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## A Word from the Chair

Greetings from the Department of Chemistry. The beginning of the new school year is always an exciting time on campus. The energy and enthusiasm that the new and returning students bring back to campus is infectious (of course the flu viruses they bring back are also infectious, but let's hope we all don't catch those too). There also seems to be a fever for learning chemistry in the air. The University as a whole announced a modest 2% increase of enrollment this Fall - a significant accomplishment considering the declining enrollment trends in many other schools around the state. However, our department had a nearly 17% increase in enrollment in our first semester general chemistry course. Needless to say, we have been working hard to accommodate this kind of unforeseen demand, but as always, the faculty and staff of the department stepped up to make it all work.

As large as the department has grown, we can now expect some comings and goings on a regular basis. This year marked the retirement of a couple of CHM Department fixtures. Professor Dave Tanis retired after more than 20 years at GVSU. Dave was the first of our Chemistry Education faculty in the Department, and was instrumental in growing this group to be among the largest and most respected Chem Ed faculty in the country. In honor of his retirement, the department hosted its first Golf Outing in the Spring. The event was so successful; all agreed that it should become an annual event. Also retiring this past year was Sandi Bacon. Sandi and I started at GVSU at the same time and have worked side-by-side (literally) for most of that time. In fact, even in retirement Sandi and I seemed "joined at the hip" as she has stayed on as a part-time adjunct instructor to team-teach a CHM 115 lab section with me this semester. New to the Department this year are two new regular faculty members. Dr. Tom Pentecost is a new Chemistry Education faculty, coming to us from

the Univ. of Colorado. Dr. Jaime Curtis-Fisk is a new bio-organic faculty coming to us from MSU. Some of you may also remember her as a GVSU Chemistry alumna, class of '04. Also new since last fall is Michelle DeWitt, our new lab supervisor in charge of the stockroom. She comes in to replace Aaron Perry who moved up to fill Sandi's position as the Director of Lab Support for the College.

Besides these changes in personnel, other major projects on-going this year include major curriculum revisions and Departmental assessment. We are in the midst of implementing significant changes in our service courses for non-majors (CHM 109, 230, 231, and 232). Thousands of students take these courses every year, so the magnitude and impact of these changes can not be underestimated. A large task force of Departmental faculty and staff has worked tirelessly on this project which is now coming to a climax as we hope to roll out the revisions starting in the Fall 2010 semester. Also in the works is our departmental assessment report. A key component of this is to track the success of our graduates. Unfortunately many of our alumni diffuse off into the air after graduation. Please, if you are a Departmental Alumni, take time to drop us a note (e-mail, reply card, phone call, etc...) to let us know where you are and what you are doing. Believe me that all our faculty and staff are invigorated knowing that their former students are off making good use of their education.



# Veteran Chemistry Educator

## Officially Retires from GVSU



A retirement reception was organized by the Chemistry Department to wish Dave Tanis a wonderful retirement on Tuesday, April 21, 2009. After Dave's poignant reflection on his teaching career, brief remarks were made by Todd Carlson, Doug Kindschi, Steve Matchett, Harvey Nikkel, Stephanie Schaertel, and others. On how he would sum up his teaching career of 47 years, Dave said, "One of the first things that happens is that you throw away your red pen! No more lab reports. No more quizzes to grade! But after 47 years, it is also a time to reflect." But on how it all started 47 years ago, Dave said his wife Judy gave him the best advice in 1962 when he was contemplating between a teaching job and an industrial job. She said, "Why don't you try teaching. You can always switch to industry if you decide you don't want to teach. But if you go to industry now and decide later you want to teach, you will never make the switch because you won't be able to afford to take the pay cut." Dave started his teaching career at the high school level. "Many of you know I started teaching on the high school level. During those first five years in a small school I taught chemistry, but I also taught physics, physical science, mechanical drawing, ninth grade math, first and second year German, coached track, ninth grade basketball, scored all the away basketball games plus a multitude of other things that I'm sure I have forgotten," Dave says. Dave's move to a high school in Holland brought him closer to the GVSU Allendale campus. "Then there was the move in 1967 to Holland Christian High School, a bigger school where I taught four chemistry classes, but sometimes had something else like physical science, a math class, or a mechanical drawing section. It was here that I took up golf coaching, spending 17 enjoyable seasons with varsity and junior varsity golfers. There were other responsibilities such as student council sponsor, class sponsor, lunch room duty, study

halls, detention periods and a bunch of other things it is just as well that I've forgotten," Dave said.

Reflecting on the evolution of teaching technology, Dave noted that a lot has changed since he started teaching 47 years ago. "When I started teaching we used opaque projectors to show book diagrams on the screen," Dave said. "The projector was almost as big as a Volkswagen and if you didn't watch it, you could burn up the book page with the carbon arc lamp! We used film strips (not strip films, although some of the high school boys would have been more stimulated by those than they were by my chemistry lessons!). When I was first at Holland Christian High, we had two overhead projectors in the whole school (the latest thing back in the 60's). If I wanted to use one, I had to go to the library before class to check one out, wheel it down to my room for the class, and then bring it back right after class! After two years, the school bought a few more projectors and one was permanently assigned to me. I even used it tilted on its back to project chemical demonstrations with an extra mirror! I used an old Smith Corona manual typewriter to type my ditto masters. Those were the purple masters that used alcohol to lift a bit of the ink off the master to print those quizzes and tests. Kids loved it if you ran off the exam just before class because the smell of the solvent was just what they thought they needed to forget all the troubles of the world, especially the stress of a test! My first computer was a Radio Shack TRS-80 Model 4P (that meant portable!). It had a daisy wheel printer that would do superscripts and subscripts! What a godsend for a chemistry teacher! It stored everything on 5 1/4 inch floppy disks. I wrote a macro that scrambled multiple choice answers – I thought I had the world by the tail! Now its laptops, three gun

projectors, clickers, online homework exercises, smart boards, the web, and . . . you name it!”

Dave also emphasized the role mentors and colleagues have played throughout his career. “Colleagues have always been a source of inspiration to me. It was a fellow math teacher that first year that helped me more than he ever knew at the time. It was colleagues in Holland that inspired me to try things in the classroom that I never thought to try. It was people like Hubert Alyea, Reg Friesen, Henry Heikkinen, Marjorie Gardner, Bassam Shakashiri, and Irwin Talesnick that were instrumental mentors as I developed my teaching style. And it has been my friends here at GVSU that set the stage to accelerate my development as a teacher. As colleagues in this department you have been such solid supporters of what I have tried to do. You have been the inspiration that has carried me through the last part of my teaching career. I have loved it here for the last 22 years. I’ve watched the growth of the university and the department that went beyond the wildest dreams of almost every one of us back in the 1980’s. Our department itself has grown from just 7 of us when I joined chemistry to over 30 now. All of our new hires in chemistry know a lot more chemistry than I do, but I have been called on to share some of my knowledge of the teaching of chemistry with many of you. And I see that as a small payback to those who guided my career development,” Dave said.

Over the years, Dave has won numerous teaching awards as he noted in his reflection. “On several occasions I was even recognized for my teaching ability receiving the Dreyfus Master Teacher designation, the Michigan Science Teachers Association College Science Teacher of the Year award, the GVSU Outstanding Teaching award, and the Niemeyer award. But the real satisfaction has been the students and teachers I have been privileged to teach over the years. A back of the envelope kind of calculation comes up with well over 8,000 students over the last 47 years. That has been the real joy. I obviously don’t remember all of their names, but many of them remember

me and make it a point to come up to me and comment on some demonstration I did or something about chemistry that they still remember. Some of them have become doctors, others nurses or other health professionals, many are now teachers themselves, some are chemists and a few are even college professors but it is my heartfelt belief that all of them have a better appreciation of how the stuff of this world interacts than when they first started my course. Of course, all were not winners in the classroom, but it has always been my goal to do the best job I can every time I am in front of students to share my excitement for the subject and share it in such a way that it may inspire them to love it a bit more than they thought they ever might,” Dave said.

Dave has also had numerous opportunities to work with pre-service teachers. “I have had to work directly with pre-service and in-service programs for chemistry teachers. There were the thirteen years of traveling for the Woodrow Wilson program teaching high school teachers in the summer. I worked with the Flinn Foundation to develop and then host chemistry teacher workshops. I have shared teaching ideas and tips with teachers at conferences and workshops across the US and abroad,” said Dave.

In concluding, Dave thanked his colleagues and urged them to continue the good work of educating our students. “It has been a fun and rewarding career. Now I’ve reached the point when I will be leaving the classroom and leaving the teaching to others. But I’m leaving it in good hands. I’m leaving it with dedicated professionals who take their chemistry seriously but who see their teaching as their ultimate challenge and their life’s work. May God bless each of you as you carry on the work here at GVSU throughout this region, this state and our nation. You are the leadership that will inspire the next generation of students. And they are our best hope for the future,” said Dave. “And keep working and paying into the Social Security trust fund. I need your continued support,” he added.





## New Faculty 2009-2010



**Jaime Curtis-Fisk** has joined the faculty as an Assistant Professor of Bio-Organic Chemistry. She is a graduate of Michigan State University, receiving her Ph.D. in chemistry in 2009, working under the direction of Dr. David Weliky. Before coming to GVSU, she was a chemistry instructor in the Lyman Briggs College at Michigan State University. Her dissertation research focused on using nuclear magnetic resonance to study the structure of viral fusion proteins from the HIV and influenza viruses. She plans to continue work in this field at Grand Valley by investigating proteins from the Ebola virus, and which aspects of their structure are crucial for infectivity. This year she will be teaching CHM 109, Introductory Chemistry.



Dr. Jaime Curtis-Fisk

**Thomas Pentecost** earned his B.S. in Chemistry from the University of Tennessee Martin, an M.S. in Chemistry (Physical) from Louisiana State University, Baton Rouge, and a Ph.D. in Chemical Education from the University of Northern Colorado, Greeley, CO, 2003. Thomas spent the last two years at the University of Colorado Boulder where he was a post-doctoral researcher in the



Dr. Thomas Pentecost

chemistry department and a Science Teaching Fellow with the CU Science Education Initiative. At CU he collaborated in the redesign of courses to focus on conceptual understanding and to create assessment tools to measure student understanding. This work required the use of both qualitative (interviews and observations) and quantitative (Item Response Theory) methodology. Prior to CU he was a Professor of Chemistry at Aims Community College in Greeley Colorado for ten years and taught high school chemistry in Baton Rouge Louisiana. He will be teaching CHM 115 this fall at Grand Valley. His current research interests are in the application of item response theory to the measurement of student conceptual understanding of structure and bonding in general chemistry and the evaluation of novel teaching strategies in physical chemistry courses.

In addition to the tenure track positions, our department also has three new visiting instructors joining us this fall; **Robert Burns, Dan Groh, and Jason Fisk.**

## 2009 Arnold C. Ott Lectureship in Chemistry

The 2009 Arnold C. Ott Lecturer in Chemistry was Dr. Thomas Lane, President of the American Chemical Society. Dr. Lane, who has over 35 years of research experience in the field of organosilicon chemistry, is also the Director, Global Science and Technology Outreach and Senior Research Scientist at Dow Corning Corporation. The Arnold C. Ott Lectureship in Chemistry was created and endowed by a generous gift from Dr. Arnold C. Ott and Marion Ott. Dr. Ott was one of the co-founders of Grand Valley State University and served on the Grand Valley Board of Trustees for 28 years. Two lectures, free and open to the public, were held: a chemistry seminar on "Inspired by Nature," in 123 Manitou Hall, on the Allendale campus; and an evening lecture on "Chemistry: Improving Peoples' Lives," at the Alumni House and Visitor Center, Allendale campus. The evening lecture was preceded by a reception in which students, guests, and faculty were able to interact with Dr. Lane. Through his lectures, Dr. Lane demonstrated that, "Chemists and scientists aren't just nerds in lab coats; they improve peoples' lives and serve humanity."





## Two Chemistry Faculty Win Teaching Awards

The Chemistry Department faculty continues a tradition of excellence in teaching as evidenced by teaching awards received by two chemistry faculty in the 2008 – 2009 school year.

**Felix Ngassa** (Associate Professor) received two awards; the “Panhellenic Association Excellence in Teaching Award” and the “GVSU Interfraternity Council Professor of the Month for March 2009”.

**Brad Wallar** (Associate Professor) received the “Educational Support Program (ESP) Professor of the Year” for 2008 – 2009.



Dr. Brad Wallar

## Chemistry Department Instrumentation Update

Some new additions or upgrades were made to the Chemistry Department's list of instrumentation. A new Shimadzu UVmini 1240 UV-Vis spectrophotometer was recently installed in one of the organic teaching labs. Two new printers were added to the existing spectrophotometers so all have the same printers. Three additional Gow-Mac gas chromatographs have been added to the organic teaching labs as well. Each of the three organic teaching labs is now equipped with a GC, an FTIR and a UV-Vis.

Most of the lower level general chemistry labs have had refurbished computers with new flat screen monitors installed to simplify the use of Hyper Chem and other molecular modeling software. Each bank of three to four computers is linked to new laser jet printers.

The Hewlett Packard 5890 GC with dual flame ionization detectors (FID) is showing signs of age so a new Thermo Focus GC has been purchased and installation should be completed very soon. This is the same GC that is on our GC/MS and will simplify method transfer. The GC/MS had a thorough preventive maintenance with some minor repairs and is functioning extremely well.

The Varian 400 MHz NMR has had a software upgrade and the Jeol 300 MHz recently had its operating system reinstalled. Some of our older equipment that was not in use has been sold to generate funds for the department and open up space for other equipment. A used preparative HPLC was brought into the department and set up so researchers can produce small quantities of more pure products.

# Target Inquiry Update

Associate Professors Deborah Herrington and Ellen Yeziarski are in the fourth year of a 5-year NSF funded study of Target Inquiry (TI), a 2.5-year, innovative professional development program for high school chemistry teachers. Thus far, results from the study indicate that the TI program impacts teachers' understanding of the process of science, teaching practices, and student achievement in chemistry. In January 2010 the third cohort of teachers will begin the program; however, the TI Directors are still actively seeking funding to help support these teachers in their endeavors to make substantial instructional change for themselves and their students. Additionally, the 8 teachers of the second cohort were on campus this summer working on developing 16 new guided inquiry activities. These will soon be published on the TI web site ([www.gvsu.edu/targetinquiry](http://www.gvsu.edu/targetinquiry)), joining the 18 labs created by the first cohort. The TI web site has over 350 registered users from 9 countries who have given the TI student and teacher guides high marks. The products of the TI program and its study have been widely disseminated over the past year.

Since last fall, Yeziarski and Herrington, along with their undergraduate students (Karen Luxford, Christina Billman, and Christina Emery), gave 15 talks and posters including National ACS Meetings, Student Scholarship Day, the Western Michigan Undergraduate Conference at the Van Andel Institute, and the NSF DRK-12 PI Meeting. Luxford's talk

and Billman's poster presented at the recent 238<sup>th</sup> National ACS Meeting in Washington, D.C. showcased their outstanding work and significant contributions to the project. Luxford is beginning her third year with the project with responsibilities commensurate with a graduate research assistant.

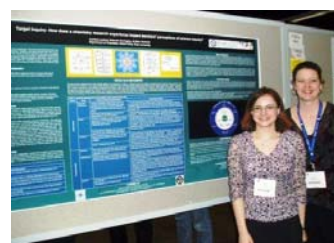
Dr. Herrington presented TI research results at the University of Western Cape and University of Cape Town in Cape Town, South Africa, and Dr. Yeziarski presented results at Purdue University and Miami University of Ohio. Most notably, Herrington and Yeziarski spoke at the Gordon Research Conference on Chemical Education Research and Practice last June and will be giving an invited talk at the National Academy of Sciences Chemical Sciences Roundtable in September.

The TI teachers have also been actively presenting at conferences. In May the second teacher cohort (Chad Bridle, Deanna Cullen, Dale Eizenga, Joe O'Malley, Doug Mandrick, Michelle Mason, Pam Scott, and Angie Slater) presented their chemistry research results at the Great Lakes Regional ACS Meeting in Chicago. Three TI alumni from the first cohort presented inquiry laboratory materials produced in the TI program at the 238<sup>th</sup> American Chemical Society National Meeting and Exposition in Washington, DC. Debra Johnson, Alice Putti, and Sarah Toman (GVSU Alumna) delivered their talks to an audience including high school teachers and university professors. Additionally, Putti and Toman were invited speakers and

workshop presenters at a biennial inquiry conference sponsored by the University of Maine.

Current research activities include: the completion of data collection for the first and second teacher cohorts, working with three other campuses who are planning to implement the TI model for teacher professional development and the writing of another NSF grant to fund the study the scale-up of the TI program, and studying the impact on student process skills with our third teacher cohort.

The TI team at GVSU is comprised of PIs Yeziarski and Herrington in addition to chemistry education colleagues Julie Henderleiter, Sherril Soman, and Nathan Barrows, College of Education colleague Caryn King, past and present chemistry research mentors (Robert Smart, Dave Leonard, Dalila Kovacs, Steve Matchett, George McBane, Stephanie Schaertel, Andrew Lantz, Matt Hart, Min Qi, Randy Winchester, Rachel Powers, and Brad Wallar), and administrative coordinator, Janet VanRhee. PIs are meeting with local chemistry companies to develop partnerships to sponsor more teachers in TI. If your company is interested in learning more about how you can contribute to the professional development of high school chemistry teachers, please contact Dr. Yeziarski or Dr. Herrington. For more information about the TI program and its study, visit [www.gvsu.edu/targetinquiry](http://www.gvsu.edu/targetinquiry).



## Chemistry Department Honors Students

In April of 2009, the chemistry department honored many of its most outstanding students for the 2008/2009 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:** *Hannah M. Hollandsworth* was the recipient of this award, which 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.

**Outstanding Sophomore Award:** *Joshua D. Davis* 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 *Randall K. Breckon*. 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:** *Brittany E. Benson* 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:** *Kyle D. Schneider* 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:** *Kirk D. Wyatt* 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 *Felix Q. Boucher*. 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.

**Senior Chemical Education Award:** *Jennifer L. Heldt* was the recipient of this award, which is given to a graduating senior who is a Chemical education major.

## GVSU to Host the Biennial Conference on Chemical Education (BCCE) in 2014

GVSU has been approved as the site for the 2014 Biennial Conference on Chemical Education (BCCE), tentatively scheduled for August 2 – 7, 2014. The BCCE is a national meeting sponsored by the Division of Chemical Education of the American Chemical Society. The conference promotes research and teaching in chemistry education at all levels (K – graduate) and provides chemistry teachers with opportunities for interacting with colleagues at all levels in formal and informal settings. General Chair Sherril Soman, Program Chair Julie Henderleiter, and the Site Management Team, Sandi Bacon and Mary Ann Sheline, are excited to start planning the conference, with the assistance of the chemistry department, Kent County Convention and Visitors Bureau (Mary Manier), and Grand Connection (Tracy Vander Meer). Additional Chemistry faculty with leadership responsibilities include: Stephanie Schaertel (Workshop Program Chair), Nathan Barrows/ Jennifer Glaab (Abstracts Book Editors), Ellen Yezierski (Poster Session Coordinator), and Robert Smart (Exhibits Coordinator). Look forward to annual updates for this important chemistry education conference!

## Chemistry faculty Members on Sabbatical for the 2009 — 2010 School Year

**Deborah Herrington** is currently on a year-long sabbatical leave this fall 2009 and winter 2010. She is working on, "A Summative Evaluation and Expansion of the Target Inquiry Program".

**Mary Karpen** will be on sabbatical leave in the winter of 2010. She will be working on, "Enhancing Student Learning in Biochemistry via Web-based Homework".

**Felix Ngassa** will be on sabbatical leave in the winter of 2010. He will be working at the facilities of AFID Therapeutics and MSU. His project will involve, "Synthesis of Chiral Cyclopentanols and Chiral Pyrrolidines as Potential Therapeutic Agents".

**Brad Wallar** is currently on a year-long sabbatical leave this fall 2009 and winter 2010. His sabbatical work will be done in his research laboratory at the Cook-Devos Center for Health Sciences at GVSU.

**Ellen Yeziarski** is currently on a year-long sabbatical leave this fall 2009 and winter 2010. She is working on, "Target Inquiry Dissemination and Growth: Impacting Inquiry Instruction in High School Chemistry on a National Level".



**Dr. Ellen Yeziarski**

## Student Scholarship Day 2009

More than a dozen Chemistry students presented their research results in either oral or poster form at 14<sup>th</sup> Annual Student Scholarship Day in April 2009. Student scholars and their sponsors were the following:

**Kristina Emery.** "Target Inquiry: A Teacher Case Study". Sponsors: *Deborah Herrington and Ellen Yeziarski*

**James Marr.** "Computational Study of Carbonmonoxymyoglobin". Sponsor: *Christopher Lawrence*

**Ryan Nelson.** "Capillary Electrophoretic Detection of Candida Albicans Fungi in Blood". Sponsor: *Andrew Lantz*

**Steve Asiala.** "Toward Construction of a Modular Raman Spectrometer for Solid, Aqueous, and 'Quasi-Liquid' Samples". Sponsor: *Stephanie Schaertel*

**Brandon Haines.** "A Novel Cu- and Amine-Free Sonogashira Cross-Coupling in the Alkynylation of 2'-Deoxyadenosine". Sponsor: *Felix Ngassa*

**Karen Luxford.** "Target Inquiry: Can Professional Development Change Teachers' Beliefs and Instructional Practices?". Sponsors: *Deborah Herrington & Ellen Yeziarski*

**Shannon Murphy & Sarah Wood.** "Synthesis of Piperazine-Based  $\alpha$ -Helix Peptidomimetics for the Disruption of the HIV-I Rev-RRE RNA Interaction". Sponsor: *Shannon Biras*

**Benjamin Eggleston.** "Chemical Warfare Agent Recognition and Quantification". Sponsor: *Cory DiCarlo*

**Trevor Lott & Todd Major.** "How Wide is that Peak? Progress Towards Measuring Line Broadening Coefficients in Infrared Spectroscopy with Small Gas Phase Molecules". Sponsor: *George McBane & Stephanie Schaertel*

**Kevin Maupin.** "Progress Towards the Synthesis of a Novel Indane Derivative as a Regulator of TAAR Activity". Sponsor: *Matthew Hart*

**Kirk Wyatt.** "Synthesis of Derivatives of 3-Aminoquinazolinone and 2'-Deoxyguanosine as Potential Inhibitors of FAK and Src". Sponsor: *Laurie Witucki & Felix Ngassa*

**Amanda Hanks.** "Catalytic Hydrogenation of Threitol over Pd/C Catalyst". Sponsor: *Dalila Kovacs*

**Derek Loutzenhiser.** "Economical Simulation of Extraterrestrial Environments". Sponsor: *Cory DiCarlo*

**Randall Breckon.** "Investigation of the Silaallyl Anion". Sponsor: *Randy Winchester & John Bender*

**Nathan Craft.** "Cyclohexene Derivatives in Transfer Hydrogenation". Sponsor: *Dalila Kovacs*

**Kyle Schneider.** "Acyl-Enzyme Complex of the Class D  $\beta$ -Lactamase OXA-I and Doripenem". Sponsor: *Dave Leonard*

**Kyle Kilpatrick.** "Antibacterial Properties of a Telomerase Inhibitor". Sponsor: *Robert Smart & Rod Morgan*

**Katherine Stahrr.** "Design and Synthesis of Peptide Substrates for Focal Adhesion Kinase (FAK) Using Solid Phase Peptide Synthesis Strategies". Sponsor: *Laurie Witucki*

**Evan Lund.** "The Design of Focal Adhesion Kinase Substrates and Specificity Determination Using ELISA Assays". Sponsor: *Laurie Witucki*

**Daniel Wood & David Duran.** "Toward the Synthesis of a Series of Phenyl Vinyl Ether Complexes of Iron. Establishing the Correlation Between Metal-Olefin Bond Asymmetry and Reactivity". Sponsor: *Stephen Matchett*

**Christina Billman.** "Target Inquiry: Teacher-Perceived Barriers to Inquiry Instruction". Sponsors: *Deborah Herrington & Ellen Yeziarski*

**James Ruble & Jenna Tomlinson.** "Effects of Asn152 Mutation on Substrate Selectivity of P<sub>99</sub> Cephalosporinase". Sponsor: *Rachel Powers*

**Brittany Benson.** "Studying Potential Drug Interactions in the Regulation of the Diaphanous-related Formins". Sponsor: *Brad Wallar*

**Renee Bouley.** "Redox-Enzyme Activity Under Simulated Extreme Martian Conditions". Sponsor: *Cory DiCarlo*



# GVSU Chemistry Department Host Green Chemistry Education Network Conference

The first Michigan Green Chemistry Education Networking Conference was held at Grand Valley State University on Friday, May 8, 2009. Over 70 participants took part in the conference that was held at the Alumni House on the GVSU Allendale campus. The conference, supported through financial donation from the Michigan Department of Environmental Quality, had as its goal the establishment of a network of educators interested in the implementation of green chemistry in teaching and learning. Participants at the one-day conference included educators from K-12 to community colleges and universities, legislators, and some industrial chemists from across the state. Opening remarks were given by the co-organizer, Dalila Kovacs, and the Chair of the GVSU Chemistry Department Todd Carlson. Activities at the morning session comprised of short talks from instructors who have taught green chemistry courses in their respective schools. Talks from Jim

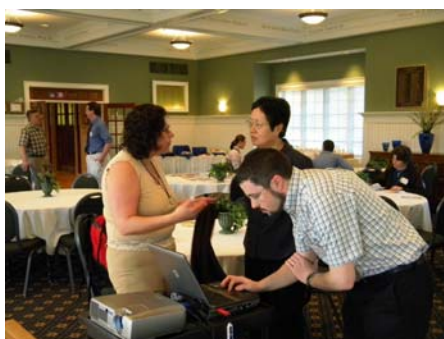
Krikke of GVSU, Jennifer Aurandt and Montserrat Rabago-Smith from Kettering University, and James Jackson from MSU were presented. The featured presentations from John Warner and Amy Cannon were the highlights of the morning session. John Warner is a household name in the field of green chemistry both in the industrial and academic sectors. John Warner is the founder of the Center for Green Chemistry at the University of Massachusetts-Lowell. He also serves as the president of both the Warner-Babcock Institute for Green Chemistry and Beyond Benign. Amy Cannon, a co-founder of Beyond Benign, was awarded the world's first Ph.D. in green chemistry from the University of Massachusetts. Activities at the afternoon session involved a demonstration by Doug Mandrick of Portage Public Schools on implementing green chemistry in the high school chemistry curricula.

In other Green Chemistry news, the Chemistry Department also received \$24,000.00 from



John Warner

the Michigan Department of Environmental Quality, to offer a new general education course "Pollution Prevention (P2), Green Chemistry, and Green Engineering" in the winter semester of 2009. The class consisted of lecture, group discussions, student presentations, and four field trips. The course, offered as a "special topics" course, will be offered again in the winter semester of 2010. In the future, the Green Chemistry course will be added to the department curriculum and offered yearly; the course has been approved by the CLAS curriculum committee while approval by the university curriculum committee is pending.



## Departmental Research Update



Research in the department remains active. Many faculty members attended regional, national and international meetings in which the results of their research were presented. The department has also maintained as its priority the active involvement of undergraduate students in research. A summary of some faculty research update is presented.

**Nathan Barrows** continues his research into the development of student conceptual understanding. He had a funded Student Summer Scholar, Kaitlin Downey, working on a online video tutorial project for general chemistry; he collaborated with **Deborah Herrington** on a related project in organic chemistry funded by a Pew FTLC grant. A second Pew FTLC grant supported collaboration with **Felix Ngassa** and **Karen Matchett** to pilot test organic chemistry experiments modified to include particulate-level reasoning.



**Matthew Hart** had an S<sup>3</sup> grant, titled "Efficient Synthesis of a Truncated Ergoline: Development of TAAR Regulators," funded for \$6000.00. He also had his research students present their work at the

Van Andel Institute, Student Scholarship Day, the Midwest Regional ACS Meeting in Chicago, and the Spring ACS National Meeting in Salt Lake City, UT.

**Debbie Herrington** continues her research on Target Inquiry (TI) with **Ellen Yeziarski**. Some work from her research group was presented at the national ACS meeting and BCCE this year.

**Dalila G. Kovacs** and **Jim Krikke** started a new research project in collaboration with student Shane McGrath, a junior chemistry major, funded by a S3 scholarship. The project, Mechanistic insights into cellobiose conversion under heterogeneous catalytic conditions, targets cellobiose, a two-glucose unit dimer, an ideal simplified model for cellulose, because of the presence of a single ether-linkage per molecule and its solubility in water. In addition, Dalila G. Kovacs participated in a Green Chemistry Workshop, at the University of Oregon, Eugene, organized by the Center for Workshops in Chemical Sciences (CWCS), July 18-24, 2009. The primary objective was to expand the network of chemical educators who are promoting green chemistry and share the experience in incorporate green chemistry experiments and concepts into undergraduate teaching. Besides participation in lecture sessions and panel discussions, Dalila performed a total of 18 hands-on experiments, in 5 four-hour sessions, throughout the week. The experience gained will be shared with the

organic faculty, lab coordinators, lab and safety managers, in order to continue and extend the implementation of green experiments in our curriculum.

**Andrew Lantz** is continuing research into pesticide-cyclodextrin interactions and the detection and separation of microorganisms by capillary electrophoresis. Last March he took Pam Scott and Michael Delamarre down to Pittsburgh Conference in Chicago to present their work on "Estimation of Pesticide-Cyclodextrin Association Constants by Affinity Capillary Electrophoresis." An external subcontract grant "Antimicrobial Activity of Essential Oils: Alternative Delivery Strategies" from Van Beek Scientific was renewed for another year and an additional \$2000.



**Christopher Lawrence** published two papers: (1) "Molecular Dynamics Simulations of Water Transport Through Butanol Films", published in *Journal of Physical Chemistry A* 2009; and (2) "Observation of Water Dangling OH Bonds Around Dissolved Nonpolar Groups", published in *Proceedings of the National Academy of Sciences* 2009.

**Dave Leonard** continues studies on beta-lactamase structure-function. The Leonard group had four students this past summer: Kyle Schneider, Caleb Ortega, Nick Hefferan, Stephanie Pavlish.

## Departmental Research Update

The group had a peer-reviewed publication with undergraduate students on "Mutation of the active site carboxy-lysine (K70) of OXA-I beta-lactamase results in a deacylation-deficient enzyme", published in *Biochemistry* 2009, 48, 6136-6145. In addition, a prestigious external grant of \$150,000.00 was received from the NIH (see separate article in this newsletter).



**George McBane** and **Stephanie Schaertel** worked with several GVSU students on measurements of pressure broadening effects in gases and on isotope ratio determination in carbon dioxide. Research student Luan Nguyen was awarded both a Michigan Space Grant Consortium Undergraduate Fellowship and an Ott Scholar award. George gave a presentation at the Conference on the Dynamics of Molecular Collisions in July. George also published four papers: (1) "CO blocking of D<sub>2</sub> dissociative adsorption on Ru (0001)", published in *ChemPhysChem* 2008, 9, 2372; (2) "Relaxation of NH( $a^1\Delta_v=1$ ) in Collision with H( $^2S$ ): An Experimental and Theoretical Study", published in the *Journal of Physical Chemistry* 2009; (3) "Production of O<sub>2</sub> Herzberg states in the deep UV photodissociation of ozone", published in the *Journal of Chemical Physics* 2009, 131, 011101; and (4) "A Plea for the Abandonment of the Atmosphere as a Unit in Gas Law Instruction" published in the *Journal of Chemical Education* 2009.

**Felix Ngassa** continues his research on transition metal-catalyzed syntheses of modified nucleosides. He had a funded Pew FTLC Grant this past summer, working in collaboration with **Nathan Barrows** and **Karen Matchett**, to pilot test organic chemistry experiments modified to include particulate-level reasoning. The Ngassa group also presented research results at the spring ACS national meeting in Salt Lake City, UT, and had a peer-reviewed publication with undergraduate students Erick Lindsey and Brandon Haines, published in the journal *Tetrahedron* 2009. The Ngassa group currently has five undergraduates doing research this fall.

**Min Qi** was invited to visit the National Institute of Biological Science in China this past August 2009. While in China, she taught a short course: Supercritical fluid extraction and supercritical fluid chromatography - Green Application at the graduate level. In addition to her teaching duty, she met faculty members in the institute and discussed future collaboration possibilities. A new research project has been initiated in Min's lab this summer. The project involves the study of antibiotics levels in the environment. "There has been an increasing interest in the study of occurrence and fate of pharmaceuticals in the aquatic environment because of their potential function toward the spread and maintenance of resistance in bacterial pathogens and post-therapeutic effects," Min said. Jody Wycech, a student

majoring in Environmental Chemistry will join Min on this project.

**Stephanie Schaertel** continued working on a joint research project with **George McBane** involving the use of diode-laser-based spectroscopy to make fundamental measurements of molecular parameters of small molecules. Three students worked on the project this year. She also continues working on building modular inexpensive Raman spectrometers for the investigation of protein structure.

**Randy Winchester** was on sabbatical during the winter of 2009 and worked at Notre Dame University with Paul Helquist. He spent his time working intensely on designing and synthesizing new catalysts that he will continue to develop at GVSU and use with students in his group for asymmetric synthesis. During the fall of 2008 and continuing in fall of 2009 Randy is working with GVSU student Randall Breckon at studying conjugation in silicon analogues of allyl anions, both experimentally and theoretically.



**Ellen Yeziarski** continues her research on Target Inquiry (TI) with **Deborah Herrington**. Some work from her research group was presented at the national ACS meeting and BCCE this year.



# Chemistry Department Graduates the Largest Class in a Decade



The Chemistry Department's largest Senior Class in a decade celebrated their graduation from GVSU in April. The celebration was part of the annual seniors' banquet held at the Alumni House in the Allendale campus. The graduating seniors were joined by their family and friends, as well as the faculty and staff of the Chemistry Department. The graduating seniors were Sarah Anzell, Steve Asiala, Brittany Benson, Christina Billman, Kristen Bloch, Mark Bryson, Danielle Buglio, Nate Craft, Kristina Emery, Brandon Haines, Jennifer Heldt, Mike Kelly, Trevor Lott, Joe Loviska, Evan Lund, James Marr, Megan Mater, Nick Myers, Nick Renck, Kyle Schneider, Lucas Snider, Katie Stahrr, Emily Tamayo, Ben Thome, Tom Wigger, and Dan Wood.

Part of the fun of the seniors' banquet was the "mock elections" conducted by seniors for seniors. Some of the results of the "mock elections" were the following: *Best Dancer*, Trevor Lott and Sarah Anzell; *Best Dressed*, Mike Kelly and Jennifer Heldt; *Best Personality*, Evan Lund and Katie Stahrr; *Biggest Lab Report Procrastinator*, Nate Craft and Emily Tamayo; *Class Clown*, Nick Renck and Sarah Anzell; *First to Drop Out of Graduate School*, James Marr and Brittany

Benson; *Most Outgoing*, Evan Lund and Sarah Anzell; *Most Hardworking*, Kyle Schneider and Brittany Benson; *Most Likely to Win a Nobel Prize*, Kyle Schneider and Brittany Benson; *Most Likely to Succeed*, Evan Lund and Katie Stahrr; *Sleeps Most in Class*, Dan Wood and Danielle Buglio; *Most Likely to Have and Atom Named After Them*, Steve Asiala and Brittany Benson; *Most Likely to be a Professor at GVSU*, Steve Asiala and Christina Billman.

The "Senior Chemical Education Award" went to Jennifer Heldt and the "American Institute of Chemists Award" went to Kyle Schneider. The winner of the "Outstanding Senior Award" was Brittany Benson. I spoke with a few graduating seniors who shared with me their career goals.

**Sarah Anzell:** "I am graduating this year with a B.S. in chemistry, with an emphasis in biochemistry/biotechnology. I'm currently looking for a job. My hopes are to work in a laboratory doing biochemical research or drug design. I plan on working for a year, while applying to law schools. I would like to start law school in the fall of 2010 and hopefully go into intellectual property law."

**Danielle Buglio:** "I will be graduating this April with a Bachelor's of Art in

Chemistry with an emphasis in Biochemistry and Biotechnology and a minor in Criminal Justice. I've been a member of the GVSU Swim team the past four years and have qualified for the Division II National Championships all four years. After graduation I plan on joining the Coast Guard, specifically the rescue dive division. After the coast guard I plan on pursuing a career in forensic science."

**Megan Mater:** "After graduation, I'm moving to Lexington, KY to start medical school at the University of Kentucky. Right now, I'm enrolled in the MD program, but I'm thinking about switching into the MD/PhD program. I'll be moving down early this summer to take an intro to research class to begin getting involved in a research project."

**Emily A. Tamayo:** "After graduating I will be taking a year off to work full time. I hope to find a position within a crime lab and currently have some possible opportunities out of state. During my year off, I will begin to apply to graduate school to obtain my master's degree in Forensic Science. My career goal is to work as a forensic scientist in the Microchemical Unit or Firearms Unit."



# Two Chemistry Faculty Receive External Grants to Fund Research

Two chemistry faculty members, Dave Leonard and Rachel Powers, have received highly competitive external grants from the National Institutes of Health (NIH) and the Research Corporation, respectively.

**Dave Leonard:** A three-year grant totaling \$150,000 has been received by Chemistry professor Dave Leonard. The award from the National Institutes of Health is entitled "Investigations of the role of key active site residues of two class D lactamases" and focuses on mechanisms by which bacteria become resistant to penicillin-type antibiotics. The grant funds a wide range of investigations including the effect of drugs on live bacterial cells, the mechanism of enzymes that break down the drugs, and the synthesis of new antibiotics. The grant will help strengthen the collaborations that Leonard has developed with scientists at Case Western Reserve University and with GVSU colleague Rachel Powers, but the most important feature is the enhancement of undergraduate research. "The heart of what we do at Grand Valley is introducing students to the excitement of scientific exploration," says Leonard, adding that two students will be funded for full-time summer research each year. The students will learn a variety of techniques including site-directed mutagenesis, minimum inhibitory concentration analysis, fluorescence anisotropy and many

others. "Working full-time allows the students to fully immerse themselves in their projects," notes Leonard. "Not only can they make a lot of progress, but is often the time during which they get excited about a career in research."

**Rachel Powers:** A Cottrell College Scholar Award (CCSA), in the amount of \$44,895 with matching support of \$9,000 from CLAS, has been received by Assistant Professor of Chemistry Rachel Powers. The CCSA is sponsored by Research Corporation. The funded project involves the structural analysis of mutants of the antibiotic resistance enzyme P99 *cephalosporinase* and provides funding for two undergraduate students to conduct research during the summer. The project is in collaboration with Virginia Cornish at Columbia University and was established during her visit to GVSU for the Arnold Ott Lectureship in Chemistry. The goal of this research is to determine the structural basis of substrate selectivity for three mutant P99 enzymes using X-ray crystallography. These mutants occur at amino acid position 152 of P99 and result in a switch in substrate preference for the enzyme. A better understanding of these observed substrate selectivity switches may aid in the design of novel antibiotics, prior to the emergence of these mutants in clinical isolates.



Dr. Leonard with students Caleb Ortega and Kyle Schneider.



Dr. Powers with students Mehreteab Mengsteab and Amanda Hanks.

# GVSU Faculty and Students Present Research

## At National Meetings: ACS, and ASBMB

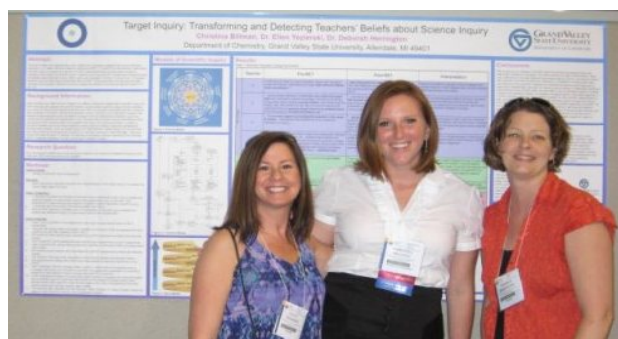
Faculty and students from the Chemistry Department at GVSU presented research results at two national meetings: The national meeting of the American Chemical Society (ACS), and the national meeting of the American Society for Biochemistry and Molecular Biology (ASBMB). At the ASBMB meeting, faculty/student presentations came from the research groups of Dave Leonard, Rachel Powers, and Brad Wallar. At the ACS, faculty/student presentations came from the research groups of Matthew Hart, Deborah Herrington, Dalila Kovacs, Felix Ngassa, and Ellen Yeziarski. In addition, several GVSU Chemistry faculty were involved in the organization of symposia and participated in the business sides of the ACS meeting. Significant participation from Debbie Herrington, Sherril Soman, and Ellen Yeziarski are presented below:

**Deborah Herrington**, Associate Professor of Chemistry, organized and presented a talk in the Chemical Education symposium "High School Chemistry Teacher Professional Development: What Works and How We Know" Her talk was titled "No quick fixes: The long road to inquiry based instruction." Herrington also serves on the Division of Chemical Education (DivCHED) New Members and Chemical Education Research committees and while in Salt Lake attended the semi-annual meetings of these committees as well as the DivCHED business meeting.

**Sherril Soman**, Associate Professor of Chemistry,

attended the 237th national meeting of the ACS in Salt Lake City, UT. Sherril participated in meetings related to the development of a national chemistry lab practical, as a member of the ACS Lab Practical Committee and chair of the Hands On Practical subcommittee. Sherril also attended the Executive Committee Meeting of the Division of Chemical was discussed. Education in which GVSU's bid to host the 23rd Biennial Conference on Chemical Education. GVSU's bid was approved and we are the host site for the conference in 2014.

**Ellen Yeziarski**, Associate Professor of Chemistry, participated in the business and research sides of the ACS meeting. As a newly elected DivCHED Alternate Councilor and newly appointed member of the Board of Publications, Ellen attended the Executive Committee Meeting of the Division in addition to 2 days of meetings of the Board of Pubs. She presented a talk in the Chemical Education Research Symposium titled, "Target Inquiry: Using observational data to detect changes in teacher practice" and presided over the symposium, "High School Chemistry Teacher Professional Development: What Works and How We Know" organized by Deborah Herrington. Ellen particularly enjoyed the Chemical Education Research Poster Session where Target Inquiry research student Karen Luxford (mentored by Herrington and Yeziarski) gave the poster, "Target Inquiry: Can professional development change teachers' beliefs and instructional practices?"



Ellen Yeziarski, Christina Billman and Debbie Herrington



Sarah Toman, Deb Johnson and Alice Putti

# Department Faculty News

**Toni Brown** was married to Barry Rice on August 29, 2009.

**Matthew Hart** and his wife, Sally D. Ngo, had their second child, Ethan Wei-Mahn Hart, on September 9, 2008.

**Dalila Kovacs** earned tenure and was promoted to associate professor. She is planning to take her sabbatical leave next year.

**Andrew Lantz** and his wife had a baby boy, William Robert Lantz, on February 6, 2009.

**David Leonard** received a prestigious NIH grant to fund research with undergraduate students.

**Felix Ngassa** earned tenure and was promoted to associate professor.

**Aaron Perry** and his wife had a baby girl, Kayla Rose Perry, on April 21, 2009.

**Rachel Powers** received a prestigious grant from the Research Corporation (CCSA) to fund her research with undergraduate students for two years.

**Sherril Soman** has joined the office of the Provost on an interim, half-time basis as the Assistant Vice President for Academic Affairs. She will split the duties of the Assistant Vice President for Academic Affairs with Dr. Maria Cimitile of the Psychology Department. Specifically, Sherril will take over duties associated with academic advising, orientation, and student success, retention, and time to graduation. She will also work with student concerns brought to the Provost's office.

**David Tanis** has officially retired from GVSU Chemistry Department after more than 20 years of distinguished service.



Barry & Toni Rice



William Robert Lantz



Kayla Rose Perry

# Alumni News

**Steve Asiala**, a **2009** graduate, is in the Chemistry PhD program at the University of Notre Dame.

**Brandon Haines**, a **2009** graduate, is in the Chemistry PhD program at the University of Notre Dame.

**James Marr**, a **2009** graduate, is in the Chemistry PhD program at the University of Notre Dame.

**Megan Mater**, a **2009** graduate, is studying human medicine at the University of Kentucky (class of '13).

**John Schwartz**, a **2005** graduate, graduated from Wayne State University and received the Doctor of Medicine degree. John started his residency in pathology with William Beaumont Hospital in Royal Oak, Michigan.

**Paul D. Cook**, a **2004** graduate, earned his PhD from the University of Wisconsin Madison Biochemistry Department during the spring of 2009. He is currently a postdoctoral research fellow trainee in Richard Armstrong's lab at Vanderbilt University in Nashville, TN. His research focuses on structure, function and evolutionary relationships among enzymes involved in antibiotic production or resistance.



Asiala

Haines



Marr

Mater



## Please Update Us With News About You!

Please send information to:

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Please remember to include your graduation year with any exciting news that you submit to us. We would love to know what you are doing!