Chemistry Department Newsletter

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GRAND VALLEY STATE UNIVERSITY
DEPARTMENT OF CHEMISTRY

SOME FEATURES IN IN THIS ISSUE:

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A Word from the Chair

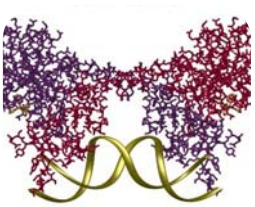
Summer 2014 finished with a bang: GVSU hosted the Biennial Conference on Chemical Education, which brought over 1500 people with interests in chemistry education to Allendale. The conference ran remarkably smoothly, thanks to thorough advance work. The Organizing Committee included Chemistry faculty Sherril Soman (as General Chair), Julie Henderleiter, Bob Smart, Stephanie Schaertel, Nate Barrows, Jessie VandenPlas, Tom Pentecost, Mary Karpen, and Chris Lawrence, as well as several other people with connections to the department: Sandi Bacon, Ellen Yezierski, and alumna Alice Putti. Department secretary Janet VanRhee served as conference secretary and our laboratory supervisor Michelle DeWitt organized the handling of materials and the stockroom support for more than 100 workshops. Randy Winchester organized a 5K fun run that showed off our campus and John Bender wrote a discriminating visitors' guide to local breweries, pubs, and restaurants that showed off Grand Rapids. Students, staff, and faculty contributed hundreds of volunteer hours, and many faculty organized workshops and symposia. Visitors appeared to be uniformly impressed with the organization, the quality of the space and preparations, and the campus. Blair Miller found himself in an argument with a visitor who concluded that "GVSU must be very well funded" because the conference was so nice! This international conference was the largest meeting ever held at GVSU, and the department is proud that it ran so successfully.

Our department welcomes Scott Thorgaard, a new analytical chemist, with particular expertise in electrochemistry. You can read about Scott's background elsewhere in the newsletter. In the fall he will teach our analytical chemistry survey course, and in winter he will teach a new electrochemistry course designed to support the growing regional battery industry.

We have put in place two initiatives to help students in our service courses. In response to the removal of discussion sections from several courses last year, we established a Chemistry Success Center that provides walk-in tutoring for students in 100- and 200-level chemistry courses. Last year it was staffed principally by chemistry faculty, with a modest amount of student tutoring, and was overseen on an interim basis by two of our Visiting professors, Hilary Mackay and Angie Slater. The commitment of the faculty to the Center made an impression on the administration. This year we have a new Affiliate faculty member, Sarah Clark, who will serve as director of the Center, and GVSU's Student Academic Success Center is providing support for 35 hours per week of student tutors. Our plan is to staff the Center with a mix of faculty and well-informed student tutors. Our faculty have signed up for about 50 hours each week for fall semester, and the Center is now housed in the Knowledge Market on the main floor of the stunning Mary Idema Pew Library and Learning Commons. We look forward to helping hundreds of students discover the beauty of chemistry while getting help with their homework.

We have also established a new course, "Preparatory Chemistry". This 2-credit, lecture-only course is designed specifically for students whose degree programs require them to take our mainstream chemistry sequence starting with Chemistry 115, but whose academic profiles indicate that they may struggle with 115. We had been talking about such a course for some time, but finally decided to implement it just before the beginning of freshman orientation this summer. We informed the orientation counselors of the course and its target audience, and they responded with enthusiasm. Our initial section of 30 students filled, we opened another, and by the end of the summer that one filled too. Two outstanding instructors, Professors Steve Matchett and Jessie VandenPlas, are teaching the sections this fall and we look forward to seeing their students succeed.

Finally, I should mention that our department now offers a new degree: a Bachelor of Science in Biochemistry! Our Biochemistry and Biotechnology emphasis within the Chemistry major has been very successful for a long time, attracting strong students. The biochemistry faculty suspected that some additional highly qualified students might be interested in a Biochemistry degree. In addition there was some administrative advantage in a separate degree program for biochemistry students as we began designing the revised Chemistry curriculum we expect to submit this year. The degree requirements for the BS in Biochemistry are the same as our current Biochemistry and Biotechnology emphasis, so our current students will get to select which degrees they receive. We're confident the new degree will be popular and will serve students well.



We enjoyed seeing several of you at the BCCE, and always enjoy updates from our alumni. Please keep in touch!

George McBane

Chemistry Faculty Receive Awards

A tradition of teaching excellence and mentorship continues in the Chemistry Department. In the 2013-2014 school year, three faculty colleagues were honored with various teaching, research and mentoring awards.

Shannon Biros (Associate Professor) received the Center for Scholarly and Creative Excellence (CSCE) Distinguished Early-Career Scholar Award. The Distinguished Early-Career Scholar Award honors remarkable investigators who began their independent scholarship within the past six years. These scholars demonstrate mastery in their field and show significant potential for continued success. The award recipients have made major contributions to theory, research and creative practice, and they have earned national recognition for their outstanding achievements. The presentation of this award was done at the Faculty Awards Convocation on February 6, 2014.

Dr. Shannon Biros

Deborah Herrington (Professor) was awarded the Distinguished Contribution in a Discipline Award from the Center for Scholarly and Creative Excellence (CSCE) at GVSU. This award is given to a member of the faculty whose performance in scholarly or creative activities, or whose contributions through service to professional organizations, is clearly outstanding. The award recognizes a continued record of exceptional achievement. The presentation of this award was done at the Faculty Awards Convocation on February 6, 2014.

Deborah Herrington (Professor) was named a 2014 Niemeyer Award winner by Grand Valley State University. The Glenn A. Niemeyer Awards, named for the first Provost of Grand Valley State University, honors faculty for their excellence and loyalty to teaching, scholarship, and service. Faculty members selected for the award have a superior student-centered approach to teaching with continual development of excellence in the classroom that instills the love of learning in their students. They create new knowledge and explore its applications through scholarly activity. They also contribute their expertise and service to the University, professional organizations, or the community. Dr. Herrington co-founded the Target Inquiry program, an innovative professional development program designed to improve the quality and frequency of inquiry-based instruction in middle and high school science classes. Dr. Herrington is also noted for her level of service to organizations such as the American Chemical Society, Chemical Education Research Committee, and the National ACS Awards Selection Committee, among others.

Dr. Deborah Herrington

Deborah Herrington (Professor) was included in the list of the Top 25 STEM Professors in Michigan by onlineschoolsmichigan.com. The goal of the top professors list is to highlight post-secondary educators who have been recognized recently for excellence in the classroom, on campus, and/or in the community. The complete list of award winners can be found at http://onlineschoolsmichigan.com/top-college-professors-in-michigan/science-technology-engineering-math/

Rachel Powers (Associate Professor) received the Distinguished Undergraduate Mentoring Award from the Center for Scholarly and Creative Excellence (CSCE) at GVSU. This award is intended to recognize excellence in mentoring undergraduate researchers. Dr. Powers conducts research on the biochemical characterization of β-lactamases and other enzymes using crystallography, and collaborates with a large number of undergraduate researchers in her laboratory. Her work has resulted in numerous presentations and publications with GVSU student authors. The presentation of this award was done at the Faculty Awards Convocation on February 6, 2014.

Dr. Rachel Powers

2013 Distinguished Alumnus-in-Residence

Dr. Paul Cook

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 Alumna-in-Residence for 2013 was Dr. Paul Cook, Assistant Professor of Chemistry at Grand Valley State University. Paul Cook earned his B.S. in Chemistry/Biochemistry from Grand Valley in 2004. As a student at GVSU he was highly successful, receiving the ACS Analytical Division Award and the Outstanding Senior Chemistry Award. He was involved in undergraduate research projects at Grand Valley and at Indiana University-Bloomington as part of the NSF-REU program. After graduation, he attended the University of Wisconsin-Madison, where he earned his Ph.D. in Biochemistry in 2009. As a graduate student, he worked in the laboratory of Professor Hazel M. Holden, where he utilized X-ray crystallography to determine the three-dimensional structures of several bacterial enzymes. While at Wisconsin, Paul was awarded the Wisconsin Alumni Research Foundation Distinguished Graduate Fellowship. After completion of his graduate work, he was an NIH Postdoctoral Research Fellow in Professor Richard Armstrong's lab at the Vanderbilt University Medical Center in Nashville, Tennessee. There he studied the structures and functions of a class of enzymes that confer antibiotic resistance to certain bacteria. Eager to get back into the classroom and work with undergraduates in the lab, Paul secured a faculty position in the Department of Chemistry and Biochemistry at the University of Mount Union in Alliance, Ohio. In addition to teaching general chemistry and biochemistry, he also developed his undergraduate-geared research program, again involving structural and functional studies of bacterial enzymes. Paul returned to the Chemistry Department at Grand Valley as an Assistant Professor last year. He is currently teaching courses in the Biochemistry sequence and conducting research with undergraduate co-workers.

Chemistry Faculty Receives External Grant to Fund Research

A chemistry faculty has received a highly competitive external grant to fund research projects for three years. Rachel Powers (Associate Professor) was recently awarded an AREA (R15) grant from the National Institutes of Health ($388,758). The title of the project is "Structure-based discovery and design of novel class D beta-lacatamase inhibitors." Currently, antibiotic resistance is one of the most pressing public health crises of the 21st century, and beta-lactamases are the most widespread resistance mechanism to beta-lactam antibiotics, like penicillin and cephalosporins. In particular, the class D beta-lactamases are clinically relevant targets for which there are no known inhibitors. The proposed research focuses on the optimization of two classes of compounds with the potential to become the first clinical inhibitors for class D beta-lactamases. This grant supports the project for three years and will provide funding for two undergraduate students to conduct research in the laboratory of Dr. Powers during each of the three summers.

NATIONAL INSTITUTES OF HEALTH

Arnold C. Ott Lectureship in Chemistry for 2013-2014 School Year

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 2013-2014 school year, were Drs. Carl Lineberger, and Richmond Sarpong.

Dr. William Carl Lineberger is the E.U. Condon Professor of Chemistry and Biochemistry and Fellow of JILA at the University of Colorado in Boulder. His research centers on the application of lasers to problems in chemical physics, especially those involving gas phase anions. He has won numerous awards such as the H. P. Broida Prize in Chemical Physics and the Earl K. Plyler Prize from the American Physical Society. He received the Bomem-Michelson Prize and the William F. Meggers Prize from the Optical Society of America.

Two lectures were scheduled on October 29 and 30 at the Grand River Room of the Kirkhof Center and the Cook-DeWitt Center on the Allendale campus, respectively. The evening lecture on Tuesday, October 29, at the Grand River Room, was titled "Negative Ion Chemistry Research: How it Led to A Positive Look Into Science and Technology Policy". The afternoon lecture on Wednesday, October 30, at the Cook-DeWitt Center, was titled "Molecular Reaction Dynamics in Time and Frequency Domains: A Wonderful Playground for Collaboration between Experiment and Theory".

Dr. Lineberger has served on many advisory committees, chairing the NSF Advisory Committee for Mathematical and Physical Sciences, the National Research Council Commission on Physical Sciences, Mathematics and Applications, and the Department of Energy Basic Energy Sciences Advisory Committee. In 2011, he was nominated by President Obama for Membership on the National Science Board, and was subsequently confirmed by the US Senate. He serves as a Member of the Executive Committee and Chair of the Subcommittee on Facilities of NSB.

Dr. Richmond Sarpong was born in Ghana, West Africa in 1974 and lived in various countries in Africa including Zambia and Botswana. He received his B.A degree from Macalester College (St. Paul, Minnesota, USA) in 1995. During that time he carried out undergraduate research in organic chemistry with Professor Rebecca Hoye. He conducted his Ph.D. research with Professor Martin F. Semmelhack at Princeton University (Princeton, New Jersey, USA) and completed his degree in 2000. At Princeton, his research was focused on organic synthesis. After three and a half years as a postdoctoral fellow with Professor Brian Stoltz at Caltech (Pasadena, California, USA) working on natural products synthesis, he began his independent career at the University of California, Berkeley where he has recently been promoted to Full Professor (officially effective July 2014). Richmond has been the recipient of several awards including a Sloan Research Scholar award and a Camille-Dreyfus Teacher Scholar award. His current research interests span the development of new strategies for natural product synthesis.

Two lectures were scheduled on Tuesday, April 15 and Wednesday, April 16, at the Robert C. Pew Grand Rapids campus and Allendale campus, respectively. The evening lecture on Tuesday, April 15, at the Loosemore Auditorium, was titled "Nitrogenous Natural Products: Suppliers of Life's Quality". The afternoon lecture on Wednesday, April 16, at the Cook-DeWitt Center, was titled "Strategies and Tactics for Chemical Synthesis Inspired by Alkaloids".

Dr. William Carl Lineberger

Dr. Richmond Sarpong

Local High School Students Win Google Science Fair Award with Help from GVSU

Kelsey Brennan, Kayla Foley, and Anna Fritz, all students at Comstock Park High School, were working with John Ball Zoo to determine the calorie content of several different foods the zoo was preparing for its animals. The students intended to describe their project in an entry to the Google Science Fair. They constructed a calorimeter for the purpose, but found by testing samples with known calorie content that it was not accurate enough. Their teacher, Jon Wier, contacted GVSU Chemistry to ask for help.

Prof. George McBane invited the four to come to GVSU in May to use precision bomb calorimeters. In a half-day visit the students made measurements on three different types of animal feed.

The students described the measurements in their Science Fair entry, and compared the calorie counts being provided to bears and apes at the zoo to the diets of their wild counterparts. They found that the number of calories the zoo animals were receiving was similar to that of wild animals during times of plentiful food but did not reflect the large variation in food availability experienced by wild animals.

In July the students found that they had won a Local Award worth $1000 from the Google Science Fair. Only 33 of these awards were given worldwide. Their report can be viewed at www.googlesciencefair.com under "Local Award Winners."

Department Faculty News

Shannon Biros earned tenure and was promoted to Associate Professor. She will be on a year-long sabbatical in the 2014-2015 academic year.

Julie Henderleiter is on sabbatical for the academic year 2014-2015.

Debbie Herrington was promoted to Full Professor. Debbie also gave presentations at Chemical Education Conferences in the US and Canada. At ChemEd 2013 in Waterloo, Ontario, Debbie gave a talk titled "Target Inquiry: Chemistry Activities that Actively Engage Students." At the Gordon Research Conference for Chemistry Education Research & Practice, held at Salve Regina College in Newport, RI, Debbie co-authored a poster along with **Tanya Gupta** titled "A Study of the Impact of the Target Inquiry Program on Teacher Behavior in the Science Classroom."

David Leonard and **Rachel Powers** coauthored a paper with collaborator Robert Bonomo. The paper, "Class D β-Lactamases: A Reappraisal after Five Decades," appears in Accounts of chemical research (2013).

Richard Lord and his research student, Talon Kosak, received the Ott-Stiner Modified Student Summer Scholar award to work on computational modeling of BBr3 mediated benzofuran formation from o-alkynlanisoles (a project that grew out of Andrew Korich's 2012 S3 student, Samantha Ellis, work). In addition, work from the Lord's group resulted in numerous presentations and peer-reviewed publications.

Richard Lord and GVSU undergraduate student Adam Terwilliger published a paper in Acta Crystallographica: Hui, A.K.; Chen, C.-H.; Terwilliger, A.M.; Lord, R.L.; Caulton, K.G. A Tale of Hydrogen Abstraction, Initially Detected via X-ray Diffraction. Acta Cryst. 2014, C70, 250-255.

Felix Ngassa received a Pew FTLC Scholar Teacher Grant. He also published a book chapter, "Mentoring Undergraduate Research: Opportunities and Challenges" In Developing and Maintaining a Successful Undergraduate Research Program; Chapp, T. W.; Benvenuto, M. A., Eds.; ACS Symposium Series; American Chemical Society: Washington, DC, 2013; Chapter 4.

Rachel Powers and **David Leonard** coauthored a paper, along with GVSU students Kip-Chumba Kaitany, Neil V. Klinger, and Maddison E. Ramey, and laboratory technician Cynthia M. June. The paper, titled "Structures of the Class D Carbapenemases OXA-23 and OXA-146: Mechanistic Basis of Activity Against Carbapenems, Extended-Spectrum Cephalosporins and Aztreonam" is published in Antimicrobial agents and chemotherapy, 57(10), pp 4848-4855 (2013).

Rachel Powers and **David Leonard** coauthored a paper, along with GVSU student Beth Vallier, laboratory technician Cynthia M. June, and collaborator Robert Bonomo from Cleveland VAMC and Case Western Reserve University. The paper, titled "Structural origins of oxacillinase specificity in class D beta-lactamases" is published in Antimicrobial agents and chemotherapy, 58(1), pp 333-341 (2014).

Sheila Ryan in collaboration with **Debbie Herrington** published a paper in the Journal of Chemical Education titled, "Sticky ions: A student-centered activity using magnetic models to explore the dissolving of ionic compounds." J. Chem. Educ. 2014, 91, 860-863.

Sherril Soman is still on "administrative leave", where she is serving as the University Registrar for the 2014-2015 academic year.

Chemistry Department Honors Students

In April of 2014, the chemistry department honored many of its most outstanding students for the 2013/2014 academic year. A total of twenty-two awards in various categories were given. 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 Scholarship and Development 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, *Roxana Dumitrache, Audrey Yeiter, Emma Schroder, Amber Hoagland,* and *Ethan Austhof.*

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 Scholarship and Development 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, *Veena Janardan, Julie Cole, Lauren Mammina, Rochelle Harmon, Heidi Conrad,* and *Jennifer Grousd*

Organic Chemist Award (ACS Poly-Ed Award): The recipient of this award was *Talon Kosak*. 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: *Hannah Westra* 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: *Jeremy Whitmore* 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: *Michael Esch* 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.

Senior Organic Award (ACS): The recipient of this award was *Matt Bailey*.

Biochemistry Award: The recipient of this award was *Jozlyn Clasman*. 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 *Lauren McCulloch*.

American Institute of Chemist Award: *Jozlyn Clasman* 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 recipient was *Jeremy Whitmore.*

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 Scholarship and Development Committee then selects the award winner(s). The award recipient was *Kip Kaitany.*

Outstanding Service Award: This award is given to chemistry major that 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 Scholarship and Development Committee then selects the award winner(s). The award recipient was *Garett MacLean*.

Chemistry Department Faculty and Students Attend the 246th National Meeting of the ACS in Indianapolis, IN

Several GVSU faculty and students attended the 246th National Meeting of the American Chemical Society in Indianapolis, IN from September 8-12, 2013. The contributions of the GVSU chemistry department are highlighted below:

Shannon Biros collaborated with undergraduate student Shelby McGraw and Dr. Eric Werner from the University of Tampa to present a poster at the meeting titled "*Synthesis and solution studies of new tripodal CMPO ligands for f-element extractions.*"

Matthew Hart and his research group gave 2 poster presentations at the meeting. Students Jacqueline Williams and Alex Zuhl presented a poster titled "*Progress towards the development of urea based modulators of the trace amine associated receptor*". Students Jeremy Whitmore and Olivia White presented a poster titled "*Progress towards the regioselective nucleophilic ring opening of aziridines.*"

Debbie Herrington and Target Inquiry Teachers Deanna Cullen, Debra Johnson, Matt LeaTrea, Michelle Mason, Alice Putti, Doug Ragan, Ryan Schoenborn, Visiting Professor of Chemistry at GVSU **Angela Slater,** and Dr. Ellen Yezierski (Target Inquiry director at Miami University, OH) presented a session titled "*Engage your students in scientific practices with Target Inquiry activities, developed and tested by teachers*" as part of High School Chemistry Day on Sunday, September 9th.

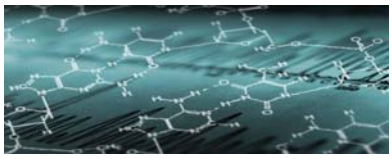
Dalila Kovacs gave a talk entitled "*Biomass conversion to value-added chemicals: A divergent approach with mechanistic insights*" as part of the session Small Splash, Big Waves: Research at Primarily Undergraduate Institutions, hosted by the Division of Organic Chemistry. This session was organized and presided over by **Shannon Biros**.

Richard Lord co-authored 5 talks given at the meeting by collaborators. Four talks were hosted by the Division of Inorganic Chemistry: "*Dinuclear metal complexes for the cooperative activation of heteroallenes*", "*Design and synthesis of ligands and homobimetallic complexes for the activation of heteroallens*", "*Six coordinate Fe(II) complex featuring tetrazine-based pincer ligands that can act as a four electron storage unit*", and "*Chemical reduction studies of a bulky pincer ligand attached to Fe(II): Evidence for ligand-based redox activity*". One talk was hosted by the Division of Analytical Chemistry: "*Multifaceted examination of multielectron transfer reactions.*"

Thomas Pentecost gave a talk entitled "*Use of a construct map and Rasch analysis in assessing student understanding of chemistry concepts*" in the session "Innovative Uses of Assessments for Teaching and Research".

Jessica VandenPlas gave a talk titled "*Assessment instruments as research tools: An eye-tracking study of expert and novice chemistry problem solving*" in the session "Innovative Uses of Assessments for Teaching and Research". The talk was co-authored by **Thomas Pentecost** and GVSU student Jessica Vogl.

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. Herein is provided update of some faculty research activity.

Shannon Biros continues her research in organic synthesis with undergraduate co-workers. At least six undergraduate researchers worked with Shannon over the course of the 2013-2014 academic year. The Biros group presented their research at the 246th and 247th national meetings of the ACS.

Paul Cook and his group continue their research on the X-ray crystallographic analysis of sugar-modifying enzymes in bacteria. Paul presented a poster at the 36th Steenbock Symposium in Madison, WI entitled "Structural and functional analysis of the glycosyltransferase BshA: the first enzyme of the bacillithiol biosynthesis pathway."

Matthew Hart continues his research in organic synthesis with undergraduate co-workers. At least four undergraduate researchers worked with Matt over the course of the 2013-2014 academic year. The Hart group presented their research at the 246th and 247th national meetings of the ACS.

Debbie Herrington continues her work with the TI Program. In addition, Debbie gave an invited talk (A Picture is Worth 1000 Words) and workshop (Making Assessment Part of the Learning Process) at the 2014 Maine Center for Research in STEM Education National Summer Conference: Integrating STEM Education Research and Teaching: Using Assessment to Guide Practice, June 20-22, University of Maine, Orono ME. At the International Conference on Chemistry Education, July 13-18, 2014, Toronto, ON Canada, Debbie gave an invited talk titled "Target Inquiry: Teachers Designing Chemistry Activities to Actively Engage Students." Debbie received an InTeGrate Implementation Program grant ($42,000) with Steve Mattox (Co-PI) titled, "Integration of Earth Science Content across Science Teacher Preparation Courses at GVSU."In collaboration with Sheila Ryan, Debbie published a paper in the Journal of Chemical Education. The full citation of the paper is the following: Ryan, S. & Herrington, D. G. (2014). Sticky ions: A student-centered activity using magnetic models to explore the dissolving of ionic compounds. *J. Chem. Educ.* **2014**, *91*, 860-863. The Herrington group presented their research at the 246th and 247th national meetings of the ACS.

Dalila Kovacs continues her research on green chemistry with undergraduate co-workers. At least three undergraduate researchers worked with Dalila over the course of the 2013-2014 academic year. The Kovacs group presented their research at the 246th national meeting of the ACS.

Andrew Lantz and his research group worked on three research projects: 1) the development of a capillary electrophoresis based method for the enantioseparation of chiral silanes, 2) the development of capillary electrophoresis based methods for microbial separation and detection using isoelectric focusing, and 3) the development of an organic redox flow battery system for mass energy storage, funded by a subcontract from Vinazene, Inc. The Lantz group had five undergraduate researchers in the 2013-2014 school year: Emily Peters, Joel Medina, Nick Hefferan, Matt Crooks, and Nadia Sunny. The Lantz group received funding from Vinazene Corp. through April 2015. Details of the funding is the following: Lantz, A. (Principal), Smart, R. (Supporting), Schroeder, W. (Supporting), Schroeder, J. (Supporting), Boezart, A. (Supporting), Contract, "A Single Substance Organic Redox Flow Battery", Vinazene Corp., Private, $118,896.00, Funded. (sub: November 21, 2013, start: November 27, 2013, end: April 2015).

Chris Lawrence and his research group continue to work on Computer modeling of the mechanism of water evaporation; design of ligands for capture of lanthanides and actinides. Two undergraduate researchers worked with Chris this past academic year, 2013-2014.

Dave Leonard and his research group continue their work on β-lactamase enzymes, and had students present posters at the Midwest Enzyme Chemistry Conference (Chicago) and Symposium of the Protein Society (San Diego). The Leonard group bid farewell to students Kip Kaitany, Josh Mitchell, Jozlyn Clasman, Brianna Jackman and Jake Scheid. Dave, his undergraduate researchers, and collaborators published three papers in the 2013-2014 academic year.

Richard Lord continues his research in computational chemistry with undergraduate co-workers. The Lord group presented their research at the 246th and 247th national meetings of the ACS. In addition, Richard was co-author in more than seven peer-reviewed publications in the course of the 2013-2014 academic year.

George McBane worked with undergraduate researchers and with **Stephanie Schaertel** to develop a diode-laser-based technique for measuring pressure-broadening coefficients of molecules in the gas phase.

Felix Ngassa continues his research on synthetic organic chemistry with undergraduate co-workers. Five students worked in the Ngassa group in 2013-2014 academic year.

Thomas Pentecost continues working in the field of psychometrics as applied to chemistry education. He presented an invited talk at the Fall 2013 national meeting of the American Chemical Society about using a Construct Map and Rasch analysis to measure student understanding. He was also invited to present a talk about the use of Analysis of Variance techniques in chemistry education research at the Spring 2014 national ACS meeting. This talk is being published as a book chapter in the ACS Symposium Series book "Tools of Chemistry Education Research". His research students, Kayla Maki and Skylar Welti, have both graduated and moved on to Pharmacy and Veterinary school, respectively.

Rachel Powers continues her research in Biochemistry/Crystallography. Rachel, her

undergraduate researchers, and collaborators published three papers in the 2013-2014 academic year. In addition, Rachel's NIH R15 AREA grant got renewed for three years (*see separate article*).

Stephanie Schaertel worked with two GVSU students and with **George McBane** to develop a diode-laser-based technique for measuring pressure-broadening coefficients of molecules in the gas phase. One of those students (Catlin Schalk) received a Michigan Space Grant Consortium Fellowship to continue that work during the summer of 2014. Stephanie Schaertel also had a sabbatical during the Winter 2014 semester. She used that time to work on several physical chemistry lab development projects.

Jessica VandenPlas continues her research in chemical education with undergraduate co-workers. Research from the VandenPlas group was presented at the 246th and 247th national meetings of the ACS.

Randy Winchester continues his research in the synthesis of chiral silanes with undergraduate collaborators. Three undergraduate co-workers worked in the Winchester group in the course of the 2013-2014 academic year. Research from the Winchester group was presented at the 247th national meeting of the ACS.

GVSU's Target Inquiry Program Explores New Avenues and Takes the 2014 BCCE by Storm!

The Target Inquiry program (TI) began at GSVU in 2006 as an innovative and coherent professional development program for high school chemistry teachers with the goal of increasing the frequency and quality of inquiry instruction. Since that time, it has grown in ways we did not even imagine. To date three cohorts of teachers have completed the TI program and the materials they have developed have been accessed by over 2000 users from all 50 States and over 30 different countries across the world. These materials are featured in AP workshops across the country and have resulted in the TI teachers being invited to give regional and national workshops. Thus far, the project PIs (Deborah Herrington – GVSU and Ellen Yezierski – now at Miami University), their undergraduate and graduate students, and the TI teachers have given over 150 presentations and workshops and have published numerous journal articles and book chapters. This summer, the teachers added to this list by presenting a TI workshop and 5 talks in the *Target Inquiry: Teacher Designed and Tested Inquiry Materials that Really Work* at the 2014 Biennial Conference on Chemical Education that was hosted by GVSU.

So what do we do next? Expand of course! In January 2013, in response to the numerous teachers who asked us when we were going to have this program in other locations or for other science disciplines, with the help of a 5-year National Science Foundation grant, TI at GVSU expanded to include middle and high school science teachers from all science disciplines. And we are now in two states as the other piece of the NSF grant was the launch of the TIMU (Target Inquiry at Miami University) program in chemistry, which serves the southwest Ohio region. So at GVSU this summer, 11 eleven dedicated teachers and five amazing science education faculty have been working hard developing, piloting, and revising inquiry-based activities that cover topics such as photosynthesis, kinematics, force and motion, plate-tectonics, colligative properties, stream health, the inter-relation of body systems, and more. At Miami University, eleven chemistry teachers have been developing more chemistry inquiry-based activities to add to the almost 50 activities we already have available free for teachers on the TI website.

With more States adopting the Next Generation Science Standards, many teachers are going to need to make significant changes to the way they approach teaching and learning in the classroom. The numerous years of teacher and student data we have collected as part of our NSF-funded studies of TI show that the TI program can help provide teachers with the support and skills they need to meet these new demands.

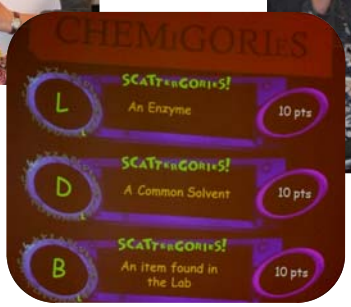
Be sure to check out the TI program at our website (www.gvsu.edu/targetinquiry). There you will find information about the program as well as the almost 50 inquiry-based chemistry activities the previous cohorts of teachers in the program have developed and tested, and coming fall 2014, more TI activities in physics, biology and Earth science from our current cohort of TI teachers.

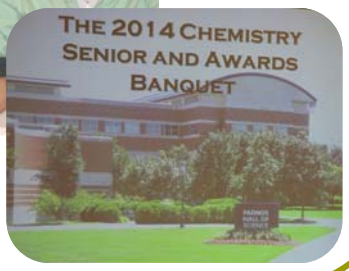
TARGET INQUIRY:
Improving Science Instruction

Chemistry Department Graduates its Class of 2014

The Chemistry Department's Class of 2014 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 2013-2014 academic year. At the combined celebration, held at the Alumni House 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:

Christopher Adkins	Devi Haria	Lauren McCulloch	Justin Shady
Colleen Ahlers	Zachary Hundley	Joel Medina	Julie Stoscup
Vincent Baggett	Kayla Hurd	Cassie Miles	Kyle Tanis
Matthew Bailey	Mallory Johnson	Nicholas Mortimer	Cuong Tran
Travis Bisson	Matthew Jones	Ryan Nelson	Jessica Vogl
Jozlyn Clasman	Kip Kaitany	Daniel Ozinga	Kristen Wellman
Brooke Davis	Allison Kay	Stephanie Pierson	Jeremy Whitmore
Terry Felty	Garett MacLean	Matthew Pisz	Jacqueline Williams
Zachary Hamersma	Nathan Marckini	Cameron Piszczek	Nathan Winkler
Erin Harbour	Aaron Marshall	Megan Robb	Noah Zucker
			Alex Zuhl





Part of the celebration involved interactive games between faculty, students and guests, and the presentation of gag awards. The following were recipients of gag awards:

"Crime Buster"	Colleen Ahlers	"Dancing Chemist"	Lauren McCulloch
"Dodgeballer"	Vince Baggett	"Outdoorsman"	Joel Medina
"Fashionably Late"	Matt Bailey	"Eye Tracker"	Cassie Miles
"Siamese Twins"	Erin Harbour & Kristen Wellman	"Iron Woman"	Julie Stoscup
"Home Run"	Kayla Hurd	"Pyro"	Kyle Tanis
"Crystalization Master"	Kip Kaitany	"Courteous Curtis Rearrangement"	Curtis Tran
"Mr. Fix It"	Garett MacLean	"Jack of All Trades"	Jeremy Whitmore
"Jokester"	Nathan Marckini	"Research Gypsy"	Jacqueline Williams

New Faculty 2014-2015

Scott Thorgaard has joined the department as an Assistant Professor of Analytical Chemistry. Scott completed his Ph.D. in 2010 at the University of Minnesota, where his thesis research with Professor Philippe Bühlmann involved investigations of self-assembled monolayers using electrochemical scanning tunneling microscopy. Scott went on to serve as a postdoctoral fellow at the University of Texas at Austin working with Professor Allen J. Bard. His research there focused on the development of electrochemical techniques for trapping and characterizing single nanoparticles. He then served as a Visiting Assistant Professor at Winona State University in Minnesota for two years before coming to GVSU. Scott's research efforts here will focus on nanoscale electrochemistry, including fundamental studies of single particle detection and electrocatalysis, as well as applications in analytical chemistry, such as electrochemical sensors. During his first year at GVSU, Scott will be teaching Electrochemistry and Survey of Analytical Chemistry. Outside of science and teaching, Scott also enjoys experimental music, running, and science fiction.

Scott Thorgaard

Sarah Clark

Sarah Clark has joined us as an Affiliate faculty member with half of her responsibility to direct the Chemistry Success Center.

Angela Slater is a new Affiliate faculty with the Integrated Science Program but with most of her teaching duties with the Chemistry Department.

There are five new visiting instructors joining us this fall; **Ashley Campanali**, **Heidi Cuticchia**, **Dr. Ryan Hoekstra**, **Dr. Camden Parks**, and **Dr. Nicholas Taylor**.

~Alumni News ~

Trent Mazer, a **2013** graduate, sent the following update for the newsletter. "Upon graduating from Grand Valley, I was hired as a lab technician in Grand Rapids. I began applying to medical schools and was accepted into the MSU MD program. During this previous summer I also married Kaitlin Bremer, who is another GVSU alumni. Thank you Grand Valley and especially the chemistry department staff for providing me the tools and education needed to successfully pursue a career in medicine!"

Beth Vallier, a **2013** graduate, sent the following update in July for the newsletter. Beth wrote: "I am currently living in Allegan and working at Perrigo. Last fall I got engaged and I will be getting married to Jacob on October 4th. But I am currently on vacation with my fiancé and his family taking an Alaskan Cruise."

Alexandra Gabrielli, a **2013** graduate, sent the following update in July for the newsletter. Alexandra wrote: "I am currently living in Rochester Hills, MI, attending medical school at Oakland University William Beaumont School of Medicine (an MD program). I just finished my first year and am doing an internship at Beaumont Hospital in the Orthopedic Surgery Department! I am also doing research concerning osteoarthritis and biomarkers along with a community project with Girls on the Run, a YMCA run after school program for middle school girls."

Hope Sartain, a **2013** graduate, sent the following update in July for the newsletter. Hope wrote: "I am attending the University of Hawaii at Manoa for graduate school-Craig Jensen is my PI (Inorganic Chemistry). My current project involves synthesizing catalysts for use in hydrogen storage. Two papers have been submitted for publication; one with Shannon Biros from GVSU."

Patrick Clark, a **2013** graduate, sent the following update in July for the newsletter. Patrick wrote: "I am working for Emergent BioSolutions Inc. in Lansing, MI. Currently performing water, and protein assays as well as testing incoming raw materials, to support our production of the vaccine for Bacillus Anthracis (anthrax). I will also be getting married this August!"

Steve Asiala, a **2010** graduate, sent the following update for the newsletter. In a correspondence to Prof. Schaertel, Steve wrote: "Greetings! I'm emailing today with some exciting news from South Bend that I thought you might be interested in hearing. First, I'm happy to report that I successfully defended my dissertation, titled "Surface Enhanced Raman Spectroscopy (SERS) for the Characterization of Particles in Solution." Second, I've accepted a postdoctoral research appointment working for Duncan Graham in the Centre for Molecular Nanometrology at the University of Strathclyde in Glasgow, Scotland! Both Heather and I are VERY excited for the opportunity! Thank you for all of your support throughout my academic career. I appreciate it greatly!"

Dan Meyers, a **2008** graduate, sent the following update in July for the newsletter. Dan wrote: "Last summer I moved to Portage, MI from Indianapolis and I currently teach chemistry at Portage Central High School. I just got married on June 22 to my beautiful wife Bethanie, a special education teacher in Mattawan. And in August I will be giving 2 talks at BCCE at GVSU, one about high school organic chemistry (a follow-up to my 2013 ACS talk) and the other regarding survivor skills for a first-fifth year high school teacher."

Kyle DeKorver & Brittland Winters-DeKorver, both **2007** graduates, welcomed their second son, Matthijs Winters DeKorver, into their family on June 30. Kyle was recently promoted to Associate Scientist at Dow AgroSciences, while Brittland is working on her PhD in Chemical Education in the research group of Marcy Towns at Purdue University. In her communication with Prof. Schaertel in July, Brittland writes, "I think physical chemistry is getting a lot of attention from the Chem Ed research community right now. In fact, this month's issue of Chemical Education Research and Practice is devoted to pchem articles."

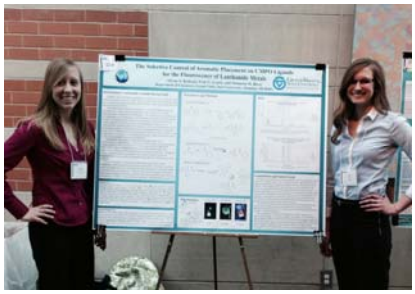
Erica Vogel (Schwander), a **2007** graduate, and the husband, **Paul Vogel,** a **2008** graduate, are still in NC. Erica is an Assistant Professor of chemistry at Meredith College in Raleigh, NC, while Paul is a postdoc in the medical school at UNC, Chapel Hill. In an e-mail correspondence in July, Erica wrote: "I finished my PhD in Chemistry and Quantitative Biology in 2012 (MSU), did a short postdoc in the Chemistry department at NCSU, and will be starting as an Assistant Professor of chemistry at Meredith College this August. Paul and I got married in 2010. Paul finished his PhD in Chemistry in 2012 (MSU), and is currently a postdoc in the Medical School at UNC Chapel Hill (studying hypertension and Ca signaling in the kidney)."

Andrew Berke, a **2006** graduate, has accepted a position as an Assistant Professor of chemistry at Smith College in Northampton, MA.

Stefan Kilyanek, a **2003** graduate, got a faculty position in the Department of Chemistry and Biochemistry at the University of Arkansas.

Student Scholars Day 2014

More than a dozen Chemistry students presented their research results in either oral or poster form at the 18th Annual Student Scholars Day in April 2014. Student scholars and their sponsors were the following:



Joel Berglund, Nicholas Mortimer, Cameron Piszczek, and Julie Stoscup. "A More Sustainable Future Through New Biofuel Synthesis" Sponsor: *Dalila Kovacs*

Colleen Ahlers, Nathan Marckini, and Kyle Tanis. "Bio-Oils Display Amazing Potential for Use as Biofuels" Sponsor: *Dalila Kovacs*

Alyssa Katz, Tanner Remick, and Nathaniel Stoller. "Biobased Epoxy Resins: Plastics of the Future" Sponsor: *Dalila Kovacs*

Nicholas Mortimer and Cameron Piszczek. "Fuel Both Your Body and Your Car with Coffee Grounds" Sponsors: *Dalila Kovacs, James Krikke and Min Qi*

Lina Atanasova and Sean Riley. "A Simple and Efficient Method for the Sulfonylation of Phenol Derivatives" Sponsor: *Felix Ngassa*

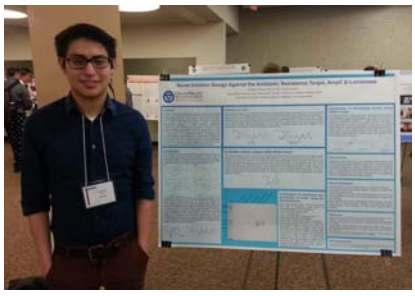
Tyler Cooley. "Direct Cu-free Sonogashira Cross-coupling Reaction of Aryl Sulfonates with Terminal Alkynes" Sponsor: *Felix Ngassa*

Jessica Vogl. "An Eye-Tracking Study of Expert and Novice Chemistry Problem Solving" Sponsors: *Thomas Pentecost and Jessica VandenPlas*

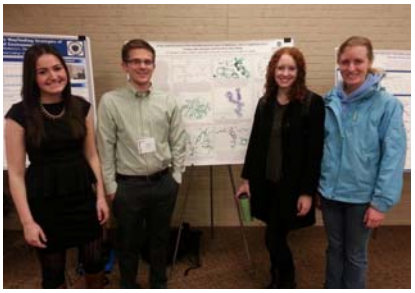
Josephine Werner. "Antibiotic Resistance Enzyme OXA-24 ß-Lactamase: Expression, Purification, and Optimization of Crystallization Conditions" Sponsor: *Rachel Powers*

Samantha Bidwell. "Benchmarking a Computational Protocol for Redox-Induced Electron Transfer" Sponsor: *Richard Lord*

Talon Kosak. "Computational Study into Controlling Azide Reduction vs. Dinitrogen Expulsion Through Metal and Ligand Choice" Sponsor: *Richard Lord*



Michael Esch. "Carbonmonoxy Myoglobin Vibrational Frequency Investigation" Sponsor: *Chris Lawrence*



Paul Morse. "Characterization of *f*-Element Bidentate Phosphoryl Complexes" Sponsor: *Shannon Biros*

Justin Shady. "Characterization of a New CMPO Ligand for the Sensitization of Lanthanide Metal Luminescence" Sponsor: *Shannon Biros*

Julie Stoscup. "Developing a Further Understanding of Heavy Metal Chelation for the Improvement of Radioactive Waste Remediation and Magnetic Resonance Imaging" Sponsor: *Shannon Biros*

Jakob Nowicki and Catlin Schalk. "Collisional Effects in Molecules Measured with a Laser-Based Spectrometer" Sponsors: *George McBane & Stephanie Schaertel*

Jozlyn Clasman. "Crystal Structures of a Clinically-Derived Class D ß-Lactamase Variant with Cefotaxime, Ceftazidime, and Aztreonam Bound" Sponsor: *David Leonard*

Benjamin Nicholson. "Expression and Purification of the GDP-6-Deoxytalose Biosynthesis Enzymes" Sponsor: *Paul Cook*

Chemistry Department Faculty and Students Attend the 247th National Meeting of the ACS in Dallas, TX

Several GVSU faculty and students attended the 247th National Meeting of the American Chemical Society in Dallas, TX from March 16-20, 2014. The contributions of the GVSU chemistry department are highlighted below:

Shannon Biros and her research group gave three presentations at the meeting. Student Julie Stoscup gave a poster presentation titled "*Investigation of multidentate carbamoylphosphine oxide compounds for lanthanide and actinide chelation*." Student Justin Shady gave a poster presentation, co-authored by student Adam Boyden, "*Lanthanide luminescence with a new carbamoylphosphine oxide ligand*."

Shannon Biros also presented a talk, co-authored by Justin Shady and Adam Boyden, entitled "*Sensitizing lanthanide luminescence with CMPOs*."

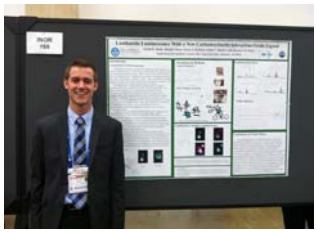
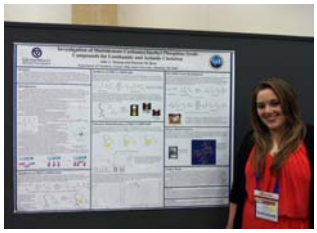
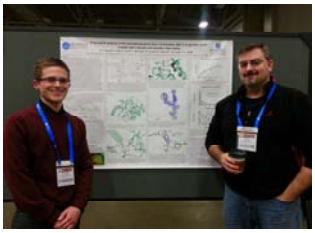
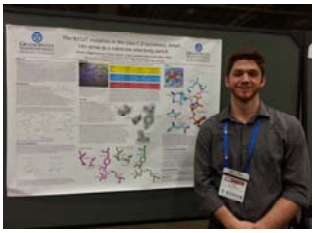
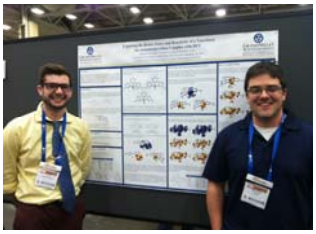
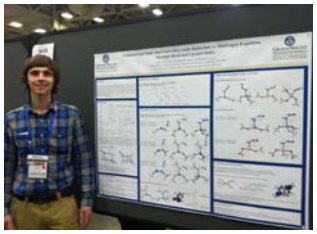
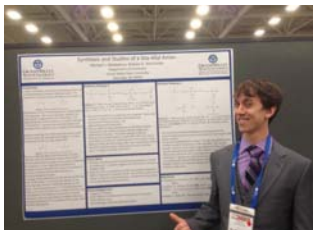
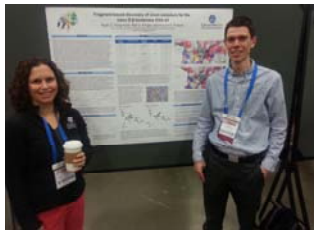
Matthew Hart and his research group presented three posters in the Undergraduate Research Poster session. Student Alex Zuhl presented *"Progress towards the synthesis of ortho substituted derivatives of T_1AM as potent TAAR activators."* Student Jacqueline Williams presented *"Progress towards the development of urea based modulators of the trace amine associated receptor: Meta linked ureas,"* and student Alyssa Snyder presented *"Novel biphenyl ureas as regulators of the trace amine associated receptor."*

Debbie Herrington and collaborator Dr. Patrick Daubenmire, of Loyola University, presented a talk "*Using interviews in CER projects: Options, considerations, and limitations*" in the "Tools of Chemistry Education Research" Symposium.

Debbie Herrington also co-authored a talk with Dr. Ellen Yezierski (Target Inquiry director at Miami University, OH), presented by GVSU postdoc Dr. **Tanya Gupta**, titled "*Impact of Target Inquiry (TI) professional development program on teacher questioning behavior in science classroom*." Dr. Gupta also presented a talk, co-authored by Dr. Thomas Greenbowe and Kathy Burke, of Iowa State University, entitled "*Implementing student roles in general chemistry: Student-Led Instructor Facilitated Guided Inquiry-based Laboratories (SLIFGIL).*"

Dave Leonard, **Rachel Powers** and **Brad Wallar** co-authored a poster presentation by students Vincent Baggett and Brianne Docter, titled "*The N152T mutation in the class C beta-lactamase, AmpC, can serve as a substrate selectivity switch*."

Richard Lord and his research group made presentations at the meeting. Student Samantha Bidwell presented a poster titled *"Benchmarking a computational protocol for redox-induced electron transfer."* In the session "ACS Award in Organometallic Chemistry: Symposium in Honor of Kenneth G. Caulton", the Lord group made three presentations. Student Talon Kosak presented the talk "*Computational study into controlling azide reduction vs. dinitrogen expulsion through metal and ligand choice*," student Adam M. Terwilliger presented *"Exploring the redox states and reactivity of a vanadium bis-tetrazinylpyridine complex with DFT,"* and **Richard** presented *"Where are the electrons? How DFT can be both a research and teaching tool with metal complexes featuring redox-active ligands."* Finally, **Richard** was also a co-author on the talk *"Playing both sides: Comparing the redox abilities of tetrazine-based and pyrazolyl-based pincer ligands"* in this session.

Thomas Pentecost gave an invited talk entitled "*Introduction to the Use of Analysis of Variance in Chemistry Education Research*" in the "Tools of Chemistry Education Research" Symposium.

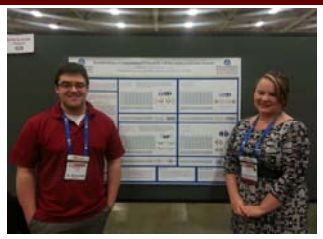
Rachel Powers and **Brad Wallar** co-authored a poster presentation by student Hollister Swanson, titled "*X-ray crystal structure of the extended-spectrum class C β-lactamase, ADC-7, in apo form and in complex with a boronic acid transition state analog.*"

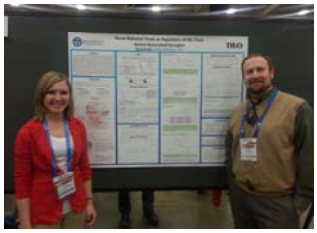
Rachel Powers and collaborator Neil Klinger co-authored a poster presentation by tudent Ryan Hoogmoed, titled "*Finding novel inhibitors for class D β-lactamase, OXA-24, using fragment based discovery.*"

Robert Smart and collaborators, Dr. Roderick Morgan and Dr. William Schroeder, along with student co-authors Alexander Bouza, Joseph Baumann, Brittany Wildgen, and Uma Mishra gave a presentation titled, "*Antimicrobials for Gram positive bacteria.*"

Jessica VandenPlas co-authored a talk given by Dr. Katherine Havanki from the Catholic University of America titled "*Eye Tracking Methodology for Chemical Education Research*" in the "Tools of Chemistry Education Research" Symposium.

Randy Winchester and his research group made three poster presentations at the meeting. Matthew Bailey presented the poster *"Synthesis of Chiral Silanes."* Kelly Le presented *"Synthesis of chiral vinyl substituted silanes,"* and Michael Maddalena presented *"Synthesis and studies of a silaallyl anion."*





Chemistry Department Instrumentation Update

The chemistry department at GVSU remains busy keeping our instrumentation running and has made a few new purchases. With assistance from the Dean's office, the department was able to purchase some new instruments.

An auto-sampler for the Thermo (Dionex) ICS-1100 ion chromatography system was purchased and installed and will greatly reduce operator time at the instrument. This piece of equipment is being shared with the Geology department.

The ion chromatograph ICS-1100 and the new Thermo Trace 1310 gas chromatograph (GC) equipped with an electron capture detector (ECD) have been set up to run on Chromeleon 7.1. Two of our other GC's, the Focus GC with flame ionization detector (FID) and the Focus GC with thermal conductivity detector (TCD) are in the process of being converted to Chromeleon 7.1 in order to decrease the learning curve for the software and facilitate ease of use for both teaching labs and research.

The department also purchased a Labconco Freezone 1 Liter lyophilizer (freeze-dryer) with a vacuum pump and twelve-port manifold. This is a unit that will be used jointly by Chemistry and Biomedical Sciences and will allow quick freeze-drying of heat sensitive samples.

The GC/MS is in need up a new computer and upgrade in order to keep it operational. The old computer was ten years old and has quit functioning. A new computer and upgrade have been ordered and should be installed soon.

An older HPLC unit (Hitachi 7400 Series) has been modified so that it can be used to do gel permeation chromatography (GPC) in addition to chiral chromatography. In order to process the GPC data, an analog to digital converter was purchased to allow data transfer to a laptop for processing.

The chemistry department's two high field NMRs, the 300MHz JEOL and 400MHz Varian continue to provide reliable service for classes and research. Both instruments have been in use more than 13 years. Given the time constraints between submitting a proposal and installation, we can expect that we will be relying on these instruments at least another 3 to 5 years. With that in mind, this summer the department purchased a second probe for the JEOL along with getting some repair work done to the original probe. Both probes are multinuclear and capable of variable temperature measurement as well as having gradient capabilities. We have been getting excellent service out of our 400MHz Varian, with the usual replacement of boards as they age and the replacement of the computer interface.

This last summer we added a third NMR to the department, a Pico-spin 45MHz permanent magnet that is being used primarily in CHM241 and CHM242. The Pico-spin uses a small capillary for the sample and there is no need for a lock solvent, significantly lowering cost.

Several vacuum pumps used for mass spectroscopy and other applications have been rebuilt due to leaks or inadequate vacuum. Minor repairs and preventive maintenance were performed on many instruments as well.

GRAND VALLEY STATE UNIVERSITY
Chemistry Department
312 Padnos Hall
1 Campus Drive
Allendale, MI 49401

THE ARNOLD C. OTT LECTURESHIP IN CHEMISTRY

Public Lecture
Thursday, October 16, 2014

Self-healing Polymers

Reception — 5 p.m.
Evening Lecture — 6 p.m.
Grand River Room, Russel H. Kirkhof Center
Allendale Campus

Seminar
Friday, October 17, 2014

Polymer Mechanochemistry and the Concept of the Mechanophore

1 p.m.
Pere Marquette Room, Russel H. Kirkhof Center
Allendale Campus

Jeffrey Moore, Ph.D. received his B.S. in chemistry (1984) and Ph.D. in materials science and engineering with Samuel Stupp (1989), both from the University of Illinois. Moore then went to the California Institute of Technology as an NSF postdoctoral fellow working with Robert Grubbs. In 1990, he joined the faculty at the University of Michigan in Ann Arbor and then in 1993 returned to the University of Illinois, Urbana-Champaign (UIUC) where he is currently the Murchison-Mallory chair in the Department of Chemistry. Moore is a fellow of the American Academy of Arts and Sciences and the American Chemical Society. He received the Campus Award for Excellence in Undergraduate Teaching and has been recognized as a "Faculty Ranked Excellent by Their Students." For 14 years, he served as an associate editor for the *Journal of American Chemical Society.* He has published more than 300 articles covering topics from technology in the classroom to self-healing polymers, mechanoresponsive materials, and shape-persistent macrocycles.

COMING SOON!

Wilson Ho, Ph.D.
Donald Bren Professor,
Physics and Astronomy
and Chemistry
University of California, Irvine

April 16 and 17, 2015

Alumni Professional Networking Support

GVSU has established a "Career Contact Bank" on LinkedIn to help alumni develop professional connections with one another. It can be found through www.gvsu.edu/careercontact.