Chemistry at Hamilton

A newsletter produced by the Department of Chemistry at Hamilton College

Inside this issue:
December 2006

Goldwater Scholar Dan Griffith, '07. Dan is the seventh Goldwater Scholar from Hamilton College.

Hamilton

INTRODUCTION

It is a special pleasure to write this Newsletter. The year 2005-06 was a pivotal one in the life of the department. We graduated 11 students, we had 20 sophomores declare majors in chemistry and another five in biochemistry, and we had 52 students work with us this past summer on research projects. Dan Griffith became the seventh Goldwater Scholar from Hamilton College. We received two prestigious national awards. The first, from Research Corporation, will allow the chemistry and physics departments to expand our faculty and staff and enhance our program in biochemistry. In chemistry we will be expanding to seven full-time teaching faculty, and hiring an instrument support technician who will free up faculty time for research by maintaining our continually increasing number of instruments. The second, from Sherman Fairchild, brings mass spectrometers and a technician to run them, for a research initiative in environmental chemistry that is a collaborative effort between the chemistry, biology, and geology departments. I owe a debt of gratitude to Tim Elgren, who was the PI on the Research Corporation grant, and Robin Kinnel, who was the chemistry representative and writer for the Sherman Fairchild grant, for their efforts in securing these awards. Robin is completing his 41st year of service at Hamilton and plans to work half-time over the next two years. We are delighted that he has chosen a long transition into retirement, and look forward to his help implementing these two awards.

The new Science Center was dedicated over a year ago, on September 30, 2005. Congressman Sherwood Boehlert (R-NY) was the keynote speaker, and he spoke on the effectiveness of undergraduate research and quality teaching at liberal arts colleges for inspiring students to become scientists. Jacqueline Barton, the Arthur and Marian Hanisch Memorial Professor of Chemistry at the California Institute of Technology, was presented with an honorary degree. Our own chemistry alumni, Paul Carlier '83, Associate Professor of Organic and Medicinal Chemistry at Virginia Tech, and Rebecca Heald '85, Associate Professor of Cell and Molecular Biology at the University of California, Berkeley, were honored on Saturday, October 1. Paul and Rebecca presented seminars on their research, and both received Alumni Achievement Medals. The new building is phenomenal, and prospective students who visit are stunned by the excellence of the facilities. As one indication, our enrollment in general chemistry, which averages 95, is 137 this semester. We have added two more laboratory sections to meet the demand. More than 15 percent of the first-year class is enrolled in chemistry, which is a good sign for the future of our discipline. The organic chemistry enrollments for the spring, which typically average 75, are already at 110 students.

Karen Brewer is the new chair of the department, and I am delighted to be able to turn over the day-to-day operations to her. We have started searches for a Director of Instrumentation and for faculty positions in biochemistry and organic chemistry. Karl

continued on next page

Dan Griffith '07 became the seventh Goldwater Scholar from Hamilton College!

continued from page one

Kirschner and I have set up a Center for Molecular Design, which we hope will be a training ground for more Ph.D. scientists to learn how to mentor undergraduates in research projects, as well as allow us to develop more research projects for Hamilton undergraduates. Please read this newsletter for more details, and, as always, write, call or visit and let us know how you are doing.

George C. Shields
Winslow Professor of Chemistry

Hamilton College • Department of Chemistry
198 College Hill Road • Clinton, NY 13323

Office: 315-859-4729• **Fax:** 315-859-4744
E-mail: chem@hamilton.edu
Web: www.chem.hamilton.edu

MEGHAN DUNN '06 IN PRINT AND ON AIR

Meghan Dunn '06 and Associate Professor of Chemistry Tim Elgren, were featured in an article in the Kaplan-Newsweek 2006 edition of "America's Hottest Colleges." The article "Under the Microscope" discusses undergraduate science research opportunities at small schools. Elgren noted in the article, "Many of the small colleges are focusing more on research because it resonates so well with the personalized education that is central to their missions." Dunn, who transferred from George Washington University, said there "even graduate students 'were too busy doing their own thing' to show her the ropes in the lab."

Meghan Dunn '06 was a guest on WAMC Northeast Public Radio's "The Best of Our Knowledge" on May 22. Dunn, a chemistry major, taped a studio interview with the show's host Glenn Busby in March as part of a National Science Foundation story about women in science and math. In the interview, Dunn describes why she likes Hamilton's size, the importance of her research on water clusters, gender equity in science and helping to get more young women into science. Dunn has entered graduate school this fall at the University of Colorado at Boulder, in its atmospheric/environmental chemistry program. The interview can be heard on the Web; Dunn's segment begins around the 16-minute mark. http://www.publicbroadcasting.net/wamc/news.newsmain?action=article&ARTICLE_ID=915298

FACULTY UPDATE

Karen Brewer

Professor of Chemistry Karen Brewer and Professor of Physics Ann Silversmith co-authored an article in the *Journal of Luminescence* (vol. 121, Nov. 06) with Hamilton students Dan Campbell '08 and Yubo Lu '07, titled "$^5D^3 \rightarrow {}^7FJ$ emission in terbium-doped sol–gel glasses."

The authors show that in silicate sol–gel glass doped with trivalent terbium, the intensity of violet and blue fluorescence from the $^5D^3$ level is highly dependent on terbium concentration, on the presence of Al^{3+} co-dopant, and on annealing conditions. Evidence is presented that aluminum co-doping prevents rare earth clusters from forming, and also modifies the coupling of rare earth ions to the local environment. $^5D^3$ emission is observed in glasses annealed at 750 °C, and increases in intensity with increasing annealing time and with higher temperature. This behavior is shown to be due to the removal of residual hydroxyl ions.

Katie Donahue '08, Elizabeth Faroh '08, Robin Joseph '09, Louisa Brown '09, and Matt Kotlove '09 spent their summer working in the Brewer research lab. Donahue and Joseph synthesized calix[4]arenes, which are chalice-shaped molecules with four aromatic rings, for the purpose of coordinating rare earth metal ions. These molecules are then embedded in sol-gels which can be processed into glasses. The students examine the light that is absorbed and emitted from the glass.

About 70 Seneca Street Elementary School students (Oneida) in grades 3-6 visited Hamilton for a Science Day on June 5. The students had completed a reading challenge and this field trip was their reward. In chemistry, Professor of Chemistry Karen Brewer did several short experiments for the children. Brewer showed the students that when an inflated balloon is placed in liquid nitrogen the extremely cold temperature turns the air in the balloon to liquid and the balloon becomes smaller; but when it is removed from the liquid nitrogen, the balloon goes back to its original size. Brewer also put a dollar bill soaked in water and alcohol into a flame and explained that the alcohol burns, but then the water extinguishes the flame. The students got to do their own chemical reaction to produce green "goop."

Tim Elgren

This past year Professor of Chemistry Tim Elgen was awarded a grant from the National Science Foundation to support his ongoing efforts to characterize the chemistry associated with a variety of enzymes encapsulated in sol-gel materials. The award provides for student stipends, a postdoctoral research associate, and research equipment and supplies. Maxwell Akuamoah-Boateng '09, Trevor Clarkson '09, Nick Scoglio '09, Marielle Matthews '09, Katheryn Hansen '07, Lauren Tom '10 and Madeline Caudle '10 worked in his lab this past summer. Katheryn Hansen '07, Hilary Gamble '07 and Sergey Piatkovski '07 are currently pursuing their senior theses projects in his lab. Elgren has recently completed work on a book that he has co-edited titled "Developing and Sustaining a Research-Rich Undergraduate Curriculum: A Compendium of Successful Practices" published by the Council on Undergraduate Research (2007). He also published a piece for *Inside Higher Education* on the transformation of the advising system at Hamilton College titled "Advising: Less is More."

continued on next page

FACULTY UPDATE, continued

continued from page 2

Elgren delivered an invited talk at the Protein Derived Radicals, Cofactors, and Quinones Gordon Research Conference in Ventura, Calif. in January. The talk was titled "Sol-Gel Encapsulation of Enzymes: Mechanistic and Spectroscopic Studies." In February he gave an invited presentation titled "Undergraduate Research Experiences: Synergies Between Teaching and Research" at the national meeting of the American Association for the Advancement of Science (AAAS) in St. Louis. Elgren published the lead "analysis" article in the winter 2006 issue of *Peer Review*, titled "Undergraduate Research Experiences: Synergies between Scholarship and Teaching." The theme for the winter issue was "Undergraduate Research: A Path to Engagement, Achievement, and Integration." Last fall he published a paper titled "Immobilization of Active Hydrogenases by Encapsulation in Polymeric Porous Gels" in the *American Chemical Society* journal *Nano Letters*. The manuscript describes the successful incorporation of hydrogenases into glass-like materials and the demonstration that the enzymes remain fully active in this environment. Hydrogenases are capable of generating hydrogen gas from protons and electrons. They are also capable of catalyzing the reverse reaction, which represents the catalytic core of a hydrogen fuel cell. Elgren was promoted this past year to the rank of full professor (see page 7).

Camille Jones

Assistant Professor of Chemistry Camille Jones worked with nine students on various research projects during the summer of 2006. Keigo Shimura '07 studied the viscosity of various hydrate-forming binary liquid solutions and tested the validity of the postcursor hypothesis of viscous hydrate melts. The project of Sing Yeung '07 established a method for making accurate density measurements with a newly purchased vibrating-tube densitometer. Victoria Jenkins '09 used FTIR spectroscopy to examine water inside a reverse-micellar system of isooctane, and sodium docusate salt (AOT) to determine its hydrate-forming ability. Nicholas Berry '09 studied the effect of the additives tetrahydrofuran and trimethylene oxide on the stability of semiclathrates. Anique-Marie Cabardos '07 studied the effects of sodium halide additives on clathrate hydrate stability. Pablo Abreu Jr. '08 built a miniature thermoelectric cooler to maintain clathrate hydrates cold enough for the measurement of their X-ray diffraction patterns. Timothy Currier '09 designed and tested a system for the high-pressure synthesis of clathrate hydrates in reverse-micellar solutions. Michael Flanders '09 developed a series of mathematical methods to identify guest molecules that allow hydrate formation at the mildest temperatures and pressures possible. Thomas Nevers '10 synthesized 4,4-dimethyltetrahydropyran, a potential guest molecule identified by Flanders' work, as a pure compound in good yield, and it was used to synthesize a structure H clathrate hydrate at the end of the summer. Additionally, Jones collaborated with Associate Professor of Chemistry Ian Rosenstein and his students Silas McKee '07 and Greg Nizialek '08 on the synthesis of two different deuterated versions of propylene oxide for use as clathrate hydrate guests.

This year, Keigo Shimura, Kevin McCarthy, and Anique-Marie Cabardos are continuing their summer research as senior thesis projects. Jones has written three proposals to Research Corporation, Petroleum Research Fund, and an NSF proposal with a new collaborator, Jae W. Lee at The City College of New York, for funding to continue and expand this work.

Robin Kinnel

The Kinnel group enjoyed a very lively summer, and considerable progress was made with a number of projects. Our long time concern with the Pacific sponge, *Stylotella aurantium*, continued with STEP student David Brown, '10, joining Evan Savage '08 at the beginning of July in isolating more palau'amine for our collaboration with Sergey Kozmin at the University of Chicago and for further studies on the base decomposition of the compound. Also of interest was isolating and crystallizing either one of the palau'amines or a derivative and further exploration of the extracts for new bioactive compounds. Lenny Saraceno '07, is continuing to work on this problem for his senior project. Continuing another marine natural product project Ben Van Arnam '09, did some careful, painstaking work pursuing the structure of a compound isolated from the cryptic sacoglossan *Calyphylla sp.*, which is found at Black Point on the island of Oahu in Hawaii. Van Arnam also began a study of the eggs of the sacoglossan *Elysia rufescens*, looking in both for bioactive compounds.

Amy Klockowski '09, and Nicole Tetreault '08, collaborated on what has become called "the butterfly project." Earlier work established that the major volatile compound in asters that attract the Pearl Crescent (*Phyciodes tharos*) butterfly is germacrene-D. These asters include New England aster, Crooked Stemmed aster, and White Panicle aster. Klockowski and Tetreault's work confirmed that the three different species of aster and different members of the same species contain varying compositions of the (-) and the (+) enantiomer. Furthermore, the gravid females prefer to lay their eggs on plants with the highest percentage of the (-) enantiomer, most frequently the White Panicle aster.

continued on next page

FACULTY UPDATE, continued

continued from page 3

Interested in pursuing a synthetic project for her summer and senior project, Danielle Massee '07, completed a synthesis of the apparently unknown ester between 4-hydroxybenzoic acid and 4-hydroxyphenylacetic acid; this compound had been isolated from a Panama sponge *Amphimedon compressa*, originally collected in 1999 and worked on during Kinnel's sabbatical in Hawaii during the spring of 2005. Massee then set out to synthesize (+)-germacrene-D, which occurs only rarely in nature and often mixed with the (-) enantiomer. When complete, this synthesis will permit completion of the "butterfly project."

Katie Naughton '08 initiated a project to learn the structure of peptides derived from alpha-fetoprotein. She purified some of the tetrapeptide and carried out a wide range of NMR experiments in deuterated water and in water itself. She also ran some experiments near the freezing point of water. Spatial relationships have been observed, but only the ones from nearby hydrogens. Rebecca Levinn '07, has taken up the study and expanded it to include another tetrapeptide and a pentapeptide. These peptides have anticancer activity. The group obtained better information through experiments on the 800 MHz instrument at RPI this fall.

Kinnel traveled to Ventura, Calif., last February for the biennial Marine Natural Products Gordon Conference, and to Washington, D.C. in early August to attend the yearly meeting of the American Society of Pharmacognosy.

Karl Kirschner

Visiting Assistant Professor of Chemistry Karl N. Kirschner recently published a book chapter titled "Incorporation of Carbohydrates into Molecular Mechanics Force Fields." The chapter was co-authored with Sarah Tschampel '00, and with Robert Woods from the Complex Carbohydrate Research Center (CCRC) at the University of Georgia. The chapter appears in an *American Chemical Society* book titled NMR Spectroscopy and Computer Modeling of Carbohydrates Recent Advances.

The chapter is an overview of molecular mechanics force fields developed to simulate carbohydrates. Included in the overview is the GLYCAM force field, which was developed by Kirschner, Tschampel and Woods. Kirschner was a postdoctoral student and Tschampel was a graduate student at the CCRC during this research. GLYCAM is a state-of-the-art force field that has been incorporated into the molecular dynamics program AMBER, distributed by the University of California, San Francisco.

Ashley Deline '06, conducted her senior thesis with Kirschner and used the GLYCAM force field and AMBER to explore the conformational space of an oligosaccharide that is found in antibodies associated with the autoimmune disease rheumatoid arthritis.

This past summer Kirschner co-directed 20 undergraduates in research projects along with Professor of Chemistry George Shields. Katrina Lexa '05 returned from her graduate work at Michigan to lead the alpha-fetoprotein project, which included Amanda Salisburg '08, Katherine Alser '09, Sharfi Farhana '09 and Amber O'Connor '09. Kay Larkin '06 stayed for the summer to lead a group that was developing computational approaches to determining the binding ability of different ligands to the estrogen receptor. Becky Mackenzie '08 and Alexa Schwarzman '09 worked with Larkin on this project. Cecilia Disney '07 developed a new project directed against African trypanosomiasis (sleeping sickness). James McConnell '07 and Kristin Alongi '08 worked on testing new software available for determining the protonation state of molecules. Jovan Livada '08 and Deacon Lile '09 worked together on a materials science project funded by industry. Marco Allodi '08 and Russell Holz '10 worked on understanding the mechanism of the enediyne reactions. Staff scientist Chuck Borton joined the lab for the summer, helping to supervise students working on atmospheric chemistry projects. Greg Hartt '08, Allodi, Alongi, Ngoda Manongi '08, Alexa Ashworth '09, Tom Morrell '10 and Andrew Beyler '10 all worked on atmospheric chemistry projects.

Ian Rosenstein

Associate Professor of Chemistry Ian Rosenstein had six students working in his lab in the summer of 2006. Dan Griffith '07 worked on a project that is a collaboration with Associate Professor of Biology Herm Lehman, synthesizing a compound that is a potential insect neurotransmitter and working toward the synthesis of compounds that may serve as inhibitors of the enzyme tyramine beta-hydroxylase. Rebecca Parkhurst '07 initiated two new projects. One aims to develop a chiral auxiliary that can also be used to induce remote radical formation. The other will apply the cyclopropylcarbinyl radical ring open reaction to the synthesis of medium sized rings. Silas McKee '07 continued the group's study of the stereoselective addition reactions of electron-deficient radicals. McKee and Greg Nizialek '08 also completed the synthesis of two different deuterated versions of propylene oxide for a collaborative project with Assistant Professor of Chemistry Camille Jones. David Hamilton '09 and Phillip Milner '10 worked on the synthesis of precursors to aryl-substituted cyclopropylcarbinyl radicals for a kinetic study of the ring opening reaction.

Two seniors, Amanda Bennett '06 and Grant McSurdy '06, completed their senior thesis with Rosenstein last year. This year there are four seniors working in Rosenstein's lab with Sarah

continued on next page

FACULTY UPDATE, continued

continued from page 4

Fuzesi joining Griffith, Parkhurst and McKee. Professor Rosenstein also continues to make progress on an invited review for *Organic Reactions*.

George Shields

Winslow Professor of Chemistry George Shields presented a seminar for Ithaca College's Department of Chemistry last November. His lecture, titled "Water Clusters in the Atmosphere: An Overview of Computational Chemistry Research at Hamilton College," featured the atmospheric chemistry work of Hamilton students.

Shields gave an invited lecture at the 46th International Symposium on Atomic, Molecular, Biophysical, and Condensed Matter Theory, March 6, 2006, St. Simons Island, Ga. His lecture, "Computational Design of a Small Peptide that Inhibits Breast Cancer," covered on-going cancer drug design research. He gave a similar lecture to the biochemistry department at Florida State University on March 23, and at the 38th Middle Atlantic Regional Meeting of the American Chemical Society on June 5, in Hershey, Pa.

Shields and Kirschner have published five papers in 2006, with 11 different students. The citations are listed following, with undergraduate authors indicated by an asterisk.

"Do Hydroxyl Radical-Water Clusters, $OH(H_2O)_n$, n=1-5, Exist in the Atmosphere?" Marco A. Allodi,* Meghan E. Dunn,* Jovan Livada,* Karl N. Kirschner and George C. Shields, *J. Phys. Chem. A* 110 (2006) 13283-13289.

"Comparison of CCSD(T), W1, and other Model Chemistry Predictions for Gas Phase Deprotonation Reactions" Frank C. Pickard IV,* Daniel R. Griffith,* Skylar J. Ferrara,* Matthew D. Liptak,* Karl N. Kirschner and George C. Shields, *Int. J. Quantum Chem.* 106 (2006) 3122-3128.

"Exploration of the Potential Energy Surfaces, Prediction of Atmospheric Concentrations, and Vibrational Spectra of the $HO_2 \bullet\bullet\bullet (H_2O)_n$ (n=1-2) Hydrogen Bonded Complexes" Kristin S. Alongi,* Theodore S. Dibble, George C. Shields and Karl N. Kirschner, *J. Phys. Chem. A* 110 (2006) 3686-3691.

"Ortho-Effect in the Bergman Cyclization: Electronic and Steric Effects in Hydrogen Abstraction by 1-Substituted Naphthalene 5,8-Diradicals" Frank C. Pickard IV,* Rebecca L. Shepherd,* Amber E. Gillis,* Meghan E. Dunn,* Steven Feldgus, Karl N. Kirschner, George C. Shields, Mariappan Manoharan, and Igor V. Alabugin, *J. Phys. Chem. A* 110 (2006) 2517-2526.

"Prediction of Accurate Anharmonic Experimental Vibrational Frequencies for Water Clusters, $(H_2O)_n$, n=2-5" Meghan E. Dunn,* Timothy M. Evans,* Karl N. Kirschner and George C. Shields, *J. Phys. Chem. A* 110 (2006) 303-309.

HAMILTON STUDENTS EXCEL AT CONFERENCE

Kay Larkin '06, Frank Pickard '05 and Meghan Dunn '06

Karilyn Larkin '06, Frank Pickard '05 and Meghan Dunn '06 won Outstanding Poster Presentation Awards at the 46th annual Sanibel International Symposium on Atomic, Molecular, Biophysical, and Condensed Matter Theory. The meeting, held on St. Simon's Island last February 26 - March 3, is an international symposium devoted to forefront theory and computation in quantum chemistry, condensed matter, chemical physics, nanoscience, quantum biochemistry, and biophysics.

Larkin and Dunn shared the Superior Poster Award. Larkin presented "Analysis of Raloxifene and its Derivative's Binding Affinities to the alpha-Estrogen Receptor Ligand Binding Domain" while Dunn presented "Predicting Atmospheric Chemistry Through Quantum Theory: Intermolecular Attractions of OH, O_2 and N_2 with H_2O." Pickard won the inaugural Most Creative Two-minute Presentation for his poster "Methodology Development for the Study of Bergman Cyclization in Enediyne Anticancer Antibiotics," for his interpretive dance that showed cell death after DNA cleavage by enediynes. The judges were impressed by the quality of the Hamilton students' two-minute talks and the way they explained their posters during the poster session.

RESEARCH CORPORATION AWARD

Hamilton College has received a $500,000 Department Development Award from Research Corporation (RC) to increase faculty and technical staffing in the chemistry and physics departments. Only five U.S. colleges have received RC awards since the first grants were awarded in 1989. Proposals for the award are by invitation only.

The goal of these awards is to provide a catalyst for enhancing single or multiple science departments in pursuit of academic excellence. A biochemist, astronomer or astrophysicist, an instrument technician, and a machinist will join the two departments. Expanding the faculty will enable the chemistry and physics departments to offer more and varied research opportunities for students.

"We see this award as a partnership with Hamilton College, whose goal is the evolution of its science departments into nationally distinguished interactive and interdisciplinary programs, said James Gentile, president of Research Corporation. "We believe that the sciences at Hamilton College can stand out as a model for science as it will be practiced in the 21st century," said Gentile.

"After an extensive review process employing external consultants, Research Corporation selected our chemistry and physics programs deeming them ready to move to new levels of research excellence," said Tim Elgren, Hamilton College professor of chemistry, project director for this award.

Hamilton's chemistry and physics faculty members are heavily engaged in research and their projects are often externally funded. "The success of the departments can be directly attributed to a focused team effort to integrated research and teaching. Faculty members regularly produce publications, often with student co-authors who are intimately involved in their research," said Elgren.

Thirty-one grants, totaling almost $4 million, were awarded to Hamilton's chemistry and physics departments from 2000 to 2005. During the same period, nearly 80 papers were published by faculty members in the chemistry and physics departments; half of these papers were co-authored by students.

For example, Meghan Dunn, a 2006 graduate and 2005 Goldwater Scholar, has co-authored six papers. Dunn's research has appeared in the *Journal of Physical Chemistry* and the *Journal of the American Chemical Society*, among others. Hamilton students have also been recognized for their outstanding achievements in physics. Brandon Collings, a 1994 graduate, received the Apker Award of the American Physics Society, which is given to the top undergraduate physics student among all U.S. colleges and universities that do not grant doctoral degrees. Additionally, three Hamilton graduates have been named finalists.

Other examples of Hamilton's commitment to science include:

•A new $60 million integrated Science Center, the largest building project in the history of the college, opened September 2005. The building was designed with special consideration toward encouraging interdisciplinary work, especially in the areas of neuroscience, environmental studies and biochemistry.

•The sciences at Hamilton have grown tremendously over the past decade. The Hamilton summer science research program has evolved during this period from 20 students to more than 70; faculty participation has doubled from 13 to 26.

•For the four classes of 2003-06, the number of chemistry graduates has increased to an average of 18 per year. The number of physics graduates has increased to an average of seven per year.

•Professor of Chemistry George Shields, with funding from the National Science Foundation and the Camille and Henry Dreyfus Foundation, initiated an intensive summer research program for entering first-year students designed to retain women and minority science majors and to increase the number of science graduates who pursue graduate programs.

GOLDWATER SCHOLAR

Daniel Griffith '07 has been named a Barry M. Goldwater Scholar for the 2006-07 academic year. This scholarship is the premier national undergraduate award in the fields of mathematics, the natural sciences and engineering. Hamilton College students have won seven Goldwater Scholarships since 2001. All seven demonstrated their research aptitude through working with chemistry faculty.

Goldwater Scholars were selected on the basis of academic merit from a field of 1,081 mathematics, science and engineering students who were nominated by the faculties of colleges and universities nationwide. This year 323 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.

A chemistry major at Hamilton, Griffith plans to pursue a research career in the field of organic synthesis. He worked on research projects with Professors Kirschner and Shields in the summer of 2004 and during the 2004-05 academic year. He worked with Professor Rosenstein on organic synthesis research during the summers of 2005 and 2006. He recently co-authored a paper in the *International Journal of Quantum Chemistry* on his research with Professors Kirschner and Shields. He is a member of the varsity golf team, the Newman council, and the Scrabble club, and he has hosted a sports talk show on WHCL, Hamilton's student radio station. He also was a trip leader for Hamilton's alternative spring break in 2004, 2005 and 2006.

Pictured above are Hamilton Chemistry Summer Research Students, 2006.

ELGREN PROMOTED TO FULL PROFESSOR

Associate Professor of Chemistry Tim Elgren was promoted to full professor last summer. Elgren received his Ph.D. from Dartmouth College and brought his expertise in biophysical chemistry to Hamilton in 1993. His current efforts are dedicated to the examination of metalloproteins encapsulated in sol-gel glasses. The porous nature of these materials allow the encapsulated enzymes to retain their catalytic functions. The transparent materials also allow for the study of the properties of these enzymes using spectroscopic methods. Elgren has received numerous grants and has published articles in the *Journal of the American Chemical Society*, *Biochemistry*, *the Journal of Chemical Education*, and *The Chemical Educator*. He is the past president of the Council on Undergraduate Research.

Elgren was instrumental in obtaining a $500,000 Department Development Award from Research Corporation (RC) to increase faculty and technical staffing in the chemistry and physics departments. He recently received a $259,000 award from the National Science Foundation in support of his continuing research. Congratulations to Professor Elgren on a well-deserved promotion!

STUDENT AWARDS

Class and Charter Day and Commencement 2006 Award Recipients: Marco Allodi '08: Was Los honor society; **Kristin Alongi** '08: The American Chemical Society and Joint Polymer Education Committee Award; **Amy Barrows** '08: The Coleman Burke Prize Scholarship; **Amanda Bennett** '06: The William Rosenfeld Chapbook Prize in Creative Writing; The Rose B. Tager Prize; **Valery Danilack** '06: Phi Beta Kappa; The Senior Prize in Biochemistry/Molecular Biology; The Senior Prize in Dance; Captain Gerald Fitzgerald Dale Senior Scholarship; Summa cum Laude; Honors in Biochemistry and Molecular Biology; Honors in Dance; **Ashley Deline** '06: The Frederick Edmund Alexis Bush Award (for leadership in the Student Assembly); **Meghan Dunn** '06: The Norton Prize (Outstanding Researcher in chemistry); Elihu Root Fellowship; cum Laude; Honors in Chemistry; **Maxwell Falkoff** '08: The Robert Leet Patterson Prize Scholarship in Philosophy; **Amber Gillis** '06: cum Laude; Honors in Biochemistry/Molecular Biology; **Helena Grabo** '06: Phi Beta Kappa, The Underwood Prize in Chemistry (Top Chemist); Magna cum Laude, Honors in Chemistry; **Daniel Griffith** '07: The Donald J. Denney Prize in Physical Chemistry; The Barry M. Goldwater Scholarship; **Andy Glossner** '06: cum Laude; Elihu Root Fellowship; Honors in Chemistry; **Anne Kurtz** '06: Elihu Root Fellowship; Honors in Chemistry; **Karilyn Larkin** '06: Phi Beta Kappa; Magna cum Laude; Honors in Chemistry; **Rebecca Mackenzie** '08: The Coleman Burke Prize Scholarship; **Grant McSurdy** '06: Phi Beta Kappa; Magna cum Laude; Honors in Chemistry; **Daniel Seeger** '06: Phi Beta Kappa; The Mary McMaster Hallock Prize in Science; The Underwood Prize in Chemistry (Top Chemist); Summa cum Laude; Honors in Chemistry.

Sigma Xi:
Valery Danilack, Meghan Dunn, Helena Grabo, Andy Glossner, Anne Kurtz, Karilyn Larkin, Grant McSurdy and Dan Seeger.

Congratulations to all graduates in chemistry, chemical physics, and biochemistry from the class of 2006: Amanda Bennett, Valery Danilack, Ashley Deline, Andrew Downey, Meghan Dunn, Amber Gillis, Helena Grabo, Andy Glossner, Anne Kurtz, Grant McSurdy, and Dan Seeger

SEMINAR SCHEDULE SPRING 2007*

January 19 & January 26
Senior Thesis Progress Reports

February 2
Keith Broekhuizen, Dept. of Chemistry, Colgate

February 9
Mary Carroll, Dept. of Chemistry, Union College
"Understanding Aerogel Materials Through the Use of Luminescent Probes

February 16
Sylvia Ceyer, Dept. of Chemistry, MIT
New Surface Reaction Mechanisms: Role of Bulk H in Catalytic Hydrogenation and F Atom Abstraction by Si"

March 2
Dan O'Leary, Dept. of Chemistry, Pomona College
"New NMR Methods for Detecting Hydrogen Bonds in Organic Molecules: Stereochemical Applications"

March 30
Derek Tan, Memorial Sloan Kettering Cancer Center
"Diversity and Design: New Small Molecule Probes for Biology and Medicine"

April 6
Sean Decatur, Dept. of Chemistry, Mt. Holoyoke College

April 13
Charles Clapp, Dept. of Chemistry, Bucknell University
"Mechanistic Studies of Soybean Lipoxygenase-1"

April 20
Bruce Ganem, Dept. of Chemistry, Cornell University
"Studies on Multiple Component Condensation Reactions"

April 26 (4:00 p.m.) **& April 27** (3:00 p.m.)
Senior Thesis Presentations

*All events at 3:00 p.m. Fridays (except where noted).
Science Center Room G041, Refreshments Served at 2:45 p.m.

SUMMER CONFERENCES AT HAMILTON

5th Annual MERCURY Conference a Hit at Hamilton: Conference Promotes Undergraduate Research in Computational Chemistry

Members of the 2006 MERCURY Conference at Hamilton.

Wednesday July 26 through Friday July 28, Hamilton played host to the fifth annual MERCURY (Molecular Education and Research Consortium in Undergraduate Computational Chemistry) Computational Chemistry conference.

The MERCURY group is an organization of investigators, faculty and undergraduate students, at eight liberal arts colleges in the United States. Their annual conference is designed to promote undergraduate research in computational chemistry.

Lecturers included Dr. Andras Fiser of the Albert Einstein College of Medicine, Dr. Heather Gordon of the Center for Biotechnology at Brock University, Dr. Yvonne Martin from Abbott Laboratories, Dr. Hugh Nymeyer from Florida State University, Dr. Jeff Saven from the University of Pennsylvania, and Dr. Dagmar Ringe from Brandeis University. The speakers concentrated their discussions on bioinformatics, structural biochemistry, protein folding, and computer-aided drug design.

Thursday afternoon the students gathered in the Science Center's Kennedy Auditorium to give short talks about their research. After an hour and a half of presentations, the students mingled during an interactive poster session.

The Hamilton students were especially colorful, thanks to the production of a team shirt. Bright, Hamilton blue, the shirts announced "Shieldslab" on the back. The front was embellished with a quotation from Jim Morrison: "love is hidden in molecular structure" and a heart with an organic molecule in the center.

Although the MERCURY consortium consists of eight U.S. colleges, the attendees were from all over. The poster session featured such diverse locations as Brock University in southern Ontario, and from the Technische Universitat Graz, Austria.

The MERCURY conference included 24 Hamilton students: 17 current students, four recent graduates, and three recipients of the STEP/Dreyfus grant, which allows the students five weeks of summer research before they matriculate.

Colgate-Hamilton Organic Group Conference

While the large MERCURY conference was going on next door, another, smaller group of students also met at Hamilton for a science conference. This was the Colgate-Hamilton Organic Group conference, the creation of four professors at the two institutions for their organic chemistry students.

The conference is roughly 10 years old. It came into existence when the Silas D. Childs Professor of Chemistry Robin Kinnel broached the subject to Colgate's Professor John Cochran. Kinnel wanted to bring research students together for a symposium. Cochran, who has since retired, put Kinnel in touch with Colgate professor Ernie Nolan and the two professors worked out what would become the CHOG conference.

The group meets most summers. Kinnel estimates that they have met eight times in the past 10 years, alternating host privileges between the schools. Since the beginning, it has always been an afternoon of talks followed by a group meal. Kinnel feels that this is evidence of a spirit of academic cooperation between the two schools. Certainly it gives the students the opportunity to share their research with a wider audience, which was Kinnel's intention when he began the conference.

Over the years there have been few changes. What "evolution" has occurred has been two-fold. Kinnel, and Ian Rosenstein, associate professor of chemistry, the other Hamilton organizer, see a slight increase in the number of participating students, although this is due more to the movements in the departments than to any larger trend. There is also more mixing between the representative students, which clearly pleases both professors. Kinnel recalls one year where the Colgate students stayed at Hamilton watching movies until midnight.

Colgate and Hamilton students participated in annual conference.

From the students' end, CHOG is a taste of a professional conference. They each assemble a power-point presentation about their research and give a 15-minute talk and question session in one of the Science Center lecture halls. The students prepare on their own and most do their presentations without asking their professors for help. This kind of group presentation is as much part of what a scientist does as 10 weeks of lab research, and it gives the students the "conference" experience to go with the "lab" one. As Kinnel put it, "the show is the students."