THE MIDLAND CHEMIST

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YCC Social Event – How to Make the Perfect Cup of Coffee, May 20

Abrin Schmucker, Younger Chemists Committee

You are invited to join the Younger Chemists Committee (YCC) at the Live Oak Coffeehouse (711 Ashman Street, Midland), on Saturday afternoon, May 20, 1:00-3:00 PM, for an afternoon with Angelo Cassar of roasting, brewing, and learning the art and science behind making the perfect cup of coffee for your individual palette.

Pre-registration is required by Monday, May 15, by going to https://occ.sn/tq2vtdww and signing up. Please note that this event has a $5 cover charge per person, and all are welcome. For more information, see Live Oak Coffeehouse Facebook page, or contact Abrin Schmucker, YCC Chair, at ALSchmucker@dow.com.

48th Central Regional Meeting (CERM 2017), June 6-9

Steve Keinath, Co-Editor, The Midland Chemist

This is just a quick reminder to everyone not to forget about the upcoming 48th Central Regional Meeting (CERM 2017) being held in Dearborn, MI, on June 6-9, 2017.

For more information, please see the CERM 2017 home page at http://acscerm2017.org/.

To register to attend CERM 2017 and its associated events, please go to http://acscerm2017.org/register/.

Finally, the full program for CERM 2017 can be found at http://acscerm2017.org/programs/.

Join us for an afternoon of roasting and brewing coffee to learn the art and science behind making the perfect cup of coffee for our individual palette.

PRESENTED BY ANGELO CASSAR,
HOSTED BY LIVE OAK COFFEEHOUSE AND YOUNGER CHEMIST COMMITTE OF THE AMERICAN CHEMICAL SOCIETY
1-3 PM SATURDAY, MAY 20, 2017
LIVE OAK COFFEEHOUSE

Pre-registration is required by May 15th at https://occ.sn/tq2vtdww. There is a $5 cover charge.

ACS Chemistry for Life®

LIVE OAK coffeehouse

YCC

Mid-Michigan AIChE to Hold Spring Banquet Featuring Gene Anderson, May 23

Tom Gregory, Past-Chair, AIChE

Mark your calendar! The Mid-Michigan Section of the American Institute of Chemical Engineers (AIChE) cordially invites you to attend their annual Spring Banquet on Tuesday, May 23, 2017. Our special guest speaker for the evening will be Gene Anderson, speaking on the topic, *Life Is Too Important to Be Taken Seriously*.

Where:

Great Hall Banquet & Convention Center, Valley Plaza Resort, 5221 Bay City Road, Midland
Phone: 989-496-2158

Agenda:

5:30 – 6:00 PM, Social time with cash bar
6:00 – 7:55 PM, Dinner and awards program
8:00 – 8:45 PM, Gene Anderson, guest speaker

Menu:

- Chicken Breast with Marsala Wine & Mushroom Sauce
- Slow-Cooked Beef Brisket with Coca-Cola BBQ Sauce
- Garlic & Chive redskin potatoes, penne pasta with alfredo, sautéed zucchini and yellow squash, classic Caesar salad, romaine salad with raspberry vinaigrette, tomato salad with fresh mozzarella, onions, olives, and basil pesto

Cost:

$30 per person for AIChE members and one guest per member, $40 per person for non-members.

If you plan to attend the Spring Banquet, please RSVP to Bruce Holden, Secretary, Mid-Michigan AIChE, at bsh0@hotmail.com by 5:00 PM on Tuesday, May 16. You may pay at the door the evening of the event, with cash or a check made payable to Mid-Michigan AIChE.

Note: If you make a reservation but then do not attend the event, AIChE will still need to charge you for the cost of the dinner to recover our costs. Thank you.

Photo of 2017 Midland Section ACS Officers, Board Members, and Other Local Section Leaders

Steve Keinath, Co-Editor, The Midland Chemist

Photo of the members of the 2017 Midland Section ACS leadership team taken at the Monday, March 6, 2017 Board meeting held at the Midland Center for the Arts.

Far left (left to right): **Bob Howell**, Director; and **Wendell Dilling**, Director.

Front row (left to right): **Tina Leaym**, Councilor; **Gina Malczewski**, Director; **Michelle Rivard**, Treasurer; **Anne Kelly-Rowley**, Chair; and **Dale LeCaptain**, Councilor.

Middle row (left to right): **Aswini Dash**, Director; **Tami Sivy**, Alternate Councilor; **Beata Kilos**, Director; **Wendy Flory**, Chair, Nominations & Elections; **Tamlin Matthews**, Membership Chair; and **Tom Lane**, Ex Offico Director.

Back row (left to right): **Wenyi Huang**, Chair-Elect; **Kshitish Patankar**, Secretary; **Steve Keinath**, Alternate Councilor; **Kevin Wier** (partly hidden), Director; **Dave Stickles**, Director; and **Pat Smith**, Director.

Officers and Board members missing from the group photo: **Jaime Curtis-Fisk**, Past Chair; and **Michelle Cummings**, Director.

Chemists Without Borders Is Working on a Model to Solve the Arsenic Contamination Problem in Bangladesh

Ronda Grosse, Board Member, Chemists Without Borders

As many in the Midland Section know, Bangladesh suffers from arsenic contamination of drinking water in many regions of the country. The problem began in the 1970s when international organizations and the Bangladesh government started constructing tube wells to collect water from the deeper aquifers. This was done because some of the surface water, ponds and rivers had bacterial contamination. It seemed like a viable solution at the time, but 20 years later it was discovered that many people were getting sick from arsenic-contaminated water being drawn from the deep tube wells. Even today, after much work to alleviate the problem by the Bangladesh government and international organizations, an estimated 43,000 people die each year due to illnesses caused by arsenic poisoning.

Why has the problem been so difficult to solve? The primary challenge is the number of community tube wells that were constructed, about one million, and the cost of replacing all of the contaminated wells. Since 2014, Chemists Without Borders (CWB) has been working on arsenic awareness and replacing contaminated wells at several high schools in Bangladesh. Now CWB has a model that may be a practical solution to the problem nationwide. It is being implemented in one region, Sitakunda Upazila, near the city of Chittagong, with 400,000 residents. CWB is concentrating on getting safe water to local high schools. The cost is very low compared to replacing all of the contaminated community wells (one million community wells compared to about 7,000 high schools).

Ring Well

The solution may be a ring well that brings up uncontaminated water from an aquifer near the surface, or it could be equipment that removes arsenic and other contaminants from the water.

Arsenic Removal Equipment

CWB then proposes to use the high schools as distribution hubs, delivering water for drinking and cooking to homes (only a small quantity is needed; other water uses can be from the normal wells). Drinkwell Systems has developed this business model which they are using at several installations in India and at one in Bangladesh.

If CWB can demonstrate that this model provides safe drinking water to the residents of Sitakunda Upazila, it could be used as a template to offer a low cost solution to the arsenic contamination problem nationwide in Bangladesh. Chemical expertise is essential, since accurate measurement of arsenic and other contaminants depend on proper collection and testing procedures. The chemical behavior of these contaminants in water is complex. However, except for a few chemists and managers to oversee the project, all of the work can be done by students and young adults. University students and recent graduates are educating and training high school students. Then the high school students test the community wells near their schools and inform their families and neighbors. A small fee will be paid for the water home delivery. We are enabling the power of youth to help resolve a critical health problem that has persisted for a generation in Bangladesh.

Delivery Vehicle for Water Home Delivery (photo credit: http://drinkwellsystems.com)

Anyone interested in receiving more information, or who would like to work on the project, or provide financial support, please contact Ronda Grosse at rondagrosse@chemistswithoutborders.org. Thank you!

Donald A. Tomalia Named a Fellow of AAAS

Submitted by NanoSynthons LLC, Mount Pleasant, MI

Donald A. Tomalia, CEO and Founder, NanoSynthons LLC and the National Dendrimer & Nanotechnology Center, has been named a Fellow of the American Association for the Advancement of Science (AAAS). Election as an AAAS Fellow is an honor bestowed upon AAAS members by their peers.

The AAAS awarded the distinction of Fellow to Donald A. Tomalia (Section on Chemistry) for his pioneering contributions to nanotechnology and nanomedicine, particularly the discovery of new dendritic macromolecular architectures including dendrimers, poly(oxazolines), and a nanoperiodic concept for unifying nanoscience.

Professor Barbara A. Schaal, 2016-2017 AAAS President, and Dean of the Faculty of Arts and Sciences, Mary-Dell Chilton Distinguished Professor of Biology, Washington University, St. Louis, congratulating Donald A. Tomalia for his being named a Fellow of the American Association for the Advancement of Science, at the 2017 AAAS Annual Meeting in Boston, MA, on February 18, 2017.

The American Association for the Advancement of Science (AAAS) has awarded the distinction of Fellow to 391 of its members this year. These individuals have been elevated to this rank because of their efforts toward advancing science applications that are deemed scientifically or socially distinguished. New Fellows were presented with an official certificate and a gold and blue (representing science and engineering, respectively) rosette pin on Saturday, February 18, 2017 at the AAAS Fellows Forum during the 2017 AAAS Annual Meeting in Boston, MA.

The tradition of AAAS Fellows began in 1874. Currently, members can be considered for the rank of Fellow if nominated by the steering group of their respective sections, by three Fellows, or by the Association's chief executive officer. Each steering group then reviews the nominations of individuals within its respective section and forwards a final list to the AAAS Council. The AAAS Council votes on the final aggregate list. The Council is the policymaking body of the Association, chaired by the president, and consisting of the members of the board of directors, the retiring section chairs, delegates from each electorate and each regional division, and two delegates from the National Association of Academies of Science.

For more information on the nomination process, visit http://www.aaas.org/aboutaaas/fellows/. A database of current AAAS Fellows, which does not include Fellows who have not maintained their AAAS membership, is available at https://www.aaas.org/elected-fellows.

The American Association for the Advancement of Science (AAAS) is the world's largest general scientific society and publisher of the journal, *Science* (www.sciencemag.org) as well as *Science Translational Medicine, Science Signaling,* a digital, open-access journal, *Science Advances*, *Science Immunology*, and *Science Robotics*. AAAS was founded in 1848 and includes nearly 250 affiliated societies and academies of science, serving 10 million individuals. *Science* has the largest paid circulation of any peer-reviewed general science journal in the world. The non-profit AAAS (www.aaas.org) is open to all and fulfills its mission to "advance science and serve society" through initiatives in science policy, international programs, science education, public engagement, and more. For the latest research news, log onto EurekAlert!, www.eurekalert.org, the premier science-news Web site, a service of AAAS.

Accompanying Biographical Information about Donald A. Tomalia

Dr. Tomalia is the CEO/Founder of NanoSynthons LLC and the National Dendrimer & Nanotechnology Center, Mount Pleasant, MI; Distinguished Visiting Professor (Chemistry Department), Columbia University, NY; Adjunct Professor (Department of Chemistry), University of Pennsylvania, PA; and Affiliate Professor (Department of Physics), Virginia Commonwealth University, VA. He received his B.A. in Chemistry from the University of Michigan and Ph.D. in Physical–Organic Chemistry from Michigan State University while working at The Dow Chemical Company (1962-1990). He has founded three dendrimer-based nanotechnology companies, namely: NanoSynthons LLC (2010), Dendritic Nanotechnologies, Inc. (2001), and Dendritech, Inc. (1992). Other positions currently held by Tomalia include: Advisory Board CLINAM*,* European Foundation for Clinical Nanomedicine; and Senior Scientific Advisor to the European Union CosmoPHOS Nano Project (2012-present). Dr. Tomalia also serves as Faculty Member, *Faculty 1000 Biology*; Associate Editor, *Journal of Nanoparticle Research* (Springer); Editorial Advisory Board, *Nanomedicine* (Elsevier), and *Current Bionanotechnology*.

He is the pioneering scientist/inventor credited with the discovery of poly(oxazolines) (Industrial Research-100 Awards in 1978 & 1986) and dendrimers. His 1979 discovery of dendrimers (dendritic polymer architecture) led to a third R&D-100 Award in 1991 and the Leonardo da Vinci Award (Paris, France) in 1996. He received the International Award of The Society of Polymer Science Japan (SPSJ) (2003) which recognized his discovery of the fourth major macromolecular architectural class, namely, *dendritic polymers*. He was the invited "Linus Pauling Memorial Lecturer" (2010) Portland, OR and recipient of the Wallace H. Carothers Award (American Chemical Society) (2012).

He has authored/coauthored over 265 peer-reviewed publications with more than 37,725 citations, an h-index=88 (Google Scholar, 2-2-17) and over 128 U.S. granted patents. Over 170 papers are focused in the dendrimer/dendritic polymer field including two monographs entitled: *Dendrimers and Other Dendritic Polymers* (J. Wiley) co-edited with J.M.J. Fréchet (2001) (over 1572 citations), and more recently *Dendrons, Dendrimers, Dendritic Polymers* (Cambridge University Press, 2012). His original dendrimer paper entitled: "A New Class of Polymers; Staburst/Dendritic", *Polym. J*., (1985), 17, (1), 117-132 has received over 3500 citations, whereas his review article entitled: "Starburst Dendrimers: Molecular Level Control of Size, Shape, Surface Chemistry, Topology and Flexibility from Atoms to Macroscopic Matter," D.A. Tomalia, A.M. Naylor W.A. Goddard III, *Angew. Chem. Int. Ed. Engl.*, 29(2), 138 (1990) has over 3,387 citations. Tomalia was

inducted into the *Thomson Reuters Hall of Citation Laureates in Chemistry* (2011) (i.e., top 40 most highly cited scientists in the field of chemistry).

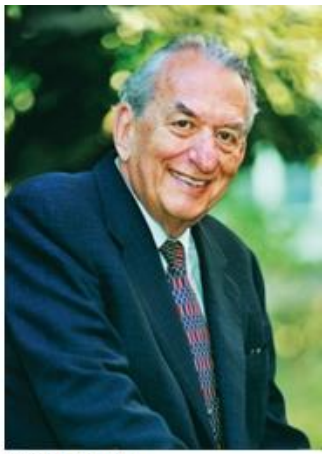
Tomalia is recognized as a pioneer in dendritic polymers and an international focal point for activities related to dendrimer-based nanotechnology and nanomedicine. His extensive studies on dendrimers provided a conceptual window to his recent development of a systematic framework for defining and unifying nanoscience. This concept is now accepted by both chemists and physicists as cited in "Developing Superatom Science" (*Chemical & Eng. News* (USA), April 15, 2013) and "In Quest of a Systematic Framework for Unifying and Defining Nanoscience" (*Modern Physics Letters B,* 28, (3), 1430002, 2014). This paradigm proposes the application of traditional first principles to discrete nano-building blocks (i.e., nano-element categories) which are found to behave much like picoscale atoms by exhibiting stoichiometries, heuristic surface chemistries, and nanoperiodic property patterns/relationships associated with traditional atoms ("A Systematic Framework and Nanoperiodic Concept for Unifying Nanoscience: Hard/Soft Nanoelements, Superatoms, Meta-Atoms, New Emerging Properties, Periodic Property Patterns and Predictive Mendeleev-like Nanoperiodic Tables," *Chem. Rev.*, 16, 2705-2774, 2016). Tomalia is now applying this nanoperiodic paradigm and many of these principles to nanomedicine (*J. Intern. Med.*, 276, 579-617, 2014) and advanced materials. These principles have been used to engineer the "critical nanoscale parameters" (CNPs) of dendrimers. This effort has recently led to the development of an unprecedented "hyperpolarizable dendrimer based film" that emits high quality terahertz radiation (*J. Biosens. Bioelectron*, (2016), 7, 1000196) suitable for constructing commercial terahertz spectrometers.

Editor's note: Donald A. Tomalia is a 46-year member of the American Chemical Society, and he was awarded the Midland Section ACS Award for "Outstanding Achievement and Promotion of the Chemical Sciences" in 1992.

George Olah Dies at Age 89

Chemistry Nobel Laureate advanced carbocation chemistry and championed alternative energy technology

Adapted from Mitch Jacoby, Chemical & Engineering News, Volume 95, Issue 11, p. 6, March 13, 2017.



George Olah
Credit: Mitch Jacoby/C&EN

George A. Olah, the Donald P. and Katherine B. Loker Distinguished Professor of Organic Chemistry at the University of Southern California and the recipient of the 1994 Nobel Prize in Chemistry, has died. He was 89.

Olah was a towering figure, physically and scientifically, who earned international chemistry fame 40 years ago for his novel use of "magic acid," a concoction of antimony pentafluoride and fluorosulfonic acid that is billions of times as strong as sulfuric acid, to prepare long-lived carbocations.

By extending the lifetimes of these fleeting species, Olah was able to probe them directly via NMR spectroscopy, X-ray photoelectron spectroscopy, and other methods. That work rapidly advanced and greatly popularized the study of reactive intermediates and organic reaction mechanisms. It ultimately led to Olah's receipt of the Nobel Prize.

In addition to research in fluorine chemistry, Olah and longtime USC colleague and scientific collaborator G.K. Surya Prakash recently focused on the chemical transformations needed to convert methane and carbon dioxide to methanol. They aimed to drive the so-called methanol economy, in which an inexpensive, abundant, and carbon-neutral supply of methanol could be widely used as an energy carrier.

In the drive to develop technology that underpins methanol use, the USC researchers developed a direct methanol fuel cell for generating electricity from methanol without first producing hydrogen. The team also developed catalytic processes for reducing the greenhouse gas carbon dioxide to methanol.

In an industrial development of this green technology, Carbon Recycling International began operating the world's first commercial CO_2-to-renewable-methanol plant in Iceland in 2012. Named in Olah's honor, the plant recycles 5,500 tons of CO_2 annually and produces some 5 million liters of methanol, which is used in gasoline blends.

In a 2005 interview with *C&EN* upon winning the Priestley Medal, the American Chemical Society's highest honor, Olah remarked that no award meant more to him than the ACS Award in Petroleum Chemistry, which he received in 1963 for his work on Friedel-Crafts chemistry related to refinery processing of crude oil.

Olah, who in 1963 had recently relocated from Hungary, said: "I was an unknown immigrant at that time. And for a young guy who came from a faraway country and started all over with nothing, it really was a significant honor. I still feel that way." ACS later renamed the award the George A. Olah Award in Hydrocarbon or Petroleum Chemistry.

Editor's note: Dr. Olah was a former Dow Chemical Company employee during the late 1950s through the early 1960s.

Upcoming Dates, Events, and Other Updates

- May 20 (1:00 – 3:00 PM) – Younger Chemists Committee (YCC) social event, *How to Make the Perfect Cup of Coffee*, with Angelo Cassar, Live Oak Coffeehouse, 711 Ashman Street, Midland. Pre-registration is required by going to https://occ.sn/tq2vtdww and signing up, $5 cover charge per person, all are welcome. For more information, see Live Oak Coffeehouse Facebook page, or contact Abrin Schmucker, YCC Chair, at ALSchmucker@dow.com.
- May 23 (5:30 – 8:45 PM) – Mid-Michigan AIChE Spring Banquet, Great Hall Banquet & Convention Center, Valley Plaza Resort, 5221 Bay City Road, Midland. Featuring guest speaker Gene Anderson who will give a talk on the topic, *Life Is Too Important to Be Taken Seriously*. Pre-registration is required by contacting Bruce Holden, Secretary, Mid-Michigan AIChE at bsh0@hotmail.com by 5:00 PM on Tuesday, May 16. $30 per person for AIChE members and one guest per member, $40 per person for non-members.
- May 24 (5:00 – 6:30 PM) – Midland Section ACS 100th Anniversary Celebration planning team meeting, MSU-Midland STEM Center (1910 West St. Andrews Road, Midland). For more information, or to volunteer, please contact Wendell Dilling at dilli1wl@cmich.edu or Gina Malczewski at reginamalczewski@gmail.com.
- June 5 (7:00 – 8:00 PM) – ACS Board meeting, MCFTA Board Room (in person), or via a WebEx conference call connection at Midland Section WebEx Board Meeting, meeting number/access code: 715 679 159, phone number: 989-633-1166.

- June 6-9 – 48th Central Regional Meeting (CERM 2017), Dearborn, MI. For more information, see http://acscerm2017.org/.
- June 7 (5:00 – 6:30 PM) – Midland Section ACS 100th Anniversary Celebration planning team meeting, MSU-Midland STEM Center (1910 West St. Andrews Road, Midland). For more information, or to volunteer, please contact Wendell Dilling at dilli1wl@cmich.edu or Gina Malczewski at reginamalczewski@gmail.com.
- June 21 (5:00 – 6:30 PM) – Midland Section ACS 100th Anniversary Celebration planning team meeting, MSU-Midland STEM Center (1910 West St. Andrews Road, Midland). For more information, or to volunteer, please contact Wendell Dilling at dilli1wl@cmich.edu or Gina Malczewski at reginamalczewski@gmail.com.
- July 5 (5:00 – 6:30 PM) – Midland Section ACS 100th Anniversary Celebration planning team meeting, MSU-Midland STEM Center (1910 West St. Andrews Road, Midland). For more information, or to volunteer, please contact Wendell Dilling at dilli1wl@cmich.edu or Gina Malczewski at reginamalczewski@gmail.com.
- July 19 (5:00 – 6:30 PM) – Midland Section ACS 100th Anniversary Celebration planning team meeting, MSU-Midland STEM Center (1910 West St. Andrews Road, Midland). For more information, or to volunteer, please contact Wendell Dilling at dilli1wl@cmich.edu or Gina Malczewski at reginamalczewski@gmail.com.
- August 7 (7:00 – 8:00 PM) – ACS Board meeting, MCFTA Board Room (in person), or via a WebEx conference call connection at Midland Section WebEx Board Meeting, meeting number/access code: 715 679 159, phone number: 989-633-1166.
- August 20-24 – 254th ACS National Meeting & Exposition, Washington, DC. For more information, see https://www.acs.org/content/acs/en/meetings/fall-2017.html.
- September 11 (7:00 – 8:00 PM) – ACS Board meeting, MCFTA Board Room (in person), or via a WebEx conference call connection at Midland Section WebEx Board Meeting, meeting number/access code: 715 679 159, phone number: 989-633-1166.
- October 2 (7:00 – 8:00 PM) – ACS Board meeting, MCFTA Board Room (in person), or via a WebEx conference call connection at Midland Section WebEx Board Meeting, meeting number/access code: 715 679 159, phone number: 989-633-1166.
- October 21 (Save the Date) – 2017 Midland Section ACS Fall Scientific Meeting (FSM), Saginaw Valley State University (Curtis Hall). For more information, or to volunteer, please contact Peter Bai, 2017 FSM Chair, at PJBai@dow.com.
- November 6 (7:00 – 8:00 PM) – ACS Board meeting, MCFTA Board Room (in person), or via a WebEx conference call connection at Midland Section WebEx Board Meeting, meeting number/access code: 715 679 159, phone number: 989-633-1166.
- December 4 (7:00 – 8:00 PM) – ACS Board meeting, MCFTA Board Room (in person), or via a WebEx conference call connection at Midland Section WebEx Board Meeting, meeting number/access code: 715 679 159, phone number: 989-633-1166.

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Volunteer Staff

Vickie Langer	Editor (vllanger@dow.com)
Steve Keinath	Editor (skeinath54@charter.net)
Greg Cushing	Webmaster, electronic distribution
Tamlin Matthews	Membership roster, hardcopy mailings

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