Chemistry at Hamilton

A newsletter produced by the Department of Chemistry at Hamilton College

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March 2009

Chemistry Major Alongi 2008 Valedictorian; Goldwater Scholar Allodi Wins James Soper Merrill Prize
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Hamilton

INTRODUCTION

Much has changed since the last edition of the Newsletter in December 2006, but we have thrived, grown, graduated students, had them earn honors, even changed editors. The major reason for the two-year hiatus is the departure of George Shields to become the first Dean of Science at Armstrong Atlantic State University in Savannah, Georgia, leaving large editorial shoes to fill, and I've volunteered to take on the job for the moment. The intervening two years have been a whirlwind of change, but the events are exciting to contemplate. The track record continues to be strong. We graduated 14 Chemistry majors in 2007, and another 19 in 2008. In those same two years we graduated a total of thirteen Biochemistry and Molecular Biology majors and one Chemical Physics major.

We currently have fourteen seniors preparing to graduate in chemistry with five of them applying to graduate school, and a class of 26 juniors, including Chemistry, Biochemistry and Chemical Physics majors. Present information indicates that we have twelve Chemistry and eleven Biochemistry majors in the class of 2011. We have filled the new position supported by the Research Corporation grant with a biochemist who promises to forge stronger ties within the biochemistry program, and we have hired a new instrument specialist who will support the entire Science Center. We have also hired an organic chemist as an early replacement for me after my retirement. And we can report at this juncture that we have hired a tenure-track physical chemist to fill the position vacated by George Shields.

Our students did very well at commencement in the last two years, as detailed in a later article. In 2007, biochemistry major Heather Michael was the valedictorian, while in 2008 Kristin Alongi, a chemistry major, earned that distinction, and Marco Allodi won the prestigious James Soper Merrill prize for "the student who most typifies the highest ideals of Hamilton College." Earlier this past fall we learned that Edward C. Taylor '46, and his wife Virginia have made a grant to the College that will support summer research stipends for eight to ten students in organic chemistry and biochemistry, also detailed inside. Ian Rosenstein is the new chair of the Department, and will continue to serve while he is on leave in 2009-2010. Although there have been many changes in the last two years, we continue to be a vital and exciting place to study and to teach. Enjoy this newsletter, and please stop to see us or keep in touch to let us know how things are going.

Robin Kinnel, Silas D. Childs Professor
Editor, *pro tem*

FROM THE CHEMISTRY DEPARTMENT CHAIR

As the introduction above makes clear, the department has undergone a lot of change in the past two years. With typical modesty, though, Professor Kinnel has only hinted at the biggest change: he will be officially retiring as of June 30, 2010. In fact, Professor Kinnel will be on sabbatical for the 2009-10 academic year so this academic year is his final year of full-time teaching. The department will mark this occasion with a celebration of Professor Kinnel's career on May 1 and 2.

The celebration will begin with seminars on Friday afternoon by Bill Baker, a natural products chemist from the University of South Florida and Jason Kingsbury '97, Assistant Professor at Boston College. Saturday will feature afternoon talks by chemistry and biochemistry alumna/e and dinner with a keynote address by Professor Jerold Meinwald of Cornell University. I hope that many of you will be able to attend to share memories with Robin and to reconnect with fellow alumni and the Department.

Ian Rosenstein
Chair, Department of Chemistry

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FACULTY UPDATE

Robin Kinnel

Research in the summers of 2007 and 2008, as well as during the academic years, involved a number of students in the Kinnel group, and proved to be exciting and productive. The long time project involving the Pacific sponge *Stylotella aurantium* is nearing completion, although David Brown's ('10) reinvestigation of a number of samples using the new LC/MS system during the 2008 summer provided stimulus to reexamine several active fractions, and we hope to get to this soon. Evan Savage '08, joined the group for the 2007 summer and carried out his Senior Thesis with some solid results, confirming the revised stereochemistry of palau'amine published by three groups in early 2007 and further investigating its decomposition in basic solution.

Work on the "butterfly project" continued apace, with Amy Klockowski and Tom Irvin, both '09, collaborating during two summers and continuing for their Senior Projects this year. Amy began working on the synthesis of (+) germacrene D during the first summer, and Nicole Tetreault '08 made significant progress on the synthesis during her Senior Thesis. We hope it will be finished by Amy by the end of her Senior Project work during this year. Keith Willner '11, who did yeoman work in the synthesis of a major intermediate in the synthesis, joined her during the summer of 2008. Tom Irvin's work on the butterfly project in 2008 centered on extending the biological data that the female Pearl Crescent butterflies prefer laying their eggs on asters that contain a high percentage of the (-) enantiomer of germacrene D, and we now have a convincing set of statistically significant data. Tom also reinvestigated the volatile components of the White-topped Aster (*Aster umbellatus*) that serves as the only host plant for the Harris' Checkerspot (*Chlosyne harrisii*) butterfly. He has isolated some atractylon, the major attractive ingredient, and showed that, although it is labile, it can be stored for long periods of time at -80° under argon. He has also investigated some of the minor components of the plant. Tom also has isolated an unknown component of the Crooked-stemmed Aster and is working this year to establish its structure, as well as to continue the work on the White-topped Aster chemistry.

We began several years ago to investigate the solution structures of several small peptides related to alphafetoprotein (AFP), to try to confirm experimentally the computational studies that showed that these were held in a U-shaped conformation, probably by a hydrogen bond, to buttress the effects of two prolines in them. They are of interest because they retain significant activity against estrogen-mediated breast cancer. Rebecca Levinn '07, Sarah Wiener '08, Mike Flanders '09 and a masters' student from France, Aurelien Forget, could not detect any interaction by NMR, using a wide variety of conditions and solvents, hence it is likely that the molecules are simply too mobile in solution. However, this led us to a project synthesizing some related cyclic peptides, depsipeptides and cyclic molecules held together by two or three carbon methylene linkers. Katie Alser '09, did some computational work during the summer of 2008 with Tom Castonguay and showed that these compounds have shapes comparable to the energy minimized small linear peptides, and therefore promise some activity. Because of their chemistry, they should have more stability and better shelf life. Mike Flanders and Tim Currier '09, a neuroscience major, are currently working on these syntheses.

Kinnel attended the Marine Natural Products Gordon conference in February 2007, where he presented the Paul J. Scheuer award to two colleagues, Murray Munro and John Blunt, both from the University of Canterbury in New Zealand. Murray visited Hamilton during the summer of 2008 and gave a talk to the summer research students. Kinnel also attended the American Society of Pharmacognosy meeting in Portland during the summer of 2007. Later in the 2007 summer he hosted Thomas Hemscheidt, a professor at the University of Hawaii, who also spoke to the summer research students.

Camille Jones

Camille Jones is enjoying 2008-2009, her fourth year at Hamilton, on academic leave working primarily in the laboratory of Dr. Jae Lee at the City College of New York. Work in the Jones Group at Hamilton continues to focus on the formation and structure of clathrate hydrates. Since 2007, she has conducted research with four senior thesis students, twelve undergraduate researchers, and three high school students. Kevin McCarthy '07, and Keigo Shimura '07, measured the density and viscosity of clathrate hydrate-forming solutions for their Senior Projects, and Anique-Marie Cabardos '07, wrote her thesis on the effect of salt additives on the stability clathrate hydrates. Divij Mathew '09, is currently modeling hydrate-forming solutions and kinetics of hydrate growth for his Senior Project. Four students worked during the summers of both 2007 and 2008. Sarah Cryer '10, used crystallographic methods to study the crystal structures of semiclathrates and clathrate hydrates to tease out factors contributing to their stability. Thomas Nevers '10, synthesized the clathrate hydrate guest molecule 4,4- dimethyltetrahydropyran and performed *ab initio* calculations to determine the stable conformation of another guest, propylene oxide. Fallon Chipidza '10 investigated ways of controlling the amount of water in semiclathrates and the use of FTIR to characterize the hydrogen bonding in hydrate-forming solutions. Divij Mathew also spent the summers of both 2007 and 2008 studying hydrate growth and the modeling of their formation; Yuqi Mao '09, synthesized guest molecules for semiclathrate synthesis and Pablo Abreu '08, built and studied a miniature thermoelectric cooler during the summer of 2007. In Summer 2008, Ke Xu '11 synthesized hydrate specimens for neutron diffraction experiments while Sam Cho '10 measured the densities of propylene oxide hydrate-forming solutuions. Jones also con-

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tinues to collaborate with Professor Rosenstein and his students on the synthesis of deuterated versions of propylene oxide for use as clathrate hydrate guests. Three high school students, Miguel Rodriguez-Mendez '08, Basia Bowens '09, and Tyriek Burgess '10, spent the summers of 2007 (Miguel and Basia) and 2008 (Tyriek) conducting research in the Jones Group alongside Hamilton students. Members of the Jones group visited the NIST Center for Neutron Research to conduct an experiment (summer 2007) and attended the national ACS meeting in Philadelphia, PA (summer 2008), where Divij Mathew presented a paper. Jones has published one paper and three proceedings with students and external collaborators and submitted four proposals to NSF, three of them with external collaborator Dr. Lee at CCNY. The proposal most recently submitted to NSF was funded, providing support for Jones, one undergraduate, and one high school student to conduct research at CCNY for the next three summers, and for neutron beam time at the Spallation Neutron Source in Oak Ridge, TN. In addition, a proposal submitted to the Petroleum Research Funding for the determination of clathrate hydrate structural distortions was awarded in August of 2007.

Ian Rosenstein

The lab of Associate Professor of Chemistry Ian Rosenstein has been a lively one in the years since the previous newsletter. In the 2006-2007 academic year, four senior thesis students worked in the lab: Sarah Fuzesi, Dan Griffith, Silas McKee and Rebecca Parkhurst. Dan, Silas and Becca accompanied Prof. Rosenstein to his graduate alma mater (Duke University) in June for the National Organic Symposium with each making a poster presentation. In 2007-2008, thesis students included Alex Chaconas, Max Falkoff, Kurtis Magee, Greg Nizialek and Chip Smith. The 2008-2009 group is Louisa Brown, David Hamilton, Yuqi Mao and Ben Saccomano. Additional lab members who have worked over the past two summers are Phill Milner '10, Graham Hone '10 and Kathy Lee '11.

The major research focus in the group has been on a new project. The goal of this project is to examine the use of the radical mediated conversion of vinylcyclopropanes to vinylcyclopentanes for the synthesis of bi- and tricyclic cyclopentane containing compounds. These reactions produce several new chiral centers and the hope is to be able to exercise control over the stereochemistry of their formation. Students in the group have thus far been able to prepare several model substrates and preliminary results indicate that the radical cascade reactions work as planned. A second challenge relevant to this project that is a subject of current investigation is the determination of methods for preparing the cyclopropane compounds used for the radical reactions with control of stereoselectivity. Aside from this primary effort, other students in the group are continuing long standing projects, including the study of the relative rates of the ring opening reactions of aryl-substituted cyclopropylcarbinyl radicals, the study of the stereochemistry of addition reactions of electron-deficient radicals and a collaborative project with Prof. Camille Jones for which the group is synthesizing three different selectively deuterated propylene oxides.

George Shields

Unable to resist the siren call of administration, George Shields left Hamilton at the end of the 2007-2008 academic year to become the Dean of the College of Science and Technology at Armstrong Atlantic State University in Savannah, GA. He has continued to be active in research, garnering an NSF grant, and he has published several papers with Hamilton students. He has published seven papers with Hamilton students since the last newsletter, continuing his computational work on atmospheric chemistry, the chemistry of the enediyne antibiotics, and active small peptides derived from alpha-fetoprotein. In the citations names with asterisks are Hamilton student authors.

"Efficient and Accurate Characterization of the Bergman Cyclization for Several Enediynes Including an Expanded Substructure of Esperamicin A1" Edward C. Sherer, Karl N. Kirschner, Frank C. Pickard,* Chantelle Rein,* Steven Feldgus, and George C. Shields, *J. Phys. Chem. B* 112 (2008) 16917-16934.

"Experimental and Theoretical Study of the OH Vibrational Spectra and Overtone Chemistry of Gas-Phase Vinylacetic Acid" Meghan E.Dunn,* George C. Shields, Kaito Takahashi, Rex T. Skodje, Veronica Vaida, *J. Phys. Chem. A* 112 (2008) 10226-10235.

"Thermodynamics of the Hydroxyl Radical Addition to Isoprene" Marco A. Allodi,* Karl N. Kirschner, George C. Shields, *J. Phys. Chem. A* 112 (2008) 7064-7071.

"Hydration of OCS with One to Four Water Molecules in Atmospheric and Laboratory Conditions" Gregory M. Hartt,* George C. Shields, Karl N. Kirschner, *J. Phys. Chem. A* 112 (2008) 4490-4495.

"The Search for Low Energy Conformational Families of Small Peptides: Searching for Active Conformations of Small Peptides in the Absence of a Known Receptor" Katrina W. Lexa, * Katherine A. Alser,* Amanda M. Salisburg,* Damien J. Ellens,* Lorena Hernandez,* Sam J. Bono,* Heather C. Michael,* Jennifer R. Derby,* Jaime G. Skiba,* Steven Feldgus, George C. Shields

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International Journal of Quantum Chemistry 107 (2007) 3001-3012.

"In Search of CS2(H2O)n=1-4 Clusters" Karl N. Kirschner, Gregory M. Hartt,* Timothy M. Evans,* George C. Shields, *J. Chem. Phys.* 126 (2007) 154320/1-154320/8.

"Computational Design and Experimental Discovery of an Antiestrogenic Peptide Derived from α-Fetoprotein" Karl N. Kirschner, Katrina W. Lexa,* Amanda M. Salisburg,* Katherine A. Alser,* Leroy Joseph, Thomas T. Andersen, James A. Bennett, Herbert I. Jacobson, George C. Shields, *J. Am. Chem. Soc.* 129 (2007) 6263-6268.

Karen Brewer

Beginning in July 2008, Professor Karen Brewer started a three-year position as Associate Dean of Students for Academics. In this position, she principally works with students encountering academic difficulty, chairs the Committee on Academic Standing, which administers the academic regulations of the college, and works with the student chair of the Honor Court to coordinate hearings and oversee assigned sanctions for violations of the Honor Code. She also chairs the President's Coalition for Alcohol and Other Drugs and is a member of the Advising Task Force and serves as a non-voting member on the Committee on Academic Policy and the Committee on Athletics.

For the past several years, Brewer has taught Principles of Chemistry 120, Research Methods in Chemistry 371, Inorganic and Materials Chemistry 265, and Advanced Inorganic Chemistry 423. She will continue to teach Inorganic and Materials Chemistry 265 in the spring semester while serving as Dean. At the ACS Meeting in New Orleans in March 2008, Kaitlin Johnson '08 presented a poster at the Tuesday evening Division of Inorganic Chemistry poster session coauthored with Professors Brewer, Elgren, Kinnel, and Rosenstein that explained the current projects in metallated porphyrin chemistry used in Research Methods in Chemistry 371 ("SuperLab"). At the same poster session and also at the Sci-Mix poster session, Brewer presented "Putting Materials Chemistry Topics into the Intermediate Inorganic Course Syllabus" about the topics discussed her Inorganic and Materials Chemistry 265 course. Also in 2008, Brewer authored the instructor and student solutions manuals for second edition of "Chemistry: The Science in Context" by Gilbert, Kirss, Foster, and Davies, published in August 2008 by WW Norton. She has been invited to start work on the third edition of the text this spring.

Brewer continues her research program encapsulating rare earth ions and their chelated complexes into silica sol-gel glasses. Along with two students, she presented their most recent work at the ACS National Meeting in New Orleans in March 2008. She presented an invited talk for the symposium on the Integration of Research and Education at the Frontiers of Inorganic Chemistry entitled "Rare Earth Doped Materials: A Continuing Collaborative Project in Chemistry and Physics" and her students, Elizabeth Faroh '08 and Kathleen Donahue '08 presented their posters ("Rare Earth Ions and Doped Nanoparticles in Silica Sol-gel Glasses" and "Incorporation of Rare Earth Ion Chelates into Silica Sol-gels") at the Inorganic Division poster session. The work was funded in part by a research grant form the ACS Petroleum Research Fund. Last summer she worked with three students (Peter Kosgei '10, Matthew Breen '11, and Kate Arpino '10) and will be working with students again this summer in the new inorganic research lab from the renovated former computational research lab, a renovation.

Tim Elgren

Tim Elgren is on sabbatical leave for the 2008-09 academic year. During this year, he is continuing to work on projects related to his on-going interests in using sol-gel materials to stabilize a variety of enzymes. He is pursuing two aspects of the problem: 1) spectroscopic and mechanistic studies of the encapsulated metalloproteins, and 2) development of these materials as functional bio-catalysts. A recent award from the National Science Foundation has funded the mechanistic studies, and this has allowed Elgren to bring a post-doc into his research lab and to fund several summer students. Amy Barrows '08, was a Senior Fellow in his lab during the last academic year and she worked on the encapsulation of hydrogenases, which convert protons and electrons into hydrogen gas. Amy's work focused on doping the silica-based sol-gel materials with carbon nanotubes in order to make the glass-like material conductive, thereby eliminating the need for redox mediators that are typically used to help shuttle the electrons from the chemical reductant (or electrode) to the metal clusters at the heart of the enzyme active site. The latest development in this project is the successful incorporation of a photo-active ruthenium complex that allows for the conversion of photons into the electrons that drive hydrogen production. Domestic and foreign patents have been filed for the sol-gel:hydrogenase project.

Elgren also co-edited a book titled *Developing & Sustaining a Research-Supportive Curriculum: A Compendium of Successful Practices* for the Council on Undergraduate Research (CUR) which was published in 2007. He has been involved with CUR for the past 12 years as councilor in the Chemistry Division, served a term as CUR President, and a three-year term on the CUR Executive Board. CUR is an organization that serves faculty members and institutions that seek to initiate and sustain undergraduate research programs. (WWW.CUR.org)

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This past year, Elgren was elected to the inaugural class of SENCER Fellows to promote Science Education for New Civic Engagements and Responsibilities (SENCER). His involvement in this organization led to the development of the sophomore seminar course that he and Professor of Biology Herm Lehman created and co-taught called "Scientific and Social Perspectives on HIV/AIDS". He is now working with our new colleague, Prof. Myriam Cotton, to incorporate public policy and science in the public domain into the advanced general chemistry course (Chem 125) and its associated lab. The goal is to introduce the fundamental principles of chemistry in the context of issues that are current and interdisciplinary. The challenge, as it has been for many years, is how to take extraordinarily well-prepared first year Hamilton students and "rock their world"? We hope that our students see that scientific inquiry requires a well-prepared mind, creativity, and dedication. We also hope to demonstrate for them that there are many serious issues that can benefit from their contribution either as a practicing scientist or an engaged citizen fully prepared and willing to explore a technical issue.

NEW FACULTY

Myriam Cotten

Associate Professor of Chemistry Myriam Cotten has joined the department after six years as an Assistant Professor at Pacific Lutheran University in Tacoma, WA. She holds a BS degree in Chemistry from Université Pierre et Marie Curie and a MS degree in Chemical Engineering from Ecole Supérieure de Chimie Organique et Minérale in Paris, France. She earned a Ph. D. in Chemistry from Florida State University where her supervisor was Prof. Timothy Cross. She then joined the group of Prof. Gary Drobny at the University of Washington in Seattle to perform postdoctoral work. Cotten's research interests include the use and development of biophysical and biochemical techniques such as Nuclear Magnetic Resonance (NMR) to study the structure, function, and mode of action of membrane-interacting peptides and proteins. She currently is focusing on antimicrobial peptides, which are important peptides belonging to a large family of host-defense peptides spanning all kingdoms of life.

Her goal is to characterize the secondary structures and dynamics of selected cationic antimicrobial peptides and use this knowledge to identify factors optimizing specific molecular interactions, initially at cell membranes, that are directly related to function and mode of action. Her long-term goal is to help uncover common principles that will facilitate the design of pharmaceuticals with enhanced antibacterial activity and low toxicity for mammalian cells. Her research has been supported by the Dreyfus Foundation, National Science Foundation, and Research Corporation (RC), and she is a recipient of a RC Brian Andreen Award and an NSF Faculty Early Career Development (CAREER) Award.

Cotten is dedicated to advancing knowledge through her research. She is committed to infusing education with the excitement of scientific discovery and integrating teaching and research in innovative ways that enhance student learning. As a councilor on the national Council on Undergraduate Research (CUR), she is helping advance the organizational mission to support and promote high-quality undergraduate research. Deacon Lile '09 is conducting his senior thesis with Cotten. His project focuses on piscidin, a family of antimicrobial peptides from fish, which have broad-spectrum activity against pathogens including multi-drug resistant bacteria. His goal is to use two dimensional solution NMR to obtain the pKa of a histidine side chain in piscidin when the peptide is bound to micelles that mimic bacterial membranes.

This information will feed a larger body of knowledge aimed at better understanding the possible link that may exist between the charge of the histidine side chain and the attraction of the peptide to negatively-charged microbial membranes. As part of his project, Deacon is preparing ^{15}N-side chain labeled Fmoc-His(Trt), a protected form of the amino acid histidine, which will be incorporated in piscidin by solid-phase peptide synthesis. He will purify the synthetic peptide on a new High Performance Liquid Chromatography (HPLC) system. The last phase of his project will involve preparing a sample of piscidin in the presence of micelles and using solution NMR to obtain the titration curve and hence the pKa of the labeled histidine side chain.

Nicole Snyder

Anticipating Robin Kinnel's retirement at the end of 2009-2010, the College agreed to hire an early replacement and Nicole Snyder Lee joined the department early in the summer of 2007. Snyder did her undergraduate work at Westminster College in western Pennsylvania—yes, she is a Steelers fan—and completed her doctorate at the University of Connecticut. After a two-year stint as a visiting faculty member at Wellesley College, she joined Hamilton for the 2007-2008 year. In the summer that she arrived Nicole got her research off to a flying start with James Greisler '10 and Elijah Lachance '10. She has now taught the full year sequence of Organic Chemistry once, and last fall she offered a new course in Chemical Immunology and is currently teaching Chemistry 371, "Superlab" for the first time. During her first year she supervised Senior Projects for Brandon Clair '08 and

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Jodi Raymond '08, who were involved with the synthesis of the septanose derivatives referred to below.

Snyder and her collaborator Peter Zhang of the University of South Florida received a joint grant from the Petroleum Research Fund to work on a project titled "Bio-Inspired Catalysts." As a part of this grant, Snyder and James Greisler '10, will spend eight weeks in the summer of 2009 preparing a number of carbohydrate analogs that will be coupled to porphyrins in Professor Zhang's lab using a specialized process developed by his group. The final products, called "carbophyrins," will be studied for their ability to serve as catalysts in organic reactions and as therapeutic agents that can be used in photodynamic therapy, which has been used in cancer treatment.

Snyder recently co-authored a paper (*Journal of Organic Chemistry* **2008** 73, 6341-6354) titled "Stereoselectivity in the Epoxidation of Carbohydrate-Based Oxepines." The article describes the reactivity of several unsaturated seven-membered rings that resemble carbohydrates. These unusual molecules, called carbohydrate-based oxepines, are currently employed to access septanose carbohydrates, a class of unnatural carbohydrates that are targeted for their potential to serve as structure-function probes and as functional components in pharmaceutical reagents. Snyder, also recently received an award for her contributions as coauthor of one of the "Top-50 Most Cited Articles" published in Carbohydrate Research between the years of 2004 and 2007. The article (*Carbohydrate Research* **2004**, 339(6), 1163-1171), titled "Synthesis, Crystal Structure, and Reactivity of a D-Xylose Based Oxepine," has been cited in several peer reviewed articles and books since its publication. The authors and coauthors of all fifty papers were honored at a reception in celebration of their paper's achievement at the 2007 EuroCarb Meeting in Lubeck, Germany.

Tom Castonguay

With George Shields on sabbatical during 2007-2008, Tom joined the department in September 2007 and stayed on during 2008-2009 after Shields decided to take up the deanship at Armstrong. Tom completed his BS at Central Connecticut State University, then moved to the University of Vermont for his doctorate. He then took a position at Boston University, where he was a postdoctoral faculty fellow for three years honing his teaching skills, lecturing in General Chemistry, working out lecture demonstrations while teaching both general chemistry and physical chemistry laboratory. He also did some computational research, modeling molecular hydrogen and deuterium in supercritical carbon dioxide. Since coming to Hamilton, Castonguay participated in supervising summer 2008 research students Tom Morrell '10, Katherine Alser '09, and Alexa Ashworth '09, on their computational studies with George Shields, and is currently supervising Alexa's Senior Project. Katherine, Tom and Alexa accompanied Castonguay and presented their research at the Sanibel Symposium on Sanibel Island at the end of February.

Patrick Caruana

Patrick A. Caruana joined the faculty at Hamilton College in fall 2008 as a replacement for Tim Elgren. Caruana grew up in Liverpool, a suburb of Syracuse, and attended Liverpool High School. Caruana then attended Le Moyne College, a Jesuit liberal arts college in Syracuse, where his fascination with organic chemistry began, thanks to the influence of his research advisor Joe Mullins. He had entered Le Moyne as a pre-med, but he came to realize that carbon compounds are just too fascinating as the stuff of life. He graduated in 2001 *summa cum laude* with a B.S. in chemistry and a minor in biology, and then began graduate school in organic chemistry at the University of Rochester.

He found a home in the fledgling research group of newly hired professor Alison Frontier. After investigating the feasibility of several projects, he enjoyed success with the [2,3]-Still-Wittig rearrangement and a funky metal-catalyzed rearrangement of propargyl acetates. Caruana also made some progress toward the synthesis of terpestacin, a bioactive natural product, with the Nazarov cyclization as the cornerstone of the synthesis. As he reflects on his time in graduate school, Caruana realizes that he developed a fascination for synthesizing ring structures of various sorts and studying reactions that proceed by cyclic transition states. In May 2007 he completed his Ph.D., then took a position as a visiting assistant professor at SUNY Cortland. After a year of teaching chemistry courses that ranged from introductory level for non-science majors to a graduate-level advanced organic course, Caruana moved to Hamilton College, where he has been teaching organic chemistry, his true passion.

He has enjoyed his time with students and colleagues thus far, and he looks forward to another year of trying to convince students and other faculty that organic chemistry is the most important science. Caruana also looks forward to doing research with undergraduates this summer in the field of organic synthesis. His current research interests are in the conversion of renewable, biomass-derived compounds to more complex organic structures, which would serve as precursors to bioactive molecules. Last fall Caruana was married, perhaps as an outgrowth of his intense interest in rings.

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Brad Wile

Bradley WIle received his Bachelor of Science degree from St. Francis Xavier University in Antigonish, NS, Canada in 2002. He was awarded his Ph.D. in organometallic chemistry in late 2006, for research conducted under the supervision of Mark Stradiotto at Dalhousie University in Halifax, NS, Canada. He then conducted postdoctoral research with Paul Chirik at Cornell University in Ithaca, NY. In July of 2008, Wile joined the faculty at Hamilton College as a Visiting Assistant Professor, stepping in for Karen Brewer who has taken a three year position in the Dean of Students' office.

Wile's research interests lie in the field of organometallic chemistry, specifically the development of new ligands capable of supporting lighter, readily available transition metals with the hope of generating a new generation of catalysts that are robust and less expensive. Brad brings considerable experience in the field of organotransition metal chemistry, highlighted by previous research with a variety of iron, platinum, silver and gold complexes, most featuring redox-active ligands. At Hamilton, Wile is pursuing these interests with senior project student Kathryn Manning '09, and will be conducting research with students this coming summer.

SEMINAR SCHEDULE SPRING 2009*

January 23 & January 30
Senior Thesis Progress Reports

February 6
Moses Lee, Dept. of Chemistry, Hope College; "Recognition of Specific DNA Sequences by Small Molecules: Opportunities for the Discovery of New DNA-Based Therapeutics"

February 27
Christian Brückner, Dept. of Chemistry, University of Connecticut; "The Breaking and Mending of Porphyrins"

March 6
Linda Nicholson, Dept. of Molecular Biology and Genetics, Cornell University;
"From the NMR Tube to Living Systems: Relating Protein Dynamics to the Dynamic Regulation of Cellular Processes"

May 1, 2 (Schedule to be announced)
Symposium to Honor Robin B. Kinnel, Silas D. Childs Professor; Keynote Speaker: Jerrold Meinwald, Dept. of Chemistry, Cornell University

May 6 (4:00 PM) **& May 7** (4:00 PM)
Senior Thesis Presentations

*All events are in Science Center Room G041 at 3:00 p.m., except where noted. Refreshments available at 2:45 p.m.

NEW INSTRUMENTATION SPECIALIST

As part of the Research Corporation grant, the Department was provided funds to hire an instrument technician. After a search that didn't work out it was apparent that the proposed salary was insufficient for attracting highly qualified candidates. Fortunately, the Sherman Fairchild grant, which had provided support for acquiring a liquid chromatograph/mass spectrometer, also earmarked funds to support a technician, but they were similarly inadequate. Fortunately, it was possible to combine the two and hire an excellent instrument specialist, who has primary responsibility for the major instruments in the Science Center, which includes mainly Chemistry and Geology.

Greg Rahn joined the College in January 2008 from Proctor and Gamble in Norwich, where he had worked for seven years as a researcher and lab manager in their analytical laboratory, following twenty years at Oneida Research Services providing analytical expertise for a variety of analytical areas, primarily related to mass spectrometry. With a chemistry degree from Cortland, lots of experience, and a number of publications related to mass spectrometry, Greg has greatly enhanced the department's utilization of the LC/MS by facilitating the use of the instrument by both students and faculty. He also has provided critical help in maintaining and optimizing the use of existing instrumentation, and has proved to be an outstanding resource.

STUDENT NEWS

E. C. TAYLOR GRANT PROMOTES STUDENT RESEARCH

Edward C. Taylor '46 and his wife Virginia have established The Edward and Virginia Taylor Fund for Student/Faculty Research in Chemistry, a $1 million fund to inspire students interested in chemical research and to facilitate their work with the chemistry faculty. The fund will provide stipends to enable students to pursue research in organic chemistry, biochemistry and physical chemistry beginning in the summer of 2009.

Taylor spent his first two years at Hamilton, entering the college with the idea that he wanted to be an English major, thinking that he wanted to be a writer. He chose chemistry to fulfill the science requirement at Hamilton, and fell in love with the subject, ably mentored by Professors Dick Sutherland and Asa McKinney. Interested in further developing his chemistry, Taylor chose to transfer to Cornell, where he completed his bachelors' and doctorate degrees. After a brief period at the University of Illinois, Taylor joined Princeton University where he has had a distinguished career teaching and doing research in heterocyclic chemistry. For the past several years he has been working on an anticancer compound related to folic acid, which is now marketed by Eli Lilly as Alimta. Taylor treasures his Hamilton experience, and has been recognized by the College with an honorary degree in 1968 and a Distinguished Alumni Award in 1994.

CLASS AND CHARTER DAY AND COMMENCEMENT AWARD RECIPIENTS

2007: Marco Allodi '08: Barry M. Goldwater Scholarship; **Kristin S. Alongi '08**: Barry M. Goldwater Scholarship, Benjamin Walworth Arnold Prize Scholarship, Willard Bostwick Marsh Prize Scholarship; **Amy M. Barrows '08**: Paul S. Langa Prize Scholarship; **Louisa Brown '09**: ACS and Joint Polymer Education Committee Prize in Organic Chemistry, CRC Press First Year Prize in Chemistry, Phi Beta Kappa Book Prize; **Cecilia Disney**: Phi Beta Kappa, *Magna cum Laude*, Honors in Biochemistry and Molecular Biology, Mary McMaster Hallock Prize in Science, Senior Prize in Biochemistry and Molecular Biology; **Maxwell Falkoff '08**: Randall J. Harris Prize Scholarship; **Matroner George**: Honors in Biochemistry and Molecular Biology; **Daniel Griffith**: George Lyman Nesbitt Prize (Salutatorian), Phi Beta Kappa, *Summa cum Laude*, J. William Fulbright Grant, Norton Prize, Underwood Prize (Top Chemist); **Rebecca Levinn**: *Magna cum Laude*; **Kurtis Magee '08**: Lawrence Yourtee Prize Scholarship; **Yuqi Mao '09**: G. Harvey Cameron Memorial Prize, CRC Press First Year Prize in Chemistry; **James McConnell**: Phi Beta Kappa, *Summa cum Laude*, Edward Huntington Memorial Mathematical Prize Scholarship, Donald J. Denney Prize in Physical Chemistry, Norton Prize; **Silas McKee**: *Magna cum Laude*; **Heather Michael**: George Lyman Nesbitt Prize (Valedictorian), Phi Beta Kappa, *Summa cum Laude*, Honors in Biochemistry and Molecular Biology, Benjamin Walworth Arnold Prize Scholarship, James L. Bennett Prize, Senior Prize in Biochemistry and Molecular Biology; **Matthew Palscak**: Honors in Biochemistry and Molecular Biology; **Rebecca Parkhurst**: Phi Beta Kappa, *Summa cum Laude*, Elihu Root Fellowship, Underwood Prize (Top Chemist); **Leanne Pasquini**: Phi Beta Kappa, *Magna cum Laude*; **Benjamin Saccomano '09**: Leonard E. and Sue J. Kingsley Prize Scholarship; **Benjamin van Arnam '09**: CRC Press First Year Prize in Chemistry, Phi Beta Kappa Book Prize; **Robert Wysocki**: Honors in Biochemistry and Molecular Biology.

Sigma Xi: Daniel Griffith, Rebecca Levinn, James McConnell, Silas McKee, Rebecca Parkhurst, Leanne Pasquini, Keigo Shimura

2008: Marco Allodi: Fulbright Grant, Phi Beta Kappa, *Summa cum Laude*, James Soper Merrill Prize, Honors in Chemical Physics, Norton Prize, Underwood Prize in Chemistry; **Kristin Alongi**: George Lyman Nesbitt Prize (Valedictorian), Phi Beta Kappa, *Summa cum Laude*, Honors in Chemistry, Root Fellowship, Benjamin Walworth Arnold Prize Scholarship, Willard Bostwick Marsh Prize Scholarship, Underwood Prize in Chemistry; **Katherine Alser '09**: Donald J. Denney Prize in Physical Chemistry; **Amy Barrows**: *cum Laude*, Senior Fellow, Honors in Chemistry, Norton Prize, Underwood Prize in Chemistry; **Andrew Beyler '10**: G. Harvey Cameron Memorial Prize, CRC First-Year Prize, Phi Beta Kappa Book Prize; **Dan Bond**: Honors in Biochemistry and Molecular Biology; **Gail Corneau '10:** Charles A. Dana Prize Scholarship; **Kathleen Donahue**: Phi Beta Kappa, *Summa cum Laude*, Honors in Chemistry; **Max Falkoff**: Phi Beta Kappa, *Magna cum Laude*; **James Greisler, '10**: Edwin Barrett Prize; **Dan Griffith '07**: Root Fellowship; **Graham Hone '10**: CRC First-Year Prize; **Kurtis Magee**: Honors in Chemistry, Root Fellowship; **Ngoda Manongi**: Honors in Biochemistry and Molecular Biology, Bristol Fellowship; **Philip Milner '10**: ACS Prize in Organic Chemistry, CRC First-Year Prize, Phi Beta Kappa Book Prize; **Greg Nizialek**: *Magna cum Laude*, Honors in Chemistry; **Greg Ray**: Honors in Biochemistry and Molecular Biology, Glass Fellowship, Senior Prize in Biochemistry and Molecular Biology; **Evan Savage**: *cum Laude*, Honors in Chemistry, Mary McMaster

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STUDENT AWARD RECIPIENTS, *continued*

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Hallock Prize in Science; **Chip Smith**: *Magna cum Laude*, Honors in Chemistry; **Nicole Tetreault**: Phi Beta Kappa, *Magna cum Laude*, Honors in Chemistry, Jack Riffle Award for Senior Athlete; **Benjamin van Arnam '09**: Dr. Philip I. Bowman Prize Scholarship, Alfred J. and A. Barrett Seaman Prize in Interdisciplinary Writing; **Sarah Wiener**: Phi Beta Kappa, *Magna cum Laude*, Honors in Chemistry

Sigma Xi: Marco Allodi, Kristin Alongi, Amy Barrows, Greg Hartt, Kurtis Magee, Amanda Salisburg, Evan Savage, Nicole Tetreault, Sarah Wiener

Congratulations to all the graduates in chemistry, biochemistry and chemical physics from the two recent classes. **2007:** Nikola Banishki, Anique-Marie Cabardos, Cecilia Disney, Sarah Fuzesi, Hilary Gamble, Matroner George, Daniel Griffith, Rebecca Levinn, Danielle Massee, Kevin McCarthy, James McConnell. Silas McKee, Heather Michael, Matthew Palasczak, Rebecca Parkhurst, Leanne Pasquini, Sergey Pyatkovskiy, Daniel Roston, Leonardo Saraceno, Keigo Shimura, Robert Wysocki. **2008:** Marco Allodi, Kristen Alongi, Amy Barrows, Matthew Cashman, Alex Chaconas, Brandon Clair, Bryden Considine, Kathleen Donahue. Maxwell Falkoff, Elizabeth Faroh, Gregory Hartt, Kaitlin Johnson, Zhe Li, Jovan Livada, Kurtis Magee, Ngoda Manongi, Gregory Nizialek, Gregory Ray, Jodi Raymond, Amanda Salisburg, Evan Savage, Crystal Simonds, Chip Smith, Nicole Tetreault, Sarah Weiner.

CHEMISTRY MAJOR ALONGI 2008 VALEDICTORIAN

Kristin Alongi was named the Valedictorian of the Class of 2008 at Commencement. The distinction carries with it the George Lyman Nesbitt Prize.

In her valedictorian's speech, Kristin emphasized that success can't always be measured in accolades or a good job, and she wished that her classmates would be able to "lie in bed at night and say, '…I have the life I want and I couldn't be happier.'" Kristin entered a graduate program in Food Science at Cornell this past fall and appears to be taking her own advice.

GOLDWATER SCHOLAR ALLODI WINS JAMES SOPER MERRILL PRIZE

At Class and Charter Day, the Dean announced that Marco Allodi had won the James Soper Merrill Prize for the student who "has best typified the highest ideals of the College," and at Commencement Marco received an engraved gold watch and gave an address in which he encouraged his classmates to "Pursue your passions because when you do, the hard work seems like easy work and life will be that much sweeter."

Marco is currently pursuing chemical physics in Germany on a Fulbright Fellowship, and he will attend California Institute of Technology upon his return.

RENOVATIONS UNDER WAY–ALREADY

With the advent of a new biochemist, Myriam Cotten, and moving the high end computing cluster into a new space we decided to renovate the inorganic laboratory into a biochemical space so that Professors Elgren and Cotten would have labs adjoining one another.

To accommodate Professor Brewer's inorganic laboratory, the vacated computational space is being converted into a working wet laboratory, and should be completed by the end of spring 2009 in time for summer research. The computational facility has been moved to a classroom next to the room accommodating the computer cluster.

SUMMER CONFERENCES AT HAMILTON

7TH ANNUAL MERCURY CONFERENCE A HIT AT HAMILTON:

Conference Promotes Undergraduate Research in Computational Chemistry

From August 3-5 Hamilton hosted the seventh annual MERCURY Conference on Undergraduate Computational Chemistry. Faculty and student researchers from predominantly undergraduate institutions across the country met to hear talks from keynote speakers and present posters about their computational research. The speakers came from both academic and industrial laboratories, while the undergraduates came from such institutions as University of Richmond, Mt. Holyoke College, Carleton College, Brock University and Hope College to present more than 60 posters. Representing Hamilton were Alexa Ashworth and Tom Morrell, who had pursued projects jointly supervised by Tom Castonguay and George Shields.

Mercury Group Photo, August 2, 2008

CHOG–COLGATE HAMILTON ORGANIC GROUP

Continuing a tradition that is more than ten years old, summer organic research students from both Hamilton and Colgate assembled in both 2007 and 2008 to present fifteen minute talks on the research they had done during the summer. As has been the custom, the venue alternated between the two institutions. In 2007, a sizable group from Hamilton traveled to Colgate on July 27 to participate in the symposium. After a full afternoon of approximately sixteen talks, the group repaired to Merrill House for a fine dinner.

The 2008 symposium, held at Hamilton, was delayed until the afternoon of September 26 for logistical reasons, but that did not diminish the enthusiasm or the quality of the talks. Eleven Hamilton students and eight Colgate students presented their findings, and after the symposium the group enjoyed a dinner in the Great Room of Spencer House. Their mentors included Professors Snyder, Rosenstein and Kinnel from Hamilton and Professors Nolen, Geier and Chianese from Colgate. The conference helps to maintain the warm relationship between the Hamilton and Colgate departments that has been in place for several decades.

2008 CHOG Conferees at Hamilton