Special Elements of Excellence
WMU Department of Chemistry Newsletter

Chair's Welcome
William G. Rantz

Greetings,

As the interim chair of the Department of Chemistry at Western Michigan University, I would like to invite you to look through our first "Special Elements" newsletter, which encompasses many exciting initiatives on behalf of our faculty and students.

The Department of Chemistry has several major paths to success in the rewarding field of chemical sciences. If you are interested in graduate school or going into the chemical industry, you should examine our American Chemical Society Certified undergraduate degree program. Our biochemistry major is for students with an interest in health sciences (medicine, dentistry, nutrition, pharmacology, etc.) or a graduate degree in biochemistry or molecular biology. We also have majors that are business-oriented and for those with a teaching interest in secondary education.

We would like to thank everyone, both alumni and friends, who have recently contributed both time and money to the Chemistry Department. Your gifts, pledges, and endowments to the Chemistry Department have been a tremendous help in supporting many needs of the department and our students.

Please join us for the 10-year celebration of the dedication of our chemistry building on April 21, 2017. We will be unveiling the new lobby tiles of 6 new elements which were recently added to the periodic table. Chemistry Department Scholarships will also be awarded during an afternoon ceremony. Please see further details in the newsletter of all the events planned for April 21

The Chemistry Department is forming a new industrial advisory board for the 2017-18 academic year. This group of advisors will meet twice each year and work with our faculty and students to ensure our curriculum, internships, interview skills and laboratories are on the cutting edge. We plan to host an introductory meeting of interested industrial advisors prior to the 10-year celebration event.

Best wishes and we hope to see you soon,

Bill

10 Year Chemistry Building Celebration
8th Annual Research Chemistry Research Day & Spring 2017 Awards

April 21, 2017
Chemistry Building Lobby

- 11:30 am Industry Council Lunch RSVP: chem-info@wmich.edu or (269) 387-2845
- 1:00 pm Opening Remarks/Unveiling of the 6 New Elements
- 1:10 pm Insights from Senior Leadership
- 1:45 pm Research Poster and STEAM project viewing
- 3:45 pm Best Poster/Project Award
- 4:00 pm Award and Scholarship Presentations in 1220 Chemistry Building

The Science Behind Crafting Beer

On April 12 The Kalamazoo Area Mass Spectrometry Discussion Group and Thermo Fisher Scientific hosted a seminar on mass spectrometry and the science behind crafting beer. This event at Bells Brewery Eccentric Café brought 91 attendees together. The crowd represented a wholesome mix of those working in mass spectrometry or in the brewing industry and included professionals, students and other interested members of the public. Two presentations were presented providing a mixed taste of beer quality control and beer flavor innovation.

The first presentation was delivered by Dr. Barbara Dunn from the Department of Genetics at Stanford University and was entitled the "*Systematic Integration of "Omics" Data to Improve Innovation in Beer Crafting*". Dr. Dunn described how systems biology is used to study, for example, the differences between popular yeast strains used in the production of California Ale and Hefeweizen beer styles.

Dr. Luke Chadwick, Senior Scientist at Bells Brewery, presented on how the challenge to make a delicious beer consistently can be addressed by picking it apart at the molecular level. Dr. Chadwick presented an overview of the instrumentation used in a brewing laboratory and on the role of data in the quest for ever-increasing beer quality. He dazzled us with numerous rabbit holes of yet to be explored challenges faced by those who take a scientific approach to crafting quality beer.

Thermo Fisher Scientific demonstrated the use of the Gallery™ Plus Beermaster. This photometric analyzer provides automated efficiency in quality control measurements to help reduce costs and improve productivity in breweries.

For more information on ThermoScientific Mass Spectrometry Products, please contact giovanni.pallante@thermofisher.com

If you would like to be notified of future events by the Kalamazoo Area Mass Spectrometry Discussion Group, please send an email to andre.venter@wmich.edu.

The STEAM project: A collaboration between Chemistry and Art **Author: Andre R. Venter, PhD**

In the STEAM project (Science, Technology, Engineering, Art and Math), students from the Department of Chemistry and from the Gwen Frostic School of Art formed teams to create artful displays and compositions based on data collected after chemical analysis. During the project groups of 3-4 students were formed, each comprising of a member of the Chem Club, a music composition student and a sculpture student. The groups collected samples of coffee, beer or tea from businesses in the Kalamazoo community and these samples were then prepared using Solid Phase Micro Extraction (SPME) and analyzed by Gas Chromatography-Mass Spectrometry (GCMS). The compositions and Artwork will be displayed on April 7 in the Park Trades Center during the April ArtHop.

STEAM was recently featured by WMUK

http://wmuk.org/post/western-students-turn-chemistry-art

KALSEC Tour - An Insider's Look

By Erin K. Heath

Founded in 1958, The Kalamazoo Spice Extraction Company, or as it's better known, Kalsec is an international brand specializing in naturally derived food and beverage additives that got its start in, and is headquartered in, Kalamazoo, Michigan. In July 2016, I began an internship at Kalsec (something every chemistry major should look into) and soon thought to myself, "Why not bring along the Chem Club for a tour?" And so it became. Located on West Main, not far from Drake, the Kalsec property at first glance appears like a pastoral ranch; situated behind a white picket fence sealing in long ribbons of grass and dirt roads. In fact, much of the property is actually undeveloped land, filled with trees and small ponds, as compared with the space in which work is actually conducted. Our tour met inside the sensory evaluation room, where as it suggests, any kind of flavor or beverage is evaluated, through taste and smell, against a target. Such tests can be unpleasant so everyone who participates is awarded with a snack of their choosing as well as "sensory points" which can be used like store credit to buy vacation days or other things of value. From here we were led into the production facility to take a look at the machinery which accomplishes a bulk of the extraction and creation of products. Labyrinths of pipework angularly coiled along every wall, vat, drum, or scaffold in the primary extraction rooms making me awe at humanity's capacity to conceive instruments of complex design and bring it all together so as to extract the essential oils from 20,000 lbs. of raw material when operated. Another thing to note was how the smell changed from room to room, each new smell reflective of the massive variety of products Kalsec produces. The last place we were guided to was the research building where almost all lab work is conducted. We went first in to the applications kitchen, the space where experimental compounds are dosed in to food and beverages. While there, Howard, one of Kalsec's most veteran employees, described in detail the business that his pickle flavoring spice that he developed brought in. Next door lies the upstairs lab, a large space dedicated to the research of antioxidant, flavor, and color additives. Down a stairwell lie the Hops research, quality control, and analytical R&D labs. The analytical and QC labs were stocked with HPLCs, UPLCs, GCs, and many other analytical tools which are usually used to identify, and often quantitate, specific compounds from a variety of sample types whether from customers, the manufacturing plant, or one of the research team members. The array of analytes that the QC and Analytical receive is astonishing and even more so spectrum of compounds they can identify within. Our tour ended with a group photo in the parking lot.

Chemistry Club at Kalsec

New Faculty Specialist!

Robert Sutton received a position of Faculty Specialist the fall of 2017 in the Department of Chemistry at Western Michigan. This is a tenure track position where innovations in instruction are a component of consideration for tenure. He states "I am fortunate to be a member of the Gateway to Completion effort in the Department. This effort focuses on the implementation of current "Best Practices in Learning" in courses that have large enrollment and are key courses to program success. For my course in Chemistry for Health Professionals, a course for pre-nursing students, I have employed one of the best practices, "The Active Learning Practice". I placed the students in teams, where they share their understanding of a topic and come to an agreed upon conclusion. This fosters team work, something that is key in the health professions. It also helps build confidence that all students feel they belong in this course."

ACS Periodic Accreditation

The American Chemical Society stimulates excellence in chemistry by certifying bachelor's degrees. The certified bachelor's degree is designed to prepare students not only for a career in chemistry but also for the wide range of professional careers that now employ chemistry majors. The current ACS guidelines assure that students who pursue and graduate with an ACS accredited bachelor's degree have both a breadth and depth of *Chemistry Knowledge* along with *Experience* and *Skills* to provide them with the background for success in their careers in chemistry or related professions. In 2016 the Department of Chemistry successfully completed its periodic evaluation for compliance, a certification that has been maintained since 1959.

2017 Million Dollar Club

Dr. Megan Grunert Kowalske was recently recognized by President John Dunn and Provost Tim Greene as a member of the 2017 Million Dollar Club. This award is presented to principal investigators who have been awarded one million dollars or more in external funding over the past five years. Her National Science Foundation funded project, AGEP: BPR: Understanding URM STEM graduate students' identity integration and assimilation into a community of practice, examines the experiences of students from underrepresented minority (URM) groups as they pursue their doctoral degrees. The goals of the project are to identify ways to better support URM graduate students through university programs and resources, improved mentoring relationships, and an overall culture change in academia to be more inclusive of diverse researchers. Dr. Grunert Kowalske was also just awarded supplemental funds to support two undergraduate research students on this project for the summer. Steven Eddy and Alyssa Proper will join the research team for ten weeks and will present a poster to share their work on the project at the conclusion of their experience. Other members of the research team include Renee' Schwartz (co-PI, Georgia State University), Jocelyn Steinke (co-PI, Communications), Susan Stapleton (co-PI, Graduate College), Marisol Mercado Santiago (post-doctoral researcher), Tasia Bryson (graduate student), and Kristi Tullis (graduate student).

Frontiers in Chemistry Lectureship

For the past eight years the Frontiers in Chemistry Lectureship, co-sponsored by our community partners Kalexsyn and Zoetis along with the Department of Chemistry have invited over a dozen internationally recognized speakers in the fields of organic and medicinal chemistry. The lectureship not only provides a cutting edge scientific lecture, but also brings scientists who can offer something "out-of-the-box." In the development of the lectureship we envisioned that the out-of-the-box portion for each lecturer would be different based on some unique perspective they could offer the students, faculty, and the community within the field of science. The spring 2017 lecture was provided by Professor Justin Du Bois of Stanford University who presented a stimulating presentation on “Turning Toxins into Tools for the Study of Sodium Ion Channels”.

Fulbright Scholar in Denmark
Professor David Huffman

Professor David Huffman of the Biochemistry Division was at the University of Copenhagen in Denmark as a Fulbright Senior Scholar from August until February. David taught courses in the Department of Chemistry under the direction of Professor Morten Bjerrum in the area of bioinorganic chemistry. David also performed research in the Department of Plant and Environmental Sciences, Transport Biology Section, under the direction of Professor Michael Palmgren. There he worked with a team of scientists on metal transporting and proton transporting ATPases, enzymes that pump ions across biological membranes. David was using an advanced gene editing technique, CRISPR, which has potential for the treatment of genetic diseases. He also took advantage of the Center for Advanced Bioimaging there.

During breaks in teaching and research, David enjoyed visiting old churches and castles. He lived a ten minute walk from Frederiksborg Castle in Hillerød (photo), a structure rebuilt by J. C. Jacobsen after a devastating 1859 fire. Like the Danes, he got around on a bicycle and trains – you are allowed to take bikes on trains. He shares that it is a lot cloudier than Michigan but the temperature is milder due to the Gulf Stream. He says that everyone is friendly, but the spoken language is hard to learn.

David's appointment as a visiting scientist was extended until May 31, and he is continuing his collaboration with the research team there.

Recent Awards received by Students and Faculty of the WMU Department of Chemistry

Student Awards

2017 Presidential Scholar for the Department of Chemistry
- Jacob Kirkendall

Undergraduate Research Excellence Awards from the Office of Vice President for Research
- Christian Hartman working with Dr. Gellert Mezei
- Jacob Kirkendall working with Dr. Andre Venter

College of Arts and Sciences' Undergraduate Research and Creative Activities Award
- Emily Hanners working with Dr. James Kiddle
- Paige Poindexter working with Dr. James Kiddle

Graduate Student Research Grant
- Sarut Jianrattanasawat working with Dr. Elke Schoffers

Graduate Student Travel Grant
- Kelley Current working with Dr. Sherine Obare
- Jaliya Samarakoon working with Dr. Sherine Obare

2017 All-University Graduate Research and Creative Scholar Award
- Basil Ahmed working with Dr. Gellert Mezei

Faculty Awards

College of Arts and Sciences Discovery and Dissemination Award
- Dr. James Kiddle

University's Support for Faculty Scholars Award
- Dr. Andre Venter
- Dr. James Kiddle

2016-17 College of Arts and Sciences' Faculty Achievement Award for Part-Time Instructor Excellence in Teaching
- Dr. James Guzinski

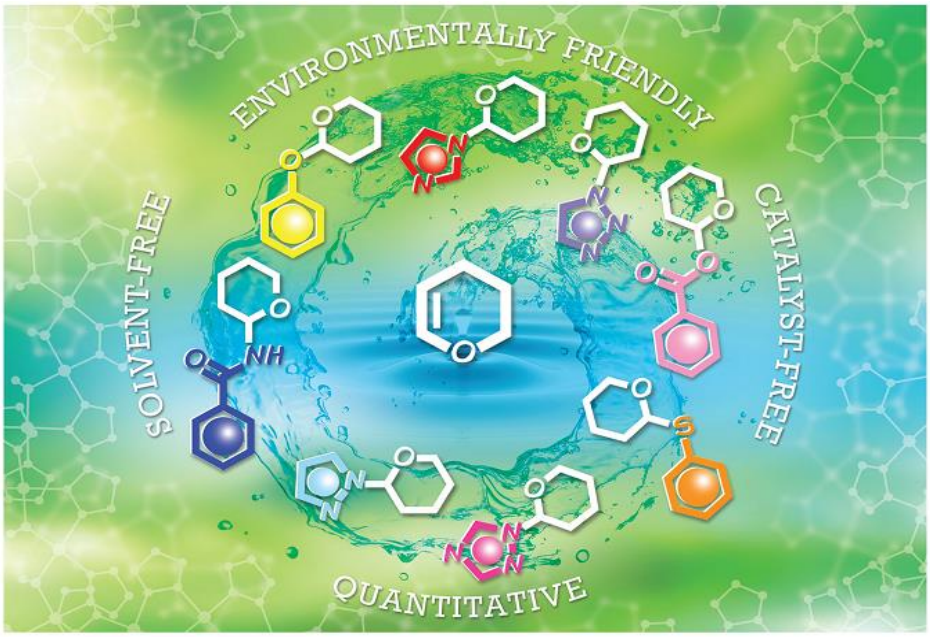
More Scholarships and Awards to come April 21, 2017

Scholarships
- Dr. Susan Burns Scholarship
- Frederick W. Stanley Jr. Memorial Chemistry Scholarship
- Lillian Meyer UnderGraduate and Graduate Scholarships
- Colonel Charles E. Bayliss Scholarship
- MPI Research Undergraduate and Graduate Scholarships
- Marc W. Perkovic Memorial Scholarships
- Lester Boyce Maile Endowed Scholarship
- Dr. Nagler Endowed Graduate Scholarship
- Dr. Berndt Endowed Graduate Scholarship
- Jensen Chemistry Scholarship

Awards
- William McCracken Award
- A.C.S. Kalamazoo Area Outstanding College Student Award
- American Institute of Chemistry Award
- CRC Press Freshman Chemistry Achievement Award
- A.C.S. Division of Organic Chemistry Award
- Chemistry Endowed Undergraduate and Graduate Awards
- Merck Award
- A.C.S. Analytical Award
- Adli Kana'an Award

Examples of Published Research from the Faculty of WMU Department of Chemistry

Dr. Gellert Mezei



Showcasing Research from the Group of Prof. Gellert Mezei at Western Michigan University, USA.

Solvent- and catalyst-free, quantitative protection of hydroxyl, thiol, carboxylic acid, amide and heterocyclic amino functional groups

A truly green method for the quantitative protection of various functional groups has been developed, using 3,4-dihydro-2*H*-pyran (DHP) under its own pressure at 125 °C. The new method requires no additional solvent or catalyst, needs no laborious work-up or purification, generates no waste products and allows for the protected substrate to be used in the same flask for telescoping synthesis.

As featured in:

See Gellert Mezei *et al.*, *Green Chem.*, 2016, **18**, 6209.

ROYAL SOCIETY OF CHEMISTRY

www.rsc.org/greenchem

Registered charity number: 207890

Dr. Yirong Mo

C–I···π Halogen Bonding Driven Supramolecular Helix of Bilateral *N*-Amidothioureas Bearing β-Turns

Jinlian Cao[†], Xiaosheng Yan[†], Wenbin He[†], Xiaorui Li[†], Zhao Li[†], Yirong Mo[‡§], Maili Liu[∥], and Yun-Bao Jiang[†]

[†] Department of Chemistry, College of Chemistry and Chemical Engineering, The MOE Key Laboratory of Spectrochemical Analysis and Instrumentation, Collaborative Innovation Center of Chemistry for Energy Materials (*i*ChEM), Xiamen University, Xiamen 361005, China

[‡] Department of Chemistry, College of Chemistry and Chemical Engineering, Xiamen University, Xiamen 361005, China

[§] Department of Chemistry, Western Michigan University, Kalamazoo, Michigan 49008, United States

[∥] Wuhan Institute of Physics and Mathematics, State Key Laboratory of Magnetic Resonance and Atomic and Molecular Physics, Chinese Academy of Sciences, Wuhan 430071, China

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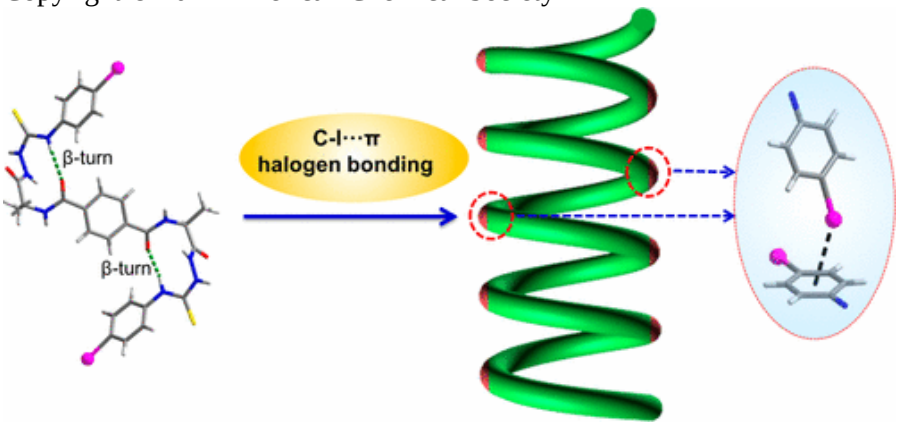

Abstract: We report the first example of C–I···π halogen bonding driven supramolecular helix in highly dilute solution of micromolar concentration, using alanine based bilateral I-substituted *N*-amidothioureas that contain helical fragments, the β-turn structures. The halogen bonding interactions afford head-to-tail linkages that help to propagate the helicity of the helical fragments. In support of this action of the halogen bonding, chiral amplification was observed in the supramolecular helix formed in acetonitrile solution. The present finding provides alternative tools in the design of self-assembling macromolecules.

Contact information:
Department of Chemistry
College of Arts and Sciences
1903 West Michigan Avenue
Kalamazoo, Michigan
49008-5413
(269) 387-2870
http://wmich.edu/chemistry/
http://www.facebook.com/wmuchemistry/