University of Minnesota Duluth
Chemistry and Biochemistry
Department Newsletter:
Summer 2015

transitions

in this issue

The Heart of our Educational Mission: Undergraduate and Graduate Students

This issue of Transitions is dedicated to our undergraduate and graduate students. They are bright, hard-working, and motivated students in our courses, engaged and creative partners in our research labs, and responsible teaching assistants and student employees who make it possible for us to serve so many students in our lecture and lab courses. We are honored to have them in our programs and thank them for bringing their energy and commitment to our mission. We have chosen an undergraduate and a graduate student for our front page article. You will find many other short pieces about our students in this issue of Transitions.

The department congratulates all of the members of the UMD Chemistry and Biochemistry Class of 2015. We are pleased to introduce **Kevin Hughes** of Aitkin, MN. Kevin graduated in May with departmental honors, a BS-Chemistry, and a BS-Biochemistry and Molecular Biology.

(continued on page 8)

Graduate students in our program do an excellent job managing multiple roles: master's student, graduate teaching assistant, and researcher. We value and thank them for their many contributions to our teaching and research programs. We are pleased to introduce current MS-Chemistry student **Amber Nelson-Porter** (BS-Chemistry and BS-Biochemistry and Molecular Biology 2013) of Rice Lake, WI.

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Dear Friends and Alumni of UMD Chemistry and Biochemistry,

The Chemistry and Biochemistry students, staff, and faculty warmly greet each of you. The focus of this issue of Transitions is on students, the reason we are here and the inspiration for the work we do. We are excited to introduce several undergraduate, graduate, and former students to you, and we know that there are many more whose accomplishments are equally distinguished (p. 1, 7-10).

2014-15 has been a year of exciting new appointments in the department! Two new faculty members, Dr. Alessandro Cembran and Dr. Katie Schreiner, and a new staff person, Ms. Christine Boisjoli joined us this past year (p. 4). We also selected our new department head, Dr. Elizabeth Austin-Minor, and assistant department head, Dr. Steve Berry (p. 3). In January 2016, analytical chemist Dr. Melissa Maurer-Jones will start her faculty position.

The faculty has been successful in securing research and major instrumentation grants and publishing and presenting numerous journal articles and presentations. Their scholarship has taken them all over the country and well beyond its borders. We congratulate Dr. Viktor Zhdankin who was selected by the Faculty of Science at Chiba University (Japan) to receive the 2014 Science Lectureship Award (p. 5). We continue to update our curriculum including efforts to incorporate more active learning into our courses (p. 11). Brian Gute's leadership in this work was recognized by his Experiments in Learning Innovation grant award (p. 11).

As you read this issue of Transitions, I will have completed my department head term. It has been an extraordinary privilege to work with wonderfully talented colleagues and contribute to the education of our students.

The work we do is enhanced by your generous support and we are extremely grateful to our alumni and friends. Your gifts allow us to provide more scholarships to deserving students (p. 14-15), a first-class undergraduate research program, support for our instructional labs, and graduate student support.

We will continue to work hard at what we do best – educating our students, discovering new knowledge, and providing leadership to the campus and the community. We fondly remember all of our graduates and are proud to hear about your achievements and successes. We welcome and look forward to showing you around the department. Please stay in touch by using the enclosed envelope to tell us what you are doing.

Best wishes,

Bilin P. Tsai
Professor

Dear Friends and Alumni of UMD Chemistry and Biochemistry,

It is with much excitement and some trepidation that I take on the role of Department Head. Excitement because the department is educating and graduating amazing students (fifty-eight undergraduates and eight master's students so far this year) (p. 16-17), pushing back the frontiers of knowledge (with thirty-nine publications in peer-reviewed journals, one book, and five book chapters) (p. 18-19), and making a difference in the northern Minnesota region (as shown by our popular Chemistry and Biochemistry Club presentations and the outreach work with Proctor High School students which led to them winning the Conrad NASA Competition). I have some trepidation as I will be taking over a major responsibility from Dr. Tsai, whose compassionate and competent leadership has led us through many changes as we have grown in the number of faculty, staff, and students involved in our programs. I would like to take this opportunity to thank Dr. Bilin Tsai for her extraordinary efforts on behalf of the Department of Chemistry and Biochemistry.

I hope that you enjoy reading through this copy of Transitions as much as I have. We will have many new and interesting things to share with you in our next issue!

Sincerely,

Liz Minor
Professor and Head

New Department Leadership:

Professor Elizabeth Austin-Minor and Associate Professor Steve Berry

Congratulations to Liz Minor and Steve Berry who have accepted the Department Head and Assistant Department Head positions, respectively! Their terms started on June 1, 2015 following the end of the three-year terms of Department Head Bilin Tsai and Assistant Head Liz Minor.

Liz grew up in the state of Virginia and earned a B.S. in Chemistry in 1992 from the College of William and Mary and a Ph.D. in Marine Chemistry and Chemical Oceanography from the MIT-Woods Hole Oceanographic Institution Joint Program. Following a post-doctoral appointment at FOM-AMOLF in Amsterdam, she accepted an assistant professor position at Old Dominion University. In 2005, she joined UMD as a member of this department and also the Large Lakes Observatory.

As an analytical chemist, Liz's teaching assignments have included Quantitative Analysis, Environmental Chemistry, General Chemistry, and graduate courses in Chemical Limnology. Her commitment to promoting science to the general public and improving K-12 science education is reflected in her participation in the YWCA Duluth's Girl Power! Program which is designed to promote science among 3rd-8th grade girls, LLO's Science on Deck which invites the public to board the Blue Heron research vessel and learn about the science projects that probe the world's large lakes, and interviews for local radio and TV stations.

Liz has established a research program investigating the relationships between the packaging of aquatic organic matter, its molecular level characteristics, and reactivity in the water column. Eighteen B.S., eight M.S., and three Ph.D. students have been trained in Liz's lab at UMD. Her program is funded by NSF, Minnesota Sea Grant, and the Minnesota Commission on Minnesota Resources. Liz and her students have authored forty-two peer-reviewed research papers. Recognition of Liz's scientific achievements has led to her associate editorship of the journal *Limnology and Oceanography Methods*, appointment as an NSF panelist, and her current membership on the Board of Directors of the Association for the Sciences of Limnology and Oceanography (ASLO). She was recently invited to attend the May 2015 meeting of The Council of Scientific Society Presidents.

Liz is an avid runner; she has run the Boston Marathon twice and tries to run Grandma's (full or half) Marathon each year. Liz, her husband, UMD Physics/LLO Prof. Jay Austin, and son, Ben, enjoy exploring the trails and parks of northern Minnesota, by foot or bike in the summer and by skiing in the winter. Jay and Ben are violinists and Liz enjoys singing in a local choir.

Steve Berry grew up in Duluth and earned a B.S. in Chemistry and Biochemistry in 1997 from UMD and a Ph.D. in Chemistry from the University of Illinois-Urbana-Champaign. Following a Camille and Henry Dreyfus Post-Doctoral Fellowship at the College of William and Mary, he accepted an assistant professor position at UMD in 2005.

As a bioinorganic chemist, Steve's teaching assignments have included Inorganic Chemistry, Biochemistry, and General Chemistry as well as graduate courses in Spectroscopy, Methods in Molecular Biosciences, and Bioinorganic Chemistry. He has served as the Chemistry Club faculty advisor, the Director of Graduate Studies, and is currently a member of the core project group for the design phase for the Chemical and Advanced Materials Science building. Steve has also been active in the Integrated Biosciences interdisciplinary graduate program.

Steve has established a research program investigating the roles of metals in biological systems and particularly the roles of copper ions in enzyme structure and function. His current NIH funded research project is focused on the rational design of function into a protein model system that mimics naturally occurring copper oxidoreductase enzymes. He uses a variety of experimental techniques to study these systems including enzyme assays, electrochemistry, EPR, mass spectrometry, and protein X-ray crystallography. Thirty-eight B.S. and eight M.S. students have been trained in Steve's laboratory.

Steve, his wife, Jennifer, and their three children enjoy the numerous outdoor activities that Duluth has to offer, including hiking, swimming, and skiing.

Faculty & Staff Updates

Fond Farewell To:

Erika Bladholm resigned to accept a job at Beckman Coulter in June 2015. Erika completed her BS-BMB and MS-Chemistry at UMD and then joined the department as an instructor in August 2011. We will miss Erika and wish her the best.

Welcome To:

Christine Boisjoli, Principal Office and Administrative Specialist, joined the department in June 2015. She has a Bachelor's Degree in English and Creative Writing from Saint Cloud State University. During her time at SCSU, Christine was very active in the writing and tutoring communities. Before joining the department, she worked for a local florist, where she was the Operations Manager for several years. In her spare time, Christine enjoys renovating her home with her husband, Chris, traveling, writing, and playing with her dog, Tallulah.

Alessandro Cembran joined the department in August 2014 as an Assistant Professor in computational chemistry. He earned an M.S. degree in Chemistry and a Ph.D. degree (2004) in Chemical Sciences from the University of Bologna, Italy, where he studied the photochemistry of organic molecules. He then completed postdoctoral training at the University of Minnesota - Twin Cities, where he developed quantum mechanical methods that he applied along with molecular dynamics simulations and nuclear magnetic resonance data to study protein function. In his laboratory here at UMD, Dr. Cembran and his students (both undergraduates and graduates) use computer simulations to investigate the mechanisms and function of biomolecules involved in clinical disorders. He also collaborates with other UMD research groups. The scientific questions and methodologies employed in Cembran's laboratory provide a platform for interdisciplinary training of students at the interface of physical chemistry, biochemistry, biology, and medicine. The complementary theoretical and experimental research approaches also help students to be well-rounded scientists with unique skills for problem solving.

Alessandro enjoys working with students on research projects and in the classroom. He finds that teaching keeps the fundamentals alive while his research experience enables him to highlight real-world problems related to those fundamentals. Alessandro and his wife, Lisa, enjoy hiking and biking and look forward to more outdoor activities this summer.

Kathryn Schreiner joined the department in August 2014 as an Assistant Professor in a joint position with the Large Lakes Observatory. She earned a B.S. in Chemistry and an M.S. in Earth Sciences from Purdue University, and a Ph.D. in Oceanography from Texas A&M. She completed her postdoctoral training in the Department of Earth and Planetary Sciences at Northwestern University. Dr. Schreiner's research focuses on carbon cycling in coastal margins as well as aquatic and marine environments. She is particularly interested in understanding how human activities are affecting and altering that carbon cycling, and is excited about extending her research into Lake Superior and the other Great Lakes. She values collaborating with colleagues at LLO and in the department, as well as with other aquatic-based scientists in the community.

Her teaching interests include courses on Environmental Chemistry, Organic Geochemistry, and Biogeochemical Cycles. Along with other Large Lakes Observatory professors, Dr. Schreiner is also working to update and revamp their graduate curriculum, strengthening ties with the local Twin Ports water resources community, and ensuring that new generations of graduate students from LLO and UMD are fully prepared for careers in industry, research, consulting, academia, and many other fields. In addition to her teaching, research, and service, Katie and her partner, John, have enjoyed exploring the North Shore of Lake Superior on day hikes with their dog, Scout, bike trips, and kayaking.

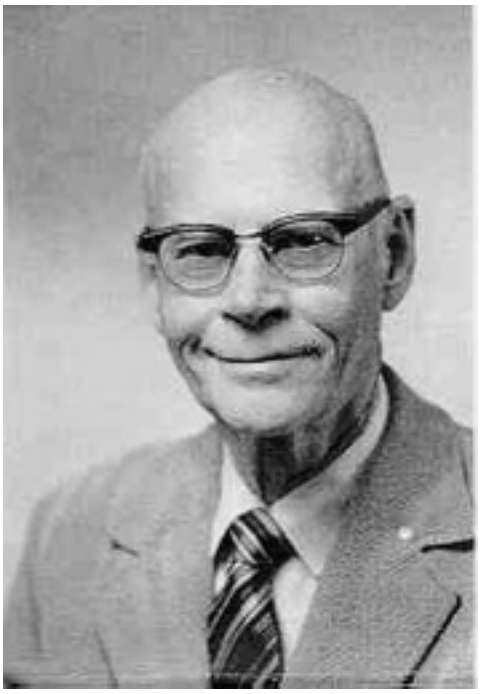
Faculty & Staff Updates, cont.

Congratulations To:

Anne Hinderliter was promoted to Full Professor in May 2015. Dr. Hinderliter earned her Ch.C. (advanced B.S.) degree (1988) in Chemistry from the University of Wisconsin-Madison and a Ph.D. degree (1994) from Cornell University (Division of Biochemistry, Molecular and Cell Biology). She was a Postdoctoral NIH Fellow and Research Associate (1994 - 2000) at the University of Virginia. Anne teaches Physical Chemistry, Physical Biochemistry, and General Chemistry courses. She and her students are interested in understanding how the weak cooperative interactions between lipids modulate cellular function. Dr. Hinderliter is an accomplished scholar with over 30 publications in scientific journals, is the recipient of an NSF CAREER Award (2009 - 2014), and a winner of the Biophysical Society Margaret Dayhoff Award (2006).

Viktor Zhdankin was selected by the Faculty of Science at Chiba University, Japan, to receive the 2014 Science Lectureship Award for his outstanding scientific achievements. Chiba University is a national university located at the center of the iodine-producing region of Japan. In January 2015, Professor Zhdankin traveled to Chiba, Japan, to present both an interdisciplinary scientific seminar and a public lecture on "Iodine: The Element of Life," to receive this award, and to meet with numerous faculty and students. Viktor has been collaborating with Chiba faculty on hypervalent iodine chemistry for over 25 years. Viktor, his students, and collaborators have published over 300 scientific articles in synthetic organic chemistry of hypervalent main-group elements, development of catalytic and recyclable systems based on hypervalent iodine chemistry, synthesis of heterocycles, and synthetic organic chemistry of fluorine.

Looking Back: Professor Francis B. Moore



The modern history of the Chemistry Department at UMD began with the hiring of a new Department Chair, Dr. Francis B. Moore in 1952. Dr. Moore received his Ph.D. in Analytical Chemistry from Iowa State University in 1940 and had been teaching at Southeast Missouri State University in Cape Girardeau when he joined the UMD faculty. He was charged with moving the department towards certification by the American Chemical Society and to initiate a graduate program in chemistry. However, during his required pre-employment physical, it was discovered that he had tuberculosis. This discovery dictated that he spend several months at the now decommissioned TB facility in Nopeming (just south of Duluth). In his efforts to advance the Department's mission when he returned to the campus, he enlisted the help of Professor Bryce Crawford (Head of the Department of Chemistry on the Twin Cities Campus) and some newly appointed faculty (including Professors J.C. "Charlie" Nichol and L.C. Thompson, among others). The overall process was challenging, but ultimately proved highly successful.

Professor Moore had the nickname of "Red" for the non-existent shock of red hair he had as a youth. He was an avid sportsman and active in the development of the BWCAW and Voyageur's National Park. However, his pipe was his trademark and he was forever trying to keep it lit. Colleagues knew that he also used the unending ignition process during conversations to both unnerve the other person and to give him time to develop a response. "Red" hired UMD graduate William Maupins, an African-American stockroom manager (and "social consciousness" mentor), as the first minority staff member on the UMD campus. Under Professor Moore's leadership, the faculty and staff were active and vibrant, and participated in creating a generation of students and faculty for whom science opened up new horizons.

"Red," who died at the age of 92, served as Department Head of Chemistry until his retirement in 1974.

SCSE Academy of Science & Engineering

The Academy of Science and Engineering was established in 2002 to recognize alumni and special friends of the Swenson College of Science and Engineering who have distinguished themselves through their participation, commitment, and leadership in their chosen professions. Our 2014 inductee to the Academy is Dr. Richard C. Holz, Dean of the Helen Way Klingler College of Arts and Sciences and Professor of Chemistry at Marquette University.

Dr. Holz completed a B.S. degree at Bemidji State University, an M.S. degree at UMD (1986), and a Ph.D. at Pennsylvania State University, all in the field of chemistry. Following an NIH postdoctoral fellowship, he rose through the ranks to professor at Utah State University. He also served as department chair at Loyola University Chicago before accepting the deanship at Marquette University in 2013. He has published over ninety research articles and co-invented two patents in the areas of the structure, function, and catalytic mechanisms of metalloenzymes and bioinorganic chemistry utilizing biophysical methodologies. He has mentored numerous research students and served as a review panel member for the NSF and NIH.

Moving Forward: Departmental Strategic Plan, Two Years Later

Goal 1 Undergraduate Education: A new General Chemistry sequence for majors was approved and will be offered this fall. In addition to strong foundations in chemistry for our majors, this sequence will incorporate an introduction to our research programs, professional development, communication and writing skills, and community building. The corresponding teaching lab experiments were revised to fit the 2015-16 early start calendar.

Goal 2 Graduate Education: We established a policy and process for first year graduate students to select and join a research lab. New graduate courses (Polymers, Group Theory, and Biophotonics) were reviewed and approved. Three of our MS students will be the first to complete the Community College Teaching Certificate this year. New research fields and opportunities for our graduates have been introduced with new faculty hires.

Goal 3 Research and Scholarly Activities: We created a research ethics workshop that meets the compliance standards of several funding agencies (NSF, NIH). An increase in the departmental and college travel allocation was recommended to support dissemination of research results. One-third of our graduate students presented their research results at national and regional meetings and half of the publications from our research labs include undergraduate and/or graduate student co-authors.

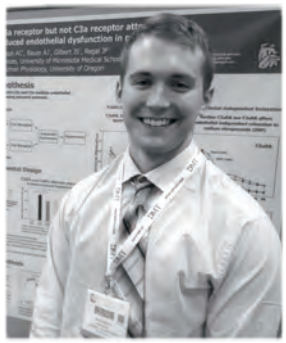
Goal 4 Human and Physical Resources: We completed the Pre-Design document for the Chemical and Advanced Materials Science (CAMS) building. With legislative planning funds, an architectural firm was selected and has initiated the Schematic Design phase. This spring, we hired a new office and administrative specialist who started in June and a new analytical chemist who will start in January 2016. Our faculty also secured external funding (NSF-MRI grant) for a new mass spectrometer.

Goal 5 Departmental Culture: We revamped our safety guidelines and awareness in the department's research and teaching laboratories. We also supported a new students-initiated group, the "Society of Chemists and Biochemists," that focuses on professional and career development of our undergraduate students. We continued our development and delivery of programs for K-12 students (Chemistry Shows, Science Days) and the general public (research on Lake Superior).

Spotlight on Undergraduate Students

The Chemistry and Biochemistry department has over 400 majors and about 50-55 baccalaureate graduates each year. Collectively, they are a very impressive group and we would like to introduce some of them to you.

Michelle Botts (BS-BMB, Class of 2016) created a figure for a contribution authored by Dr. Anne Hinderliter and Dr. Kalina Hristova (Johns Hopkins University) for the *New and Notable* column in the *Biophysical Journal* issue 108 (9) 2015. It was also displayed on the 5 May 2015 *Biophysical Journal* homepage. Michelle is from Elk River, MN and has been participating in undergraduate research in Dr. Hinderliter's laboratory for the last three years.



Jonathan Opacich (BS-BMB, Class of 2015) received one of the *David S. Bruce Outstanding Undergraduate Abstract Awards* from the 2014 American Physiological Society, Experimental Biology meeting. Jon is from Duluth, MN and completed undergraduate research with Dr. Jean Regal in the School of Medicine-Duluth. He will enter a Ph.D. program at the Weill Cornell Medical College, New York City in Biophysics and Organ Systems.

Hillary Heiling (BS-BMB and BS Statistics, Class of 2016) and **Mathew Kayser** (BS-BMB and BS-Chemistry, Class of 2015) received 2014 **Minnesota High Tech Association (MHTA) Foundation STEM Scholarships.** Hillary, a native of Pine Island, MN is an *IBM Watson Scholar* who is participating in undergraduate research with Dr. Anne Hinderliter. Mathew is from Cloquet, MN. He completed undergraduate research with Dr. Viktor Nemykin and will pursue an M.S. degree in Chemistry at UMD.

Hannah Leopold, **Tyler Floden**, and **Justine Schramel** were awarded *Casmir Ilenda Awards for Outstanding Undergraduate Research* during the 2015 Symposium. The award was named after Dr. Casmir Ilenda (BS-Chemistry, Class of 1969). Dr. Ilenda received an excellence in research award from his long time employer, Rohm and Haas Pharmaceutical, and then gave this award to the department to recognize excellence in undergraduate research.

Katie Schneider (BS-BMB, Class of 2015) was selected to receive a *2014 Northern Sun Intercollegiate Conference (NSIC) Myles Brand All-Academic with Distinction Award*. Katie is a native of Brookings, SD, and has been on the varsity soccer team for four years. Katie completed undergraduate research with Dr. Alessandro Cembran in computational chemistry and will attend the University of Houston, College of Optometry to pursue a Doctor of Optometry degree.

Student Spotlight: Kevin Hughes

We are pleased to introduce Kevin Hughes of Aitkin, MN. Kevin graduated in May with departmental honors, a B.S. in Chemistry, and a B.S. in Biochemistry and Molecular Biology.

Kevin was selected as a Swenson Academic Scholar as an incoming freshman student and was awarded this prestigious scholarship for four years. In addition to his outstanding record in his courses, he excelled in Dr. Venkatram Mereddy's research lab. Dr. Mereddy said, "Kevin learned several techniques such as organic synthesis, cancer biology, and also a few protocols in handling animals for cancer studies in my lab. Initially he wanted to attend medical school and based on his near perfect GPA and high intelligence, he would have easily been admitted to medical schools. However, after spending time in my lab, he decided to pursue biomedical research as his career field. I am proud of his all-around abilities and he will become a great scientist in the future." Additionally, Kevin performed biomedical engineering research during the summer of 2014 at the Twin Cities campus of the University of Minnesota.

Regarding his experience at UMD, Kevin stated, "I've been really impressed with the amount and quality of research I've been allowed to do at UMD. After talking with students and faculty from all over the country during graduate school interviews, it became clear that UMD gave me research experience with depth and breadth that matched or surpassed what other students received at any of the large, "prestigious" research universities. Throughout my undergraduate career I loved having professors that were leaders in their fields as both teachers and researchers who still made time to meet with students as often as possible. I don't think there are many other institutions where someone could get the combination of expertise and care that I got from the chemistry and biochemistry department."

When he applied to PhD programs, Kevin received offers from the University of Minnesota Twin Cities, the University of Michigan Ann Arbor, the Mayo Graduate School, and the University of Wisconsin Madison. In the fall, Kevin will be attending the University of Michigan Ann Arbor to pursue a PhD in biomedical engineering. When asked how he decided on the University of Michigan, Kevin replied, "It was difficult to decide between the offers I was given, but I ultimately choose Michigan because of the huge advances they are making in medicine and in engineering. I'm very excited to enroll in their program in biomedical engineering to be at the interface of the two. Go Blue!" We wish Kevin the very best in pursuing his professional career and we expect great things from him.

Student Spotlight: Amber Nelson-Porter

We are pleased to introduce current MS-Chemistry student, Amber Nelson-Porter (BS-Chemistry and BS-Biochemistry and Molecular Biology 2013) of Rice Lake, WI.

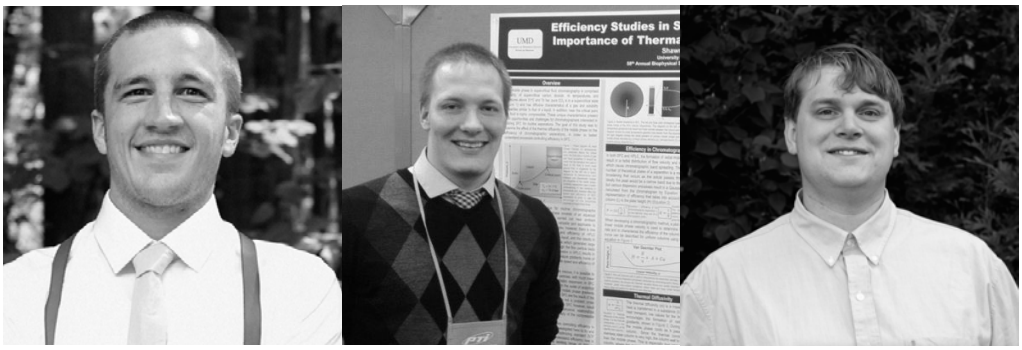
Amber came to UMD in 2008 as a first generation college student, Chemistry major, and, based on her outstanding high school record, Swenson Academic Scholarship recipient. As a UMD undergraduate student, she was on the SCSE Dean's List for Academic Excellence multiple times. Her strong interest and curiosity led her to participate in undergraduate research in Dr. Peter Grundt's laboratory at the end of her freshman year. Amber conducted research on synthesizing and biologically testing compounds to inhibit *Toxoplasma gondii* until she graduated in May 2013. She wrote several successful UROP proposals to fund her research and was also awarded a Swenson Summer Research Scholarship. When she completed her BS degree, Amber had compiled a very impressive research record including lead authorship on two research publications and co-authorship on two others.

With a strong record in coursework, research, and as an undergraduate teaching assistant, Amber was accepted into the Master's program in Chemistry at UMD. She continues to work in the Grundt lab, but has transitioned to a different project for her thesis work. Her work now focuses on the synthesis of 2,1-benzisoxazoles via the oxidation of indoles using the oxidizing agent Oxone. Amber was recognized for her achievements as a graduate student with the John C. Cothran Memorial Fellowship. In addition, her enthusiasm and dedication to teaching and to her students make her an exceptional teaching assistant and led to her selection as an SCSE Outstanding Graduate Teaching Assistant Award recipient. When Amber completes her MS degree, she plans on continuing with further education.

Amber and her husband, Brandon, have a three-year-old son, Kadrik. They enjoy fishing on Lake Superior, hiking with their Labrador retrievers, and taking Sunday drives.

Spotlight on Graduate Students

-Eleven, or one-third, of our graduate students presented their research results at national (American Chemical Society, Biophysical Society, Gibbs Society) and regional (Minnesota Chromatography Forum) scientific meetings and conferences this past academic year. This was an excellent opportunity for our students to present their research findings, learn about recent scientific advances, and meet and network with scientists.



-**Chase Gomez (left)**, **Shawn Helmueller (center)**, and **Scott Klasen (right)** are the first graduate students completing the MS-Chemistry degree and the Community College Teaching Certificate. This program is a collaboration between the STEM departments and the Department of Education at UMD. The certificate program is designed to provide chemistry master's students with a strong foundation in the principles and practice of teaching and learning.

-As faculty members pursue more interdisciplinary questions, graduate program opportunities have broadened. Students working in Chemistry and Biochemistry faculty labs can earn degrees in Chemistry, Water Resources Sciences, and Integrated Biosciences.

-The teaching contributions of our graduate students are essential in our ability to deliver lecture and lab courses to so many UMD science, engineering, and education students. We thank all of them. MS students **Rochelle Warner (left)**, **Shawn Helmueller (center)**, and **Amber Nelson-Porter (right)** were selected to receive the SCSE Outstanding GTA Awards.

-In addition, **Alexandra Sauer (left)**, **Anthony Wertish (center)**, and **Lucas Solano (right)** were the recipients of the departmental outstanding teaching awards.

Scientific Discovery

Faculty members provide meaningful and productive research experiences to our students as part of our commitment to prepare the next generation of scientists, educators, and health care professionals. A snapshot of our research contributions include:

- Thirty-nine peer-reviewed journal articles including eighteen with student co-authors
- A book authorship, a book editorship, and five book chapters
- Numerous scientific talks, poster presentations, and seminars
- Five new IP disclosures
- One patent
- $1.34M in new grant funding including an NSF-Major Research Instrument grant for an LC-MS (Professor Victor Nemykin, PI).

Beyond Our Borders

That science is a global enterprise is reflected in our international visitors, the lectures and seminars our faculty present abroad, and their international collaborations.

- **Paul Kiprof** hosted Visiting Professor **Zhaokuai Peng** (Biochemical Engineering College of Beijing Union University).

- **Victor Nemykin** hosted **Yurii Zatsikha** (student from Institute of Organic Chemistry, National Academy of Sciences, Ukraine) and Visiting Professor **Elena Makarova** (Organic Intermediates and Dyes Institute, Moscow, Russia). Professor Nemykin also presented invited talks at the:
  -International Conference on Porphyrins and Phthalocyanines (ICPP-8) in Istanbul, Turkey (June 2014)
  -Michinoku International Symposium on Porphyrins, Phthalocyanines, and Functional Molecules in Zao, Miyagi, Japan (October 2014)

- **Viktor Zhdankin** hosted Postdoctoral Associate **Akira Yoshimura** (University of Tokushima, Japan), Visiting Associate **Professor R. Y. Yusubova** (Tomsk Polytechnic University), Visiting Associate Professor **P. S. Postnikov** (Tomsk Polytechnic University), Visiting Professor **M. S. Yusubov** (Tomsk Polytechnic University), and Visiting Professor **A. Saito** (Tokyo University of Agriculture and Technology, Japan). Professor Zhdankin presented invited plenary lectures at the:
  -4th International Conference on Hypervalent Iodine Chemistry (ICHIC2014) in Narita, Japan (July 2014)
  -International Symposium on Elementoorganic Chemistry in Kunshan, China (Nov. 2014)

Curricular Innovations

- **Brian Gute** was awarded an *Experiments in Learning Innovations* grant sponsored by the UM Center for Teaching Innovations. This award will enable Brian to examine the effectiveness of a flipped-class approach in achieving General Chemistry II learning outcomes compared with a more traditional lecture approach. The study will begin in Fall 2015 and be duplicated in Spring 2016. Mr. Gute will conduct a quantitative assessment concerning the applicability of the flipped-class approach to general chemistry courses.

- One of the major goals of the departmental strategic plan is to strengthen our curriculum for our undergraduate majors, to introduce them to the major, undergraduate research opportunities, future careers, and to support building a community of freshman students intending to major in Chemistry, BMB, or Biochemistry. To this end, we developed a General Chemistry for Majors lecture and laboratory sequence that will be offered for the first time during 2015-2016. These courses are designed to focus on chemistry content, problem solving and critical thinking, writing and technical skill building, and team and leadership skills.

- In addition to the new course sequence for our freshman majors, we offered courses in Polymers and Group Theory last year and will offer Biophotonics next year.

Outreach and Community Engagement

The department is very fortunate to have students and faculty who excel in the classroom and in the research lab, and also as scientists committed to bringing science to the greater community. Here are some examples of our outreach programs for students from K-12 to lifelong learners:

- For many years you have been reading Transitions articles about the highly popular Chemistry shows that the **Chemistry and Biochemistry Club** plans and delivers to a full 400-person Kobilka Lecture Hall (the old Chem 200), as well as elementary school classrooms, the Minnesota State Fair, and the UMD Residence Life Haunted Halls program. The Club received the *2015 UMD Arrowhead Award*, which is given to students for exemplary service to an organization and the community. Their advisor, **Romesh Lakhan** received a *2015 Outstanding UMD Student Organization Advisor Award* in recognition to his work with the Chemistry and Biochemistry Club. *Club officers: Jasmin Mellesmoen, Matthew Johnson, Nathan Welle, and Brett Macleod*

- Society of Chemists and Biochemists (SCB) is a new student-driven organization aimed at helping students in our program to (1) navigate the university, college, and departmental resources available to them, (2) foster student-faculty interactions, (3) promote undergraduate research opportunities, (4) build a community of friends and support groups, and (5) become professional chemists and biochemists. The first semester of this organization was a success with activities comprised of research talks, career development, literature reviews, laboratory tours, and social gatherings. *SCB officers: Valerie Bruner, Hannah Leopold, Jessica Christensen, and Michael Rogers*

- **Professor Robert Carlson and Samuel Renk (UMD, 2015) arranged with Dr. Dean Fox, a UMD Chemistry and Biochemistry graduate (1986), to host a Dinner for Pre-Medicine Chemistry and Biochemistry Students with Local Health Care Professionals:** On Thursday, February 19th, a dinner for thirty-five chemistry and biochemistry students who are considering a career in medicine was hosted by Dr. Dean Fox, M.D. (Essentia Health) and his wife, Dr. Tammy Fox, M.D. (Essentia Health) at their home. Six other health professionals and Professor Carlson and his wife joined this dinner, which was aimed at networking, career development, and informative discussion about the health care and medical profession. The organizers and hosts are planning to continue working together, to better serve our "pre-med" undergraduates.

- **Ahmed Heikal** provided guidance and advice to a team of tenth graders from Proctor High School as it prepared its entry in NASA's Conrad Spirit of Innovation Challenge. In April 2015, the team won first place in this international competition in the Energy and Environment Category. One of seventy-five competing teams and the only public school team, the Proctor students developed an engineering process and machine design that recycles every part of a dirty diaper and other absorbent hygiene products. These non-biodegradable products make up 30% of landfill waste. *Team Members: Alyssa Hagemeyer, Ben Nicolson, Daniel Roach, Jonny Gales, and Zach Coughlin. Team Advisor: Allison Nicholson*

- To promote science for the general public, **Liz Minor** and other Large Lakes Observatory scientists hosted a cruise on board the R/V Blue Heron for members of the local and state media. The purpose of the cruise on Lake Superior was to present various research projects supported by the Blue Heron and to emphasize the breadth and interdisciplinary nature of lakes research based in chemistry, physics, biology, and geology.

The Next Generation of Scientists

The 28th Annual Gibbs Conference on Biothermodynamics was held at Southern Illinois University in September 2014. This conference is devoted to innovative applications of and training in the field of Biological Thermodynamics and provides mentorship and networking opportunities to graduate students and postdoctoral research associates who make up about 75% of the attendees. A remarkable number of the 200 participants earned or are currently earning degrees at UMD. The eight UMD alums or current students worked in the research labs of Professors Anne Hinderliter, Ahmed Heikal, and Grant Anderson while at UMD and presented their current research findings focused on understanding the basis of how physico-chemical forces preside over regulation of biological function and the utilization of linkage theory to map these interactions.

Back row: Jake Marold: BS-BMB 2009 (2015 Ph.D. - Molecular Biophysics at Johns Hopkins University), Spencer Kruggel: BS-CMB 2015 (Will attend Midwestern School of Pharmacy Fall 2015), Ben Horn: BS-BMB 2014 (Current UMD Chemistry MS student), Robb Welty: MS-Chemistry 2013 (Current Biochemistry and Molecular Biophysics Ph.D. student at Washington University)

Front row: Justine Schramel: BS-BMB 2015 (applying to Physician's Assistant Programs), Sarah Kempka McDonald: BS-BMB 2010 (Current Molecular Biophysics Ph.D. student at Johns Hopkins University), Anne Hinderliter, Jeremy Anderson: BS-BMB 2011 (Current Molecular Biophysics Ph.D. student at Johns Hopkins University), Katie Dunleavy: BS-BMB 2012 and MS-Chemistry 2015 (Will enter Chemistry Ph.D. program at the University of Florida in Fall 2015)

We also congratulate **Michael Fealey** (MS-Chemistry 2013) who received a *2014 Distinguished Master's Thesis Award* in Physical Sciences/Engineering from the UM Graduate School. His thesis work was done in the Hinderliter lab and titled "Synaptotagmin Signal Propagation: A Model System for Functional Cooperativity at the Membrane." Michael is currently pursuing a Ph.D. in Biochemistry, Molecular Biology, and Biophysics at the Twin Cities campus.

Student Awards

Our department is fortunate to be able to recognize our outstanding and deserving students. Former students, faculty, and friends of the department established some of these awards; others are from organizations in the field. Award details can be viewed at http://www.d.umn.edu/chem/undergraduates/awards.html and http://www.d.umn.edu/chem/graduates/awards.html

UNDERGRADUATE AWARDS:

Swenson Family Foundation Scholarships for Academic Excellence
2014/2015: Mary Helen Berntson, Ryan Leighton, Alexandria Loneman, Maria Lorenson, Savannah Nelles, Erin Salo, Hannah Stoffel, Marissa Wheeler

Achievement in Organic Chemistry (ACS) Award
2014/2015: Jonathan Fuchs

Achievement in Inorganic Chemistry (ACS) Award
2014/2015: Katelyn Schneider

Achievement in Organic Chemistry (POLYED) Award
2014/2015: Cody Makitalo

HyperCube Scholar Award
2014/2015: James Lyon

Peterson Memorial Scholarship
2014/2015: Kathryn Peterson

Lake Superior Section of ACS Outstanding Senior
2014/2015: Tyler Floden, Jonathan Opacich

The American Institute of Chemists Outstanding Senior
2014/2015: Valerie Bruner

F. B. Moore Academic and Leadership Award
2014/2015: Mathew Kayser

General Chemistry Award for Excellence
2014/2015: Tristan Litke, Marissa Wheeler, Tana O'Keefe, Alycia Chmielewski

Warren F. Davis Award for Excellence in Biochemistry
2014/2015: Katrina Lau, Dakota Lundstrom, Katherine McMahon, Kaelt Simpson

Catherine E. Cox Scholarship for Chemistry & Biochemistry
2014/2015: Mikelle Dougherty, Nicolette Fisher, Mackenzie Liebl

James H. Maguire Scholarship
2014/2015: Hillary Heiling, Cyrina Ostgaard, Kaelt Simpson, Yishu Zhang

Undergraduate Analytical Chemistry Award
2014/2015: Benjamin Walker

Robert Bayer Memorial Scholarship
2014/2015: Tylor Franklin, Alexander King

Norm and Joan Gill Scholarship
2014/2015: Majia Dorland

Larry C. Thompson Inorganic Chemistry Award
2014/2015: Tyler Floden

James C. Nichol Scholarship
2014/2015: Justine Schramel

Casmir Ilenda Award for Outstanding Undergraduate Research
2014/2015: Tyler Floden, Hannah Leopold, Justine Schramel

Dr. Nathan and Elaine Ballou Scholarship
2014/2015: Michelle Botts, Zachary Hartnady, Kevin Wielenberg

Departmental Honors
2014/2015: Valerie Bruner, Tyler Floden, Kevin Hughes, Nathan Karp Mathew Kayser, Alexander Niemczyk, Justine Olson, Chad Reuter, Katelyn Schneider, Justine Schramel, Stephanie Schramel

Student Awards, cont.

Departmental Outstanding Service Award
2014/2015: Valerie Bruner

Chemistry and Biochemistry Outstanding Undergraduate Teaching Assistant
2014/2015: Jonathan Fuchs, Kevin Hughes, Erica Lueth, Alexandra Theis

GRADUATE AWARDS:

John C. Cothran Memorial Fellowship
2014/2015: Spencer Gardeen, Cole Holstrom, Stephanie Kobany, Ben Orpen, Conor Ronayne, Tony Wertish

Moses Passer Graduate Fellowship
2014/2015: Katie Dunleavy, Shawn Helmueller, Lucas Solano

UMD Siders Chemistry Graduate Fellowship
2014/2015: Benjamin Horn

SCSE Outstanding Graduate Teaching Assistant
2014/2015: Shawn Helmueller, Amber Nelson-Porter, Rochelle Warner

Chemistry and Biochemistry Outstanding Graduate Teaching Assistant
2014/2015: Alexandra Sauer, Lucas Solano, Anthony Wertish

CAMPUS AWARDS:

University Honors
2014/2015: Teresa Heck, Kevin Hughes, Justine Olson, Chad Reuter, Justine Schramel, Stephanie Schramel

2014-2015 Award Recipients

Graduating Seniors: 2014-2015

Carl Anderson, BS-BMB
Kyle Anorve-Andress, BS-BMB
Kevin Antonich, BS-BMB
Maren Bakke, BS-BMB
Baredu Bakuto, BS-BMB
Andrew Bjorklund, BS-Chem
Tanner Blesener, BS-Chem
Phillip Brown, BS-Chem
Valerie Bruner, BA-Chem*
Jessica Christensen, BS-BMB
Zachary Dahlin, BS-BMB
Kelby Donnay, BS-Chem
Nicholas Dougherty, BS-BMB
Tyler Floden, BS-BMB*
Jonathan Fuchs, BS-BMB
Teresa Heck, BS-BMB
Michael Hitz, BS-BMB
Kaitlyn Hook, BS-BMB
Kevin Hughes, BS-BMB*
Nathan Karp, BS-Chem*
Mathew Kayser, BS-Chem*
Jacob Keller, BS-BMB
Mohamud Kodah, BS-BMB
Hannah Leopold, BS-BMB
Erica Lueth, BS-Chem
Brett MacLeod, BS-BMB
Peter Maddaus, BS-BMB
Trang Nam Mai, BS-BMB
Anthony Meger, BS-BMB
Jessica Miller, BS-Chem
Megan Nelson, BS-BMB
Dustin Nevonen, BS-Chem
Megin Nguyen, BS-BMB
Alexander Niemczyk, BS-BMB*
Lucas O'Neil, BS-BMB
Justine Olson, BS-Chem*
Jonathan Opacich, BS-BMB
Evian Rave, BS-BMB
Sam Renk, BS-BMB
Chad Reuter, BS-Chem*
Katelyn Schneider, BS-BMB*
Justine Schramel, BS-BMB*
Stephanie Schramel, BS-BMB*
Michael Stocke, BS-BMB
Paul Vue, BS-Chem
Peter Wey, BS-BMB
Erika Wilson, BS-Chem
Shane Wilson, BS-BMB
Mitchell Zuidema, BS-Chem

*** With Distinction (Departmental Honors)**

Masters of Science in Chemistry Program Graduates: 2014-2015

The Master of Science in Chemistry degree program at UMD provides an excellent opportunity to acquire and develop advanced technical expertise and problem-solving skills expected of today's chemical and biochemical professionals. Coursework is designed to provide a firm fundamental basis for students going into a variety of chemical specialties in both professional and academic settings. Following is a list of students who are completing their Master's degree over the 2014-2015 academic year:

Top Row: Katie Dunleavy, Rochelle Warner, Lucas Solano, Shawn Helmueller, Anthony Evans

Bottom Row: Tony Wertish, Spencer Gardeen, Scott Klasen, Chase Gomez

Not pictured: Adam Jersett, Balabhadra Khatiwada, Kebreab Samuel

Research Publications

- Zampino, Anthony. P.; Masters, Francesca. M.; Bladholm, Erika. L.; Panzner, Matthew. J.; **Berry, Steven. M**.; Leeper, Thomas. C.; Ziegler, Christopher. J. "Mercury metallation of the copper protein azurin and structural insight into possible heavy metal reactivity" J. Inorg. Biochem. **2014**, 141, 152-160.
- Srivastava, A.K., McDonald, L.R., **Cembran, A.**, Kim, J., Masterson, L.R., McClendon, C.L., Taylor, S.S., Veglia, G. (**2014**) Synchronous opening and closing motions are essential for cAMP-dependent protein kinase A signaling. *Structure*, 22, 1-9.
- Desai, B.J., Goto, Y., **Cembran, A.**, Fedorov, A.A., Almo, S.C., Gao, J., Suga, H., Gerlt, J.A. (**2014**) Backbone amide bond to ester substitution: the importance of substrate backbone amide hydrogen bond in the OMP decarboxylase reaction. *Proc. Natl. Acad. Sci. U.S.A.*, 111, 15066-15071.
- **Heikal, A.A. 2014**. "Time-resolved fluorescence anisotropy and fluctuation correlation analysis of major histocompatibility complex class I proteins in fibroblast cells." *Methods* 66: 283 - 291.
- Rice, A.M., Mahling, R., Rannikko, A., Dunleavy, K., Fealey, M.E., Hendrickson, T., Lohese, K.J., Kruggel. S., Heiling, H., Harren, D., Sutton, R.B., Pastor, J. and **Hinderliter, A. 2014**. Randomly organized lipids and marginally stable proteins: coupling weak interactions to optimize membrane signaling. *Biochem. Biophys Acta* 1838(9):2331-2340.
- Fuson, K., Rice, A., Mahling, R., Snow, A., Nayak, K., Shanbhogue, P., Meyer, A., Redpath, G., **Hinderliter, A.**, Cooper, S.T., and R.B. Sutton. **2014**. Alternate splicing of dysferlin C2A confers Ca2+-dependent and Ca2+-independent binding for membrane repair. *Structure (Cell)* 22:104-115.
- Zigah, P.K., **Minor, E.C.**, H.A. Abdulla, J.P. Werne, and P.G. Hatcher, **2014**. An investigation of size-fractionated organic matter from Lake Superior and a tributary stream using radiocarbon, stable isotopes and NMR. *Geochimica et Cosmochimica Acta* 127: 264-284.
- **Minor, E.C.**, M. Swenson. B.M. Mattson, and A.R. Oyler. **(2014)** Structural characterization of dissolved organic matter: A review of current techniques for isolation and analysis. *Environmental Science: Processes and Impacts*, DOI: 10.1039/c4em00062e.
- **Minor, E.C.**, B. Forsman, and S.J. Guildford. **(2014)** The effect of a flood pulse on the water column of western Lake Superior, *USA. J. Great Lakes Res.*, 40: 455-462.
- Swenson, M.M., A.R. Oyler, and **Minor, E.C. (2014)** Rapid solid phase extraction of dissolved organic matter. *Limnol. Oceanogr.: Methods*. 12, 713-728.
- **Minor, E C.**, H. Li, A. R. Oyler, M. M. Swenson and B. M. Mattson. **(2015)** Reply to the Comment on "Structural characterization of dissolved organic matter: a review of current techniques for isolation and analysis" by **Minor E.C.**, M.M. Swenson, B.M. Mattson, and A.R. Oyler, Environ. Sci.: Processes Impacts, **2014**, 16, 2064.
- Rhoda, H.M.; Crandall, L.A.; Geier III, G.R.; Ziegler, C.J.; **Nemykin, V.N.** "Combined MCD/DFT/TDDFT Study of the Electronic Structure of Axially Coordinated Metallocorroles" *Inorg. Chem*. **2015**, *54*, 4652-4662.
- Xu, Z.; Gao, F.; Makarova, E.A.; **Heikal, A.A.**; **Nemykin, V.N.** "Energy Transfer from Colloidal Quantum Dots to Near Infrared Absorbing Tetraazaporphyrins for Enhanced Light Harvesting" *J. Phys. Chem. C* **2015**, *119*, 9754-9761.
- Maligaspe, E.; Pundsack, T.J.; Albert, L.M.; Zatsikha, Y.V.; Solntsev, P.V.; Blank, D.A.; **Nemykin, V.N.** "Synthesis and Charge-Transfer Dynamics in a Ferrocene-Containing Organoboryl aza-BODIPY Donor-Acceptor Triad with Boron as the Hub" *Inorg. Chem*. **2015**, *54*, 4167−4174.
- Vecchi, A.; Erickson, N.R.; Sabin, J.R.; Floris, B.; Conte, V.; Venanzi, M.; Galloni, P.; **Nemykin, V.N.** "Electronic properties of mono-substituted tetraferrocenyl porphyrins in solution and on gold surface: assessment of the influencing factors for photoelectrochemical applications" *Chem. Eur. J*.**2015**, *21*, 269-279.
- Vecchi, A.; Galloni, P.; Floris, B.; Dudkin, S.V.; **Nemykin, V.N.** "Metallocenes meet porphyrinoids: Consequences of a "fusion"" *Coord. Chem. Rev.* **2015**, *291*, 95-171.
- **Nemykin, V.N.**; Makarova, E.A.; Erickson, N.R.; Solntsev, P.V. "Coupling ferrocene to brominated tetraazaporphyrin: exploring an alternative synthetic pathway for preparation of ferrocene-containing tetraazaporphyrins" *Turk. J. Chem.* **2014**, *38*, 1027-1045 (*invited paper for special issue*).
- **Nemykin, V.N.**; Makarova, E.A.; Grosland, J.O.; Dudkin, S.V.; Dennison, R.; Purchel, A.A. "Tuning the near-IR energy and redox potentials of magnesium tetra(ferrocenyl)tetraazaporphyrins" *J. Porphyrins Phthalocyanines* **2014**, *18*, 792-803 (*invited paper for special issue*).
- Yusubov, M.S.; Celik, C.; Geraskina, M.R.; Yoshimura, A.; **Zhdankin, V.V.**; **Nemykin, V.N.** "Binuclear iron(III) octakis(perfluorophenyl) tetraazaporphyrin μ-oxodimer: a highly efficient catalyst for biomimetic oxygenation reactions" *Tetr. Lett.* **2014**, 55, 5687-5690.
- Maligaspe, E.; Hauwiller, M.R.; Zatsikha, Y.V.; Hinke, J.A.; Solntsev, P.V.; Blank, D.A.; **Nemykin, V.N.** "Redox and Photoinduced Electron-Transfer Properties in Short Distance Organoboryl Ferrocene-Subphthalocyanine Dyads" *Inorg. Chem.* **2014**, 53, 9336-9347.
- Sun, B.; Ou, Z.; Meng, D.; Fang, Y.; Song, Y.; Zhu, W.; Solntsev, P.V.; **Nemykin, V.N.**; Kadish, K.M. "Electrochemistry and catalytic properties for dioxygen reduction using ferrocene-substituted cobalt porphyrins" *Inorg. Chem.* **2014**, *53*, 8600-8609.
- **Nemykin, V.N.**; Dudkin, S.V.; Dumoulin, F.; Hirel, C.; Gurek, A.G.; Ahsen, V. "Synthetic approaches to asymmetric phthalocyanines and their analogues" *ARKIVOC* **2014**, *(i)*, 142-204.
- Dahlby, M.R.; Purchel, A.A.; Solntsev, P.V.; Rohde, G.T.; Zatsikha, Y.V.; **Nemykin, V.N.** "Synthesis, characterization, redox, and Hg2+ optical ion sensing properties of ferrocenyl-containing maleo- and fumaronitrile derivatives" *Can. J. Chem.* **2014**, 92, 739-749.
- Ziegler, C.J.; Chanawanno, K.; Hasheminsasab, A.; Zatsikha, Y.V.; Maligaspe, E.; **Nemykin, V.N.** "Synthesis, Redox Properties, and Electronic Coupling in the Diferrocene Aza-dipyrromethene and azaBODIPY Donor-Acceptor Dyad with Direct Ferrocene-α-Pyrrole Bond" *Inorg. Chem.* **2014**, *53*, 4751-4755.

Research Publications, cont.

- Tamgho, I.S.; Hasheminasab, A.; Engle, J.T.; **Nemykin, V.N.**; Ziegler, C.J. "A New Highly Fluorescent and Symmetric Pyrrole-BF2 Chromophore: BOPHY" *J. Am. Chem. Soc.* **2014**, *136*, 5623-5626.
- Yoshimura, A.; Koski, S.R.; Kastern, B.J.; Fuchs, J.M.; Jones, T.N.; Yusubova, R.Y.; **Nemykin, V.N.**; Zhdankin, V.V. "Hypoiodite-mediated cyclopropanation of alkenes" *Chem. Eur. J.* **2014**, *20*, 5895-5898.
- Varzatskii, O.A.; Penkova, L.V.; Kats, S.V.; Dolganov, A.V.; Vologzhanina, A.V.; Pavlov, A.A.; Novikov, V.V.; Bogomyakov, A.S.; **Nemykin, V.N.**; Voloshin, Y.Z. "Chloride Ion-Aided Self-Assembly of Pseudoclathrochelate Metal Tris-pyrazoloximates" *Inorg. Chem.* **2014**, 53, 3062-3071.
- Goetsch, W.R.; Solntsev, P.V.; Van Stappen, C.; Purchel, A.A.; Dudkin, S.V.; **Nemykin, V.N.** "Electron-Transfer Processes in 3,4-Diferrocenylpyrroles: Insight into a Missing Piece of the Polyferrocenyl-Containing Pyrroles Family" *Organometallics* **2014**, *33*, 145-157.
- **Poe, D.P.**, D. Veit, M. Ranger, K. Kaczmarski, A. Tarafder, G. Guiochon, J. *Chromatogr. A*, **2014**, 1323, 143-156. Pressure, temperature and density drops along supercritical fluid chromatography columns in different thermal environments. III. Mixtures of carbon dioxide and methanol as the mobile phase.
- A. Tarafder, P. Iraneta, G. Guiochon, K. Kaczmarski and **Poe, D.P.**, J. *Chromatogr. A*, **2014**, 1366, 126-135. Estimations of temperature deviations in chromatographic columns using isenthalpic plots. I. Theory for isocratic systems.
- Protasiewicz, J.D.; **Zhdankin, V.V.** "Development of New Hypervalent Iodine Reagents with Improved Properties and Reactivity by Redirecting Secondary Bonds at Iodine Center." *Coord. Chem. Rev.* **2014**, *275*, 54-62. [3]
- Ivanov, A.S.; Popov, I.A.; Boldyrev, A.I.; **Zhdankin, V.V.** "The I=X (X = O, N, C) Double Bond in Hypervalent Iodine Compounds: Is it Real?" *Angew. Chem. Int. Ed.* **2014**, 53, 9617-9621
- Yoshimura, A.; Koski, S.R.; Kastern, B.J.; Fuchs, J.M.; Jones, T.N.; Yusubova, R.Y.; **Nemykin, V.N.**; **Zhdankin, V.V.** "Hypoiodite-mediated cyclopropanation of alkenes" *Chem. Eur. J.* **2014**, *20*, 5895-5898.
- Yoshimura, A.; Todora, A.D.; Kastern, B.J.; Koski, S.R.; **Zhdankin, V.V.** " Synthesis of 1,2,4-thiadiazoles by oxidative dimerization of carbothioamides using Oxone." Eur. *J. Org. Chem.* **2014**, 5149-5152.
- Yoshimura, A.; Jones, T.N.; Yusubov, M.S.; **Zhdankin, V.V.** "Hypoiodite-Mediated Catalytic Cyclopropanation of Alkenes with Malononitrile." Adv. Synth. Cat. **2014**, 356, 3336-3340.
- Yoshimura, A.; Koski, S.R.; Fuchs, J.M.; Saito, A.; **Nemykin, V.N.**; **Zhdankin, V.V.** "Saccharin-based α-Oxo Imidoiodane: A Readily Available and Highly Reactive Reagent for Electrophilic Amination." Chem. Eur. J. **2015**, 21, 5328-5331.
- Saito, A.; Kambara, Y.; Yagyu, T.; Noguchi, K.; Yoshimura, A.; Zhdankin, V.V. "Metal-Free [2+2+1] Annulation of Alkynes, Nitriles and N-Atoms from Iminoiodanes for Synthesis of Highly Substituted Imidazoles." *Adv. Synth. Cat.* 2015, *357*, 667-671.
- Yoshimura, A.; Nguyen, K. C.; Klasen, S. C.; Saito, A.; **Nemykin, V. N.**; **Zhdankin, V. V.** "Preparation, structure, and versatile reactivity of pseudocyclic benziodoxole triflate, new hypervalent iodine reagent" *Chem. Commun.* **2015**, *51*, 7835-7838.
- Postnikov, P.S.; Guselnikova, O.A.; Yusubov, M.S.; Yoshimura, A.; **Nemykin, V.N.**; **Zhdankin, V.V.** "Preparation and X-ray structural study of new dibenziodolium derivatives" *J. Org. Chem.* **2015**, *80*, 5783-5788.

Book Authorship, Editorship, and Book Chapters

- **Zhdankin, V.V.** *Hypervalent Iodine Chemistry: Preparation, Structure and Synthetic Applications of Polyvalent Iodine Compounds*. John Wiley & Sons: Chichester, **2014**

- "Natural Biomarkers for Cellular Metabolism: Biology, Techniques, and Applications." Vladimir V. Ghukasyan and **Ahmed A. Heikal** (*Editors*), Taylor & Francis, *CRC Press* (October 7, 2014, 408 Pages, *ISBN*: 9781466509986), Series in Cellular and Clinical Imaging (Senior Editor: Ammasi Periasamy).

- Harshad D. Vishwasrao, Qianru Yu, and **Ahmed A. Heikal. 2014**. "Polarization Imaging of Cellular Autofluorescence" In "Natural Biomarkers for Cellular Metabolism: Biology, Techniques, and Applications", V. Glukasyan and **A.A. Heikal** (*Editors*), Taylor & Francis Group; *October 7, 2014*.

- Wickramasinghe, D., R. Timerman, J. Bartusek, and **Ahmed A. Heikal. 2015.**"Partitioning and diffusion dynamics of fluorescently labeled FTY720 in resting epithelial cells." In "Advanced Time-Correlated Single-Photon Counting Applications", Wolfgang Becker (*Editor*), Springer, May 2015.

- **Schreiner, K.M.**, N.E. Blair, W. Levinson, and L.M. Egerton-Warburton (2014). "Contribution of fungal macromolecules to soil carbon sequestration" In: *Progress in Soil Science 2014: Soil Carbon*. (Eds. A. Hartemink and K. McSweeney): pp. 155-161, Springer, Berlin.

- **Zhdankin, V.V.** "Hypervalent Iodoarenes and Aryliodonium Salts (Update 2014)." *Science of Synthesis*, **2015**, *31*, Ch. 31.4.1.3.

- **Zhdankin, V.V.** "Iodine Heterocycles." *Advances in Heterocyclic Chemistry,* **2015**, *115*, Ch. 4.

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