cancer treatment since its FDA approval in 1978. However, it is also harmful to the patient because of its nephrotoxicity, neurotoxicity and ototoxicity, leading to discomfort side effects such as nausea, vomiting, alopecia, hypomagnesaemia and hypokalaemia, etc. during the cancer treatment. This research aims to make a safe and effective chemotherapy using salicylic acid and its derivatives to coordinate with platinum (II) ions to form complexes as cisplatin analogs. In this work, we synthesized Pt(II) complexes with salicylic acid and methyl salicylate. A novel salicylate dendrimer is also considered as the potential ligand for the coordination. These compounds are relatively safe since Aspirin, a commonly used antiflammatory drug is the acetyl derivative of salicylic acid and the oil of wintergreen, a flavoring agent is the methyl ester of salicylic acid. The dendrimer was synthesized using salicylate, glycerol and succinic acid through ester bonds, which are biocompatible building blocks and biodegradable (hydrolysable) linkages. Therefore the salicylic acid based chemotherapy can be expected as a potential safe and effective cancer treatment. NMR spectroscopy has been used to characterize the ligands and their complexes with Pt(II) ions.

[21]
Determination of Anandamide in Mouse Kidneys by RP-HPLC with UV Detection

D. Babankova,[1] Y. Wang,[2] D.H. Wang,[2] and G. M. Swain[1]
[1]Department of Chemistry, Michigan State University, East Lansing, MI
[2]Department of Medicine, Michigan State University, East Lansing, MI

The transient receptor potential vanilloid type 1 (TRPV-1) channels are expressed in sensory nerves and, when activated, released potent vasodilating neuropeptides to regulate cardiovascular function. This action functions in a compensatory manner to counteract elevated blood pressure in salt-sensitive hypertension. Capsaicin is a selective exogenous agonist for TRPV-1 channels, and other endogenous agonists have been proposed to activate TRPV-1. Anandaminde is an endogenous agonist for the cannabinoid receptor and it has been reported that this molecule is also an agonist for TRPV-1. This research tested the hypothesis that anandamide levels are elevated in the DOCA-salt model of hypertension.

The level of anandamide in the mouse kidney tissue was determined using HPLC with UV detection at 204 nm. The HPLC separation was accomplished with a Discovery BIO Wide pore (C18) column with gradient elution (mobile phase A: 0.1% acetic acid, B: acetonitrile with 0.1% acetic acid). Anandamide was extracted from the mouse kidneys according to the method of Folch. The recovery was 77.2 ± 4.7%. The calibration curve for standard anandamide was linear over

the range of 3–575 pmol (R^2 = 0.999). The limit of detection was 350 fmol per injection (S/N=3). Four different groups of mouse kidneys were investigated. The anandamide concentration was 60.5 ± 14.6 pmol/g tissue (n=7) in wild type control mouse kidneys, 95.2 ± 33.6 pmol/g tissue (n=5) in TRPV-1-null control mouse kidneys, 93.5 ± 17.1 pmol/g tissue (n=4) in wild type DOCA-salt mouse kidneys, and 362.8 ± 124.4 pmol/g tissue (n=4) in TRPV-1-null DOCA-salt mouse kidneys.

[22]

The History of the National Chemical Technician Award

Janet Smith
Department of Chemistry, Saginaw Valley State University, University Center, MI

This poster will highlight the history and criteria of the National Chemical Technician Award (NCTA), recipients of the award, and their contributions to the chemical enterprise. It will focus on the three local recipients from the Midland Section.

[23]

Electrochemical Studies of Horse Heart Cytochrome *c* on Boron-Doped Diamond Electrodes

Yingrui Dai and Greg M. Swain
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Electron-transfer reactions play an important role in many biological processes. Cytochrome *c*, a relatively small (12,384 Da), water-soluble protein that functions as an electron carrier in biological respiration and photosynthetic processes, has been studied extensively as a model system for biological electron transfer. Normally, modified electrodes are required for fast heterogeneous electron transfer with the protein. However, preliminary work a few years ago in our laboratory indicated the unmodified, hydrophobic diamond electrode functions well for the study of the direct electron transfer of this redox protein. We report on a more detailed investigation of the electrochemistry of this protein at the diamond electrode. Specifically, room temperature cyclic voltammetric data as a function of the diamond film morphology and surface chemistry, electrolyte composition and ionic strength, and pH will be presented. The key finding was that the most reproducible and reversible response was observed for the oxidized, hydrophilic nanocrystalline diamond electrode.

[24]

Effects of Pharmacological Agents on the Electrochemical Response for Norepinephrine at Carbon Fiber and Diamond Microelectrodes

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Norepinephrine is a neurotransmitter that can be measured amperometerically (i.e., an oxidation current) with a carbon fiber or boron-doped diamond micro-

electrode. In our laboratory, we record in vitro norepinephrine release from sympathetic nerves innervating mesenteric arteries and veins. We study the release and uptake mechanisms using specific drugs. Therefore, it is important to know if and how a particular drug affects the electrode response for norepinephrine. Two problems with the drugs are: (i) irreversible adsorption on the electrode that blocks sites involved in the norepinephrine oxidation reaction and (ii) electroactivity (i.e., oxidation) at the potentials used for norepinephrine detection. To this end, we investigated the effect of several drugs on the response for norepinephrine at a carbon fiber and boron-doped diamond microelectrode. These effects were studied by cyclic voltammetry in quiet solution that is with no convection. Our results show that cocaine, idazoxan and PPADS are not electroactive at the potentials used for norepinephrine detection and have little effect on the oxidation current response for norepinephrine. However, capsaicin, prazosin, yohimbine and UK 14,303 significantly affect the sensitivity of both microelectrodes. Norepinephrine can not be determined directly when prazosin is present in the medium. When UK 14,303 or yohimbine is present, norepinephrine can be determined but the electrode sensitivity is dramatically decreased. In the case of capsaicin, norepinephrine can be determined but at a lower than optimal detection potential in amperometric measurements and the sensitivity also decreases. These data demonstrate that direct effect of a drug on the electrode response sensitivity for a redox molecule of interest should be known before using electrochemical methods for monitoring.

[25]

Temperature-Dependent Changes in Norepinephrine Release and Clearance from Normotensive and Hypertensive Rat Arteries and Veins Using *in vitro* Continuous Amperometry and a Recording Diamond Microelectrode

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and the [3]Neuroscience Program, Michigan State University, East Lansing, MI

Norepinephrine (NE) is released from sympathetic nerves supplying arteries and veins. There are artery-vein differences in NE release and clearance mechanisms and these mechanisms are altered in hypertension. Electrochemical methods, specifically continuous amperometry, can be used to measure the local concentration of endogenous NE at the surface of a blood vessel as an oxidation current. Key to this measurement is the use of a diamond microelectrode because of the excellent response sensitivity, reproducibility and stability it provides.

We studied temperature-related (25-37°C) differences in release and clearance of NE in mesenteric arteries and veins in vitro. Tissues from sham and DOCA-salt hypertensive rats were studied. In sham tissues, the rise time and peak NE currents declined with temperature in arteries and veins, but veins showed greater temperature sensitivity. There were no temperature-dependent differences in rise time or peak NE currents recorded from arteries and veins from DOCA-salt rats. The decay of the NE current was prolonged by cocaine (blocks the norepinrephrine transporter, NET) in arteries but not veins. We conclude that control of NE release from peri-arterial nerves is more complex (temperature-sensitive) than in peri-venous nerves. Clearance of NE in arteries is NET-dependent

and cooling reduces NET activity. NE clearance in veins is diffusion dependent. DOCA-salt hypertension impairs NE release and clearance in arteries but not veins.

[26]
Assessing Student Understanding of the Nomenclature Rules in Organic Chemistry

David Baker
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An approach was devised to assess students' skills in how they understand and apply the standard rules of nomenclature in organic chemistry. Through a series of course exams it was possible to evaluate how students draw and name alkanes, alkenes alkyl halides, aromatic compounds and assign stereochemical centers. Using these results a series of classroom nomenclature tutorials tools were developed for use in organic chemistry course. These tutorials were integrated with a modified educational strategy to provide students with prompt feedback of their own understanding and comprehension of nomenclature.

[27]
ACS Election Procedures Need Revision

Wendell L. Dilling
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The results of the recent four-way election for ACS president-elect show one of the reasons why ACS election procedures should be revised. The extra expense and work required for the runoff election could have been avoided if multiple-choice voting (instant runoff) had been used. All that would have been required was a second- and third-choice by each voter. Also a separate runoff election could have been avoided in the 2004 District IV Director election. A second problem with ACS elections involves directors-at-large. A majority vote was not required for their election. Two recent examples where candidates won election with less than a majority, 47% and 44%, occurred in 2004. A bylaw amendment was recently (3-07) enacted to correct the problem of director-at-large elections by less than majorities. However, this amendment still does not correct all possible situations. If two directors are being elected from four or more candidates, the amendment allows a director to be elected by less than a majority. All these problems could be solved with bylaw amendments that allow multiple-choice votes for *all elected offices* according to the following formula: C – E = N, where C is the number of candidates, E is the number of candidates to be elected, and N is the number of choices a voter can make. Examples of various voting scenarios are shown.

[28]

Copper(I) Catalyzed Photocycloaddition Reactions—A Review

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The title reactions have been used numerous times to isomerize or dimerize simple olefins to cyclobutane derivatives. These reactions have also been employed as key steps in natural product syntheses. Early procedures employed copper(I) halides, but later copper(I) triflate was shown to be superior in both yields and processing ease. A neighboring hydroxyl group has been shown in some cases to direct the reactions stereoselectively. Compounds studied include 1,5-cyclooctadiene, norbornene, norbornadiene, *endo*-dicyclopentadiene, cyclopentene, allyl alcohol, various hydroxy-1,6-heptadienols and their polymethyl derivatives. α- and β-panasinsene and the isocomene carbon skeleton have been synthesized using copper(I) triflate catalyzed reactions as key steps. Some mechanistic studies are also reviewed.

[29]

Copper(I) Catalyzed Intramolecular Asymmetric [2 + 2] Photocycloaddition Reactions—Corrections to the Literature

Wendell L. Dilling
Department of Chemistry, Central Michigan University, Mt. Pleasant, MI

Diene derivatives of D-glucose and D-glyceraldehyde have been reported to undergo copper(I) triflate catalyzed intramolecular photocycloaddition reactions to give chiral nonracemic cyclobutane derivatives (Holt, D. J.; Barker, W. D.; Ghosh, S.; Jenkins, P. R. *Org. Biomol. Chem.* 2004, *2*, 1093-1097; Sarkar, N.; Nayek, A.; Ghosh, S. *Org. Lett.* 2004, *6*, 1903-1905). Problems with the stereochemical representation of the chiral nonracemic compounds in these papers are examined.

[30]

Model Reactions for the Synthesis of Fuel Cell Membranes

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Department of Chemistry, Central Michigan University, Mt. Pleasant, MI

A program to generate novel and useful polymeric membrane materials for the production of hydrogen fuel cells is underway. Several model reactions which may be used to generate components for such a system have been optimized. For example, the treatment of a phenyl ether with succinic anhydride in the presence of a strong Lewis acid generates the corresponding *bis-phenone*. Both keto groups readily add Grignard reagents to form tertiary benzylic alcohols which readily dehydrate to generate the corresponding diene. Hydrogenation of the diene followed sulfonation of the phenyl groups and hydrolysis of the ether functions affords one monomer component of a suitable membrane polymer.

[31]

Phospholane Precursors to Phosphorus Containing Polymers

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Department of Chemistry, Central Michigan University, Mt. Pleasant, MI

Reductive coupling of benzophenone affords the corresponding pinacol, 1,1,2,2-tetraphenyl-1,2-diol, in good yield. Treatment of this diol with a variety of phosphorus reagents generates the corresponding five-membered heterocycle containing phosphorus. For example, when (phenyl)dichlorophosphine is used as the reagent, pentaphenyl-1,3,2-dioxaphospholane is produced. This compound contains a labile carbon-carbon bond that undergoes smooth homolysis at 70°C to generate a diradical capable of initiating vinyl polymerization.

[32]

Synthesis of 1,2-(4-Bromophenyl)-1,2-(4-hydroxyphenyl)-1,2-ethandiol

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Department of Chemistry, Central Michigan University, Mt. Pleasant, MI

Suitably substituted diols are useful precursors for the generation of phospholanes which may be used in novel polymerization reactions. In this case, a diol containing reactive phenolic functionality as well as bromine is being prepared. The diol will serve as a base for the generation of phosphorus heterocycles which may function as a monomer in a variety of step growth polymerizations.

[33]

Midland Section NCW Chemistry Celebrations: Twenty Years Young!

Gretchen Kohl, Angelo Cassar, and Wendell Dilling
Midland Section ACS Governance, Midland, MI

The National ACS Office of Community Activities began the National Chemistry Week program in 1987, to celebrate the positive contributions that chemistry makes to our everyday lives. Members of Midland Section and a host of other volunteers have participated every year, from a modest beginning of putting on chemical 'magic shows' at area school classrooms, in the designated NCW 'week' to sustainable educational outreach initiatives in the Community. Today, in addition to Sci-Fest, an annual 'hands-on' Saturday science festival held during NCW at Delta College, we have launched a sustainable year-long teacher training program, a multi-country watershed water testing program and have activated interest in chemistry and science supported by the Chamber of Commerce of an area rural community. Major funding from area industry, matching grants from National ACS, community gifts in kind and of course thousands of volunteer hours are continuing to make this twenty-year program forever young.

[34]

NMR Characterization of Novel Priostar Dendrimers

Ewa K. Groski,[1] Zhiyuan Wang,[1] Minghui Chai,1[†] Michael A. Zhuravel,[2] Douglas Swanson,[2] Donald A. Tomalia,[2] and Sönke Svenson[2]
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[2]Dendritic NanoTechnologies, Inc., Mount Pleasant, MI

Priostar dendrimers are core-shell nanostructures with well-defined design and low polydispersity, which are synthesized in a cascade fashion around a core unit, emanating with high level of control over size, branching points and surface functionality. The ability of tailoring dendrimer properties to the needs of a drug makes them ideal carriers for drug delivery. In this study, multidimensional NMR techniques relaxation and diffusion NMR measurements have been used to characterize the structures of these novel priostar dendrimers with carboxyl groups on the periphery, which are very readily soluble in water. Through multidimensional NMR studies, the NMR resonance assignments of the dendrimers can be achieved. Then using relaxation and diffusion NMR measurements, the motion and size of the molecules can be probed.

[35]

Characterization of Novel Salicylate DrugTrees via Various Analytical Techniques

Nichole K. Nevorski, Zhiyuan Wang, Shengzhuang Tang, Stephen M. June, Bob A. Howell, and Minghui Chai
Department of Chemistry, Central Michigan University, Mt. Pleasant, MI

In this presentation, NMR spectroscopy including multidimensional NMR and diffusion NMR techniques was used to characterize a new class of dendrimers synthesized using biocompatible building blocks: succinic acid, glycerol and salicylic acid, through biodegradable ester linkages. GPC, MALDI-TOF-MS and UV-Vis analyses were also performed on these dendrimers. Unlike drug-dendrimer conjugation and encapsulation, these novel dendrimers are built up with salicylic acid entities in a cascade distribution from the core to the exterior. Thus the dendrimers themselves are intrinsic drugs or prodrugs, which are vividly named as drug-trees. The results from the analyses clearly indicated that the synthesized dendrimers have high purity and the expected structures.

[36]

Synthesis of Novel L-Dopa DrugTrees

Ryan Paul and Minghui Chai
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L-Dopa, a commonly used drug for treating Parkinson's disease, has known for its negative consequences such as nausea, vomiting, cardiac arrhythmias, involuntary movements, and confusion after a long chronic use. This is mainly due to its poor solubility in water. Creating a more water-soluble and controlled-release form of this drug could significantly reduce or eliminate these side-effects. This research is to synthesize novel dendrimers which incorporate L-Dopa entities

from the core to the exterior, vividly called DrugTrees. These dendrimers are designed to be biocompatible and biodegradable by using biocompatible building blocks such as succinic acid and glycerol via ester bonding. Integrating L-Dopa drug moieties in such a cascade structure could provide a new and more efficient means of drug-delivery.

[37]

Biodegradable Plasticizers Synthesis and Application for PVC

Smith, Jason; McCallum, Megan; Fan, Daming; LeCaptain, Dale; Young, Choon Lee; and Mohanty, Dillip
Department of Chemistry, Central Michigan University, Mount Pleasant, MI

Phthalates esters are currently being used as plasticizers but have been found to be toxic in medical equipment and can therefore effect an individual's health. These phthalate esters are typically produced from nonrenewable petroleum resources and are toxic to the environment upon disposal. Plasticizers are incorporated into polymers to increase their flexibility, softness, distensibility or workability, in particular for PVC. We are developing a biodegradable and benign plasticizer that has comparable or better performance then phthalate compounds but without hazard to human beings or the environment. In this work, we present the synthesis, characterization, and application of a novel and potentially non-toxic alternative plasticizer based on amino acid starting materials.

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Important Dates on the ACS Midland Section Calendar

Oct. 8 Midland Section board meeting, MidMichigan Innovation Center, 7:00 p.m., Core Conference Room, Directions (Dee Strand, dastrand@dow.com)

Oct. 8 Charles K. Deak, C.K. Deak Technical Services, Inc., ACS Tour Speaker, "Forensic Chemistry and the Private Sector," Dow Science Building, Rm 102, Central Michigan University, 4:00 p.m. (Minghui Chai, chai1m@cmich.edu)

Oct. 19 Fall Scientific Meeting, Midland Center for the Arts, 11:00 a.m.–5:00 p.m., Social, Main St. Sports Pub, 5:15–6:30 p.m., Speakers Dinner, Tuscany Hall, 7:00 p.m. (Dale Meier, meier@mmi.org)

Oct. 27 Sci-Fest, Delta College Pioneer Gym, 10:00 a.m.–2:00 p.m. (Dave Stickles, dstick44@chartermi.net)

Nov. 5 Deadline for December issue of The Midland Chemist

Nov. 12 Midland Section board meeting, MidMichigan Innovation Center, 7:00 p.m., Core Conference Room, Directions (Dee Strand, dastrand@dow.com)

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