

GOESSMANN

gazette



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NEW BUILDING TO INTEGRATE CHEMISTRY AND LIFE SCIENCES

Shannon Reilly, one of our best chemistry students, cannot seem to get to class on time. As a double major in Chemistry and Biochemistry, she can often be found schlepping back and forth across campus between Goessmann Chemistry Lab and Morrill Life Science Center. The distance between these buildings reflects the boundaries we create between fields of science. Students like Shannon Reilly remind us that Mother Nature has no such boundaries. To nurture cutting-edge teaching and research that builds bridges between fields, UMass Amherst is moving forward on plans for a major new “Integrated Science Building.”



Plan for ISB facade.

The Integrated Science Building (ISB) will forge a new model of science that integrates the life, chemical and physical sciences, with Chemistry playing its critical role as the “central science.” The ISB will provide state-of-the-art teaching

MAY I HAVE THE ENVELOPE PLEASE? AND THE WINNER IS ...

One of this year’s UMass Amherst Distinguished Alumni Awards go to ... (drum roll please) ... a CEO, a father, a husband, a philanthropist and a scientist. He is our very own Dr. David J. Mazzo (Chem PhD ’84)!



Dr. David J. Mazzo, Ph.D. '84

The UMass Amherst Alumni Association established the Distinguished Alumni Award to recognize outstanding achievements – either professional or in the realm of campus or public service. The award honors alumni who have attended UMass Amherst and who have translated their UMass Amherst experience into distinguished service.

Dr. Mazzo is a prominent scientist, a highly successful business executive and an excellent educator. He started his career as a research chemist in 1983 and in twenty years has risen to the top of several corporate ladders to become the current President and CEO of a major pharmaceutical company, Chugai

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Alumni Reunion 2005
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AFTER ALL THESE YEARS AT UMASS AMHERST, STEIN AND RICHASON STILL HAVE GREAT CHEMISTRY

2004 Reunion Honors Legendary Careers of Two UMass Amherst Chemists



Professors Richard S. Stein and George R. Richason

As with fine wine, some things do get better with time. Such is true for the careers of UMass Amherst Chemistry Professors **Richard S. Stein** (Honorary Alumnus, '84) and **George R. Richason, Jr.** (Chem BS '37, MS '39, Honorary Doctorate '91), who together have devoted more than a century to UMass Amherst. To celebrate their remarkable achievements, over 130 alumni and friends of the Chemistry Department reunited on June 5, 2004 in Lederle Tower. The reunion will likely be viewed as an historic event in its own right, with many of Amherst's heavyweights attending to honor **Profs. Stein and Richason.**

The reunion began with a reception involving remarks from UMass Amherst **Chancellor John Lombardi** and **Congressman John Olver**, himself a former Chemistry professor at UMass Amherst from 1961 to 1968. **Professor Bret Jackson**, Head of Chemistry, then offered a glimpse into the state of the department, highlighting recent achievements in teaching and research excellence. This was followed by remarks from **Prof. Lee Osterweil**, Dean of Natural Sciences and Mathematics, regarding the community of chemists that has been fostered at UMass Amherst. **Professors Stein and Richason** were then awarded the first annual "World Awards," involving globes fabricated by local artist, **Josh Simpson**. Upon receiving his award, **Prof. Stein** thanked his coworkers for their commitment to polymer research, and for returning to UMass Amherst. **Professor Richason** paid tribute to his mentor, **Richard "Doc" Fessenden** (Chem BS '26, MS '28), whose son, **Richard Fessenden** (Chem BS '55), was in attendance. **Professor Richason** also thanked **Bill Donovan** (Chem BS '63) for founding the Richason Lab Fund.



Prof. Stein chats with friends.

The crowd was then treated to a terrific lecture from **Prof. Dave Adams** (Chem BS '67), our most recent winner of the UMass Amherst Distinguished Teaching Award, the campus's highest honor for educators. **Professor Adams'** lecture was entitled: "Professors Richason and Stein, Groundbreakers in Chemistry at UMass Amherst." The lecture featured rich historical anecdotes from the time of Goessmann right up to the present, chronicling the fantastic and often intertwined careers of **Profs. Richason and Stein**, two people who created much of the excellence we now take for granted in Chemistry at UMass Amherst.



Prof. Richason shares his latest award.

Senator Stan Rosenberg (BA '77) then presented special citations to **Profs. Richason and Stein** from the Massachusetts Senate, honoring their many contributions to the Commonwealth.

Reunion attendees were offered a tour of Chemistry facilities led by **Professors Venkataraman, Lillya and Thayumanavan**, ending with a polymer research poster session presented by several attendees of the Stein reunion.

At the same time, many reunion attendees offered their own sentiments to **Profs. Richason and Stein**, by making Toasts and Roasts. These were presented by **Bob Goodhue** (BA '70, MS '80) on behalf of **UMass President Jack Wilson**, **Bill Mahoney** (Chem BS '55) for himself and also on behalf of his brothers **Dick** (Chem BS '55)

and **Bob Mahoney** (Chem BS '70), **Mina Lussier** (BA '63) and **Sam Lussier** (BS '63, MS '65), **Mike Kestigian** (Chem BS '52), **Lila Gierasch**, **Dave Sikora** (Chem PhD '82), **James "Trip" Treml**, **Francis McInerney** (BA '54, MS '58), **Ron Archer** and **Dave Curran** (Chem BS '53). **Bill Mahoney** read **Bob Mahoney's** toast, which offered two hilarious hypotheses regarding the biochemistry behind the ageless **George Richason**. **Bill Mahoney** also presented a \$15,000 check to Chemistry for the **George R. Richason, Jr. Laboratory Fund**; \$5,000 from each of the three Mahoney brothers. This fund, which is presently just above \$181,000, must reach \$250,000 before the naming of the Richason Lab can be made official. Please see www.chem.umass.edu for information on making your gift to the Richason Lab Fund.

editorial ANNOUNCEMENT

This issue of the Goessmann Gazette features a new format where Alumni News is organized by research group (please see Lab Notes on page 5). This should make it easier to find news about your colleagues and labmates. We hope you enjoy this new format! Let us know if you like it by sending an email to ggazette@chem.umass.edu.

The reunion ended with **Prof. Jackson** thanking all those who attended, and those who made the event possible, not least being **Profs. Richason** and **Stein**. **Professor Jackson** also thanked the assembled crowd for their support now, in the past, and especially in the future, because the legacies created by **Profs. Stein** and **Richason** are strong, and will continue to grow with our hard work and with your current support.

ALL ALUMNI ARE CORDIALLY INVITED TO CHEMISTRY ALUMNI REUNION 2005

Honoring Professors Peter Lillya and Marvin Rausch

YOU are cordially invited to the next Chemistry Reunion on Saturday, June 4, 2005, in room 1634 of the Lederle Graduate Research Tower from 2-5 p.m. This event is part of the campus-wide Alumni Weekend. Chemistry Reunion 2005 will honor two of Chemistry's towering figures: **Professors Peter Lillya** and **Marvin Rausch**, people who defined organic and organometallic chemistry at UMass Amherst for the past three decades.



Profs. Peter Lillya and Marvin Rausch

You are also invited to the Research Symposium to be held in honor of Profs. Lillya and Rausch on Friday, June 3, 2005, at 2-6 p.m. in room 1634 of the Lederle Graduate Research Tower. Speakers include Prof. Robert Crabtree (Yale University), Prof. David Collard (Georgia Tech), Dr. Arthur Kluge (GPC Biotech), Dr. Larry Klemann (Kraft Foods) and Prof. John Esteb (Butler University), and Prof. Donald Hunt (University of Virginia).

We plan the following schedule of events, open to all students, faculty, staff, alumni and friends:

Friday, June 3, 2005

2-5 p.m. Research Symposium

5-6 p.m. Poster Session Featuring the Work of Current Students at UMass Amherst

Saturday, June 4, 2005

2-3 p.m. Reception for Professors Lillya and Rausch

3-4 p.m. Historical Anecdotes by Prof. Paul Lahti and others

4-5 p.m. Social Hour

Please RSVP to Ms. Susan Pixley by phone at 413-545-2585 or by email at spixley@chem.umass.edu. For more information about the reunion weekend including lodging information, call Ms. Susan Pixley or visit our website at <http://www.chem.umass.edu/Alumni/>.

The Reunion will take place in Lederle Tower room 1634. Lederle Tower is just north of Goessmann Laboratory; room 1634 is on the 16th floor. We hope to see you all there in June 2005!

GEO-CENTERS, INC.

Makes a Major Gift to UMass Amherst Chemistry

The Chemistry Department of the University of Massachusetts Amherst is pleased to announce receipt of a major gift of \$250,000 from Newton, MA based GEO-CENTERS, INC. In announcing the gift, **Prof. Bret Jackson**, Department Head, thanked **Dr. Edward P. Marram**, UMass Amherst alumnus and CEO of GEO-CENTERS, for his past and current support of the Chemistry Department. This gift will be used for providing equipment purchase and laboratory renovation start-up funds for new Chemistry faculty members. A portion of the funds has been allocated to the new George R. Richason Jr. Laboratory, where **Associate Professor Mike Barnes** is now setting up his research group.

Dr. Marram received his BS degree in chemistry in 1959, and a MS in physics in 1961, both from UMass Amherst. He worked with **Prof. John Ragle** for the MS degree, entitled: "Studies in Nuclear Quadrupole Resonance Spectroscopy." **Dr. Marram** is presently a member of the Advisory Council of the College of Natural Sciences and Mathematics at UMass Amherst.



Dr. Marram is the founder, President, and CEO of GEO-CENTERS, INC., a high-technology, professional services firm. GEO-CENTERS, INC., which was started over twenty-five years ago, is a privately held company with over 950 employees with forty work locations in sixteen states. GEO-CENTERS, INC. has shown an increase in annual revenue from \$1 million in 1980 to over \$91 million in 2001. The company's areas

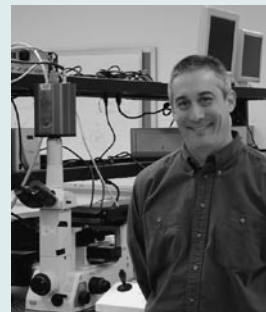
of expertise include chemical and materials research and development, epidemiology, toxicology, biomedical research, human performance testing, biological and chemical sensors, environmental remediation, and defense and civilian scientific policy. Drawing on its strengths in the above areas, GEO-CENTERS, INC. has emerged as a leader in research in the defense and homeland security areas.

GEO-CENTERS, INC. encourages community involvement of time and money. The corporate office in Newton makes financial gifts to groups such as Narcanon, The Museum of Science in Boston, The UMass Athletic Fund, The Corcoran Gallery of Art, the University of Massachusetts Amherst Children's Hospital, the New England Aquarium, the Massachusetts Firefighters, and the Newton, Massachusetts police department.

Chemistry Department Head, **Prof. Bret Jackson** commended GEO-CENTERS, INC. for providing the support that enables UMass Amherst Chemistry to maintain its leading position in teaching and research.

new FACULTY

Michael Barnes joined the Department as an Associate Professor in September 2004. Professor Barnes moved to UMass Amherst after 13 years at Oak Ridge National Laboratory as a Senior Staff Scientist. Professor Barnes received his PhD in 1991 from Rice University working with Philip Brooks and Robert Curl, and was a postdoctoral associate at Oak Ridge National Laboratory under the supervision of Dr. Mike Ramsey. Professor Barnes' research interests are in single-molecule spectroscopy and chemical microscopy of conjugated organic systems, with an emphasis on nano-optics and quantum informatics. His work was recognized by several Oak Ridge National Laboratory R&D achievement awards, and two recent patents on use of ink-jet printing methods for preparing polymer meso- and nano-structures for optics applications. Professor Barnes moved to Amherst with his wife, Carolyn, and his two sons, Austin and Curtis.



Professor Michael Barnes

labNOTES

In the Auerbach lab ...

Scott Auerbach was promoted to full professor in September 2004. He was awarded a new grant for \$304,000 by the Department of Energy to study “Multi-component Transport through Zeolite Membranes,” in collaboration with **Prof. Curt Conner** of the Chemical Engineering Department. Professor Auerbach co-edited the “*Handbook of Layered Materials*,” published in 2004 by Marcel-Dekker. He also published a dozen articles in 2004, including one with **Cristian Blanco** (PhD '03) on “*Simulating Microwave-Heated Diffusion in Zeolite Nanopores*” in the Journal of Computational and Theoretical Nanoscience. Prof. Auerbach gave invited lectures on his group’s research at the European Center for Molecular Calculations in France, and at the American Institute of Chemical Engineers (AIChE) meeting in San Francisco.

Leanna Toy, Aldo Combariza, Matt Ford and **Miguel Jorge** presented posters at UMass Amherst’s first annual MassNanoTech Conference. During the 2004 Chemistry Research Symposium, **Matt Ford** lectured on “*The Mechanical Properties and Phase Behavior of Silica.*” **Matt** lectured at the San Francisco AIChE meeting on the same subject.

Tim McIntire (BS '02) is attending graduate school to become a high school chemistry teacher. **Imona Omole** (BS '04) is working towards his PhD at Georgia Tech. **Terry Moniz** (BS '04) is going to dental school at Tufts. **Melissa Allen** (MS '01) attends Suffolk Law School, and has married UMass Amherst Physics alum **Jon Celli**. **Dr. Cristian Blanco** (PhD '03) returned home to Colombia to become a chemistry professor at the Industrial de Universidad Santander.

An article by **Cristian Blanco** and Prof. Scott Auerbach was featured on the cover of the Journal of Physical Chemistry B. This article reported on molecular

dynamics simulations of zeolite–nanoporous solids–driven by microwave radiation. **Blanco** and Auerbach’s simulations predicted that comparable experiments might produce new and energy efficient separation technologies, by focusing energy in a targeted portion of the whole system.

In the Barnes lab ...

Professor Barnes was awarded a new grant for \$660,000 from the Department of Energy to study “*Chemical Microscopy of Macromolecules: Designing Nanoscale Optical Networks*,” in collaboration with **Prof. Paul Lahti**. This spring, Prof. Barnes will co-chair a 3-day symposium on “*Nanophotonic Materials and Methodologies*” at the American Physical Society national meeting in Los Angeles.

The Barnes group has been very busy transforming the **Richason Lab** (Goessmann 256) into a modern laser lab. We have added a 2000 pound (!) optical table, two microscopes with state-of-the-art imaging, and our large-frame ion laser (thanks to **Paul Lahti** and others). We have several collaborations underway with **Profs. Lahti, Venkataraman, Thayumanavan** and **Emrick** (Polymer Science and Engineering), and have obtained very exciting data on “*single-molecule circular dichroism.*”

The Barnes group is now composed of **Benjamin Vanderpuije, Carolina Tomczyk** (joint with **Prof. Venkataraman**), **Michael Odoi** and **Ruthanne Hassey**.

*Not available
for web.*

chemprep/general CHEMISTRY

Professors *Roberta Day*, *Beatrice Botch*, *Steven Hixson*, *Peter Samal*, and *David Hart* (Computer Science) are co-investigators on ChemPrep, a grant funded by the University of Massachusetts Information Technology Council to create and deliver two self-paced chemistry courses to help improve student preparedness for first semester general chemistry and first semester organic chemistry. These courses are delivered over the web using the OWL (Online Web-based Learning) system developed at the University of Massachusetts Amherst. ChemPrep/General Chemistry covers topics such as the structure of matter, algebra, significant figures, nomenclature and dimensional analysis. ChemPrep/Organic Chemistry covers general chemistry concepts such as Lewis structures, formal charge, molecular geometry, hybridization and acid/base theory. Each course is designed to take ten to twenty hours to complete and is offered prior to the start of the semester. Evaluation studies of the Spring '04 semester show that for those students who completed more than half of the ChemPrep units, course grades and retention rates in the subsequent chemistry courses were higher. Evaluation studies for the Fall courses are underway. The Department is excited about the interest students have shown for the ChemPrep courses (students voluntarily participated at a rate of 5 to 22% for the 6 different courses offered this fall) and for their potential in helping to improve the success rate in chemistry.

In the Bianconi lab ...

Professor Bianconi and coworkers have completed studies on the conversion of polymer precursors to diamond and silicon carbide ceramic films. These studies were published in the *Journal of the American Chemical Society* and in *Advanced Materials*.

In the Holmes lab ...

Professor Emeritus Holmes continues his research on “*Hypervalent Cyclic Oxyphosphoranes as Catalytic Reaction Intermediates*” supported by the Petroleum Research Fund. Studies recently performed with **Dr. A. Chandrasekaran** and **Natalya V. Timosheva** appeared in the October 2004 issue of *Accounts of Chemical Research*, entitled “*Phosphoryl Transfer Enzymes and Hypervalent Phosphorus Chemistry*.”

Professor Holmes was the keynote speaker at the 7th International Conference on Heteroatom Chemistry held in Shanghai, China, August 2004. At a special dinner for plenary lecturers and guests, Prof. Holmes was surprised when everyone stood up to sing happy birthday (in English) as a lovely decorated cake was placed at his table in honor of his 76th birthday. While

in China, he was invited to present the keynote lecture at the forthcoming International Conference on Phosphorus Chemistry, planned for Fall 2007 in China. Professor Holmes continues as Editor-in-Chief of the journal *Phosphorus, Sulfur and Silicon and the Related Elements*, a position he has held for the past 17 years.

Last summer Prof. Holmes' 17 year old granddaughter, **Kelsey Jones**, completed a chemistry project in **Prof. Bill Trogler's** laboratory on nanoparticles, which she plans to use in the San Diego science fair competition. **Dr. Trogler** said **Ms. Jones'** level of research competence equals that of a beginning graduate student, rather than a beginning college student!

In the Jackson lab ...

In addition to being Head of the Chemistry Department, Prof. Jackson continues to receive generous research funding from both the Department of Energy (18th year) and the National Science Foundation (NSF) for theoretical studies of reactions on metal catalysts. The NSF gave Prof. Jackson two recent “Extensions for Special Creativity,” a rare honor indeed. He has recently given several invited lectures, including two at Gordon Conferences (“*Surface*

Dynamics” and “*Molecular Energy Transfer*”), the “*Conference on the Dynamics of Molecular Collisions*,” lectures in Germany, and the “*van Marium Colloquium*” in Leiden, The Netherlands. Professor Jackson was also recognized by the 2004 Who’s Who Among America’s Teachers Award. Graduate student **Joe Quattrucci** has recently published his third article on reactions of hydrogen atom beams with chlorine-covered gold metal surfaces, and is expected to defend his PhD this year.

In the Kaltashov lab ...

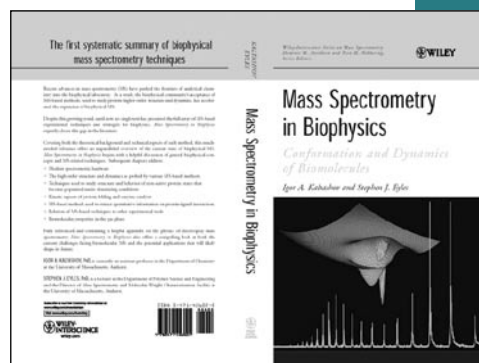
Professor Kaltashov was awarded \$357,000 by the National Science Foundation to develop mass spectrometry approaches for studying “*Architectures and Dynamics of Proteins and their Assemblies in Solution*.” The Kaltashov group has partnered with Amgen, a pharmaceutical company, which provided \$35,000 to study the behavior of immunoglobulins. Professor Kaltashov also received \$450,754 from the National Institutes of Health to purchase an electrospray mass spectrometer to serve diverse needs of NIH-funded faculty

members at UMass Amherst.

Professor Kaltashov has recently been invited to speak at the Ångström

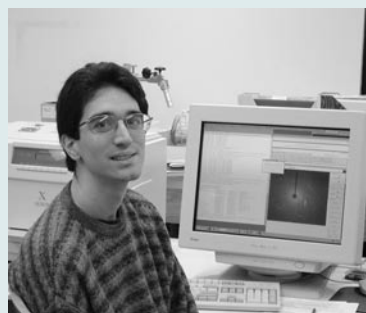
Ion Physics Institute in Uppsala, Sweden. Graduate students **Wendell Griffith**, **Hui Xiao**, **Joshua Hoerner**, **Mingxuan Zhang** and **Anirban Mohimen** presented posters at the 52nd *Conference on Mass Spectrometry* in Nashville, TN. Professors Kaltashov and Eyles (Polymer Science) completed their book entitled “*Mass Spectrometry in Biophysics: Conformation and Dynamics of Biomolecules*,” to be published in April 2005 by John Wiley & Sons, Inc.

Two PhD students defended their dissertations in 2004 and obtained excellent jobs: **Anirban Mohimen** as a Senior Research Scientist at Schering Plough Research Institute, and **Hui**



new FACULTY

The Department recently welcomed **Peter Khalifah**, who began work as a crystallographer and Lecturer in September, 2004. Dr. Khalifah came from Oak Ridge National Laboratory (ORNL) where he specialized in the electronic and magnetic characterization of extended solids, as part of the Correlated Electronic Materials group under Dr. David Mandrus. While at ORNL, Dr. Khalifah was actively involved in neutron and x-ray and scattering experiments at their High Flux Isotope Reactor and High Temperature Materials Laboratory. Prior to that, he was the first PhD student of Prof. Robert Cava at Princeton University, learning solid-state synthesis techniques from the researcher who holds patents on two of the most important superconductors, YBCO and BSCCO. Dr. Khalifah’s current research interests include orbitally ordered solids, metal-metal bonding within solid state materials, next generation dielectric materials, magnetic influences on the Hall effect, chemically informative band structure calculations, and interfacing a diverse range of electronically active crystalline materials with polymeric and/or nanoscale partners. Although he is proud of his recent Science and Nature publications, his greatest accomplishment since moving to Amherst is solving the “two-body problem” of finding a job close to his wife, Prof. Surita Bhatia of the UMass Amherst Chemical Engineering Department.



Professor Peter Khalifah

Xiao as a post-doctoral fellow at Albert Einstein School of Medicine. **Dr. Dmitry Gumerov** (PhD '03) is now with Bruker Daltonics; **Kimberly Dickson** (BS '04) was accepted to the graduate program in Forensic Science at John Jay College of Criminal Justice; **Kathleen Ryan** (BS '03) is continuing her graduate studies in Chemistry at Penn State.

In the Knapp lab ...

Professor Knapp received a grant from the American Cancer Society to study proteins involved in the sensing of hypoxia (low oxygen concentration). Hypoxia sensing is involved in blood-vessel development, and may present a target for anti-cancer therapies. Professor Knapp also inaugurated the UM-PETS outreach program with **Prof. Thayumanavan** in Fall 2004 (see below). UM-PETS is off to a tremendous start, providing high school students with exposure to a broad variety of scientific disciplines.

Undergraduate **Todd Ratajczak** was awarded a Commonwealth College Research Assistant Fellowship for 2003-2004. This supported **Todd's** research on the synthesis of oxidation catalysts. Another undergraduate, **Tom Vargo**, was awarded an ARIAD Scholarship in Chemistry, from ARIAD Corp. **Tom**

works on proton-coupled electron transfer chemistry.

In the Lahti lab ...

Professor Lahti was appointed Associate Dean for Facilities in the College of Natural Sciences and Mathematics, beginning summer 2004. Professor Lahti received a grant from the National Science Foundation for \$381,000 to study "*Synthesis and Characterization of Organic-Based Molecular Magnetic Materials.*" Professor Lahti also received a "*Japan Society for the Promotion of Science*" award for a lecture tour in Japan during October 2004. He delivered lectures at Tsukuba, Keio University, Waseda University, Tokyo University, Kyushu University, Mie University, Osaka University and Osaka City University. These lectures described his group's study of molecular magnetism, light-emitting organic molecules and polymers, and high-spin open-shell molecules studied by electron spin resonance spectroscopy. Just after these talks, he heard that the Boston Red Sox had taken out the New York Yankees in seven games — nice end to the lecture tour!

Graduate student **Hemali Rathnayake** was awarded a Best Poster prize at the 2004 Chemistry Department Posterfest. Her poster was entitled, "*Color*

UM-PETS

(UMass Amherst Program for Encouraging Tomorrow's Scientists)

Two of our faculty members (*Michael Knapp* and *S. "Thai" Thayumanavan*) have launched a new outreach program for local area high school students, UM-PETS. The main objective of this program, which started in Fall 2004, is to encourage talented high school students to pursue future careers in basic sciences. The program identifies talented high school sophomore or junior students through recommendations from their teachers and a standardized examination. The program then offers Saturday classes in a variety of areas in science and engineering. During Fall '04, classes were offered in Biology ("The Human Genome and You"), Chemistry ("Discovering Chemistry"), and Astronomy ("Radio Astronomy: Revealing the Invisible Universe") by faculty members from the respective departments. The Chemistry course was offered by our own Dr. Justin Fermann. More details about the program can be found at the program's web site <http://www.umass.edu/umpets>.

UMass Amherst Chemistry Alumnus, Jonathan J. Wilker, Flexes his Chemistry Mussels

Jonathan J. Wilker (Chem BS '91), an assistant professor of chemistry at Purdue University, has generated a lot of excitement with his studies of marine adhesives. Prof. Wilker and his coworkers report in a paper published in *Angewandte Chemie* ["Metal-Mediated Cross-Linking in the Generation of a Marine Mussel Adhesive," Mary J. Sever, Jaime T. Weisser, Jennifer Monahan, Shalini Srinivasan, and Jonathan J. Wilker, *Ang. Chemie Int. Ed.* 43, 447 (2004)] that the glue that mussels use to adhere to rocks, boats and other surfaces is generated from proteins by an iron-catalyzed reaction with oxygen. The work has potential applications for the development of anti-fouling paints that prevent organisms such as barnacles and mussels from attaching to ships, etc., in corrosion-prevention, and as strong, non-toxic surgical glues that may one day replace stitches in closing wounds and incisions. This research was covered by several news agencies including UPI, Reuters, and ABC News, which interviewed Prof. Wilker in a broadcast carried locally by WGGB in Springfield. Following his UMass Amherst research in Prof. Maroney's bioinorganic chemistry laboratory, Jon received a PhD for work carried out in Prof. Stephen J. Lippard's lab at MIT. Jon then joined the lab of Prof. Harry B. Gray at CalTech for postdoctoral research before moving to Purdue in 1999. His interest in marine adhesives was inspired by a blending of two passions: bioinorganic chemistry and scuba diving. Prof. Maroney recalls that the only thing that could draw Jon out of the lab was coaching a women's softball team. His former mentor says "Jon has made a strong contribution with his mussels, and I hope he will stick with it." Prof. Wilker is currently in the tenure process at Purdue and has received the support of his Department. We wish him continued success.



Jonathan Wilker collecting zebra mussels from a freshwater lake in northeast Indiana. Credit: Jonathan Wilker of Purdue University, NSF.

Tuning Conjugated Oligomers through Functional Group Modifications.

In the Maroney lab ...

Professor Maroney's group continues its research directed at understanding the roles of metals in biology, with an emphasis on the biochemistry of nickel. Current projects include studies of the structure and function of nickel superoxide dismutase (NSF), the structural parameters involved in nickel trafficking proteins (NIH) and the structure and function of cysteine dioxygenase, a non-heme iron metalloenzyme (PRF). In addition, the group continues to study aspects of the chemistry of NiFe hydrogenases. Professor Maroney was a visiting lecturer sponsored by the Chemistry Research Promotion Center, National

Science Council, Republic of China in Spring 2004. He gave a series of lectures entitled, "Nickel Trafficking in *E. coli*," "NiSOD: A Novel Enzyme for Eliminating Superoxide," and "Structure and Function in Metalloenzymes: A Nickel Tour" at Academia Sinica, National Taiwan University, and National Tsing Hua University while he was in Taiwan. He was also an invited speaker in the Biochemistry seminar program at Washington University School of Medicine, in the Minority Access to Research Careers (NIH-MARC) Program at the University of Arizona, and at chemistry departments including the University of Texas at San Antonio and Union College.

Recent graduates of the group include **Gerry Davidson** (PhD '02), who is

currently an assistant professor at St. Francis University in Brooklyn, NY; **Paul Carrington** (PhD '03), a postdoctoral researcher at Rockefeller University; and **Faizah Al-Mjeni** (PhD '02), who is on the chemistry faculty at Sultan Quaboos University in Muscat, Oman. **Faizah** and former UMass Amherst Chemistry graduate student **John Husband** (Metz lab) are the proud parents of a daughter, **Noorah**, who was born November 19, 2004. Undergraduate researcher **Jacob Banik** (BS '04) is now in a graduate program at the University of East Anglia in Britain. On deck are **Peter Bryngelson** and **Sergio Chai**, who were both NIH Chemistry-Biology Interface Trainees in the group.

In the Martin lab ...

Graduate students **Peng Gong** and **Eddie Esposito** recently published back-to-back articles in the *Journal of Biological Chemistry* illuminating the transition of T7 RNA polymerase from an unstable,

initially transcribing complex to a fully stable elongation complex. In a collaboration between the Martin lab and that of newly hired Biochemistry & Molecular Biology **Prof. Karsten Theis**, **Peng Gong** also published a paper in the journal *Biochemistry*, proposing a new model to explain the massive structural change in the RNA polymerase that accompanies this important transition. All three studies, together with earlier fluorescence results from the Martin lab, are brought into in a unified mechanism in an upcoming issue of *Progress in Nucleic Acids and Molecular Biology*. Last Fall, **Eddie** and **Peng** presented these studies at the Biennial Meeting on Post-initiation Activities of RNA Polymerases in Mountain Lake, VA and will present these and more recent results at the Annual Meeting of the Biophysical Society in Long Beach, CA. Professor Martin is currently on sabbatical at the California Institute of Technology in Pasadena, CA.

DIVERSE TEAM OF UMASS AMHERST CHEMISTS WINS \$1.3M GRANT TO DETECT CANCER AND BIO-WARFARE AGENTS

UMass Amherst Chemistry *Professors Richard Vachet, Vincent Rotello, and Sankaran "Thai" Thayumanavan* have recently received a \$1.3 million research grant from the Office of Naval Research to develop more effective methods for measuring bio-warfare agents and related compounds collectively known as endocrine disrupting chemicals (EDCs). Exposure to these bio-warfare agents is, as yet, a rare occurrence, but developing the ability to detect these agents is critically important for protecting against the threat of biological weapons. Moreover, EDCs are increasingly found in environmental waters because wastewater treatments cannot completely remove these compounds. Effective detection of EDCs is important because exposure to these compounds is implicated in breast cancer, weakened immune systems, thyroid dysfunction, and reproductive problems in young adults.

To develop effective measurement approaches, the research team will combine UMass Amherst Chemistry strengths in nanotechnology and mass spectrometry. Nanoparticles designed with specific chemical groups will be synthesized to selectively concentrate the compounds of interest. These nanoparticles will then be controllably assembled into larger super-structures for analysis by mass spectrometry. New approaches to mass spectrometry based on laser irradiation will be developed to measure the bio-warfare agents and EDCs with unprecedented sensitivity.

Much of the grant will be used to support research assistantships for undergraduates, graduate students and postdoctoral fellows. The grant will also fund new equipment needed for detection technology, and also specialized chemicals used to make nanoparticles. This award further establishes UMass Amherst Chemistry as a rich source of interdisciplinary research in mass spectrometry and nanotechnology.

In the Metz lab ...

Professor Metz was awarded a new grant by the National Science Foundation to study the spectroscopy of intermediates and products of C-H and C-C bond activation of hydrocarbons by gas-phase transition metal cations and metal oxide cations. This award will allow the group to extend its previous studies of the electronic spectroscopy of these complexes to their vibrational spectra. Two recent invited review articles highlighted this work (in *International Reviews in Physical Chemistry*) and ongoing studies of solvation of multiply charged ions (in *International Journal of Mass Spectrometry*). **Kay Stringer** finished her dissertation in August 2004 and immediately moved to Austin, where she teaches General Chemistry and directs the General Chemistry labs at the University of Texas. **Fernando Aguirre** (PhD '02) works at Thiokol Propulsion in Utah – yes, it is rocket science. **Chris Laperle** (BS '99) just finished his PhD in chemistry at U.C. San Diego and will be starting a postdoc with **Prof. Rose-Petruck** at Brown. **John Husband** (PhD '02) and **Faizah Al-Mjeni** (PhD '02, Maroney group) teach at Sultan Qaboos University in Oman.

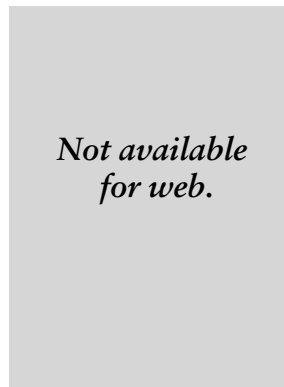
In the Rotello lab ...

Ayush Verma, a graduate student in our group, has been awarded a Sigma Xi Grant. Sigma Xi, The Scientific Research Society founded in 1886, is a non-profit membership society of more than 70,000 scientists and engineers who were elected to the Society because of their research achievements or potential.

Research in the Rotello group has recently been featured on the covers of two prominent journals (see figures). Nanoparticles provide key tools for bridging the gap between “bottom-up” synthetic methods and “top-down” fabrication. An account by **Roy Shenhar** and Prof. Rotello that describe some

of the unique structural aspects of nanoparticles and the use of these attributes to the creation of devices with tunable specificity and environmental response was

featured on the cover of the July 15, 2003 issue of *Accounts of Chemical Research*. The cover artwork was by **Nicholas O. Fischer** of the Rotello Group.



The January 21, 2005 issue of *Chemical Communications* features a review by **Ayush Verma** and Prof. Rotello that highlights some unique properties of nanoparticles

that make them particularly attractive resources for biomacromolecular recognition.

In the Stidham lab ...

The Stidham group completed a study of the vibrational spectrum of 1,3-dibromopropane, and the manuscript has been accepted for publication in *Spectrochim. Acta Part A*.

In the Thayumanavan lab ...

The Thayumanavan group enjoyed a productive, first full year at UMass Amherst. Several publications came out of the group in 2004. Most notably, the article on *Invertible Amphiphilic Homopolymers* (*Journal of the American Chemical Society* Year 2004, Vol. 126, Page 9890) was picked up as a highlight item by “Heart Cut”, a news weekly

published electronically by the American Chemical Society. Another paper by the Thayumanavan group (“*Dendrimers with Both Polar and Apolar Nanocontainer Characteristics*”, Journal of the American Chemical Society, Year 2004, Vol. 126, Page 15636) is being featured in the Research Advances section of the Journal of Chemical Education. In addition to giving several invited lectures within the United States, the highlight was an invited lecture at the MACRO 2004 polymer conference in India. Thai also organized a symposium on Molecular Mimicry of Photosynthesis at the National ACS Meeting in Philadelphia.

In the Thompson lab ...

Professor Lynmarie Thompson continues to direct the Chemistry Biology Interface (CBI) Training Program, a thriving community that now includes 25 research

groups from 5 different departments, and over 60 graduate students who benefit from the CBI curriculum. Her lab continues to use solid-state NMR and other biophysical methods to investigate mechanisms of transmembrane signaling in bacterial chemotaxis receptors. Dr. Thompson gave invited lectures at the 15th Conference for the International Society for Magnetic Resonance (ISMAR) in Tallahassee Florida, the Keystone Meeting on Frontiers of NMR in Molecular Biology in Banff, Canada, and for the departments of Chemistry at the University of Washington, Mt. Holyoke College, and Worcester Polytechnic Institute. Dr. Thompson is spending a sabbatical (January - July 2005) as a Visiting Associate in the laboratory of **Prof. Doug Rees** at the California Institute of Technology.

IT'S GOOD TO BE THE KING!

Richmond Ampiah-Bonney, a graduate student in the Chemistry Department, played the King in the Amherst Community Theater production of Rogers & Hammerstein's "Cinderella." In an article in the Amherst Bulletin by Phyllis Lehrer, Richmond said that although he was initially reluctant to act in the play because of his demanding graduate studies, he was glad that he did act, and ended up enjoying every minute of it. Lehrer writes, "Those who saw the show couldn't help but note his enjoyment on stage and his singing."

Richmond, a native of Ghana, is working toward his PhD with Prof. Julian Tyson on analytical and environmental chemistry. Richmond has an undergraduate degree from the University of Science and Technology in Ghana and a Master's degree from University of Hull in England. In the Amherst Bulletin article, Richmond says that he selected UMass Amherst because it was highly recommended by his professor in England. About the Chemistry Department, he said, "I have had a good experience here. The relationship between professors and students, you couldn't ask for more." Richmond also helps with the Science Technology Engineering and Mathematics Teacher Education Collaborative (STEMTEC), a program funded by the National Science Foundation. Through this program, Richmond works with middle-school and high-school students in Springfield, MA, introducing them to scientific questions and methods.

Richmond, who lives with his wife Olivia, his daughter Adwoa, and his sons Kodwo and Joojo, says that he looks forward to acting in future productions of the Amherst Community Theater. Talking in the article about his future after UMass Amherst, Richmond says that after his graduation, his goal is to return to Ghana, to teach at the university level. As to what kind of professor he will be, he says like his mentor, Prof. Tyson, "I want to establish a relationship with students so they could talk, tell me what they won't tell other teachers, confide in me and know that I won't betray their trust." When Richmond finishes his PhD, we suspect that his will be a hard act to follow!



Richmond Ampiah-Bonney

Syed Peeran completed his MS degree in the group during summer 2005 and immediately began to pursue a degree in medicine at New York Medical College.

Dan Fowler presented a poster on his (and Syed's) work characterizing the structure of the HAMP domain of the serine receptor by solid-state NMR at the Biophysical Society Meeting in Long Beach, California in February 2005.

Greg Gallagher published a paper in Biochemistry on a solid-state NMR spin diffusion method for characterizing structure in membrane-bound peptides.

Former lab members **Theresa DiMeo** (BS '04) started graduate studies at Tufts University. **Stacy Seeley** (PhD '96), now Associate Professor of Chemistry at Kettering University, had a baby girl in 2004. **Kristin Kumashiro** (postdoc 1995-96), now Associate Professor of Chemistry at University of Hawaii, also had a baby girl in 2004.

In the Tyson lab ...

A book chapter written by former graduate **Emily Yourd** and Prof. Tyson, entitled "*Flame Atomic Absorption Spectroscopy, including Hydride Generation and Cold Vapor Techniques*," appeared in "*Atomic Spectroscopy in Elemental Analysis*," edited by M. Cullen, CRC Press, 2004.

The NSF-funded Graduate Student Fellows in K-12 Education, of which Prof. Tyson is both the lead PI and a faculty participant, has had another successful year in which large numbers of middle school students were introduced to the fascination of science through inquiry based projects carried out in their classrooms. The year culminated in a conference on the campus at which over 500 students (and their teachers) attended and presented the results of their research in a poster session. The Chemistry Department was involved though the presentation of two

lecture-demonstrations, one by Prof. Venkataraman's group and one by the Tyson/Uden groups.

Prof. Tyson was invited to give lectures at two international meetings celebrating the life-time contributions of two well known analytical chemists. One was in the UK in July at which the Royal Society of Chemistry invited several speakers from around the world to a special meeting to mark the retirement of Alan Townshend at Hull University. The second was in Canada (Halifax) in August when Prof. Tyson was invited by the Spectroscopy Society of Canada to lecture at the 50th International Conference on Analytical Sciences and Spectroscopy to mark the retirement of **Jean-Michel Mermert**, Univ. of Lyons.

In the Vachet lab ...

Amanda Chaparro and **Jihyeon Lim** from my research group received their PhD's in September 2004. In March 2004, I gave the 2004 Glaxo-Smith-Kline Seminar in Analytical Chemistry at the University of North Carolina, Chapel Hill. I taught a two-day short course on "*Quadrupole Ion Trap Mass Spectrometry and Tandem Mass Spectrometry*" at the 2004 National Meeting of the American Society for Mass Spectrometry.

In the Venkataraman lab ...

Two of our group's copper catalysts for cross-coupling reactions are now commercially available from Strem chemicals. With regard to students, **Michael Doherty** (BS '05) was awarded a Pfizer Fellowship in 2004. **Uche Anyanwu** interned at GE Plastics in Indiana from July 2004 until September 2004; he finished his PhD in February 2005. **Craig Bates** (PhD '05) joined ArQule as a research Scientist in February. **Margaret Trombley** (MS '04) has now become a free-lance science writer; her article on '*The Delay on Hydrogen-fuelled Cars*' was recently

Don't You Want to be a Chemist When You Grow Up?

Professor Venkataraman (DV) asked this to an eager group of young visitors during "Take Your Children to Work Day" on April 22, 2004. After Prof DV and his group finished their remarkable demonstrations, it is safe to say that for many of those visitors the answer is "yes"!!!

As a part of the "Take Your Children to Work Day" activities at UMass Amherst, Prof. DV and his group organized a series of demonstrations that highlighted the applications of chemistry in every-day life. Sudharsanam and Noah placed powdered potassium permanganate in a Petri dish and added drops of glycerol. After a minute or so, the powder caught fire with a brilliant flame. Sudharsanam and Noah explained to the kids how this reaction is used by fire fighters to set protective fires that protect forests from wild fires in the summer. Ping-pong balls containing potassium permanganate and glycerol are dropped in areas where the protective fires need to be started. Since the reaction takes a few minutes to start, fire fighters have time to move away before the fire starts thereby protecting their own lives.



Margaret Trombley demonstrates "Fun with Liquid Nitrogen."

Another demonstration by Uche showed how molecules change their shape depending on the environment. When sodium polyacrylate was added to water, the kids were amazed to find that when a teaspoon of polymer was added to about half a liter of water, the polymer absorbed all the water and became a gel, like Jello. The kids were equally amazed when the polymer released all the water and became a precipitate when Uche added common salt to the gel. When Uche told that the ability of sodium polyacrylate to absorb water is the reason of their use in diapers, it was greeted with a "Wow." When he told them that this is the same polymer used in milk shakes in some fast-food restaurants, this fact was greeted with "Eew" and "Yikes." Some of the children even proclaimed that they will never drink milk shakes from fast-food restaurants again!

The children also enjoyed other demonstrations such as the "Chemical Volcano," "Fun with Liquid Nitrogen," "Making Silver and Gold Pennies," and "Exciting Molecules." With the help of graduate students, Pranorm and Travis, each child made a "silver" and a "gold" penny and took them home as souvenirs. At the beginning, some young visitors seemed a little hesitant about chemistry. But after they saw and experienced the wonders of science with Prof. DV and his group, many left the event asking each other: "Don't you want to be a chemist when you grow up?"

published by the Daily Hampshire Gazette. **Arlicia Grant** (MS '04) is now a science teacher in a high school in Springfield. She will teach chemistry and physics to 11th graders.

From the undergraduate alumni side, **Tom Hill** (BS '02) and **Pam Shields** (BS '02, Lahti Group) got married in the summer of 2004. **Tom** is now a graduate student at Boston College and works with **Prof. Larry Scott**. **Kate Huber**, an undergrad who worked in our group from 2000-2001 also got married in the summer of 2004. **Noah Tremblay** (BS '04) is now a graduate student at Columbia University and is now working with **Prof. Colin Nuckolls**. **Jaclyn Murphy** (BS '04) is now a graduate

student at Yale University and is now working with **Prof. John Hartwig**. **Janice Chin** (BS '00) is now working with ArQule, a biotech firm in Woburn, MA. **Karen Osman** (BS '00) is now working in Shimadzu Scientific Instruments, Pleasanton, CA. **Claire Cohen** (BS '00) is now a graduate student at Cornell University and works with **Prof. Geoff Coates**. **Jeremy Kintigh** (BS '01) is working with Bristol-Myers Squibb.

From the graduate alumni side, **Jason Field** (PhD '03) is now a senior research scientist in Alphora Research Inc., in Mississauga, ON, Canada. **Rattan Gujadhur** (PhD '03) is now working with Synthon Chiragenics in New Jersey. **Derek Van Allen** (PhD '04) is an NRC

Fellow at the Advanced Materials and Processing Branch of the NASA Langley Research Center in Virginia.

Not available for web.

Research in the DV group was recently featured on the cover of the August 2003 issue of the Journal of Organic Chemistry.

The article, co-authored by **Jason Field** and **Tom Hill**, reported the synthesis of a new class of heterohelicenes, based on bridged triarylaminines using a simple three-step procedure. These heterohelicenes are highly luminescent and redox active. When photoexcited, these molecules also emit circularly polarized light. Therefore, they can potentially be used for back-lighting in liquid crystalline devices.

In the Vining lab ...

Professor Bill Vining is on sabbatical leave this year. His group spent the first half of the year creating a new version of the well established General Chemistry Interactive Software. This major effort involved creating over 400 new step-by-step interactive tutors that are closely aligned with chapter learning goals in the accompanying textbook. The software is delivered on both CD-ROM as well as over the internet. The now over 600 modules on the CD are also used with the online web-based learning (OWL) electronic homework system, which this year is being used by over 35,000 students at over 100 colleges and universities around the country.

Victoria White (Chem BS '85), who owns and operates Eclectechs, a website development and computer and internet training firm, is celebrating her 10th year in business! Visit them at www.eclectechs.com.

Following the completion of this project, Prof. Vining spent 2 1/2 weeks in Singapore teaching a chemistry course as part of an exchange program. The program next brings him to Switzerland this coming summer.

Professor Vining's major work this coming Spring involves the authoring of a general chemistry textbook along with UMass Amherst Professors **Roberta Day** and **Beatrice Botch**, and with Professor **Susan Young** from Hartwick College. The book is revolutionary in that it is completely integrated with use of the OWL homework program. The text is expected to be completed in two years.

In the Voigtman lab ...

Professor Voigtman and graduate student **Dan Montville** are studying instrument detection limits, which have application to a wide array of chemical measurements. Central to this study is the preparation of millions of calibration curves for comparison with Prof. Voigtman's theory. Other research focuses on studying corrections to atomic absorption spectroscopy, in collaboration with Prof. **Barry Lavine** of Oklahoma State.

In the Weis lab ...

Weis proclaims that all the students currently in his lab are doing 'marvelous' (**Lubna Al-Challah**, **Frances Antommattei**, **Abdalin Asinas**, **Tatiana**

Frank Higbie (Chem MS '69) is a process chemist for Akzo Nobel. He and his wife Lois Egan (Math MS '69) visited Minneapolis for the 4th of July, then on to Bismarck for their first trip to North Dakota. They explored historical sites along the Lewis & Clark expedition, and at Fort Abraham Lincoln where General Custer left for his ill-fated mission against the Sioux. In August they visited Albuquerque and Santa Fe, NM finding many signs of Franciscan and Jesuit influences, and beautiful art and sculpture in Santa Fe. Their trip summary: "The southwest is interesting to visit, but the countryside is a bit too brown to suit us."

Besschetnova, David Montefusco, Tony Shrout, Hoa Tran, and Li Zhi). Collectively they have made remarkable progress in understanding the nature of transmembrane signaling in the *E. coli* chemotaxis pathway, a problem of long standing interest in the Weis lab. Recent developments have been made possible with a technological breakthrough pioneered by **Tony and David** (with some encouragement from Weis), who worked out a new “template-directed” method for assembling functional complexes of the signaling proteins. The resulting publication was a “Hot Article” in the December 2003 issue of *Biochemistry* (42, 13379-13385), and the method has been well received, both as a biotechnological tool, and for providing insights into fundamental properties of receptor biology. To wit: Weis-lab posters have won two 1st place awards (worth \$500 apiece), one poster was presented by **Tony** (co-authored with **David**, and **Abdalin**) at the New England Biomedical Engineering Alliance & Consortium Symposium in Hartford, CT (October, 2004), and the other was presented by

Tatiana (co-authored with **Frances, Tony and David**) at BLAST VIII (Bacterial Locomotion and Signal Transduction VIII) in Boca Raton, FL (January, 2005). The 1st place Robert Macnab Award (given in honor of the late **Robert Macnab**) was presented to **Tatiana** ‘for the lucid presentation of exciting new insights into bacterial motility and signal transduction.’ In other news, **Anas Chalah** (PhD ’05) has graduated and moved onward to a postdoctoral appointment at Harvard Medical School, and **Frances Antommattei**, next in line to graduate, is accepting employment with Procter and Gamble in Stamford, CT.

MARV ELLIN WINS CHANCELLOR’S HIGHEST HONOR

Marv Ellin, Director of Operations for the Chemistry Department, was awarded the Chancellor’s Citation Award in 2004. This award is given to UMass Amherst staff members who perform above and beyond the call of duty. This is certainly true in Marv’s case. His job, quite simply, is to keep the Chemistry teaching and research facilities up and running 24/7. This is no small task, considering that the Chemistry Department consists of about 30 faculty members, 18 staff, and 145 graduate students, and we teach thousands of undergraduate students every semester. Marv keeps all this running with enthusiasm and poise. This is remarkable considering that Marv’s Chemistry position is not full time, giving Marv time to pursue his other passion, writing children’s storybooks.

One particular story exemplifies the devotion Marv brings to the Chemistry Department. In 2004 we had a major emergency in the Lederle Graduate Research Tower, a 16-story building housing part of Chemistry and several other departments. One of the two main building transformers blew up, starting a fire. Marv took charge by evacuating the building. He then got all the freezers and other essential equipment on emergency power, preventing a great number of experiments, and much money, from being lost. Marv did all this while being off-duty for most of the emergency response. The Research Tower is back up-and-running, with many thanks to Marv. Now that’s a story with a happy ending!



Chancellor John Lombardi, Marv Ellin, Prof. Bret Jackson, and Provost Charlena Seymour

staffCHANGES

COMPUTING TEAM:



Alex McKenzie, Suzanne Palmer, and Jon Belanger

We have had some changes in our computer support team over the past year. With the departure of **Kim Florek**, we have convinced the dynamic **Suzanne Palmer** to become our new Computer Systems Administrator. Suzanne comes to us by way of the UMass President's Office and also has previous experience with private companies. She is looking forward to the challenges of maintaining the computer systems for both Chemistry and BMB.

The talented **Jon Belanger** has transitioned to becoming our new Computer Systems Specialist. Jon brings a breadth of knowledge, a familiarity with the CRC and other Departmental systems as well as an aptitude in resolving complex problems.

We also hired the enthusiastic **Alex McKenzie** as our new Computer Systems Technician. The latest addition to our team, Alex has quickly proven to be an effective problem solver and a conscientious support person.

MAIN OFFICE:

Since joining the Staff on a part-time basis, **Anne Nadolski** has become instrumental in the smooth operations of the Chemistry Office. In addition to assisting with the Graduate Program, Anne jumps in and lends a hand wherever it's needed, always with enthusiasm and good cheer.

Susan Pixley brings her years of experience in social services to her new position as Seminar Coordinator and Alumni Coordinator. Susan is our front-line person in the Main Office, ably assisting students, faculty and others with any questions and concerns they might have. Although Susan has only been with us a matter of months, she has been a member of the UMass Amherst Chemistry family for years – her father is Professor Emeritus David Curran.

Brigette McKenna has been awarded a richly-deserved promotion, and is taking over responsibility for departmental payroll and post-doctoral appointments. In addition, she is now supervising clerical staff and work study students in the Main Office.



Anne Nadolski, Brigette McKenna, and Susan Pixley

inMEMORIAM

Professor Oliver (Tom) Zajicek

The UMass Amherst Department of Chemistry was tremendously saddened by the passing of Professor Oliver Thomas (Tom) Zajicek on Wednesday December 31, 2003. Prof. Zajicek was a committed citizen of the Department, caring educator of students, and tireless protector of the environment. Here are some fond memories of Tom Zajicek, collected for a memorial service held on April 23, 2004.



Oliver Thomas (Tom) Zajicek was born in Detroit on October 5, 1928. In 1951, he received his bachelor's degree in chemistry from Baldwin-Wallace College in Ohio. He received his masters in 1958 and his PhD in 1961, both from Wayne State University in Detroit. In 1958, Tom became the first trained inorganic chemist hired by UMass Amherst. He taught, conducted research, and served the campus community for 45 years until he fell ill Spring 2003. Tom considered himself first and foremost a teacher; he consistently taught two or three courses per semester. In 1992, he received the College Outstanding Teacher Award.

Tom was a pioneer in the study of environmental chemistry. For many years he served on the Amherst Conservation Commission playing a key role in establishing the nationally, and internationally, acclaimed Acid Rain Monitoring Project. As a major component of the latter in 1982 he established the ongoing Environmental Analysis Lab to support volunteer surface-water monitoring groups around

the region. The lab was also used to support the analytical needs of numerous high school, undergraduate and graduate research projects.

His knowledge of chemistry was legendary and a colleague once described him as "one heck of a chemist." He was also a heck of a nice guy and will be sorely missed. He leaves his wife Roberta; three children: Thomas, Peter and Kristin; and two grandchildren.

Contributions to the The Dr. Oliver T. Zajicek Undergraduate Chemistry Scholarship Fund may be sent to Ms. Susan Alston, see page 27.

Mr. Dan Keedy (MS 1956)

On Christmas day 2004 our chemistry community lost a friend who will be familiar to many who read this. Dan Keedy, our wizard

of scientific instruments, died at home after a short illness. For more than 40 years he designed, built and maintained analytical



instruments in the Chemistry Department. Dan was a familiar sight in the corridors of Goessmann Lab and Lederle Tower, with his shopping cart that seemed to contain every known replacement part in the universe. In fact, the cart contained many fewer parts and tools than we all guessed based on Dan's success in reviving ailing instruments. He had an instinctive feel for anything electronic or mechanical and could coax instruments that belonged in museums into collecting vital data for the students and faculty he supported. When Dan retired in 1997, we also retired all our remaining vacuum tube instruments.

Dan grew up in Amherst, graduated from Amherst High School and

Deerfield Academy. He earned a degree in chemistry at American International College in Springfield. He met his wife, Mona, while he was at AIC and living in a room he rented from her mother. Dan earned an MS degree in (physical) chemistry in 1956. Working with Prof. Richard Stein, he coauthored one of 33 most important papers to appear in the first 50 years of the *Journal of Polymer Science*,¹ and was elected a member of Sigma Xi. Dan then became a technical assistant in Dick Stein's research group, and later an instructor before his appointment as an instrument specialist in 1965. His proficiency with instruments shows in a 1961 paper in *The Review of Scientific Instruments*.² Dan was awarded the Chancellor's Medal for outstanding service in 1986.

Beginning in South Deerfield, Dan and Mona Keedy raised two daughters and three sons in Amherst, mostly in a south Amherst neighborhood near five other UMass Amherst chemists. Dan was an important contributor to the rise of UMass Amherst Chemistry as a research department beginning in the 50s and accelerating in the 60s. He leaves us scientific instruments that he modified and cared for but most important many fond memories and the respect of his colleagues and many former research students.

1. The Dynamic Birefringence of High Polymers, R. S. Stein, S. Onogi, & D. A. Keedy, *Journal of Polymer Science*, 1962, 57, 801.

2. A Tensile Testing Machine for Determination of Stress and Strain-Optical Coefficients, *Review of Scientific Instruments*, 1961, 32, 415.

new ADDITIONS

Professor Metz and his wife Jacquie Scott are the proud parents of twin boys. Aidan (left) and Ethan (right) were born November 2, 2004 and are already preparing for General Chemistry.



Dr. Federic Theriault (BS 1938, MS 1939)

Federic Rusell Theriault, 89, a cryptanalyst who helped break the code used by the Japanese navy during World War II, died September 2004 of a heart attack in Oklahoma City. Dr. Theriault was born in Boston and received his B.S. and M.S. in Chemistry from UMass Amherst in 1938 and 1939. He received his PhD in food technology from UMass Amherst in 1942.

In a memoir we wrote for his family in 1999, he recalled that “For the last three years of the war, my principal duty was making unreadable messages readable, and I was good at it.” Dr. Theriault was especially gratified that the messages he was able to decipher quite likely save lives. At the end of the war he received a promotion to lieutenant, then became employed with the National Security Agency from 1947 to 1977.

Dr. Leon Stanley Ciereszko Sr. (BS 1939)

Leon Stanley Ciereszko Sr., 85, died June 2003 in Norman, Oklahoma. Dr. Ciereszko was born July 31, 1917 in Holyoke, MA, and graduated from Holyoke High School. He received a BS degree in Chemistry from Massachusetts State College (now UMass Amherst). He was awarded a PhD in physiological chemistry at Yale University. He married Esther Martin May 1, 1943 in Philadelphia. They moved to Norman from Champaign, Illinois, in September 1948. He was a Chemistry and Biochemistry professor at the University of Oklahoma for 32 years. He conducted research for almost 50 years in comparative biochemistry of marine invertebrates.

chemistry SEMINAR PROGRAM

Each year our department hosts several outstanding scientists as part of our seminar program, and 2004 was no exception. The topics ranged from hydrogen tunneling to bioactive supramolecular polymers. Highlighted among these seminars were five honorary lectures.

On April 2, Prof. John Bercaw from the Caltech presented an engaging seminar entitled “Olefin Oligomerization and Polymerization with Organotransition Metal Catalysts” as part of the Five College Lecture Series in Chemistry. Professor Bercaw is a member of the National Academy of Sciences, and has received numerous awards for his work in inorganic and organometallic chemistry. During his lecture, Prof. Bercaw described his recent investigations of metallocene catalysts for Ziegler-Natta polymerization of olefins.

On September 21, Prof. Tim Swager from MIT spoke to our department also as part of the Five College Lecture Series in Chemistry. In addition to his position in the chemistry department at MIT, Prof. Swager is also the Associate Director of the Institute for Soldier Nanotechnologies at MIT. During his seminar entitled, “Electrical, Optical, and Structural Materials Based upon Triptycene,” he described some of the unique properties of triptycene that arise from its unusual shape. Professor Swager discussed unique liquid crystalline phases resulting from polymer materials based upon triptycene.

The following week, on September 30, we hosted Prof. Isiah Warner from Louisiana State University as part of the 8th Annual Procter & Gamble seminar series. Professor Warner is the Boyd Professor and Philip W. West Professor of Analytical and Environmental Chemistry at LSU. He is well known for both his scientific achievements and efforts to encourage disadvantaged students into careers in chemistry. His work has garnered several accolades, including a Howard Hughes Medical Institute Professorship in 2002 and the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. During his lecture entitled “Chiral Drugs: The Difficulty of Dealing with these Jekyll-Hyde Twins in the Pharmaceutical Industry,” Prof. Warner detailed his group’s efforts to develop novel chromatographic approaches for separating chiral molecules.



Prof. Isiah Warner



Prof. Richard Zare

The annual William E. Mahoney Seminar was held on October 22. This seminar series is made possible by the generous contributions of Chemistry alumnus William E. Mahoney (Chem BS '55) and features a top scientist who has also contributed to scientific understanding of the public at-large. This year’s speaker was Prof. Richard Zare from Stanford University. Professor Zare is internationally renowned for his research in the area of laser chemistry, resulting in a greater understanding of chemical reactions at the molecular level. He is a member of the National Academy of Science and is a Fellow of the American Association for the Advancement of Science. In addition, Prof. Zare has also garnered a great deal of attention for his energetic promotion of science education. During his lecture/demonstration entitled, “Chemical Fizzics: Seeing Chemistry in Action,” Prof. Zare demonstrated his love for science as he described the complexity and fascinating features of something as simple and everyday as bubbles.

On November 18, Prof. Samuel Stupp gave the 8th annual Stein-Bayer Lecture in Polymer Chemistry. This seminar series is generously sponsored by The Bayer Corporation, and it honors the seminal contributions to polymer chemistry made by our own Prof. Richard Stein. Professor Stupp, a leader in the areas of nanotechnology and biomaterials, is a member of the American Academy of Arts and Sciences and a fellow of the American Association for the Advancement of Science. At the request of the White House, Prof. Stupp served in 2001 as the chair of the committee to review the National Nanotechnology Initiative. Professor Stupp gave an inspiring lecture entitled “Crafting Supramolecular Polymers for Bioactivity.” During his lecture he excited the audience by describing how self-assembled polymers can play a role in tissue regeneration.



Prof. Richard Stein and Samuel Stupp

Faculty and students attended these seminars in large numbers. Avid student participation at Chemistry seminars reflects the quality of undergraduate and graduate education available at UMass Amherst. Our students exchange ideas with the best and brightest chemists in the world, preparing them to push forward the frontiers of Chemistry.

—Professor Richard Vachet, Departmental Seminar Chair

research SYMPOSIUM 2004

The 14th Annual Chemistry Department Research Symposium was held on Saturday, April 17, 2004. This is an exciting event because it is the one time in the year when a showcase is provided for all the excellent research that is in progress. The symposium consisted of over 50 poster presentations by undergraduate and graduate researchers. In addition, five outstanding graduate students gave 20 minute oral presentations, representing a cross-section of research within the department.

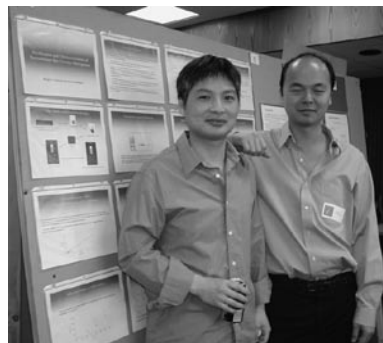


Princess Hernandez (Tyson/Uden lab), Angela Fahey (Vachet lab), and Jihyeon Lim (Vachet lab)

There was a large turnout this year, in part due to the generous awards provided by the Procter and Gamble Company and the University of Massachusetts Amherst Chemistry Department graduates. Nine \$700 prizes were offered to help defray the cost of attendance at scientific

meetings and conferences. The award for best lecture was given to **Jihyeon Lim** of the Vachet group. The panel of judges awarded prizes to graduate researchers **Juma Bridgewater**, **Peter Bryngelson**, **Anas Chalah**, **Gizem Dinler**, **Edward Esposito**, **Rui Hong**, **Anirban Mohimen**, and **Hemali Rathanayake** for the eight best posters. In addition, two \$50 awards were given to **Matthew Kade** and **Jay Kerwin** for the best undergraduate posters.

Perhaps the highlight of the day was the First Annual Pub Quiz, which occurred while the judges made their final decisions. **Kay Stringer's** brainchild, the Pub Quiz consisted of 35 humorous questions about chemistry and UMass Amherst Chemistry faculty. A prize was awarded to the team that answered the most questions correctly.



Hui Xiao (Kaltashov lab) and Sergio Chai (Maroney/Uden lab)

The event would not have been possible without the help of the judges: **Professors Michael Knapp**, **Ricardo Metz**, **Lynmarie Thompson**, **Dhandapani Venkataraman**, and **Robert Weis**.

degrees AWARDED

BA/BS Degrees

Joseph Jacob Banik	05/2004
David E. Bauer	05/2004
Christen M. Bell	05/2004
Alexis M. Clough	02/2004
Kimberly E. Dickson	05/2004
Ben Feldman	09/2003
Britt Ellen Gentry	05/2004
Sarah Marie Gentry	05/2004
Ian Golten	05/2004
Peter J. Hotchkiss	05/2004
Jay M. Kerwin	05/2004
Scott P. Lentini	09/2003
Michael Nathan Levine	05/2004
Teresa S. Moniz	05/2004
Jaclyn M. Murphy	05/2004
Christopher R. Partovi	05/2004
Carlos A. Perez	05/2004
Eric N. Salgado	05/2004
Trudy A. Smith	05/2004
Michael Andrew Tarselli	05/2004
Noah J. Tremblay	05/2004

MS Degrees

Jonathan Babyak	05/2004
Rebecca Michelle Eden	05/2004
Angela M. Fahey	02/2004
Princess C. Hernandez	05/2004
Olena G. Kratsutska	09/2003
Geeta P. Kumar	05/2004
Jihyeon Lim	05/2004
Yustina Rodriguez	05/2004
Cesar Sierra	09/2003
Stephenie L. Smulligan	02/2004
Margaret I. Trombley	02/2004
Rosemary S. Turingan	05/2004

PhD Degrees

Cristian Blanco	09/2003
Yi-Te Chou	09/2003
Mariyanny Y. Combariza	02/2004
Kanad Das	09/2003
Daniel J. Duffy	09/2003
Kieron P. Faherty	02/2004
Catherine M. Goodman	02/2004
Rattan Gujadhur	09/2003
Dmitry R. Gumerov	09/2003
Paul R. Serwinski	09/2003
Christopher J. Thompson	02/2004
Derek Van Allen	05/2004

undergraduate SENIOR & AWARDS DINNER

At its sixth annual Senior and Awards Dinner, held at the China Dynasty Restaurant in Amherst on Thursday, May 13, 2004, the Chemistry Department recognized those undergraduates who have distinguished themselves in their pursuit of academic excellence. More than seventy-five students, parents, faculty and staff attended the event, which included a sumptuous Chinese buffet followed by the presentation of over 30 awards to 27 deserving undergraduates.

Professors Scott M. Auerbach and William J. Vining were masters of ceremonies, and **Marie Whalen**, Undergraduate Program Coordinator, organized the evening's activities. **Lisa Korpiewski**, the departmental graphics designer, provided the creative talents, making the certificates awarded to individual students, and the favors including Chemistry Department keyholders and bookmarks. Additional information about our undergraduate awards is available at the departmental web site: www.chem.umass.edu/Undergraduate/scholarshipAwards.htm

The following students received awards:

Noah J. Tremblay – Connecticut Valley Section of the American Chemical Society (CVS/ACS) Student Award

Jay M. Kerwin, Teresa S. Moniz, and Peter J. Hotchkiss – Merck Index Awards

Jaclyn M. Murphy – American Institute of Chemists Award

Michael N. Levine and Christen M. Bell – Richard W. Fessenden Awards*

On Yi Wong – Jay A. Pirog Scholarship*

Talia L. Ramsdell, Lauren K. Snyder, and Taryn E. Janeliunas – Robert Maxwell Williams Memorial Scholarships*



Professor Richard Vachet, Jason Numbers, and Professor William Vining

Jason W. Numbers – Analytical Chemistry Award from the American Chemical Society

Sarah M. Lyon, Mary-Kate E. McEntee, and Jennifer N. Batson – CRC Freshman Chemistry Awards

Fei Huang, Leanna K. Toy, Jocelyn R. Scheintaub, Thomas R. Vargo, Ethan T. Sullivan, and Olga E. Rosado – Edward Shapiro Scholarships

Jack D. Peters, Jay M. Kerwin, and Jaclyn M. Murphy – Senior Class Award*

Jay M. Kerwin – HyperCube Scholar Award

On Yi Wong – Bates Research Fellowship*

Shannon M. Reilly – C. D. Youngren Scholarship

Marissa K. Callahan and Shannon M. Reilly – Bradspies Research Fellowships*

Jacob J. Banik – Departmental Recognition Award*

Jay M. Kerwin and Mathew J. Kade – Best Undergraduate Poster at Posterfest*

Michael Q. Doherty – Pfizer Summer Undergraduate Research Fellowship

*Made possible through generous contributions to the Chemistry Department.

New Building to Integrate Chemistry ... continued from page 1

facilities, including computerized classrooms and lectures halls, and new laboratories designed for interdisciplinary experiments. The building will provide 150,000 square feet of new space, which will house:



- All undergraduate Chemistry labs (intro, organic, physical, analytical)
- Upper-division Life Sciences labs (molecular biology, cell biology, genetics, physiology)
- Lab space for 10 research groups
- A 300-seat auditorium equipped for experimental and computer demos
- An 85-seat computerized classroom equipped for in-class case studies

The genesis of this building occurred under former Chemistry Head Lila Gierasch, as a response to our far-flung and aging laboratories, and to emerging research opportunities. With our teaching labs spread throughout “old” Goessmann (opened in 1924) and “new” Goessmann (1958), the time is right to consolidate our laboratories into a single, state-of-the-art facility.

The ISB is also a response to our interdisciplinary research strengths in the Chemistry-Biology Interface (CBI) and in nanotechnology. Our strength in CBI has led to an NIH-funded training program that brings together 10 Chemistry faculty members as well as those from five other UMass Amherst departments. The CBI program, which is currently directed by Chemistry Prof. Lynmarie Thompson,

yields PhD chemists who speak the language of biology, and PhD biologists who harness the full power of chemistry.

UMass Amherst is also a world leader in nanotechnology, having won several prestigious National Science Foundation team grants. The majority of these awards involve Chemistry faculty collaborating with colleagues in the Departments of Physics, Polymer Science and Engineering, Chemical Engineering, and Mechanical Engineering. These projects involve application areas such as high-density data storage and novel drug-delivery systems.

Research conducted in the ISB will blend cutting-edge chemistry with powerful tools such as molecular biology, bio-informatics and nanotechnology to advance our understanding of molecular, cellular and developmental biology. The research is targeted for applications in cancer therapy, genetic disorders, and biohazard detection, to name a few.

The ISB will be located along North Pleasant Street and Stockbridge Road, approximately mid-way between Goessmann Chemical Lab and Morrill Life Science Center. Construction is planned in three phases, beginning summer 2006 and ending by summer 2008. The financial plan involves a mixture of borrowing and fundraising. Richard (Chem BS '55) and Barbara Mahoney have pledged a \$1.5 million gift for the ISB, while Robert (Chem BS '70) and Kathleen Scott Mahoney have pledged \$500,000. UMass Amherst will continue fundraising throughout the building process.

Shannon Reilly's research with Chemistry Prof. Craig Martin aims to reveal how DNA provides a blueprint for the future of a cell. Inspired by students like Ms. Reilly, we have designed the ISB to provide a blueprint for the future of science. With continued support from alumni and friends of UMass Amherst, this future is right around the corner!

Pharma USA. Throughout these years, he has been a committed supporter of UMass Amherst, directing more than half a million dollars in contributions to the Amherst campus. Dr. Mazzo has influenced UMass Amherst by helping it become a world center for Analytical and Environmental Chemistry.

David Mazzo obtained his Chemistry PhD from the campus in 1984 for his dissertation work on *“The evaluation of high performance liquid chromatography and specific element detection for the analysis of organometallics in various matrices.”* His dissertation advisor was Prof. Peter C. Uden. He also spent a year at the Ecole Polytechnique Federale de Lausanne in Switzerland as a Research Fellow. Mazzo obtained his BA in the Liberal Arts Honors Program and his BS in Chemistry from Villanova.

Dr. Mazzo has published over 20 scientific papers and book chapters. He also has an exemplary track record of successful product development, from concept to market. He has been involved in the creation of the allergy-relief drugs Claritin™ and Nasonex™, the asthma-relief drugs Asmanex Twisthaler™, Hepatitis C therapeutics, PEG-Intron™ and PEG-Intron Redipen™, and the more recent cholesterol-lowering drug, Zetia™.

Throughout his career, Dr. Mazzo's relationship with UMass Amherst has personified the phrase *“A friend in need is a friend indeed.”* When he was a scientist at Merck, a job that he took immediately after graduating from UMass Amherst, he initiated support for Chemistry Profs. Curran and Uden. These relationships have continued over the years, bringing around \$223,000 during 1985-1995. While at Schering-Plough, Dr. Mazzo convinced Schering to support UMass Amherst with five graduate student stipends, a graduate

student fellowship and money for equipment totalling around \$225,000. Dr. Mazzo was also instrumental in getting many pieces of advanced equipment on long-term loan to UMass Amherst.

When the UMass Amherst Department of Chemistry was planning to hire two faculty members in Bio-Analytical Chemistry, Dr. Mazzo played a crucial role in launching the initiative. He convinced Hoeschst Mario Roussel to donate \$50,000, and Schering Plough to donate \$70,000. These contributions catalyzed other companies to join the initiative by making gifts, culminating in the hiring of Profs. Igor Kaltashov and Richard Vachet in 1999. These two scientists have since established themselves as outstanding educators and scholars, having won millions of dollars in competitive grant funding (see pages 7 and 10 for more details). This chapter of the UMass Amherst Chemistry Department could not have been written without the vision and influence of Dr. David Mazzo.

Beyond these activities, Dr. Mazzo has provided summer internships and permanent jobs to many graduate students in Chemistry. He has also lectured in the course *“The Business of Science”* taught by another UMass Amherst Chemistry alum, Mr. William E. Mahoney. More recently, Dr. Mazzo has contributed his time and leadership as a member of the Advisory Council to the Dean of the College of Natural Sciences and Mathematics.

When all is said and done, it is clear that Dr. Mazzo has been a paragon of an alumnus. His personal accomplishments and his valuable contributions to his alma mater make us all proud.

Now, the next envelope please ...



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Dear Alumni and Friends of the Chemistry Department,

The Department of Chemistry has had another outstanding year, and I encourage you to read the details in this issue of the Goessmann Gazette. I am pleased to announce that we have hired two new faculty. Mike Barnes, already well recognized for his work in single-molecule spectroscopy and optoelectronic devices, comes to us from Oak Ridge National Laboratory, where he was a Senior Staff Scientist. Peter Khalifah, who is also coming from Oak Ridge, will be teaching in the areas of General and Inorganic Chemistry, and helping to oversee our X-ray crystallography facility. I am sad to announce that Tom Zajicek, who served on our faculty since 1958, passed away last year. In addition, Peter Uden has retired, after mentoring close to 100 PhD students during his 34 years here. In other news, Dave Adams and Tom Whelan were once again recognized for their superb contributions to teaching, receiving the UMass Amherst Distinguished Teaching Award, and a Certificate of Appreciation for Demonstrating Excellence in Teaching, respectively. Paul Lahti was recognized with a Japan Society for Promotion of Science Fellowship, which included a three-week lecture tour in Japan this past Fall. Our research prominence continues to grow, with grant expenditures exceeding \$4.7M last year. In fact, our research grant expenditures per investigator have doubled in the past four years. And finally, the Integrated Science Building, which will provide new state of the art teaching and research facilities, will soon be a reality.

We are deeply grateful to all of you who have contributed so generously to our department over the years. In addition to improving our teaching and research facilities and providing scholarships to students, your gifts help us to provide start-up packages for new faculty. Given the numerous recent retirements, we are in a period of rebuilding. New faculty start-up packages typically exceed \$400,000, and our department is expected to make significant contributions to this. Your gifts help us to do so. For example, an extremely generous contribution by GEO-CENTERS, INC. has facilitated our most recent hires, as well as a current search in the biological-materials area. I thank you again for your generous support, which helps us to maintain our level of excellence in both teaching and research.

Sincerely,



Bret Jackson, Department Head



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Procter & Gamble is one of largest Fortune 500 companies with annual sales greater than \$51 billion and net earnings of \$6.48 billion. P&G is consistently ranked in the top 10 most admired U.S. corporations by Fortune magazine and according to Money magazine “tops the companies with the best benefits.” P&G manufactures 16 products with annual sales in excess of \$1 billion – Always, Ariel, Bounty, Charmin, Crest, Downy, Folgers, Iams, Olay, Pampers, Pantene, Pringles, Tide, Wella, Actonel and Head & Shoulders.

With 19 research centers around the world, P&G employs over 1,000 PhDs with an annual R&D budget of about \$2.0 billion. Despite its large internal R&D operation, Procter & Gamble recognizes the importance of acquiring technology from outside sources and has established many relationships and tools to achieve this. One such tool is NineSigma, a web site (<http://www.nine-sigma.com/>) dedicated to technology acquisition via RFPs (requests for proposals). Also, P&G and UMass have a master agreement in place to facilitate P&G funded research at the University.

Procter & Gamble is committed to higher education. The P&G Fund, the company's foundation, contributes about \$40 million last year to educational institutions, health, social service, cultural, civic and environmental organizations. About 60% of giving supports education. UMass Amherst has received over \$2 million since 1990 in restricted and unrestricted research grants from Procter & Gamble. Recently sponsored research programs involve biodegradable polymers, medical devices for pain relief, and osteoporosis epidemiology.

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