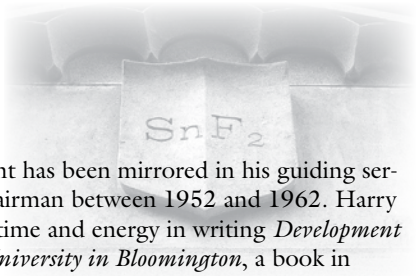
Harry G. Day — A Century of Life

by Rupert Wentworth



Harry Day celebrated his 100th birthday on Oct. 8, 2006, at Meadowood Retirement Community in Bloomington, Ind. Although I was unable to attend this party, I remember Harry's 90th birthday 10 years earlier with some clarity. The department celebrated with a gathering in the atrium. Paul Grieco, the chair; Elizabeth Greene, Harry's secretary since 1951; Max Marsh; and Gary Hieftje spoke briefly. I think Harry was prepared for that salute to his life, but another celebration, one attended by more than 60 people, was a complete surprise to him. It occurred at the First United Methodist Church, Harry's place of worship for over 50 years. Herman B Wells, four years older than Harry and in a wheelchair, attended, as well as Dennis Peters, Robin Nordstrom, and Reva and Jack Shiner. My wife and I were there, along with Harry's children, Margaret, Barbara, and Robert, and some of his eight grandchildren. I know that Harry enjoyed that party very much. Later, he said that it was special and deeply felt by him.

I also remember how Harry looked that day, and I recall being filled with a mixture of admiration and jealousy because of his remarkable youthful appearance. He seemed to have remained unchanged through the years as the rest of us have grown flabby and wrinkled and gray and bald.

Courtesy of IU Archives

His love for our department has been mirrored in his guiding service to it — he was our chairman between 1952 and 1962. Harry also devoted considerable time and energy in writing *Development of Chemistry at Indiana University in Bloomington*, a book in which he describes the department's history up to 1991.

Harry also served the university in several capacities. In addition to many committee assignments, he was associate dean for research and advanced studies from 1967 to 1972 and special assistant in the office of research and development from 1973 to his retirement in 1976. He received the IU President's Medal for Excellence in 1990 and the university's Distinguished Service Award in 1993.

He co-authored approximately 200 scientific publications dealing generally with the chemistry of nutrition. One of his major works was *The Newer Knowledge of Nutrition*, fifth edition, with E.V. McCollum and E. Orent-Keiles, published in 1939.

Perhaps, however, the accomplishment for which he is best remembered by everyone is his contribution to the development of Crest toothpaste. The 2002 edition of this magazine described the way this success occurred. Joseph Muhler and William Nebergall were also an integral part of the development team, and Harry, with undue but characteristic modesty, gave them most of the credit for this triumph.

Harry has also been a moving force within the First United Methodist Church, serving as a trustee for a number of years. He also loves Bloomington, and he loved it enough to have tossed his hat into the city's political ring. He was elected to the city council and served in that body for eight years until 1971. Some of the issues that he must have considered include the effect of the 1970 census on the city, and the city's plan to turn Kirkwood Avenue into a mall between the court house and IU. For his contributions to our department, the university, and the city, Harry was elected to the Monroe County Hall of Fame. He is also a Sagamore of the Wabash. Moreover, the main lecture hall in the Chemistry Building as well as a lectureship bear his name.

This birthday greeting would not be complete without the words of Cindy Jackson, a longtime friend of my family and Harry's caregiver at Meadowood for two years. "I have seen a very humble, thankful, gracious man age with pride and dignity. His advanced years have never taken away his sense of humor, caring spirit, and his genuine regard for all of his friends and acquaintances. When I think of the time I have spent with him, I smile as I remember him sitting in his chair with an IU tie, navy blue jacket, and a broad smile."

Happy birthday, Harry.

Courtesy of IU Archives

Top right: The symbol for tin(II) fluoride (stannous fluoride), the active ingredient in Crest toothpaste, occurs in stone near the entrance to the chemistry building. Center: Harry G. Day, circa 1976. Bottom right: The top shelf in Harry Day's lab in 1952.

The ~~Two~~ Three Sides of Scientific Investigation

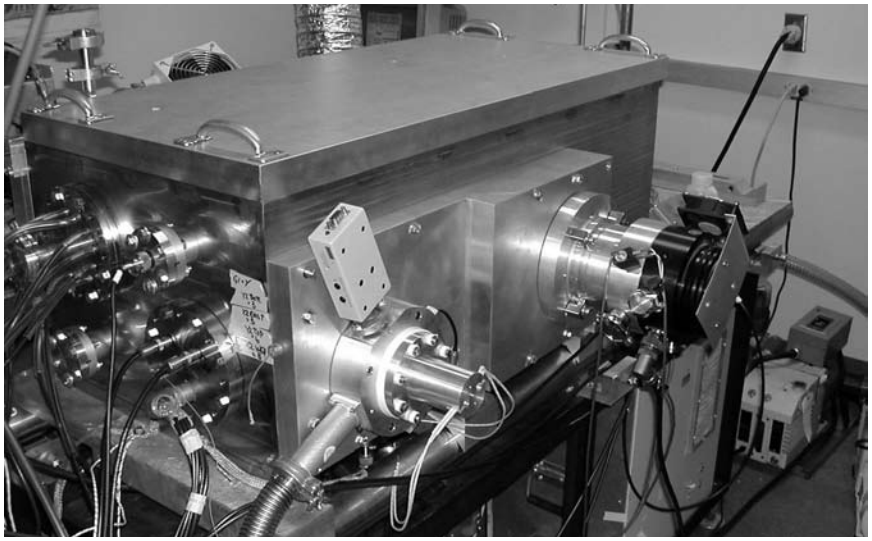
by Gary Hieftje

The rather peculiar title of this narrative is the same as that of the Distinguished Faculty Lecture on which it is loosely based. It attempts to provide a framework that I have found convenient for considering scientific developments. It also elicited some interesting comments, such as that from J. Michael Dunn, dean of the Indiana University School of Informatics: "There are three kinds of scientists: those who can count and those who can't."

The first part of the concept involves the classical view of scientific inquiry, that theory guides application. That is, a theoretical framework is developed from which applications spring. Put more colloquially by Yogi Berra, "If you don't know where you are going, you're apt to end up somewhere else." Abundant examples of this approach can be found. For example, nearly 40 years elapsed between the first description of mass spectrometric principles and their initial application to chemical characterization. Similarly, NMR and Mössbauer spectrometry were described theoretically long before their application. In the area of physics, the principles of laser operation were established long before a workable system was designed; the use of lasers in chemistry took even more time. This classical view of scientific inquiry can be represented as:

Theory $\xrightarrow{\text{Guides}}$ Application

Excellent examples of how analytical spectrochemistry has benefited from fundamental findings in atomic physics were provided by the Dutch physicist C.Th.J. Alkemade. He stated the philosophy clearly: "Analytical systems can be improved more straightforwardly and more universally if one first understands the basic mechanisms involved and has knowledge of the relevant physical parameters and constants."



Courtesy of Gary Hieftje

An example of equipment developed in the Hieftje laboratory: This is a dual-source time-of-flight mass spectrometer for simultaneous analysis of metalloproteins by electrospray and inductively coupled plasma ionization.

The converse side of scientific inquiry is that applications drive theory. In many situations, a sufficiently important application requires that the pertinent theory be developed. An example in the field of separation science is the work by A.J.P. Martin. It was only after Martin's initial demonstration of paper chromatography that the relevant theory was worked out.

Perhaps an even better example can be found in the field of atomic spectrochemistry, which stems largely from the original work of R.W. Bunsen. Long before the Bohr model of the atom was formulated, Bunsen and his colleague Kirchhoff showed that a chemical flame and spectroscope could be used for the determination of alkali metals. This general approach can be embodied as:

Application $\xrightarrow{\text{Drives}}$ Theory

The processes involved in these two "reactions" are mutually supportive and essential for scientific progress. No matter whether an investigation begins with an important application or a new theory, the opposite partner will benefit. For example, in NMR spectrometry, theoretical developments led and workable instrumentation followed. But when it became evident that NMR could solve important problems in chemistry, medicine, and other fields, the theory was refined further, to encompass the use of multiple pulse sequences, relaxation times, and other parameters to elicit additional information. In turn, those multidimensional parameters enabled even more complex problems to be tackled, and so on.

In both cases, when theory guides applications or applications drive theory, the NMR example suggests that instrumentation provides a catalyst; it serves as an enabler for theory to solve important problems or for problems to be investigated more fully and lead to improved theories. Instrumentation, therefore, serves as the third "side" of scientific inquiry. The theory of multipulse sequences in NMR was of little use until it could be embodied in scientific instrumentation. Similarly, applications of NMR instruments to real problems suggested the importance of other parameters to characterize. Thus:

Application $\xrightarrow{\text{Instrumentation}}$ Theory

To illustrate these points, a few examples will be cited from our own research activities. The first involves the development of new theories and fundamental underpinnings to solve important analytical problems.

One of the most common tools for performing elemental analysis employs the emission from an inductively coupled plasma. The ICP is a

high-temperature rare-gas electrical discharge, into which an aerosol of sample solution is fed. In the plasma, the aerosol droplets are dried, the resulting solute particles volatilized, and atoms of the original sample are liberated so they can emit characteristic narrow-band radiation. The method is extraordinarily powerful, capable of simultaneously determining most elements in the periodic table, and offering detection limits below one part per billion. Regrettably, however, the method suffers from "matrix effects." That is, the emission intensity from a given element, say calcium, changes depending upon whether the calcium was originally in a sample of bone, chalk, or limestone. Because the origins of such interference effects are not known, laborious and time-consuming procedures such as internal standardization and standard additions must be used if accurate quantification is desired.

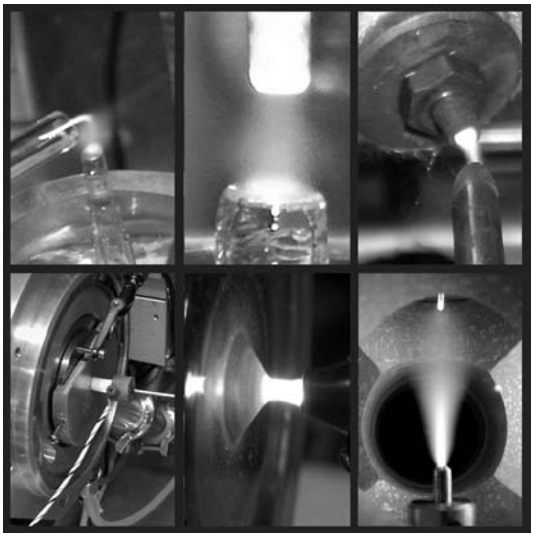
In our laboratory, we have been attempting to solve this problem by understanding more completely the processes by which an aerosol droplet is converted to neutral atoms and atomic ions in the ICP, determining the factors that lead to excitation of such species and, in general, how the sample make-up (the matrix) influences those events. To aid us in achieving this understanding, we have employed a host of novel experimental tools and instrumentation, including a device to introduce individual droplets of sample solution into the ICP, laser-saturated atomic fluorescence to map the concentrations of atoms from a sample and also those intrinsic to the plasma, and both Rayleigh and Thomson scattering, the former to obtain spatially resolved values for gas-kinetic temperature and the latter for measuring both electron concentrations and electron temperatures. Details cannot be provided here, but the importance of instrumentation in developing the theoretical framework for solving important problems is clear.

How theory can be embodied in new instrumentation to solve an important problem is illustrated by our recent use of a glow discharge to characterize proteins. Glow discharges are another rare-gas plasma but operated at reduced pressure (typically near 1 torr). At this pressure, a voltage applied between a negative sample electrode and a remote positive electrode causes the intervening gas to break down. If argon is employed, the breakdown produces a free argon ion and an electron, with the electron moving toward the positive electrode and the argon ions being accelerated toward the sample surface. Because of its substantial mass, the charged argon can ballistically "sputter" atoms directly from the sample surface, permitting them to travel a short distance before being excited and emitting characteristic radiation. During fundamental investigations, we established that applying a pulsed rather than steady-state voltage to such a discharge allowed us to ascertain the location from which individual elements were sputtered. In turn, this capability allows elemental distributions across the surface to be mapped. Further, earlier work revealed that the same capability is available from non-conducting samples, just by employing a radiofrequency rather than DC voltage to the cell.

Recently, we applied this fundamental knowledge to the simultaneous analysis of protein spots separated by gel electrophoresis. Because the emission wavelengths from the discharge allow a range of elements to be determined, we can identify which proteins contain metals, which metals are there, and the metal-to-protein stoichiometry. Moreover, sensitivity is enhanced by utilizing traditional staining methods such as silver, since a number of silver atoms collect on each of the protein spots. Lastly, characteristics of the proteins can be determined by employing element-coded affinity tags, which react with proteins having certain characteristics (e.g., proteins that have been oxidized).

Courtesy of Susan Hieftje

A seaside view of Gary Hieftje with his dog, Dusty



Courtesy of Gary Hieftje

Atmospheric-pressure glow discharges being developed in the Hieftje laboratory for atomic and molecular analysis by emission and mass spectromety

In some cases, instrumentation serves not only as a catalyst but also as the beginning point of an investigation, arguing once again that it be considered a "side" of scientific inquiry. One case is our development of a novel light source. The light source can be fabricated to dimensions of only a few micrometers, can be tuned in wavelength output, is capable of producing hundreds of millions of light pulses per second, and the light pulses can be only a few picoseconds in duration. The light it produces can be polarized and, amazingly, it requires no outside power. The source is based on a radionuclide and a second medium for producing flashes of light. This medium can range from a scintillator to a substance to produce Cerenkov radiation. The source is now finding its way into a host of sensors and other applications.

We hope that the foregoing comments provide convincing evidence that there are not two but really three areas of scientific inquiry: theory, application, and instrumentation. Each is capable of existing and being important on its own, but all benefit from symbiosis. The transfer of information between theory and applications will be driven not only by instrumentation but also by individuals who seek to recognize the importance of instrument and method development and who also attempt to understand the fundamentals of instrumentation and the measurement process in greater detail.

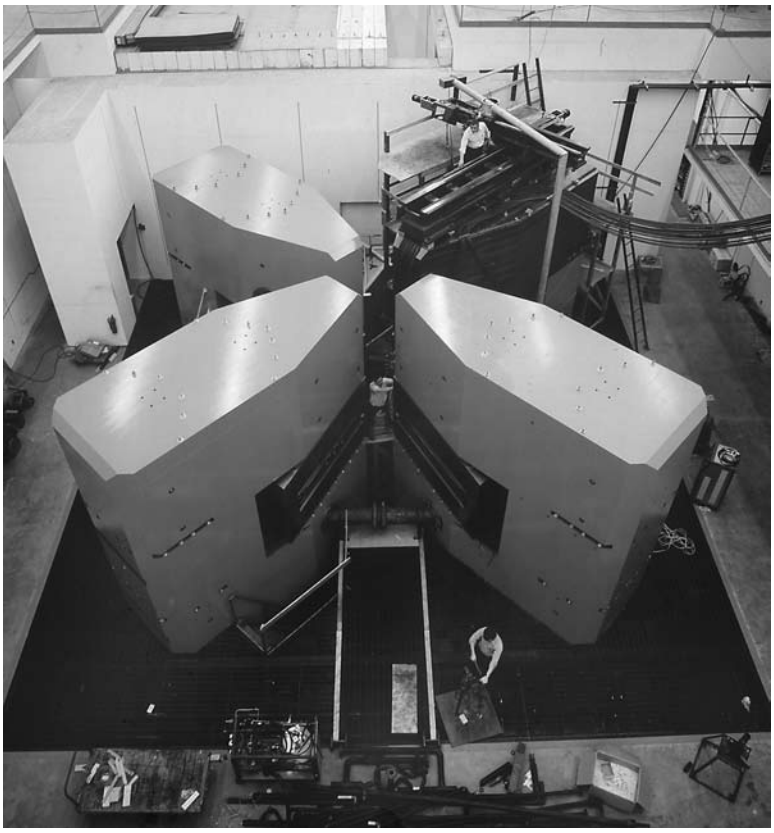
Protons Pack *Power*

by Rupert Wentworth

Let's face it: If you are a male, your chances for prostate cancer increase with every year you age. In fact, an oncologist once guessed when talking to me that every man would eventually get this disease if he lived long enough. I'm certainly not the exception to his guess. Nor is Charlie Parmenter, whose photographs strengthen this story.

We'll never really know the truth of the oncologist's prediction, but prostate cancer is not a disease to take lightly because it kills more than 30,000 American men every year, almost as many as the number of American women who die of breast cancer annually.

Once diagnosed, a man must pick and choose among several available therapies, and rarely is it an easy task. The four principal modes of treatment are surgical removal of the gland, bombardment with X-rays from an external source, X-rays from internal seeds implanted directly on the tumor, and bombardment with protons. (For the record, Charlie chose surgery, and I chose internal seeds.)



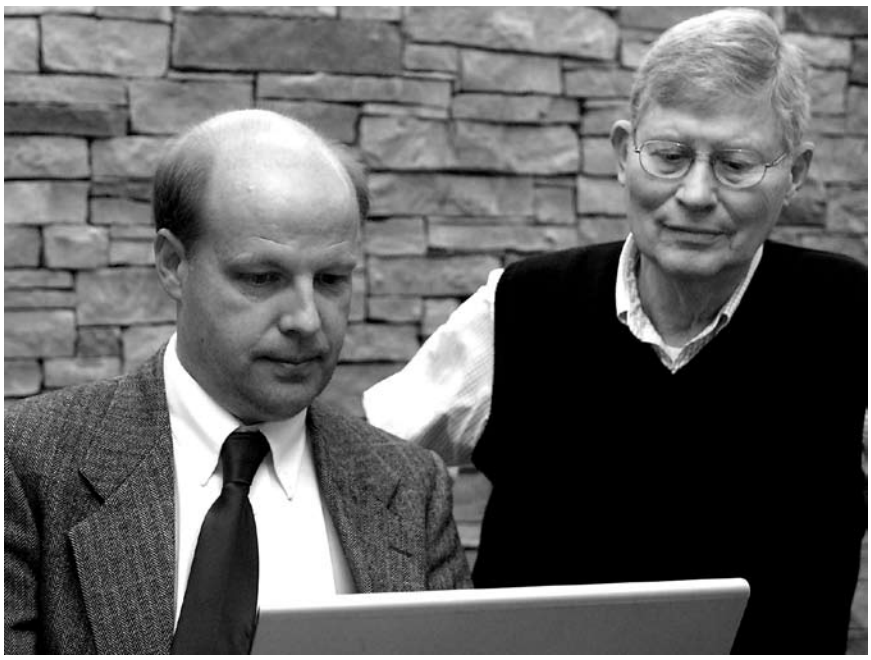
Courtesy of IU Archives

The cyclotron is an enormous instrument. (Find the three workers for scale.)

Before February 2004, a man who became convinced that proton therapy was his preferred treatment would have gone necessarily to the Loma Linda Medical Center in California or Massachusetts General Hospital if he had the time and financial resources. So a man on either the East or West Coast clearly had an advantage that a Midwestern man did not have. That advantage disappeared when proton therapy became available on IU's Bloomington campus in 2004 at the Midwest Proton Radiotherapy Institute. The institute is located at the center of 10 midwestern states that are home to 25 percent of the U.S. population.

Let's follow the case of P.A. Mack, a resident of Bloomington. He is a former two-term trustee of IU, and before that, the chief of staff for Birch Bayh, who was a U.S. senator from Indiana from 1963 to 1981. Currently, P.A. serves on the board of the IU Foundation. When he was diagnosed with prostate cancer, P.A. considered all of his options carefully. Ultimately, he was swayed by MPRI's location and turned to them for help. By coming to MPRI, he had opted for a series of careful exposures to a beam of protons accelerated to great speeds by a cyclotron.

P.A. met Allan Thornton, MD and medical director of MPRI, almost immediately. He was very impressed with the way Dr. Thornton made him feel at ease and equally impressed with his explanation of the treatment's protocol. Thornton's expertise in radiation medicine is recognized nationally. A board-certified radiation oncologist, he came to MPRI from Massachusetts General Hospital, where he was director of the Stereotactic Neurosurgical Irradiation Program and Coronary Irradiation.



Allen Thornton, left, MD and medical director of MPRI, and Rupert Wentworth

Although an ideal radiation beam for treating prostate cancer is unknown, a proton beam resembles the ideal more closely than a beam of X-rays (another type of therapy). When protons enter the body's tissues, they deposit a minimal amount of energy as they approach the tumor, causing little collateral damage to good tissue. As the protons slow down, interacting with negatively charged electrons, the amount of energy they deposit increases. Suddenly and remarkably, however, a peak — the Bragg peak — is reached, and the energy dose falls immediately to zero. You can see this phenomenon in Figure 1.

The dependence of the Bragg peak on the incident energy of the beam is also shown in the figure. A radiation oncologist will take advantage of this dependence and focus the Bragg peak on the

tumor by degrading the energy of the beam. Moreover, the oncologist will enlarge the peak by modulating the beam so it conforms to the tumor volume along the axis of the beam, and so a large dose falls directly on that volume.

The advantage of proton radiation is clear. For a fixed dose at a tumor, protons generally give a very low dose to healthy tissue in front of the tumor, and the sharp cut-off at the Bragg peak ensures that healthy tissue beyond the tumor is undamaged.

For those who may find the behavior of the proton beam to be almost counterintuitive, as I did, consider the explanation given to me by Vic Viola, a Distinguished Professor of chemistry. When the beam enters a stopping medium, such as human tissue (or water in the accompanying figure), the rate of energy loss is proportional to several unchanging factors as well as the charge on the ion and the reciprocal of the energy. As the proton slows down due to collisions with atomic electrons, the rate of energy loss increases as the energy decreases. Although mathematically the rate of energy loss could go to infinity, that doesn't happen because eventually the proton becomes thermalized and slows down enough to capture an electron, becoming a neutral hydrogen atom. The charge then changes abruptly from +1 to 0. At that point, the Bragg peak occurs, and the dose plummets to zero.

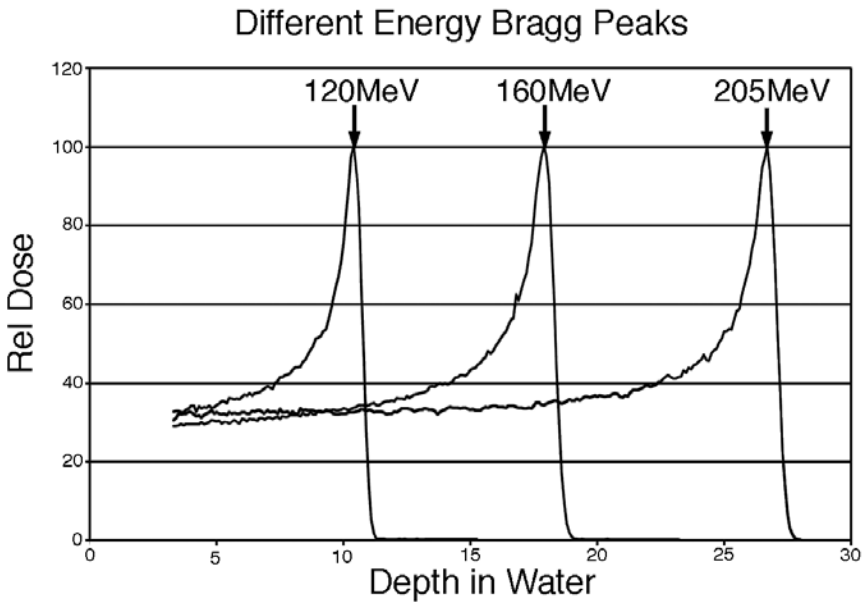


Fig. 1. The dependence of the Bragg peak on the incident energy of the proton beam

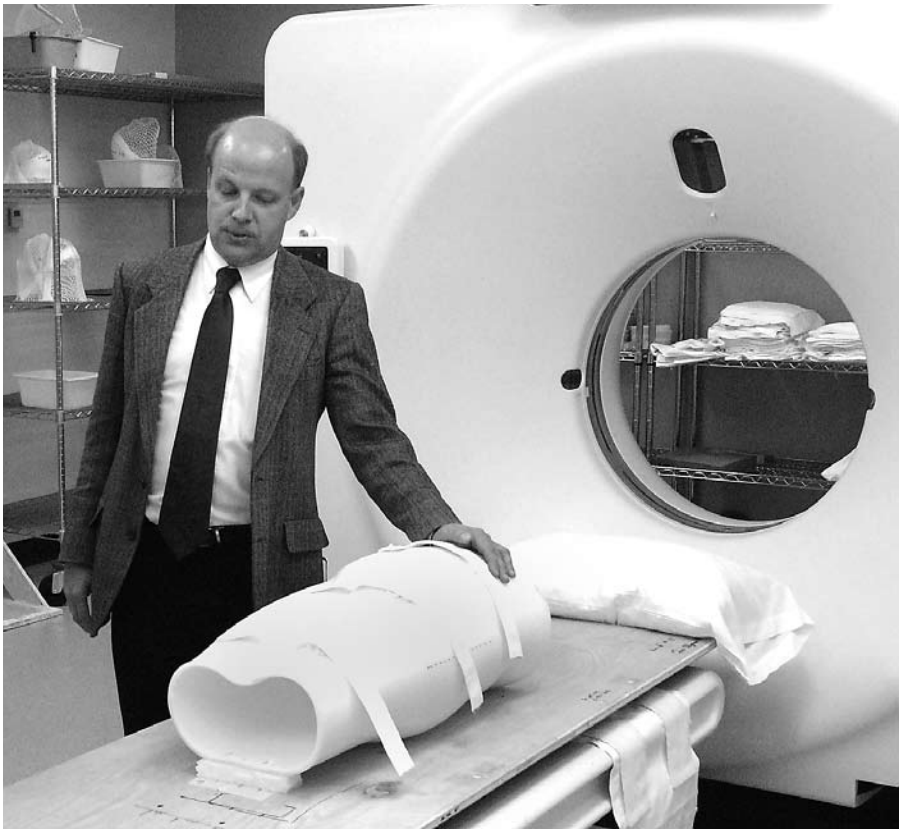
P.A. had 44 treatments over a nine-week period of time with each treatment consisting of exposure to an incident 206 million-electron-volt proton beam for about one and a half minutes. He is not currently experiencing any side effects, but he did feel somewhat less energetic during the treatments. The results, P.A. said, are better than he expected and hoped. Like any cancer treatment, time will tell its effectiveness, and time, according to Thornton, will bring out any side effects resulting from slowly forming internal scar tissue.

Proton therapy is not confined to prostate cancer. In fact, approximately 15 percent of all cancer cases are candidates for proton therapy. It can be used to treat other genitourinary cancers as well as benign tumors, certain ophthalmological conditions, head and neck malignancies, base of skull carcinomas, spinal cord and paraspinal tumors, gastrointestinal malignancies, pediatric cancers, and lung cancer. The U.S. Food and Drug Administration has approved proton therapy as a treatment for cancer.

A brochure from MPRI indicates that one of their principal concerns is compassionate, sensitive care for patients. P.A. found every word of that concern to be true. He was so impressed and grateful for the care he received that he established a two-year scholarship for radiation therapy training at Ivy Tech Community College.

It was a cold night in November when Charlie Parmenter and I went to the MPRI so that I could check out P.A.'s story and interview Dr. Thornton, while Charlie recorded the event for posterity. Some of his photos accompany this account. I think both of us came away with one mind: Thornton, who is intense and gracious with subtle humor, directs a facility grounded firmly and simultaneously in compassionate medicine and precise physics. I can't think of a better way to spend a cold November evening.

I normally print only those stories that concern our department directly, but although this story does not meet that criterion, it is about a remarkably sophisticated application of science. And it deals specifically with prostate cancer, a disease that any aging male chemist, including me, may contract. — RW

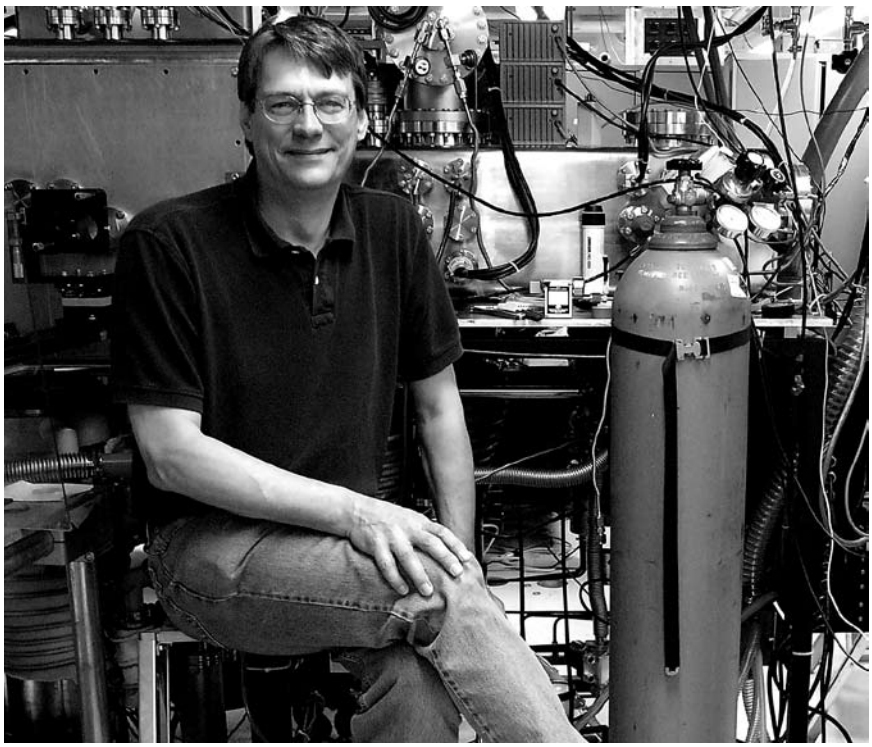


The patient uses a body cast to achieve stability and proper alignment.

Melting of Small Particles: Less Is Different

by Martin Jarrold

When an ice cube melts, it all melts at the same temperature. This melting transition is sharp because the ice cube, which contains more than 10^{23} molecules, is a large system from a thermodynamic point of view. What happens if we make the system much smaller? For example, what about a metal particle containing less than a hundred atoms? In this size regime, adding or subtracting just a single atom can make a huge difference to the properties. I've been told that particles this small are really molecules, and molecules don't melt. There certainly are questions about how many atoms are required for something to have liquid and solid states. The solid is perhaps more straightforward since at least in some cases very small particles adopt geometries that are clearly bulk fragments. The lowest energy structure of $(NaCl)_{32}$, for example, is a miniature rock-salt cube, with sides that are four atoms long. The liquid is trickier. While we usually think of a liquid as being random and disordered, the truth is that liquids possess short-range order. Which means that if you sit on an atom in a liquid and look out, the atoms near you will show some regularity in the way they are arranged, but the farther out you look, the more random things become. The point is that with a hundred atoms everything is local. A liquid with so few atoms must have properties that are quite different from bulk liquids.

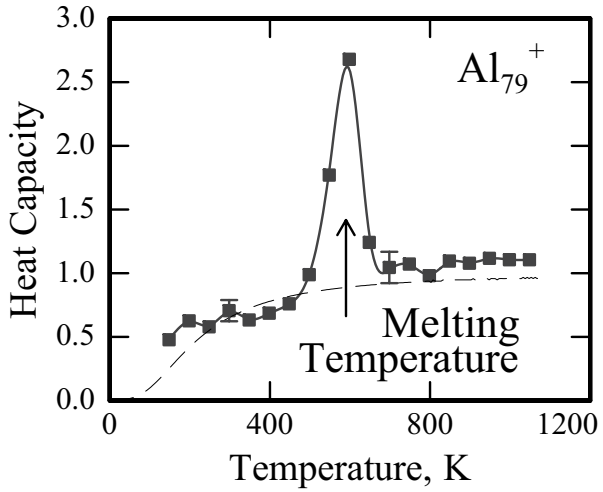


Martin Jarrold

So do particles with fewer than a hundred atoms show a melting transition? Melting point measurements for particles with thousands of atoms have been routine now for many years. The particles are placed on a heated surface, and electron microscopy is used to determine when they melt. However, this approach cannot be extended to particles with less than a hundred atoms because interactions with the surface would severely modify the particle's properties. So the measurements must be done on levitated particles. Furthermore, since the melting behavior is expected to be strongly size dependent in the small size regime, measurements must be made on single-sized particles as a function of the number of atoms. How do we set and measure the temperature of a levitated, size-selected particle, and how do we determine if it is a liquid or a solid?

In the last few years, methods have been developed that finally allow us to access the small size regime. Specifically, we can now measure the heat capacities of size-selected particles as a function of temperature. An example is shown in Figure 1, which shows the heat capacity measured as a function of temperature for Al_{79}^+ — a positively charged aluminum particle containing 79 atoms. We work with charged particles instead of neutral particles because we can use mass spectrometry to select the size before the heat capacity is measured. The presence of the charge is not expected to influence the results. The heat capacity is measured by determining how much energy is needed to fragment the particles. As the temperature is raised the internal energy increases and less energy must be added to cause fragmentation. The change in the fragmentation energy divided by the change in the temperature yields the heat capacity.

Fig. 1. Heat capacities recorded for Al_{79}^+ as a function of temperature. The peak in the heat capacity at around 590 K indicates the melting transition.



For a macroscopic object there is a sharp spike in the heat capacity at the melting point due to the latent heat (the energy that must be added to a solid to break it up into a liquid). In Figure 1, there is a peak in the heat capacity for Al_{79}^+ at around 590 K. We take the center of this peak to be the melting temperature. Bulk aluminum melts at 933 K, so Al_{79}^+ melts at a substantially lower temperature than the bulk. The peak in the heat capacity for Al_{79}^+ is broad, stretching from around 480 K to 680 K. Above 680 K, Al_{79}^+ is liquid, and below 480 K, it is solid. In a sense, Al_{79}^+ has different melting and freezing points. Below 480 K (the freezing point) only solid exists while above

(*continued on page 7*)

Clemmer steps down, DiMarchi takes the lead

2006 is a year of change for our department. David Clemmer has stepped down as chair, and Richard DiMarchi, gathering the reins of leadership from Clemmer, has replaced him.

A thank-you from David Clemmer

Several years ago I took on the job of chair with great enthusiasm and optimism about the future of the Department of Chemistry at IUB. As I finish my term, I continue to feel very positively about the progress we've made in moving our department forward. We began and continued addressing many major issues that we faced, including space, graduate and undergraduate programs, and outreach. We hired many new faculty who energized the department, and we implemented a number of innovative programs and changes. I have especially enjoyed our departmental graduation ceremonies (and so valued meeting the parents and friends of our students). Thanks to everyone again for their contributions to IUB. This is really a rare and special place!

A message from Richard DiMarchi

"Catch a Wave and You're Sitting on Top of the World." The popular tune of the 1960s that launched a generation of surfers is now the theme for technology in the first decade of this century. Advances in rDNA-biosynthesis, chemistry, and information technology are enriching our understanding of biology and chemistry through the delivery of an unprecedented wave of new knowledge. The sequencing of the human genome is a one-time achievement in the history of humankind that represents a chemical expression for the molecular basis of human genetics. It is a library that holds many of the secrets regarding human physiology and pathology, but presently composed in a machine language of which we have limited literacy.

The state of Indiana and, most notably, Indiana University have played a seminal role in the establishment, advancement, and application of biotechnology. Individual faculty members within the chemistry department have developed some of the high-performance analytical chemistries that have enabled macromolecule detection. Our biochemists have designed, synthesized, and studied a set of the most medicinally important bioproducts. Physical, organic, and inorganic chemistry faculty members have also made breakthrough contributions to their respective disciplines. Most recently, we have launched an important interdisciplinary program in material sciences, with a special emphasis on bio-materials.

Upon this rich foundation of achievement, Indiana University has committed itself to continued international leadership in the life sciences. A new interdisciplinary research center coupled with a sizably enlarged faculty and targeted financial support from the Lilly Endowment has created a unique period of growth on the Bloomington campus. Within chemistry, we continue to welcome new faculty such as Lane Baker and Liang-shi Li.

Each of them brings world-class scientific skills and strong interpersonal skills that are certain to render them superb teachers.

This alumni report is our attempt to stay connected with our large and geographically extended family. As I begin my tenure as the new chairman of chemistry, I extend to each of you an invitation to visit the department and experience first-hand the excitement I witness on a daily basis. If travel is not possible, I'd certainly welcome hearing from you by whatever communication methods you find most comfortable. Your interest, advocacy, and financial support for us are a sizable reason why this department has flourished through the years. I sincerely thank you for it on behalf of the faculty, staff, and students.

David Clemmer

Richard DiMarchi

Melting

(*continued from page 6*)

680 K (the melting point) only liquid exists. Between 480 K and 680 K, individual Al_{79}^{+} particles rapidly switch back and forth between being entirely liquid and entirely solid. The center of the peak in the heat capacity (which above we called the melting temperature) is actually the temperature where each particle spends half of its time as liquid and half as solid. There are enormous fluctuations in the melting temperatures with particle size. For example, Al_{61}^{+} melts at around 453 K while Al_{66}^{+} melts at around 900 K. What actually causes these large fluctuations in the melting temperatures has yet to be explained. The smallest particle we've found to show a well-defined melting transition is Ga_{20}^{+}, which melts at 720 K. This is well above the melting point of bulk gallium, which is 303 K. In fact, all small gallium clusters have elevated melting temperatures. The melting transition for Ga_{20}^{+} is around 400 K wide! But it appears 20 atoms are enough to show liquid-like and solid-like states and a melting transition between them.

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U.S. News & World Report *ranked our chemistry program 24th in the country while placing our analytical chemistry efforts sixth.*

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SCENE ON CAMPUS

Changes under way in IU's administrative structure

After months of controversy, IU President Adam Herbert announced in a letter to the university's trustees that he will step down no later than July 2008, when his current contract expires. If a successor is found before that date, Herbert could serve out his contract in another capacity.

Acting on the advice of Herbert, the university's trustees reshuffled administrative positions and named Michael McRobbie to the new position of Bloomington provost, the chief academic officer for the campus, on an interim basis. McRobbie is also vice president for academic affairs. Previously, he was vice president for research and information technology.

The Bloomington chancellor position that was held by Ken Gros Louis was eliminated. Gros Louis retired for a second time, taking the title of university chancellor.

In related stories, Kumble Subbaswamy, who was dean of the College of Arts and Sciences, and Suzanne Thorin, who was dean of the Libraries, left IU for other jobs. Subbaswamy has been replaced by a University of Chicago neuroscientist, Bennett Bertenthal.

Simon Hall one year ago and Simon Hall today.

New computing aids boost cyberstructure

The Bloomington *Herald-Times*' front-page story called it a "power play," describing IU's acquisition of the fastest university-owned computer in the United States, a machine capable of 20.4 trillion numerical operations per second. Equally important, IU acquired the nation's largest disk-based research facility, one that is capable of holding 200 times as much information as exists in the IU Main Library. Brian Crouch, the manager of our information technology group, said the new asset uniquely places IU's cyberinfrastructure among the very best in the nation and on a par with a small number of federally funded agencies and research centers.

John Huffman, who directs our Molecular Structure Center, had this to say: "What I did for my PhD thesis back in the early '70s, I could do in a day now — and enjoy doing it."

LECTURE SERIES, SPECIAL LECTURES, & SYMPOSIA

Lectures

The Harry G. Day Lecture was delivered by **Chi-Huey Wong**, the Ernest W. Hahn Professor of Chemistry at the Scripps Research Institute in La Jolla, Calif., on Sept. 14, 2005. His talk was titled "Post-translational Glycosylation: New Challenges and Opportunities." Research in the Wong lab encompasses a broad spectrum of bioorganic and synthetic chemistry, including the synthesis of biologically active compounds and designed molecules as mechanistic probes and inhibitors of carbohydrate-mediated biological recognitions.

The department welcomed two speakers for the **Eli Lilly Lecture** series. On Sept. 26, 2005, **Dennis Curran**, Distinguished Service Professor of Chemistry and Bayer Professor of Chemistry from the University of Pittsburgh, gave his talk titled "Mechanistic and Synthetic Studies of Radical Reactions." In addition to developing new classes of cascade radical reactions directed toward natural products, his work in the radical field focuses on new methods of stereoselection.

On April 26, 2006, **Richard Mathies**, professor of chemistry and director of the Center for Analytical Biotechnology at the University of California at Berkeley, gave the second **Eli Lilly Lecture** of the year. His talk was titled "Microfabricated Chemical Analysis Devices." Mathies's research foci include using laser spectroscopy to study excited-state reaction dynamics in photoactive proteins and to develop novel microfabricated chemical and biochemical analysis devices.

Harry B. Gray, Arnold O. Beckman Professor of Chemistry and the founding director of the Beckman Institute at the California Institute of Technology in Pasadena, Calif., presented the **Raymond Siedle Lecture** on Sept. 28, 2005. His talk, titled "The Currents of Life: Electron Flow through Iron and Copper Proteins," was well

(*continued on page 10*)

From left, Ken Caulton, 2006 Raymond Siedle lecturer Harry Gray, and Alan Siedle

Southern Indiana Section ACS activities

The Southern Indiana Section of the American Chemical Society section grew in its number of outreach events this year, including events such as Earth Day, BubbleFest, and the National Science Olympiad hosted at IU in May that brought in more than 6,000 students, parents, and teachers to the IU Bloomington campus. SISACS continues to support students by offering an organic tutor in the chemistry department every Sunday night (7–10 p.m.) during the academic school year.

SISACS hosted several social events in 2006 for the local section, including new "Feb-brew-ary" activities; these activities included a well-attended beer tasting and a trip to the local brewery, Bloomington Brewing Co. Additionally, we hosted two incredibly successful ice cream socials to send students off in the spring and again welcome them back in the fall.

SISACS awarded travel grants to six students (two undergraduates and four graduate students) this year to attend the spring and fall meetings in Atlanta and San Francisco, respectively. At the end of every academic year, SISACS gives an award to an "Outstanding Undergraduate in Chemistry" during the chemistry department's honors banquet ceremony in March. This year's recipient was Grace Lin; Lin graduated from IU in May 2006 with a BS in biochemistry with a double BA in biology and classical studies (Latin). She performed undergraduate research in Peter Ortoleva's lab, submitting a thesis titled "Analyzing Gene Expression and Transcriptional Activity to Differentiate B Cell Subpopulations: A Systems Biology Approach." In fall 2006, Lin entered the medical scientist training program at the University of Pennsylvania in Philadelphia in order to pursue her career as a physician scientist.

As is customary, the SISACS proudly sponsored National Chemistry Week to enhance the public's awareness of the wonderful contributions of chemistry. NCW was celebrated during Oct. 22–28 in the Chemistry Building at Indiana University. This year's theme was "Your Home — It's All Built on Chemistry." We also offered a series of activities including a straw-bale house display, alternative-energy activities, multiple hands-on activities for kids and families, contests and games, Boy Scout merit badges, and poster competitions for students from elementary school to high school, concluding with the final customary "Magic Show" hosted by Dennis Peters and Dan Sutton. Due to its proximity to Halloween, our student affiliates chapter hosted a very successful "Haunted Laboratory" where kids could walk through the laboratory and work on a "who-done-it" exploration by watching demonstrations, gathering evidence, and figuring out which scientists were responsible for a fictitious crime. The NCW coordinators were Kimberly Aumann and Alice Dobie-Galuska.

For the calendar year 2006, Kate Reck was the chair, Mookie Baik was the chair-elect, Levi Simpson was the secretary, and Andrea Pellerito remained as treasurer. Jeff Zaleski was our local section councilor, with Kenneth Caulton as our alternate councilor.

Lectures

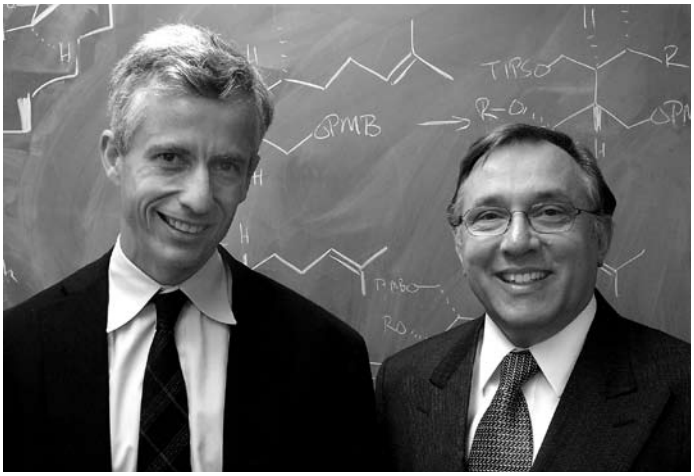
(*continued from page 9*)

received with humor and great interest, commensurate with Gray's keen wit. Most recently, Gray and his co-worker, J.R. Winkler, developed photoactive electron tunneling wires to probe deeply buried active sites in P450s and other redox enzymes. Further studies using fluorescent probes have mapped the folding energy landscapes of several heme proteins.

The **Ernest Campaigne Lecture** was presented on Oct. 19, 2005, by **Eric N. Jacobsen**, professor of chemistry at Harvard University. His talk, "Seeking General Asymmetric Catalysts," related a good description that the control of absolute and relative stereochemistry is an underlying goal in much of his work because of the crucial role played by the three-dimensional structure of molecules in their biological function.

Martin Karplus, professor emeritus of chemistry at Harvard University, visited IU to present his talk titled "How New Proteins Function: Insights from Simulations" for the **Harrison Shull Computational Lecture** on Nov. 30, 2005. Karplus and his group pursue topics toward understanding the electronic structure, geometry, and dynamics of molecules of chemical and biological interest. In recent years, techniques of *ab initio* and semi-empirical quantum mechanics have been used to obtain the desired solutions.

On April 12, 2006, the **Frank Gucker Lecture**, titled "Chemistry and Physics of Semiconductor Nanocrystals," was presented by **Louis E. Brus**, professor of chemistry from Columbia University in New York. He has been nationally recognized for his work in nanosciences, most recently receiving the ACS Chemistry of Materials Prize in 2004 and being elected to the National Academy of Sciences. His current research includes carbon nanotubes, organic electronics, local electromagnetic field enhancement, nanocrystal synthesis, and electric force microscopy.



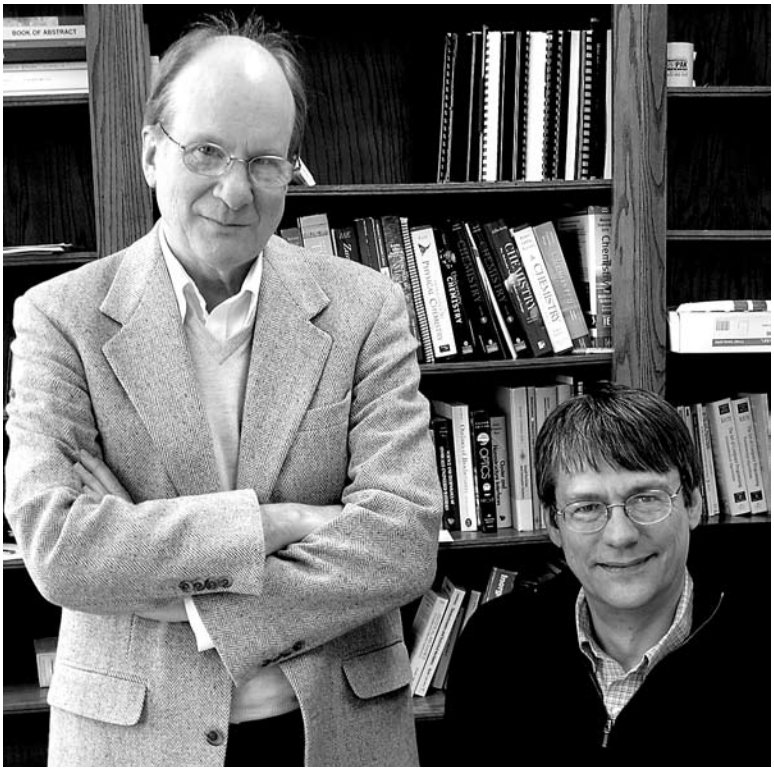
2006 Campaigne lecturer Eric Jacobsen, left, with David Williams

Krishnan Rahavachari, left, with Shull lecturer Martin Karplus

Symposia

The 15th annual Inorganic Alumni Symposium took place on Sept. 30, 2005. Speakers included Professor **George Bodner**, PhD'72 (with Lee Todd), Purdue University; Professor **Hilary Eppley**, PhD'96 (with George Christou), DePauw University; Professor **Mark Greene**, PhD'82 (with Kenneth Caulton), Purdue University; Professor **Suri Iyer**, PhD'00 (with Malcolm Chisholm), University of Cincinnati; **Loon-Seng Tan**, PhD'81 (with Malcolm Chisholm), Wright-Patterson Air Force Base. The symposium concluded with the customary dinner at Le Petit Café on Friday night and a picnic on Saturday at Hardin Ridge.

The **2005 PINDU Inorganic Chemistry Conference** was hosted in Bloomington on Dec. 3, 2005. PINDU is an inorganic chemistry conference that involves Purdue, Indiana, and Notre Dame universities. At this event, graduate students from each department present posters or presentations, with awards being given to speakers with the most number of participants, best poster, and best talk. This past year, Indiana University had the most participants, while **Brad Bailey** (Mindiola group) won the best poster and **Justin Riddle** (Lee group) was second. The day-long event allows graduate students from three different schools a chance to interact and share their work in chemistry.



2006 Frank Gucker lecturer Louis Brus, left, with Martin Jarrold

FACULTY PROFILE:

Mike Montgomery

Retired … but not forgotten

Mike has retired. He did so as a professor of chemistry after 44 years of service to our department. Although he loved Bloomington, his Colorado body never adapted to the hot humid summers of southern Indiana, so he returned to the state of his birth, where he can enjoy many of his favorite leisure activities, such as hiking, fly-fishing, and basking in the warm, dry air.

He joined the faculty at IU because the Department of Chemistry was growing rapidly and it seemed to have a bright future. And it did. Moreover, as the son of a basketball coach, he has felt very much at home in Bloomington, where he, who was a superb athlete in high school, could engage in lively discussions at the barber shop, debating whether Bloomington High School should have used a 1-3-1 zone defense instead of a 2-3 zone defense the night before.

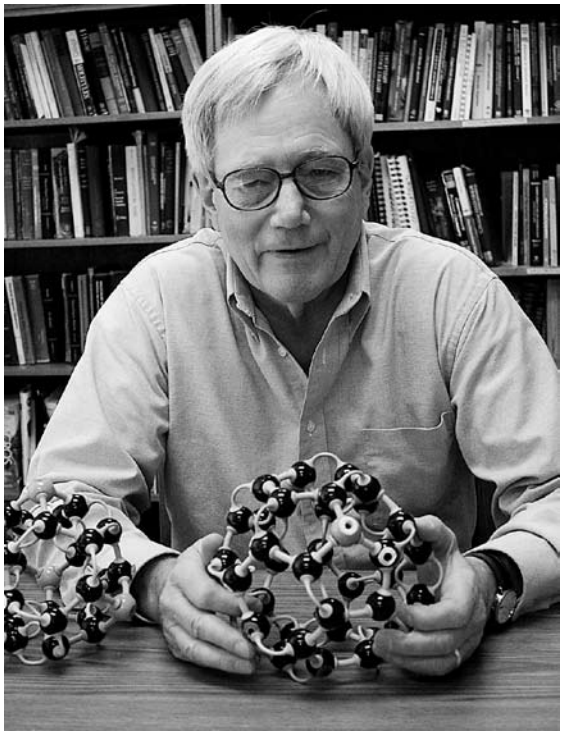
But his peripheral interests went beyond athletics. When Mike was in grade school, he had a superb music teacher, Miss Nesbit, who was passionate about opera and instilled this love in her students. Accordingly, the many years of opera that Mike has enjoyed at IU are for him an unforgettable fringe benefit.

Establishing and maintaining a highly successful research program was, however, his principal interest. Mike's early investigations addressed the details of how organic chemical reactions take place. He utilized a host of experimental and theoretical techniques and made significant contributions in six different areas.

The two most original contributions were in deuteron magnetic resonance spectroscopy and high-temperature gas-phase electron diffraction. The spectroscopy experiments entailed introducing a hydrogen atom isotope (deuterium) into a molecule and following this isotope during the course of a chemical reaction using deuteron nuclear magnetic resonance. These were the first experiments of this type. This is now a standard procedure in chemistry and biochemistry. In the second contribution, Mike designed an oven capable of attaining temperatures as high as 2000° C. The oven was used to break chemical compounds into highly reactive pieces. The structures of the pieces were determined by gas-phase electron diffraction. Structural experiments of this type had never been attempted previously.

In the 1987–88 academic year, Mike was a scientist in residence at Argonne National Laboratory, where he participated in organic superconductor research. Upon returning to IU, he established his own research program in the design, preparation, and characterization of new organic superconductors. This evolved into the leading chemistry program in this area in the United States. In this work he collaborated with more than 40 physicists.

Mike has given invited lectures at more than 100 universities, industrial laboratories, and government laboratories in the United States and abroad. He has been an invited or plenary lecturer at many national and international conferences on organic conductors.



Mike Montgomery

Mike was an enthusiastic and demanding teacher at both the graduate and undergraduate levels. The difficulty of his undergraduate organic chemistry courses presented a major obstacle to many preprofessional students. Nevertheless, Mike maintains that one of the most satisfying aspects of teaching undergraduate courses was the numerous letters and telephone calls he received from doctors and lawyers long after they had left IU, thanking him for teaching them how to think clearly and study independently. They felt that it had a significant impact on their careers. Mike received Teaching Excellence Recognition Awards in 1998 and 1999.

Mike served as graduate adviser in the Department of Chemistry for 12 years. He instituted a number of the important procedures that are still employed. He also served on several research and fellowship panels for the National Science Foundation, the Department of Energy, and the Air Force Office of Scientific Research. In an effort to improve the quality of organic chemistry textbooks, Mike consulted extensively for publishing companies and was the consulting editor in organic chemistry for Holt, Rinehart, and Winston for 12 years.

Certainly, he will always remember his years here with fondness. Beyond basketball, beyond opera, and beyond his research, he and his wife of 48 years, Mary Anne, raised three children in Bloomington: Jeff, an artist and computer programmer who designs Web sites; John, a television editor specializing in high-end editing software; and Anne, a dedicated critical-care nurse.

Yes, Mike has retired and left Bloomington. But his mark will always be here.

Edited by Rupert Wentworth

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Establishing and maintaining a highly successful research program was his principal interest.

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FACULTY NEWS

Ken Caulton and his group are pursuing the synthesis of novel transition metal complexes that have the capability of unusual reactivity, even new reactivity types. Although the reactivity always involves changes at the metal, recent findings show that their ligand, monoanionic "PNP" (an amide with two phosphine donor "arms"), can also be a reactive functionality: bond making and breaking involving substrate. These metal/substrate reactions are usually stoichiometric cleavage of normally inert bonds in small molecules (N_2, N_2O, NO, CO_2, olefins, but even alkanes and arenes), but they can be induced sometimes to proceed catalytically. Their overall focus is to study previously unachieved metal complexes and transformations: 14-valence electron complexes, radical hydrides, unusual metal oxidation states, unprecedented ligand binding geometries, very weak substrates, very low coordination numbers, etc. Creating the unusual can frequently enable accomplishing the impossible. Since they work in these underdeveloped areas, precedent offers little guidance and often molecular detective work is necessary, using an open mind and variety of physical and spectroscopic techniques. Most often, because they claim to be doing unprecedented things, final proof rests on X-ray diffraction determination of molecular structure: which atoms are bonded together, and whether each bond is single, double, triple, or some weaker noncovalent interaction (e.g. agostic, hydrogen-bonded, or charge-controlled). Answering these last questions is greatly facilitated by the results of Density Functional Theory calculations on structure, bonding, and energy, as well as characterizing transition states of reaction mechanisms.

David E. Clemmer finished his term as chairman and reports that he is very thankful for all of the hard work and dedication of the faculty, staff, and university administration.

Richard DiMarchi took over as chairman of the department. He and his research group have developed a series of aqueous stable glucagon agonists and highly selective, superactive glucagon antagonists suitable for pharmaceutical development. Additionally, the group is pioneering new chemical methodology for extending time action and expanding therapeutic index for peptide-based pharmaceutical agonists. This work has formed the basis of a number of emerging IU-based patent applications.

Dan Mindiola

Amar Flood has established a research program at Indiana University in the new division of materials chemistry. The goal of his current research is the development of molecular wires and motors and their integration into nanoscale devices. Such systems offer complementary chemical approaches to emerging problems at the nanoscale that were traditionally the area of engineering, such as in silicon-based electronics and miniaturized mechanical systems.

A recent focus in the **Gary Hieftje** group is the development of new atmospheric-pressure glow discharge sources. Such devices can be used for either atomic (elemental) or molecular determinations, depending on the source configuration and the demands of an application. Some are tailored for analysis of gases, others for solution samples, and others for direct solids analysis. Most are intended as ion sources for mass spectrometry, but some are suitable also for simpler emission-based measurements. All, however, can operate without the aid of auxiliary vacuum equipment or enclosed chambers, and some function directly in the atmosphere, making them attractive for remote or field applications. One specific new source, the atmospheric-pressure flowing afterglow, operates in a low flow of helium, to produce excited He atoms and ions and, indirectly, excited atoms and ions from nitrogen and water vapor derived from the atmosphere. These highly active species can not only ionize gas-phase sample material that they encounter, but can also desorb and ionize substances directly from solids. And, just as important, the ionization process is unusually "soft," so the main mass-spectral feature that results is the molecular ion. Not only does this feature yield a simplified, less cluttered mass spectrum, it also enables the direct analysis of simple mixtures of substances, without the need for a prior separation step. Interest in the new sources has already been expressed by several commercial vendors of scientific instrumentation.

Dongwhan Lee and his group are implementing gating motions in molecular crystals. By correlating large-scale structural changes of bulky aromatics, his group is also developing switches and sensors that can exploit photophysical properties associated with dynamic 2-D conjugation.

Dan Mindiola and graduate student **Brad Bailey** discovered a method to generate transient and reactive titanium alkylidynes (Ti=C linkages). These reactive motifs can activate, under mild conditions, C-H bonds from arenes and aliphatic hydrocarbons. Using a combination of synthesis, kinetics, and theoretical studies, Bailey was able to demonstrate that the Ti=C linkage was responsible for the C-H activation step. In general, the intermolecular activation of inert C-H bonds remains one of the most intensely studied areas in organotransition metal chemistry since these systems could allow the catalytic (perhaps even selective) conversion of hydrocarbons from cheap sources to valuable, functionalized organic precursors, which would ultimately serve as templates for a wide variety of commodity products.

Milos Novotny has been awarded a grant by the National Center for Research Resources, a component of the National Institutes of Health, to estab-

(*continued on page 13*)

Faculty news

(*continued from page 12*)

Goodbye, spectrometer!

lish and direct the National Center for Glycomics and Glycoproteomics and is currently evaluating a mass spectrometry-based approach for early cancer detection. He is also directing the Institute for Pheromone Research, which is involved in a large genetic study for the detection and quantification of human skin compounds that may have family, individual, and gender-related odor signatures.

More than 50 undergraduates, graduate students, and postdocs in **Charlie Parmenter**'s group have spent more time than they perhaps wished with the group's 1.7 meter f/10 scanning spectrometer (left). Designed by Professor **Ed Bair** and built in 1965 under his supervision in the departmental instrument shop, it has been a unique tool for revealing the behavior of fluorescing molecules isolated from their friends by very low pressures or, in more recent times, by supersonic expansions. Its resolution and high light throughput made it ideal for following the rare collisional events occurring in crossed molecular beams. Many of its discoveries were summarized in the *Journal of Chemical Physics*, 107 (2003), 3552.

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Faculty receive prestigious awards

David Clemmer received the Bieman Medal and gave the award lecture at a recent meeting of the American Society for Mass Spectrometry in Seattle.

Dongwhan Lee received an NSF Faculty Early Career Development Award for his research on shape-adaptive molecules as a general structural platform for applications in molecular transport, switching, and sensing.

Dennis Peters received the W. George Pinnell Award for Outstanding Service at the 2006 Founders Day celebration.

Professor Dennis Peters, right, receives the W. George Pinnell Award from IU President Adam W. Herbert at the 2006 Founders Day celebration.

Faculty news

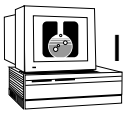
(*continued from page 13*)

Now, after 40 years as a centerpiece in the lab, it has been dismantled with some of the parts still in use elsewhere. As the accompanying photos show, removing the optics required the attention of Professor Bair, who could still remember the subtle construction of their precision mounts. The top image shows the spectrometer with the end plates removed to reveal the back of its 8 X 10 inch diffraction grating. Finally, with the help of instrument shop director Gary Fleener, a difficult birth was achieved so that the grating emerged in its mount to be admired proudly. The grating and the spectrometer's large mirrors are living in Parmenter's office as impressive objets d'art.

During the past year, **Dennis Peters** and his students have been exploring the use of electrogenerated cobalt(I) coordination compounds as catalysts for the degradation of some environmentally harmful chlorinated compounds. **Philip Gach** (a senior undergraduate from Princeton, Ind.) is the first author of a paper dealing with the catalytic dechlorination of the pesticide DDT (as well as DDD and DDE, two less chlorinated analogues) by cobalt(I) salen. Although DDT was banned from use in the early 1970s because of its harmful environmental effects, it has reemerged recently for the control of malaria-bearing mosquitoes, particularly in South Africa. In addition, Gach has just completed another project involving the cobalt(I) salen-catalyzed degradation of hexachlorobenzene, a hazardous pollutant of water, soil, and the atmosphere, and he has designed and will soon test a flow-through electrochemical reactor for the bulk catalytic dechlorination of DDT and hexachlorobenzene. **Gregory Bishop** (a recently graduated senior from Milan, Ind., and now a graduate student at the University of Florida) is co-author of a submitted manuscript describing the catalytic reduction of Freon 113a, a compound that, when released into the atmosphere, causes destruction of the ozone layer. Freons (chlorofluorocarbons) were eliminated from general use by the Montreal Protocol in the 1980s, but stockpiles of these substances remain in storage around the world.

Thomas Tolbert's group has expressed modified versions of the HIV entry inhibitor peptide Fuzeon in bacteria. Fuzeon is a peptide drug used to treat HIV that is currently produced by a chemical synthesis that requires 106 steps. By expressing the peptide in bacteria, the Tolbert group hopes to simplify the synthesis of this peptide drug and also facilitate the production of chemically modified versions of it. An N-terminal cysteine has been included in the Fuzeon peptide to facilitate chemoselective ligation of the peptide to synthetic molecules, and modification studies are under way.

Ted Widlanski and his group members recently published a paper, "A Role for Sulfation-Desulfation in the Uptake of Bisphenol A into Breast Tumor Cells," describing the chemistry of Bisphenol A (BPA), a ubiquitous plasticizer that has estrogenic activity (i.e., it is suspected of being an endocrine-disrupting agent that may affect development of fetuses). Its potential role in stimulating the growth of breast cancer or other hormone-responsive tumors has remained very controversial for years. The Widlanski group tested whether a chemical modification (sulfation) keeps BPA from being absorbed by breast tumor cells, or whether the sulfated BPA is still capable of stimulating breast tumor cell growth (and by extension, possibly exerting effects on in utero development of hormone-sensitive developmental processes). What they showed was that sulfation does not have a chemo-protective effect, and the sulfated derivatives of BPA do stimulate breast tumor cell growth. They showed that the breast tumor cells convert the sulfated derivative back into BPA, which can be absorbed readily. This is important because breast tumor cells and placental cells both have an enzyme (called aryl sulfatase C) that is not present in most other cells, which is probably responsible for this transformation. Therefore, there exists a clear mechanism that can explain how BPA may be concentrated into cells that are hormonally responsive. This could explain why BPA seems to have a greater effect on these types of cells than what would ordinarily be predicted. Even more interestingly, there are a number of similar estrogenic chemicals in the environment that may be subject to the same process. Although experiments in vivo were not possible, they did demonstrate that there is a relevant mechanism that might explain the effects people have been speculating about for years now. It doesn't mean that your Evian water is any less safe today than it was yesterday. It just means that if it isn't safe, we might be able to explain why.

CHEMICAL  INFORMATICS

The big news for the chemical informatics program was the receipt of a two-year $500,000 NIH planning grant for an exploratory center for cheminformatics research. In partnership with IU's Community Grids Laboratory, we created the Chemical Informatics and Cyberinfrastructure Collaboratory. For an overview, see www.chembiogrid.org. We anticipate that NIH will fund several full cheminformatics research centers in the next round of competition.

Joining **Xiao Dong** in the PhD in informatics program (chemical informatics track) this fall will be **Hari Machina**, **Huijun Wang**, and **Pulan Yu**. Also entering the MS in chemical informatics program in August will be **Dah Mee Koo**, **Gulshan Patil**, and **Dazhi Zhao**. **David J. Wild**, who taught the previous two years as a visiting faculty member, has accepted a tenure-track appointment in the School of Informatics, beginning August 2006. Wild will continue to teach the distance-education courses that form the basis for the new graduate certificate in chemical informatics program. Working with him on the NIH project is postdoc **Rajarshi Guha**. On the library school side, **Andrew Klein** has finished the MLS chemical information specialist program. He is now a science librarian at California State University at Northridge. Two students, **Yan He** and **Meredith Saba**, are entering the second year of the SLIS program.

— Gary Wiggins

STAFF NEWS

On May 9, 2006, our staff and faculty gathered at the Tudor Room for our annual Staff Banquet to honor some of our outstanding staff who were acknowledged for their dedication and longevity to the university/department. Again this year the Outstanding Staff Award was given to six staff members, and we celebrated those award recipients and welcomed the many retired staff members who helped make this a festive event.

Service recognition

• 25 years — **Jackie Drake**, purchasing representative

• 25 years — **Don Garvin**, manager, glass instrumentation

• 30 years — **Rick Hackler**, shipping and receiving clerk

• 35 years — **Richard Landgrebe**, research systems engineer specialist

Staff Award recipients

• **Kimberly Aumann**, undergraduate laboratory coordinator

• **Judy Crandall**, personnel and grants manager

• **Kathy Fisher**, chairman's office assistant

• **Rick Hackler**, shipping and receiving clerk

• **Melissa Jayne**, graduate admissions secretary

• **Jeff Tate**, research machinist III (posthumous)

Retired

Bob Addleman retired in May after nearly 34 years in the Department of Chemistry. He was formerly the manager of the NMR facility, where, in the early days, he was involved in the construction of in-house NMR instrumentation. Recognizing his background in NMR and mass spectroscopy, he became our major instrument systems engineer in 1994. Addleman has always been very active in Boy Scouts and was recognized this past year with the Silver Beaver award, one of the highest honors a volunteer leader can receive. His son, Hans, and his wife, Jennifer, gave Addleman his first grandson in May.

Remembering

Sadly, **Jeff Tate**, research machinist III in the Edward J. Bair Mechanical Instrument Center, died on Nov, 22, 2005. Tate was a former custodial worker in our department and began working as a research machinist trainee in 1991. He quickly developed the required machining skills and made rapid progress through the ranks. He was a valuable asset to our machine shop, and all his friends and colleagues in the department miss him greatly.

LIBRARY NEWS

Brian Winterman, the assistant librarian hired in September 2004, and I continue to split our time between the Chemistry Library and the Life Sciences Library. Although we feel a bit disoriented at times, there are many areas of overlap in terms of the subject matter so we feel positive about the arrangement. In the coming year we want to focus more of our attention on outreach and instruction. The budgets for books and serials go in cycles, and this fiscal year was more of an up one, although we are expecting to tighten our belts next year. We were able to add a number of electronic resources this year, including the *Kirk-Othmer Encyclopedia of Chemical Technology*, the *Dekker Encyclopedia of Nanoscience and Nanotechnology*, online journals in a Material Science Backfile Collection from Wiley, and backfiles for the *Canadian Journal of Chemistry*, 1951–1997. The library is trying to respond to increased research activity in the material chemistry area. One journal we added in this area has a great name, *Small*. We also added *Current Opinion in Drug Discovery and Development*, *Journal of Vacuum Science & Technology, MRS Bulletin*, *Current Nanoscience*, and *Journal of Colloid and Interface Science*.

Yan He was our SLIS graduate assistant for 2005–06 school year. She has an advanced chemistry degree and was a real asset in assisting chemistry students using the library. She was the recipient of the 2006 Marion E. Sparks Award for Professional Development and received the award at the SLA Chemistry Division Annual Business Meeting held in Baltimore this June. She will be replaced by **Lisa Johnston** for 2006–07. Johnston has a BS degree in astrophysics and was an assistant editor at *Sky & Telescope* magazine. Our SLIS GA for 2004–05, **Andrew Klein**, was married in June, graduated from SLIS, and started his new position as science librarian at California State University at Northridge at the beginning of August. Our branch coordinator, **Justin Gardner**, who started with us in September 2003, resigned at the end of July to take a job as a librarian at the Louisville Free Public Library. We plan to fill his position shortly after the start of the school year.

— Roger Beckman

Courtesy of the Tate family

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We continue to take pride in our staff, whose work ethic and dedication continue to contribute to the success of this department.

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Jeff Tate, gone but by no means forgotten.

STAFF PROFILE:

The ITG

Providing information solutions

When I decided to write a story about Brian Crouch and his information technology group, I did so with some hesitation. After all, this group spends all day, every day, five days or more a week working with many wide-ranging aspects of computers. And what are my computer skills? I'm able to write this story in Microsoft Word (but I have a current copy of *Word for Dummies* by my side), I can send and receive e-mail, and I can play solitaire — sorry credentials for understanding what the ITG does and then writing about it.

The ITG, shown here with its director, Brian Crouch, top left, continues to grow.

Nevertheless, this competent group deserves a story. So here goes: You'll meet the members of the ITG, just as I did.

My first real encounter with Brian came when I was writing a book. I was retired, so I was writing at home, but was experiencing a problem with e-mailing my co-author and my publisher. I called Brian, and, to my surprise, he told me that he would stop by my house on his way home. He did, and my e-mailing problem disappeared within a few minutes.

Later, Brian told me that the ITG's mission is "to provide information solutions, enabling students, staff, and faculty at IUB Chemistry to effectively meet their goals in a world-class learning and research community." While it was completely unexpected, his house call more than lived up to his group's mission.

When I encountered Brian again, I had an ailing laptop; it was a machine laden with more viruses than ticks on my uncle's old hound dog. My laptop and I entered the ITG area and found rooms that are small by any standard. Several desks make the first room even narrower than its naturally constricted width. One of those desks belongs to David Felker, who provides design and management of the technical needs of the department's instructional program. Steve Creps, who maintains the UNIX systems, sits at the other desk.

When I edged past those desks, I found Brian's office at the back of the room. It is so small that my grandmother's kitchen pantry would have swallowed his office with plenty of room left over for another office of the same size. Information overflow might be a way to describe my impression of the contents of Brian's space.

Later, I learned that the group assists the faculty, students, and staff in their instructional, administrative, and research-based computing activities. At the time of publication, they oversee 1,498 devices, including printers, Apple systems, Windows work stations and servers, and UNIX work stations, as well as climate-control monitoring systems and instrumentation. You can find a complete description of their duties and activities at www.chem.indiana.edu/facilities/AboutITG.asp.

Back into the narrow room, I found a crowded room on the left where computers are repaired and built. When Brian and I entered this space, I met Becky Hanson, whose job description includes technical support for administrative computing as well as development and maintenance of information systems. She was scanning some of the departmental computers for viruses. Brian then introduced me to Scott Harrington, the group's computer consultant. Among his many responsibilities is the supervision of two hourly employees. Together they repair, rebuild, and upgrade the departmental computers as well as dealing with data recovery. I left my laptop with Scott, and several days later, he had chased all of the viruses away and recovered the data while adding a few bells and whistles that had not been there before.

I would be remiss if I didn't also mention Robin Nordstrum. She doesn't solve computer problems, but she does belong to the group and she does deal with information. Anyone who has written an exam in the last 30 years should know her — she is the one who does the duplicating. During the years that I wrote exams, I would sometimes submit one late, but Robin always found a way to duplicate it in time for class.

Whether supporting professors Clemmer, Raghavachari, and Iyengar with their high-performance cluster-computing needs or explaining to an old, retired professor what the letters UNIX and CPU represent, the ITG does it with ease and assurance. It's clear to me that Brian runs a tight but happy ship.

— Rupert Wentworth

GRADUATE NOTES

During the 2005–06 school year, Professor **Martin Stone** was director of graduate studies. Serving with him on the Standards Committee were professors **Kenneth G. Caulton**, **Gary M. Hieftje**, **Lawrence K. Montgomery**, and **Charles S. Parmenter**.

The Graduate Admissions Committee was chaired by **Martin F. Jarrold**. Evaluating the hundreds of dossiers submitted to the department were professors **Richard D. DiMarchi**, **Bogdan Dragnea**, **Amar Flood**, **Srinivasan S. Iyengar**, **Stephen Jacobson**, **Dongwhan Lee**, **Daniel J. Mindiola**, **David Williams**, and **Faming Zhang**.

Fellowship award winners

Leigh Boerner was awarded the Richard Slagle Fellowship. Boerner completed her undergraduate studies at Indiana University, earning a BS in biology and a BA in chemistry in December 2003. She decided to pursue her graduate degree at IU and joined the lab of Professor **Jeffrey Zaleski** in January 2004. The project that Boerner is currently working on involves the synthesis and Bergman cyclization of porphyrinic enediynes, which can be used as phototherapeutic agents for hypoxic environments. She spends her spare time trying to figure out how to knit porphyrins into socks.

George Chan was awarded the Kraft Fellowship. Chan attended the University of Hong Kong from 1994 to 1997 before receiving his BSc degree in chemistry. After receiving his BSc degree, he joined the Wing-Tat Chan research group at the University of Hong Kong for graduate study and received his MPhil degree, majoring in analytical chemistry in 2000. He started his graduate research at Indiana University in 2002 with Professor Gary M. Hieftje. His current research interests include understanding matrix-effect mechanisms and analyte excitation mechanisms in ICP-AES, and development of diagnostic tools to identify interelement matrix effects and methods to alleviate them. The work aims to clarify the origin of matrix interferences and to better understand the excitation and ionization mechanisms for analyte and their relationships to matrix effects.

Virginia Goehlert Jarymowycz was awarded the Baxter Pharmaceutical Fellowship. Jarymowycz received her BS in biochemistry from Indiana University in 2001. She is currently pursuing a PhD in biochemistry at Indiana University in the laboratory of Professor Martin J. Stone. Her research is focused on using NMR relaxation techniques to investigate the potential contributions of fast time scale dynamics to observed protein stability and function.

Michelle Kovarik was awarded the National Science Foundation graduate research fellowship (2004–08). Kovarik graduated with a BS in chemistry from St. Louis University in 2004. She started her graduate studies at IU in August 2004 in the laboratory of Professor Stephen C. Jacobson. Kovarik has been working to fabricate nanometer-scale channels and pores using electron-beam lithography and standard photolithography for use in chemical analysis.

Partha Nag was awarded the Chester Davis Fellowship in organic chemistry. Nag was born and raised in the suburbs of Calcutta in India. He received his BSc in chemistry and MSc in the field of organic chemistry from the University of Calcutta. His undergraduate research focused on the synthesis of natural and unnatural bioactive coumarins, 1-benzopyran, and chromone derivatives. During his pre-doctoral studies, Nag received a junior research fellowship from the Council of Scientific and Industrial Research, India, and the GATE Fellowship from the Department of Education. Graduate studies with Professor David R. Williams began in the fall of 2002 at Indiana University Bloomington. His doctoral research examines the development of new methodologies for the synthesis of bioactive, structurally complex natural products.

Beili Quan received the Linda and Jack Gill Fellowship. Quan graduated from Fudan University, Shanghai, China, with a BS in chemistry. She entered Indiana University Bloomington, majoring in biological science, in fall 2003. She currently works for Professor Richard DiMarchi in the research of insulin analog activity. She participated in the American Peptide Society meeting in June 2005 and was chosen to give an oral presentation in the Young Investigators' Mini Symposium. She also won the travel award for the meeting.

Michael Webb has been awarded the E.M. Kratz Fellowship. Webb was born in Rochester, N.Y. In 2001, he earned his BS at Union College in Schenectady, N.Y., where he majored in chemistry and minored in English and physics. While at Union, he used HPLC and other techniques to research chloramines with Katherine Alben at the New York State Department of Health. For his senior thesis, he used a variety of spectroscopic techniques to explore interactions between fluorescent dyes and surfactants with Professor Mary Carroll. Webb's work with Professor Gary Hieftje

(*continued on page 18*)

Department award winners

At the chemistry honors banquet in April 2006, the following students were honored with awards:

E. Campaigne C500 Award: **Alison Fout** and **Sam Merenbloom**

Eli Lilly Analytical Award: **Pilsoo Kang**

Wendell P. Metzner Memorial Award: **James Sawyer**

William H. Nebergall Memorial Award: **Tillmann Koepke**

Felix Haurowitz Award: **Brad Bailey**

Henry R. Mahler Award: **Levi Simpson**

McKenzie Award: **Levi Simpson**

Jack Crandall Award: **William Andrews**

David A. Rothrock Award: **Michael Fultz**

Instructor Awards: **Michelle Borden**, **Michael Fultz**, **William Pitcock**, and **Nate Rawlinson**

Graduate notes

(*continued from page 17*)

at IU deals with plasma-source spectrometry, and particularly with glow discharges used for imaging and liquid analysis.

William Andrews has been awarded the Proctor and Gamble Fellowship. Andrews graduated cum laude with a BS in chemistry from Allegheny College in 2002. He then moved to Indiana University in fall 2002 to pursue his PhD in organic chemistry in the lab of P. Andrew Evans. Andrews's research has focused on the development of new methods for the stereo-controlled synthesis of cyclic ethers. He is currently applying the bismuth-mediated oxy-conjugate addition reaction developed in the Evans's lab to the formal synthesis of leucascandrolide A.

Xiaofan Yang has been awarded the Chester Davis Fellowship in Inorganic Chemistry. Yang received his BS from Peking University in China, where he majored in chemistry and minored in computer science. He was interested in linking lanthanides and transition metals to make heterometallic compounds. In fall 2003, he moved to Indiana University as a joint student with professors Kenneth Caulton and Mu-Hyun Baik. His current research is focused on the rational catalyst design from both theoretical and experimental aspects, such as the mechanistic study of water oxidation catalysts and the synthesis of new metal-carbene complexes.

Our department has been selected by the U.S. Department of Education to participate in the Graduate Assistance in Areas of National Need Fellowship Program. Fellowships were awarded to: **Emily Barter**, **Leigh Boerner**, **Jody Evans**, **Ryan Fenno**, **Alison Fout**, **Maggie Lerch**, **Colleen Neal**, **William Pitcock**, **Kelly Rask**, **Sarah Richer**, **Brigitte Robinson**, **Laura Sharon**, **Martin Walsh**, and **Lloyd Zilch**.

Other fellowship recipients were **Brian Bohrer**, Baxter Fellowship; **Jonah Chang**, Paget Fellowship; **Maggie Lerch**, WIS Fellowship; **Kristy McNitt**, Berk Fellowship; and **Jay Srinivasan**, Eli Lilly Organic Fellowship.

Research and University Graduate School Fellowships were awarded to: **Kevin Barry**, **James Black**, **Brian Bohrer**, **Michele Borden**, **Michael Brinton**, **Drew Buschhorn**, **Angela Carrillo**, **Aroop Chandra**, **Jonah Chang**, **Alan Cusak**, **Anja Dancevic**, **Arnab De**, **Christopher DuFort**, **Ryan Fenno**, **Glen Ferguson**, **Matthew Foley**, **Alison Fout**, **Benjamin Fulmer**, **Michael Fultz**, **Holly Herbert**, **Uriah Kilgore**, **Tillmann Koepke**, **Michelle Kovarik**, **Margaret Lerch**, **Michael Lawler**, **Richard Lord**, **Sarah Mabbett**, **Yogita Mantri**, **Joshua Maze**, **Kristy McNitt**, **Samuel Merenbloom**, **Jonathan Meyers**, **Colleen Neal**, **Elizabeth Opsitnick**, **Kumar Parimal**, **Joseph Pinchman**, **William Pitcock**, **Kelly Rask**, **Justin Riddle**, **Emma Shansky**, **Andrew Share**, **Laura Sharon**, **Jacob Shelley**, **Anne Starace**, **Isaiah Sumner**, **Timothy Tatge**, **Timothy Troyer**, **Jeremy Vaughn**, **Martin Walsh**, **Ardian Wibowo**, **Yuening Zhang**, and **Kaimeng Zhou**.

Congratulations to our recent chemistry graduates!

PhD degrees awarded

Beardsley, Richard (analytical, Reilly, May 2006), postdoctoral research, University of Arizona, Tucson, Ariz.

Hilderbrand, Amy (analytical, Clemmer, November 2005), postdoctoral research, University of Arizona, Tucson, Ariz.

Kim, Youngchan (biological, Kao, February 2006)

Mikulecky, Peter (biological, Feig, August 2005), postdoctoral research, Scripps Research Institute, La Jolla, Calif.

Nugent, Benjamin (organic, Johnston, March 2006), research chemist, Dow Agro Sciences, Indianapolis

Patnaik, Samarjit (organic, Williams, April 2006), senior research scientist, GlaxoSmithKline, Raleigh, N.C.

Roychowdhury-Saha, Manami (biological, Burke, December 2005), postdoctoral research, Scripps Research Institute, La Jolla, Calif.

Saksmerprome, Vanvimon (biological, Burke, August 2005), postdoctoral research, University of Massachusetts Medical School, Worchester, Mass.

Saran, Dayal (biological, Burke, May 2006)

Sayyed, Ahmad Abdallah (physical, Ortoleva, October 2005), postdoctoral research, University of Minnesota, Minneapolis

Szumlas, Andrew (analytical, Hieftje, November 2005), senior engineer, Hamilton Sundstrand, Pomona, Calif.

MS degrees awarded

Baum, Erich (organic, Evans, September 2005), research assistant, GlaxoSmithKline/RTP, North Carolina

Byun, Chang Kyu (analytical, Novotny, December 2005), graduate student, Texas Tech University, Lubbock, Texas

Carrick, Jesse (organic, Williams, October 2005)

Stites, Ryan (organic, Williams, December 2005), medicinal chemist, Lilly Corporate Center, Indianapolis

Yoder, Bruce (physical, Jarrold, C, March 2005), graduate student, École Polytechnique Fédérale de Lausanne, Switzerland

Zhao, Guangyu (inorganic, Mindiola, March 2005)

UNDERGRADUATE NOTES

During the 2005–06 academic year, we continued to refine the curriculum developments described in last year's issue of this magazine. Most particularly, in the fall semester we inaugurated our one-semester course (Chemistry C117 or S117) in general chemistry, which was followed in the spring by organic chemistry (C341 or S341). Our success with our new curricular initiatives and momentum in the undergraduate office has been reflected in an increase in the number of students majoring in chemistry or biochemistry. Specifically, in the spring of 2006, we had 108 students pursuing BA degrees in chemistry, 94 pursuing BS degrees in chemistry, 29 pursuing BA degrees in biochemistry, and 132 pursuing BS degrees in biochemistry. In May, a total of 90 students earned baccalaureate degrees.

Overall enrollment in undergraduate courses rose slightly to 5,300 in 2005–06. Moreover, for our first-year courses for majors, Chemistry C117 claimed 477 enrollees for the fall (up modestly from 400 in the preceding year), and Chemistry C341 had 596 students (up dramatically from 268 in the preceding year). Our curricular changes and new 1:2:1 sequence allow us to cover more material in the organic chemistry sequences than previously. Overall, our dynamic curriculum will offer our science students better preparation and better appreciation for the field of chemistry.

Our undergraduate office had many staff changeovers in the last year. Most notably, **Steve Wietstock** left IU after eight years to accept a teaching faculty position at Notre Dame. This loss left our position for director of laboratories vacant for 10 months. We would like to express our gratitude to **Kim Aumann**, coordinator of undergraduate laboratories, for ensuring that the undergraduate laboratories ran smoothly during this interim period. For this, Aumann was a recipient of a Chemistry Staff Award in 2006. In addition to this vast work load, Aumann took on the position of outreach coordinator and worked to expand the department's outreach programs in the community. She taught a new service-learning course for the department in which her students led hands-on science activities with children at local schools and youth organizations. For this work, she received the Outstanding Service Learning Faculty Award from the campus office of Community Outreach and Partnerships in Service-Learning.

On Saturday, May 6, 2006, we had fine weather for our annual celebration to honor the undergraduates who received degrees in December 2005, May 2006, and August 2006. Graduating seniors, their families and friends, chemistry faculty and staff — in all, a group totaling 325 — gathered for a light breakfast under a tent on the north side of the Chemistry Building. Following breakfast, the ceremony was held in the Harry G. Day lecture hall. David Clemmer provided opening remarks, after which he and Dennis Peters called each student forward to spend a minute or two speaking about the student's accomplishments and future plans and to acknowledge the student's family and friends. We are very proud of our graduates and look forward to hearing from them as they begin the next phase of their lives and throughout their careers.

Scholarships and awards

C117 Award: **Rachel Maranto**

S117 Award: **John Greco** and **Derek Weaver**

C118 Award: **Mahalia Way**

Chemistry Honor Roll (at least 3.5 GPA): **Richelle C. Alcantara**, **Courtney E. Allen**, **Saif U Ansari**, **Erin R. Badenhop**, **Michael Yoon-Phil Bang**, **Alana L. Barbato**, **Noah M. Benjamin**, **Alana R. Bentley**, **Gregory W. Bishop**, **Jessica E. Brown**, **Matthew J. Bueter**, **Matthew T. Burk**, **Bradley A. Burkhart**, **Alex S. Burn**, **Kenneth D. Byrge**, **Elizabeth T. Cera**, **Jean K. Chung**, **Erica M. Daniel**, **Anshuman Das**, **Mark B. DeLeeuw**, **Aaron J. DeLoughery**, **Panechay Detaksone**, **Jenna Devare**, **Kathryn E. Dickerson**, **Michael W. Drazer**, **Kelsey Duke**, **Matthew T. DuPre**, **Warren D. Epley**, **Meghann M. Faas**, **Justin T. Farlow**, **Rebecca M. Forest**, **Emily K. Free**, **Michael Fuchs**, **Philip C. Gach**, **Lauren N. Galloway**, **Pauley Gasparis**, **John A. Greco**, **John A. Hardwick**, **Chris M. Heaton**, **John V. Hegde**, **Abram S. Hess**, **Amy M. Ho**, **David L. Hocker**, **Cristina M. Hoffer**, **Amy L. Hoffman**, **Ryan S. Holbrook**, **Michael A. Ingram**, **Stephen T. Irish**, **Michael A. Ischay**, **Katherine A. Israel**, **Erin L. Jeffries**, **Theodore B. Jennermann**, **Dana D. Jones**, **Chad W. Katona**, **Tyler D. Keena**, **John F. Kellie**, **David J. Kiefer**, **Edward T. Kim**, **Nicholas J. Klem**, **Robert M. Koffie**, **Christopher J. Kumfer**, **Joseph Tien Yo Lee**, **Grace Lin**, **Sibo Lin**, **Tony Ljuldjuraj**, **Adriana M. Mach**, **Smita Mahapatra**, **Kimberly Masden**, **Jeff A. Mayfield**, **Rachael R. McFarland**, **Joseph W. Meisel**, **Robert W. Mertz**, **Deanna L. Miller**, **Anthony K. Mitchell**, **M. Francesca Monn**, **Andres A. Morera**, **Peter Morone**, **Bryan A. Morse**, **Heather N. Muston**, **Mikel S. Newman**, **Elizabeth A. O'Bryan**, **Emmanuel K. Obeng-Gyasi**, **Trent J. Oman**, **Nicole E. O'Neil**, **Anita Panchanathan**, **Sara A. Pappas**, **Irina M. Pekar**, **Blake T. Prather**, **Trevor F. Price**, **Zachary T. Quinkert**, **Raymond Ramirez**, **Tiffany A. Ray**, **Erika**

(*continued on page 20*)

Undergraduate notes

(*continued from page 19*)

Marie Robertson, **Rohini Michelle Sarin**, **Bryan Harris Schmidt**, **Abrin L. Schmucker**, **Adam J. Sedia**, **Anand Subhash Shah**, **Rahul Sharma**, **Daniel E. Shelby**, **Vlad V. Simianu**, **Mark T. Smith**, **Alberta Soesanto**, **Pamela A. Sontz**, **Daniel P. Stanko**, **Sara L. Stombaugh**, **Dorena C. Stuckwisch**, **Virginia E. Teige**, **Sarah J. Teter**, **Carrye L. Troyer**, **Rachel Tuttle**, **Tedi S. Vlahu**, **Susan M. Wetzel**, **Erica A.Weyer**, **Joshua S. Wiley**, **Livia M. Wilz**, **Jay E. Wolverton**, **Jun Yin**, and **Stephen A. Zent**

Chemistry Honors Program (undergraduate research, BS chemistry or BS biochemistry major, at least 3.3 GPA): **Noah M. Benjamin**, **Jessica E. Brown**, **Alex S. Burn**, **Jean K. Chung**, **Adam D. Comer**, **Lindsay E. Darling**, **Anshuman Das**, **Jenna Devare**, **Kathryn E. Dickerson**, **Michael W. Drazer**, **Kelsey Duke**, **Michael Fuchs**, **Philip C. Gach**, **John V. Hegde Amy M. Ho**, **Stephen T. Irish**, **Michael A. Ischay**, **Theodore B. Jennermann**, **John F. Kellie**, **David J. Kiefer**, **Robert M. Koffie**, **Joseph Tien Yo Lee**, **Grace Lin**, **Tony Ljuldjuraj**, **Sandra E. Ngo**, **Elizabeth A. O'Bryan**, **Trent J. Oman**, **Nicole E. O'Neil**, **Irina M. Pekar**, **Zachary T. Quinkert**, **John R. Retrum**, **Erica Nicole Robertson**, **Matthew W. Robinson**, **Daniel E. Shelby**, **Alberta Soesanto**, **Daniel P. Stanko**, **Dorena C. Stuckwisch**, **Corinne D. Sulok**, **Sarah J. Teter**, **Erica A. Weyer**, **Jun Yin**, **Anthony K. Mitchell**, **Tedi S. Vlahu**, and **M. Francesca Monn**

The John H. Billman Summer Scholarship: **Jenna Devare**

Harry G. Day Scholarships / Hutton Honors College Scholarships: **Jessica E. Brown**, **Michael W. Drazer**, **Theodore B. Jennermann**, **David J. Kiefer**, **Zachary T. Quinkert**, **Jessica Rice**, and **Sarah J. Teter**

Ira E. Lee Summer Scholarships: **Philip C. Gach** and **John V. Hegde**

Frank Mathers Undergraduate Summer Research Scholarships: **Tony Ljuldjuraj**, **Peter Morone**, and **Matthew W. Robinson**

Earl G. Sturdevant Summer Research Scholarship: **Sibo Lin**

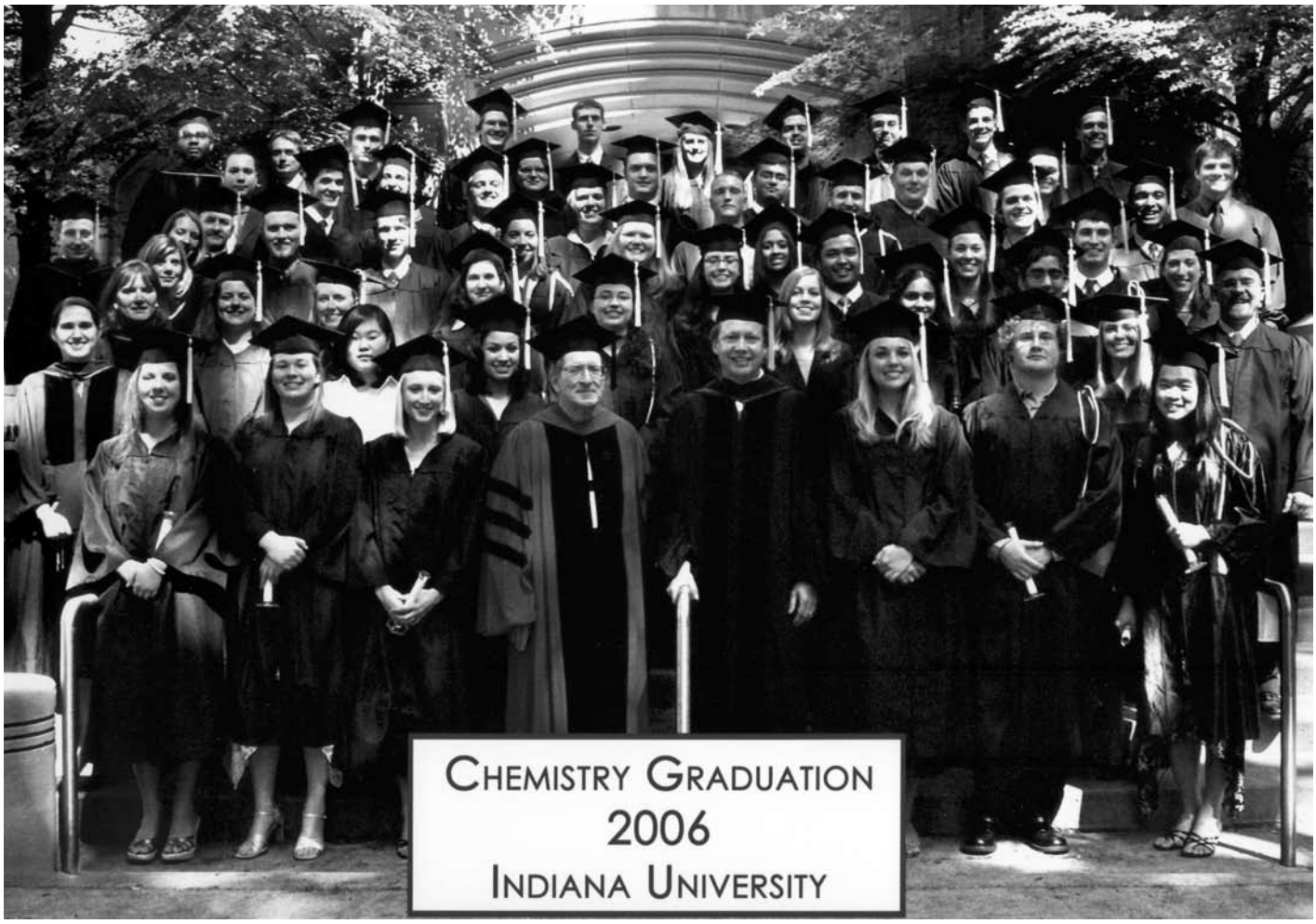
The Votaw Undergraduate Summer Research Scholarships: **John "Jack" F. Kellie** and **Alberta Soesanto**

Keith Ault Scholarhip: **Katherine A. Israel**

R.J. Grim Scholarships: **Jessica E. Brown**, **Michael W. Drazer**, **John V. Hegde**, **Theodore B. Jennermann**, **Robert M. Koffie**, and **Sibo Lin**

William P. Klinkenberg Award: **Richelle C. Alcantara**

(*continued on page 21*)



Lorayna Sanders

Undergraduate notes

(*continued from page 20*)

The Andrew Loh Scholarship for Analytical Chemistry: **John "Jack" F. Kellie**

John H. and Dorothy McKenzie Scholarship: **Emmanuel K. Obeng-Gyasi**

Dennis G. Peters Scholarships: **Cristina M. Hoffer** and **Peter Morone**

William G. Roessler Scholarship: **Ryan S. Holbrook** and **Joshua S. Wiley**

The Francis and Mildred (Ecktery) Whitacre Scholarships: **Bryan H. Schmidt** and **Daniel P. Stanko**

Enola Rentschler Van Valer Trafford Scholarship Awards: **Alberta Soesanto** and **Sarah J. Teter**

Russell and Trula Sidwell Hardy Scholarship: **Candice Ellis**

Merck Index Awards: **Pauley Gasparis** and **Blake T. Prather**

William H. Bell Awards: **David J. Kiefer**, **Kimberly M. Masden**, and **Zachary T. Quinkert**

ACS 2006 Undergraduate Award in Analytical Chemistry: **Zachary T. Quinkert**

ACS Award: **Grace Lin**

Hypercube Scholar Award: **Sibo Lin**

Joseph B. Schwartzkopf Award: **Tedi S. Vlahu**

Mary Frechtling White Award: **Pamela A. Sontz**

James C. White Award: **Michael A. Ischay**

University and national awards

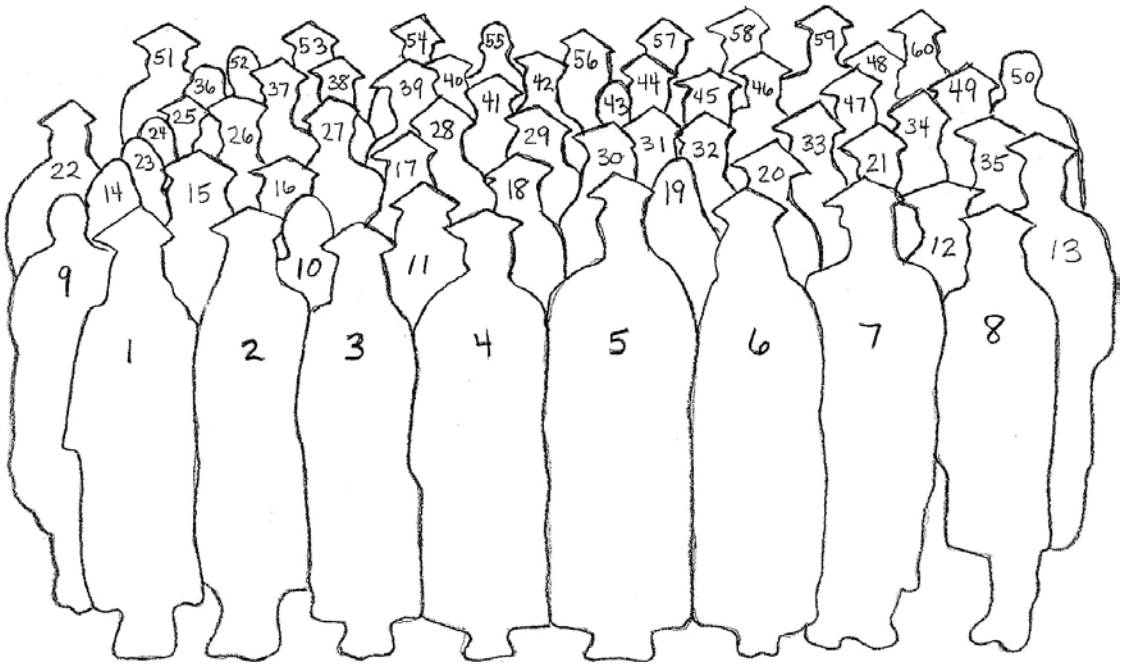
Barry Goldwater Scholarship: **Robert M. Koffie**

Malcolm A. Kochert Scholarships from the College of Arts and Sciences: **Richelle Alcantara**, **Jessica Brown**, **Cristina Hoffer**, **Theodore Jennerman**, **David Kiefer**, **Patrick O'Neill**, and **Erika Marie Robertson**

Phi Beta Kappa: **Michael Yoon-Phil Bang**, **Jessica E. Brown**, **Jean K. Chung**, **Sarah K. Colvin**, **Michael Fuchs**, **Pauley T. Gasparis**, **Amy M. Ho**, **Brock A. Martin**, **Anthony K. Mitchell**, **Peter J. Morone**, **Patrick E. O'Neill**, **Zachary T. Quinkert**, **Raymund Ramirez**, **Brittany L. Shepherd**, **Vlad V. Simianu**, **Sienna M. Teschendorf**, **Rachel L. Tuttle**, and **Tedi S. Vlahu**

Sigma Xi: **M. Francesca Monn** and **Bryan H. Schmidt**

— Alice Dobie-Galuska and Dennis Peters



Graduation 2006: 1) Jessica Newblom, 2) Elizabeth O Bryan, 3) Emily Free, 4) Professor Dennis Peters, 5) Chair David Clemmer, 6) Meghann Faas, 7) Mark Gromski, 8) Grace Lin, 9) Professor Andrea Pellerito, 10) Jean Chung, 11) Cynthia Moreno, 12) Rachel Tuttle, 13) Mark Bieszka, 14) Professor Cathrine Reck, 15) Pamela Sontz, 16) Erin Badenhop, 17) Irina Pekar, 18) Mitzi Templeton, 19) Nicole O'Neil, 20) Anita Panchanathan, 21) Neil Ramolia, 22) Professor Jeffery Zaleski, 23) Professor Jill Robinson, 24) Kim Aumann, 25) Professor Gary Hieftje, 26) Craig Hollars, 27) Robert Hays, 28) Sienna Teschendorf, 29) Kathryn Metzinger, 30) Natalie Cygan, 31) Darshana Patel, 32) Raymund Ramirez, 33) Rachel Lowe, 34) Vlad Simianu, 35) Elizabeth Cera, 36) Professor Daniel Mindiola, 37) Samprati "Kenny" Lalwani, 38) Noah Benjamin, 39) Colin Campbell, 40) Corinne Sulok, 41) Rebecca Baxter, 42) Adam Sedia, 43) Brian Ward, 44) Rahul Sharma, 45) Brock Spencer, 46) Thomas "TC" Watson, 47) Tedi Vlahu, 48) Sarah Colvin, 49) Anshuman Das, 50) Daniel Shelby, 51) Professor Michael Edwards, 52) Professor Bogdan Dragnea, 53) Trent Oman, 54) Michael Ischay, 55) Greg Bishop, 56) Kathryn Dickerson, 57) Mark Smith, 58) Michael Fuchs, 59) Robert Jaynes, and 60) Justin Stewart

Alumna profile

Lisa Baker, a rockin' dentist

Lisa Baker

She has been my dentist for about 10 years, but it was only recently during some dental work that **Lisa Baker** told me she had been a chemistry major (BA'85 with minors in biology and psychology) at IU. I was elated, not only because she told me she had been reading the 2005 edition of this magazine, but because I wanted to write a few profiles about alumni who were in health professions. I asked her, with some difficulty because of all the things that were stuffed in my mouth, if I could write about her. She — displaying an uncanny ability to understand someone who had a mouth full of all kinds of dental things, an ability that seems to be shared by all dentists, an ability that might be one of the first lessons learned in dental school — agreed readily.

Her father, Don Baker, is also a dentist, and her mother, Diana, is a dental hygienist. With that parental background, it's no wonder that Baker began working in her father's Bloomington office at the age of 8, developing X-rays and brushing the teeth of children who were patients. As she grew older, her responsibilities and duties increased. She did her first restoration (filling) at 12, and she began doing routine billing and other clerical tasks when she was in high school. Baker continued working for her father throughout her undergraduate years at IU.

But more than dentistry has shaped the life of this vivacious woman. Her grandfather once played the drums for Doris Day, her father and mother sang in the Singing Hoosiers while they attended IU, and her mother plays the piano, keyboard, flute, and guitar. If there is a "musical gene," Baker inherited it. She began playing a ukulele when she was 10 and graduated to a guitar when she demonstrated to her father that she had learned three songs. She also started playing the piano about this time. Playing in the band in middle school led her to mastering a tenor saxophone, which in turn led her to the symphonic band at Bloomington South High School, then the marching band, and finally the jazz band, where she played both the saxophone and a bass guitar.

She achieved a balance (her term) in high school, a balance that went far beyond learning what coefficients to use in a chemical equation. In addition to her participation in the bands, she had a 4.0 GPA and she won 12 varsity letters, four each in basketball, golf, and track. She was the first athlete, male or female, to achieve that distinction. Bill Lumbley, who taught her chemistry, and his wife, Nancy, who taught her English, are still ecstatic about her extraordinary abilities in and out of the classroom.

IU's School of Dentistry brought more than knowledge to Baker. It also brought tension, and she found no better way to relieve stress than playing her guitar whenever she could.

Baker started practicing dentistry in 1989, working with her father. In 1997, she opened her own practice, but she remains in the same office with her father. She quickly learned that she liked doing root canals more than anything. Nowhere among my favorite things do I find a root canal, however. So when she once said that I needed one, I shuddered, protested, and then resigned myself to what I thought would be an experience worse than death. In spite of this trepidation, she did it gently and well. But when I needed a tooth pulled, she sent me to her father because extractions are her least favorite procedure.

Baker's busy dental practice has not extinguished her need for music. She formed a rock-and-roll band consisting of two guitars (she plays one of them), drums, keyboard (played by her mother), and a singer. The band has played at various venues in Bedford, Seymour, and Bloomington, including the Farmer's Market on Saturday mornings in the summer.

Rock on, Lisa!

— Rupert Wentworth

If you are a former chemistry major who is now in one of the health professions and you want your story told, please contact me either by letter in care of the department or by e-mail at rwentwor@indiana.edu.

Alumnus profile

William Mays, the right chemistry for success

By 1990, the *Indianapolis Recorder* was in trouble. The venerable African-American newspaper had been a voice for Indianapolis's black community for nearly a century. But as the '90s dawned, the paper was sinking fast.

Enter **William Mays**, BA'70, MBA'73, ScD'00.

The successful businessman swooped in and purchased the *Recorder*, literally saving it from financial devastation. Under his ownership, the paper righted itself and has survived and thrived in the new millennium as the fourth-oldest black newspaper in the country.

For Mays, his purchase of the paper was simply a matter of giving back to the community.

"There are so few black institutions that approach 100 years in age," says Mays, who turned over the duties of running the paper to his niece, Carolene Mays. "They just needed to modernize for the 21st century. I just couldn't let that operation fail."

Mays was able to rescue the *Recorder* thanks to the success of Mays Chemical Co., the chemical-distribution firm he launched in 1980 after serving as president of another chemical firm. In the ensuing quarter-century, Mays Chemical has become the 16th-largest chemical-distribution firm in North America, with more than 180 employees and more than $180 million in sales. The company has also been listed since 1995 in Black Enterprise's annual compilation of the 20 most successful black-owned firms in the nation.

Mays says he hopes such success goes beyond any racial boundaries. "We wanted to be known as a really great chemical-distribution company that just happened to be minority-owned and -operated," he says. "That attitude has permeated the entire company and everything we've dealt with."

Mays says his successful career is firmly rooted in his experience at IU. "If I had not gotten the education [at IU]," he says, "I wouldn't have the skill set needed to run a company [of this size]."

Mays majored in chemistry as an IUB undergraduate, and today he is grateful for the guidance and support of Harry Day, his adviser and the chemistry department chair at the time. Mays also cites the educational influence of his father, Theodore, MA'40, MS'54, who himself earned two master's degrees from IU.

Mays then earned an MBA from IU, an experience that prepared him to become a successful businessman in addition to a successful chemist.

He has since given back to his alma mater in myriad ways, including serving on the IU Foundation board, the President's Council, and the Kelley School of Business Advisory Council.

"Giving back is all part of my nature," he says. "It's what I was trained to do." For his efforts, Mays has received honors from the College of Arts and Sciences and the Kelley School, as well as his honorary degree from IU.

At this point, Mays is at a career crossroads, pondering a possible retirement in two or three years and planning a smooth "exit strategy." He says he regularly receives offers from people wanting to purchase Mays Chemical, but he's waiting to see if his daughter, Kristin Mays Graham, BS'98, MBA'02, wants to assume control of the firm. "The next step," he says, "is to faithfully transition the company into the next generation."

There's also no doubt that his other community service, including the *Recorder* and his IU work, will continue unabated, efforts he describes with modesty. "I try to make a contribution," he says.

— Ryan Whirty

Courtesy photo

William Mays

Reprinted with permission from Indiana Alumni Magazine *January/February 2006.*

Trivia about chemistry

Is there a sensible word for this?

Although the principle behind it is appealing, the use of the word "organic" to describe certain foods should be galling to all chemists. Now, the use of this word has come full circle: The label on De-Solv-It, a solvent, brags that the contents are "100% organic." Among its listed ingredients are "organic hydrocarbons."

Equally maddening and silly are the claims found on other items that they — whatever "they" might be — are free of chemicals. Listen to Forrest Gump once again: "Stupid is as stupid does."

(*Taken in part from* C&E News*, Oct. 3, 2005.*)

Errors from high school and college students

A vibration is a motion that cannot make up its mind which way it wants to go.

Some oxygen molecules help fires burn while others make water, so sometimes its brother against brother.

Water is composed of two gins, oxygin and hydrogin. Oxygin is pure gin, but hydrogen is gin and water.

Proteins are composed of a mean old acid.

When they broke open molecules, they found they were stuffed with atoms. But when they broke open atoms, they found them stuffed with explosions.

(*Taken from* Harper's*, December 2005.*)

50 YEARS AGO

Henry Mahler, a biochemist, and **Harrison Shull**, a physical chemist, joined the department.

Joseph Waltz, PhD'40, was the director of the Dacron Research Laboratory.

Edward Kennedy, MS'48, became department head of the Analytical Research and Development Group at Eli Lilly Co.

25 YEARS AGO

William G. Mays, AB'70, was (and still is!) president of the Mays Chemical Co. in Indianapolis.

Alan K. Engel, BS'74, joined DuPont as a research chemist in the polymer chemical department.

Joseph Gajewski's book, *Hydrocarbon Thermal Isomerizations*, was published by Academic Press.

15 YEARS AGO

Our auditorium was named in honor of **Harry G. Day**. He also received the IU President's Medal for Excellence during the ceremony.

Al Sattelberger, PhD'75, was appointed deputy division leader of the Isotope Nuclear Chemistry Division at the Los Alamos National Laboratories.

Wayne Merriman, BS'52, and his wife retired and moved to Florida.

ALUMNI NEWS

Stephen M. Antonelli, PhD'01, of Lynn, Mass., is manager of clinical trial materials for Microbia Inc. He and his wife, Korey (Hofmann), MPH'97, have a daughter, Audrey, who turned three in August. Antonelli's address is santonelli@microbia.com.

Rod S. Berman, MS'79, was selected by the *Daily Journal* as one of California's Top 25 Intellectual Property Attorneys. Berman is chair of the law firm of Jeffer Mangels Butler & Marmaro, Los Angeles.

Judith R. Wasko Chin, BA'90, DDS'94, gave birth to her son, Christian Joseph Chin, on Aug. 11, 2005. "Future IU class of 2027," she writes. Chin is an assistant professor in the Department of Preventive and Community Dentistry and the Department of Oral Facial Development at the IU School of Dentistry in Indianapolis. She lives in Carmel, Ind.

Eileen E. Cravens, BA'78, MD'82, is a gastroenterologist in Richmond, Ind. In her free time, she shows horses on the national quarter-horse circuit. Her husband, Dana H. Reihman, BA'76, MD'79, is a physician in Richmond.

Joseph T. Czaja, BA'85, MD'89, is medical director and chief pathologist at FirstSource Medical Laboratories in Fishers, Ind. The Fortville resident can be reached at czaja@msn.com.

Paul R. Downing, BS'82, has his own dental practice in Columbia, S.C., and is married with three children.

James P. Hickey, PhD'77, retired from the U.S. Geological Survey Great Lakes Science Center in Ann Arbor, Mich., as a research chemist after 21 years. He is moving to Phoenix, Ariz.

James E. Holmes, BA'84, MD'88, joined Clarian Health Partners and is practicing emergency medicine at Indiana University Hospital. He and his wife, Marcy (Hubbard), BS'88, live in Bloomington, Ind.

After receiving a PhD from the University of Michigan in 1995, **Heather Kay Webb Hsu**, BS'86, worked at the biopharmaceutical companies Tularik Inc. and Scios Inc., studying absorption, distribution, metabolism, and excretion of potential drug molecules. She is now the head of pharmacology and preclinical development at the startup company Arête Therapeutics Inc. in Davis, Calif. She lives with her husband, Gene, in San Francisco.

Frank B. Kitchel, MS'41, wrote to tell us he is living in Nashville, Tenn. From 1941 to 1977, he worked as a chemist and then as a supervisor for DuPont, where he managed laboratories and manufacturing areas dealing with both rayon and nylon yarns. He is proud that he introduced the transition from wet methods to instrumental analysis. His first wife died, but he is remarried. He has a son and a daughter, as well as eight grandchildren, all of whom, he says, are very happy.

A cheerleading coach for 13 years, **Mark A. Krockover**, BA'93, also teaches chemistry at Maine East High School in Park Ridge, Ill. In each of the past 11 years, his coed cheerleading team has placed in the top 10 in the Illinois High School Association competition.

"I'm still living in Quincy, Ill., on the mighty Mississippi River, since 1979," writes **David W. Lockhart**, BA'72, MD'76. "I am now a hospice and palliative-care doctor, board certified in November 2005. I direct a service of about 20 to 30 hospice patients and have seen 100 inpatient consults for palliative care since our inpatient consult service started in February. I somehow feel like end-of-life care is what I have spent my life preparing for, and I'm happy to be able to do it well. And mostly, I like playing with my three grandkids, ages 8, 5, and 2, playing golf, and flying my Cessna 172."

Monica J. Mann, BA/BS'04, of Butlerville, Ind., is a student at the IU School of Medicine. Her address is mojmann@iupui.edu.

John R. Mink, BA'51, DDS'56, MS'61, was honored at the 2006 University of Kentucky Alumni Association Great Teacher Awards reception and dinner on April 13 in Lexington. He is a professor and the acting division chief of the pediatric section of the university's College of Dentistry.

William R. Murphy, BS'64, MS'67, and his wife, Vera M. (Stillabower), BA'64, MAT'67, are both retired from teaching after 29 and 40 years, respectively. They are both enjoying retirement in Shelbyville, Ind., and like to attend IU football games. He teaches two math classes at Franklin (Ind.) College. The Murphys have one son and three grandsons.

Jason R. Owens, BA'93, MBA'01, of Indianapolis, is senior products manager for Cosco Home and Office's furniture division.

Mark A. Pogue, BA/MS'89, directs community initiatives for Smokefree Indiana in Indianapolis. His wife, Melissa (Bennet), BS'88, is assistant principal of Edgewood Junior High School in Ellettsville. They have a son, Trey, 11. The family lives in Bloomington and can be reached at mpogue@alumni.indiana.edu.

Maj. **Scott A. Sendmeyer**, BS'95, BS'03, is living in Bucharest, Romania, and attending the political science faculty of the University of Bucharest on a scholarship from the Olmsted Foundation. His address is ssendmeyer@yahoo.com.

Mansukh Wani, PhD'62 (Campaigne), received an award for RTI North Carolina's highest

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Alumni news

(*continued from page 24*)

achievement in science. Wani, in partnership with the late Monroe Wall, discovered camptothecin™ and proved the structure of Taxol®, compounds that have been instrumental in the fight against cancer and whose derivatives represent nearly one-third of all anti-cancer medications on the market.

Timothy S. Wells, BA'94, MS'96, MD'99, has been appointed assistant professor of ophthalmology at the Medical College of Wisconsin and to the medical staff of Froedtert Hospital, the Children's Hospital of Wisconsin, and the VA Medical Center in Milwaukee.

Hongsun Yoon, BS'99, JD'02, is an associate in Barnes & Thornburg's Indianapolis office. He practices in the firm's intellectual property department. Prior to joining Barnes & Thornburg, Yoon worked as an attorney for Finnegan Henderson Farabow Garrett & Dunner in Washington, D.C. The Carmel, Ind., resident is a member of the IU School of Law–Bloomington's Intellectual Property Program Advisory Board.

Randall E. Youngman, PhD'96, reports that his daughter Abigail Kate Youngman was born on Nov. 3, 2005. He is a senior research scientist for Corning Inc. in Corning, N.Y., and lives in Horseheads.

Matthew M. Zipse, BS'04, is a student at the IU School of Medicine.

In memoriam: Fred Stein

Fred Stein, a 1971 PhD in chemical physics from the group of Charles Parmenter, died in his Dillon, Colo., home on Oct. 14, 2005, at the age of 63. His PhD professional career started in Colorado. After positions in other regions of the United States, he ultimately responded to the symmetry genes of a true spectroscopist and returned to Colorado for retirement. A battle with cancer interrupted too soon his enjoyment of the Colorado ski country that he loved so much.

Stein's first PhD position was at Western State College in Gunnison, Colo., a town often cited on the morning television as the coldest spot of the day in the United States. He remained there for 17 years, braving the cold and climbing the ranks to professor, department head, and, finally, dean of natural sciences. He also took advantage of being near a premier U.S. ski area to elevate his skiing to "expert" status. His PhD supervisor had fun trying (futilely) to ski with him. His two young daughters, Mischele and Lisa, however, stayed right with him.

How he initially got the Gunnison job is one of the endearing "Fred stories." Stein was never shy in presenting his abilities. Some would call it chutzpah, and it served him well. In 1971, new PhDs were particularly abundant and college teaching jobs were particularly sparse. To solve this dilemma, Stein decided that he would go out and actually get the advertised Western State job rather than just passively apply with the herd of peers who were also sending résumés. So without waiting for an invitation, he advised the Western State chemists that he would appear on, say, Thursday, give a research lecture, and teach a class for them on Friday. This he did. Evidently, they liked what they saw and enjoyed his easy ways and great sense of humor. They also realized that Stein had solved their problem of sorting through all those applications. He appeared back in Bloomington early the next week with the job in his pocket.

His interest in education started early. Stein and his wife of 40 years, Claudia, were both teacher trainers for the Peace Corps in Medellín, Colombia, in the years following their undergraduate days at the University of Colorado.

Stein's true professional interest was education, and in his later years he followed this passion by seeking positions where he could have an impact well beyond Western State. He first moved east, where he spent five years as director of the Philadelphia Renaissance in Science and Mathematics, a public schools program. This was followed by years at Colorado State University, serving as director of its Center for Science, Mathematics, and Technology Education, where he reverted to the part of a proposal-writing scientist to raise the money for an extremely effective program. Finally, in 1999, Stein became the director of education for the American Physical Society in College Park, Md. His APS proposals obtained millions of federal dollars for the training of pre-service teachers in "hands-on" methods for teaching science in public schools. For these achievements, Stein was proud to be elected a fellow of the APS.

A scholarship fund has been set up in Stein's name through the APS. Donations can be sent to: Attn: Darlene Logan, The American Physical Society, "The Fred Stein APS Education Fund," One Physics Ellipse, College Park, MD 20740-3844.

— Charles Parmenter

Did you know

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Clara McMillen Kinsey, the wife of sex researcher Alfred Kinsey, received her BA in chemistry in 1921 from IU. She died on April 30, 1982.

Clara McMillen's yearbook photo, 1921 Arbutus

Necrology

We received notices of the following deaths of alumni since the 2005 issue of ***IU•Chemistry***.

David W. Allmann, BS'58, Dec. 15, 2005
Chester M. Alter, MA'28, March 6, 2006
William H. Armbruster, BA'42, Dec. 25, 2005
Roy W. Awalt, BS'54, Feb. 19, 2006
Van Pleak Batterton, BA'35, Dec. 9, 2003
David A. Beckwith, MAT'68, Sept. 1, 2005
Crist A. Blassaras, BA'44, MD'46, Dec. 1, 2005
Alvin M. Borders, BA'35, MA'36, PhD'37, Dec. 31, 2005
Leta M. Kesling Brock, BA'32, Dec. 19, 1992
Harry J. Bugel, BA'39, MD'44, Aug. 18, 2005
Arthur W. Campbell, BA'36, MA'38, PhD'41, Jan. 28, 1996
Eunice E. Runner Carter, BA'40, MD'43, April 12, 2006
Donald J. Cook, PhD'44, Aug. 15, 2005
Chester D. Davis, BS'44, Nov. 5, 2005
Betty J. Dickerson Dukes, BA'41, MD'43, Nov. 21, 2005
Byron L. Ferguson, MA'50, April 9, 2005
Gene M. Figel, BA'48, July 7, 1993
Jack D. Furr, BA'55, MD'59, March 16, 2006
Susan A. Erwin Gavin, BA'82, MD'86, Nov. 27, 2005
Roger W. Gentry, MA'37, May 19, 1992
Edward A. Gergesha, BA'62, MD'65, Nov. 11, 2005
George R. Goodale, BA'32, Dec. 9, 1997
Carl L. Green, BA'42, MD'44, Nov. 21, 2004
R. Case Hammond, BA'40, Nov. 2, 1999
Norman B. Hasler, BA'42, MD'44, Jan. 6, 2006
Julian A. Hay, BS'38
John W. Hohe, BA'45, DDS'45, Dec. 16, 2005
James C. Humphrey, BA'39, MD'42, Nov. 20, 2004
Frank L. Jennings, BA'42, MD'47, July 15, 2006
Harold Kraus, BS'53
Ward Laramore, BA'40, MD'42, Jan. 1, 2006
George J. Leitner, BS'43, March 17, 2006
Urven G. Lyon, BA'31, April 25, 1992
John W. McDowell, PhD'61, Sept. 1, 1994
Donald H. Meredith, BA'65, Nov. 17, 2004
Robert E. Moses, BA'42, MD'44, Dec. 21, 2005
Ira A. Murphy, PhD'57, March 8, 2006
Clemens O. Olsen, BA'31, Oct. 10, 1990
Robert L. Parnell, BS'42, May 7, 2006
Melvin H. Paxton, BA'31, Oct. 25, 1994
Robert C. Peacock, BA'38, MD'42, Sept. 16, 2004
Joseph L. Pedicini, BA'42, MD'44, July 10, 2004
Walter A. Raczynski, PhD'43, Feb. 5, 1996
John C. Reed, BA'31
Paul B. Richardson, BA'31, Oct. 10, 2001
Florence Richardson, BA'55, March 21, 1993
Ervin Rodey, BA'34, MA'35, Feb. 16, 2006
Maxine Rowe, BA'40, Nov. 9, 2005
A. Morton Saske, BA'46, Feb. 26, 2003
Lavene I. Deckard Schaffer, BS'38
Robert I. Schrier, BA'47, Sept. 5, 2005
Nicholas N. Seldon, BA'56, MA'59, May 24, 2006
Joseph R. Siefker, PhD'60, Sept. 2, 2005
Irving A. Singer, BA'37, Dec. 24, 2005
Daniel D. Sokol, BA'40
Patricia Birum Spangler, BA'52, MD'55, Sept. 2, 2005
Frederic L. Spencer, BA'27, July 28, 1989
Fredrick M. Stein, PhD'71, Oct. 14, 2005
Albert J. Tucker, BA'47, Jan. 10, 2006
Paul W. Vogel, PhD'46, Sept. 9, 2005
Theodore B. Warner, PhD'63, April 26, 2006
Norman J. Wells, PhD'83, Jan. 7, 2006

Chemistry Honor Roll 2005

Abraham, Aleyamma
Ake, Robert
Akers, Scott & Amanda
Alleman, Kent
Anders, Robert
Anders, Timothy & Ana Thompson
Anderson, Mark & Ann
Anex, Deon
Appleton, Burton
Aprahamian, Ani
Aronoff, George & Angela
Aronson, Michael
Arvan, Peter
Atkinson, George & Charlene
Bacon, William Jr. & Mary
Bair, Edward & Dorothy
Baker, Raymond
Ball, Donald
Ballard, Larry
Balliet, Craig & Margaret
Bannister, Thomas
Barnes, Helen
Bart, John
Baxman, Horace
Beckman, Jean
Beeson, James
Behforouz, Mohammad & Nancy
Bensko, Nicholas
Bente, Paul Jr.
Berk, Genia,
Bettinger, Ella
Bibart, Charles
Black, Lawrence & Cheryl
Blair, Brian & Mary
Boehne, John III
Borer, Matthew
Boxman, Charles
Bracken, David
Bradley, David
Breuer, Herbert
Bromer, William
Brown, Richard & Bette
Brown, Jay & Kristina
Brown, Richard
Bryant, Mark
Buckley, Barbara & Brian
Buddenbaum, Warren & Judith
Buhrow, Susan
Burck, Kenneth & Marian
Burgin, Timothy
Cain, Thomas
Cameron, John
Campaigne, Ernest & Jean
Canada, Emily & John
Carmack, Marvin
Carroll, William Jr. & Mary
Cartwright, Alan,
Cassel, William
Caulton, Kenneth & Lyudmila Bronstein
Chastain II, Paul
Chiu, Grace Py
Chovanec, Michael
Chung, John
Clampitt, Janet
Cliff, Johnnie Marie
Cline, Richard & Janet
Coope-Epstein, Janet
Cooper, William III
Corning, James & Kelly
Coveleskie, Joan Marie
Cox, Sara & Scott
Craig, John & Mary
Crandall, Jack & Judy
Crelier, Arnold
Crofts, Bradley
Czuba, Leonard
Dalman, David
Davidson, Donald & Anita
Davis, Dwight
Davisson, Vincent
De Amicis, Carl
De Las Alas, Vincent & Kimberly
Di Marchi, Richard & Sue
DiDonato, Gerald
Diesing, Arthur
DiPierro, Michael & Barbara
Doherty, Michael & Mary Lorenz
Dorman, Linneaus & Phae
Douglas, Judith & Robert
Druelinger, Melvin & Judy
Duerr, Ann
Duffin, Kevin
Dugan, LeRoy Jr. & Dorothy
Dygert, Stephen & Mary
Dykstra, Ronald
Earl, Donald
Eaton, Louise & Merrill Jr.
Ebeling, Richard

(*continued on page 27*)

Honor roll

(*continued from page 26*)

Edmonson, Keith
Eichhorn, Bryan
Elcock, Douglas
Ellenbogen, Leon
England, Dustin
English, Margaret
Everton, Yvonne
Ferris, James
Fesenmyer, Lynn
Fields, James
Fike, Steven
Folkerth, Rebecca
Foye, William & Lila
Franz, John & Martha
Frohman, Charles & Evelyn
Froning, H. R.
Frump, John & Norma
Gabrys, Christopher
Gaetano, Raymond
Galley, Paul
Gansinger, Grant
Gasser, Wilbert Jr. & Mary Kratz
Gay, Frank
Gebre-Egziabher, Ytbarek & Semainesh
Ginger, David & Van Huynh
Glagola, Bruce
Gnewuch, Charles & Julie
Godomsky, Stephen
Goldhammer, Alan
Golgart, Carl & Patricia
Gotlib, Robin & Josh
Gottlieb, Betty
Grant, Raymond
Guthrie, Frank & Marcella
Gwaltney, Charles & Catherine
Hall, Arthur & Dorothy
Hammersley, Vernon & Sue
Hamori, Paul
Hardin, David
Hauber, David
Hay, Gene
Hearn, Dennis & Paula
Hefta, Laura
Hein, Scott & Claudia
Henning, Shannon
Henry, K. Sue
Hensley, Albert Jr. & Wilma
Herman, Rayna & Christopher
Hespen, Robert & Maria
Hillhouse, Gregory
Hodes, Zachary & Judy
Hodes, William
Hodsdon, Michael
Hollingsworth, Jill
Hopkinson, Alice Frutchey & Reginald
Howard, John & Stacie
Howell, Jonathon & Margaret
Huffaker, Donald & Clara
Huffman, John & Carolyn
Hugli, Tony & Judith
Humphrey, James Jr. & Janet
Hutchins, Lou Ann
Hyman, Ross & Kristen Leckrone
Immel, Calvin
Indiano, Victor
Irick, Neil & Susan Anderson
Iung, Orestes
Jacobson, Stephen & Juli
Janetos, Nicholas
Janizek, David & Patricia
Jarosinski, John
Jass, Paul & Judith
Jeffcoat, Alex & Elaine
Johnston, Maynard
Joy, William & Jo
Jurayj, Jurjus
Kagel, John Jr.
Kaplan, Maxine
Keilsohn, Jerry
Kelley, Charles
Kellum, Charles & Rose
Kelly, Robert III & Judith
Kindig, John & Wendy
King, Peter & Ellen
Kinnaman, Rob & Cheryl
Kleindienst, Tadeusz
Klinkenberg, Iris
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Kuehl, Guenter
Kurtz, Wendy
Kwiatkowski, Kris & Lai
La Belle, Ellen & Frank Jr.
La Perriere, Daniel & Leona
Larson, John & Sarah
Laswell, Joann
Leal, Joseph
Lemmen, Timothy
Letsinger, Robert & Dorothy
Levy, Melvyn
Lewis, Larry & Ricki
Lidster, Reuben
Light, James & Nina
Lin, Luan-Ho & Cheyeh Lin
Linder, James & Laura
Logan, Ted & Ruthanne
Lohnes, Vida Trafford & Jonathan
Lopez, Suzanne
Lucas, Jennifer
Luther, Lars & Janet
Luthy, James
Lynch, Mark & Michele
Mahoney, Wayne
Mann, Robert
Marcus, Spencer
Marquis, Edward & Thelma
Marsella, John & Gail
Marsischky, Gerald
Maskalick, David & Kathleen
Mathews, Grant
Mauer, Mary & John
McAnally, Robert & Dara Spivack
McCann, Peggy
McChesney, James
McDonald, Amy
McGillivray, Bette Tillman
McGinley-Wright, LeeAnn & Peter Wright
McLaughlin, Gordon III
Metz, Fred & Judith
Meyer, Wendell & Barbara
Meyers, Jeffery & Jill
Middendorf, Max & Eva
Miles, Donald & Mary
Miller, Lloyd
Miller, Kenneth
Mitchell, Patrick & Frances
Monroe, Linda
Moore, Michael & Katherine
Morice, William & Elizabeth
Morrison, Irena & Ralph
Morrissey, David
Moss, David & Kathleen Cornely-Moss
Mueller, Thomas & Gretchen
Muser, Frani Blough
Nagourney, Stuart & Janet
Naples, John
Ng, Elaine & Raymond
Nguyen, Dinh
Niehaus, Nancy
Noel, John
Northuis, Jill & Michael
Norton, Martin Sr. & Arlene
Nugent, William & Susan
O'Connor, Hazel
Oster, Greg
Pack, Mary & Brian
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Pasterczyk, James
Paterson, Bruce & Maggie
Paulson, Donald & Elizabeth
Paur, Richard & Sandra
Pendley, Rex
Perugini, Francesca
Peters, Dennis
Peterson, Stephen
Pifferitti, Michael
Pletcher, Terry & Marga
Potratz-Driver, Paula & Orlando
Powell, Christopher & Jennifer
Prather, David
Rahbar, Ahmad,
Rambo, Joe & Elisa
Rampy, Larry
Rasmussen, Royce
Raths, Richard & Carmen
Raymond, Michael
Reeder, Lisa
Reisz, Gerald
Ricca, Daniel
Ricketts, John & Lucille
Rinker, Jennifer & Robert Jr.
Roach, Philip
Rodriguez, Jose
Roessler, William & Richardine
Rolf, Ramon
Rosen, Irving
Rothman, Harold
Ryan, Sheila & Paul
Ryan, Sheila
Sachs, Nancy
Salvat, Ricardo & Alice
Sathe, Sharad & Usha
Sattelberger, Alfred & Mary Anne
Saturday, Kathy
Sawicki, Robert & Elizabeth
Schepartz, Saul
Schilling, Beth & Jerry
Schindler, Ann
Schroeder, Robert
Schuh, Merlyn & Judy
Seidel, Eugene & Nancy
Sellers, Christopher & Wendy
Shih, Chung Mei & Chih
Shriver, Kathleen
Shull, Willa
Shull, Lisa & Douglas
Shutske, Gregory
Siedle, Allen & Veronica
Sievert, William & Alice
Sigel, Carl
Sikora, John & Jean
Smith, Walter Jr. & Miriam
Smith, Homer Jr.
Sobotka, Lee
Sojka, Stanley & Kathleen
Sommer, Nolan Gloria
Sondgeroth, Jason
Sorensen, Roger & Carolyn
Sowinski, James & Carolyn
Springer, Mary Alice & Tom II
Stammer, Charles & Shirley
Stanford, Marlene
Stapleton, Patricia
Starn, Timothy
Stevens, Michael
Stewart, Richard & Jean
Stoddard, Robert
Stoelting, Daniel
Streaty, Richard & Mae
Strother, James
Sullivan, Daryl
Surdzial, Ronald
Sussman, Clyde

(*continued on page 28*)

IU chemistry alumni: What's new with you?

The IU Alumni Association is charged with maintaining records for all IU alumni. Please print as much of the following information as you wish. Its purpose, in addition to providing us with your class note, is to keep IU's alumni records accurate and up to date. To verify and update your information online, visit our online alumni directory at www.alumni.indiana.edu/directory.

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Tanner, John Jr.
Thieneman, Andrew Jr. & Martha
Timm, Nicholas
Tolzmann, James & Margaret
Troyer, Brenda & Ted
Urbach, Herman
Vanatta, Lynn Ellen
Vickers, George
Vigna, Robert & Mary
Vincent, John & Sharon
Viola, Roger & Karen
Vogel, Paul & Mary
Watts, Daniel & Karen Bush
Wachter, Eric
Wagner, Martin & Ching-Shu
Wagrowski-Diehl, Diane & Bruce
Waiss, Elaine
Waling, Buford & Frances
Wands, Thomas
Warfield, Timothy
Weber, Kara
Welty, Willis & Catherine
Wesolowski, Dennis & Mary
Wessling, Elizabeth
Weymouth, Alexandra
White, Thomas
White, James & Mary
White, Thomas
Wiederhold, Tony
Wilkerson, Charles Jr. & Marianne
Williams, Martin & Jane
Willis, Donald & Nancy
Wilson, Larry
Winner, Bernard & Adele
Winslow, Robert & Margaret
Wissinger, John
Wood, Jodi & Scott
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