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THE UNIVERSITY OF IOWA
COLLEGE OF LIBERAL ARTS & SCIENCES

Department of Chemistry

www.uiowa.edu/~chemdept/

Summer 2005

Sesquicentennial Celebration Issue
150 Years of Chemistry at the University of Iowa (1855 – 2005)

Inside this issue:

The View From the Front Office

I had the opportunity a few days ago to welcome back to the Department a group of alumni that were visiting campus for the College of Liberal Arts & Sciences Alumni Reunion Weekend. It was great fun to meet with people who were part of this Department at different times and to hear their stories of life here in different decades. It was just a small slice of our 150 year history, but a very interesting one nevertheless.

It was fortunate that the Reunion Weekend was held when it was, because the renovation of our building has since begun in earnest. As I write this column the buzz of jackhammers and the whine of power saws fill the air, as I suspect they will for the next several years. The first step, the move of Chemistry Stores, is now complete and the storeroom now is open for business in a new location under 225 CB auditorium. With this key piece finished, demolition of the central core has begun. We've taught our last classes in the large auditorium 300 CB, or for that matter in the smaller lecture rooms 321 and 221 CB. By early fall, those rooms will be gone to make way for the new suite of instructional labs that will take their place. Detailed plans have been laid for the next phase of this project, and those for the following phase are well underway. At the same time, our faculty has undertaken an aggressive effort to secure grant support to expand the scope of this project, so there is still much to be done.

Soon the changes in our physical facilities will be visible to all, but the changes in our faculty and staff are just as extensive and even more important. Harold Goff has joined Don Burton in the UI's phased retirement program, and plans to retire fully at the end of the next academic year. However, two new faculty members joined us last fall (analytical chemists Gary Small and Don Cannon), and another joined in mid-year (organic chemist Greg Friestad). Two more faculty members are scheduled to join us by the end of the summer, organic chemist Chris Pigge and inorganic chemist Jan-Uwe Rohde. So despite some plans for future retirements, we will see our faculty numbers reach 28 for the start of the fall semester.

We're also in the midst of some significant growth in the size of our graduate program. We expect an incoming class of about 30 graduate students, which could push our total graduate enrollment to ~120. The College of Liberal Arts & Sciences has continued to support competitive TA stipends, and the Department has vigorously pursued support for graduate students through mechanisms such as the internal Presidential Graduate Fellowships and an external GAANN grant. At the same time, we have added several new staff members over the past year. Amber Seaton joined the Department as an administrator in August, Amy Michel Strathman joined us as a lecturer in the fall semester, and David Sansbury joined our staff as a systems administrator in January. Last but not least, Bettie Baumert joined the front office staff late last year and works directly with me, keeping the DEO mission on track and me out of trouble, among her other duties. These new additions to our staff reflect the strong support for our Department in the College and the importance of our mission, even in times of difficult state budgets.

As we look ahead, it's certain that the next academic year will hold its share of challenges. Yet even against a backdrop of turmoil from the renovation and uncertainty in the State budgets, I am confident the dedicated faculty, staff, and students will meet these challenges as they arise. With the support of the College, our alumni, and our many, many friends, we will make the most of each opportunity as this Department has for the last 150 years.

David Wiemer

By the Numbers — Spring 2005
Teaching and Research in the Department of Chemistry

26	tenure/tenure-track faculty
6	visiting assistant professors
2	lecturers
108	graduate students
75	undergraduate majors
25	postdoctoral associates
3	research scientists
22	professional staff

Organic Growth with Senior Faculty and Spectrum Improves with Junior Inorganic

The Department continues to grow with the addition of two organic faculty and one new inorganic faculty member. Associate Professor Greg **Friestad** joined the Department in January coming from the University of Vermont where he had been on the faculty since 1999. He earned his Ph.D. degree from the University of Oregon in 1995 and a B.S. degree from Bradley University in 1990. His research focus is synthetic organic chemistry with an emphasis on biologically active targets that have significant potential either as biological probes in health sciences research or as lead compounds for development of new disease therapies. A key feature of the synthetic methods developed in the Friestad group is a focus on making substances more efficiently and with less environmental impact.

Associate Professor Chris **Pigge** comes to the Department after having served on the faculty at the University of Missouri at St. Louis. He received a B.A. degree from the College of Wooster in 1989 and then earned his Ph.D. degree from the University of North Carolina, Chapel Hill in 1993. Pigge's research interests lie in the broadly defined areas of organic/organometallic synthesis and supramolecular chemistry. His favored synthetic targets are materials that are structurally related to biologically active natural products and supramolecular building blocks that can be used to make crystalline inclusion complexes, dendritic materials, catalysts, and molecular receptors.

The newest faculty member in the inorganic division, Assistant Professor Jan-Uwe **Rohde**, joins the department after four productive years as a postdoctoral fellow at the University of Minnesota. He earned his Diplom in 1997 and Ph.D in 1999 from the University of Kiel in Germany. His research interests focus on the activation of inert molecules by transition metals and the study and synthesis of multinuclear metal sites that mimic those found in metalloenzymes. His approach is to combine synthetic chemistry with spectroscopic methods of analysis, electrochemical methods, and crystallography to fully characterize the synthesized targets.

All of these new faculty will have an immediate positive impact on our research and teaching efforts. Their research interests compliment the ongoing work in the Department and offer fertile ground for diverse new collaborations within the department and across the University. We are excited about these new faces in the Department of Chemistry.

Biological Connections Interweave Many UI Chemical Research Programs

Although biochemistry has not been a part of our Department for almost fifty years, research into the chemistry of biological systems continues to be a major theme in the Department. There is an enormous diversity of work at the interface between chemistry and biology currently underway in the department ranging from research to develop novel analytical tools for use as biosensors to efforts to discover and synthesize new compounds that have potentially important biological activity and from studies of enzyme mechanism and inhibition to efforts to make designer enzymes with desired function and specificity.

Bioanalytical chemistry has been a departmental strength for many years. One long-standing research collaboration between the Mark **Arnold** and Gary **Small** groups involves the development of near-infrared spectroscopy and chemometrics to quantitatively measure blood glucose levels with the long-term goal of developing a noninvasive blood glucose sensor for use by patients with diabetes. Another exciting bioanalytical research area involves the work in Lei **Geng**'s group using laser spectroscopy for cancer detection. Don **Cannon**'s group is using nanometer scale electrodes to do electrochemistry on single nerve cells to explore the role of free radicals as signal transducers in brain chemistry. Inorganic students in Lou **Messerle**'s group are synthesizing metal cluster compounds as intense contrast agents for magnetic resonance imaging. Another inorganic group lead by Sonya **Franklin** makes designer molecules in the form of *de novo* designed lanthanide-binding helix-turn-helix peptides that act as artificial endonucleases to selectively bind to and cleave DNA.

Mechanistic studies of enzymes and enzyme catalyzed reactions are a recurring theme in a number of research groups. Harold **Goff**'s research into heme-proteins and peroxidases involves both inorganic synthesis and spectroscopy of exotic high-valent metalloporphyrins. The work in Dan **Quinn**'s group is focused on acetylcholinesterase, which is responsible for the hydrolysis of the neurotransmitter acetylcholine in the central nervous system. Their work focuses on understanding the enzyme's mechanism through experimental and computational methods, with the ultimate aim of developing newer and better enzyme inhibitors that might be useful as drugs in the treatment of Alzheimer's disease. Chris **Cheatum**'s group studies enzyme catalyzed reactions using recently developed two-dimensional infrared spectroscopic methods to study the role of enzyme vibrational dynamics in catalysis. These measurements explore a new paradigm in enzymology that emphasizes the relationships between structure, dynamics, and function. In addition, Amnon **Kohen**'s enzyme kinetics work is profiled later on page 7.

A powerful approach to making molecules with important pharmaceutical, agricultural, or ecological properties is to discover what nature does with the molecules it makes and to learn to make these molecules from common starting materials. Jim **Gloer**'s group examines fungi and fungal metabolites to discover new natural products that have the potential to be the next generation of antibiotics, anti-tumor, or anti-fungal compounds with important pharmaceutical or agricultural applications. Dave **Wiemer**'s group develops new synthetic methods with a focus on the total synthesis of biologically active organophosphorous compounds. The primary targets of their work, terpenoids, have important biological properties as anti-cancer, anti-HIV, anti-insect, and anti-fungal agents.

(continued from bottom of pg 2) Analogs of farnesyl pyrophosphate made in the Wiemer group hold promise as potential anti-cancer agents. Our new organic hires (see pg. 2) add to our strengths in this synthetic area.

Computational methods are becoming indispensable for researchers at the interface between chemistry and biology. Pioneering new quantum chemical methods, Jan **Jensen**'s group is able to predict the pKa and NMR chemical shift of protons buried deep inside of proteins and has gained insight into how proteins regulate the acidities of key residues. They recently set up a Web site where users can input a PDB file and the software will calculate the protein pKa's (http://propka.chem.uiowa.edu/). Claudio **Margulis**' group is aimed at predicting the structures of polysaccharides, which are composed of sugar sequences similar to proteins, but unlike proteins little is known about how to predict their structures. Polysaccharides are tagged onto the surface of many proteins and play a complex and often poorly understood role in the chemistry of life at many levels.

Counting up the number of research groups we have listed, you will discover that more than half of the faculty in the Department have research interests that lie at the interface between chemistry and biology. This area of research is a major strength in the department and drives many collaborations both within the University and with research across the world.

For Collegiate Alumni Fellow Sudarsky, Retirement is a Temporary Condition

As we announced in the 2004 newsletter, faculty and students were treated to a wonderful informal tale of the life and times of our College of Liberal Arts and Sciences Alumni Fellow awardee, Jerry **Sudarsky**, during a department visit on Sept. 9, 2004. His hour-long story was frequently punctuated by laughter as he gave us all a peek into his wild and unpredictable life adventure. Growing up in New York, his family could not afford college, but his high school baseball coach knew the UI baseball coach and Sudarsky got a baseball scholarship to attend UI. His family returned to eastern Europe to run small business ventures while he played intramural baseball as a pitcher and was a friend of Nile Kinnick. He was also a chemistry major from 1936 -1939. Hard times forced a return to New York to help support his family who had returned due to dangerous pre-WWII conditions and he eventually completed a chemical engineering degree at Brooklyn Polytechnic Institute.

Sudarsky's first job out of school involved working at a facility making baker's yeast. He then moved to the West Coast, borrowed $30K, and desired to start his own business involving yeast fermentation. He wanted to locate in San Francisco or LA, but he needed a large milk dryer for production and found one near Bakersfield that was too large to remove from the factory, thus he started out his business there (Bioferm Corp.). After an early stumble, he hit upon a lucrative strategy of buying used brewers yeast from LA beer companies, drying it out, and selling it as a protein additive for livestock feed. Later he cornered the market on a liquid vitamin B12 derivative as a chicken growth enhancer, outsmarting a powerful competitor, Merck.

Sudarsky describing his many retirements

Sudarsky regaled our students and faculty with stories of how his analytical deductive reasoning and consulting with academic experts at Stanford University played a key role in the development of his fermentation-based vitamin synthesis. Other company products included efficient biosynthetic routes to MSG (monosodium glutamate), and at one time he was producing a major portion of the world supply of this flavor enhancer. He also discovered (in his kitchen) how to turn chicken droppings into a high protein pet food additive and developed a non-toxic insecticide for farms and gardens. At age 47, he sold his business and retired for the *first* time.

Sudarsky then consulted for a UN agency giving industrial advice to developing countries. His big challenge was a politically charged project in Israel, organizing the transformation of five poorly run, government-owned chemical companies into one successful privatized company. It took five years to achieve success, but he created a profitable company (Israel Chemicals) that focused on turning local raw materials into value-added products. At this point, Sudarsky "retired" for the second time, though only briefly because a friend soon asked for his assistance in returning a major Northern California engineering firm to profitability (mission accomplished again!).

His challenge for the past decade or so involved the creation of a company that builds and leases fully outfitted research labs to major chemical and biochemical companies. This company (Alexandria Real Estate Equities) has sites in most major US biochemical centers and is a very successful, publicly traded company. Though officially retired for the fourth time, at 87 he still attends board meetings, goes into the office and shows no signs of slowing down.

Sudarsky fondly remembers his time spent at Iowa and appreciated being nominated for the Alumni award. He really enjoyed visiting the university and department and hopes to come back again someday.

(from left) Dan Quinn, Mildred Sudarsky, Jerry Sudarsky, David Wiemer

Alumni Reunion and Symposium 2005

In conjunction with the College of Liberal Arts and Science's alumni events, our Department held its own *Alumni Reunion and Minisymposium* on June 10, 2005. Professor Dan **Quinn** organized this reunion event. Two alumni speakers described their research adventures since graduating from UI. Shelley **Minteer** (Ph.D. in 2000 with Professor Leddy) is currently an assistant professor at St. Louis University and educated the crowd on how to design a functional fuel cell based on enzymatic reactions. She also illuminated the challenges of conducting research at a small college (we profiled her in our 2004 newsletter). David **James** (Ph.D. in 1975 with John Stille) is currently a senior research associate at BP America, Inc. in Naperville, Illinois and described his adventures with polyester chemistry and product development. He also walked the audience through his chemical genealogy and described Iowa connections to polymer development at BP and other companies (Dell Meyer, Noyes, Marvel, and Carothers, to name a few).

Professor Ed **Gillan** followed these alumni talks with a short presentation describing the early history of our Department in recognition of our 150th anniversary of chemistry instruction at UI (see later article in this issue). After that, the floor was opened for an informal discussion with other alumni attendees reminiscing about their days at Iowa and their recent research adventures. Curtis **Franz** (Ph.D. 1972) highlighted his challenges with the synthesis of a calcium polymer that is an active ingredient in digestive products such as FiberCon. William **Feld** (Ph.D. 1971) reminisced about a Burton versus Stille group softball rivalry and presented his Top 10 list of UI Chemistry memories. Compare his list on pg 15 with yours! He also shared a chemistry volleyball team photo, also shown on pg 15. Other alumni attendees were Lee-Shan **Leu** (Ph.D. 1992), John **Snyder** (B.S. 1985), and Erik **Walke** (B.A. 1991). The current students and faculty enjoyed socializing with the returning alumni at a reception following this afternoon event. We will organize additional alumni gatherings in the future. You should always feel free to stop in and visit!

(from left) Minteer, Feld, James, Franz

Gary Small and Walke

Send us your alumni update today describing your adventures in science, business, and life, and favorite UI memories! (see info on page 15)

Undergraduates Reel in Awards and Degrees

Our Chemistry undergraduates continue to provide creative additions to the laboratory research environment. They had a chance to showcase their scientific discoveries at our annual ***Undergraduate Poster Session and Awards Presentation*** on April 28, 2005. As you can see from the photos, the afternoon session was filled with vibrant scientific conversations. This year's *Chemistry Alumni Award* recipients were sophomore Julia **Brimeyer**, junior Alison **Uhl**, and senior Ann **Zachariah**. Other student awardees included Stephen **Barrett** *(Ken Sando Undergraduate Scholarship),* Laura **Parker** (*American Institute of Chemists Award*), Gillian **Woodburn** (*Analytical Chemistry Award*), Nadiya **Zelenski** (*Merck Index Award*), and Kelli **Paul** (*CRC Press Freshman Chemistry Award*). There were also three *Alpha Chi Sigma (AXΣ) Awards* presented to Scott **Tharp**, Gillian **Woodburn**, and Jacqueline **Alcantar** by the chemistry fraternity's Master Alchemist, Melissa Ward. Earlier this year, the College of Liberal Arts and Sciences awarded a *George S. Schaeffer Scholarship in Science* to Garth **Strohbehn**.

There were 75 declared Chemistry majors and 9 undergraduate Chemistry bachelors degrees awarded during the 2004-2005 year and Jonathan **Gourley** and Johann **Hochstrasser** graduated with distinction. Congratulations to these dedicated undergraduate chemists and best wishes to all of our recent graduates!

(from left) Barrett, Zachariah, Paul, Bowden, Woodburn, Ward, Parker, Zelenski, Uhl, Brimeyer, Alcantar

Science and socializing at the poster session

Graduate Students Receive Local and National Awards

University awards: The Department is again happy to announce that two new graduate students, William **Ames** (B.A., Macalester College) and Nolan **Mente** (B.S., University of Northern Iowa), have received highly competitive *University Presidential Graduate Fellowships*. Reygan **Freeney** (B.S., M.S., University of Northern Iowa) was awarded a *Graduate Assistance in Areas of National Need (GAANN) Fellowship*. These fellowships are made possible by a $1.8 million grant from the US Department of Education awarded to UI mathematics, engineering, and chemistry students (Professor Eyman is Chemistry co-PI). Kelly **Boss** and Ramon **Cuellar** received *Graduate Teaching Awards* from the University's Council on Teaching in 2004 and 2005, respectively.

National awards: Nitish **Agrawal** (Kohen group) obtained several competitive travel grants to attend scientific conferences in the past year, including one from the American Chemical Society (ACS) to attend the Green Chemistry Gordon Conference in July 2004 and another to attend the American Association of Advancement of Science meeting in February 2005. In October 2004, he also received a *Leadership Development Award* from the ACS Younger Chemists Committee at the Northeast Regional ACS Meeting. Agrawal also received a 2004 fellowship from the University's Center for Biocatalysis and Bioprocessing and earned his Ph.D. this summer. Tamara **Hamilton** (MacGillivray group) was selected by the ACS Division of Inorganic Chemistry as one of eight recipients of its inaugural *Young Investigator Award* and she will present a research lecture in an award symposium at the August 2005 ACS National Meeting in Washington, DC. She also received a 2005 American Crystallographic Association (ACA) *Margaret C. Etter Student Lecturer Award*. Hamilton received her Ph.D. this spring and will start a postdoctoral position with Professor Jim Wuest at the Universite de Montreal in September. Tony **Sokolov** (MacGillivray group) was awarded a *Pauling Poster Prize* at the 2005 ACA Annual Meeting. Zhenming **Zhong** (Geng group) is a recipient of an ACS Analytical Division Graduate Fellowship, successfully selected from a national pool of applicants.

Your generous contributions to our Department support people and scientific advances such as those you see on these pages.

(from left) Agrawal, Freeney, Ames, Mente, Boss, Hamilton, Sokolov, Cuellar, Zhong

Hind **Al-Abadleh** (2003 Ph.D. in Physical Chemistry with Professor Grassian) garnered university-wide recognition by winning a prestigious 2004 *D. C. Spriestersbach Dissertation Prize*. Only two of these are awarded each year for excellence in doctoral research at UI. Al-Abadleh is currently a postdoctoral researcher with Professor Franz Geiger at Northwestern University studying the mobility and transport of chromate pollutants in ground water using second harmonic generation. She has several published papers in prestigious journals and her postdoctoral work was highlighted in an April 2005 issue of *Chemical and Engineering News*. In July 2005, Al-Abadleh will start a tenure-track faculty position in the Department of Chemistry at Wilfrid Laurier University in Waterloo, Ontario, Canada.

(from left) Mark Arnold, Jan Jensen, Al-Abadleh, Sarah Larsen, Amy Strathman

Al-Abadleh returned to UI this spring for a University awards ceremony (photo above) and was very appreciative of the encouragement and mentoring she received from Professor Grassian and her Ph.D. committee. She was also grateful for the financial support provided by the Department and the UI Center for Global and Regional Environmental Research. She believes that her graduate training gave her the necessary skills to understand the challenges facing our global environment and is proud to be an Iowa graduate!

A Scientific Field of Dreams: Johnson Meets the Nobel Laureates in Germany

One of our graduate students, Elizabeth **Johnson**, was selected as a U.S. student representative to the 55th Meeting of Nobel Laureates in Lindau, Germany. Each year the UI Graduate College can invite up to two graduate students for a national competition, with the caveat that the students must be involved in research funded by the NSF Mathematical and Physical Sciences Division or Department of Energy's Office of Science. Johnson's Ph.D. advisor, Professor Grassian, is very proud of her selection to represent UI and the US at this international meeting.

Johnson shares strudel with Alan MacDiarmid, co-recipient of the 2000 Chemistry Nobel Prize for his research on electrically conductive organic polymers

Johnson had many individual meetings and photo opportunities with Nobel Laureates, including Fenn, Crutzen, Rowland, Townes, to name a few (photo at right). She loved the entire trip and said it was beyond her expectations. It was a busy event filled with lively panel discussions and seminars, social events with students from around the globe, and regional sightseeing tours . We congratulate her on this rare and well-deserved honor!

Nanoscience in Outreach, Research, and Teaching— It's a Small World After All

A Hands-on Nanoexperience

The Chemistry Department's 6th Working Weekends at Iowa was held October 22 - 23, 2004 with the research theme of *Nanoscience and Nanotechnology.* Professors Sarah **Larsen** and Amnon **Kohen** organized the latest in this series of successful workshops that were first introduced in 2001. This outreach program brings in professors and their undergraduate students from regional colleges to visit our Department and the University for short focused tutorials on modern chemical or analytical methods. Twenty-one undergraduate students and eleven faculty from local colleges (Augustana College, Drake University, Northwest Missouri State, St. Ambrose, Cornell College, and University of Wisconsin, River Falls), attended the workshop that featured topics such as nanoscale materials, nanoscale processes in the environment, biosystems at the nanoscale, electron microscopy, and undergraduate laboratory experiments in nanoscience. Some of the attendees brought samples from their current research projects and were excited to gain free access to the sophisticated instrumentation available at UI. Other students and faculty synthesized CdSe nanoparticles suspended in oleic acid (i.e., purified olive oil) solutions.

In addition to the intense weekend of tutorials and hands-on experimentation and analysis, the students and faculty enjoyed interacting with current UI Chemistry graduate students and postdocs who manned research posters during the group breakfast and lunch breaks. The Friday evening session was capped off by a barbecue dinner hosted by the AXE House. The Saturday dinner took place at the downtown Cottage restaurant where students described their weekend projects and several Chemistry faculty gave short presentations on their research. Judging from the feedback, this workshop on small science was definitely a very big success!

Faculty and student visitors make CdSe nanoparticle solutions (left) and perform UV-vis spectroscopic analysis on them (right).

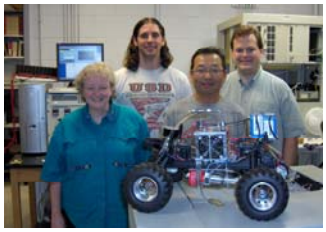
Big Influence of Small Solids

Iowa chemists appeared in several local and university publications describing ongoing efforts to educate undergraduates and graduate students in nanoscale science and technology. Chemistry professors Vicki **Grassian** and Sarah **Larsen** described how high surface area and very small particle size solids can have dramatically different effects in environmental arenas, as compared to their larger counterparts. Grassian along with colleagues in the College of Public Health, recently received a $335K grant from the US Environmental Protection Agency to study the potential impact of manufactured nanomaterials on human health and the environment. This area is receiving increasing public attention and will be critical in determining the factors that must be considered as nanoscience discoveries are incorporated into practical real-world uses.

In addition to Larsen's successful synthetic work producing monodisperse nanosized zeolite catalyst structures, she recently developed a popular freshman seminar course geared towards non-majors that seeks to demystify nanoscience concepts for Iowa undergraduates. These students got hands-on experience with materials properties using a Nano Toolkit available from the University of Wisconsin ICE program.

Alternative Energy Powers Supercharged UI Built Vehicle

In the 2004 newsletter, we reported that students in Professor Johna **Leddy**'s group constructed a small lab-built car that was powered by electricity generated by hydrogen-oxygen reactions in a stack of fuel cells containing platinum dispersed on a conducting carbon support. Luke **Haverhals** was not satisfied with the car's original design, so he created a larger, more rugged, and sophisticated version with a palladium hydride hydrogen fuel storage system. His colleagues, Wayne **Gellett** and Dr. Hachull **Chung**, assisted with the design and construction of the stack of fuel cells, which is at the heart of the car's power source. They debuted this fuel cell monster car at the 2004 Iowa State Fair (photo at right) and will bring it back for an encore at this year's fair. Haverhals and the fuel cell car have become local celebrities with front page spreads in the Daily Iowan and an interview on the local Channel 7 news (KWWL).



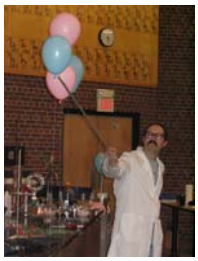
(from left) Leddy, Haverhals. Chung, and Dunwoody

Dazzling visitors at the State Fair with a home-built fuel cell car race track.

Gellett and Drew **Dunwoody** also designed a new and improved polymer electrolyte fuel cell (fuel cells of this design were used in the monster truck) and entered it in the 14th Annual Collegiate Inventors Competition in Akron, Ohio. They were one of 14 finalist teams selected from across the country. Their selection was profiled in the February 2005 issue of *Scientific American*. Thus, on many fronts, the Leddy group is working towards transforming fuel cells from an alternative energy of tomorrow to a practical alternative of today!

Telford Completes ACS Local Section Presidential Term and Wows Scouts with Demos

While the Iowa Chemistry Department has historic roots in American Chemical Society Local Section activities, in more recent times, section leadership and participation have come from smaller colleges in the region. That changed over the past few years when Professor Jason **Telford** became involved in the local section and agreed to serve as its president from 2002 – 2005. One of the most visible results of Telford's presidency was the local section meetings began to meet in Iowa City or nearby Amana colonies more frequently. These events, which included dinner and a seminar by an invited external speaker, drew new attendees from our Department. The local section subsidized all student dinner costs, which increased their participation in these events. One particularly memorable speaker described the chemistry of Sherlock Holmes. Even though Telford has completed his term as president, he is a co-organizer of the 2009 Midwest Regional ACS Meeting that will be held in Iowa City for the first time in more than 20 years. Telford also notes that 2005 marks the 100th year that the local ACS section has been in existence. A celebration picnic was held in mid July at Lake Macbride.



Telford has also presented an enthralling chemistry demonstration "magic show" for several years to cap off annual Boy Scout Merit Badge events coordinated by AXE House members that take place in our Department. These demonstrations include colorful changes in solution "clock" reactions, flashes of nitrocellulose combustion, explosions with hydrogen-filled balloons (see photo at right), and rapid implosions from soda cans under pressure. He supplemented all demonstrations with some description of the chemical process at work.

Final Chemistry Students in 300 CB: Chemistry 4:11 Final Exam May 12, 2005

Familiar Duo Summits the Tenure Peak

It seems hard to keep Professors Amnon **Kohen** and Len **MacGillivray** out of our annual newsletter. They first appeared together in 2002 when both earned NSF CAREER Awards and last year we profiled their research highlighted in *Chemical and Engineering News*. Now we proudly announce that this duo each received tenure and promotion this year and we offer them our congratulations!

Professor Kohen's research interests are at the physical-organic/bioorganic interface and he has made significant strides in improving the understanding of complex kinetics in enzymatic processes, specifically concentrating on hydrogen transfer processes. His group studies the role of whole proteins in active site reactions to address questions about why enzymes are so big, how protein dynamics affects catalysis, and which deviations from a protein's crystal structure are critical for function. Such investigations are of practical importance to the rational design of drugs and biomimetic catalysts. The Kohen group is strongly connected to the biosciences infrastructure at UI and he serves on a biosciences admissions committee.

MacGillivray and Kohen

The first Ph.D. degree from his group was earned by Kelli Markham in late 2004 and other successful group members (graduate student Nitish Agrawal and undergraduate Scott Tharp) are profiled in other articles in this newsletter. The Kohen lab is hitting its stride with six papers published in 2004 and similar number anticipated for 2005. These research efforts are funded by the NSF, National Institutes of Health, and Frasch Foundation. Kohen is also co-editor of a forthcoming book entitled *Isotope Effects in Chemistry and Biology*.

Professor MacGillivray's research interests are in the areas of supramolecular and organic solid-state chemistry. His group is working to change the way chemists think of the solid-state by showing that it is possible to construct molecules in the solid state with synthetic freedoms encountered in the liquid phase. The MacGillivray group utilizes small organic molecules as linear templates to assemble and preorganize reactant molecules in an appropriate position and alignment for chemical reaction. In addition to being able to synthesize molecules completely unavailable in the liquid phase, such investigations are of importance to the fields of green chemistry and materials science. The MacGillivray group is affiliated with the Optical Science and Technology Center, and the Biocatalysis program.

The first Ph.D. degrees from his group were earned by Dushyant Varshney and Tamara Hamilton. MacGillivray has published 43 papers since joining Iowa in 2000. These research efforts have been funded by the NSF, Honda, Inc., Research Corporation, and the American Chemical Society. MacGillivray currently serves on editorial boards of *Crystal Growth and Design*, *Crystal Engineering Communications*, and *Main Group Chemistry*, and is the reviews editor of the *Journal of Chemical Crystallography*.

150 Years of University of Iowa Chemistry (1855 – 2005): Highlights of the Early Days

The first Chemistry courses were taught during the fledgling State University of Iowa's first year of instruction in 1855. Our first professor, Josiah **Whitney**, apparently taught all courses with the most intriguing one entitled "The imponderable agents". The early years were somewhat turbulent, as a slate of several professors, some with Reverend in their titles, assumed various chemistry teaching duties through the early 1860s. In 1863, a young aspiring European chemist, Gustav **Hinrichs**, arrived to take charge of Chemistry instruction at Iowa as a Professor of the Physical Sciences in the Collegiate Department (predecessor to the College of Liberal Arts). Hinrichs (photo at right) grew up in a region of Denmark that was the center of significant German and Prussian upheaval in the mid 1800s. He studied chemistry and other physical sciences at the University of Copenhagen and graduated in 1860. Hinrichs then left a turbulent Europe for a more "stable" environment in America; however, he landed in the middle of the US Civil War and it took a few years before he made his way to the University of Iowa. One of his many major contributions to building an enduring chemistry foundation at Iowa was to design the first *Chemical Laboratory* and later serving as the first Director of the Laboratory. The 1870 catalog notes that students will "learn more in one day in the laboratory than they could learn in weeks from books". On a somewhat humorous side note, the catalog describes this laboratory as encompassing the entire first floor of the new North Hall building "fitted up according to the detailed plans of Prof. Hinrichs, as adopted by the Board of Trustees in 1866. For want of funds, only about one-third of these plans have yet been carried out." Thus funding scientific building construction was a struggle even in the early days! Hinrichs had a strong influence on many university and state institutions as he was a founding member of the Medical Department (~1869), and co-organized the Iowa Academy of Sciences and the Iowa Weather Service. He also authored nearly 300 articles in at least five languages and remained on the University faculty until 1886 when he moved to St. Louis and joined St. Louis University's Medical School.

Hinrichs

Hinrich left his Iowa chemistry foundation in the capable hands of Professors Launcelot **Andrews**, who became the new Director of the Laboratory, and Elbert **Rockwood**. They were active during the construction of the new *Chemical and Pharmaceutical Laboratory* building in 1891 at a cost of $50K (see photo below), which housed both chemical and medical laboratories. Both of these professors' scientific backgrounds included studies at the University of Goettingen (Germany), thus retaining an early European science presence. Andrews taught chemistry courses in the Collegiate Department, was given the nickname "Toughy" by students, and reportedly once challenged an Engineering professor to a dual with broadswords. Rockwood initially handled chemistry and toxicology teaching in the Medical Department, was an early member of the University's Pharmaceutical Department (founded in 1885), and briefly left to earn a Ph.D. in chemistry at Yale in 1904. Prof. Wilbur **Teeters** provided Chemistry instruction assistance before and during Rockwood's absence, and went on to become Dean of the College of Pharmacy in 1903. Upon Rockwood's return to the University, he assumed duties as the first Chemistry Department Head and continued in that position until 1921. Rockwood and his colleague, William **Karslake**, increased the department size considerably with the hiring of Professors **Pierce**, **Raiford**, **Bond**, and **Olin**; all of whom helped shepherd the department into the 20th Century. Bond earned one of Iowa's first Chemistry Ph.D.'s in 1914. As a young professor, Pierce recalled Rockwood telling him "…any time you feel that you can introduce a (new) course that will advance this department, you *do* it." Clearly Rockwood's mentoring and teaching were also appreciated by many medical students who eagerly contributed to a bronze bust in his memory (photo at left). Many of you will remember rubbing the nose of this bust for good luck before exams when it graced the entrance to our Department. It was stolen in the mid 1980's and only recovered a few years ago. The UI Art Museum has restored it and now its Departmental return only awaits funding for a proper secure pedestal.

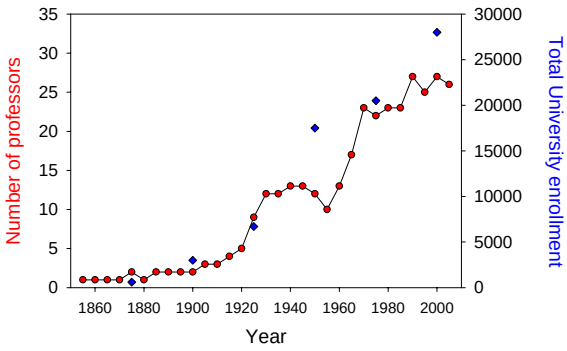
Andrews

Rockwood

In 1921, enter Professor Edward **Bartow**, who came from Illinois to assume the Department Head position from Rockwood. His first mission was to oversee the construction of our current Chemistry Building (CB - also included Botany and Pharmacy) in the early and mid 1920s. He hired additional faculty to fill these new, modern research facilities including **Coleman**, **Cornog**, **Mattill**, **Gibson**, **Eversole**, **Waldbauer**, and **Berg**. The 1920 - 1940 period was one of huge growth for the chemical research enterprise, which included the divisions of biochemistry and chemical engineering. Nearly 200 Ph.D. degrees were earned during this period, compared to 4 in the years prior to 1920. In 1925, Bartow and colleagues sponsored the founding of the Chemistry Honors Fraternity (Phi Lambda Upsilon) that was active until the mid-1970s. Newsletters from the 1940s show that a branch of the Chemistry Honor Sorority (Iota Sigma Pi) also existed, in addition to the Alpha Chi Sigma chapter that is still active today.

In 1940, a new external Department Head, Prof. George **Glockler**, arrived and ushered our Department through the war years and into the 1950s. During WWII, chemistry faculty instructed regular students in semester long regular courses, in addition to an overlaid three quarter system teaching army soldiers basic chemistry principles and giving "refresher" courses on organic explosives. During Glockler's term as Head, the Chemical Engineering division became a separate Department (~1952) headed by Professor **Kammermeyer** (some may remember his characteristic cigars?) with **Osborn** and **Major** (though they still resided in CB). Then in

1953, a major fire on the 5th floor of CB (an ether flask ignited) forced most of the Biochemistry division to relocate to the Medical Laboratories and today Biochemistry is part of the Carver College of Medicine. Ironically, Glockler was flying over Iowa City and saw the fire from his plane. Faculty growth continued in the 1940s with the addition of a new cadre of long serving faculty including **Wawzonek**, **Shriner**, **Buckles**, **Baenziger**, **Eyring**, **Tanford**, and **Sanderson**. In 1952, Shriner succeeded Glockler as Department Head and **Popov**, **Bennett**, and **Person** arrived, rounding out the first 100 years of Chemistry with faculty numbers near a dozen.



Within the limit of space and research source material, details of the exciting Departmental progress of more recent years will be delayed until later newsletters (it also avoids embarrassing mistakes that many of you would catch from your personal experiences!). Suffice it to say that for the last 50 years Chemistry Department growth has mostly tracked increases in student enrollment (see graph at right), growing to more than 20 faculty members by 1970, and seeing an expansion of the CB footprint to its present size (225 lecture hall and entire northwest wing). The CB building was partially renovated in the early 1980s, and is undergoing a major renovation and expansion starting this year. The last couple of decades have also been characterized by continuing growth and diversity, for example the first female senior professor (**Allen**) and first tenure-track female faculty member (**Grassian**) came on board in 1987 and 1990, respectively. While Rockwood is the longest serving departmental faculty member (47 years, including three as an instructor); Baenziger, Bennett, and **Burton** follow closely behind. The hard work and constant efforts of faculty, staff, and students have assured the security and growth of the University of Iowa Chemistry Department far into the distant future!

Record of Chemistry Professors at The University of Iowa (a work in progress - with the caveats listed at bottom of page!)

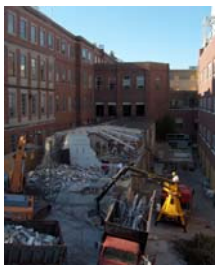
1855-1858	Josiah D. Whitney
1860	Rev. James Lillie
1860-1864	Rev. Oliver M. Spencer
1863-1886	**Gustavus Hinrichs**
1874-75, 1882-83	William C. Preston
1885-88, 1890-03	**Launcelot W. Andrews**
1888-1935	**Elbert W. Rockwood** (1st)
1901-1902	Wilber J. Teeters
1903-1904	William E. Barlow
1903-1904	Frederic Bonnet, Jr.
1905-1907	Carl L. von Ende
1905-1918	**William J. Karslake**
1907-1936	**James N. Pearce**
1907-1909	Charles D. Poore
1913-1918	Arthur W. Hixson
1918-1944	**Lemuel C. Raiford**
1919-1950	**Hubert L. Olin**
1918-1948	**Perry A. Bond**
1920-1949	**Edward Bartow** (2nd)
1924-1927	Victor C. Myers
1924-1946	**George H. Coleman**
1924-1954	**Jacob Cornog**
1926-1931	Stephen J. Popoff
1927-1948	**Henry A. Mattill**
1927-1948	**Robert B. Gibson**
1928-1946	**William G. Eversole**
1932-1943	**Lewis Waldbauer**
1935-1948	**Clarence P. Berg**
1937-1944	Jerome H. Arnold
1940-1957	**George Glockler** (3rd)
1942-1948	Joseph I. Routh
1944-1984	**Stanley Wawzonek** (5th)
1945-1949	Lothrop Smith
1945-1948	Cornelius S. Grove
1946-1949	Walter F. Edgell
1947-1964	**Ralph L. Shriner** (4th)
1947-1952	James O. Osburn
1948-1984	**Robert E. Buckles**
1949-1952	Karl Kammermeyer
1949-1994	**Norman C. Baenziger**
1949-1962	**Leroy Eyring**
1949-1954	Walter T. Smith Jr.
1949-1961	**Charles Tanford**
1950-1965	**Robert T. Sanderson**
1950-1952	Coleman J. Major (to Chem. E.)
1952-1961	Alexander I. Popov
1953-1996	**William E. Bennett**
1955-1967	**Willis B. Person**
1956-1992	**Ronald T. Pflaum**
1957-1970	**Richard D. Campbell**
1957-1994	**John R. Doyle**
1959-1978	**John K. Stille**
1960-1968	Wilmer G. Miller
1960-1996	**Edward B. Buchanan Jr.**
1961-1998	**E. David Cater**
1961-2002	**Donald J. Pietrzyk** (9th)
1962-	**Donald J. Burton**
1963-1968	David M. Schrader
1964-	**Darrell P. Eyman** (10th)
1964-1969	Merle M. Millard
1966-1982	**Clyde W. Frank**
1966-2000	**H. Bruce Friedrich** (7th)
1966-1969	Thomas A. Rettig
1967-1974	Gilbert Gordon
1967-2002	**Robert E. Coffman**
1968-1976	Fredrick R. Duke (6th)
1968-1984	**Dimitri N. Coucouvanis**
1968-1994	**William C. Stwalley**
1968-1998	**Leodis Davis** (8th)
1969-2002	**Vasudewan Nair**
1969-1998	**Keneth M. Sando**
1969-2002	**Dwight C. Tardy**
1976-	**Harold M. Goff**
1978-	**David F. Wiemer** (12th)
1979-1982	Alexander Scheeline
1982-	**Mark A. Arnold**
1982-	**Daniel M. Quinn** (11th)
1984-	**James B. Gloer**
1984-	**Louis Messerle**
1984-1992, 2004 -	Gary W. Small
1985-1992	William J. Scott
1987-1994	Susan D. Allen
1988-2000	**Richard F. Jordan**
1990-	**Vicki H. Grassian**
1990-	**Mark Alan Young**
1991-2002	**Leslie B. Sims**
1991-	**Johna Leddy**
1993-2002	Nancy I. Totah
1993-1996	Stephen Johnson
1994-2002	Josef Simeonsson
1995-	**Lei Geng**
1995-	**Sarah C. Larsen**
1997-	Edward G. Gillan
1997-	Jan H. Jensen
1998-	Sonya J. Franklin
1999-	Norbert J. Pienta
1999-	Amnon Kohen
2000-	Leonard R. MacGillivray
2000-2004	Robert J. Linhardt
2000-	Jason R. Telford
2002-	Ned B. Bowden
2003-	Christopher Cheatum
2003-	Claudio J. Margulis
2004-	Donald M. Cannon, Jr.
2005-	Gregory K. Friestad
2005-	F. Christopher Pigge
2005-	Jan-Uwe Rohde

This listing does not include numerous instructors and demonstrators; after 1910 only those serving 3 or more years are listed, end dates are approximate (±2 yrs) based on list of active Departmental faculty in the University catalog, **bold** indicates terms longer than 10 years, and (1st, 2nd, etc.) shows Dept. Head/DEO service.

References Keyes, Charles, "In Memoriam: Gustavus Detlef Hinrichs", *Proceedings of the Iowa Academy of Sciences* **1923**, 30, 29.
Perry A Bond "Oral History Interview", *University of Iowa Oral History Project*, 13, **1976** (Archives ref 3:4)
Pierce, James Newton, "In Memoriam: Elbert William Rockwood", *Proceedings of the Iowa Academy of Science*s **1936**, 43, 34.
"Memoirs of Edward Bartow", *University of Iowa Archives*, vol. 1, #1-11 (LD2568.3.S8)
Department of Chemistry Newsletters (1941 - 1969), 1893, 1894, &1914 Hawkeye Yearbooks, and every University Catalog from 1855 - 2004.

Building Renovations Begin—UI Chemistry Jackhammers Itself into the 21st Century

Our old dungeon-like Chemical Stores has been replaced by a brighter and much safer one, located under the 225 CB lecture hall. Solvent handling is particularly improved with flammables cabinets in smaller storage rooms. The Stores manager, Gene **Hauge**, and his co-workers, Tim **Orris** and Tim **Koon**, seem more cheerful and friendly since we moved them to this sunnier locale. The modern computerized checkout system speeds students through their purchases and early comments by faculty, staff, and delivery agents has been very favorable!



Students have departed 300 CB for the last time (photo pg. 7) and demolition workers are ripping out the old wooden seats as you read this. Inner courtyard windows are boarded up and the annex (one-time Pharmaceutical Lab) is being demolished (photo at left, open windows of 300 CB are visible at the center back of image).

Look for updates in our next newsletter and on our Web site as this major 21st century upgrade moves forward!

Old Chem Stores

Hauge, Orris, and Koon in the new Chem Stores

Good News and Updates From the Chemistry Faculty

Ned **Bowden** received a $20K American Cancer Society seed grant awarded by the UI Holden Comprehensive Cancer Center for research directed towards the fabrication of a new type of biosensor that uses silicon to track, detect, and study cancer.

Donald **Burton** was re-elected to a three-year term as Councilor for the ACS Division of Fluorine Chemistry. He wrote an invited chapter in the 2005 ACS Symposium Series (vol. 911) on "Fluorine Containing Synthons" and another invited chapter on fluorinated organozinc reagents in the long-running Patai Series entitled "The Chemistry of Functional Groups". In 2005, Burton published six full papers in the *Journal of Organic Chemistry* or *Journal of Fluorine Chemistry*. He also presented an invited Plenary Lecture at the 17th International Symposium on Fluorine Chemistry (Shanghai, China) in July 2005 and will present another one in the "Current Frontiers of Fluoroorganic Chemistry" symposium to be held at the 230th ACS National Meeting in Washington, DC in August 2005.

Sonya **Franklin** received a $479K three-year grant from the National Science Foundation (NSF) Biological Sciences Directorate for a study entitled "Structure and Selectivity of Designed Metallo-homeodomains".

Edward **Gillan** is the Chair of the ACS Division of Inorganic Chemistry's Solid State and Materials Chemistry subdivision. He administered a national competition for the 2005 ExxonMobil Solid State Chemistry Faculty Fellowship. He will chair the awards session at the fall national ACS meeting in Washington, DC.

James **Gloer** was awarded a $353K grant from the National Institutes of Health for research studies on the isolation of biologically active natural products from fungi. He is searching for new antibiotics in classes of fungi that are particularly adept at killing neighboring fungi by releasing toxic substances.

Vicki **Grassian** was appointed to a three-year term on the *Journal of Physical Chemistry (A and B)* Editorial Advisory Board and was appointed to the science advisory board of NanoScale Materials, Inc. (Manhattan, Kansas), which is a company founded by UI chemistry alumnus Professor Kenneth Klabunde (1969 Ph.D. with Burton) from Kansas State University. Grassian gave an invited talk at the 5th Meeting of the European Geophysical Union, in Vienna, Austria. In addition to the EPA nanoparticle grant noted on page 6, she received an $80K grant from the ACS Petroleum Research Fund to use atomic force microscopy as an *in-situ* probe of surface chemical reactions that occur under ambient conditions and a $488K grant from the NSF to study the impact of physicochemical processes on the optical properties of mineral dusts in collaboration with Professors Mark **Young** and Paul Klieber (UI Physics). Grassian along with Professor Bowden was also the major force behind a successful $180K NSF grant to purchase a new scanning probe microscope that will be installed in the University's microscopy facility.

Sarah **Larsen** was elected Chair of the College of Liberal Arts Faculty Assembly in 2004. She is working to turn that governing body into a more relevant force in collegiate decision-making processes.

Leonard **MacGillivray** received a 2004 Margaret C. Etter Early Career Award from the American Crystallographic Association (ACA) and a Dean's Scholar award from the College of Liberal Arts and Sciences. He gave several invited international lectures in the past year, including a plenary lecture at the 13th International Symposium on Supramolecular Chemistry at the University of Notre Dame, a keynote lecture at the 39th Congreso Mexicano de Quimica of the Mexican Chemical Society in Merida, Mexico, and several lectures in Croatia. He also presented over a dozen invited lectures around the U.S. at various universities (*e.g.*, Notre Dame, Purdue, Michigan, Michigan State, and Oregon) and regional or national scientific meetings, notably the 2005 Annual ACA Meeting and the 2nd International Conference on Green and Sustainable Chemistry.

Norbert **Pienta** has been selected by the Provost to serve as the new Director of the University's Center for Teaching.

UI Chemical Research in 2004

published papers	patents (filed & issued)	research expenditures
78	5	~$4.4 million (fiscal 04 - 05)

Staff Members Reinforce Department Foundations

Below we introduce you to several new faces that we recently welcomed into our Department. We hope they will enjoy many years of respect and collegiality in our growing Chemistry family!

Bettie **Baumert** has joined our department to take over the reins of a high profile clerk position assisting DEO Wiemer and providing support for faculty and staff appointments, among a growing list of other things that keep our department running smoothly. Prior to joining the Chemistry team, she worked as a secretary in the UI Hospitals - Child and Health Specialty Clinics. Bettie is happy to return to our side of the river and join our growing Department.

Sharon **Robertson**, a member of the Chemistry Department's main office staff, was recognized with a College of Liberal Arts and Sciences *Improving Our Workplace Award (IOWA)* earlier this year. She was nominated by Professor Burton in recognition for her amazing efforts in assisting with a very complex faculty search in fall 2004 that resulted in two successful senior organic hires.

David **Sansbury** joins our Departmental information and technical services area to assist Jeff Miller with computer maintenance and software and hardware support. He previously worked as a systems analyst at the University of Oklahoma in their housing and food services administration. In one of his early amazing feats at UI, he recovered all the data from a malfunctioning X-ray facility hard drive by cooling it on a block of dry ice, which stabilized the electronics enough to allow a slow but complete transfer of data. Now that is an impressive melding of chemistry, physics, magnetics, and electronics!

Amber **Seaton** joined our department as an administrative assistant and works directly with Hazel Kerr on administration of research grant accounts, facilitating new faculty arrivals, and assisting with preparations for our rapidly approaching renovation adventures! We are fortunate that Amber previously worked in the university's grants accounting division and is very familiar with the UI system. She also has past experience working in our College and was a work study student in our Department. Amber was awarded a 2005 *Mary Louise Kelley Professional Development Award* from the University.

Amy **Strathman** rejoins our Department as one of two lecturers, the other is Dr. Russell Larsen, who are primarily responsible for designing and presenting the new case study lectures and demonstrations that compliment the general chemistry laboratories. She and Larsen also coordinate with the graduate teaching assistants that supervise the laboratory sections. Amy returned to Iowa City from Washington State after a short stint as a chemistry professor at the University of Puget Sound. Prior to that she was a postdoctoral researcher with Professor Grassian from 2001-2003. She earned her Ph.D. from the University of Colorado and B.S. from Ursinus College in Pennsylvania.

Several familiar faces have joined our visiting assistant professor ranks. They are John **Thurston** (Ph.D. 2003 Rice University, postdoctoral researcher with Messerle), Kelli **Markham** (Ph.D. 2004 with Kohen), Dale **Miller** (Ph.D. 2004 with Gillan) and they taught lecture sections for our large general chemistry teaching mission.

Graduate Degrees in Chemistry Awarded in 2004 - 2005

There were 10 M. S. Chemistry Degrees awarded in the past year (advisor's name in parentheses): Cara **Bonnema** (Gloer), Sofia **Carlos-Cuellar** (Grassian), Ramon **Cuellar** (Pienta), Alice **Eck** (Geng), Ebony **Price** (MacGillivray), Lanell **Rupert** (Larsen), Maya **Salnikova** (Wiemer), Jose **Tormos** (Quinn), Zhenming **Zhong** (Geng), and Yajun **Zhu** (Arnold).

There were 15 Ph. D. Chemistry Degrees awarded over the past year. They are (advisor's name and dissertation title in parentheses): Jun **Chen** (Arnold, Spectral Processing Tools to Improve and Characterize Near Infrared Spectroscopic Measurements of Glucose in Complex Biological Matrixes), Russel **De Silva** (Eyman, Synthesis and Characterization of Manganese and Cerium Oxide Catalysts Supported on Gamma-Alumina and Catalytic Application in Denox Reactions and Oxidative Dehydrogenations of Propane), Wayne **Gellett** (Leddy, Magnetic Microparticles on Electrodes: Polymer Electrolyte Membrane Fuel Cells, Carbon Monoxide Oxidations, and Transition Metal Complex Electrochemistry), Tamara **Hamilton** (MacGillivray, Metal-Organic Polygons, Polyhedra and Extended Structures—Assemblies Arising from Products of Template-Directed Synthesis in the Solid State), Conrad **Jones** (Larsen, Solid State MAS NMR Studies of Zeolites), Brenda **Krueger** (Grassian, The Heterogeneous Chemistry of Mineral Dust and Sea Salt and Their Components with Trace Atmospheric Gases), Gonghu **Li** (Grassian/Larsen, FT-IR Studies of Zeolite Materials: Characterization and Environmental Applications), Mark **Lowry** (Geng, Studies of Capillary Electrochromatography and Retention in Reversed-Phase Chromatographic Stationary Phases Using Confocal Fluorescence Microscopy), Kelli **Markham** (Kohen, Mechanistic Studies of Enzymatically Catalyzed Hydride Transfer Reactions Utilizing Nicotinamide), Dale **Miller** (Gillan, Molecular Single Source Precursors for Synthesis of Nitrogen-Rich Carbon Nitride Materials), Donald **Nolting** (Messerle, Polynuclear Lanthanide and Yttrium Complex and Tungsten Bromide Cluster Chemistries Relevant to Diagnostic Imaging and Protein Crystallographic Phasing), Ricardo **Reategui** (Gloer, Chemical Investigations of Fungicolous and Freshwater Fungi), Dino **Ress** (Linhardt, Progress in the Synthesis of Sialic Acid Containing C-Glycosides of Potentially Therapeutic Carbohydrate Epitopes), Dushyant **Varshney** (MacGillivray, Controlling Reactivity in Molecular Solids Using Linear Templates), and Gufeng **Wang** (Geng, Fluorescence Studies of Apomyoglobin Folding and Two-Dimensional Fluorescence Correlations Spectroscopy).

The number of advanced degrees increased 25% from last year, so we are steadily populating the scientific community with a growing crowd of well-trained UI chemists! The Department is proud of this group of talented Chemistry practitioners and we wish them the best in their future scientific endeavors!

Alumni News

Sent in from former students and notes from faculty members about their former students.

from the 1930's

Margaret E. Thomas **Berhenke** (1931 B.S., 1933 M.S., 1935 Ph.D. working with Professor Pearce) sends greetings to any other surviving students from the "good old days"! During her time at UI, in addition to her research with Pearce, she worked as a graduate assistant to Professor Bond. She married Dr. Luther F. Berhenke, who was also a graduate student working with Pearce and received his Ph.D. in 1934. Luther was also a graduate assistant to Professor Cornog. After finishing his degree, Luther was employed as a research chemist for Dow Chemical Company for 38 years, receiving a number of patents and retiring to Longmont, Colorado in 1972. At Longmont, Margaret reports that they were actively involved in community activities. Luther died in July 1998 at age 89. Margaret is now 94, still lives in her own home, and does some gardening and other home activities.

from the 1940's

William (Bill) **Doerres** Jr. (1942 B.S., his active military WWII service was noted in our 1944 Departmental Newsletter) sends us regular notes on art and music and a portion of one of his poems "Artists Life" (dedicated to Liebig and Professor Waldbaur) is written here: "Give me the artist's life. That's so free of care and strife. They laugh and sing and play all day and at night they dance their cares away. O Danube so blue, when I think of you. My heart seems to glide, like the breeze outside. Where your fair face gleams, thinks so. Spritely seem this song, this song to you."

Editor's note: We'd love to hear more about UI Chemistry in the 1930's - 1950's, an evolutionary period filled with growth & change for our Department!

from the 1950's

Calvin **Hanna** (1949 B.S., University of Illinois; 1950 M.S., Organic with Professor Smith; 1953 Ph.D. in Pharmacology with Professor Gross) began his academic career with Instructor and Assistant Professor positions at the University of Tennessee Medical College (1953 - 1955), followed by a move and promotion to Associate Professor at the University of Vermont Medical School (1955 - 1961), and finally a long career as a Professor of Ophthalmology and Pharmacology at the University of Arkansas College of Medicine (1961 - 1989). He is now an Emeritus Professor at the University of Arkansas. During his career, he also did consulting work for Brookhaven National Labs in New York, the National Institute of Health, and the Food and Drug Administration (OTC Drugs Panel, 1973-1980). Hanna was the first to find a fungus that could produce cartenoids (Dacrymyces ellisii in 1953) and to demonstrate that narcotic addiction; i.e., tolerance and withdrawal, could develop in smaller animals. He later determined that donor cells in a heterograft survived, in contrast to the conventional belief at the time that these cells died and hence graft rejections were ignored. Hanna founded the Tissue and Organ Foundation (Eye and Kidney Bank) in Arkansas in 1969 and was the first to use the phrase; Give the Gift of Sight, Life (that Lives after You). His more recent research activities involve a process to make an aqueous clear solution of hydrocortisone, for which he received a US patent in 2004. This patent award was a long struggle, since it took him five years to convince the patent reviewer that his clear solution was distinctly different than previous formulation of nearly water insoluble, opaque hydrocortisone solutions.

from the 1960's

Professor Ned Bowden (our resident organic polymer expert) spotted national recognition for William **Culbertson** (1963 Ph.D. in Organic Chemistry with Professor Stille) who received a 2004 *Industrial Sponsor's Award* from the ACS Division of Polymer Chemistry in recognition for outstanding industrial innovation. In 2002, Culbertson was also inducted as Fellow of the Polymeric Materials Science and Engineering (PMSE) Division of the ACS. Our 1964 newsletter notes that his first postgraduate job was polymer research at the Archer Daniels Midland Plastics Division in Minneapolis. Culbertson then established a long and successful 27 year career in polymer chemistry, much of it spent working at Ashland Chemical Co. where he was awarded nearly 40 patents! He followed an industrial career with a productive academic career as a Professor in the College of Dentistry at Ohio State University.

Mark **Marcus** (1966 B.S.) writes that after his chemical beginnings performing research with Professor Pflaum in our Department, he obtained a Ph.D. at Kansas State University in 1970 and then became an Assistant Professor at Marquette University. He notes that he had several talented undergraduate research assistants, notably one was our current Department Executive Officer, Professor David Wiemer. Marcus also sent us a great photo of Wiemer as an undergraduate in the laboratory!

After his career at Marquette, Marcus joined the Midwest Research Institute and developed analytical methods for the Environmental Protection Agency (EPA) that are still used today (gas chromatography/mass spectrometry methods for volatile and semi-volatile compounds). He also worked for several companies in the hazardous waste management industry and made significant contributions to improving the industrial handling of hazardous waste. Marcus was also involved in the operation of one of the major U.S. commercial environmental laboratory networks and is currently a contractor with the Department of Energy where he is involved in radioactive and hazardous waste remediation at the DOE's Hanford site. He also sits on EPA advisory boards and was previously on a trade association's Board of Directors and on the ASTM's editorial board. Marcus currently resides in Pasco, Washington.

from the 1970's

Mark A. **Mitchell** (1975 B.S.) performed UI undergraduate chemistry research with Professors Don Burton and John Stille, then worked with Professor Larock at Iowa State University before moving on to Caltech where he earned his Ph.D. in 1982 working with Professor Peter Dervan. Mitchell's career as a medicinal chemist began at Upjohn in Kalamazoo, Michigan in 1982. He saw that company transform into Pharmacia and later becoming part of Pfizer. His research projects spanned cancer and antiviral targets. His personal favorite research challenges were drug/DNA interactions, matrix metalloproteinase inhibition

for cancer, and RNA polymerase inhibition for Hepatitis C antivirals. In 2003, Pfizer moved discovery research to Ann Arbor and Mitchell joined the Information Management area that provides chemical literature support and data search services to researchers in the Pharmaceutical Sciences.

Mitchell has fond memories of his time in our Department in the early 1970's where his organic chemistry foundation was shaped by Burton and Stanley Wawzonek. He remembers Wawzonek's characteristic pipe and the support and guidance he received from Professor Baenziger. He also appreciated the Departmental support he received as an undergraduate, in one case, using a $150 scholarship to buy a Texas Instruments calculator and ditch his slide rule forever, noting that tuition was only about $320 per semester at that time!

Mitchell's undergraduate Burton memories include exams filled with fluorinated organic molecules, a summer reading on Ylid chemistry (a book he still has!), playing on the Burton group softball team, and repeated reminders to turn on the helium *before* turning on the GC filament. His research in the Stille group focused on palladium catalyzed carbonylation chemistry, with memories of a Parr rocker used as a supercharged carbonylator!

Mitchell says that he "feels to this day that the opportunities to work in a laboratory research environment early in my career remains the most important aspect of my UI chemistry education". He also sent a wish to the Department for the best of fortunes as we chart our path forward through the next 150 years.

from the 1990's

Angie **Goodman** (2000 Ph.D. in Physical Chemistry with Professor Grassian) is now working at a Department of Energy laboratory outside of Pittsburgh (National Energy Technology Laboratory) and is conducting research on carbon dioxide sequestration.

In Memoriam

The following alumni and a member of our extended Departmental family have passed away recently :

Kathryn Chadima informed us of the death of her father, Richard **Chadima** (1949 B.A.) on February 20, 2005. He spent most of his career as president of a wholesale farm equipment company serving hundreds of Iowa towns and later was a lobbyist for several national firms focused on giving small businesses a voice in Congress. Prior to his time at UI, he served in World War II in the 71st Infantry Division, where he helped liberate a concentration camp and was awarded the Bronze Star. Chadima was exceptionally active in Cedar Rapids charities and civic causes, particularly those with the Presbyterian Church. His civic work included serving on the Governing Council of the Old Gold Development Fund at the University of Iowa and on the Board of Directors for the Cedar Rapids Symphony. He also was engaged in a more than 30-year odyssey exploring and studying the philosophy of Jung, theology, quantum physics, and the biology of the brain. He was a member of the Himalayan Institute for Yoga, and in his later years, he moved to Iowa City and published a book in late 2004 that was five years in the making entitled "Take Off Your Shoes: You're Standing on Holy Ground" (Xlibris press). This book interweaves the words and teachings of major figures from the world's major religions with current concerns of the human race, with the premise that at their core most religions share many of the same values.

Dr. James **Holden** (1955 Ph.D. with Baenziger) passed away on July 20, 2003. His widow, Daphne, recently informed us of his death and said that Jim was proud of his years at the University of Iowa and of the work he did with Professor Baenziger. He died from an exotic form of lung cancer, but was never in pain and his illness lasted less than two months. Holden's research legacy was profiled in the fall 2003 American Crystallographic Association (ACA) newsletter. He received B.S. and M.S. degrees from the University of Nebraska then came to UI to earn his doctorate. He spent his entire 33-year career as a research scientist in the Energetic Materials Division at the Naval Surface Warfare Center in White Oak, Maryland (formerly the Naval Ordinance Laboratory). His specialty was in molecular structure determination by X-ray crystallography and his laboratory determined the structures of more than 20 polynitro aromatic compounds, which led to publications on the relationship between bond lengths and angles in these compounds. One of his greatest contributions was the development of an empirical method of estimating the densities of organic compounds. After his retirement, he continued to work on theoretical models to predict the crystal structures of energetic materials. His colleagues described him as a wonderful mentor, teacher, and friend. He is survived by his wife Daphne, two daughters and four grandsons. The ACA tribute notes that his daughter reported that Holden was "a scientist to the end, signaling with his hands and eyes to ask about the nature of the sickness that took him".

The faculty, staff, and students of the Department of Chemistry extend our deepest sympathies to David and Barbara Wiemer as they grieve the loss of their daughter, Kathryn Julia **Wiemer**, who died of leukemia April 21, 2005 at the age of 26. Kathryn led a full life in Iowa City under the loving care of her parents. She will be greatly missed by all of us.

Do you remember **Helen Brum** (1923 - 1966)? Her career began as CB was built. She was an assistant to many Department Heads, edited the Departmental Newsletter for decades, and you were careful to stay on her good side!

Notes from the Editors: We thank several people for providing a few photos used in this newsletter (Qianli Chu, Haverhals, Johnson, Larsen). Michele Gerot is gratefully acknowledged for assistance in collecting student data, organizing alumni submissions, and addressing and mailing every newsletter! We thank Janet McCune Kugley for carefully proofreading this newsletter. Ed particularly thanks Denise Anderson and other staff members of the University Archives, Department of Special Collections, University of Iowa Libraries for assistance in finding historical info on our Department and for permission to use the photos on page 8. We hope you enjoyed reading!

Ed Gillan and Chris Cheatum

Born and raised in Iowa City:
Tom Cech - 1989 Nobel Prize winner, Director of Howard Hughes Medical Institute.

Bill Feld's Iowa City Top 10 List for 1966 – 1970

1. John & Dee Stille - Iowa Chemistry Faculty
2. AXE House, Fraternity, Initiations
3. Van Allen Lectures - Physics Shop
4. Anti-War Protests at Iowa Union
5. Sodium Disposal in Iowa River
6. Lab Store Guy - Bill Reifschneider - Daryl Yoder
7. Iowa Football - Good, Bad, Ugly - Greene, Podolak
8. Orals Parties - Don Cram, H. Brown, H. Gray, G. Wittig
9. Volleyball Team, City League Champs
10. Chemistry Softball Team, Don Burton Pitching

Feld's chemistry volleyball teammates in the late 60's —▶

Alumni Updates for 2006 Chemistry Newsletter

An update is a great way to reconnect with your former classmates and professors!

Send your replies by mail to: Department of Chemistry, c/o Michele Gerot - Newsletter, University of Iowa, Iowa City, Iowa 52242-1294 or email us at: chem-alumni@uiowa.edu

Name:

Degree information (years at UI, type of degree and year earned, UI faculty advisor):

Address/phone number/e-mail:

Current and past career positions:

Tell us about the significant events in your life and career since leaving the University of Iowa. Feel free to include any recollections from your years in the Chemistry Department (attach a separate sheet if needed).

2005 is the 150th Anniversary of Chemistry at the University of Iowa

You have been a key part of our past success and now you have the *opportunity* to establish a place in our future growth! Thank you very much for all of your support to our Department!

Your Support and Generosity = Growth and Prosperity for our Department

Your financial support is as **vital as ever** for us to remain a vibrant and growing Chemistry program. With increasing budget constraints, your contributions are very important and *they do make a difference*. For example, your generous annual donations provide crucial funds to support a variety of Chemistry Department endeavors including:

- funding scholarships and awards for outstanding graduate student researchers and teachers
- providing student travel grants to encourage presentations of research results at regional and national scientific meetings
- upgrading departmental research shared equipment and facilities
- increasing our ability to improve student-centered interactions within the building (*e.g.*, outfitting communal break areas)

Attendance at national scientific meetings not only exposes our students to state-of-the-art research, but publicizes our continuing research successes at the University of Iowa. We also want to retain our current faculty and continue to attract the best and brightest new faculty and students. Your generous financial support increasingly provides important funds to supplement and *bridge the gap* between university funding and the real costs of our research and teaching missions. As the first major renovation project of the new millennium begins in earnest this year, our developmental funding needs will only increase. Join us in **guiding our Department** strongly upward and assuring future students and faculty of a successful second 150 years of Chemistry at the University of Iowa!

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