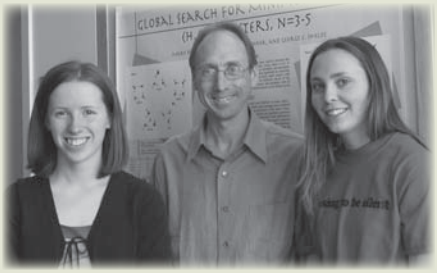
Chemistry at Hamilton

A newsletter produced by the Department of Chemistry at Hamilton College

Inside this issue:
November 2005



Professor George Shields and Goldwater Scholars, Mary Beth Day '07, on the left and Meghan Dunn '06, on the right.

1	Introduction
2-4	Faculty Update
3	Congratulations Professor Brewer
5	Goldwater and Fulbright Scholars
6	Robin Kinnel Sabbatical Adventures
7	Tim Elgren Sabbatical Adventures; New Faculty
8	Student Research and Awards

Hamilton

INTRODUCTION

I write this just after the new building celebration that occurred September 29 through October 1, and we have a lot of excitement in the building after the dedication of our $60 million science center. On Friday September 30 Congressman Sherwood Boehlert, Chairman of the House Science Committee, gave the keynote address, and Jacqueline Barton from Cal Tech received an Honorary Degree. Paul Carlier '83 and Rebecca Heald '85 received Alumni Achievement medals and presented seminars on Saturday. Rebecca, an Associate Professor of Cell and Developmental Biology at the University of California, Berkeley, discussed the topic: *What Frog Eggs Can Teach us about Cell Division*. Paul, an Associate Professor of Chemistry at Virginia Tech, discussed: *Memory, Mosquitoes and Malaria*. Chemistry now has 7128 square feet devoted to laboratory instruction, 4180 square feet devoted to research space for undergraduates working with faculty, along with modern classrooms. We built the building at just the right time, too, as the recent rise in construction costs mean that the same building started today would cost 60% more. The success of the building is a tribute to the faculty. Stone Professor of Psychology Doug Weldon spent the last eight years coordinating the building project. He told me the way that chemistry professors Karen Brewer, Tim Elgren, Robin Kinnel, and Ian Rosenstein worked with the architects in the design of the building is what has made our building so special. At an Admissions open house in October, I heard him tell a group of assembled high school students and their parents that the Organic Chemistry laboratories were the most high-tech labs in the building, and the care and attention that Ian Rosenstein, our departmental representative on the building committee, put into the design of these spaces has made them outstanding. Our introductory chemistry enrollment was 110 students at the start of the semester, up 15 from our normal numbers. We expect more students to choose our program based on the excellence of our teaching, the chance to start research early, and our incredible new facilities. Those of you who have a chance to visit, please do, as you will be amazed at the building. It is simply awe-inspiring.

We have other exciting news to report. Last spring Meghan Dunn '06 and Mary Beth Day '07 won prestigious Goldwater Scholarships, becoming the fifth and sixth Goldwater Scholars from Hamilton College. All six Goldwater Scholars (Annie Toth '02, Lorena Hernandez '03, Matt Liptak '03, Shayna McHugh '05, along with Mary Beth and Meghan) did their formative research with Hamilton chemistry faculty. This research showed the Goldwater selection committee that these students had outstanding aptitude for scientific research. In addition Shayna McHugh won a Fulbright Fellowship, and is currently in Brazil pursuing research in natural products chemistry prior to starting graduate school next fall. Eleven graduates from the class of 2005 earned Honors in Chemistry, four earned Honors in Biochemistry/Molecular Biology, and four of our majors earned Honors in their second major. Associate

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... Meghan Dunn '06 and Mary Beth Day '07 won prestigious Goldwater Scholarships, becoming the fifth and sixth Goldwater Scholars from Hamilton College.

continued from page one

Professor of Chemistry Karen Brewer has been promoted to Full Professor, effective last July 1, a tribute to her dedication and excellence in teaching and mentoring research students. Professor Brewer received a grant from the Dreyfus Foundation for an X-ray Powder Diffraction system, Professor Elgren received a grant from NSF for a Raman Microscope, and Professor Kirschner and I received four grants to support our research with students in computational chemistry. Steve Waratuke, a visiting professor the past two years, has taken a tenure-track position at Bridgewater State University, a public undergraduate institution in Massachusetts that usually graduates the most chemistry majors in that state. Steve can be reached at Swaratuke@bridgew.edu. Frank Pickard '05, has joined the department for the year as a Research Assistant working in my research group. Finally, we had a very exciting tenure-track search last year for a physical chemist, and we are delighted to report that we hired Camille Jones, who comes to us from a position as a staff scientist at the National Institutes of Standards and Technology. Camille arrived at Hamilton at the end of May and has already spent a summer working with three Hamilton students on research projects. Please look inside the Newsletter for more details, and, as always, write, call or visit and let us know how you are doing.

George C. Shields
Winslow Professor and Chair of Chemistry

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Hamilton College's 209,000 square-foot Science Center, the largest construction project in the College's history.

FACULTY UPDATE

Karen Brewer

Hamilton College Professor of Chemistry Karen Brewer has been awarded a $36,500 grant from the Camille and Henry Dreyfus Special Grant Program in the Chemical Sciences. The grant is for her proposal "Materials Chemistry Project Laboratories for Descriptive Inorganic Chemistry." This project will introduce x-ray powder diffraction as a technique for the characterization of a wide range of inorganic materials into the laboratory curriculum for the course "Inorganic and Materials Chemistry 265." The Special Grant Program in the Chemical Sciences funds projects that propose to advance the science of chemistry in innovative ways and is intended to seed the initial phases of a project.

In December Brewer also received a $50,000 Petroleum Research Fund/American Chemical Society grant for her research project, "Rare Earth Calixarene Complexes in a Sol-Gel Matrix: Synthesis and Luminescence."

Professor Brewer's collaborative and interdisciplinary research focuses on the synthesis and luminescence properties of rare earth (lanthanide) sol-gel derived materials. Along with her collaborators, Professors Ann Silversmith (physics, Hamilton College), Daniel Boye (physics, Davidson College) and Ken Krebs (physics, Franklin & Marshall College), Brewer and her students synthesize materials including silica-based glasses and gels containing rare earth ions and chelated complexes with the aim of enhancing the materials' fluorescence properties as studied by fluorescence and laser spectroscopy.

Karl Kirschner

Visiting Assistant Professor of Chemistry Karl Kirschner published an article in the *International Journal of Quantum Chemistry* titled "Pople's Gaussian-3 Model Chemistry Applied to an Investigation of $(H_2O)_8$ Water Clusters." This work was co-authored with George Shields and Mary Beth Day '07. Day worked on this project during the summers of 2003 and 2004, and during her freshman year. The research in this eight-page article describes a water cube and other isomers of eight waters, and demonstrates that the G3 model chemistry method developed by Nobel Laureate John Pople yields accurate structures and energies for this hydrogen-bonded system. The paper was published in a special memorial issue dedicated to John Pople.

Kirschner, Day, and Shields published a second article in the *Journal of Physical Chemistry A* titled "Global Search for Minimum Energy $(H_2O)_n$ Clusters, n=3-5." The paper describes a complete and thorough search of the potential energy surfaces of the water trimer, water tetramer, and water pentamer. The researchers used 144 starting models of the trimer, 1728 starting models of the tetramer, and 20,726 starting structures of the pentamer. After high-level quantum mechanical calculations, only two trimers, 5 tetramers, and 10 pentamers were found to exist at room temperature and atmospheric pressure. The results reveal that the cyclic structures are the lowest energy structures, and confirms that these low energy cyclic structures will be the most abundant water clusters in the atmosphere under humid conditions.

Kirschner and Shields have received an AREA grant from the National Cancer Institute of the National Institutes of Health to support research with students at Hamilton College. The proposal, titled "Reactivity and Dynamics of Enediyne Natural Products," brings $248,250 over the next three years to support research aimed at establishing the mechanism by which the enediyne family of natural products cleave DNA. Establishing the mechanism by which these molecules cut DNA in half may lead to useful molecules with anti-cancer activity in the future. This research builds on previous work of Chantelle Rein '03 and Frank Pickard '05, postdoctoral associate Steve Feldgus, as well as other student researchers in the Shields lab. The AREA program supports research at undergraduate institutions and is highly competitive.

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Congratulations to Professor Karen Brewer

Karen Brewer has been promoted to Full Professor, effective last July. Professor Brewer has had one of the most productive research programs in the department over the last several years. Her work on sol-gels has been funded by the Research Corporation in 2000-01 and the Petroleum Research Fund of the American Chemical Society for 2004-2007. In addition she has received funding from the Dreyfus Foundation to develop inorganic chemistry laboratories using x-ray powder diffraction. Her collaboration with physicists Ann Silversmith at Hamilton, and Dan Boye at Davidson has been very productive. Professor Brewer has published six articles in the past six years, twice the national average of 0.5 publications per year for faculty at undergraduate institutions.

Professor Brewer received her B.S. in Chemistry with High Distinction from Ohio Northern University in 1984. She attended graduate school at the Massachusetts Institute of Technology, working with Dietmar Seyferth. After receiving her Ph.D. in Inorganic Chemistry in 1989, she joined the faculty at Hamilton College. She was promoted to Associate Professor in 1995. She teaches General Chemistry, Inorganic & Materials Chemistry, Advanced Inorganic Chemistry, Research Methods in Chemistry, and supervises student research projects.

FACULTY UPDATE, continued

continued from page 2

Kirschner and Shields have received a grant funded by the US Army Medical Research and Material Command, from the Department of Defense Breast Cancer Research Program, to support their research with students at Hamilton College. The proposal, titled "Development of a Computational Assay for the Estrogen Receptor" is a one year grant for $113,620 that supports efforts to use computers to develop a procedure that predicts the binding affinity of potential drugs to the estrogen receptor. The estrogen receptor takes part in several signaling pathways, and initial activation of the estrogen receptor occurs through the binding of estrogen. Approximately 70% of all breast cancers are estrogen receptor positive, making the estrogen receptor a compelling target for drug design. This research builds directly on the senior thesis work of Scott Huntington '05. Previous Hamilton students who have helped develop this project include Sarah Taylor '03, Abby Markeson '04, and Sarah Felder '07. Karilyn Larkin '06, is working on this project as her senior thesis, with assistance from Amy Barrows '08. This grant was one of 92 proposals recommended for funding out of a total of 1,285 proposals considered in a blind peer review process. The grant will pay Kirschner's salary for the 2005-06 year, so that he can focus most of his efforts on research. He will be teaching Chem 322 in the spring semester.

Ian Rosenstein

Associate Professor of Chemistry Ian Rosenstein had five senior thesis students and a Senior Fellow working in his research lab this past year. Julianna Allport '05 synthesized species for the study of cyclopropylcarbinyl cation ring opening reactions. Ming Chan '05 explored synthetic methods for radical precursors that are important for the study of steric effects on the stereochemistry of radical addition reactions. Nica LeGendre '05 and Hima Poonati '05 worked on projects aimed at the synthesis of different types of precursors for studying the cyclopropylcarbinyl radical ring opening reaction. Sarah Stewart '05 investigated radical addition reactions of α-azido acrylate esters and amides. Senior Fellow Lou Vaickus '05 spent the year in an intensive investigation of intermolecular free radical reactions of α- and β- nitro esters, amides, and ketones. Posters based on Lou Vaickus' work were presented at the National Organic Symposium in Salt Lake City in June and at the Gordon Research Conference on Free Radical Reactions in New Hampshire in July.

Rostenstein published an article in the *Journal of Chemical Education*, titled "A Literature Exercise Using SciFinder Scholar for the Sophomore Organic Course." He also wrote a review article for the *Electronic Encyclopedia of Reagents for Organic Synthesis* that was published on the web. He continues to work on an invited book chapter for *Organic Syntheses*.

George Shields

Winslow Professor of Chemistry George Shields published a paper in the *International Journal of Quantum Chemistry* with Goldwater Scholar Meghan Dunn '06 and Emma Pokon '04. Their article is titled "The Ability of the Gaussian-2, Gaussian-3, Complete Basis Set-QB3, and Complete Basis Set-APNO Model Chemistries to Model the Geometries of Small Water Clusters."

Shields published an article in the *Journal of Chemical Physics* titled "Comparison of Complete Basis Set-QB3, Complete Basis Set-APNO, Gaussian-2, and Gaussian-3 Thermochemical Predictions with Experiment for Formation of Ionic Clusters of Hydronium and Hydroxide Ions Complexed with Water." This work was co-authored with chemical physics major Frank Pickard '05, Emma Pokon '04 and Matthew Liptak '03. Shields published a related article in the *Journal of Physical Chemistry A*. The article, "Comparison of Model Chemistry and Density Functional Theory Thermochemical Predictions with Experiment for Formation of Ionic Clusters of the Ammonium Cation Complexed with Water and Ammonia; Atmospheric Implica-

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FACULTY UPDATE, continued

continued from page 3

tions" was co-authored with Frank Pickard '05 and Meghan Dunn '06. The high-level quantum chemistry calculations predict that the thermodynamics for the formation of ion-water clusters is so favorable that virtually every ion in the lower troposphere will be hydrated with multiple water molecules.

Shields presented a seminar at the University of Minnesota's Department of Chemistry in December of 2004. His lecture, titled "Water Clusters in the Atmosphere: An Overview of Computational Chemistry Research at Hamilton College," was Webcast live to 35 institutions. He presented a similar seminar to Syracuse University's Department of Chemistry in September of 2005.

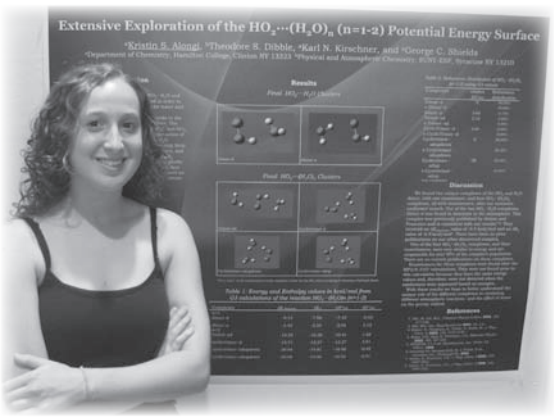
Shields published another article in the *International Journal of Quantum Chemistry*. The article, "Comparison of Density Functional Theory Predictions of Gas Phase Deprotonation," was co-authored with Matthew Liptak '03. The work shows the utility of a method of calculations known as Density Functional Theory for accurate computation of pK_a values. Liptak, a Goldwater Scholar during his senior year and winner of a Pfizer Summer Research Fellowship in 2002, has published seven papers from his undergraduate research in Shields' lab. Liptak's work formed the foundation for the recent grant awarded by the National Science Foundation to support research for students working with Shields and with Assistant Professor of Chemistry Karl Kirschner. The proposal, titled "RUI: Calculating Acid Dissociation Constants in Aqueous Solution," brings $210,000 over the next three years to support research aimed at the accurate prediction of the protonation states of small peptides. Protonation refers to the addition or subtraction of a hydrogen ion to a molecule, and the extent of protonation determines the overall charge of a molecule. Small peptides are biological molecules that are an essential class of drugs that are being developed by pharmaceutical companies. Accurate calculation of protonation states of small peptides is essential for drug design, as the charge state of peptides affects their binding properties to protein targets.

Shields has been named to the editorial board of *Computing Letters*, a new electronic journal devoted to the rapid publication of new research results in any area of computing.

Shields and Kirschner attended the 45th Sanibel Symposium on Atomic, Molecular, Biophysical, and Condensed Matter Theory, March 5 - 10, at St. Simons Island, GA. They were accompanied by their research students, Tim Evans '05, Katrina Lexa '05, Frank Pickard '05 and Meghan Dunn '06. Lexa won the award for top undergraduate student poster at the conference. Each student gave a brief talk before an international audience of more than 100 scientists, and then discussed their work during the poster session. Their posters were of graduate level quality and the students impressed the faculty in attendance. All of these students have spent one or more summers pursuing their research through the chemistry summer research program at Hamilton College.

Shields was the principal investigator and Kirschner and System Administrator and Research Support Specialist Steve Young were key personnel on a $100,000 grant funded by the National Science Foundation (NSF). The grant, titled "Acquisition of a Linux Cluster for the Molecular Education and Research Consortium in Undergraduate computational chemistRY (MERCURY)" has been funded by the NSF's Division of Chemistry through the Major Research Instrumentation Program (MRI). The research efforts of the entire consortium of eight liberal arts colleges were essential for the success of the NSF-MRI grant. The Linux Cluster will be built, maintained, and operated at Hamilton, and all MERCURY members will use it for computational research in atmospheric chemistry, materials science and physical chemistry, and biochemistry. This is the second MRI grant obtained by the consortium.

Hamilton College hosted the 4th MERCURY Conference in Computational Chemistry (http://mercury.chem.Hamilton.edu/conference) July 27-29. This national conference featured six talks by invited speakers and 44 poster presentations by undergraduates. Each undergraduate had two minutes to advertise his or her work in front of the entire audience of 74 attendees, followed by a two-hour period where they explained their work in detail at the poster session. Shields and Kirschner had 19 summer research students present the results of their collaborative research projects at the conference.



Pictured above are participants at the 4th Annual MERCURY Conference hosted by Hamilton College and Kristin Alongi '08 with the poster she presented.

GOLDWATER SCHOLARS

Mary Beth Day '07 and Meghan Dunn '06 have been named Barry M. Goldwater Scholars for the 2005-06 academic year. This scholarship is the premier national undergraduate award in the fields of mathematics, the natural sciences and engineering. Day and Dunn are the 5th and 6th Hamilton students to win Goldwater Scholarships. They and all previous winners have worked on research projects with Hamilton's chemistry faculty.

The Goldwater Scholars were selected on the basis of academic merit from a field of 1,091 mathematics, science and engineering students who were nominated by the faculties of colleges and universities nationwide. This year 320 scholarships were awarded.

The Scholarship Program honoring Senator Barry M. Goldwater was designed to foster and encourage outstanding students to pursue careers in the fields of mathematics, the natural sciences or engineering.

Mary Beth Day, a sophomore from Seneca Falls, N.Y., is a geoarchaeology major at Hamilton. Two papers she co-authored with Hamilton Professors Karl Kirschner and George Shields have recently been published in the *International Journal of Quantum Chemistry* and the *Journal of Physical Chemistry A*. The first paper, resulted from a study of model chemistry methods to investigate clusters of eight water molecules. Day worked on this project during the summers of 2003 and 2004, and during her freshman year in 2003-04. A William M. Bristol Scholar, Day received a Ferguson-Seely Fund Grant for summer research in 2004 and a National Science Foundation-STEP Summer Research Grant in 2003. She has been named to the Dean's List every semester since fall 2003. The second project, started in the summer of 2004 and completed during the 2004-05 academic year, was a comprehensive study of all the possible configurations of clusters of three, four, and five water molecules. Her overall results show that only small, cyclic water clusters are likely to be important in atmospheric chemistry processes. Day has presented her results at the MERCURY conferences in 2003 and 2004.

Day is a flutist with the Hamilton College Orchestra and Chamber Music group and is involved in the Food Salvage Program, Campus Radio Show and Samuel Kirkland Film Society. She hopes to pursue a Ph.D. in climate study, then a research career in paloeoclimatology in an academic or government agency setting.

Meghan Dunn, a senior from Clinton, N.Y., is a chemistry major. For the past three summers and during the 2004-05 academic year she has done computational chemistry research under the direction of Winslow Professor George Shields. Dunn was first author of two research papers on thermodynamics and clusters with Shields and Emma Pokon '04. They were published in the *International Journal of Quantum Chemistry* and the *Journal of the American Chemical Society* in 2004. She is also the second author on another paper published in the *Journal of Physical Chemistry A* in 2005 on ammonium cation — water clusters, with Frank Pickard and Professor Shields. Dunn has presented her research at 6 conferences, including all four MERCURY conferences from 2002-2005, and at poster sessions at the Sanibel Symposium on Quantum Chemistry in March of 2004 and 2005.

Dunn is active with the Hamilton Environmental Action Group. Before transferring to Hamilton she attended George Washington University where she was on the cross country/track teams, and was public events coordinator for GW Students for Fair Trade. A brief account of why she transferred to Hamilton can be found in the 2006 American's Hottest Colleges Kaplan College Guide published by *Newsweek*. She plans to pursue a Ph.D. in environmental chemistry and investigate current problems threatening the environment.

FULBRIGHT SCHOLAR

Shayna McHugh '05 has received a Fulbright Award to do research in Brazil during the 2005-06 academic year. McHugh will work with a research group in Brazil headed by Robert Berlinck, a prominent natural products chemist at the University of Sao Paulo. McHugh's senior thesis research was on *Stylotella aurantium* – a marine sponge from Guam. At Hamilton she worked with Robin Kinnel, the Silas D. Childs Professor of Chemistry, to explore whether molecules from the sponge could be used to make new medicines.

McHugh has studied abroad for a semester in Brazil and also visited there during spring break with Hamilton's Capoeira Club. Professor Kinnel says, "She will always stand out. She has the complete package. She's bright, enthusiastic, successful and she wears her enthusiasm on her coat sleeve." McHugh was the 4th Goldwater Scholar at Hamilton, winning a two-year award for her junior and senior years.

The purpose of the Fulbright Program is to increase mutual understanding between the people of the United States and other countries through the exchange of persons, knowledge and skills. The program is designed to give recent college graduates opportunities for personal development and international experience.

ROBIN KINNEL SABBATICAL ADVENTURES

During his leave in Hawaii during the spring of 1999, Kinnel had collected a few highly cryptic, unknown gastropods while participating in a massive collection of another marine invertebrate, a sacoglossan, that was the source of an anticancer agent that had proceeded to clinical trials. He showed that the cryptic gastropods contained compounds that were cytotoxic, but insufficient material was available to do much more. In this present sabbatical, Kinnel wanted to return to Hawaii to recollect enough of these cryptic gastropods that a Hamilton senior could isolate and identify the active compound(s). He arranged to work with Professor Thomas Hemscheidt at the University of Hawaii, promising to help him with some of his own projects in return for a space in the lab. Kinnel chose to spend the spring semester in Hawaii, because collecting conditions were best then.

Kinnel, along with Wesley Yoshida, another colleague from the University of Hawaii, collected a sizeable number of the cryptic gastropods, which proved to be another genus of sacoglossan called *Calyphylla*. About once every one or two weeks, depending on the tides and their schedules, they would go snorkeling in a small bay just east of Black Point on Oahu and collect. This area is highly conducive to the growth of *Bryopsis*, the green alga host for the sacoglossans, offering the slight brackishness, a rocky ocean floor, relatively sheltered water, and relatively high nutrient content that allows the alga to thrive. The gastropods were plentiful and a project now awaits Dan Seeger, '06.

Of course, he picked up several other projects as well. Kinnel investigated five organisms, including three sponges, a tunicate and an alga that had been collected in Panama in 1999, for the possible presence of anticancer agents—as determined by cytotoxicity tests—and performed bioassay-guided fractionation of the four organisms whose extracts proved active. From these he isolated very small amounts of two rather simple molecules that could not be completely identified because of insufficient sample; however, enough information was obtained about them that Andrew Glossner, '06, will attempt syntheses of them during this coming year. Kinnel also worked on a marine fungus that had been shown to produce at least one antibiotic substance when challenged with *Staphylococcus aureus*. From the broth he isolated two related compounds that appeared to have highly unusual structures for material from a natural source. Unfortunately, work after his departure revealed that they are known compounds.

During the fall term Kinnel's main goal was to get the new 500 MHz nuclear magnetic resonance (NMR) spectrometer running smoothly and to familiarize himself with it so that he could embark on a project with Professor Shields studying the solution structures for some peptides, shown to have activity against human breast cancer, derived from alpha-fetoprotein, which is present in all women who have had children. A grant proposal to support this work is presently being written. He also wrote a book review for the Journal of Natural Products.

Sabbatical leaves are not all work and no play. After attending the eleventh MaNaPro, an international meeting concerning Marine Natural Products held in Sorrento, Italy in September, he spent a week in Paris and another week in England, visiting family and sightseeing in London, Cambridge and the Cotswolds.

Professor Kinnel hard at work collecting algae at Waianae Boat Harbor on the south west shore of Oahu.

TIM ELGREN SABBATICAL ADVENTURES

Elgren completed a four-year rotation as the Associate Dean of Faculty and spent the 2004-05 year on sabbatical at Montana State University in Bozeman, MT. He went to MSU primarily to continue an on-going collaboration with Prof. Dave Dooley. Elgren's recent work in the area of sol-gel encapsulation of various enzymes includes recent efforts to encapsulate and characterize the mechanism of copper-containing amine oxidases, the primary focus of the Dooley lab. This work is an extension of senior projects conducted by Rob Gordon '03 and Jeff Rubino '05 and is currently funded by grants from the American Chemical Society: Petroleum Research Fund and the Research Corporation. During the year, Elgren was able to use EPR spectroscopy to characterize an intermediate in the turnover cycle of amine oxidase. He also developed a number of catalytic bio-materials that employ multiple enzymes and can serve as novel bio-sensors. His time at MSU also allowed him to interact with other research groups. In collaboration with Prof. John Peters, Elgren was able to encapsulate a variety of hydrogenases into sol-gels and demonstrate their extended stability and activity. Hydrogenases catalyze the production of hydrogen from water and the reverse reaction, oxidation of hydrogen producing protons and electrons. The later represents a potential core of a hydrogen fuel cell. A manuscript describing this work has been submitted for publication and a patent disclosure has been filed.

In addition to his work at MSU, Elgren served this past year as the President of the Council on Undergraduate Research (CUR) and continues to serve on the CUR Executive Board. CUR is an organization that supports faculty members and institutions that seek to implement and administer undergraduate research programs. He began work on a book he is co-editing with Kerry Karukstis (Harvey Mudd College) on curricular structures which support undergraduate research. Elgren also traveled throughout the year to conduct external reviews of the biology and chemistry programs at Trinity University and the University of Wisconsin-Eau Claire, participate in a workshop convened by the National Science Foundation to consider the "state of the post-doctorate," which led to a published report with a series of recommendations on how to strengthen these experiences. He made three presentations at the American Chemical Society's National Meeting in San Diego, a presentation at the American Association of Colleges and Universities National Conference in San Francisco, CA, and presented a poster at the "Metals in Biology" Gordon Conference in Ventura, CA.

Elgren also found time to take full advantage of the Bozeman area. He describes his ideal day as skiing until noon in fresh Big Sky powder (termed "white smoke" by the locals), jumping into the Gallatin River (the filming site for the movie "A River Runs Through It") to catch a handful of native cutthroat trout, zipping down the canyon to MSU for an afternoon at work, home for dinner at 7, and enjoying some family time before falling into bed feeling like he couldn't wait for tomorrow (a feeling he doesn't recall from his time in the Dean of Faculty's office). Elgren looks forward to returning to his full time teaching in the department and installing a new Raman microscope (supported by an award from the National Science Foundation: Major Research Instrumentation Program) in the new biochemistry labs.

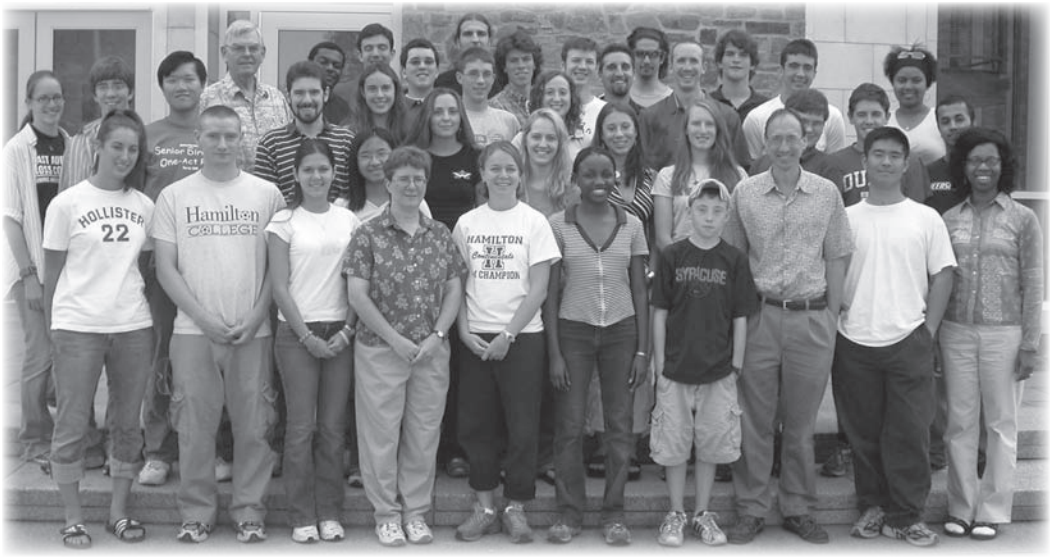
NEW FACULTY

Camille Jones

Last spring, Camille Jones was hired as an Assistant Professor of Chemistry. Jones earned a Ph.D. from the University of Toledo and bachelor's degree from Butler University. Before coming to Hamilton Jones held several positions at National Laboratories. From 1999-2001 she was a postdoctoral scientist in the Metals and Ceramics Division at Oak Ridge National Laboratory, and from 2001-2002 she was a postdoctoral research associate at the National Institute of Standards and Technology (NIST). Her excellent work resulted in her full-time hire as a Research Chemist on the Crystallography Team at NIST, a position she held from July of 2002 until May of 2005. She joined Hamilton at the end of May, and spent eight weeks working with three students on research projects. An experimental physical chemist, she has published 20 papers, and most of her work uses neutron diffraction to look at condensed phase systems. She will be teaching physical chemistry, physical chemistry laboratory, and general chemistry laboratory this year.

Prof. Jones has recently received a grant of $200,000 from the Department of Energy to use neutrons for the study of hydrogen storage in clathrate hydrates, as part of a larger DOE-funded study in collaboration with scientists at Tulane University and Los Alamos National Laboratory.

STUDENT RESEARCH AND AWARDS



Pictured above are participants of the summer 2005 chemistry research program with their professors.

STUDENT RESEARCH

This past summer Camille Jones worked with Nicola Banishki '07, Kevin McCarthy '07, and Keigo Shimura '07. These three helped Professor Jones set up her research laboratory at Hamilton and began an investigation into clathrate hydrate structure. Karen Brewer worked with Lousia Brown '09, Elizabeth Faroh '08, Leane Pasquini '07, Jodi Raymond '08, and Kimberly Roe '08: the sol-Gals were working on sol-Gels. Robin Kinnel spent five weeks working with Michael Flanders '09. Ian Rosenstein worked with Dan Griffith '07, Yuqi Mao '09, Silas McKee '07, and Thao Nguyen '08. Karl Kirschner and George Shields worked with Marco Allodi '08, Kristin Alongi '08, Amy Barrows '08, Meghan Dunn '06, Matroner George '07, Tumelano Gopolang '08, Dave Hamilton '09, Greg Hartt '08, Karilyn Larkin '06, Katrina Lexa '05, Jovan Livada '08, Ngoda Manongi '08, Greg Nizialek '08, Frank Pickard '05, Jared Pienkos '09, Pragyan Pradhan '08, Amanda Salisburg '08, Evan Savage '08, Dan Tomb '08, and James McConnell '08. James worked on a collaborative research project sponsored by Professor Tim Elgren. These 33 students and their faculty members had a great time working on research and enjoying the hottest Central New York summer in a very long time.

STUDENT AWARDS

The annual Class and Charter Day and Commencement ceremony were times that many of our students were honored for their academic achievements.

Shayna McHugh received a J. William Fulbright Grant to study in Brazil next year, the Dr. Philip I. Bowman Prize Scholarship, the James L. Bennett Achievement Prize, the Norton Prize, an Elihu Root Fellowship, and Phi Beta Kappa Honors. Mary Beth Day '07 and Meghan Dunn '06 received Barry M. Goldwater Scholarships. Alison Lin '04 and Andrea Stroud '04 received Samuel F. Babbitt Kirkland College Fellowships. Ming Chan received the Donald J. Denney Prize in Physical Chemistry, an Elihu Root Fellowship, and Phi Beta Kappa Honors. Tim Evans received the Norton Prize, an Elihu Root Fellowship, and Phi Beta Kappa Honors. Scott Huntington received the Donald J. Denney Prize in Physical Chemistry and Phi Beta Kappa Honors. Senior Fellow Lou Vaickus received the Underwood Prize in Chemistry, the Mary McMaster Hallock Prize in Science, an Elihu Root Fellowship, and Phi Beta Kappa Honors. JunChan Hong received Phi Beta Kappa Honors. Katrina Lexa received the Judge John Wells Fellowship and the Public Policy Prize. Jeff Rubino received an Elihu Root Fellowship. Heather Michael '07 received the Benjamin Walworth Arnold Prize Scholarship, the American Chemical Society and Joint Polymer Education Committee Prize in Organic Chemistry, the Brockway Prize, the CRC Press First Year Prize in Chemistry, and the Phi Beta Kappa Book Prize. Hilary Gamble '07 received the Coleman Burke Prize Scholarship. Nikola Banishki '07 and Sergey Piatkovski '07 received Lawrence K. Yourtee Prize Scholarships. Thao Nguyen Nguyen '08 and Daniel Tomb '08 received G. Harvey Cameron Memorial Prizes. Daniel R. Griffith '07 received the CRC Press First Year Prize in Chemistry and the Phi Beta Kappa Book Prize. Sarah Felder '07 received the Michael T. Genco, Jr. Prize in Photography. James McConnell '07 and Rebecca Parkhurst '07 received the Phi Beta Kappa Book Prize. Jovan Livada '08 received the McKinney Speaking Prize. Biochemistry major Andreu Viader Valls received the James H. Glass Fellowship, the Senior Prize in Biochemistry and Molecular Biology, the Senior Prize in Neuroscience, an Elihu Root Fellowship, and Phi Beta Kappa Honors.

Commencement Honors: *Summa Cum Laude:* Tim Evans, Scott Huntington, Shayna McHugh, Lou Vaickus, Andreu Viader Valls; *Magna Cum Laude:* Julianna Allport, Ming Chan, JunChan Hong; *Cum Laude:* Katrina Lexa; *Honors in Chemistry:* Julianna Allport, Ming Chan, Tim Evans, JunChan Hong, Scott Huntington, Katrina Lexa, Shayna McHugh, Jeff Rubino, Kate Schirmer, Sarah Stewart, Lou Vaickus; *Honors in Biochemistry:* Ernie DiGiovanni, Mike Romano, Matt Ruggieri, Andreu Viader Valls.

Sigma Xi: Students elected to Sigma Xi, the National Scientific Honor Society, were Julianna Allport, Ming Chan, Tim Evans, Scott Huntington, Katrina Lexa, Shayna McHugh, Frank Pickard, Lou Vaickus and Andreu Viader Valls.

Congratulations to all graduates in chemistry, chemical physics, and biochemistry from the class of 2005: Julianna Allport, Ming Chan, Beth Benton, Tim Evans, JunChan Hong, Scott Huntington, Nica LeGendre, Katrina Lexa, Shayna McHugh, Tenma Otsuka, Frank Pickard, Hima Poonati, Jeff Rubino, Kate Schirmer, Sarah Stewart, Ernie DiGiovanni, Mike Romano, Matt Ruggieri, Lou Vaickus and Andreu Viader Valls.