Chemistry Department Newsletter

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GRAND VALLEY STATE UNIVERSITY
DEPARTMENT OF CHEMISTRY

SOME FEATURES IN IN THIS ISSUE:

Editor: Felix Ngassa

Layout: Jennifer Glaab

Chemistry Department
312 Padnos Hall
www.gvsu.edu/chem
chmdept@gvsu.edu

A Word from the Chair

Greetings to the students, alumni, and friends of the GVSU Chemistry Department. As you read through this newsletter, you will undoubtedly find a wealth of information about the accomplishments of our students and faculty over the past year. Most notably, we welcomed two new professors this year - Andrew Korich and Jessica VandenPlas. Andrew is an organic chemist who will be contributing his knowledge of polymer chemistry to our department. Jessica joins our Chemistry Education group. She will be using eye-tracking technology to study how students interact with educational materials in chemistry class.

Our faculty have also been especially active in receiving research grants, publishing research papers, and winning awards. Most of this work is done by our undergraduate students, mentored by our faculty. With over thirty professors, many are surprised to learn that we are the largest undergraduate chemistry department in the country (as far as we know). I encourage you to read through the newsletter to catch up on all the good news we have to report.

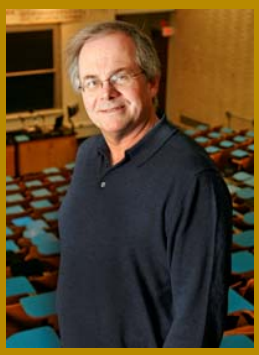
However, much of our time this current year is not spent reflecting on the past, but rather is spent looking forward. We are in the middle of revising our long-term strategic plan document. As we do so, we are exploring all sorts of ideas for what we want to do over the next few years. One exciting project on the horizon is the prospect of building a new science building. At this point, we can't say when or where a new building may be built. But the fact that we are planning is a good sign that the University has pushed this need up to top of its priority list.

We are also looking to establish and expand our contacts with local industries. Despite the continued struggles of the economy at the national level, I am encouraged by the fact that I have been contacted by a record number of local businesses who were looking to hire our students and alumni. One good example of how local industry is growing and changing is the building of three plants along the lakeshore to build lithium-ion batteries for electric vehicles. We are collaborating with the College of Engineering to develop curricula to meet the needs of this new industry. We are also developing an advisory board to strengthen the connections between the department and the business community to make sure we contribute the best we can to the revitalization of the local economy.

Finally, we are looking to expand our connections with you. We hope to develop a communications committee in the department to facilitate networking among our faculty, students, alumni, and employers. We want to get the word out about our department in order to recruit more high school students as chemistry majors and also to help place our graduates into jobs and graduate programs. This newsletter is just one part of those communications. Look for us to expand the use of our web page, Facebook, e-mail, and other resources in order to keep us all connected.

Todd A Carlson

Winter 2011 Arnold C. Ott Lectureship in Chemistry



Dr. Gregory A Petsko

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. 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. The Ott Lectureship was created and endowed by a gift from Arnold C. Ott and Marion Ott. Our Ott Lecturer for winter 2011 was Dr. Gregory A. Petsko, the Gyula and Katica Tauber Professor of Biochemistry and Chemistry at Brandeis University. Dr. Petsko is a distinguished biochemist with broad research interests in protein crystallography, structural enzymology, and yeast genetics.

Two lectures were scheduled on April 21 and 22 at the Allendale campus. The evening lecture on Thursday, April 21, at the Cook-Dewitt Center, was titled "Our Aging Population and What That Means for Human Health and Biomedical Research". The afternoon lecture on Friday, April 22, in 123 Manitou Hall, was titled "Structure and Processing of a-Synuclein: A New Approach to the Treatment of Parkinson's Disease".

Dr. Petsko is an accomplished scientist who has been recognized with numerous awards such as the Lynen Medal, the Pfizer Award in Enzyme Chemistry, and the Max Planck Research Prize. He is also very active in the scientific community and has taken many leadership roles: He has served on the scientific advisory board of Howard Hughes Medical Institutes; He served as president of the American Society for Biochemistry and Molecular Biology (2008-2010); and was recently elected to the American Philosophical Society (2010).

Chemistry Alumna Wins College of Education Outstanding Educator Alumni Award

When Sarah Toman earned her BS in Chemistry, Education and Mathematics in 2002 from GVSU, little did she know that in less than 10 years she would be conferred with the College of Education Outstanding Educator Alumni Award. After teaching high school for several years, Sarah eventually earned a master's degree in instruction and curriculum with advanced content specialization in chemistry in 2010. Sarah, who currently teaches at Western Michigan Christian High School (WMCHS) in Muskegon, was a member of the first GVSU Chemistry Department Target Inquiry (TI) cohort. In 2009, Sarah was named the "Mole of the Year" by the National Mole Day Foundation. Through the TI program, Sarah has given numerous presentations on laboratory activities at regional and national meetings such as the national meeting of the American Chemical Society (ACS). At its convocation ceremony in April 27, 2011, the College of Education honored Sarah with the Outstanding Educator Alumni Award. The award, which is selected from nominations submitted by alumni colleagues, peers, and former professors, recognizes the impact of contributions to the education community, as well as enhancements to school initiatives. Members of the COE Alumni Board make the final selection. Sarah is highly respected by her students and colleagues. "Sarah is a rare exceptional teacher that both challenges and connects with the students", said a faculty colleague at WMCHS. "Working with a teacher like Sarah makes those around her want to be better at what they do", said Dena Chilson, Director of Instruction at WMCHS.

New Faculty 2011-2012

Andrew Korich comes to GVSU as an Assistant Professor of organic chemistry from the University of San Diego (USD) where he was a postdoctoral fellow. Andrew received his B.S. in environmental science from Saint Michael's College and his Ph.D. in organic chemistry from the University of Vermont in 2008. As part of his non-traditional postdoctoral position at USD, Andrew has taught organic chemistry and mentored undergraduate researchers. His teaching interests are in the areas of organic and polymer chemistry. Andrew's research merges organic synthesis with materials chemistry and focuses on the development of various macromolecular architectures. This year he is teaching CHM 241, Organic Chemistry for Life Sciences.

Jessica VandenPlas has joined the faculty as an Assistant Professor of chemical education. She received a Ph.D. in educational psychology from the Catholic University of America in 2008. Before coming to GVSU, Jessica was an assistant professor of chemistry at Northern Arizona University, in Flagstaff, Arizona. Her research uses educational and psychological methodologies to investigate student learning in chemistry, such as utilizing eye-tracking techniques to examine student problem solving and the use of technology in the classroom. This semester she is teaching CHM 115.

Dr. Andrew Korich

Dr. Jessica VandenPlas

In addition to the tenure track positions, our department also has three new visiting instructors joining us this fall.

Vincent Hradil holds a Ph.D. from Cornell University in physical chemistry. After several years as an informatics scientist at Abbott Labs in the Chicago area, Vince started his own computational services company. He is currently teaching CHM 116 lectures and labs.

Matthew Leathen recently obtained his Ph.D. in organic chemistry from the University of Michigan. Matt is currently teaching CHM 231 lecture and labs along with some CHM 241 labs.

Hilary MacKay comes to us from Norbrook Laboratories in Northern Ireland. She had previously been a post-doc at Hope College for several years. Her Ph.D. was in Medicinal Chemistry from the University of Bradford in the UK. She is currently teaching CHM 109 lecture and some CHM 241 labs.

Three returning visitors are continuing this school year: **Daniel Groh**, **Thomas Dueweke**, and **David Westover**.

New adjuncts are: **Lucas Apol**, **Russell Chudy**, **Rachel Driscoll**, **Rachel Gerrits**, **Adjin Kavara**, **Arthur Kowalski**, **Peter Mann**, and **Michael Marmo**.

Chemistry Department Graduates its Class of 2011

The Chemistry Department's Class of 2011 celebrated their graduation from GVSU in April. In a celebration that is part of the annual seniors' banquet held at the Meadows in the Allendale campus, the graduating seniors were joined by family and friends. Also present were the faculty and staff of the Chemistry Department. The graduating seniors were Lucas T. Apol, Shelby A. Beaubien, Christina M. Billman, Megan R. Childers, Joshua D. Davis, Ryan D. Enck, Ryan J. Flaherty, Nicole L. Gibbons, Scott W. Klaasen, Aldin Lelak, Shane A. McGrath, Anthony T. Montoya, Luan T. Nguyen, Bertil Nshime, Scott A. Sarver, Matthew E. Schmitt, and Na R. Vue.

~Alumni News~

Ryan Flaherty, a **2011** graduate, is now attending graduate school for chemistry at the University of Notre Dame.

Anthony Montoya, a **2011** graduate, is now attending graduate school for chemistry at Iowa State University.

Ben Thome, a **2011** graduate, is now attending graduate school for chemistry at the University of Akron.

Christina Billman, a **2010** graduate, is now a full-time high school chemistry teacher at Grand River Preparatory High School in Kentwood, Michigan.

Nick Myers, a **2009** graduate, has started in the graduate program at the University of Notre Dame. Earlier this summer, we caught up with Nick and this is what he had to say. "I have been well. For the last two years, I have been working at SPI Pharma, an ingredients/ pharmaceutical company in Grand Haven. This fall, I am going to Notre Dame for a PhD in chemistry, probably organic."

Andrea Rice, a **2008** graduate, is completing her master's program in public health (MPH). Andrea writes, "I am now in the middle of my second year in the Masters of Public Health, Community Health Education program and loving it. I am a teaching assistant for the introductory epidemiology class, and work part time as a massage therapist. Next spring I will only have 5 credits to finish up, so I am hoping to get either a real job or an internship as a program evaluation consultant as soon as next January."

Kyle DeKorver & Brittland Winters-DeKorver, both **2007** graduates, had a baby boy Markis William DeKorver on October 2, 2010. Congratulations to Kyle and Brittland!

Marshall Stevens, a **2006** graduate, has graduated with his DVM degree from Michigan State University. Marshall writes, "I wanted to let the GVSU chemistry department know that I have graduated from Michigan State University College of Veterinary Medicine and will be starting an internship in equine veterinary medicine at a private practice in central Florida. Thanks for the excellent preparation for graduate school."

Paul Cook, a **2004** graduate, is now serving his first year as an assistant professor of chemistry at the University of Mount Union in Alliance, OH.

Vision Impairment Students Share in the Joys of Chemistry

Four faculty colleagues at the Department of Chemistry (Nathan Barrows, Shannon Biros, Jim Krikke, and Thomas Pentecost) and two chemistry majors (Mike Peruzzi and Carrie Rymiszewski) performed chemistry demonstrations for 15 students with vision impairment in summer 2011. With setup assistance from Michelle DeWitt and her crew from the Chemistry Department stockroom, the demonstrations were carried out in the teaching labs on the third floor of Padnos Hall of Science. The demonstrations were designed with the goal to make use of senses other than vision. The demonstration exercises included the following: Identifying commonly used lab equipment; Making slime and comparing it to a thixotropic liquid; Feeling an exothermic reaction (warm to the touch) and an endothermic reaction (cold to the touch); and Comparing molecular models illustrating simple bonding types as well as structural differences of isomers.

By blowing up a balloon each and comparing this balloon to that filled with a gas that was about five times heavier than air, students had the opportunity to experience the difference between heavy gases and light gases. By holding up a lit candle to balloons filled with two light gases, hydrogen and helium, students could hear the difference in the sounds that resulted when both balloons popped. The helium balloon merely popped while the hydrogen balloon exploded as the hydrogen and oxygen quickly reacted in the presence of flame. "One student said he could feel the heat given off and another said he could see the light from the flame!" Asked what he thought about the experience, Jim Krikke explained, "The students were also very interested in liquid nitrogen so a racquetball was frozen. They could hear that the frozen ball was now rock hard and were delighted when it was thrown against a block wall and shattered like a light bulb. As a final treat, a couple of the faculty members made ice cream using liquid nitrogen and all of the students were able to sample the freshly made ice cream. It was excellent!"

Chemistry Club 2010-2011: Another Year Full of Fun Activities






The major objectives of the Chemistry Club during the 2010 -2011 academic year were to increase involvement of all chemistry majors and provide many volunteer and social opportunities for student and faculty members. The club wanted to stay involved in common events held in previous years but also create different events to connect the students with faculty and the community. In order to provide the students with opportunity to connect with faculty, increased involvement of faculty during events was critical. In previous years, not many club meetings were held, so the club made an effort this year to increase the number of meetings and lecture events. The club met its objectives and had an extremely successful year. Membership of the club increased by 7% to 46 members. Most importantly, over half of the members actively attended club meetings and events. Several volunteer and social events this year were the same popular events held in previous years, such as Chemistry at the Mall, Science Olympiad, and Student vs. Faculty Softball Game. Maiden events such as the HyperChem T-shirt Design Contest and an REU Info Night, provided many benefits to the club members. The involvement of faculty in the chemistry club was further bolstered at several lecture events (HyperChem T-shirt Design Contest, REU Night, and Lasers and Pool) when many professors lectured on their experiences with research, industry, and academics. The members benefited from the activities by personally improving themselves through volunteer work, by learning about graduate school and internship opportunities and by learning about chemistry research, as well as creating valuable relationships with faculty. In order to make club meetings more interesting and increase attendance, free food was always provided as an incentive. The times for meetings and events were also flexible to allow full participation of more members.

In other service activities, the Chemistry Club continued to research the recycling of polylactic acid (PLA) found in the campus dining silverware and cups. The PLA is converted into lactic acid, which can be used as a cleaning product. If the recycling is efficient, the Chemistry Club envisions that the created lactic acid could be provided to students for cleaning in their dorm rooms and on-campus apartments. The PLA items were successfully collected throughout the year. The production of lactic acid from PLA items were optimized by Ryan Flaherty, a Chemistry Club member, working under the guidance of Dr. Matthew Hart, the Chemistry Club advisor. For Chemistry at the Mall, the Chemistry Club performed several interesting demonstrations for visitors. Some interesting demonstrations included the following: Creation of carbon dioxide bubbles from dry ice using a PVC pipe with a soap-coated end; Turning "blood into water" using phenolphthalein indicator and an acid-base reaction; and Comparing the densities of gases using falling balloons. Nicole Gibbons of the Chemistry Club benefitted from a travel grant through the ACS to present her research results at the 241st national meeting of the American Chemical Society (ACS) in Anaheim, CA, in April 2011. The Lasers and Pool Event involved a lecture by Dr. George McBane about lasers followed by some pool games; Dr. McBane is an expert billiards player. The How is Beer Made Event involved a private tour through a newly opened brewery in Grand Rapids that revealed the chemistry behind the brewing process.

For the second consecutive year, the GVSU Chemistry Club received Honorable Mention from the ACS. Funding for the activities of the Chemistry Club came from GVSU Student Life Fund, and the sale of ACS Study Guides. The Chemistry Club officers for 2010-2011 were, Jody Wycech as president and Nicole Gibbons as vice president. In all, this was another great year full of fun activities.

Chemistry Department Honors Students

In April of 2011, the chemistry department honored many of its most outstanding students for the 2010/2011 academic year. A total of eight awards in various categories were granted. The award winners in the different categories were the following.

Outstanding Freshman Award: Three awards were granted this year to reflect the different sections of the general chemistry sequence. The award recognizes a student who must have completed CHM 115 and is either enrolled in or must have completed CHM 116 by the end of the current academic year. In addition, an eligible student must have fewer than 25 earned credits. The award winners were, *Danielle Meirow*, *Anthony Hage*, and *Hannah Westra*.

Outstanding Sophomore Award: *Brianne Docter* was the recipient of this award, which recognizes an outstanding student who must have completed CHM 245-248 by the end of the current academic year. In addition, an eligible student must have fewer than 55 earned credits and be a declared chemistry major.

Outstanding Junior Award: The recipient of this award was *Zac Garlets*. To be eligible for this award, a junior must be a declared chemistry major with at least 30 credits of chemistry completed, and have fewer than 85 earned credits. In addition, a junior must be enrolled in CHM 358 and 355

Outstanding Senior Award: *Ryan Enck* was the recipient of this award, which recognizes a graduating senior with an overall GPA of 3.5 or greater. Other eligibility requirements for this award are: research participation; service to the department; chemistry-related extracurricular activities; and general attitude.

American Institute of Chemists Award: *Nicole Gibbons* was the recipient of this award, which recognizes a graduating senior who meets all or most of the criteria for the Outstanding Senior Award.

Outstanding Analytical Chemist Award: *Matthew W. Jones* was the recipient of this award, which recognizes a declared chemistry major who is outstanding in CHM 222.

Organic Chemist Award: The recipient of this award was *Adam Snoap*. The award, sponsored by PolyEd (the polymer education committee of the A.C.S.), is given to a student whose overall GPA is greater than 3.3 and whose performance in the two semester Organic sequence is outstanding.

Outstanding Inorganic Chemist Award: *Scott Sarver* was the recipient of this award, which is given to a graduating senior with great potential to pursue research in inorganic chemistry.

Chemistry Faculty Receive Awards from the Center for Scholarly and Creative Excellence (CSCE)

Dr. Rachel Powers

The Chemistry Department faculty continues to be honored with awards across the university. In the 2010-2011 school year, two faculty colleagues were honored with awards from the Center for Scholarly and Creative Excellence.

Rachel Powers (Associate Professor) received the Center for Scholarly and Creative Excellence (CSCE) "Distinguished Early-Career Scholar Award" for 2010-2011.

Deborah Herrington (Associate Professor) received the Center for Scholarly and Creative Excellence (CSCE) "Distinguished Graduate Mentoring Award" for

Dr. Deborah Herrington

Student Scholars Day 2011

More than a dozen Chemistry students presented their research results in either oral or poster form at the 16th Annual Student Scholars Day in April 2011. Student scholars and their sponsors were the following:

Michael Agius. "Toward the Synthesis of Cyclic Heterocyclic Polyamides as Tetraplex DNA Interactive Ligands Using Solid Phase Synthesis". Sponsor: *Toni Rice*

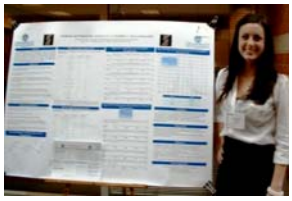
Lucas Apol. "Development of a Modular Raman Spectrometer for the Analysis of Ice Samples". Sponsor: *Stephanie Schaertel*

Joshua Davis. "Mapping the Reactivity Surface of Metal-Olefin Reactions". Sponsor: *Stephan Matchett*

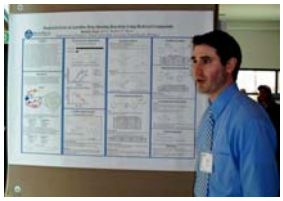
Charles DeLisle. "The Development of a Novel Gadolinium Chelating Agent, for MRI contrast agents, Employing Carbomoylmethyl-Phosphine Oxides (CMPOs)". Sponsor: *Shannon Biros*

Brianne Docter. "Regulation of the Diaphanous-Related Formin, DAAM1 in Mammalian Cells". Sponsor: *Brad Wallar*

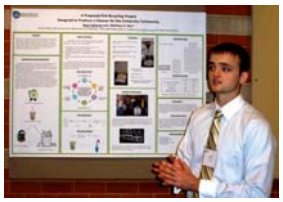
Alexandra Gabrielli. "Synthesis and Fluorescence Analysis of C-6 Modified 2'-Deoxynucleosides". Sponsor: *Felix Ngassa*



Ryan Enck. "Regioselectivity of Aziridine Ring Opening Reactions Using Hydroxyl Compounds". Sponsor: *Matthew Hart*



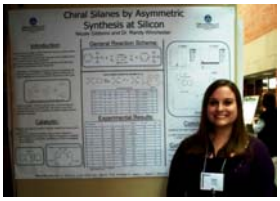
Ryan Flaherty. "A Proposed PLA Recycling Project Designed to Produce a Cleaner for the University Community". Sponsor: *Matthew Hart*



Eliscia Fought & Andy Starr. "Take 10 for Chem: Problem-Solving Videos by Students for Students". Sponsors: *Nathan Barrows & Deborah Herrington*

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

Nicole Gibbons. "Chiral Silanes by Asymmetric Substitution at Silicon". Sponsor: *Randy Winchester*



Cody Hager. "Identifying an Atypical Actin Binding Domain in the Fission Yeast Mid1 Scaffold". Sponsor: *Rachel Powers*

Eric Hansen. "Design of Novel Cyclic Heterocyclic Compounds to Interact with Higher-Order DNA". Sponsor: *Shannon Biros*

Patrick Louden. "Computational Exploration of Rtt109 Conformers Important for Chromosome Stability". Sponsor: *Christopher Lawrence*

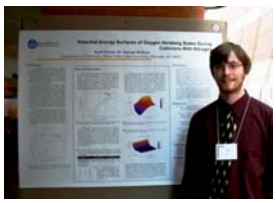
Anthony Montoya & Ben Thome. "Investigation of Phosphorus (III) Nitrogen Compounds". Sponsor: *John Bender*

Bertil Nshime. "Extraction of Pesticides from Contaminated Soil via Cyclodextrin Complexation". Sponsor: *Andrew Lantz*

Gregory Patten. "Design and Synthesis of Inhibitory Molecules for Cancer-Linked Focal Adhesion Kinase". Sponsor: *Laurie Witucki*

Kiely Rich. "Synthesis of TAAR Regulators Utilizing a Novel Urea Linkage". Sponsor: *Matthew Hart*

Scott Sarver. "Potential Energy Surfaces of Oxygen Herzberg States During Collisions with Nitrogen". Sponsor: *George McBane*



Kristen Simon. "Investigating the Role of Textbooks in Student Learning of Chemistry". Sponsor: *Thomas Pentecost*

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.

Nathan Barrows continues his research into the development of student conceptual understanding.

John Bender completed his Michigan Space Grant Consortium Faculty Seed Grant this May, entitled, "A Novel and Potentially Interesting Electronic Material, Phosphorus (III) Nitride". John was also invited to present at the LSSU "Boot Camp for NMR Educators" conference on May 23 in Sault Ste. Marie, entitled, "Multinuclear NMR in the GVSU Inorganic Curriculum".

Cory DiCarlo published a paper, "Reduction potential of yeast cytochrome c peroxidase and three distal histidine mutants: dependence on pH", in the Journal of Inorganic Biochemistry 2011. Cory's research student, Katie Heckstra, presented the results of her summer work at the East Lansing GreenUp: Michigan Green Chemistry Conference and at the 2011 Student Scholars Day. Over the summer, the DiCarlo research group with students Garett MacLean and Justine Travis grew cultures of e. coli expressing site mutants of Cytochrome c Peroxidase. These cultures were obtained originally from stab cultures provided from a research collaborator Dr. James Erman of Northern Illinois University. The DiCarlo group has isolated and purified to crystalline form seven site mutants. The crystal structures are currently being investigated by Dr. Ross Reynolds, a collaborator at the GVSU Physics Department.

Debbie Herrington continues her work with TI. The Target Inquiry (TI) project enjoyed another successful year with three student posters at the spring National ACS meeting held in Anaheim, CA, a poster at the Gordon Conference on Chemical Education Research and Practice, and several publications. The TI project also had 6 high school chemistry teachers working on campus this summer to develop 12 more classroom inquiry activities. These activities include both student and teachers guides and are posted on the TI website (www.gvsu.edu/targetinquiry), free for teachers to download.

Andrew Lantz and his research group have been busy completing research on pesticides-cyclodextrin complexation and continuing work on the separation of microorganisms using capillary electrophoresis. Over the past year, Bertil Nshime and Ryan Flaherty completed the pesticide-cyclodextrin project and began writing a paper draft for journal publication. Bertil also presented his work at the Joint Southwest and Southeast Regional ACS Meeting in New Orleans. James Bennet and Jim LaFleur have been actively working on microbial analysis using various techniques.

Christopher Lawrence continues his research work on computational physical chemistry with undergraduate researchers.

Dave Leonard and his students continue their research on beta-lactamase enzymology and bacterial resistance to beta-lactam antibiotics.

George McBane spent seven weeks of summer 2011 at the Max Planck Institute for Dynamics and Self-Organization in Goettingen, Germany. He carried out theoretical studies of the photodissociation of nitrous oxide and the electronic relaxation of highly excited oxygen molecules, in collaboration with Dr. Reinhard Schinke. In addition, George gave an invited seminar at Southern Illinois University, in April, and in early summer he published a paper in the Journal of Chemical Physics on nitrous oxide photodissociation with German and Danish collaborators.

Felix Ngassa continues his research on transition metal-catalyzed syntheses of modified nucleosides with undergraduate researchers.

Tom Pentecost and his student, Deanna Cullen, had a paper published in the Journal of Chemical Education on "A Model Approach to the Electrochemical Cell: An Inquiry Activity". The paper is the result of Deanna's work as part of the Target Inquiry program. Deanna is a high school chemistry teacher in Whitehall Michigan.

Stephanie Schaertel continues to work with students on two projects. One involves sensitive measurements of spectroscopic lineshapes and how these lineshapes respond to collisions in the gas phase. This project is in collaboration with George McBane. The other project involves the construction of low-cost Raman spectrometers for various applications in biochemistry and environmental science.

Target Inquiry (TI): Producing Positive Results Leads to Expansion

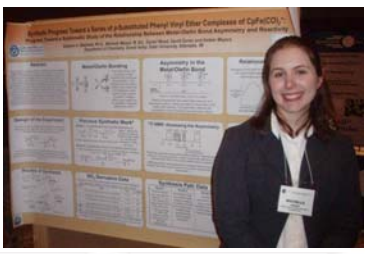
The Target Inquiry (TI) program had another busy year. This year the third cohort TI teachers presented their chemistry research at the West Michigan Regional Undergraduate Science Research Conference, held October 30, 2010 at the Van Andel Institute in Grand Rapids. This past summer, the same group of teachers completed their inquiry-materials development course under the guidance of Deborah Herrington (TI program director) and Nathan Barrows, both faculty in the chemistry department. Each of the six teachers in the cohort spent 8 weeks this summer developing and piloting inquiry-based activities that will soon be up on the TI website (www.gvsu.edu/targetinquiry) free for teachers to download and use. The new activities cover topics such as thermochemistry, electrochemistry, nuclear chemistry, intermolecular forces, ionic bonding, stoichiometry, and solution formation. Each activity comes with a student guide and an accompanying teacher guide that provides details on materials and set-up, teacher facilitation notes, and sample student data and answers. This fall the teachers will be implementing some of these new activities in their classroom and collecting some type of evaluation data to present at the Biennial Conference on Chemical Education next summer at Penn State.

This was also a great year for TI publications. Some of the teachers from the first two TI cohorts had their work published in the *Journal of Chemical Education* (Alice Putti and Deanna Cullen) and *The Science Teacher* (Pam Scott) with several more publications in the works. Co-directors Herrington and Yezierski (now at Miami University, Ohio) also published two papers related to the study of the TI program in *Chemistry Education Research and Practice*. The exciting findings from this research show that participation in the TI program impacts teachers' beliefs about science inquiry and inquiry nstruction and shifts their practices to be more aligned with research-proven, student-centered practices. Furthermore, there is evidence to suggest that these teacher changes also result in student achievement gains as well as increased student confidence and satisfaction in chemistry classes.

Now, TI is expanding! Teachers from other science disciplines have been asking us when the TI program will be expanded in other areas and the answer is now. Deborah Herrington and Ellen Yezierski recently received a five-year collaborative grant from the National Science Foundation to expand and disseminate the TI program. Herrington will be responsible for coordinating the expansion of the TI program at GVSU to include Biology, Geology, and Physics. Yezierski will be responsible for implementing the TI program in chemistry at Miami University. This funding from the NSF along with support from GVSU will support a cohort of 15 teachers from all science disciplines and fund their study of the new interdisciplinary TI program.

More information about the TI program at GVSU and how to apply for the next cohort can be found on the program website (www.gvsu.edu/targetinquiry).

TARGET INQUIRY:
Improving High School Chemistry



Department Faculty News

Sandi Bacon has been granted emeritus status at the Chemistry Department.

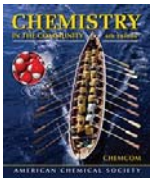
Shannon Biros was part of a group of 6 PI's from undergraduate institutions that applied for and received NSF funding-"The TIM Consortium: A Dispersed REU Site in Theoretically Interesting Molecules". This grant will provide funding for 3 summers for student stipends (one GVSU student and one GRCC student) as well as travel for faculty mentor and students to attend two conferences each year.

Grace Lantz

Cory DiCarlo earned tenure and was promoted to associate professor. Cory was elected to a three-year term on the CLAS faculty council and the Executive Committee of the University Academic Senate, where he is currently serving as the vice chair. In addition, the DiCarlo family has welcomed a new member with William – a rescued African grey parrot. William is around thirty years old and due to past mistreatment is currently plucked almost bald. Cory and his family are hoping to nurse William back to plumage and enjoying his many noises.

Deborah Herrington was awarded a 5-year, $1.1 million grant from the National Science Foundation to expand the Target Inquiry (TI) program to the other science disciplines (geology, biology, and physics). This grant will fund the study of TI's impact on teachers and their students. Furthermore, additional financial commitments from GVSU will help support teachers in the program with tuition waivers, fellowships, and money for supplies.

Matthew Hart earned tenure and was promoted to associate professor. Matt is also serving as the co-director of Students' Scholars Day (SSD).



ChemCom 6th

Andrew Lantz and his wife had a baby girl, Grace Elizabeth Lantz, on June 1, 2011.

Mary Karpen, Nathan Barrows and Stephen Matchett were awarded a $15,000 Pew FTLC Presidential Teaching Initiatives grant for summer 2011.

Felix Ngassa was promoted from *Reader* to *Table Leader* for Advanced Placement (AP) Reading, administered by the College Board.

Dalila Kovacs, Andrew Lantz, Min Qi, and Cory DiCarlo (*The GVSU Green Chemistry Quartet*) have been actively involved in Green Chemistry service. In collaboration with the Sustainable Research Group, Aquinas College, and BlueSphere Inc., the quartet have been working to build a Green Chemistry Clearinghouse website that will act as a database for all green chemistry activity in the State of Michigan. As part of this online database, the quartet hosted the 3rd MI Green Chemistry Education Conference as an online webinar.

Zoe Fern Rice

Tom Pentecost has for the past four years been part of a four-person revision team for the 6th edition of the American Chemical Society's high school chemistry textbook - Chemistry in the Community (ChemCom). The revisions included reorganizing significant portions of the text, writing new content, and adding formative assessment features to the text. The text is now published and being used by high schools.

Rachel Powers earned tenure and was promoted to associate professor. Rachel also received a grant from the NIH ($319,823 for 3 years) for the project, "Mapping the binding site of class D beta-lactamase enzymes for inhibitor design and discovery".

Toni Rice and her husband welcomed a baby girl, *Zoe Fern Rice,* on August 11, 2011. Toni is currently on leave for the school year.

BCCE 2014 is Official: The American Chemical Society (ACS) has officially signed the agreement for GVSU to host the 2014 BCCE conference.

A Story of Resilience: An Alumna's Journey from GVSU Chemistry to Columbia University Medical School

This is the story of Gillian Kupakuwana, a 2006 graduate from the GVSU Chemistry Department with a BS in Chemistry (Biochemistry emphasis). This is a story of resilience and one that could serve as an inspiration to future students that with determination and perseverance dreams could be turned into reality. Gillian's journey to GVSU started from Zimbabwe, her native homeland, where as a high school student, she was given an opportunity through the Rotary Club of Grand Rapids to study in a Grand Rapids high school as an exchange student. Apparently, Gillian enjoyed her high school experience in Grand Rapids so much so that when she returned to Zimbabwe and graduated from high school, she chose the Grand Rapids area to pursue her college education in the US. Starting out at GRCC, she transferred to GVSU where she completed her BS degree in April of 2006. As part of her undergraduate education, Gillian did research with Dr. Felix Ngassa for four semesters and had the opportunity to present her research results at a national meeting of the American Chemical Society in San Diego, CA, in March of 2005. That research experience at the GVSU Chemistry Department along with an internship at Alticor prepared Gillian for her graduate career.

However, Gillian's dream had always been to attend medical school and pursue research on HIV AIDS, a disease she had seen affect many people in her native country of Zimbabwe. Although Gillian graduated with very good grades and was a great candidate for medical school, there was one impediment; being an international student is almost impossible to get loans to attend medical school. Through the advice of her mentor, Dr. Felix Ngassa, Gillian decided to pursue a Ph.D. program at Syracuse University. I caught up with Gillian earlier this summer and asked her what she had been up to after graduating from GVSU and here is what she had to say, "I graduated in May 2006 and worked that summer at Alticor as an R&D chemistry/bioassay intern in the Analytical services department. In mid August of 2006 I started the Structural Biology, Biochemistry and Biophysics program at Syracuse University on a university merit fellowship. The next year I applied for the NIH Ruth Kirschstein National Research Service Award for which I received a five-year fellowship that provided all my support for the rest of my PhD. In the summer of 2009 I also received an NSF-AGEP summer fellowship. I have presented at several conferences including the Biophysical society, a Gordon conference, ACS, and NSF-AGEP conferences. I have published two papers one in the Biophysical journal and one in PLoS One and I have one patent. I recently successfully defended my thesis titled "High Throughput Screening of Aptamers" in late February and am working as a postdoc at Aptamatrix a spin-off biotech company in Syracuse while I await starting medical school at Columbia in New York in the fall for which I was awarded a full tuition scholarship. My career plans so far are to integrate being a researcher in infectious diseases while also being a practicing physician with a presence in areas affected by the diseases I research, thus my decision to acquire a medical degree."

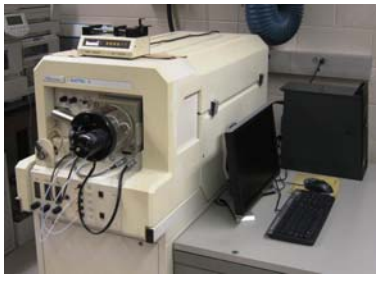
I also asked Gillian for the goal and significance of her doctoral dissertation. "My doctoral project's goal has been to develop a one-selection step, high throughput aptamer discovery method that is easily adaptable for the discovery of aptamers (functional oligonucleotides with high affinity and specificity for their targets) against a wide variety of targets including proteins, whole organisms (unicellular) and small molecules and with the proven potential for isolation of aptamers for multiple targets simultaneously. In addition to method development, I validated the method's viability by discovering highly specific aptamers against live Cryptosporidium Parvum oocysts, α-thrombin, and α-thrombin's glycan moiety. I also generated preliminary data via functional assays that infers the aptamers' potential uses as biosensors (Cryptosporidium Parvum), therapeutic agents (α-thrombin) and biomarkers (thrombin's glycan). These functional oligonucleotides are highly desirable because not only are they more stable especially when derivatized for protection from nucleases, more specific and cheaper to produce than antibodies, but they are also occasionally functional and alter the activity of their targets e.g. infectivity (Cryptosporidium Parvum) and enzymatic activity (thrombin) and are not immunogenic," Gillian said. Finally, looking back at her journey and reflecting on how far she has come, Gillian concludes, "I am excited that I get to do this and see my dream of becoming a clinician/researcher come true, thanks to mentors and teachers like you. You are much appreciated!"

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

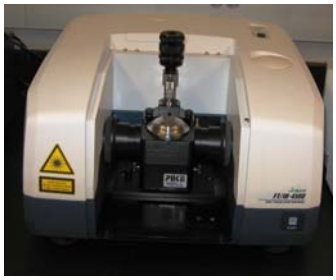
Chemistry Department Instrumentation Update

The chemistry department has added some new equipment this year and added new capabilities at the same time. This year the department obtained a triple quad MS detector, which nicely complements the single quad MS detector we obtained last year. The new MS is a Micromass Quattro II donated as a gift in kind from the Amway Corporation. The Quattro has a higher mass capacity and is a better instrument for doing quantitative and structural analysis. Either MS unit can be interfaced to the Agilent 1100 HPLC giving the department decent LC/MS capabilities. Both instruments have ESI and APCI ionization techniques and both run Micromass MassLynx software. The triple quad is capable of doing MS/MS experiments, has a higher mass range and is very sensitive for doing analytical determinations. The department is grateful to the Dean's office for assistance in setup costs such as higher voltage electrical service.

The chemistry department has also made some purchases this year using funds from departmental end of year and the Dean's office. A fourth Jasco 4100 FTIR with diamond cell ATR has been added to the labs and is housed in the NMR room. Another purchase was made to enhance the ease of use of the Thermo Focus GC. A computer and integration software for the GC will replace an integrator and will greatly facilitate saving data and getting electronic data and chromatograms suitable for publications. A CEM Microwave reactor on a rolling platform was also purchased. The organic labs hope to be able to use this in some future teaching labs and should save valuable lab time and reduce solvent use.



Triple Quad Mass Spectrometer



Jasco FT/IR 4100

CEM Microwave Reactor