



Greetings from the Chair

As fall is the start of a new season of the year, a new season begins for Chemistry at Westminster College. Some things remain the same and others change. A new class of 17 chemistry and biochemistry majors replaces the 17 majors that graduated in May. This keeps the total number of majors unchanged at 50 maintaining a robust community within the department. Our students have been busy with research experiences at Westminster, at other colleges (inside and outside the United States), and at internships. Numerous research posters decorate the walls around the department lauding our tradition of developing accomplished chemists and biochemists.

An entering class of 450 students will have many ripple effects in Chemistry for the next several years. This year the department will teach 8 sections of general and introductory chemistry! Wow! We will be teaching many more students than usual, giving us the opportunity to positively affect so many lives. Partly due to this larger number of students, but also due to a staffing change, Chemistry welcomes two new visiting faculty members. New faces and different perspectives allow our department to re-examine practices and to hone methods, allowing us to better serve our students and Westminster.

Another change that this season brings is that these greetings come from a new department chair. Please join with me in thanking Dr. Martha Joseph for a job well done over the past five plus years. Her efforts have added to our strength.

Congratulations go to Dr. Peter Smith. During the past year, he received tenure and was promoted to the rank of associate professor for his accomplishments on and off campus.

Additional congratulations go to our student award winners: Christina Hamill '10 (DeWitt Scholarship), Mike Kochemba '09 (Dunlop Scholarship and Analytical Chemistry Award), Tara Pregon '09 (Louis Skurcenski Scholarship), Amy Thomas '08 (Ken Long Book Award), Ryan Schafer '08 (Society of Analytical Chemists of Pittsburgh), Andrew Brown '09 (Penn-Ohio Border Section of ACS), Natasha Kassim '10 (Freeman Award), Ryan Konik '11 (CRC Award). All deserve high praise for their accomplishments.

My role as chair is to promote the numerous accomplishments of our students and faculty and to facilitate their efforts to do more. Our department is poised for moving forward, to build upon its tradition and the efforts of faculty and students including you, our alumni. Your support enables us to succeed. The variety of seminars, internships, gifts and feedback you provide are essential to the department's vitality. As alumni, you are always part of this department. You are welcome to visit anytime!

Dr. Timothy Sherwood
Chair, Department of Chemistry



Chemistry graduates following commencement 2008.

Department Welcomes Miller, Viskari

The Department of Chemistry welcomes Dr. Larry **Miller** and Dr. Pera **Viskari** as visiting professors for the 2008-09 academic school year.



Miller

Dr. Miller is teaching biochemistry as well as the organic chemistry lab this semester. Originally from Mentor, Ohio, Dr. Miller has now relocated to New Wilmington, two houses away from Dr. Viskari. Dr. Miller's undergraduate degrees, including a bachelor of arts in music theory and a bachelor of science in chemistry, were obtained from Case Western Reserve. He later attended Purdue University where he earned his Ph.D. in chemistry education. Dr. Miller, who taught for three years at Southern Illinois University before coming to Westminster, is interested in studying the conceptual understanding of matter as held by students. He is also interested in instituting a travel course for the field of chemistry. One idea was to incorporate one of his hobbies into this course by including a potential scuba trip off the coast.



Viskari

Dr. Viskari is teaching both of the introduction to chemistry sections as well as the labs. He hails from Hemeenlinna, Finland, but now calls Gateway home where he and his wife and two-year-old son happily abide. Dr. Viskari began his higher education at the University of Helsinki in Finland where he studied chemistry for one year. He then traveled across the Atlantic to America, finished his undergraduate degree at Averett University and obtained a graduate degree at Wake Forest University and has remained in America for the last 15 years. Dr. Viskari is interested in continuing his previous studies on the analysis of proteins using laser induced technologies and HPLC methods while being able to run 26.2 mile marathons in the rare four hours of spare time he has.

Majors Involved in Summer Research, Internships across U.S. and Abroad

Fourteen chemistry and biochemistry majors traveled outside of their comfort zones to explore the glorious world of research and possible future careers.

Dr. Peter **Smith** expressed his pride in these Westminster students by saying “I was impressed with the degree of sophistication of research that our students were involved in over the summer. I can guarantee that when these guys were first year students here, they wouldn’t have even dreamed of doing something like this.”

The National Science Foundation Research Experiences for Undergraduates (NSF REU) program sponsored 10 Westminster students at various universities.

Andrew **Brown** '09 studied 2D NMR methods for detecting multiple quantum coherences at Kent State University in Ohio.

Andrew **Davie** '09 focused on lipidomics using bioanalytical chemistry at Duquesne University in Pittsburgh.

LeighAnn **Jordan** '09 traveled to Martin Luther University Halle-Wittenberg in Halle, Germany, to study protein expression, purification, characterization and fibrillation. She also participated in an intensive language program in Berlin at the DID Institute.

W. Mike **Kochemba** '09 synthesized and studied double salt nanowires for computer chips at Boston University in Massachusetts.

Leah **Maxwell** '09 studied the effects of the anti-diabetic drug, Rosiglitazone, on osteoblast and adipocyte formation at the University of Toledo Medical Center in Ohio.

Tara **Pregibon** '09 used liquid chromatography and particle beam mass spectrometry to analyze green tea standard reference materials for NIST at Clemson University in South Carolina.

Theresa **Swanson** '09 studied the surface of graphene through the MRSEC-REU program at the University of Maryland this summer.



Pregibon

Christina **Hamill** '10 attempted to synthesize a PNP hafnium alkylidene at Brandeis University in Waltham, Mass.

Natasha **Kassim** '10 traveled to Ohio State University in Columbus to research the synthesis of ceratamine A, which is a natural anti-tumor agent.

Nathan **Barefoot** '11 performed geometric optimizations on water complexes of the conformers of 2-butanol and 2-pentanol using microwave spectroscopy at Kent State University.

Four students held internship positions in industry and government.

Mallory **Lichwa** '09 investigated crime scenes across Allegheny County while working for the Allegheny County Medical Examiner’s Office in Pittsburgh.

Brandi **Weigand** '09 returned to Plextronics in Harmar, Pa., to synthesize small molecules and polymers that would be incorporated in organic light emitting diodes.



Kassim

Linda **Farnham** '10 moved to Wexford, Pa., to work at AGX, Inc. where she trained to become an Environmental Specialist and monitored air particulate before, during and after asbestos abatement.

Eric **Cargill** '11 interned at the Food and Drug Administration, Center for Device and Radiological Health, Office of Science and Engineering Laboratories, Department of Chemistry and Materials Science outside of Washington, D.C., to study the antibacterial properties and interactions of nanosilver particles.

Chem Club Update

*Contributed by Christina Hamill '10
Chem Club President*

This year the Chemistry Club is striving to become recognized as a Green Chapter. We are planning on creating a Green Chemistry bulletin board, showing Green Chemistry experiments and hosting a Green Chemistry speaker. Another large activity we are participating in is called “Chemvention,” a program through the American Chemical Society. Our goal is to create an easy chemistry experiment around an element from the periodic table for the elementary-middle school age level. In addition to these activities, we are doing chemistry demonstrations for the preschool program during National Chemistry Week, participating in Westminster’s Geek Week and Mardi Gras, sponsoring a newspaper recycling bin, performing soil analysis with Dr. Clarence **Harms** from the outdoor lab, planning lunch seminars, holding tutoring sessions and creating a new T-shirt design for this year’s T-shirt sales.

\$1.2 M Given for Chem Scholarships

An alumna of Westminster chemistry department left the College \$1.2 million for scholarships to be awarded to chemistry students.

Vice president for Institutional Advancement Gloria **Cagigas** said that the gracious giver, Dorothy M. Robins '39, had “supported the mission of Westminster College faithfully and generously for 48 years. Because of her gift, future generations will enjoy the benefits of a Westminster education.” This endowment will fund a very significant scholarship to one incoming chemistry student each year with the opportunity for annual renewal applying to four years of undergraduate education.

Robins graduated with a bachelor of science in chemistry. She became an industrial chemist for many major corporations around the area, including McGean Chemical Company in Cleveland.

Westminster was home to many members of Robins’ family since the 1880s. Her grandmother, mother, two aunts, two uncles, and her sister attended Westminster, and her grandfather was a professor of the classics.

The department is very grateful for her generous contribution.

Faculty and Student Publications and Presentations for Academic Year 2007-08

Timothy Sherwood, Peter Smith. **Synthesis and Evaluation of Inhibitors for Mushroom Tyrosinase** in *The Integrated Chemistry Lab*; Basu, P.; Johnson, M.E., Eds.; DESTech Publications, Inc.: Lancaster, PA, in press.

236th ACS National Meeting & Exposition in Philadelphia, August 2008:

- Christina M. Hamill. **Early transition metal alkylidene complexes supported by PNP ligands.**
- Timothy A. Sherwood. **Teaching spectroscopy in the first semester of organic chemistry.**

Nicholas Mizenko, Natasha Kassim, Helen M. Boylan. **Fluorescence Flow System for Near Real-Time Analysis of Protein Conformational Changes: Effects of Microwave and Conventional Heating.** 6th International Microwaves in Chemistry Conference. Cambridge, MA. May 15, 2008.

235th ACS National Meeting & Exposition in New Orleans, April 2008:

- Mallory Elisabeth Bugel, Helen M. Boylan. **Characterization of gangliosides from brain tissue.**
- Cory Criss. **Gold mediated cellular delivery of anticancer drugs.**
- Callie A. Croushore. **Rubrene crystallization in 3-D focusing microfluidic devices.**
- David R. Davis. **Dispersion, templating, and imprinting of carbon nanostructures.**
- Joseph T. Elliott III. **Synthesis and characterization of polymers for sequestering carbon dioxide based on poly(vinyl alcohol).**
- Michael J. Gorka, Peter M. Smith. **Microwave assisted synthesis of tetrahydrofuran via acid catalyzed cyclodehydration of 1,4-butanediol.**
- Larry Miller. **Prospective elementary school teachers' understanding of the particulate nature of matter.**
- Brett R. Myers, Skye L. Lyons, Martha Joseph. **Four chemistry experiments for the home school setting.**
- Andrew T. Olphin. **Polymer synthesis for CO₂ sorption and desorption.**
- Ryan Schafer, Brian Kail. **Synthesis of a new N₂S₃ pentadentate ligand, and its corresponding Co(III) complex: A structural model of the nitrile hydratase active site.**
- Ryan M. Schubenski, Brian Kail. **Synthesis of oxygen and nitrogen containing acenaphthene based ligands for lanthanide complexation.**
- Peter M. Smith, William M. Kochemba, Brandi L. Weigand. **Encapsulating lanthanide ions with substituted, salicylaldehyde-derived Schiff-base ligands.**
- Jennifer L. Steele, Peter M. Smith. **Dehydration and decarbonylation of sugars in aqueous solution.**
- Mallory L. Strickland, Helen M. Boylan. **Effects of therapeutic touch on renaturation of ribonuclease.**
- Amy M. Thomas. **Sorption of natural organic matter (NOM) onto mineral sands.**
- Durann R. VanGorder. **Progress toward the synthesis of azacalixarenes.**
- Ian Michael Yarger, Brian W. Kail. **Synthesis of (3-nitro-4-hydroxyphenyl)-phosphonic acid.**

Helen M. Boylan. **Advanced Laboratory at Westminster College: A Student and Faculty Perspective.** Oral presentation at Pitcon: The Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy. New Orleans, LA, United States. March 1-7, 2008.

Helen M. Boylan. **Lifecycle Mercury Analysis at Coal Burning Electric Power Plants.** Invited talk for the 20th International Activated Carbon Conference. Pittsburgh, PA, United States. October 19, 2007.

Peter Smith. **Review of History and Use of the Chemical Elements, 2nd Ed.** J. Chem. Ed. 2007, 84, 1767.

Peter Smith. **High Purity Rare Earth Oxides Produced via Precipitation Stripping.** Metall. Mater. Trans. B 2007, 38B, 763-768.

Note: Co-authors who are not affiliated with Westminster College are not listed due to spacing constraints.

Undergraduate Research in Microwave Chemistry Recognized

Undergraduate research performed by Natasha **Kassim** and Nicholas **Mizenko**, junior biochemistry majors, received an award at the sixth annual International Microwaves in Chemistry conference May 14-16 in Cambridge, Mass. Their research, "Fluorescence Flow System for Near Real-Time Analysis of Protein Conformational Changes: Effects of Microwave and Conventional Heating," won the third place poster award against a competitive group of posters from research universities and industrial labs.

"The effects of microwaves on biological molecules is not well understood and is an emerging area in the field of microwave chemistry. Findings of this preliminary research suggest that microwaves induced structural changes in a model protein differently than what is observed by heating in a waterbath," said Dr. Helen **Boylan**. The research was performed under Boylan's direction.

In a related achievement, Mizenko was runner-up for the 2008 M.J. Collins Award for Outstanding Young Innovator in Microwave Chemistry. The award recognizes outstanding research by a student in the field of microwave chemistry and is open to undergraduate, graduate, doctoral, and post-doctoral students attending academic institutions in the United States. The presentation was made at the fall national meeting of the American Chemical Society (ACS) Aug. 19 in Philadelphia.

"I am very proud that undergraduate research being done at Westminster is being recognized at this level," Boylan said. "Nick and Natasha have been working very hard on this project and deserve recognition."

Travel for Kassim and Mizenko was made possible by a travel/presentation grant from Westminster's Drinko Center for Excellence in Teaching and Learning and also by funds provided by an anonymous donor.

Team-up Allows for Toy Testing

Westminster chemistry and biochemistry majors in Advanced Lab worked with the teachers in the Preschool Lab and the parents of the preschoolers to test the children's favorite toys for lead content. The chemists worked under the direction of Dr. Helen **Boylan**, and the parents were recruited by preschool teachers Diana Reed and Deborah Roud.

Students analyzed the collected toys initially using a spot test in which a color change indicates the presence of lead. The toys tested positive for lead were then tested using flame atomic absorption spectroscopy. Only a few toys contained lead, and all of the objects tested were found to contain less than the regulated level of 600 parts per million. Students also determined that a commercial lead testing kit was not accurate for the analysis of lead in toys.

Boylan, Reed, and Roud organized a parent forum on May 8, to allow the Westminster students to present their findings. Reed said parents were "impressed with the Westminster students' presentation and poise." Many parents commented that the presentations were "informative and interesting."

Service learning is undoubtedly one of the most valuable, community-centered opportunities that Westminster has to offer. One of this year's service learning projects will be the analysis of a passive treatment system for acid mine drainage in collaboration with the Slipper Rock Watershed Coalition.



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Inaugural Ken and Nancy Long Chemistry Lecture Honors Dr. Kim R. Dunbar



Dunbar

This year the Department of Chemistry hosts Dr. Kim Dunbar for the inaugural Ken and Nancy Long Chemistry Lecture. Dr. Dunbar speaks about her research concerning Metals in Medicine throughout the Ages: From Ancient Egypt to Victorian England to the 21st Century at 7 p.m. Thursday, Oct. 30 in the McKelvey Campus Center Mueller Theater.

Dr. Ken Long and his wife, Nancy, fund this chemistry lecture series. Dr. Long explains, "Many years ago the chemistry department was able to use modest amounts of budgeted funds to invite outstanding chemists to speak to our students. Unfortunately this did not continue and we think that our students were deprived. We decided to create this Lectureship to meet this need." Dr. Long had the opportunity to work with Dr. Dunbar while at Westminster. According to Dr. Long, "Kim Dunbar was outstanding as a student and has been highly successful as a graduate. We are proud of her accomplishments and are delighted that she is the first Ken and Nancy Long Chemistry Lecturer."

Dr. Dunbar is a Distinguished Professor in the Department of Chemistry at Texas A&M University. She maintains a large and active research group that currently includes six post doctorates and senior researchers and twelve graduate students. The Dunbar group investigates problems at the interface of applications of transition metal compounds.

Dr. Dunbar is an acclaimed inorganic chemist, and has been the recipient of numerous research and teaching awards. She serves the inorganic chemistry community through significant involvement with editorial boards and professional organizations. Dr. Dunbar is the associate editor of Inorganic Chemistry and was the 2007 chair of Division of Inorganic Chemistry of the American Chemical Society (ACS).

Dr. Dunbar received her bachelor of science in chemistry at Westminster College in 1980 and earned her Ph.D. in inorganic chemistry from Purdue University in 1984.

Department of Chemistry

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Martha R. Joseph

Physical Chemistry

Helen M. Boylan

Analytical Chemistry

Larry Miller

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