

# IOWA CHEMISTRY

Newsletter of the University of Iowa, Department of Chemistry, June 2002

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## Notes From the Chair

My three-year term as Department Executive Officer (DEO) of the University of Iowa Department of Chemistry comes to an end on July 31, 2002. It has been a fabulous time, in large part because our faculty, staff, and students continually invent new ways to move the department forward. New research projects and funding avenues and novel teaching programs are constantly flowering. The research programs of junior faculty are growing. Students and faculty alike are garnering external recognition. Many of these exciting developments are detailed in this newsletter. Enjoy the reading!

Though it will be hard to turn over departmental leadership in such a period of growth, all can be assured that the pace of progress will quicken. Prof. David Wiemer will take over as DEO on August 1. Dave is no stranger to the vagaries of University Administration, having served as Associate Dean of the Graduate College in 2000 and 2001. Dave will enter the office with the University and, in particular, the College of Liberal Arts and Sciences squarely behind his efforts to bring renaissance to Iowa Chemistry. Major developments on the horizon include reinvigoration of the faculty through new hires and remodeling of the aging Chemistry Building. There is little doubt that Dave will serve as an able and wise steward as the department strives for greater heights in teaching, research, and service. Dave, we wish you all good fortune in these endeavors!

It is always with a degree of sadness that we wish farewell to longtime colleagues. This summer, Prof. Vasu Nair will take a position of leadership and research opportunity at the University of Georgia. We expect that Vasu's well-recognized antiviral research program will continue to flourish. Prof. Donald Pietrzyk retired from active teaching, research, and service this past May. We expect to see Don around the department from time to time as he assumes his new role as Emeritus Professor of Chemistry. Articles in this newsletter highlight the careers of these two fine individuals. We wish them the best.

Every ending is a new beginning. I look forward to renewed efforts in the fall of 2002 and beyond in UI Chemistry teaching and research. As I leave the office of DEO, I sincerely thank UI Chemistry faculty, staff, students, and alumni for the tremendous support that you have provided over the past three years.

## Sacrifices and Objective Changes

Being the Departmental Executive Officer is not what most of our faculty planned when they joined the Chemistry Department. Generally, our enthusiasm, focus, and passion are to understand some aspect of nature that involved chemistry, to make, measure or model molecules, and to share our knowledge with students or colleagues in the profession. In rare cases, we knew that we might even receive awards for the knowledge we generated. We are 'comfortable' being knowledge generators and presenters for the University. In reality, the University also has some aspects of a business operation these days. The 'ivory' tower isolation of the past is changing to the integration of many diversified disciplines finding solutions for nature and mankind. The importance of fundraising has become a high priority. Running the Chemistry Department is a full time administrative job and has challenges similar to those found at the University level.

Our DEOs have had to substitute their curiosity for understanding molecular behavior to dealing with people (faculty and administrators) in an environment that is constantly changing. Unfortunately, their 'experiments' are neither repeatable nor reproducible. Three years ago, Dan **Quinn** made that sacrifice and was backed by the Department to become DEO. Dan, a bonafide nerd that gets excited about pure science, has supported many 'new' ventures for the Department: integrating the General Chemistry sequence, raising new funds for the Department, supporting faculty research, educating the faculty on new directions, etc. At the end of the summer, Dan will have completed his 'tenure' as DEO and will return to teaching and research. We know many of the sacrifices that he made and greatly appreciate his dedication to being our DEO. Returning to chemistry related experiments will certainly be easier than the ones he did as DEO; at least they will be predictable! Dan, we thank you for giving your all to the Department. Your sacrifices have benefited us individually and the Department as a whole.

## Frontiers Lectures for 2002 - 2003

The Frontiers lecture series is a departmental jewel, initiated in 1991 by then Chemistry DEO Darrell Eyman, that brings to the department and university some of the top chemistry researchers in the world. We anticipate that four Frontiers lecturers will visit during 2002-03, each to present three lectures on state-of-the-art happenings in their research programs. Two scientists have agreed to

come to Iowa City in the fall of 2002 – Greg Girolami of the University of Illinois at Urbana-Champaign Department of Chemistry and Richard Jordan of the University of Chicago Department of Chemistry. Barbara Finlayson-Pitt of the University of California at Irvine Department of Chemistry will present in the spring of 2003. Stay tuned for places and times for the Frontiers series speakers by visiting the department web site.

## Alumnus John Means Empowers Undergraduate Education

Dr. John Means knows the value of a good chemistry education. Dr. Means, an Illinois native, received his undergraduate education in chemistry from Western Illinois University and the University of Illinois at Urbana-Champaign, earning his B.S. in 1937. He then came to the University of Iowa for graduate school, and received his Ph.D. in 1941. His thesis research under the guidance of Prof. Louis Waldbauer involved spectrometric determination of phosphorus in ferrous alloys. His training at Iowa served him in good stead. On leaving Iowa, he embarked on a life-long career with Pfizer, Inc. He started with Pfizer in Brooklyn, New York. His first project was penicillin antibiotics, and he subsequently worked on many other antibiotic projects as head of Pfizer's microanalytical and instrumentation laboratories. In 1958, he moved to Pfizer's Vigo plant in Terra Haute, Indiana. Dr. Means is retired and still living in Terre Haute. His wife, Ivabell, a life-long partner, passed away in November of 2000.

Recently he decided to help other aspiring chemists enjoy the education from which productive careers spring. Dr. Means will make a deferred gift of \$100,000 in his name and that of his wife to the Department of Chemistry, particularly to update scientific equipment for undergraduate education or to support other important educational goals. We salute Dr. John Means for this generous and visionary commitment.

## Chemistry Faculty Climb The Ladder

The 2001-02 academic year was a busy and highly successful one for evaluation of UI Chemistry faculty for promotion and tenure. Two Assistant Professors, Sarah **Larsen** and Lei **Geng**, will be promoted to Associate Professor with tenure at the start of the 2002-03 academic year. Sarah is a physical chemist who teaches freshman chemistry, physical chemistry, and environmental chemistry courses, and who conducts an active research program in zeolite catalyst structure and function. Sarah's students apply experimental tools, such as NMR spectroscopy, and computational methods, such as quantum mechanics, to their zeolite research. Lei is an analytical chemist who teaches a freshman chemistry laboratory course for chemical science majors, as well as advanced analytical chemistry courses. Lei's research

interests in analytical spectroscopy include single molecule analysis and noninvasive biological imaging. Associate Professor Vicki **Grassian** will be promoted to Professor in August 2002. Vicki teaches courses that range from freshman chemistry laboratory to undergraduate and graduate physical chemistry to specialized courses in environmental chemistry. Her research program spans the interfaces among chemistry, environmental sciences, and chemical engineering. She and her students are particularly interested in the reactivity of gases on the surfaces of microparticulates in the atmosphere. It is with considerable pride that we salute the achievements of these three members of the UI Chemistry faculty. May your stars continue to rise!

## First Working Weekend is a Success

The Department embarked on a new avenue of graduate student recruiting this spring by holding its first Working Weekend at Iowa (WW@IA) on May 3<sup>rd</sup> and 4<sup>th</sup>. Sonya **Franklin** and other recruiting committee members Lei **Geng** and Len **MacGillivray** designed a hands-on NMR and EPR visit for a group of undergraduates and professors from regional universities. The participants came from University of Northern Iowa, Grinnell College, Augustana College (Rock Island), Truman State University, Graceland College, and Western Illinois University. The participants arrived in Iowa City on Friday afternoon, were treated to a seminar on NMR techniques by Harold **Goff**, and coordinated with local professors and graduate students in designing experiments for their samples. Group leaders included Sarah **Larsen** (for EPR), **Goff**, **Franklin**, **MacGillivray**, Jim **Gloer**, Jason **Telford**, and their students. The samples examined ran the gambit from solid-state lead (<sup>207</sup>Pb) NMR to high-resolution 2D-TOCSY and NOESY experiments on a pentasaccharide. EPR experiments were also performed on a variety of metal systems.



Two groups working with EPR (left) and NMR (right).

The participants attended a Friday night barbeque at the AXE House and spent most of Saturday immersed in experimentation and local tours. The busy 24-hour visit was capped off with a group dinner at the Cottage in downtown Iowa City, where the groups briefly described their results, and **Franklin** and **Larsen** gave research presentations. The feedback was better than expected and has built and strengthened several long-term connections with regional colleges. Another WW@IA event is being planned for the fall semester and will focus on X-ray crystallography and computational chemistry.

# Two Faculty Reel in NSF CAREER Awards

The Department of Chemistry is very proud to announce that Amnon **Kohen** and Len **MacGillivray** received Faculty Early Career Development (CAREER) awards this year from the National Science Foundation. These awards are the most prestigious NSF recognition afforded to new faculty members and provide significant research funding for five years. Typically the 350 - 400 awardees are selected from nearly 1400 applicants nationally. This award recognizes “teacher-scholars who are most likely to become the academic leaders of the 21<sup>st</sup> century.” Since Sonya Franklin received this award last year, half of our assistant professors have CAREER awards. Congratulations on achieving this early success Amnon and Len!!

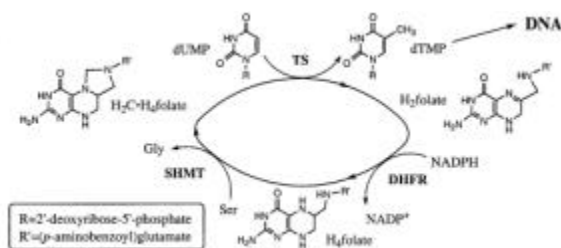


**Amnon Kohen**  
*Bio-Organic Chemistry*

B.Sc. (1989), Hebrew University in Jerusalem, Israel; D.Sc. (1994), Technion Israel Institute of Technology

## *How do enzymes activate stable bonds?*

The Kohen group is interested in understanding how enzymes activate stable covalent bonds, such as C-H and N≡N. Studying enzyme mechanisms on the molecular level will lead to an in-depth understanding of how evolution uses chemistry and physics to direct, enhance and control biological processes. Additionally, understanding how enzymes work can lead to development of new drugs of medical importance, new paths in organic synthesis, and new methodologies in biotechnology. One current area of interest is a study of the role of protein dynamics and quantum mechanical effects in enzyme catalyzed hydrogen transfer. For example, enzymes involved in DNA biosynthesis (*c.f.*, DHFR, TS, and SHMT in figure below) increase hydrogen transfer by many orders of magnitude and are of great medical interest as anti-cancer and antibiotic drug targets.



Another Kohen group research area involves an investigation of the mechanism of dinitrogen reduction by nitrogenases. These enzymes contain transition metals and activate one of the most stable bonds in nature, N≡N, and facilitate its reaction with H<sub>2</sub> to form ammonia at ambient temperatures, compared with conventional processes that require high temperatures and pressures (700 °C, 350 atm).

In his spare time, Amnon keeps active by practicing martial arts. His wife, Einat, is a senior research assistant in the UI medical center and their two young children Hilah and Nadav keep them both on the run!

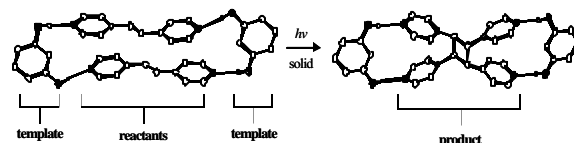


**Leonard MacGillivray**  
*Organic Materials Chemistry*

B.Sc. (1994), Saint Mary's University in Halifax, Nova Scotia, Canada; Ph.D. (1998), University of Missouri-Columbia

## *Can chemists mimic Nature?*

Traditional approaches to chemical synthesis have focused upon individual atoms and molecules. Research in the MacGillivray group encompasses understanding principles that govern the effects of intermolecular interactions (*e.g.*, hydrogen bonds) on the structure and properties of assemblies of atoms and molecules in the field of supramolecular chemistry. An elegant supramolecular example from Nature is DNA, which is essentially a linear template that conducts bimolecular reactions facilitated by hydrogen bonding. The MacGillivray group is studying whether synthetic analogs, with tailored hydrogen bond character, can be used to guide and direct organic synthetic chemistry. These solid-state molecule assemblies are linear templates that conduct bimolecular reactions (*e.g.*, [2+2] photodimerizations, see figure below).



The MacGillivray group is exploring potential applications for products of this template approach; for example, assembling a multifunctional “organic zeolite” with transition-metal-ions in the channels and voids of porous solid. These materials may have applications in the areas of catalysis, separations, and nanotechnology. The MacGillivray group is also examining whether the linear template method may be applied to the emerging field of green chemistry to provide access to a variety of molecular syntheses in a solvent-free environment.

In his spare time, Len runs daily and plays billiards with a chemistry group, including Dan Quinn, nicknamed the Nerds. His wife, Kate, a Ph.D. biochemist, has just finished her second year of law school at the University of Iowa.

# Arrivals and Departures

## New Faculty Step on Board

During the past academic year, UI Chemistry personnel pitched in for a successful run of faculty recruitment. Two young scientists will join the department as Assistant Professors this summer. Dr. Ned **Bowden** received his B.S. from Cal Tech in 1994, where he did undergraduate research with Prof. Robert Grubbs. Since earning a Ph.D. in 1999 at Harvard under the direction of Prof. George Whitesides, Ned has been a Postdoctoral Associate in Prof. Robert Waymouth's group at Stanford. Ned's teaching interests are in organic and materials chemistries, and his research interests are in the synthesis and characterization of polymers that self organize on scales ranging from nanometers to hundreds of microns. Our second new recruit is Dr. R. Scott **Martin**, who received his B.S. degree from Southwest Missouri State University in 1994, where he did undergraduate research with UI Chemistry alumna Prof. Tamera Jahnke. He received his Ph.D. in 1999 at the University of Missouri-Columbia under the direction of Professor Stanley Manahan, and is currently a NIH Postdoctoral Fellow in Prof. Susan Lunte's lab at the University of Kansas. Scott's teaching interests are in analytical chemistry, and his research program will endeavor to microfabricate "devices on a chip" for the separation and detection of analytes of environmental and biomedical importance. The Department of Chemistry welcomes Ned and Scott to our academic family and strongly supports their efforts to establish dynamic programs of teaching and research.

## Analytical Chemist, Donald J. Pietrzyk Retires



After receiving his Ph.D. at Iowa State University in 1960 and doing postdoctoral work at MIT, Don joined the Department in 1961. At that time, the Department consisted of 15 faculty members with 2 in Analytical Chemistry. Next year there will be 24 faculty members with 4 traditional Analytical

Chemists. During his 41 years in the department, Don has been exposed to 9 different faculty members serving the role of DEO in the Department. Don's primary research has been in separations of ions, amino acids, peptides and bisphosphonates. He has used high performance liquid chromatography along with capillary electrophoresis to develop various methodologies for analysis and determining trace quantities in aqueous and nonaqueous media. His research has involved collaborations in Chemistry (Donald Burton), Dentistry, and Pharmacy with publications in a diverse variety of journals. In 1998, he was a Visiting Professor at Ubon Ratchathani University in Thailand.

In addition to many undergraduate and graduate level analytical chemistry courses, Don has also taught freshman chemistry and the undergraduate organic chemistry sequence. He developed and coordinated the freshman chemistry courses by correspondence for 31 years. For 8 years, Don chaired the Graduate Analytical Examination Committee for the ACS. His professional writings include five undergraduate textbooks in analytical chemistry, 4 invited chapters in advanced reference books in analytical chromatography, and more than 115 articles in professional journals. He has been advisor to 30 Ph.D. students, 13 M.S. students, and directed 13 undergraduate research projects. His research has been supported by 19 grants from a variety of government and industrial sources.

He is a charter member of the Scientific Advisory Committee of the International Ion Chromatography Symposium and has also chaired that committee. He was on the Steering Committee for the Midwest Regional Section of ACS for 32 years and also served as section chair. He has served on many University committees including: Research Council, Environmental Health and Safety, and Faculty Assembly. In addition to many Departmental Committees, he was DEO from 1987 to 1990; at that time Don also directed the Chemistry Building phase II remodeling project.

Don has been not only a diligent worker for the profession, the University and the Department he has also provided a calming influence and a stability that has been greatly appreciated. He has been a true colleague and an unsung hero; he provided leadership when it was needed. Don with his quiet unassuming manner has successfully contributed to many facets of the Department. Don also finds time to attend Hawkeye athletic events; he has purchased football and basketball season tickets since becoming a faculty member 41 seasons ago. He and his recently retired wife, Catherine, plan to continue their international travels, road traveling in the US, and visiting their 2 daughters, Leslie and Susan. We wish him the best in this new phase of his life and look forward to hearing about his new experiences.

## Nair becomes Department Head and Director at the University of Georgia



Vasu **Nair** joined our Department in the 1969-70 academic year; since 1993 he has been University of Iowa Foundation Distinguished Professor of Chemistry. In a career that spans 30+ years at Iowa, he and his coworkers have made seminal contributions in the synthetic organic chemistry of heterocyclic compounds, and, in particular, in the synthesis and enzymology of nucleosides, nucleotides, and their

analogs. In recent years, Nair has put this expertise to good use by directing a program of synthesis and evaluation of inhibitors of HIV reverse transcriptase and HIV integrase that show clinical promise in the treatment of AIDS. In 1999, Vasu became a Fellow of the American Association for the Advancement of Science; only 30 scientists from the Chemistry and Biochemistry disciplines (National and International) were chosen that year. Just last year, he received the 2001 Midwest Award of the American Chemical Society for his research contributions and involvement in the chemistry profession. Vasu's excellence in research (authored over 175 research papers, 4 patents, and presented more than 260 conference papers) are matched by his activity in teaching and governance. He was a popular and effective teacher of undergraduate organic chemistry and received the University of Iowa Collegiate Teaching Award for Excellence in Teaching of both graduate and undergraduate students for 1999-2000. In 1999, he also received a faculty mentoring award from the Honors Program.

Vasu is entering a new stage of his academic career. He recently accepted a position as the Millikan-Reeve Endowed Professor and Head of the Department of Pharmaceutical and Biomedical Sciences in the College of Pharmacy at the University of Georgia. He will also be the Director of the new Center for Drug Discovery. Vasu will assume this new position in June. His entire research enterprise will be moving south with him. We wish Vasu the best in a new phase of his contributions to chemistry; he will have the opportunity to set up a new research lab and pursue his ideas on directing a center. Although he will be missed at Iowa, we thank him for his contributions to our Department.

### **Bullard Moves Back to the Lab**

After 3 years serving as the Coordinator of Chemistry Laboratories in the Department, Steven **Bullard** has returned to the research lab. His new job at the UI Dental School centers on the discovery of genes associated with the cleft lip/palette phenotype. In his new position, he is making use of his organizational skills in setting up labs and supervising students. Although we will miss his active participation in contributing to the lab education venture of our Department, we wish him the best in pursuing his new research challenges.

### **New Staff Additions**

In January, Dr. Russell **Larsen** started as Director of Undergraduate Laboratories, a position vacated by the retirement of Dr. Lynne Cannon last summer. Russell originally joined the department as a Visiting Assistant Professor in 1995, coming from postdoctoral work at the University of California at Berkeley and a Ph.D. in physical chemistry from Harvard. He has previously served the Chemistry Department teaching mission as an instructor for Principles of Chemistry Laboratory (4:16), Chemical Sciences Laboratory (4:20), Physical Chemistry

I (4:131), Physical Chemistry II (4:132), and Physical Measurements (4:144). Russell is a co-author, with Prof. Sarah Larsen, of the laboratory manual currently used in the Principles of Chemistry Laboratory. During his time at Iowa, he has taken a leading role in acquiring and implementing modern technology in the instructional laboratories, with a Camille and Henry Dreyfus Special Grants award in 1998, and successful Student Computer Fees Proposals in 1999 (with Dr. Lynne Cannon) and 2002 (with Prof. Norb Pienta). His enthusiasm and strong background will be an important and critical ingredient in the initiation and implementation of the new integrated chemistry course that is replacing the Principles of Chemistry series (see later article in this newsletter).

Finally, the Department has a full time computer consultant. Jeffrey **Miller** received his B.A. from St. Olaf College and joined the Department last fall. Before coming to Iowa, Jeff taught chemistry, physics, and earth sciences at a senior high school during the day and worked on networking/systems administration and computers at community colleges at night. He also was active in the Minnesota Army National Guard for 13 years. In addition to maintaining and updating the departmental computers, Jeff provides consulting support services for faculty, staff, and students. He has been instrumental in improvements and implementations of computer technology in the classroom. Jeff's knowledge of PC, Macintosh, and Unix operating systems has been a real positive for the Department. He is a welcome Departmental resource and is definitely making our lives easier.

Last summer, Steve **Treimer** became a research assistant in the High Resolution Mass Spectrometry (HRMS) facility in the Department where he joins Vic Parcel and Dr. Lynn Teesch. Steve received his B.S. degree in chemistry from the University of Iowa in 1995 and did research with Prof. Edward Buchanan. He received his Ph.D. from Iowa State University under Prof. Dennis Johnson on electrochemistry of environmental remediation technologies. His expertise will add new dimensions to the HRMS facility including inorganic ICP-MS and forensic applications of MS. Steve and his wife, Tammi, have 3 children. His hobbies include computers and antique John Deere tractors; 5 of them! Steve was born and raised a Hawkeye, but logically roots for both the Hawkeyes and the Cyclones. We are excited about having Steve join us again and to observe his emotions when the Hawks play the Clones.

We are happy to announce that Shonda **Monette** has accepted the Laboratory Coordinator position. Shonda recently received her M.S. degree working under the direction of Prof. David Wiemer. Prior to moving to Iowa City in 1998, Shonda lived in the New Orleans area and is the proud mother of her 9-year-old son, Leonard. She is in the process of enhancing the efficiency of running the undergraduate teaching laboratories by setting up a database/inventory system for the equipment and chemicals. Her outside activities include being a 'soccer'

mom and the joy of reading (Terry McMillan is her favorite author). We look forward to working with Shonda.

## Emeriti Professor's New Adventures

Past issues of the newsletter have brought you news about what's going on in the Department with our current personnel and updates on what our Alumni are doing. This year we have asked our Emeriti professors to let us know what they are doing since many of you and us were influenced by these emeriti; either from courses taught by them, by doing research with them, or just talking with them, or ...

Norman **Baenziger** joined the Department in 1949 and formally retired in 1994. On retiring, he continued his research with John Schweitzer (UI Physics and Astronomy), which resulted in several patents and papers on the BaCo(Ni)S(Se) system. He has also published a couple of papers with Jack (John) Doyle (UI Inorganic Chemistry). In the future, he hopes to find time to finish off a tutoring/testing package for freshman chemistry. He spends part of his time in the Iowa City area and in northern Minnesota. In addition to doing science and playing golf, he keeps physically active with large and small building construction projects with and for the family. In the typical Norman fashion, he started his letter with "there are the facts, and there are what one would like to be the facts." Norman sets high goals and he continues to reach for them. His grandchildren are enjoying being with their grandfather and using the facilities he has developed for camping, fishing, water skiing, canoeing, kayaking, and swimming. He attributes his continued good health to house construction, golf, and water-related activities.

E. David **Cater** joined the Department in 1961 and retired in 1997. He and his wife, Jean, spend their winters in Houston with their daughter, son-in-law, and grandchildren and in the past have cared for their 'older' generation. In addition to their Iowa City home, they have a lake home in Minnesota; outside activities include sailboarding on Lake Ada. Dave continues to enjoy sailing on the Great Lakes; and other sailing adventures include Maine to Nova Scotia and Nova Scotia to New York City. Currently, he is working on revising the Study Guide he wrote earlier for a freshman chemistry text.

Although Robert **Coffman** joined our Department in 1967 and retired just a year ago, he and Birgit have done much traveling. First, they took off to Sweden and Denmark to pick up a new Volvo; then they played detective and were able to locate the foundation of the house that their maternal great-grandparents hailed from. About a month later and after putting 3000 miles on the car, they returned home to Iowa City. Then in the fall they visited their daughter and grandson in France. In April, they drove to Arlington, Virginia to visit two other daughters and

another grandchild. In June, they will return to Copenhagen and join family for two weeks in a summer-house. Next fall they will return to France and visit Marseille and Normandy. Bob notes that the greatest thing about retirement is the "Freedom to Schedule". Their future travel plans and family visits are good indicators of how they are enjoying the 'retired' state. However, it is not apparent that he is free of scheduling!

H. Bruce **Friedrich** began working out of his home office for Concurrent Technologies Corporation immediately after retiring from the University in June 1999. CTC began as an engineering consulting and research firm that grew out of the University of Pittsburgh. The main office of the firm is now in Johnstown, PA, but there are over 1000 employees with numerous branch offices. Bruce works out of his home office for a branch of the company in Pittsburgh that does contract work for the US Department of Energy. Most of Bruce's efforts have involved projects with the Environmental Management Division of DOE. The major emphasis of the EM division is on closure and remediation of the nuclear weapons production facilities located at numerous sites throughout the country. He reviews proposals and conducts site visits; he is also responsible for the production of summary descriptions and reviews of several hundred projects sponsored by the EM Science Program. He has also worked with DOE's Office of Energy Efficiency and Renewable Energy, mostly with their Office of Industrial Technologies. With his travels and busy schedule he still finds time to visit the Department. He has commented that one of the hardest hurdles he had to overcome was to learn government acronyms and then to use them.

It is apparent that academic retirement is the beginning of a new adventure for our emeriti! These emeriti are actively learning new ideas and skills, sharing their knowledge and expertise with family and others, and enjoying the fruits of life, family, and retirement. We are hopeful that other emeriti will share their experiences with us next year. See the back page **photo gallery** for pictures of these emeriti in their early days!

## Good News From Our Faculty

In addition to their research and many service activities, our 'old' and 'new' DEOs have received recognition for their contributions. Dan **Quinn** has received Honorary Membership in Golden Key International Honour Society and David **Wiemer** has become a Collegiate Fellow.

Vicki **Grassian** continues her unlimited range of activities not only in chemistry related to aerosols and the environment, but also in teaching and service. She has organized and co-chaired several symposia related to gas-particle interactions in the environment at the Chicago National ACS Meeting, the Fall Meeting of the American Geophysical Union in San Francisco, and at the Great Lakes Regional ACS meeting. She has been invited to talk

about her research at the next two National ACS Meetings. Other invitations include the Telluride and Mesilla Workshops. This past year, she has given seminars at the University of Texas-Austin, Ohio State University, Northwestern University, and the University of North Carolina-Chapel Hill. More than a dozen of her research papers were published this year. This year she received new research grant support from the Department of Energy (with Gregory Carmichael) and the Environmental Protection Agency (with Sarah Larsen). Vicki also continues to be the primary organizer and promoter of the Chemistry track in the Environmental Science program for undergraduates. In addition to their normal teaching load, she and Sarah Larsen team-taught the Environmental Science Seminar, which emphasized environmental chemistry and included Len MacGillivray as a guest speaker. Vicki also became only the second woman to earn the rank of full professor in the Department and is the first woman to be promoted through the ranks in the Department. She was also awarded the 2002 Distinguished Achievement Award Celebrating Excellence and Achievement Among Women.

Jan **Jensen** received a 3-year research grant from the NSF entitled "The Prediction and Interpretation of Protein pKa's Using QM/MM". Jan has also been invited to present a seminar on his research at the 2002 American Conference on Theoretical Chemistry, which is only held once every three years and is a prestigious honor for a young faculty member.

Amnon **Kohen** received a 5-year research grant from the NIH entitled "Tunneling and Dynamics Studies with DHFR." He also received a 5-year research grant from the Herman Frasch Foundation for Chemical Research.

Johna **Leddy's** group was granted several patents for magnetically modified electrodes and fuel cells. In 1999 and 2001, the number of patents for these inventions granted to the University accounted for 0.0024% of the US patents granted in these years.

Robert **Linhardt** has recently been appointed to the Editorial Board of *Analytical Biochemistry*. In addition to giving plenary presentations on his Heparin work in Korea and Japan, he has been invited for plenary presentations at meetings in Los Angeles, Turkey, and India.

Len **MacGillivray's** research is getting more external recognition and he received a Research Innovation Award from the Research Corporation. He was invited to present his research on "Solid-State Organic Synthesis" in Singapore and on "Controlling Reactivity in the Solid State and Supermolecules" in Sicily, Italy.

Jason **Telford** is now the Chairperson of the Iowa Section of the ACS. This spring he was involved in the annual 'Scout Day' where chemistry badges were awarded to 75 participating scouts. The awards ceremony was capped by a chemistry demo performed by Jason.

## New Biochemical Analysis Laboratory

Several faculty members in the Department of Chemistry with common interests in biological aspects of chemistry have established a shared equipment room for biochemical research (279 CB). The equipment used in this type of research is often expensive and underutilized by individual groups. By sharing the equipment, it is used more effectively, and the costs of maintenance are shared as well. The instrumentation housed in the equipment laboratory is shared primarily by the **Franklin, Kohen, and Telford** groups, and provides a common area to meet and discuss their cross-disciplinary research.

This laboratory includes a Silicon Graphics Octane workstation for macromolecular modeling studies and various tools to construct and express proteins, including an autoclave, centrifuges, cell shakers, low-temperature freezers, and incubation baths. There is equipment to purify proteins (Pharmacia FPLC equipped with gradient pumps, and UV/conductance detectors) and to measure sample radioactivity (Packard 2900TR and a Molecular Dynamics Storm PhosphorImager system). The major equipment acquisition in this facility is an Olis Cary 17 conversion circular dichroism (CD) spectrophotometer, which arrived in January 2002. This CD spectrophotometer is only the second such instrument on campus and was primarily funded by the Telford group, with additional funds from the departmental Witte fund and contributions by several other research groups. This instrument measures the differential absorption of right- and left-circularly polarized light, thus giving information on the chirality, or handedness, of a chromophore. The CD can be used for 'small' chiral molecules, proteins, or even metal complexes. Since amino acids are chiral, the secondary structures they form are also chiral. CD is a sensitive probe of this handedness and can elucidate the chirality of secondary structure. Thus, this is an extremely powerful technique to study protein folding, stability, and interactions with other small molecules or DNA. The CD and most of the equipment in this new facility are available to outside users, either for free or a nominal charge to cover maintenance fees.

## General Chemistry Sequence Undergoes a Major Redesign

Starting in fall 2002, the general chemistry sequence (4:013, 4:014, & 4:016) will cease to exist and be replaced by a new, two-course sequence, 4:011 and 4:012. This redesign has involved the cooperative effort of many faculty and staff in the department and interactions with several departments and colleges. Spearheaded by general chemistry coordinator, Norb **Pienta**, several individuals have worked for the last two years and have been supported by external grants from the Pew Program in Course Redesign and NSF's Division of Undergraduate Education CCLI Program in addition to institutional resources. A dedicated 'brown bag lunch' group meets

regularly to work on the details of the lab experiments, case studies, and other content and delivery issues.

The new courses, 4-credit hours each, have the laboratory component reintegrated with the lecture and discussion components. Students will participate in the lecture/presentation portions (large auditorium format up to three hours per week conducted by faculty), a discussion (a small cooperative-learning session once per week conducted by a teaching assistant), a laboratory meeting (a small, guided-inquiry session every other week conducted by a teaching assistant), and a case-study meeting (a medium-sized group meeting in alternate weeks with an instructor). The 4:011 course is first offered in the fall, and 4:012 premieres in the spring.

The pedagogical emphasis of the new sequence will promote active student participation in all components, including several changes that introduce cooperative learning where students work in pairs or small groups. In particular, some current discussion sections already meet in a remodeled classroom, 233 CB. The desks have been replaced with tables and chairs, and computer technology is available in the form of a modern instructors' station and a set of laptops with wireless Internet access. The room was refurbished with resources from the College of Liberal Arts and Sciences Student Computing Fees Grant program. The TAs role is now as a mentor helping students working in pairs or small groups on assignments and activities. The laptop computers enable the students to access homework assignments and activities from dynamic web pages. The picture shows TA Elisha **Pendleton** leading students in a discussion section.



The more traditional laboratories will alternate weeks with a new feature called "case studies." The lab sections of 20-24 students will conduct experiments based on less 'cookbook' and more inquiry-based experiments. Computers and electronic data collection will facilitate real-time data analysis. The students still need to decide what data to collect and to assess its quality. The case studies involve groups of 60-80 students working in groups on activities that connect lecture material to the lab experiments. The topics for the lab experiments and case studies represent scenarios that one might encounter in everyday life. Examples include a qualitative analysis scheme based on the contents of a waste sample, concentration of common ions like nitrate in Iowa River water, and the synthesis and measurement of physical properties of a polymer 'superball.'

More details on these new courses can be found on the website, <http://genchem.chem.uiowa.edu/chemed/>.

## Graduate Degrees and Awards

Last year our chemistry graduate students totaled 101. There were 11 M.S. degrees awarded (advisor's name in parenthesis): Osamah **Al-Humaidan** (Eyman), Benjamin **Armitage** (Arnold), Abdulmalik **Bintaleb** (Messerle), Ed **Crowell** (Geng), Xiuchun **Gao** (Totah), Shonda **Monette** (Wiemer), Elisha **Pendleton** (Franklin), Yulin **Peng** (Nair), Xu **Tang** (Pienta), Yichao **Zhang** (Gloer), Qingming **Zhu** (Nair).

There were 10 Ph.D. degrees awarded in Chemistry. Here is a listing of the new Chemistry Ph.D.s with their advisors and dissertation titles noted in parentheses. Rihab **Angawi** (Gloer: Bioactive Natural Products from Mycoparasitic and Fungicolous Fungi), Liqiang **Chen** (Wiemer: Synthesis of Mannosamine Derivatives and Analogs), Yanming **Du** (Wiemer: The Design and Synthesis of Farnesyl Pyrophosphate Analogs), Christopher **Eddy** (Arnold: I. Near Infrared Measurements of Urea and Glucose in Hemodialysis Solutions and in Whole Bovine Blood. II. Optical Carbon Monoxide Sensor), Carolyn **Green** (Arnold: Characterization and Quantification of Light Scattering in Protein and Glucose Sample Solutions by Near-Infrared Transmission Spectroscopy), Yan **He** (Geng: On-Line Fluorescence Detection for Mechanistic Study of Capillary Electrophoresis and Capillary Electrochromatography), Michael **Sliger** (Eyman: Affecting Reactivity of Organomanganese Complexes through Manipulation of a Metallostereoelectronic Effect), Yu **Sun** (Arnold: Development and Assessment of Kromoscopy for the Selective Measurement of Glucose), Ed **Treadwell** (Wiemer: Studies on the Synthesis of Prenylated Aromatics. Schweinfurthins, Arieianal, and Montadial), Jianjun **Xu** (Burton: Kinetic Separation Methodology for the Stereospecific Preparation of Functionalized Monofluorinated Vinyl Derivatives).

Two graduate students have been selected to receive Leeper Fellowships for excellence in graduate study and research. These fellowships are supported by an endowment from Robert W. and Gertrude Kick Leeper. Jeff **Neighbors** is doing research under the direction of Prof. David Wiemer on the synthesis of complex natural products that are of interest in treating breast cancer. Hui **Li** is working for Prof. Jan Jensen on the development and application of codes in the quantum mechanics program GAMESS for studying structure and function of biomolecules. Leeper Fellowships can be used for a range of efforts that support study and research, such as purchase of books, supplies and software, attendance at professional meetings, and payment of tuition. We congratulate these two scientists in the making, and wish them good fortune throughout the remainder of their UI Chemistry studies.

## Undergraduate Degrees and Awards

There were 76 undergraduate majors in the fall semester with 2 of those graduating in January. There were 72 majors this spring with 11 graduating in May 2002. The



undergraduate research experience continues to be an integral part of our student's education. Each spring, we have a poster session where they share their research experience with the Department. At this time, the Chemistry Alumni Awards are also announced. This year's recipients were:

Sophomore: Erik **Alexander**  
Junior: Jennifer **Wade**  
Senior: Shoshanna **Roth**

The Russell K. Simms Scholarships were earned by Adam **Christensen**, Jennifer **Mann**, and Shoshanna **Roth**. Andrew **Houk** earned the CRC Press Freshman Chemistry Award. The American Institute of Chemists Award was presented to Sara **Schebler**. The Merck Index Award was given to Jennifer **Mann**. Tohfa **Manji** received the Analytical Chemistry Award. Steve **Maldonado** was awarded a Beckman Fellowship.

Adam **Christensen** of Cedar Falls, Iowa, a junior chemistry major, has received the prestigious Jean Dreyfus Boissevain Undergraduate Scholarship for Excellence in Chemistry. This award, sponsored by the Dreyfus Foundation, encourages "...outstanding undergraduates at formative stages of their education to choose careers in the chemical sciences" and provides \$5,500 of support for Christensen to continue his research in the Grassian laboratory during summer 2002 and 2003. Grassian describes Christensen as "... an exceptional student and scientist. He can do it all – build and construct complicated equipment, analyze data, troubleshoot and design electronic equipment ..." He plans to attend graduate school in chemistry or biochemistry and is interested in pursuing an academic career in neurochemistry.

### New Shoemaker-Strickler Scholars

Two outstanding high school seniors who will major in chemistry at the University of Iowa have been chosen to receive prestigious Shoemaker-Strickler Memorial Scholarships. This scholarship was established by Harold Whitmore Strickler in memory of his wife, Vernita Martha Ann Shoemaker Strickler. The Shoemaker-Strickler Scholars who will join the Department of Chemistry this fall are Ms. Gillian **Woodburn**, a graduate of T. F. Riggs High School in Pierre, South Dakota, and Mr. Steven **Purtle**, a graduate of Dowling High School in West Des Moines, Iowa. We welcome Gillian and Steve to Iowa Chemistry and wish them good luck in their studies at the University of Iowa.

### Visiting Scientists and Postdocs

In addition to undergraduate and graduate students, many research groups have major contributions from research and visiting scientists and postdoctoral associates. A list of the research and visiting scientists, their home institution, sponsors, and projects are as follows:

Dr. R. **Anilkumar** from the Indian Institute of Science is working with Prof. Burton and has developed a room

temperature, cost-effective, easily scaled-up route to  $C_6H_5CF=CF_2$  from HFC-134a ( $CF_3CFH_2$ ). He has also extended this work to an excellent synthesis of  $C_6H_5CX=CF_2$  ( $x=Cl, Br, I$ ) from commercially available  $CF_3CH_2X$  ( $x=Cl, Br, I$ ). Dr. Luke **Grocholl** from the University of North Dakota, who was working with Prof. Gillan, just finished up and started a job at Aldrich in Milwaukee, WI. He was working on the synthesis of gallium nitride and silver nanoparticles via solvothermal routes. He also synthesized and characterized a new diethylamido gallium hydride. Dr. Jianjun **Wang** from the University of Science and Technology, Beijing, is working with Prof. Gillan and continues to work on the chemical vapor deposition and characterization of carbon nitride films. He also is examining the structural and optical properties of nanoscale carbon nitride, gallium nitride, and metal nanoparticle powders. Dr. Amy **Michel** received her Ph.D. from the University of Colorado. She is working with Prof. Grassian investigating surface reactions of ozone with atmospheric particulates.

There are several postdoctoral scientists working in Prof. Linhardt's research group. Dr. Fuming **Zhang** is studying the biophysical chemistry of protein-carbohydrate interaction by making kinetic and thermodynamic measurements of these interactions. Dr. Helene **Bazin** is a visiting scientist from ApoLogic in Cincinnati. She is working on carbohydrate-based drugs to block the neurotoxicity of ApoE in Alzheimer's disease. Dr. Wenjun **Mao** is a visiting professor from Qingdao University, PRC and is working on the purification and characterization of polysaccharides and oligosaccharides from animal tissues. Dr. Sulthan **Sikkandar** recently received his Ph.D. from Indian Institute of Technology and is working to complete the chemical synthesis of sTn C-glycoside analogs. These will be tested as potential cancer vaccines at Sloan Kettering. Dr. Mohamad **Warda** is a visiting professor from Cairo University in Egypt and is working on "Glycomics", the study of how genomic differences in mice affect the function of carbohydrate receptors at the organ and tissue level.

### Visiting Faculty Updates

**Chris Coretsopoulos** continues adding to his repertoire of teaching courses: Analytical Chemistry II has been added to Science & Technology and General Chemistry I. He is also doing research on microfabrication of sensors, photopolymerization and photo-curing of composites and polymers, and microfabrication of biocompatible neural electrodes. He has a research scientist appointment in Chemical Engineering and was recently appointed to the Graduate College.

**Tim Kovacic** received a B.Sc. in Biochemistry from Iowa State University in 1967 and performed radiation research during his Naval service from 1967-1971. He earned a Ph.D. in Biochemistry from Oregon State University in 1976 working with Professor K. E. Van Holde (now

retired). He has taught the organic/biochemistry course in the General Chemistry sequence. In his spare time, he enjoys reading science fiction.

**Janelle Torres y Torres** is originally from a suburb of Minneapolis, Minnesota. She completed a Ph.D. in 1999 in Medicinal and Natural Products Chemistry at the University of Iowa, under the direction of Jack Rosazza. She just completed a post-doc with Caroline Harwood in the Department of Microbiology at the University of Iowa and is currently teaching Organic Chemistry II. She enjoys camping, hiking, cooking, playing piano, and watching Major League baseball.

Steve **Walstrum** received his Ph.D. from Cornell University in 1983 working with David Usher and did postdoctoral work with Olke Uhlenbeck at the University of Colorado, Boulder. Since leaving Uhlenbeck's lab, he has been teaching in small colleges. At Iowa he taught several freshman chemistry laboratories courses.

In addition to those above, a thanks goes out to others who assisted in our teaching mission this year including Doris **Eckey** (Science and Technology and General Chemistry), Burak **Esat** (Organic Chemistry sequence), Peter **Hansen** (General Chemistry sequence), and Steve **Sikorski** (General and Organic Chemistry sequences).

## Notes And Updates From Alumni

William **Carter** (1973, Ph.D. with Prof. Dwight Tardy) is doing experimental and model development research, related to the chemistry of photochemical smog at the Center for Environmental Research and Technology in Riverside, California.

Ron **Erickson** (1959, Ph.D. Organic Chemistry with Prof. Robert Buckles) worked in research at the University of Texas and as a NATO fellow in Germany. He taught chemistry and conducted research at Canisius College in Buffalo, N.Y. for four years. He was a professor of Chemistry at the University of Montana from 1965 until retiring in 1991. He was elected to the Montana Legislature in 1998 and re-elected in 2000. House Minority Leader Kim Gillan, said "He's just really bright. It's refreshing because he makes decisions based on policy, not politics. If the Legislature is ever going to think out of the box, it's going to be someone like Ron Erickson pushing us."

Vinod **Jairaj** (2000, Ph.D. with Prof. Donald Burton) is working as a postdoc for the Department of Chemistry at Florida Atlantic University. He is working on the total synthesis of azophilones. He believes the total synthesis of natural product molecules, which have high biological activity, is an important future direction in chemistry.

Preeti **Kachroo** (1996, Ph.D. with Prof. Harold Goff) is currently working at Sapient, an e-commerce firm, as a

senior engineer. She loves this field and is in the process of changing jobs and moving to Germany to work with McKinsey and Co. as a senior associate in their e-commerce division. She thinks an important future direction for chemistry is in the field of genetic engineering and cloning, where chemistry and biology intersect.

Shyan-Jer **Lee** (1992, Ph.D. with Prof. Susan Allen) returned to the National Pingtung Teacher College in Taiwan, where he is performing research in the area of science education. He is investigating how primary school pupils' grasp of scientific concepts affects their development and creativity in science. His wife, Lynn Farh, received her biochemistry degree from the UI Biochemistry Department and is also working at the Pingtung Teacher College. They shared many good times at Iowa and are looking forward to visiting in the future. They are proud to be UI alumni.

Terrance **Rooney** (1972, Ph.D. with Prof. Bruce Friedrich) is a computer consultant, consulting in development of analytical instrumentation, especially in liquid and gas chromatography and mass spectrometry. In his field, mass spectrometry (GC-MS and LC-MS) has become a routine tool used by all chemists. He is excited about the enhanced measurement capabilities of new coupled MS-MS techniques.

It has been brought to our attention that two of our alumni Gil **Belofsky** (Ph.D. 1996 with Jim Gloer) and Diana **Cermak** (Ph.D. 1997 with David Wiemer) received Cottrell College Science Awards this fall from the Research Corporation. Gil is doing research at the Department of Chemistry and Biochemistry, University of Tulsa, on "Natural products chemistry and the Neurosciences - plants with receptor binding activity from the Nature Conservancy's Tall Grass Prairie Preserve". Diana is doing research at the Department of Chemistry, Knox College, on "Stereoselective synthesis of amino phosphonic acids via reduction of imino phosphonates".

## Note From the Editors

Our department continues to change and grow in exciting directions. We hope this newsletter gives you a sense of how well your old alma mater is faring these days. We are very interested in your thoughts about our newsletter. Drop us a line sometime to tell us what you like or dislike about our features and what you would like to see us write about next year. While we only publish once a year, our web site is updated frequently with news and announcements, so please look us up at [www.uiowa.edu/~chemdept/](http://www.uiowa.edu/~chemdept/). We gratefully thank Michele **Gerot** and Sharon **Robertson** for their assistance with this newsletter, our faculty colleagues for their contributions to content, and Janet **McCune** for final proofreading.

Dwight Tardy and Ed Gillan

## Alumni Notes and Updates

As an alternative, you may fill out an Alumni Input form on our web site ([www.uiowa.edu/~chemdept/news/alumnisubmit.html](http://www.uiowa.edu/~chemdept/news/alumnisubmit.html)) or send us an e-mail ([chem-alumni@uiowa.edu](mailto:chem-alumni@uiowa.edu)).

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Degrees Earned (include year, major, and UI faculty advisor, if applicable):

In the space below, describe the significant events in your life and career since leaving the University of Iowa. We will include your message in next year's newsletter.

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# Photo Gallery: Past and Present

Professor Lou **Messlerle's** 3-compartment glove box acquisition for the Advanced Inorganic Lab; students were not included. Even though the lab is creative and modern, Lou now has an alternative way to captivate the students!



## Our Four Divisions 40 years ago (copied from our 1962 Newsletter)



*Analytical Chemistry  
Pietrzyk, Buchanan, Pflaum*



*Inorganic Chemistry  
Bennett, Doyle, Sanderson*



*Organic Chemistry  
Wawzonek, Stille, Buckles, Campbell*



*Physical Chemistry  
Baenziger, Person, Cater, Miller*



*Head of Chemistry Department  
Ralph L. Shriner*

Early photos of two of our recently minted emeriti, Robert Coffman (left) and Bruce Friedrich (right). (in the editor's opinion, they haven't aged a bit!)



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