UNIVERSITY OF OREGON

Chemistry News

COLLEGE OF ARTS AND SCIENCES · DEPARTMENT OF CHEMISTRY · 2007

INSIDE

Green Chemistry, Energy Conservation

David Tyler discusses new ways of thinking about catalysts

Organometallic chemistry conducted in water used to be considered a dead-end, but that's no longer true, especially in David Tyler's lab. Tyler, who joined the University of Oregon faculty in 1985, has been building on this research for about ten years, resulting in several fruitful areas of investigation that are gaining him increasing industry attention. "Many years ago we discovered a new class of molecules that could reduce anything," says the affable Tyler. "We didn't find anything that we could not reduce, that's how powerful it was. So we thought as long as we can reduce anything, we'd really like to reduce water to hydrogen for fuel." Ultimately, they could not efficiently generate hydrogen this way, but as a result of their investigation they did find many ways to make catalysts water soluble. "Everybody went to great lengths to keep water out of their catalytic systems, and all of a sudden we had all these methods to make catalysts water soluble, so we started investigating their reactions in water," he says. Water is a relatively environmentally benign solvent, and replacing organic solvents with nontoxic water is a major advance for those researchers following the principles of green chemistry.

About the same time, colleagues at Bend Research started using some water-soluble catalysts to remove nitrogen from natural gas. Tyler notes that ten to fifteen percent of the natural gas reserves in the United States are contaminated with nitrogen to the extent that there's no point in mining the natural gas. "We're still doing that collaboration, but the molecule we were working with led us to another series of molecules that will bind nitrogen and convert it into ammonia."

Professor David Tyler, Department of Chemistry, University of Oregon

Tyler is full of amazing figures: Between 1 and 2 percent of the energy used in the United States is used to convert N_2 into ammonia, done at 300 to 400 atmospheres and 300 to 400 degrees Celsius. Tyler imagines the energy savings that could result if this could be done at room temperature and atmospheric pressure.

"That's the whole purpose of catalysis," Tyler smiles, "to save energy." Not only did this idea work, but Tyler's team was doing it in aqueous solution, and mimicking the industrial methods of preparation. Of the five steps in the reaction sequence, there is one step that can't be done in water yet—but they're working on it.

In theory, but not yet in practice, Tyler's discovery not only can increase the country's usable natural gas reserves, but these molecules reacting with hydrogen can form ammonia, using water as a solvent.

Tyler recently discovered that these same molecules react with CO_2, reducing it to CO. This could be viewed as a first step in reducing a problematic greenhouse gas to methane, or natural gas. "It's a really remarkable molecule, and all these reactions are occurring in water," he says. "That discovery was actually a mistake in the lab, where we accidentally introduced CO_2 into the system and found out that it reacted."

In another thread of research, Tyler's lab has discovered a molybdenum-based metallocene that will, in water, convert a nitrile to an amide. Most molecules that convert nitriles to amides will also take the amide and hydrolyze it to a

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Rosaria Haugland establishes first chair in chemistry

A Eugene businesswoman and philanthropist, she establishes the chair to strengthen interactions with local industry

Rosaria Haugland made a generous gift in excess of $1.3 million to the UO Foundation to establish the Rosaria P. Haugland Foundation Chair in Pure and Applied Chemistry. Behind this gift is a story both unique and inspirational.

Rosaria Haugland was born and raised in Milan, Italy. She holds a doctoral degree in biology from the University of Milan, and was a microbiologist at Farmitalia, a pharmaceutical company in Italy. Haugland moved to the United States in 1968, earned a Ph.D. in biochemistry from Syracuse University in New York, and held postdoctoral positions at the State University of New York Upstate Medical Center and the University of California at Berkeley. Rosaria Haugland married and raised two children while at the same time pursuing a scientific career. She and her husband, Dick Haugland, started selling fluorescent probes, first out of their home and later as a small but growing company, Molecular Probes. They moved the company to Eugene in 1982, when it was still very small. Soon, business took off and Molecular Probes has since become a major employer in the Eugene-Springfield area. During this time, Haugland became aware of the need to have better interactions between local industry and academia. Both companies and universities stand to benefit from an exchange of ideas, student internships, and availability of resources, especially in a town like Eugene, which does not have a large industrial base.

Rosaria Haugland and David Johnson

After selling Molecular Probes to the global company Invitrogen in 2003, Rosaria Haugland has devoted much of her share of the proceeds to local philanthropic causes. In establishing this endowed chair, Haugland's wish is to recognize and promote the work of a faculty member in the chemistry department who is both strong in research and working to build bridges between academia and industry. This is the first endowed chair and thus a milestone in the history of the Department of Chemistry.

The goals of awarding any endowed chair are to recognize scholarly achievement and to enable the faculty member to make greater contributions to his or her field and to the educational mission of the college. In the case of this endowed chair, there is a second goal: to provide the chair holder with additional resources and visibility that will enable that person to be more effective in enhancing interactions at the interface between the university and industry, ultimately providing more jobs for graduates, a higher success rate for small scientific companies, and a healthier local economy.

Rosaria Haugland is a perfect example of "think globally, act locally." In addition to establishing this endowed chair in chemistry, Haugland established the first privately funded

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Green Chemistry, Energy Conservation

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carboxylic acid and an amine, but most organic chemists want to stop at the amide. "Our catalyst does it in water and it stops at the amide," says Tyler. "Here's the 'so what': Last year five or six billion pounds of methyl methacrylate were produced to make poly(methyl methacrylate), or Plexiglas, and for every pound of methyl methacrylate that is produced, 2.5 pounds of byproduct are produced." The byproduct, ammonium hydrogen sulfate, comes from sulfuric acid used in the production of methyl methacrylate, and is only gotten rid of by heating it to 1,000 degrees. "We're producing 15 billion pounds of this every year, and that's only projected to go up," says Tyler, as the demand for poly(methyl methacrylate) increases. Tyler's catalyst means no more sulfuric acid and no more byproduct.

As if those research projects weren't enough, Tyler is also investigating photochemically degradable plastics. "What we're trying to do is design plastics that will degrade when you want them to, and not before and not after you want them to." Tyler's group is looking at the myriad factors involved in plastic degradation, with specific interest on compressive or tensile stresses introduced in plastic production.

A new femtosecond laser system in Tyler's lab can observe reactions occurring at 100 femtoseconds, or 100 x 10^{-15} seconds. "These are obviously very fundamental reactions," says Tyler. "What happens during the first few thousand femtoseconds is critical to the eventual degradation of the plastics."

—*Vanessa Salvia*

Rosaria Haugland establishes first chair in chemistry

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chemistry graduate fellowship in 2004 (as reported in the 2005 special edition of *Chemistry News,* devoted to graduate education). She has funded this fellowship on a three-year renewable basis, with the hope of being able to fund it in perpetuity. The first recipient is Takiya Ahmed, who is working with David Tyler on ways to reduce the use of hazardous chemicals in organic synthetic reactions. Haugland recently renewed this fellowship for a second three-year period and the recipient is Anica Wandler who is working with Karen Guillemin.

In the local community, Rosaria Haugland has launched a broad program to provide resources and opportunities for women. She established Ophelia's Place, a counseling center to help adolescent girls handle typical problems of adolescence and make better life decisions. She is on the advisory board of Womenspace, a safe house and outreach program to end domestic violence. In 2005 Haugland purchased an office building at 1577 Pearl Street in Eugene to house three nonprofit groups: Ophelia's Place, Womenspace, and the Girl Scouts of Western Rivers Council, along with her property development firm and her private foundation.

Rosaria Haugland is a quiet, friendly, and unassuming person, with her own style of Italian charm. She does a great deal of community work out of the public eye. She is also a patron of the arts, offering support to the Lord Leebrick Theatre, Eugene Opera, Eugene Symphony, and Eugene Ballet. Haugland is on the PeaceHealth board of directors in the Oregon Region, which serves Sacred Heart Medical Center, PeaceHealth Medical Group, Cottage Grove Community Hospital, and South Lane Medical Group. All these activities and many more are testimony to how one dedicated person can have a big impact on an entire community.

—Hayes Griffith

Department Head's Perspective

The times they are a changin', and that describes the chemistry department to perfection! Since our last newsletter, we have welcomed to our faculty Professor Victoria De Rose, a bioinorganic chemist, and Assistant Professor Shih-Yuan Liu, an organic chemist. Vickie's research interests include studying the interaction of metals with nucleic acids, RNA-drug interactions, and novel metal-peptide complexes, utilizing electron spin resonance methods as a major tool. Liu's research concerns the development of boron-nitrogen heterocycles—and their applications to hydrogen storage as sensing materials and to boron neutron capture therapy—and rearrangement-based chemistry for the synthesis of biologically active molecules. We anticipate searches for faculty members in all areas of chemistry next year, so stay tuned for more.

In addition to new faces, I am struck by the changing funding picture for our work. As government funding becomes tighter at the state and federal level, industrial funding and donations from alumni and friends have become important resources for us. Fourteen years ago, when I did my first stretch as department head (!), the annual income from endowments and gifts was a small fraction of one percent of our department budget (excluding research grants). Currently, we are receiving about five percent of our budget (again excluding research grants) from endowments and gifts. I cannot underestimate the importance of the generosity of our alumni and friends who have donated these funds. A key example is the new Rosaria P. Haugland Foundation Chair in Pure and Applied Chemistry, announced in this newsletter. So, thanks to all of you who are bringing about this major change in our resource base and aiding our ability to train new generations of students and to make pioneering discoveries.

Speaking of change, as I click away at these notes, I can hear construction noises from the finishing work on the Lorry I. Lokey Laboratories, phase one of the Lorry I. Lokey Integrative Science Complex, a 20,000-square-foot structure that will house new facilities for the benefit of the chemistry faculty and students, along with other science departments. This research facility—built entirely underground—sits directly on bedrock, so that vibration-free space is provided for the housing of sensitive instruments. With leading efforts from chemistry professors David Johnson and Jim Hutchison, funds for this building were obtained from state, federal, and private sources, primarily through the Oregon Nanoscience and Microtechnology Institute. This is another good example of the way in which funding sources for our work are changing, and of the innovations introduced by our faculty to bring this about.

One thing that is not changing is the impact our department and, specifically, all of you are making in the world of science. I find it fascinating to read about our first class of chemistry Ph.D.'s that included a major figure like Paul Delahay, or about Charles Jacobs, who started his work in chemistry here nearly eighty years ago. I note with sadness the recent death of this friend of the department. This impact continues as greater and greater emphasis in chemistry is placed on green chemistry and the sustainable-development aspects of chemistry. Of course, our faculty have been leaders in the development of green chemistry curricular and research innovation, as you will see in the article about Professor David Tyler's research.

Enough from me! Enjoy the news about the department, and, if you should visit Eugene in the future, be sure to stop in and see if you recognize the place! We will be delighted to show you around.

With best wishes,

—Tom Dyke

David C. Johnson awarded the newly established Rosaria P. Haugland Foundation Chair in Pure and Applied Chemistry

David C. Johnson, professor of chemistry, University of Oregon

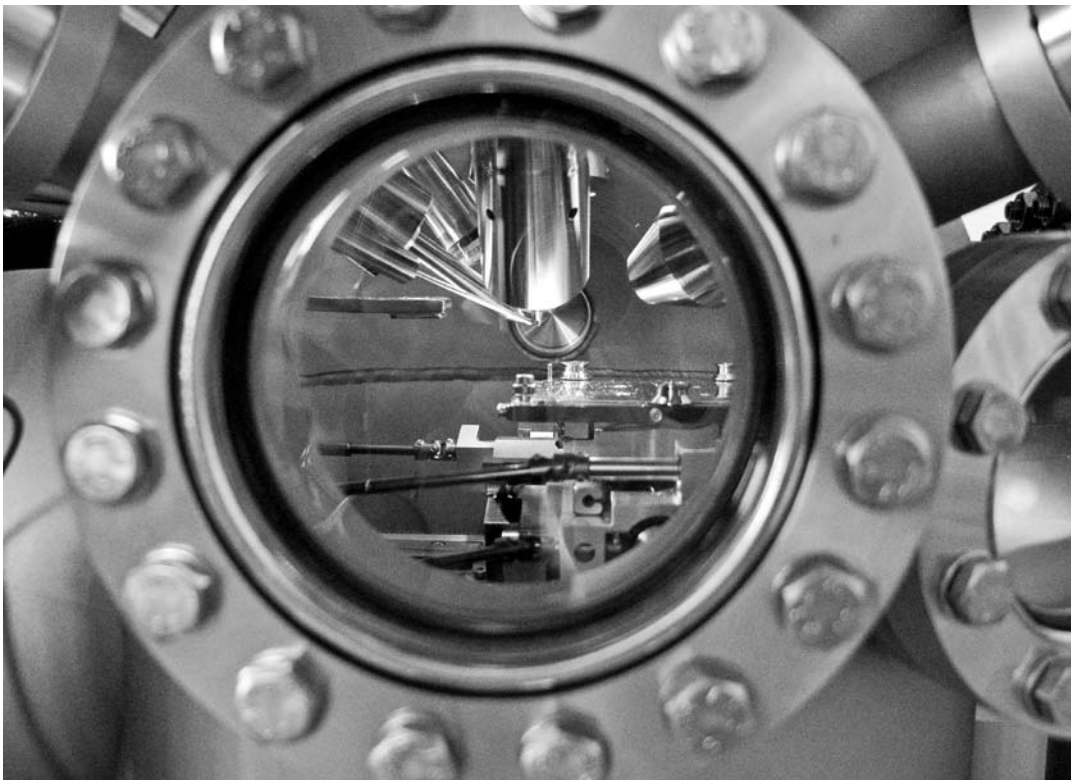
Associate Dean Dietrich Belitz and Interim Dean Wendy Larson of the College of Arts and Sciences announced in April 2007 that Professor David C. Johnson has been chosen as the first recipient of the Rosaria P. Haugland Foundation Chair in Pure and Applied Chemistry.

David Johnson received his B.A. in 1978 from Rutgers University, majoring in chemistry and physics, his M.S. in chemistry from Cornell University in 1980, and his Ph.D. in chemistry from Cornell University in 1983. After a postdoctoral appointment at Cornell and a three-year stint as a research chemist in the DuPont central research and development department, he joined the UO chemistry faculty in 1986.

David Johnson has achieved national distinction for his research on the novel synthesis of solid-state compounds and their characterization. He pioneered the use of kinetically controlled methods to synthesize new materials with practical applications. This is a nontraditional approach to chemical synthesis, and uses thin-film technology rather than combining reactants in solution. He is recognized for his creative academic research program in the synthesis of novel solid-state materials. His focus is on understanding the principal fundamentals in the processes, and his research—at the forefront of materials science—lies at the interface between chemistry and physics. As an example, Johnson has recently collaborated with researchers at three other institutions in producing a new insulation material based on tungsten diselenide with the lowest thermal conductivity ever reported for a dense solid. The material is a kinetically stable structure in between a fully disordered material and a fully ordered crystalline lattice. This work was recently published in Science 315 (January 2007): 351–53.

Johnson has emerged as a leader in establishing meaningful relationships with Oregon's high-tech industry, working with James Hutchison and Mark Lonergan to create the Materials Science Institute's graduate internship program. This program partners with over fifty companies, providing master's and doctoral students in chemistry and physics with opportunities to spend six to nine months as engineers and research scientists solving problems in an industry setting. These internships lead to career opportunities for the students, the development of well-trained employees for local industry, and improved survivability of start-up companies in the Northwest. Through such organizations as Oregon Nanoscience and Microtechnologies Institute and the Engineering and Technology Industry Council, Johnson has strengthened ties between local industry and the University of Oregon, and between the University of Oregon and Portland State University and Oregon State University. He has facilitated industrial access to expensive academic equipment through the establishment of CAMCOR—the Center for Advanced Materials Characterization in Oregon, Oregon's high-tech extension service.

—Hayes Griffith



A view of the inner workings of the deposition chamber in Dave Johnson's lab.

2006 Department of Chemistry Alumni Achievement Award in Applied Science

Tom Marriott—Team Builder and Leader in the Pharmaceutical Industry

Thomas Benton Marriott III received his B.A. from Carleton College in Northfield, Minnesota, in 1969. He earned his Ph.D. in chemistry at the University of Oregon in 1974, working in the laboratory of O. Hayes Griffith at the Institute of Molecular Biology. After graduating, Tom began his distinguished career in the pharmaceutical industry as a pharmacologist with Abbott Laboratories. This led to leadership positions at Ortho Pharmaceutical Corporation, the R. W. Johnson Pharmaceutical Research Institute, McNeil Pharmaceutical, and to the senior management positions of vice president for development research at NPS Pharmaceuticals and senior vice president for clinical and regulatory affairs at Zars Pharma. Tom has been a member or leader of multidisciplinary teams responsible for the development and approval of compounds effective for the treatment of epilepsy, pain, hypertension, primary and secondary hyperparathyroidism, and osteoporosis.

Throughout his career in a rapidly changing industry, Tom Marriott has served as a role model for leadership, mentorship, and the development of talents in others. Comments from colleagues in industry and academia include the following:

"He has an adept ability to skillfully integrate specialized topics ranging from gastrointestinal physiology and pharmacology to molecular biology and nutrition."

"He develops solutions and is open to new ideas."

"When one works with Tom, the output is not simply additive, it is synergistic through the magic of his influence."

"He is respected for his knowledge, ethics, honesty, and personality."

"He leads by example, maintaining a sense of balance between work, family, and community."

Tom Marriott resides with his wife, Lindsey, in Sandy, Utah. He is currently senior vice president for clinical and regulatory affairs and a member of the Executive Management Committee at Zars Pharma in Salt Lake City. Tom is also a member of the UO College of Arts and Sciences Advisory Council for External Relations.

—Hayes Griffith

Thomas B. Marriott in 2006. After receiving his award, Tom remarked, "I came to the university as a graduate student in 1969, in large part because of the Institute of Molecular Biology. The University of Oregon was one of the first schools to formally integrate the teaching and research of the departments of chemistry, biology, and physics. This interdisciplinary approach was very attractive to me. It was the solid interdisciplinary academic and research training I received here that helped me to flourish in the multidisciplinary R&D environment of the pharmaceutical industry."

2006 Department of Chemistry Alumni Achievement Award in Pure Science

Reg Mitchell—Outstanding Researcher and Science Educator

Reginald H. Mitchell was born in Woking, Surrey, England, on September 1, 1943. After growing up in south London, he attended Cambridge University and studied natural sciences at St. John's College, receiving his B.A. in 1965. He continued at Cambridge, where he was appointed as a research fellow at Fitzwilliam College, obtaining his Ph.D. in 1968 under the guidance of Professor Franz Sondheimer. He traveled to the University of Oregon in 1968 on a Fulbright Scholarship to conduct postdoctoral studies with Professor Virgil Boekelheide, and returned to the United Kingdom in 1970 to employment in the research division of Formica International at Maidenhead, near London. He returned to North America in 1972 as an assistant professor at the University of Victoria, and was promoted to professor in 1982. He has published 150 research papers and three book chapters, and is a member of the Canadian, British, and American chemical societies.

It was during his time in Eugene that the roots were firmly established for Reg Mitchell's more than thirty year career in the field of novel aromatic molecules. The chemistry of dimethyldihydropyrene, a bridged [14]annulene, has proven to be a gold mine for his group's studies. This molecule, when fused to another aromatic ring, is an exceptional spectroscopic probe to quantify the

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Reginald H. Mitchell, recipient of the 2006 Department of Chemistry Alumni Achievement Award in Pure Science

Recollections of undergraduate life in Belgium during World War II and coming to Eugene

By Professor Paul Delahay, one of the first Ph.D. graduates of the UO Department of Chemistry

The first group of Ph.D. graduates from the University of Oregon was in 1948. There were four—all physical chemistry students of Pierre Van Rysselberghe: Paul Delahay, Howard K. Zimmerman, Gilbert J. Hunt, and Charles Roland McCully. Today, Paul Delahay is the sole survivor of this pioneering group. He lives in Paris, France, where Hayes and Karen Griffith recently had the pleasure of being his guests for lunch.

After receiving his doctoral degree at Oregon, Paul Delahay joined the faculty at Louisiana State University in Baton Rouge. He rose through the ranks and became Boyd Professor in 1956. In 1965 he moved to New York University, was named the Frank J. Gould Professor of Sciences, and did his research there until his retirement in 1987. He is one of the most influential electrochemists of the twentieth century. Generations of young chemists studied his books New Instrumental Methods in Electrochemistry *and* Double-Layer and Electrode Kinetics. *Delahay's pioneering experimental and theoretical work has been recognized for numerous honors, including the prestigious Award in Pure Chemistry from the American Chemical Society in 1955, the University Medal from the University of Brussels in 1963, the Heyrovsky Medal from the Czechoslovak Academy of Sciences in 1965, and the Palladium Medal from the Electrochemical Society in 1967. In 1999 Delahay was named an honorary member of the International Society of Electrochemistry, and in 2001 he received the University of Oregon Alumni Achievement in Chemistry award.*

Paul Delahay was born in the Netherlands to Belgian parents. He began his undergraduate education in Brussels, Belgium. He earned a B.S. in general engineering from the University of Brussels in 1941, an M.S. in electrical engineering from the University of Liège in Belgium in 1944, and an M.S. in chemistry from the University of Brussels in 1945. This narrative, in Paul Delahay's own words, is a glimpse of his difficult undergraduate years in Belgium during World War II and the circumstances behind his coming to Oregon.

—Hayes Griffith

Professor Emeritus Paul Delahay at age 85 in Paris, France, March 8, 2007.

PART I: MY UNDERGRADUATE YEARS IN BELGIUM DURING WORLD WAR II

World War II began on September 1, 1939, with the invasion of Poland by Nazi German forces. I was admitted after a demanding entrance examination to the Polytechnic School of the University of Brussels in October 1939. This school was strongly inspired from its famous counterpart in Paris with emphasis on mathematics. This background turned out to be most useful in my research in the 1950s at Louisiana State University. My studies were interrupted on May 10, 1940, by the German invasion of Belgium, Luxembourg, the Netherlands, and France. Boys of my age were ordered by the government to go to France. This and the flight of the population of Belgium and France resulted in total chaos. I ended up in Montpellier in southern France, where I was lucky to find a room for rent. I was back in Brussels by early September.

Belgium at the time was treated by the Germans as a "war zone" under the control of the German army and its local commander, a Prussian aristocrat. The situation, under these circumstances, was not as bad as in occupied France, where Gestapo and SS were masters.

The university in Brussels reopened in October 1940 without significant interference by the occupying power. This lasted until early fall of 1942. The Germans then made unacceptable demands, and the university administration decided to close the school.

I transferred to the University of Liège, which had a good electrical engineering department. I was lucky to find a room for rent from the widow of a judge with four children. I returned to Brussels each weekend and brought back to Liège food to be cooked for me by the lady of the house. There was severe food rationing in Belgium at the time. My room and the buildings at the university were not heated. The temperature in lecture rooms and laboratories was often around twelve degrees Celsius in the winter.

The trip by train from Brussels to Liège was not pleasant in general, to say the least. This was the main line to Köln (Cologne), Germany, and there were often several cars reserved for the German army with stern sergeants shouting orders. The cars for the civilians were often overcrowded.

Each Monday, upon arrival in Liège, I had to cross the Meuse River on a bridge guarded by German sentries. These were older reservists who must have been bored to death but were better off in Liège than on the Russian front. They inspected my suitcase or simply waved me through. I never had a significant problem with them, but one never knew for sure what to expect. They might have sent you by

truck to dig trenches for the Atlantic Wall! There were rumors to that effect. I saw people being arrested in front of our house in Brussels as passing streetcars were stopped by German soldiers for inspection.

Everything came to a standstill at the University of Liège before D-day (June 6, 1944, when the allied forces landed on the beaches of Normandy, France) because of heavy bombing of railroads and stations. Thus, I remained at home in Brussels until the liberation by the English army on September 3, 1944. An unforgettable day! The southern part of Belgium was liberated by the U.S. Army the same day.

PART II: THE FINAL EXAMINATION FOR MY M.S. IN ELECTRICAL ENGINEERING, LIÈGE, 1944

Except for electronics, I passed all the final examinations for a degree in electrical engineering from the University of Liège after the liberation of Belgium in September 1944. The professor of electronics was not available at that time, and I had to return to Liège in December 1944.

Railroad traffic between Brussels and Liège was erratic at that time, and I went by bus. I found Liège in a state of siege with V-1 and V-2 bombs falling from time to time. The Battle of the Bulge and the siege of nearby Bastogne started a few days later on December 16, 1944.

[Note: The Battle of the Bulge was the huge German offensive into the icy cold and densely forested Ardennes region of eastern Belgium and northern Luxembourg. It got its name from the "bulge" the Germans put into the Allies' line. Over a million men—410,000 Germans, 400,000 Americans, and 92,000 British—fought, and the losses on all sides were horrific. The V-1 bomb, also known as the buzz bomb, was the forerunner of today's cruise missile. The more advanced V-2 was a true bomb-carrying rocket. After the war, the V-2 became the first rocket launched into space. —Hayes Griffith]

The professor, his wife, and his secretary were living in the basement of the electrical engineering building in the center of the city. The examination proceeded around noon in the makeshift kitchen with wife and secretary present. The professor was more interested in the news from Brussels than in asking questions about electronics. I passed the examination without any difficulty!

Returning to Brussels posed a problem as no bus was available, and I had to go by train. It took about twenty-four hours to cover the sixty miles to Brussels. This included a two-hour stop at a Red Cross shelter for coffee and bread in the middle of the night.

Upon arriving in Brussels, I found out that several windows of our house had been broken the preceding night, as a V-1 flying bomb had landed nearby.

PART III: GOING TO AMERICA

Pierre Van Rysselberghe, whom I met in Brussels in the summer of 1946, had invited me to spend a year in his laboratory at the university in Eugene. I was a junior faculty member at the University of Brussels at the time, and I was granted a one-year leave of absence.

I went from Cherbourg to New York on the ocean liner *Ile de France*. The ship had seen extensive service in transporting military personnel across the Atlantic during the war and had recently reverted to passenger service. The cabin equipment had not been changed yet and was rather basic. The dining room service and the food were excellent.

We arrived in New York on October 29, 1946, by good weather. I was on the upper deck well before the ship docked at the pier. It was dark and moist. Seagulls were following the ship and feeding on refuse thrown overboard by the kitchen staff. One could distinguish the lights of New York in the distance. Soon, there was an unimpeded view of the Statue of Liberty and the brilliantly lit western shore of Manhattan. A magic moment!

The pilot arrived in a small motorboat and boarded the ship. The tugboats with a big 'M' on their smokestacks (for the Moran Company) took their positions and started to maneuver the big liner along pier 88 on West 48th Street. These operations took some time, and it was broad daylight before the passengers began to disembark.

I spent two days in New York not knowing, of course, that I was destined to live at Washington Square for twenty-two years. Next, to San Francisco via Chicago by train in an old-fashioned Pullman sleeping car. Pierre Van Rysselberghe was waiting for me at the station in Eugene as I arrived from San Francisco by the overnight train.

—Paul Delahay

Postscript: There are two distinguished UO chemistry alumni who have written about the WWII era. Paul Delahay is one. The other one is Marion Hill '48, M.S. '49, former director of the Stanford Research Institute Chemistry Laboratory and recipient of the 1996 UO Alumni Achievement Award in Chemistry. Marion Hill was with the 365th Fighter Group and was wounded during a Luftwaffe attack on a Metz airfield in northeast France on New Year's Day, 1945. His memoirs of WWII, Eugene, and the UO are published in three parts in the 1995, 1996, and 1997 issues of Chemistry News *(available on the chemistry department website, http://www.uoregon.edu/~chem/news.html). Marion Hill had this to say after reading Paul Delahay's account of the conditions under which he took the final exam in engineering: "The front lines by late fall of 1944 had advanced almost all the way to Germany. A lull then set in because of extended supply lines and the winter. I was with my fighter group near Chièvres, Belgium [near Mons], in November and December 1944, until the Battle of the Bulge started on December 16. We were moved to Metz, France, at Christmas. The German offensive in the Battle of the Bulge was aimed partly toward the Meuse River and Liège, so it was little wonder that rockets were coming in on occasion. Brussels remained in Allied hands, so that Paul was able to travel to Liège. He must have had quite an adventure amid all the military activity and destroyed infrastructure. Very few people are left who know what the Belgian people went through. The fact that he persisted in getting his degrees amid all the turmoil [and tension because of the occupation] certainly attests to his character. The field of chemistry benefited tremendously as a result." —Hayes Griffith*

In Memoriam

Charles Jacobs

Charles Jay Jacobs standing with Hannah Grubb at the Department of Chemistry commencement ceremony on June 16, 2006. Hanna Grubb graduated with a bachelor's degree in biochemistry with departmental honors.

Charles Jay Jacobs of San Diego died September 7, 2006, of age-related causes. He was 93. Charles was born October 6, 1912, in Portland, Oregon, and raised in Portland by his parents, Minerva Monteith and Charles J. Jacobs. Charles attended the University of Oregon in 1930 and 1931, and went on to receive his B.A. in 1933 and M.A. in 1934 from Stanford. At Stanford he met his future wife, Margretta Young. Charles and Margretta married in 1937.

Charles began his professional career in 1934 at Shell Oil Company and subsequently held several industrial positions, including ten years (1936–46) as a chief chemist of the Pacific Can Company, and from 1946 to 1964 in a company that eventually became a chemical division of W. R. Grace and Company. In 1964 Charles became the new product manager for American Can Company in New York City.

In 1966, at age 55, Charles established a successful consulting company. In 1980 he and Margretta moved to San Diego, California, and continued consulting until his retirement in 1998. Charles played a role in the important transition from cork to synthetic organic seals in bottle caps and the packaging industry, greatly reducing food and drink spoilage. Charles was active in community land-use planning in San Diego.

Charles and Margretta took an interest in and supported higher education, and enjoyed talking with students. They established two endowments at the University of Oregon Foundation to benefit the Department of Chemistry. Charles and Margretta were also generous supporters of Stanford University. They remained happily married to the end. Margretta died August 10, 2006, at age 91, only weeks before Charles's death. They had no children.

—Hayes Griffith

Reg Mitchell—Outstanding Researcher and Science Educator

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strength of aromatic ring currents. In addition, this hydrocarbon is an extremely efficient photoswitch when irradiated, and thus has tremendous potential in the field of molecular electronics and devices.

A strong believer in science outreach, Mitchell has been involved in organizing the Vancouver Island Regional Science Fair for more than twenty-five years, and has demonstrated to more than 50,000 British Columbia youngsters the wonders of chemistry as "Dr. Zonk." In 2000 he received the Eve Savory Award for Science Communication from the BC Innovation Council as well as the Academic of the Year award from the Confederation of University Faculty Associations of British Columbia. In 2001 he received the University of Victoria Alumni Award for Excellence in Teaching.

—Mike Haley

Carmen Lisowski shares a laugh with visiting elementary school students during a science demo in the Willamette Hall atrium.

Alumnus Richard Ludescher looks at food in a new light

The luminescent properties of amorphous solids probably aren't on your mind when you enjoy a Jolly Rancher™ hard candy, but that's what alumnus Richard Ludescher thinks about every day. Ludescher earned a bachelor's degree in anthropology from the University of Iowa, then realized the social sciences were not his calling. In 1975 he enrolled in basic sciences as an undergraduate at the University of Iowa, earning enough credits to apply to graduate school as a science major. That eventually led him to the University of Oregon, where he graduated with his Ph.D. in 1984, working in the research group of Professor Bruce Hudson. He went to the University of Minnesota medical school for a postdoctoral position, then to Wichita State for a year, and then in 1988 went to the Department of Food Science at Rutgers, the State University of New Jersey. He is now a professor of food science.

His research is on the physical chemistry of foods and biomaterials and the development and use of luminescence (both fluorescence and phosphorescence) techniques to investigate their physical properties. "Solid biomaterials are usually not crystals," Ludescher notes. "For a chemist, a solid is a crystal. But actually, most solids in the universe are not crystals, they're what's called amorphous solids. They melt like a sugar melts, like glass."

Alumnus Richard Ludescher researches the fluorescent properties of food at Rutgers, the State University of New Jersey, where he is now a professor of food science.

In terms of food, almost all of the solid foods that we eat are not crystalline at all, but are actually amorphous solids, like pasta and hard candy. "It turns out that the most important . . . difference between a rigid brittle glass and a soft material is not anything about the structure of a material but how fast the molecules move," Ludescher explains. "What I do is develop luminescent techniques to measure that motion in amorphous sugars, carbohydrates, and proteins," he says, "and the idea is to develop novel techniques to do that . . . and then interpret the macroscopic properties of the material."

Ludescher's research focuses on the ability of oxygen or other gases to permeate the material, an important issue because oxidation is one of the most degradative reactions in food and pharmaceuticals. "By understanding what controls how oxygen moves through a solid, we'll then

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Alumni News

1940s

John T. Weisel '48; M.D., 1952, Oregon Health and Science University (OHSU); resident in ophthalmology, OHSU, 1956; fellow, American College of Surgeons, board-certified ophthalmology, 1958; visiting professor of ophthalmology, University of Santo Tomas, Manila, Philippines, 1970.

Weisel was founder and senior partner of the Medical Eye Center in Medford, Oregon (retired 1990). He is a past president of the Rogue Valley Medical Center, Rogue Valley Physicians Service, and the Jackson County Medical Society, and a former vice president of the Oregon Medical Association. Weisel sat on the scientific advisory board of Cooper Vision and many other professional organizations. Weisel is now living in Medford and Sunriver, Oregon. He is married, with four children. Weisel's memories of the chemistry department at Oregon are special, he says, fondly remembering professors Kunz, Heymann, and Reithel. Weisel was a laboratory assistant in his senior year. "I went to Oregon post–World War II with all the veterans. I had a very close and personal relationship with the professors I mentioned, and they were significant people in my education," he says.

1950s

Gary Christian '59; retired in September as professor of chemistry at the University of Washington. He served nine years as divisional dean of sciences in the College of Arts and Sciences. He

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Alumni News

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continues as editor in chief of *Talanta*, the international journal of pure and applied analytical chemistry, and keeps busy with other professional activities. He and his wife, Sue, live in Medina, Washington, with their granddaughter, Taffy.

Jerry Christian '59; Ph.D. in physical chemistry, 1965, University of Washington. Christian began his career at Hanford in 1965 and remained in the nuclear technology field for many years. From 1972 to 1974 Christian worked as a National Research Council senior postdoctoral fellow at NASA's Moffett Field, California, studying the kinetics of atomic oxygen reaction with nickel related to space shuttle reentry. Most of Christian's career has been at what is now the Idaho National Laboratory, where he developed technologies for immobilizing radioactive wastes, dissolution chemistry for naval spent nuclear fuels to enable recovery of the enriched uranium, and methods for production of the medical isotope Tc-99m. This work led to his becoming the world's leading expert in high-temperature ruthenium chemistry and in aqueous fluoride chemistry. Christian retired from the Idaho National Laboratory in 2001 as a scientific fellow, the highest technical ladder position. In 2000 he received the inaugural award for Distinguished Scientist/Engineer from the Idaho Academy of Science (in the previous year, LeRoy Klemm, Christian's first great UO chemistry teacher, received the Outstanding Scientist Award from the Oregon Academy of Science).

Since retirement, he has been involved in various consulting activities, including interesting, highly technical, and satisfying work as a technical expert witness successfully defending against antinuclear lawsuits. Christian continues to manufacture an instrument he developed that measures free hydrofluoric acid in acidic aqueous systems.

Of his UO chemistry professors from the 1950s, Christian remembers Donald Swinehart as a dynamic and highly motivating quantitative analysis teacher; Terrell Hill, a brilliant thermodynamicist; and Richard Noyes, an outstanding inorganic chemistry teacher. Christian also had enjoyable times on the Oregon track team under renowned coach Bill Bowerman, with teammates such as Bill Dellinger, Jim Bailey, Jim Grelle, Phil Knight, and Otis Davis. A high school science teacher and track coach at Elmira High School, Harald Platou (a UO alumnus), had a great influence on both Christian's twin, Gary (profiled above), and himself in motivating them to major in chemistry at Oregon.

After graduation from the University of Oregon with a B.A. in chemistry in 1959,

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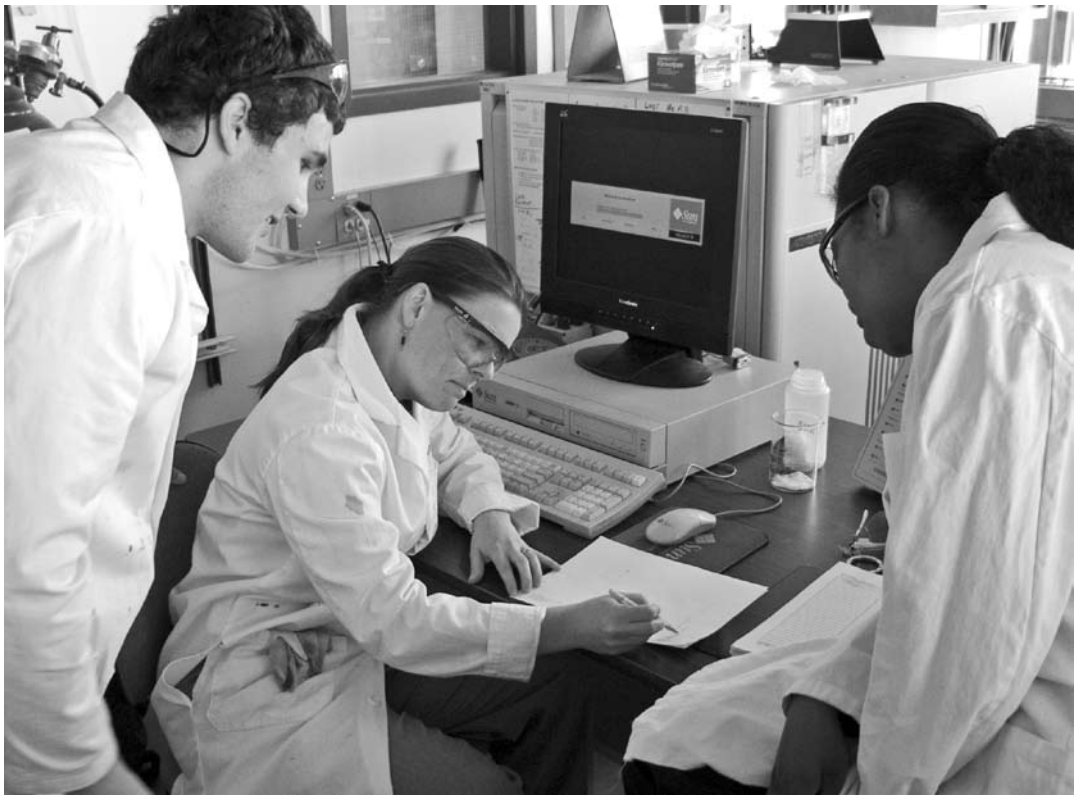

Erich Chapman, Bevin Daglen, and Takiya Ahmed consult on the next step.

Alumnus Richard Ludescher looks at food in a new light

➤ CONTINUED FROM 9

be able to possibly develop ways to . . . make coatings so the food will last longer, or develop better ways to prepare pharmaceuticals for long-term storage."

Ludescher was appointed Cook Campus dean for undergraduate education in fall 2006, an exciting position. "My function as a campus dean is to enrich academic life on the campus by development of programs that blur the line between course work and student life. It has very few traditional dean duties and a lot of creative new ways of doing things," Ludescher says.

Ludescher is an avid collector of books on the history of science, with hundreds of volumes in his collection. He has won numerous awards for teaching at the department, college, university, and national level (listed at http://foodsci.rutgers.edu/ludescher/awards.htm).

—*Vanessa Salvia*

Alumni News

➤ CONTINUED FROM 10

Jim Kennedy pursued a Ph.D. in biochemistry at the University of Minnesota at Duluth, but settled for a master of science. After graduation from the UM in 1965, Kennedy was employed within Minnesota at several facilities, including the Veterans Administration Hospital (as research biochemist) and a county hospital (as chief biochemist).

During this time, Kennedy also pursued graduate studies in computer science at Minnesota. Subsequently, he was employed by Honeywell Medical Management Systems as principal systems analyst and principal programmer while functioning as liaison between clinical laboratory personnel and Honeywell. During his employment, numerous minicomputer-based, medical management systems were installed at private and government hospitals within the United States.

Kennedy later transitioned into Honeywell Defense Systems, where he also pursued after-hours graduate studies in mechanical engineering, again at the University of Minnesota. Still later, in 1994, while employed by Honeywell Defense Systems (later spun off as Alliant Techsystems), Kennedy received a master of science with a specialization in mechanical engineering from the National Technological University (via satellite TV from Fort Collins, Colorado).

His career with Honeywell and Alliant spanned twenty-eight years, and, before retiring as principal design engineer, Kennedy was awarded five patents. After retirement, this busy alumnus now spends much of his spare time "(1) developing my website (www.askanalytic.com), (2) working in my yard, (3) trying to grow clematis, (4) fishing whenever I can find someone for company, (5) happily dog-sitting our daughter's beautiful Siberian Husky whenever I get the chance—and, most importantly, (6) awaiting the forthcoming September marriage of our only daughter." Jim and Marjorie have lived for forty-two years in the same home in Bloomington, Minnesota.

In 2002 Kennedy self-published a book with the title: *How's The Weather? Find Your Outdoors Comfort Paradise in the U.S.*

1960s

When **Samuel Greenschlag** attended the University of Oregon, he obtained a master of science degree in physical chemistry in 1963 under adviser Terrell Hill. His two favorite teachers were Swinehart and Graven. After graduating, he went to work in the aerospace industry for North American Aviation and subsequently Rockwell International, where Greenschlag worked on the re-entry heating encountered by the Apollo command module and the space shuttle. To do his job properly, he had to take additional courses in aerodynamics at UCLA. He's now retired and has moved to Westlake Village, California. His current interests are investing and gardening, but he retains an interest in chemistry as it pertains to alternate energy programs. Greenschlag would like to hear from some of his classmates by e-mail at sgreensc@roadrunner.com.

Jana Jacobsen graduate student

1970s

Daniel Olson, Ph.D. '72 (under adviser LeRoy Klemm), spent two years as a postdoctoral student at Ohio State doing organic synthesis with Melvin Newman. He joined the GE Global Research Center in 1974, intending to spend two years there before returning to Oregon. That was more than thirty years ago, and he is still at GE! It turns out that New York is a reasonable place to live and GE has provided lots of wonderfully interesting technical challenges. Olson was a unit and program manager for ten years at the research center, but for the past eight years he has gone back to the bench as a staff scientist and Six Sigma black belt. In 2005 he received his fiftieth patent. He plans finally to move back to Oregon (Bend) within the next year.

Dorayi Mohammed Aminu earned his M.S. '70 and his Ph.D. '73 from the University of Oregon under adviser Donald F. Swinehart. This Nigerian alumnus was appointed professor and study group director for the National Institute for Policy and Strategic Studies in Kuru, Jos, Nigeria.

Aminu sent us an e-mail describing the institute as "a high-level centre for reflection, research, and dialogue, where academics of excellence, seasoned policy initiators, and executors and other citizens of mature experience and wisdom, drawn from different sectors of Nigeria, meet to reflect and exchange ideas on the crucial issues

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Alumni News

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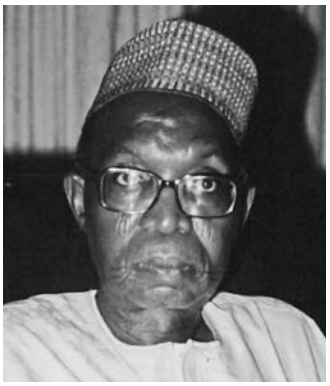
of society, particularly as they relate to Nigeria and Africa, within the context of a constantly changing world."

From February through November, the institute conducts a "senior executive" course for top-level policy makers and executors. Course participants are expected to achieve the skills necessary to think broadly and recommend and implement policies and strategies.

Aminu's duties at the institute include participating in seminars and general academic activities, as well as supervising the reporting duties of ten participants drawn from various segments of the Nigerian economy. Each year the institute focuses on a theme of study. For 2007 that theme is "Strategies for Resource Development in a Democratic Nigeria: 2007 and Beyond." Subthemes are on strategies such as "Development of Energy: Industrialization, Agricultural, Human Resources, Solid Mineral Resources" and "Information and Communication Technology."

At the end of each course, an annual summary of the findings is presented to the president of the Federal Republic of Nigeria. After the course, participants return to their agencies with the hopes that they can all make improvements for the future of Nigeria. Aminu's appointment to the institute took effect February 19, 2007.



Professor D. M. Aminu, Nigerian National Institute for Policy and Strategic Studies. Photo taken March 2007.

Takiya Ahmed in the Tyler lab.

Howard Budweg received his bachelor of science in chemistry from the University of Oregon in 1977. He was recruited by the United States Navy's naval engineering program and was commissioned as an officer in 1977. The Navy selected him for their postgraduate program and he later attended the Naval Postgraduate School in Monterey, California. Budweg earned a master of science in mechanical engineering in 1986 and completed his EIT certification in California that year.

Since leaving school, he has been a project engineer, a program manager, and a naval officer. He has been responsible for the management and oversight of major industrial and construction activities in U.S. Department of Energy sites, he has been a corporate compliance officer for several of the nation's largest architectural, engineering, and construction firms, and, as a naval officer, he was the project manager for nuclear submarine overhauls at Naval Sea Systems Command, Washington, D.C., where he developed and implemented the Navy's new approach to overhauling nuclear submarines.

His professional background has covered a wide range of major industrial technical expertise that includes extensive nuclear power plant experience. Budweg is also experienced in maintenance engineering, quality assurance engineering (ISO 9000), and environmental (ISO 14001) and safety and health compliance (OSHA 1910/1926). He is active professionally in several organizations: the American Society of Mechanical Engineers, the Association of Scientists and Engineers, Naval Sea Systems Command, and the American Society of Safety Engineers. Budweg is also a past member of the National Managers Association and the American Society of Naval Engineers. Budweg is currently working for the U.S. Department of the Navy as a federal employee of Naval Sea Systems Command, Washington, D.C. The position is responsible for the independent oversight of naval shipyard operations, safety, and compliance.

1980s

Parthasarathy Nambi, Ph.D. '85 (under the supervision of John Schellman), has been teaching at Bellevue Community College (north campus) near Seattle since about 1995. In addition to teaching, Nambi's current interests include finding new integer sequences related to chemistry. Nambi presented a poster paper with Neil Sloane of AT&T Labs in New Jersey on this topic at the fall 2006 American Chemical Society national meeting in San Francisco. Nambi hopes to give a seminar on this topic at the UO chemistry department some day. Nambi is writing a paper on this topic,

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and is also writing a paper on the color of turmeric with K. Balasubramanian. Nambi says this is a fascinating topic with much interesting chemistry, and can be a very useful demonstration in the undergraduate chemistry courses (performed with consumer chemicals that can be purchased from a grocery store!).

After graduating with a B.A. in chemistry from Oregon in 1988, **Ed Weaver** attended Yale University School of Medicine, completed a residency in otolaryngology and head-and-neck surgery at Yale, and was awarded a clinical research fellowship at the University of Washington. Weaver is now an associate professor of otolaryngology and head-and-neck surgery, and is the principal investigator in the sleep apnea research group at UW. He and his wife have four children, ranging from three months to nine years old.

1990s

Mitchel Martin graduated in 1990, earning his Ph.D. as Ed Herbert's last graduate student, and for the past twelve years he has been directing a group applying genetic-, genomic-, and bioinformatics-based technologies to identifying candidate drug targets and biomarkers at the pharmaceutical company Roche. Martin says, "We're optimistic that the recent elucidation of the human haplotype map will enable the dissection of complex disease, and boost the prospects for more targeted therapeutics. We shall see."

— Vanessa Salvia

COMMENCEMENT PROFILE

Snapshot: Department of Chemistry Graduates Spring 2005–7

Year	Undergraduates	M.S.	Ph.D.
2007	37	27	28
2006	30	29	16
2005	40	23	7

Roughly 90 percent of our undergraduates participate in undergraduate research. After commencement, 65 percent begin graduate school, 20 percent start their careers, and 15 percent pursue advanced degrees in dentistry and medicine.

—Julie Haack

Chemistry and biochemistry majors at the departmental commencement ceremony, June 17, 2006, in the Paul Olum Atrium. Photo taken by Zack Mensinger.

Chemistry Gifts, July 1, 2004–June 30, 2006

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1253 University of Oregon
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Chemistry News

An annual publication of the University of Oregon Department of Chemistry, distributed to alumni, faculty and staff members, postdoctoral fellows, students, and friends of the department.

Editor: Vanessa Salvia
Faculty Advisor: Julie Haack
Designer: Tim Jordan,
Creative Publishing,
University of Oregon
Printing: Printing and Mailing Services

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Takiya Ahmed, Ginger Shultz, and Bevin Daglen at work in the Tyler lab.