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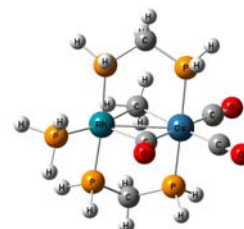
A Word from the Chair

After nine years as Chair of the Chemistry Department, I have decided not to run for reelection and reenter to ranks of the "regular" faculty. So after the end of this term in August, a new yet-to-be-selected professor will take over as occupant of this office. There have certainly been a lot of changes in the department in the past nine years. We have hired 14 new tenure track professors, 4 new affiliate professors, and 3 new staff members. We have undergone several building renovations and expansions. Yet despite all this progress, things never seem to stop changing. Just this year we welcome our newest faculty members. Richard Lord joins us this year as our newest tenure track professor (computational inorganic), and Dan Groh and Tom Dueweke are new members of the affiliate faculty. We are also in the middle of a search for a new Biochemistry professor and staff member to cover the stockroom duties during evening labs. Our Department members continue to win many awards and our students continue to go on to find great opportunities in graduate schools and careers.

However, I would say that the most interesting part of being Department Chair has been the opportunity to interact with professors and

administrators outside of the department. Prior to becoming Department Chair, I found it very comfortable to work almost exclusively with my students and a small subset of University faculty. But as a Department Chair, I was required to work within a much wider circle of University faculty and administrators. It is certainly good to get outside of your comfort zone from time to time and now. Becoming Department Chair and expanding my circle of associates was a good way for me to do that. Now that I feel more comfortable in this role, stepping aside to let someone else take over is again a good way for me to shake things up. I guess it's time for that again. It is something for you all to consider in your own lives as well. You need not do anything as drastic as change your career, but taking on a new hobby or volunteer work, seeking new friends or reconnecting with old ones, or taking that trip you have always dreamed - all are ways you can step out of your comfort zone. It's good for the soul.

Todd A Carlson



Arnold C. Ott Lectureship in Chemistry for 2011-2012 School Year

A tradition that started with one lectureship a year has now extended to two lectureships, one in the fall semester and the other in the winter semester. However, in the 2011-2012 school year, the Chemistry Department hosted three Ott Lectureships; two in the fall semester and one in the winter semester. The Ott Lectureship remains a Grand Valley Chemistry Department tradition that honors the legacy of Dr. Arnold Ott, who was one of the co-founders of Grand Valley and served on the Board of Trustees for 28 years. The Ott Lectureship was created and endowed by a gift from Arnold C. Ott and Marion Ott. Our Ott Lecturers, for the 2011-2012 school year, were Drs. Harry Gray, Gary Hieftje, and Roderick MacKinnon.

Dr. Harry B. Gray is the Arnold O. Beckman Professor of Chemistry and Founding Director of the Beckman Institute at the California Institute of Technology. Dr. Gray's research is focused on biological inorganic chemistry and solar photochemistry, including the development of inorganic systems for energy storage. Two lectures were scheduled on September 22 and 23 at the Robert C. Pew Grand Rapids campus and Allendale, respectively. The evening lecture on Thursday, September 22, at the Cook-Devos Center for Health Sciences, was titled "The 21st Century Solar Army". The afternoon lecture on Friday, September 23, in 123 Manitou Hall, was titled "Electron Flow Through Proteins".

Dr. Gray is an accomplished scientist who has been recognized with numerous awards such as the National Medal of Science, the Pauling Medal, the Linderstrøm-Lang Prize, the Gibbs Medal, the Harvey Prize, the National Academy of Sciences Award in Chemical Sciences, the Benjamin Franklin Medal in Chemistry, the Wolf Prize, and six national awards from the American Chemical Society, including the Priestley Medal. Dr. Gray has published over 750 research papers and 17 books.

Dr. Gary M. Hieftje is Distinguished Professor and Mann Chair of Chemistry at Indiana University in Bloomington, Indiana. Dr. Hieftje's research interests include the investigation of basic mechanisms in atomic emission, absorption, fluorescence and mass spectrometric analysis, and the development of instrumentation and techniques for atomic and molecular methods of analysis. Two lectures were scheduled on November 10 and 11 at the Robert C. Pew Grand Rapids campus and Allendale, respectively. The evening lecture on Thursday, November 10, at the Loosemore Auditorium, was titled "Teaching and Research: Symbiosis or Conflict". The afternoon lecture on Friday, November 11, in 123 Manitou Hall, was titled "New Tools, Toys, and Tricks for Chemical Measurements".

Dr. Hieftje is an accomplished scientist who has won numerous awards in the fields of analytical chemistry, chemical instrumentation, and spectroscopy. In addition, Dr. Hieftje has held major offices in several scientific societies, has delivered many named lectures, and has served on the editorial boards of many major journals. He is the author of over 550 publications, 10 books, and 17 patents.

Dr. Roderick MacKinnon is a Professor of Chemistry at Rockefeller University and an Investigator in the Howard Hughes Medical Institute. Dr. MacKinnon's research is focused on the characterization of potassium channels through biochemical and functional analysis. Two lectures were scheduled on March 13 and 14 at the Robert C. Pew Grand Rapids campus and Allendale, respectively. The evening lecture on Tuesday, March 13, at the Loosemore Auditorium, was titled "Electricity and Biology". The afternoon lecture on Wednesday, March 14, in 123 Manitou Hall, was titled "Potassium Channels".

Dr. Roderick MacKinnon is an accomplished scientist who has won numerous awards. The most notable award is winning the Nobel Prize in Chemistry in 2003. Dr. MacKinnon is the author of numerous scientific publications.



Dr. Harry B. Gray



Dr. Gary M. Hieftje



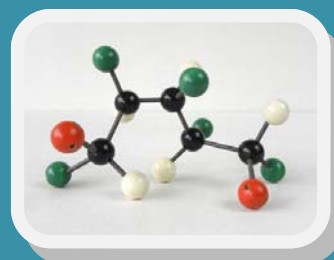
Dr. Roderick MacKinnon

Chemistry Department Activities for Visually Impaired Students

During the summer of 2012, faculty members from the chemistry department held the second annual hands-on activity session for a group of 20 visually impaired students and their helpers from Camp Tuhsmeheeta. Five faculty colleagues in the Department of Chemistry (Nathan Barrows, Shannon Biros, Jim Krikke, Thomas Pentecost, and Robert Smart) performed chemistry activities for vision impaired students. With setup assistance from Michelle DeWitt and her crew from the Chemistry

Department stockroom, the activities were carried out in the teaching labs on the third floor of Padnos Hall of Science.

During the hour session, students made slime and explored the influence of molecular structure on properties with chiral compounds and polymers. The session ended with the students experiencing exploding balloons and liquid nitrogen ice cream. According to Tom Pentecost, "The faculty and staff involved were rewarded with a room full of excited and eager students, whose enthusiasm was truly infectious – an excellent reminder of why we teach", he said.



Chemistry Faculty Receive Awards

A tradition of teaching excellence and mentorship continues in the Chemistry Department. In the 2011-2012 school year, two faculty colleagues were honored with awards from the Center for Scholarly and Creative Excellence, the Pew Teaching and Learning Center, and the Alumni Association.

Nathan Barrows (Assistant Professor) received the Pew FTLC "Teaching Excellence Award" in February 2012.

Felix Ngassa (Associate Professor) received the Center for Scholarly and Creative Excellence (CSCE) "Distinguished Undergraduate Mentoring Award" in February 2012. He also received the Alumni Association Outstanding Educator Award in December 2011.

~ Alumni News ~

Charles DeLisle, a 2012 graduate writes, "I graduated from Grand Valley with a Biomedical Science major, a Chemistry major (Biochemistry and Biotechnology emphasis), and an Applied Statistics minor. I thoroughly enjoyed my time in undergraduate research, working for GVSU Housing and GVSU Student Life, and assisting STA 215 students as a SLA Facilitator, but I am ready to move on to the next step. In August 2012, I started attending the University of Illinois at Chicago for a PhD program in Chemistry, most likely in Biochemistry or Bioorganic Chemistry, while attempting an Interdepartmental Concentration in Neuroscience through the Chemistry Department."

Patrick Feuerstein, a 2012 graduate writes, "I graduated from Grand Valley with a B.S. in Biochemistry and Biotechnology, with a minor in Philosophy. I am hoping to nab a job in the area doing biochemical research or related lab work. Graduate school in the future is still an option and would most likely be a Biochemistry or Toxicology program."

Zac Garlets, a 2012 graduate writes, "I graduated from Grand Valley with a Bachelor's of Science in Chemistry, professional emphasis. I began graduate school this summer at the University of Michigan in the biochemistry division of the Program in Biomedical Sciences. I intend to pursue organometallics or bioinorganic chemistry. My wife and I had our second child in August, which increased our family size to 4, a perfect size to start graduate school."

Eric Hansen, a 2012 graduate writes, "I graduated from Grand Valley with a B.S. in chemistry with an emphasis in professional chemistry. I played violin with the Grand Valley Symphony for many semesters while at Grand Valley. This fall, I moved to South Bend to attend Notre Dame's graduate school of chemistry. I'm not sure what I'll focus on yet. I applied as a theoretical/computational/physical chemist. I'm not at all opposed to this, but I'm afraid of never going back into the lab. After my formal education, I will hopefully be able to teach chemistry at the university level, maybe even here at good old Grand Valley."

Marlisa Hawley, a 2012 graduate writes, "I graduated from Grand Valley with a Bachelor's of Science in chemistry with an emphasis on biochemistry and biotechnology and a minor in biology. I plan upon attending medical school next year, although I have not yet decided which school I will be attending. This summer, I did retrospective research at the neurological institute at Henry Ford Hospital in Detroit."

Greg Kortman, a 2012 graduate is now attending graduate school for chemistry at the University of Illinois at Urbana-Champaigne.

Chris Offringa, a 2012 graduate writes, "I graduated from Grand Valley with a B.S. in Chemistry with a professional emphasis, and a minor in mathematics. I am currently looking for a job in the Grand Rapids area. My hope though, is to one day work in a government laboratory doing forensic science, specifically in fire – arson investigations."

Erik Wolf, a 2012 graduate writes, "I graduated from Grand Valley with a B.S. in chemistry with an emphasis in biochemistry and biotechnology and a minor in biology. I am planning on attending medical school, preferably near Michigan." Kirk Olson, a 1998 graduate writes, "After receiving my Masters degree in 2001 from Michigan State University, I went on to be a medicinal chemist for Pfizer for five years (Kalamazoo, St. Louis, and Ann Arbor) before transferring to Cayman Chemical in Ann Arbor, MI, where I am a research scientist in the Medicinal Chemistry group. Cayman is a

great place to work and we offer internships in the summer which would be great to offer to GVSU students."

Jody Wycech, a 2012 graduate, is now pursuing a PhD in climate change geochemistry at the University of Wisconsin-Madison.

Nicole Gibbons, a 2011 graduate writes, "I am studying organic polymer chemistry at the University of Florida. I finished my first year of graduate school and looking forward to 4 more."

Randall Breckon, a 2010 graduate writes, "I am married and living in Ohio. I just finished my second year of graduate work in organic chemistry at Kent State University."

Amanda Hanks, a 2010 graduate wrote, "I am finishing my second year of graduate study in Cancer Biology at UT-MD Anderson Cancer Center in Houston."

Nick Kamar, a 2010 graduate writes, "I am currently enrolled in Foundations for Chemical Engineering at Michigan State University, a bridging program for B.S. students to study chemical engineering in graduate school at MSU."

Sarah Anzell, a 2009 graduate writes, "I'm working as a Legal Analyst for a marketing company in metro-Detroit. I really like my job, and couldn't be doing it if I hadn't learned from my chemistry labs and research to be so detail-oriented. I'm also looking to buy a house and made my first offer this week!"

Brandon Haines, a 2009 graduate, got married to Maggie on May 27, 2012. Brandon is finishing up his Ph.D. work in organic chemistry at the University of Notre Dame.

Dan Jackson, a 2009 graduate, has completed his cumulative exams at the University of Akron and is making good progress towards his doctorate in chemistry.

Dan Meyers, a 2008 graduate, completed two masters' degrees (MS in Organic Chemistry and MA for Teachers) from Indiana University in Bloomington. While at IU, Dan was a 2011-2012 Noyce Scholar through the National Science Foundation and attended the 2012 Noyce Conference in Washington DC in May 2012. Dan is currently the new chemistry teacher at Cardinal Ritter High School in Indianapolis, IN. Dan writes, "A couple of weeks ago I accepted a teaching position in Indianapolis at a Catholic high school where I'll be teaching honors chemistry, AP/dual-credit chemistry, and organic chemistry. This is the first time for an organic course at my school; therefore, I am creating it from scratch!"

Kyle DeKorver, a 2007 graduate, completed his Ph.D. in organic chemistry from the University of Wisconsin-Madison. Kyle is currently employed with DOW Agrochemicals in MI.

Erica Vogel (Schwander), a 2007 graduate, and **Paul Vogel**, a 2008 graduate, completed their Ph.D. degrees at Michigan State University. Both have moved to the Research Triangle for post-doctoral work.

Caryn Lehner, a 2005 graduate writes, "I got married this April and am now officially Caryn Weiss. I was hired in February as a Scientist in Amway's R&D Analytical Sciences Department in the Chemistry Group. My primary responsibilities are Chromatography Method Development, Stability Testing and Troubleshooting for our cosmetic products. I also have secondary responsibilities working on our LCMS."

Chemistry Major Wins Prestigious Goldwater Scholarship



Brianne Docter, a Chemistry major and Frederik Meijer Honors College student, was named a 2012 Goldwater Scholar. The Barry M. Goldwater Scholarship, a nationally prestigious scholarship, is awarded to exceptional college sophomores and juniors who have an interest in pursuing careers in science, mathematics, and engineering. The scholarship covers eligible expenses for undergraduate tuition, fees, books, and room and board for a maximum of \$7,500 annually.

The Barry M. Goldwater Scholarship and Excellence in Education Program was established by the US Congress in 1986 to honor Senator Barry M. Goldwater, who served his country for more than half a century as a soldier and senator. The goal of the foundation is

to ensure the training of highly qualified scientists, mathematicians, and engineers, through the award of scholarships to college students who are inclined to pursue careers in science, mathematics and engineering. Brianne's award was one of 284 awarded nationally.

Brianne Docter is a research student in the laboratory of Chemistry Associate Professor Brad Wallar. In her research, she investigates the class C beta-lactamase, AmpC. Brianne's research experience also includes a National Science Foundation Research Experience for Undergraduates (NSF-REU) at the University of Pittsburg. In addition to given a presentation at GVSU Student Scholars Day, Brianne has also presented posters of her research results at regional and national meetings such as the national meeting of the American Society for Cell Biology and the West Michigan Regional Undergraduate Science Research Conference. Brianne is the second GVSU Chemistry student in the last four years to receive the Barry M. Goldwater Scholarship.

Brianne's other academic achievements include being named a National Presidential Scholar Candidate, a National Merit Finalist, a GVSU Presidential Scholar, Phi Kappa Phi Honor Society Freshman Honoree, 2010 Outstanding Cell and Molecular Biology Student and 2011 Chemistry Department Outstanding Sophomore. For her future plans, Brianne anticipates pursuing a doctorate in biochemistry.

Chemistry Department Graduates its Class of 2012



The Chemistry Department's Class of 2012 celebrated their graduation from GVSU in April. The annual seniors' banquet was combined with the award of prizes that honors the most outstanding students in the Chemistry Department for the 2011-2012 academic year. At the combined celebration held at the Kirkhof Center in the Allendale campus, family and friends joined the graduating seniors. Also present were the faculty and staff of the Chemistry Department. The graduating seniors were Michael Agius, William Couture, Sarah Dawson, Michelle DeFouw, Charles DeLisle, Patrick Feuerstein, Zachary Garlets, Nicole Gibbons, Robert Graff, Eric Hansen, Ross Harmon, Jason Harper, Vivian Hasbany, Marlisa Hawley, Nicholas Kamar, Alafia Kanpurwala, Aaron Koch, Gregory Kortman, James LaFleur, Patrick Loudon, Peter Minnich, Ryan Nelson, Christie Offringa, Gregory Patten, Anthony Petty, Kiely Rich, Adam Taylor, Beth Vallier, Christopher Wesley, Erik Wolf, Jody Wycech, and Aaron Yusten.

Chemistry Department Honors Students

In April of 2012, the chemistry department honored many of its most outstanding students for the 2011/2012 academic year. In the 2011-2012 school year, the department came up with new award categories. A total of twenty-five awards in various categories were granted. The award winners in the different categories were the following.

General Chemistry Award: The general chemistry awards recognize students who show excellence in general chemistry. Every instructor who teaches CHM 115 and CHM 116 (both fall/winter sections) during the academic year has the opportunity to nominate three students per section for this award. The Student Affairs Committee chooses any students whose names appear on both the CHM 115 list and the CHM 116 list and give awards to those students. Names submitted from winter CHM 115 are used with the following fall CHM 116 courses. The award winners were, *Eric Applebach, Jozlyn Clasman, Joshua Hass, Moriah Muscaro, Allie Patterson, Laura Schroeder, Hollister Swanson, Madeline Vaughn, and Michael Yanoschik.*

Organic Chemistry Award: This award recognizes the top students from the CHM 241/242 sequence. Instructors teaching CHM 241 and CHM 242 (both fall and winter) during the academic year have the opportunity to nominate up to two (2) students per section for this award. The Student Affairs Committee chooses any students whose names appear on both the CHM 241 and CHM 242 lists. Names submitted from winter CHM 241 are used with the following fall CHM 242 courses. The award winners were, *David Paul, Elizabeth Peck, Cody Rogers, Justine Travis, and Hannah Westra.*

Organic Chemist Award (ACS Poly-Ed Award): The recipient of this award was *Lauren McCulloch*. This award recognizes a student that excels in the majors organic chemistry sequence (CHM 245/246/247/248). The student must be a declared chemistry major and has completed the CHM 245-248 sequence by the end of the academic year. The instructors for these courses select the student.

Analytical Chemist Award: *Marlisa Hawley* was the recipient of this award, which is given to a declared chemistry major that is outstanding in CHM 222 and CHM 225. The student must have completed CHM 225 by the end of the current academic year. The analytical Chemistry faculty selects the awardee from the best students meeting the above criteria based upon chemistry GPA.

ACS Division of Inorganic Chemistry Award: *Zachary Garlets* was the recipient of this award, which is given to a chemistry major that has excelled in CHM 471. In the event that more than one student has been identified, performance in CHM 372 is also considered. The Inorganic Chemistry faculty selects the awardee based on the above criteria.

Physical Chemist Award: *Jonathan Lehmann* was the recipient of this award, which recognizes a student who has shown excellence in physical chemistry. The winner of this award is a student who has shown high performance in terms of grades and dedication in CHM 356, CHM 358, CHM 353, and either CHM 355 or CHM 455.

Biochemistry Award: The recipient of this award was *Erik Wolf*. The award is given to a chemistry major that has excelled in CHM 461, CHM 462 and 463. The student must have completed CHM 463 by the end of the current academic year. Biochemistry faculty selects the awardee based on the above criteria.

Senior Chemical Education Award: This award is given to a Chemical education major, typically a graduating senior. The Chemical Education faculty selects the awardee from the best students meeting the above criteria. The recipient of this award was *Andy Starr*.

American Institute of Chemist Award: *Gregory Kortman* was the recipient of this award, which is given to the senior chemistry major who meets all or most of the criteria for the Outstanding Senior Award. The Chemistry faculty selects the awardee from the eligible students.

Outstanding Senior Award: In order to be eligible, a senior, presenting in CHM 491 of the current academic year, must be a declared chemistry major and have an overall GPA of 3.5 or greater. The Chemistry faculty selects the awardee from the eligible students based upon the following criteria: Research participation; Service to the department; Extracurricular activities; and General attitude. The award recipients were *Zachary Garlets* and *Jody Wycech*.

Outstanding Undergraduate Research Award: In order to be eligible, a chemistry major must show outstanding skills, motivation, and progress in undergraduate research. This award is reserved for students that display exceptional abilities to (a) thoroughly understand their research project, (b) think critically and creatively in the research processes, (c) work independently, and (d) make significant progress in their research. In addition to participating in multiple CHM 499 and/or summer research opportunities, the awardee should also demonstrate the ability to disseminate research work to the scientific community either at regional/national conferences or through publications. Nominations for the award are be submitted by the students' research advisors in the form of a written research activity summary. The Student Affairs Committee then selects the award winner(s). The award recipient was *Zachary Garlets*.

Outstanding Service Award: This award is given to a chemistry major who has made significant contributions in service to the department. Nominations for the award are solicited from the department and other service related areas, and includes a summary statement of the student's service record. Service obligations may include stockroom duties, tutoring, serving as an SLA, Chemistry Club involvement, community outreach, etc. The Student Affairs Committee then selects the award winner(s). The award recipient was *Beth Vallier*.

Student Scholars Day 2012

More than a dozen Chemistry students presented their research results in either oral or poster form at the 17th Annual Student Scholars Day in April 2012. Student scholars and their sponsors were the following:

Derek DenHartigh. "Synthesis of Novel Peptides as Focal Adhesion Kinase Inhibitors". Sponsor: *Laurie Witucki*

Ross Harmon, Adam Taylor, Patrick Feurstein. "Disbanding the Myths of Green Chemistry". Sponsor: *Dalila Kovacs*

Hongjoon Yoon, Lee Jackson, Godwill Nwokocha, Eric Hansen. "Bio-Succinic Acid". Sponsor: *Dalila Kovacs*

Zac Garlets. "Probing the Role of Phosphorylation in the Mechanism of Formin mDia2". Sponsor: *Brad Wallar*

Paul Savage. "Modification of Antimicrobial Agent Compound by Alterations in Structure and Functionality Via Amino Acid Coupling". Sponsor: *Laurie Witucki*

Kellen Stilwell. "Asymmetric Synthesis of Chiral Silicon". Sponsor: *Randy Winchester*



Joshua Kazdan. "Student Misconceptions of Hydrogen Bonding". Sponsor: *Julie Henderleiter*

Aaron Marshall. "Biomass to Chemicals: Sustainable Chemistry". Sponsor: *Dalila Kovacs*

Kristen Simon. "The Role of the Textbook for Students in Organic and Analytical Chemistry". Sponsors: *Thomas Pentecost*

Joe Grit. "Can we Improve Research Experiences to Better Address Nature of Science Concepts?" Sponsor: *Deborah Herrington*

James Bennett. "Isotachophoretic Focusing of Bacteria and Fungi for Analysis". Sponsor: *Andrew Lantz*

Ellie Fought. "Do You Speak Chemistry? Assessing the Degree of Inconsistency Between Expert and Novice Interpretations of Exam Questions". Sponsor: *Nathan Barrows*

Kayla Hurd. "Addition of Alanine to Antibiotic Target Compound". Sponsor: *Laurie Witucki*



Jordyn Betz, Lacey Hamilton. "The Role of Textbooks: Does the Course Content or Faculty Member Matter?" Sponsor: *Thomas Pentecost*

Garett MacLean "Required Modifications for the Expression and Purification of the E290K Mutant of Horse Heart Cytochrome C Peroxidase". Sponsor: *Cory DiCarlo*

Michael Peruzzi, Charles DeLisle, Hope Sartain. "Synthesis of Multidentate CMPO Ligands for Heavy Metal Ion Chelation". Sponsor: *Shannon Biros*

Vincent Baggett. "Synthesis of Multidentate CMPO Ligands for Heavy Metal Ion Chelation". Sponsor: *Brad Wallar*

Raymond Yeow. "Co-Crystallization of Human Cdc7-Dbf4". Sponsor: *Brad Wallar*

Nicholas Florek. "Cellular Regulation of the Formin Protein, DAAM1". Sponsor: *Brad Wallar*

Alexander Porambo. "Expression and Characterization of the Beta-Lactamase, ADC-7". Sponsor: *Brad Wallar*

Alexandra Bouza. "Combinatorial Synthesis of Semiconductors Used in the Photoelectrolysis of Water". Sponsor: *Robert Smart*

Gregory Kortman. "Resonance and the Silicon-Carbon Double Bond". Sponsor: *Randy Winchester*

Stephanie Pierson, Trent Mazer. "What Happens When Molecules Collide? (Measurement of a Pressure-Broadening Coefficient)". Sponsor: *Stephanie Schaertel & George McBane*

Kirsten Tissue. "The Development of a Novel Gadolinium Chelating Agent for MRI Contrast Agents Employing Carbamoylmethyl-Phosphine Oxides (CMPOs)". Sponsor: *Shannon Biros*

Anthony Petty. "Formation of Phosphorus (III) Nitrogen Bonds". Sponsor: *John Bender*

Jonathan Lehmann. "Modified Chromenes as Precursors to TAAR Regulators". Sponsor: *Matthew Hart*

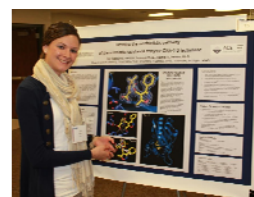
Jeffrey Globerson. "Focal Adhesion Kinase: Potential Cancer Inhibitors". Sponsor: *Laurie Witucki*

Justine Travis. "Novel Procedure Modifications for the Growth and Purification of the Mutant Forms D34K, D79K, and E118K of Horse Heart Cytochrome c Peroxidase". Sponsor: *Cory DiCarlo*

Olivia White, Jeremy Whitmore. "Regioselective Nucleophilic Ring Opening of Aziridines in the Synthesis of TIAM Analogues". Sponsor: *Matthew Hart*

Joseph Baumann "The Synthesis and Testing of GV-2 Chemical Derivatives for Antibacterial Derivatives". Sponsor: *Rod Morgan & Robert Smart*

Zoe Kilbourne. "Defining the Mechanistic Pathway of the Antibiotic Resistance Enzyme OXA-1 Beta Lactamase". Sponsor: *Rachel Powers*



Departmental Research Update



The Chemistry Department has consistently maintained as its priority research endeavor that involves the active participation of undergraduate student researchers. As in previous years, many faculty members attended regional and national meetings to present work accomplished with their undergraduate research co-workers. A summary of some faculty research update is presented.

John Bender received a Fulbright Teaching-Research grant to complete his Winter 2013 sabbatical, working with Prof Cristian Silvestru at Babes-Bolyai University in Cluj, Romania. The research project will investigate CO₂ fixation via organobismuth chemistry. John will teach a graduate course in organometallics.

Debbie Herrington continues her work with TI. The Target Inquiry (TI) project enjoyed another successful year with student poster presentations at the spring National ACS meeting held in San Diego, CA, March 2012. Eight TI teachers gave presentations highlighting the activities they developed at the recent BCCE meeting in PA in August 2012. The Target Inquiry program at GVSU is expanding to include middle and high school teachers of all science disciplines!

Andrew Korich has fully kicked off his research on organic syntheses. Two students worked in the Korich group this past summer.

Andrew Lantz and his research group continue to investigate microbial separations using various capillary electrophoresis techniques, including isoelectric focusing and isotachopheresis. The initial results from their research were included in an NSF Chemical and Biological Separations grant proposal, which was submitted this summer. The Lantz group also gave a presentation at the Joint Midwest and Great Lakes Regional ACS Meeting. In addition, the final draft of their pesticide-cyclodextrin complexation paper has been finished and will be submitted for

journal review shortly. The Lantz research group had three undergraduate researchers working in 2012-2012.

Dave Leonard and his group continue their research on the biochemistry of class D β -lactamases, with seven students working on projects this Summer/Fall. This year, the Leonard group published a paper in the journal *Biochemistry* entitled "Site-saturation mutagenesis of position V117 in OXA-1 β -lactamase: the effect of side-chain polarity on enzyme carboxylation and substrate turnover". Four former student researchers (Jenny Buchman, Kyle Schneider, Aaron Lloyd and Stephanie Pavlish) were co-authors. The Leonard group was also to find out that a new three-year grant from the NIH was funded for \$398,000. The title of the grant is "Class D carbapenemases: defining the role of carbapenem conformational changes", and will provide full-time financial support for two students each summer.

George McBane and his collaborators from Denmark and Germany published three papers in the *Journal of Chemical Physics* on ultraviolet photochemistry of N₂O and OCS. In addition, an undergraduate student in the McBane group gave a presentation at this year's August ACS National Meeting in Philadelphia on "Vibrational and electronic relaxation of Herzberg-state oxygen in collisions with nitrogen and neon". The work is funded by the National Science Foundation.



Felix Ngassa continues his research on synthetic organic chemistry with undergraduate co-workers. Four students worked in the Ngassa group in 2011-2012.

Tom Pentecost continues working in the field of psychometrics as applied to chemistry. He presented a paper at the 22nd Biennial Conference on Chemical Education on the use of Rasch modeling to

measure learning gains. Three undergraduate students, Jordyn Betz, Lacey Hamilton, and Kristen Simon presented posters at the same conference. The posters detailed their work on the analysis of students and faculty's use of textbooks in general, organic, and analytical chemistry courses. Tom was lead author on a paper published in the *Journal of College Science Teaching* describing the TA training program he co-developed while at the University of Colorado Boulder.

Rachel Powers continues her research with undergraduate students. The Powers group published a paper with an undergraduate student as co-author on "Structural analysis of the Asn152Gly mutant of P99 cephalosporinase" in *Acta Cryst* (2012), D68, 1189-1193. The Powers group also attended and gave three presentations, three undergraduate student poster presentations, at the Spring National ACS Meeting in San Diego, March 2012.



Stephanie Schaertel worked with one student during the school year and two students during the summer on a project involving the use of a diode laser based apparatus for measuring fundamental molecular constants in gas phase molecules. One of the summer students was a high school student from the Grand Rapids Area Pre College Engineering Program (GRAPCEP).

Randy Winchester worked with two undergraduate students, Anthony Coleman and Kellen Stilwell, this summer 2012. Both students worked this summer on projects related to the synthesis of chiral silanes, but with the twist that the leaving groups were derived from menthol. Both students made significant progress. This was Kellen's second summer and he has been accepted to the MSU College of Medicine and will begin there in Fall 2013. Anthony will be continuing as a senior at GVSU.

Target Inquiry (TI): It's Not Just for Chemists Anymore

Area high school chemistry teachers are making science fun by helping their students to think like real scientists, thanks to Grand Valley State University's Target Inquiry (TI) program. Teachers that have completed the TI program are sharing their methods for bringing authentic experiences to the classroom by publishing their results in peer-reviewed journals devoted to education and presenting their work at more than 50 regional and national conferences and workshops. The current TI cohort of teachers just finished presenting some of the activities they developed in the program at the 2012 Biennial Conference on Chemical Education, held at Penn State this summer, 2012.

Teachers are unanimous about the positive impacts TI has had on their teaching and their students. Alice Putti, a teacher at Jenison High School and part of the first TI cohort says, "The Target Inquiry program has done more for my teaching than any other program. The program encompasses conceptual learning instead of memorization. It's important to know how to perform a skill but it's even more important for students to learn the concept behind it." Kevin Conkel, who teaches chemistry at Hudsonville High School, said: "Kids can have a dull sense of science. TI has changed my teaching in respect

to the quality and understanding of chemistry students leave with. My teaching has become so enjoyable and the students are taking ownership of their learning."

The success of the TI program, which began at GVSU in 2006 as a professional development program for high school chemistry teachers, has resulted in a second, five-year, \$1.1 million dollar National Science Foundation Grant that, along with support from GVSU and collaborations amongst the science departments, will allow for the expansion of the program to other science disciplines (biology, geology, and physics) and middle school teachers. An additional \$1.3 million in funds from a Collaborative NSF grant will support the implementation of this innovative program at Miami University in Ohio.

The next cohort of GVSU TI teachers starts in January 2013. "We have already identified 13 outstanding teachers but still have 2 spots open if you know anyone who might be interested", said Debbie Herrington, the PI. Be sure to check out the TI program as well as the over 40 inquiry-based chemistry activities the teachers in the program have developed and tests at our website: www.gvsu.edu/targetinquiry.



Department Faculty News

John Bender received a Fulbright Teaching-Research grant to complete his Winter 2013 sabbatical, working with Prof Cristian Silvestru at Babes-Bolyai University in Cluj, Romania. The research project will investigate CO₂ fixation via organobismuth chemistry. John will teach a graduate course in organometallics. As part of his sabbatical leave, John will build collaborations between the chemistry departments at Grand Valley and Babes-Bolyai University. John was also promoted to full professor effective fall of 2012.

Shannon Biros and Andrew Korich had their symposium proposal for the fall 2013 ACS national meeting, in Indianapolis, approved. This symposium will bring together a variety of PUIs from across the nation and highlight the impact that PUIs have had on organic chemistry in a variety of arenas including materials, organic methodology, physical organic, and synthesis. The symposium will feature various faculty members at different stages of their careers to encourage cross-talk among institutions and provide a support network for junior faculty.

Matthew Hart is on sabbatical for the academic year 2012-2013.



Andrew Korich and Julie were married on July 28th at The Inn in Baldwin Creek, located in Bristol, Vermont. For their honeymoon, they traveled to several villages in Alsace region of France, followed by a few days in Paris.

Dave Leonard had a new three-year grant from the NIH funded for \$398,000. The title of the grant is "Class D Carbapenemases: Defining the Role of Carbapenem Conformational Changes", and will provide full-time financial support for two students each summer. Dave was also promoted to full professor effective fall of 2012.

Steve Matchett is on sabbatical for the fall semester 2012.

George McBane will spend the academic year 2012-2013 on sabbatical at Durham University in northeast England. He received a Leverhulme Visiting Professorship to work with Prof. Jeremy Hutson on the theory of ultracold molecule generation and behavior. He and his family are looking forward to their year abroad.

Rachel Powers is on sabbatical for the academic year 2012-2013.

Sherril Soman is on "administrative leave", where she is serving as the University Registrar for the fall semester 2012.

Toni Rice has retired from GVSU Chemistry Department.

2011-2012 Distinguished Alumni-in-Residence

The CLAS Distinguished Alumni-in-Residence Program is an opportunity for various departments in the college to invite outstanding alumni to visit GVSU and share their post-graduation experiences with students, faculty, and staff. Our department's Distinguished Alumni-in-Residence for 2011-2012 was Dr. Peter Stevens, co-founder and the Technical Director of Analytical Sciences at 3 Degrees of Separation in Dayton, Ohio. Prior to founding the company Dr. Stevens was an applications chemist at LECO Corporation. Pete graduated with a degree in Chemistry from GVSU in 2001. He then went on to receive masters and PhD degrees in Analytical Chemistry from the University of Michigan, working with Dr. Richard Sacks in the field of separation science. Pete's area of specialization is Comprehensive Two-dimensional Gas Chromatography (GC-GC). His research interests include the GC-GC analysis of human breath as a tool for medical diagnostics, GC-GC for metabolomics research, and the development of instrumentation for space, environmental, defense and homeland security applications. Dr. Stevens holds two patents and is an author on publications, applications notes, and numerous presentations.



New Faculty 2012-2013

Richard Lord has joined the faculty as an Assistant Professor of Inorganic Chemistry. He graduated from Indiana University in 2010 with a Ph.D. in chemistry, working under Profs. Mookie Baik and Frank Schultz. His dissertation research focused on the electrochemical properties of transition metal complexes exhibiting unusual electron transfer behavior. Immediately prior to his arrival at GVSU, he was a post-doctoral fellow at Wayne State University working with Profs. John Endicott, Berny Schlegel, and Claudio Verani on the spectroscopic characterization of transition metal complexes featuring redox active metals and ligands. His research at GVSU will use computational methods to understand how redox active ligands influence: (i) small molecule activation mechanisms and (ii) electrochemical and magnetic properties of transition metal complexes. This fall he will be teaching lab and lecture for CHM 115 and CHM 109.

Georgia Fritz has joined the faculty as a Visiting Assistant Professor of Chemistry. She is a graduate of the University of Michigan, receiving her Ph.D. in chemistry in 2011, working under the direction of Dr. John Wolfe. Her dissertation research focused on the synthesis of nitrogen containing heterocycles using



Dr. Richard Lord

palladium catalysts. Before coming to GVSU, she was a visiting assistant professor of chemistry at the University of Mount Union in Alliance, Ohio. This year she will be teaching CHM 115, Principles of Chemistry.

Angela Slater has joined the faculty as a Visiting Assistant Professor of Chemistry. She is a graduate of Grand Valley State University, receiving her M.Ed. in chemistry in 2010. Her dissertation research focused on Instruction and Curriculum with Emphasis in Advanced Content Specialization-Chemistry. Angela serves as an adjunct professor in the School of Education, where she co-teaches EDG 601, Content for Teaching. Angela was also a Science Teacher at Muskegon Heights High School and had served as the Science Department Chairperson. This fall she will be teaching lab and lecture for CHM 109 and labs for CHM 115.

In addition to the new tenure track faculty and visiting positions, our department also has two new affiliate faculty members; **Thomas Dueweke** and **Daniel Groh**. **Niraj Joshi** is a new adjunct instructor, while **Tanya Gupta** is a new post-doctoral associate working with Debbie Herrington in Target Inquiry Program.

Chemistry Department Manages Waste Sustainably

The Chemistry Department has been thinking sustainably in its efforts to reduce the amount of hazardous and landfill waste that is produced in the teaching and research laboratories. No effort has been spared in this endeavor, explained Michelle DeWitt, laboratory supervisor. "In the Chemistry Department, we take great care for the environment and our budget," said Michelle. "Contrary to public opinion, chemistry professionals care about the environment, and thus are always looking for ways to improve the way experiments are taught in the teaching and research labs. We love to experiment with new methods and technologies", Michelle said.

According to Jim Seufert, lab safety specialist for the College of Liberal Arts and Sciences, "an important aspect of this hazardous waste management is working hard to get inventory on every chemical in storage. What everyone tries to do is reduce the quantity of unused chemicals. The goal is to reduce some chemicals, albeit, old bottles are expensive to get rid of," Jim said. Jim added that although he does not wish to discourage anyone in a research lab from using chemicals necessary for research projects, it would be beneficial for the department, college and the university if unused chemicals are not kept around.

There are many examples of how the Chemistry Department has championed sustainability in the management of hazardous waste for many years. More than a decade ago, the department started talking about switching its labs from macroscale to microscale and choosing experiments that are more "green". "We switched from macro distillations to micro distillations around 2000 and then in the fall of 2011, we started with phasing in the microwave experiments," Michelle said. "The sustainability effort is very effective and is a work-in-progress," said Michelle. Other sustainability efforts include the following: Using starch packing peanuts that dissolve in water rather than Styrofoam ones; Switching from mercury thermometers to digital thermometers; Categorizing metals into hazardous and nonhazardous categories to save money when disposing them; Converting plastic cups from summer orientations into polylactic acid, an all-purpose cleaning solution; Limiting landfill waste by rewashing weigh boats, test tubes and plastic droppers; Reducing paper, cardboard waste and batteries through recycling; Reducing the use of printer papers by providing laptops in some labs and allowing students to enter data and answer questions on the online program WebAssign; and using a special microwave in organic labs to reduce and eventually eliminate solvent use in extractions and distillations.

"Waste disposal cost dropped from \$4,200 in June 2010 to \$3,900 in June 2011," said Jim. "Padnos Hall of Science was the largest waste generator," Jim said.



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Chemistry Department Instrumentation Update



This past year the chemistry department has been busy doing upgrades on some of our current inventory. Several new flat screen monitors were installed as replacements for the older CRT monitors that were still in use on some instruments. All of the major pieces of equipment are now equipped with flat screens. A computer with integration software (ChromPerfect Seven) was purchased and installed on the Thermo Focus GC with the FID (flame ionization detector) to accommodate file transfers and data storage. This software replaces an integrator that had been in use. Also several new balances were purchased as replacements for older models and to meet additional needs for the classroom laboratories.

The department also purchased and installed a second Thermo Focus GC equipped with a TC (thermal conductivity) detector. This instrument will not only increase our research capabilities but will also be used in our analytical instrumentation classes.

Other than that, we are striving to maintain our current instrumentation to meet the needs of a thriving and growing department. Much of our instrumentation such as the NMR's, mass spectrometers and FTIR's, continue to be workhorses in the department. The facilities committee is seeking plausible ways to finance replacement when the time comes.