

# IU • CHEMISTRY

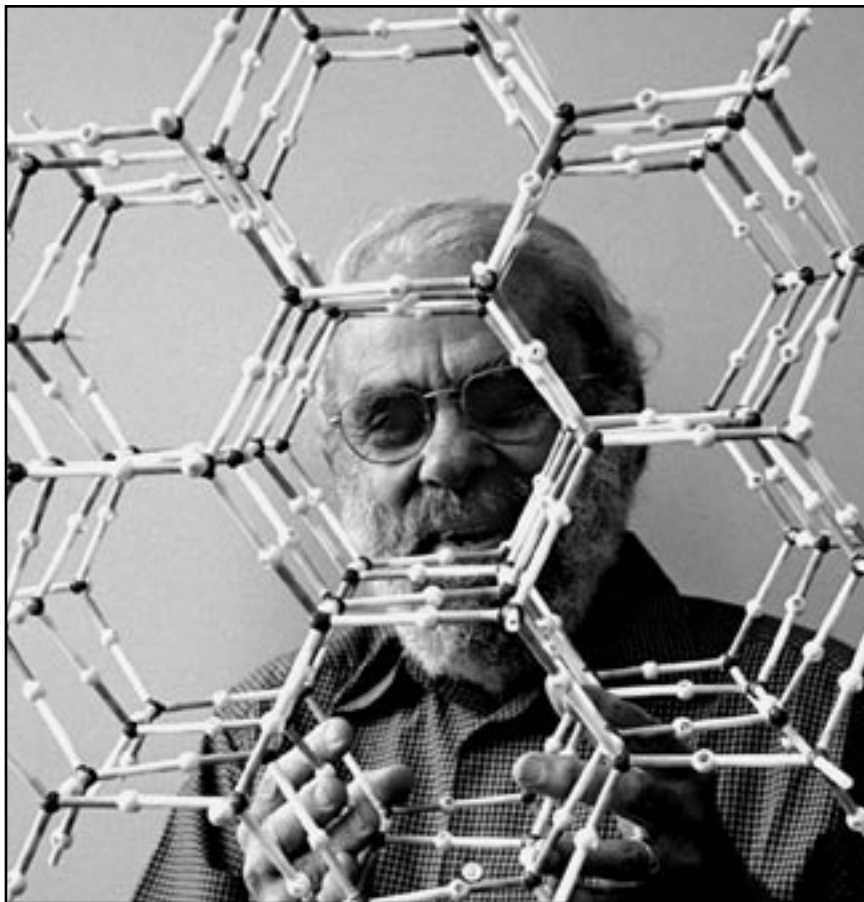
## Ice

by George Ewing

“To almost anyone who has used an ice-cube tray or skated across a frozen pond, the freezing process is expected and unremarkable. Yet, in 1936, Noah Dorsey began a series of experiments involving the freezing of ice that would last nearly a decade. Dorsey charged small, scrupulously cleaned glass ampoules with samples of water and observed the temperature at which each sample spontaneously froze. Thousands of trials are neatly summarized in a single remarkable observation: Water is difficult to freeze. Samples of highly purified water could be repeatedly supercooled to below  $-10^{\circ}\text{C}$  and remain liquid, while a sample of Washington, D.C., tap water could be held at less than  $-20^{\circ}\text{C}$  without freezing. Out of all his thousands of trials, Dorsey never observed a sample to spontaneously freeze above  $-3^{\circ}\text{C}$ . The possible influence of container walls has been eliminated in other experiments using levitated droplets. Some droplets  $10\ \mu\text{m}$  in diameter, a typical size found in clouds, freeze near  $-40^{\circ}\text{C}$ . The presence of foreign substances is known to facilitate the freezing of water. Indeed Dorsey was convinced that, even in his most highly purified samples, trace impurities, which he called motes, served as nucleation sites for the freezing process. Today, suspensions of bacterial (*pseudomonas syringae*) fragments are mixed in with the water sprayed over ski slopes to favor the production of artificial snow at temperatures only slightly below  $0^{\circ}\text{C}$ . The mechanism by which such impurities affect the freezing process is still uncertain.”

So begins a paper by Peter Conrad, Robert Karlinsey, Vlad Sadtschenko and myself soon to appear in the *Journal of Chemical Physics*. Following 50 years of research by others, we contribute our bit to understanding the mechanism of ice formation from water. (You will have to read the paper to find out what we learned.)

Ice is obviously commonplace, but it is also extraordinary. Beyond its reluctance to form from even supercooled water, it also floats. Is this extraordinary? It is. In any listing of chemicals and their properties, it is difficult to find a substance that floats in its melt. Lead shot sinks when dropped into a pot of its molten state. On cooling a flask of benzene below its freezing point, crystals that form fall to the bottom of the container. And so it goes through thousands of examples that point to the chemical anomaly of ice floating on water. That ice is less dense than water is a



*George Ewing views a model of the structure of ice.*

consequence of its strong and directional hydrogen bonds. In ice, each water molecule keeps its four neighbors at a distance and tetrahedrally arranged. The resulting crystal structure consists of hexagonal channels (see above). The void provided by these channels in the solid collapses on melting to yield the higher density liquid.

Under carefully controlled laboratory conditions it is possible to grow a single crystal of ice — a transparent hexagonal prism. This apparently flawless crystal belies its inherent disorder. While the oxygen atoms are periodically arrayed, the orientations of the water molecules are randomly arranged among six different directions. The third law of thermodynamics states that a perfect crystalline substance has zero entropy (i.e., is perfectly ordered) at 0 K. Ice, being imperfect, locks into an entropy value considerably above zero (but consistent with its six-way disorder) as it gets colder. No one has been able to grow an ordered crystal of ice.

Ice can express itself in myriad sizes, shapes, and forms. This observation is reflected in the many  
(continued on page 2)

❖  
*The freezing point  
of water is  $0^{\circ}\text{C}$  ... or  
is it?*



# Ice

(continued from page 1)

names for ice. Some familiar (snow, hail, sleet, icicle, glacier) others more exotic (firn, spicule, diamond dust, growler, helicite). There are 80 meteorological classifications of snow crystals alone, and the U.S. Navy publishes a dictionary of ice forms of importance to mariners that contains 127 vocabulary entries. It is often said that the Inuit have a hundred words for snow and ice. Perhaps. But not nearly as many as the listings in English.

How can we understand this great variety in ice morphologies? In part it is due to the wide range in physical conditions that influence crystal growth in the natural environment. In the lower atmosphere some of these conditions give rise to the millimeter-sized platelets, with six-fold dendritic projections, that we call snow crystals. Other conditions produce needles. In ice fog, common during the polar winter, are suspended



Rupert Wentworth, left, and George Ewing discuss the publication of this article.

micron-sized ice particles. At the bottom of the snow pack in the upper latitudes, seasonal accumulations eventually lead to glacier growth with length measured in kilometers. Finally, ice caps essentially cover countries (Greenland) and even a continent (Antarctica).

Freezing at the surface of the winter polar oceans produces its own unique forms (pancake and grease) as salt from the brine is excluded from the growing solid mass of ice. And we have just been talking about ordinary ice. There are 11 other identified ice crystalline phases that have been produced under exotic conditions of pressure and temperature as well as two recently discovered amorphous solid phases. In addition there are the theoretically possible ordered phases labeled ferroelectric and antiferroelectric ice where calculations (some by Ernest Davidson) can predict their properties.

If these many ice forms were not enough, there is even another class, the clathrate hydrates. The

first clathrate hydrate was discovered by Humphrey Davy and described in his 1811 paper characterizing oxymuriatic acid gas. He discusses a number of reactions of this yellow-green gas to conclude that it is really an element that he proposes calling chlorine. Tucked away in this long paper, together with descriptions of the synthesis of “butter of arsenic” and other mouth-watering compounds, is the statement that water freezes at a higher temperature when chlorine is bubbled into it. Michael Faraday took over the problem to find that pale green crystals formed in water above 0° C in the presence of one atmosphere of chlorine. Over 100 years later, the clathrate hydrate crystal structure was found to consist of polyhedral cages of water molecules physically entrapping chlorine molecule guests.

There are now hundreds of clathrate hydrates known. Of particular relevance are methane and other small hydrocarbon clathrates found in vast deposits on the ocean floor. The conditions for stability of these clathrates, high pressures and temperatures of about 5°C, are provided by the hundred or so meters ocean depths where they are found. The source of the hydrocarbons that make up these clathrates is now under discussion with suggestions that they are excreted by anaerobic bacteria at the ocean floor or gas leakage from deep within the earth. First found off the coast of North Carolina, and now identified around the world, these clathrate deposits are the biggest carbon reservoirs on the earth. They exceed all known petroleum and coal reserves. However, it is a great challenge to mine this potential fuel source since these clathrates spontaneously release the hydrocarbons as they are removed from the high pressure of the ocean depths. Only the Japanese, lacking their own coal and petroleum sources, have been bold enough to begin tackling this difficult mining problem.

And how do plants and animals cope with ice and freezing conditions? The warm-blooded creatures grow insulating fur or feathers, burn fat, hibernate, and so on. Likely the most elegant strategy in dealing with freezing is that first discovered in the Antarctic cod that swims in the ice-laden polar sea. Microscopic slivers of ice that invade its body are engulfed by an antifreeze protein (AFP) that frustrates the further growth of ice to a size that would be lethal. A large number of species of fish, insects, and plants are now known to have developed their own specific AFPs as a protective strategy against freezing. The mechanism by which these proteins control ice formation is uncertain.

So where is the new science? What are the important unsolved problems in ice research? Entire journals are devoted to these problems, for example *Glaciology* and *Cryobiology*. Frequent international conferences and workshops deal with ice as it relates to control of avalanches, mining hydrocarbon clathrates, climatology, global warming, freezing (and then reviving) human

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# Aspirin: A miracle drug from yesteryear's protocols

by Ernest Campaigne

The search for new chemical entities as useful drugs is a complicated business using modern methods. Computer models can generate structures of receptor sites and chemical structures designed to fit these specific sites. Combinatorial processes can synthesize hundreds of potential candidates in a short time. But severe limitations on testing and toxicity make progress proceed slowly.

Today's researcher can be envious of the free-wheeling older days of drug research. The history of the development of aspirin, one of the most useful chemical entities ever introduced into a physician's armamentarium, is a case in point.

By the early 1850s, salicylic acid and its ester, methyl salicylate, had been identified in natural products used as folk medicines. The acid had been found in the extract of *Spirea* and identified as spiric acid. The same substance had been found in willow bark, a material used in the treatment of minor pains. The methyl ester was known as oil of wintergreen and helped in the treatment of inflamed joints.

About this time, Hermann Kolbe discovered a convenient synthesis of salicylic acid, still known today in textbooks as the Kolbe Synthesis. It was obtained in good yield simply by heating a strongly alkaline solution of carbolic acid (phenol) under carbon dioxide pressure.

In Kolbe's time, infection in surgical hospitals was a serious problem. In some hospitals, a patient's chance of survival was less than 50 percent. Then Dr. Lister from Glasgow read some of the research papers of Pasteur and speculated that hospital infections might be caused by tiny organisms — germs. Because Pasteur had shown that carbolic acid was a good disinfectant, Lister began requiring cleanliness in surgery and the use of carbolic acid (phenol) to wash instruments, surgery tables, and areas of the operating room. His successes were soon the talk of the hospitals.

A few years later, surgeon Dr. Karl Thiersch at Leipzig decided to consult with Kolbe, who had joined the Leipzig faculty and was known for his research with carbolic acid. Thiersch pointed out that while carbolic acid worked wonders on surgical instruments, it left something to be desired as a wound dressing. Although very effective as a disinfectant, it was also corrosive and damaged tissue. Thiersch also noted that accumulated evidence indicated that diseases were caused by germs, but carbolic acid could not be taken by mouth or into the body. What was needed was a disinfectant as effective as carbolic acid, but one that could be tolerated by patients when given internally.



Kolbe reasoned that if phenol could be converted to salicylic acid by carbon dioxide under pressure, this process might well be reversed by metabolism, with carbolic acid slowly released under metabolic conditions. He tested the idea using some of Pasteur's tests for preserving food. He found that milk with a little salicylic acid added took nearly twice as long to sour as untreated milk. The same was true of wine and unrefrigerated meat. Kolbe concluded that salicylic acid had been metabolized to carbolic acid, the active disinfectant.

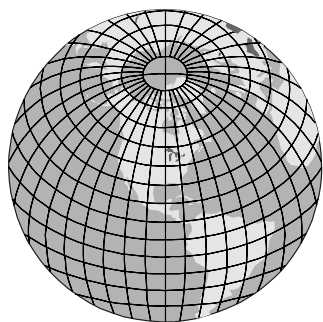
He convinced Thiersch to try it on patients with infections, and a number of his patients were the first to take pure salicylic acid internally. The FDA would not have approved! But Dr. Thiersch found decided improvement in many of his patients. Elevated temperatures universally dropped. Those who complained of headaches or other pains reported improvement, and those with sore and inflamed joints also seemed to improve.

The use of salicylic acid became quite common in German hospitals, and soon other countries adopted this protocol. The demand was so great that Kolbe and one of his former students established a plant in Dresden, using the Kolbe Synthesis to produce salicylic acid on a tonnage scale. This may well represent the beginnings of the German drug industry that dominated the field for 40 or more years.

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# Lighter moments in World War II

by Rupert Wentworth



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*World War II was so monstrous and pervasive that many refer to it simply as 'The War.' Nevertheless, the human spirit is always capable of capturing lighter moments, even in the most trying circumstances.*

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World War II affected nearly every aspect of American life. Indeed, almost every home had at least one flag with a star in the front window indicating somebody from that home was in one of the armed services, and all too often those homes were visited by a Western Union messenger carrying telegrams that began “We regret to inform you. . . .”

The War for us at home had many other aspects and effects, and all of them were initially unfamiliar. For example, soldiers, sailors, and marines filled every train station and bus depot, and women took important jobs in the defense industries while other women rolled bandages. Posters — some with Uncle Sam pointing and saying “I want you” and others warning us that “Loose lips sink ships” — spoke to us from nearly every public wall. Tunes such as *Praise the Lord and Pass the Ammunition* and *I'll Walk Alone* reflected our mood. Food rationing, working in “victory gardens” to supplement the food available in grocery stores, gasoline rationing, and mock air raids became a part of our everyday lives.

I remember one surprise with crystal clarity — it happened at the beginning of the War. I was a boy living in the South, and it was a time when most people stayed in their hometowns almost all of their lives. I had never seen anyone from north of the Mason–Dixon Line, but, like all southern boys in those days, I had been thoroughly indoctrinated about the evil carpetbaggers from the North who, stealing and pillaging, invaded the South immediately after the Civil War, a war that was less than a hundred years in the past. So seeing the newly federalized Ohio National Guard on their way to a camp outside of my hometown early in 1942 was a shock. I was sitting on our front porch when they marched by. Suddenly I realized who they were, and I remember running indoors and yelling, “Momma, Momma! The Yankees have come back!”

I have found other interesting stories about the War from my more senior colleagues. Either in white lab coats or in the uniform of one of the armed services, they also encountered lighter moments as they served this country.

## Ernest Campaigne

“Pardon me boy, is that the Chattanooga choo-choo?” That’s the song that Cam heard on the radio on the afternoon of Dec. 7, 1941, when the program was interrupted by an excited announcer who reported Pearl Harbor had been bombed by the Japanese.

Seven months later, he accepted a job as a biochemist with the then forming M.D. Anderson Hospital for Cancer Research. About a year later, a visiting Army officer told him in a very pointed

way that the Army needed chemists in the Chemical Warfare Service. Cam immediately contacted the chair of IU’s Department of Chemistry, asking about a faculty position. The Army Specialized Training Program at IU, an accelerated program that trained military personnel in medical and dental procedures, required additional instructors. He was hired, according to Cam, not only because of his research interests and his teaching experience, but also because he and his wife, Jean, made it possible to complete the sixth bridge table at departmental get-togethers.

The ASTP, a program that eventually had 2,000 students on campus, was rigorous. Teaching was continuous, six days a week, with a new semester beginning the day the old one was completed. Students hiked on Sunday to remind them they were still in the Army. Nevertheless, the students found time for extracurricular activities.

A student making moonshine at his lab bench in an unauthorized experiment got credit for the experiment but was not allowed to keep the product. Another time, Lynne Merritt rushed into Cam’s office asking for help. A huge, long, obscenely suggestive balloon filled the ceiling of the lecture hall. It obviously contained helium that Cam had used for a demonstration in the previous class. Lynne finally brought the dirigible down with a well-placed dart fired from a glass tube doubling as a blow gun.

Cam believes he had some influence with these students. He knows that one entered medical school after the War and completed his degree. Another told Cam that he was inspired to obtain his degree in pharmacy.

## Marvin Carmack

The War dominated the first years of Marvin Carmack’s faculty career at the University of Pennsylvania. In addition to teaching organic chemistry in civilian classes and special classes for the Army and Navy, Marvin was the principal investigator of a project researching new organic military explosives under a contract between the National Defense Research Committee and the University of Pennsylvania.

His group’s specific assignment, crucial to the war effort, was to investigate RDX and several other explosives, while developing and improving production processes and identifying byproducts and mechanisms of reactions. They produced many pounds of explosives in batches varying from ounces to pounds. Rather than disposing of old samples of these explosives, the group put them in numerous glass bottles under the lab benches, a procedure that would come back to haunt them.

Near the end of the war, the group realized they had created a very big problem. How would they get rid of these samples? Because unconfined explosives *usually* burn quietly like gunpowder, burning the samples in a nearby parking lot and hoping not to attract the attention of the police or citizens who were always on guard against any suspicious activities of potential saboteurs was a possibility, but it was quickly vetoed by the head of the Department of Chemistry. Finally, out of desperation and for lack of a better solution to their problem, the group made hundreds of paper boats and burned about one ounce at a time in the laboratory hoods, a procedure that required days of patient work.

Marvin now shudders as he recalls this business. One of the boats could have exploded, destroying the hood and possibly the lab and the chemists doing the burning.

## Max Marsh

Max was drafted into the Army in February of 1943. After basic training, he found himself with a medical detachment aboard a troop ship on a southwesterly course in the Pacific Ocean and accompanied by a British destroyer. Max recalls that seeing the Golden Gate bridge disappear in the wake of the ship was a very depressing sight. After rounding the south side of Australia, they headed north to their destination: Bombay, India. The circuitous route, which required 45 days, was necessary to avoid areas where the Japanese fleet was active.

In typical military hurry-up-and-wait fashion, their arrival in Bombay seemed to be totally unanticipated. Although the quartermaster regiment to which the medical detachment belonged was destined for northeastern India, no transportation was available. The regiment was forced to spend more than a month in a British rest camp eating

British rations. Max claims that he gained a new respect for the digestive powers of British soldiers during this time.

Finally, an arduous trip by rail and a perilous voyage up the Brahmaputra River by shallow draft ferry brought Max and his regiment to their duty station. After spending about a year with the medical detachment in the new location, he was transferred to the clinical laboratory staff of a nearby hospital, where he, along with the rest of the staff, enjoyed many perks. Max remembers one of these perks clearly — it was a visit by a USO troupe who came to present a music and comedy show to the patients. Jinx Falkenberg, a lovely young model and actress, was a member of this troupe. During her visit, she became ill and some diagnostic lab tests were necessary. The big question among the staff was: Who in the laboratory staff would have the honor of drawing blood from a vein in the pretty lady's arm? The issue was settled when a captain, the director of the laboratory, decided that rank had its privileges. While Max and the rest of the enlisted staff looked on with envy, the captain took the blood sample.



Max Marsh in India. Photo courtesy of Max Marsh.

*Lighter moments make times of adversity bearable. I'm sure that some of you who experienced the War as a child or as an adult also have anecdotes from the War that achieved that end. I will be happy to publish suitable excerpts.*

— Rupert Wentworth

## Aspirin

*(continued from page 3)*

Although salicylic acid became the drug of choice for treating fever and rheumatism, it was soon observed that, while it did mitigate the symptoms of infection, it did nothing to clear up infections — it did nothing to stop the germs. Moreover, patients who took the drug over any length of time complained of pains and irritation of the gastric system. And salicylic acid on amputation dressings eventually produced the same tissue destruction as carbolic acid, although milder at first.

It wasn't until 1899 that Heinrich Dresser and Felix Hoffman of Bayer Laboratories sent samples of acetylsalicylic acid, an old Kolbe derivative known for nearly 40 years, to hospitals in Halle and Berlin for experimental tests on feverish and rheumatic patients. To get away from the bad reputation of salicylic acid, they based the name on spirc acid, calling it aspirin for acetylspiric acid. The drug was a resounding success even though it was based on Kolbe's false assumptions and the freewheeling test protocols of the 1800s.

## Ice

*(continued from page 2)*

organs, stratospheric ozone depletion, etc. In my own view, a particularly pressing need is to understand, at the molecular level, the mechanism of ice nucleation. How does ice form from cold water?

It is believed that all water freezing begins with the spontaneous assembly of a small cluster of molecules that have an arrangement that resembles the ice structure. This cluster, or critical embryo, then grows into a recognizable piece of ice. The embryo size is likely in the range of a few nanometers (hundreds or thousands of molecules). No one has actually observed an embryo, although recent molecular dynamics calculations point to its existence. Our own work continues to be focused on understanding ice nucleation mechanisms.



## Progressing during uncertain times

For the last several years, it has been difficult to pick up a paper without being struck by the fact that these are extraordinarily uncertain financial times. This is certainly now true in the university and the state. However, even in such a climate we continue to make significant achievements.

After several years of planning, the university has now broken ground on the new multidisciplinary science building. The MSB attaches to the Chemistry Building through a basement walkway and now is officially named Simon Hall; please join me in thanking the Simon family as well as



David E. Clemmer

Dick and Ruth Johnson for their generous support of our campus and the sciences. Many others from our department have contributed significantly to the planning and design of this building, especially during the early stages. We owe a great deal of thanks to **Martin Jarrold**, who worked with Carl Bauer (biology) and David Baxter (physics) to come up with the final design. In addition to space for a large number of new chemistry hires, there is space for new facilities for materials chemistry, proteomics, and a new NMR facility. The planned 140,000 square-foot building is situated in the field between the Chemistry Building and Myers Hall. A groundbreaking ceremony occurred on June

6, 2004, and completion is scheduled for 2007. More information can be found at [www.indiana.edu/~college/msb/home.php](http://www.indiana.edu/~college/msb/home.php).

### Changing faculty

We say our warmest farewell this year to **Joe Gajewski**, who retired at the end of the summer after 38 years in the department. Professor Gajewski's work in physical organic chemistry enlightened us all, and he helped to train a generation of organic chemists. Joe plans to spend time with his family. In addition, he looks forward to traveling, skiing, sailing, restoring old cars, gardening, and writing a book on organic chemistry.

In my 2003 letter, I gave a rather lengthy report about six new faculty hires. All have begun their careers with a splash, and the infusion of new ideas and energy here is difficult to overstate. In last year's hiring season, we backed off from this pace, making only two offers that were ultimately

unsuccessful. We will search again this year across all areas.

### Tenure and promotions

Congratulations go to Associate Professor **Caroline Jarrold**, who received tenure this year, and to **Jeff Zaleski** and **Ted Widlanski**, who were both promoted to the full professor rank.

### Awards

Our faculty continue to win prestigious awards and bring acclaim to our department. **Gary M. Hieftje** was selected for the 2004–05 Distinguished Faculty Research Lecturer Award. He will present a lecture in the spring of 2005 that will be attended by individuals throughout the university community. The event is regarded as one of the intellectual highlights of the academic year. In addition, Gary won the 2004 Monie A. Ferst Award, given annually to a scientist who has made a notable contribution to the motivation and encouragement of research through education. The award is given under the auspices of the Georgia Institute of Technology Sigma Xi Chapter and will be presented at the chapter's awards banquet in May 2005. Finally, Gary was presented the 2004 New York Section of the Society for Applied Spectroscopy Gold Medal Award at the Eastern Analytical Symposium in November. The Gold Medal Award is presented to scientists who have demonstrated outstanding achievement in the areas of magnetic resonance, near infrared spectroscopy, chemo-metrics and separation sciences. Congratulations, Gary!

Immediately upon moving to IU, **Stephen C. Jacobson** learned that he was the recipient of the 2004 Federal Laboratory Consortium Award for Excellence in Technology Transfer by the Federal Laboratory Consortium. This award was given for outstanding work in the process of transferring technology developed in a federal laboratory to the commercial marketplace. More recently, he was selected by Eli Lilly for the ACACC award, which recognizes outstanding contributions in the field of analytical chemistry.

The dean of faculties at Indiana University selected **Jeffrey N. Johnston** for the 2003–04 Outstanding Junior Faculty Award. The faculty review panel chose only those nominees whose proposals and previous academic records clearly suggest promise for a career of excellence and significance.

**Daniel J. Mindiola** was selected as the recipient of the 2003 National Science Foundation Early Career Award. The NSF honors outstanding junior faculty members in science and engineer-

ing nationwide with the Faculty Early Career Development (CAREER) awards. The CAREER award is NSF's most prestigious honor for junior faculty members.

**Milos V. Novotny** has been chosen to be a Foreign Member of the Learned Society of the Czech Republic (Czech Academy of Sciences). He was selected because of his outstanding work in the advancement of science. In addition, Milos received the 2004 CaSSS Award for Distinguished Contributions to Separation Science sponsored by California Separation Science Society. The selection was based on outstanding contributions to the development of new chromatographic techniques and application of microscale separations to problems of biological significance.

**Cathrine Reck** received the 2004 Student Choice Award sponsored by the Student Alumni Association. Each spring, the Student Alumni Association presents the Student Choice Awards for Outstanding Faculty. All IU students are eligible to nominate their favorite professor for this prestigious award. This honor is unique because

it is based solely on student input; only three to five professors are selected to receive it each year. This award was presented at the spring recognition banquet at the DeVault Alumni Center on April 18.

**Ted Widlanski** and **Jeff Zaleski** received Trustees' Teaching Awards, established by the IU board of trustees in recognition of classroom excellence. Courses taught, course enrollments, and student evaluations provided the principal basis for selection.

Finally, on June 14, 2004, Professor Emeritus **Harry G. Day** received the Sagamore of the Wabash Award. This is one of the highest honors that can be given to someone in our state and was presented by the governor to honor Harry's lifetime of community and civic service.

As always, we look forward to hearing from all of you. Please drop a line or stop by the chair's office and visit when you are in town.

— *David E. Clemmer*

## Trivia about chemistry



**Question:** The postal abbreviation for Indiana is IN, and the symbol for the element indium is In. Fourteen other states have postal abbreviations that are identical to the symbols for elements. Can you name five of them? The answer appears on page 24.

**Question:** The exterior of the Chemistry Building has several intriguing inscriptions, including some symbols for chemical elements that cannot be found in a modern periodic table. Can you pick out the obsolete symbols from those shown on the inside rear cover and name the elements they represent? The answers will appear in next year's journal.

## ANNOUNCING

# The easy Life

**The Indiana University Alumni Association** is pleased to announce an **easy, affordable way to become a life member**: our new, **no-interest monthly payment plan!** For **\$55 a month for 10 months** you can **pay off your life membership!**

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INDIANA UNIVERSITY  
ALUMNI ASSOCIATION



## Southern Indiana Section ACS activities

On March 1–3, 2004, the Southern Indiana Section of the American Chemical Society was pleased to host **William Carroll**, PhD'78 (ACS president-elect, Occidental Chemical Corp.), to the department, where he presented a seminar titled "Vinyl Chloride, Cancer, and Technology." Carroll also spoke to one of our C118 Principles of Chemistry and Biochemistry II classes about careers in chemistry, engaging more than 300 students in the aspects behind industrial chemistry. One of Carroll's main efforts as president of ACS in 2005 will be to engage the next generation of rising adults in being excited about chemistry and chemistry careers and in becoming more chemistry literate.

Our new local student affiliates chapter of the ACS has been doing an excellent job planning

and executing both social and outreach activities. In the first five months of chapter reinstatement, we have acquired more than 70 student affiliate members. Our monthly activities included a movie night (complete with donated pizza and popcorn popped in house), rock-climbing outings, student–faculty bowling nights, and volunteering activities such as blood drives, Habitat for Humanity, and several events with WonderLab. We participated in WonderLab's Bubblefest on July 16, which saw more than 1,100 community citizens visit the hands-on demonstrations. Our student affiliates have been most excited about instituting a tutor list and helping tutor area high school students; the local ACS section is subsidizing \$5/hour toward the usual IU tutor fee (if they use the tutor list provided by the IU Department of Chemistry) to encourage high

school students and their parents to actively seek out help in chemistry when problems arise. With the formation of our local student affiliates chapter, we have been able to do more outreach than ever before.

On April 3–4, the student affiliates chapter participated in the American Cancer Society Relay for Life at IU. The event raised \$37,794 for cancer research and patient services. Our students were among 266 participants who spent an exhausting 20 hours of walking, covering many miles at Hayes Track. On April 3, the chapter hosted a trip to the Exotic Feline Rescue Center in Centerpoint, Ind. This rescue center is home to more than 180 exotic felines, giving them a home for life once they have been removed from dangerous or abusive private situations. On April 17, our members volunteered at WonderLab's first Annual Chemistry Kick-Off; this event was organized to try to get the community to appreciate chemistry and how it affects our lives. On April 28, the SISACS hosted a successful ice cream social that saw more than 300 people eat 30 gallons of ice cream and toppings.

At the end of every academic year, SISACS gives an award to an "Outstanding Undergraduate in Chemistry" during the Department of Chemistry's honors banquet cer-

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*RIGHT: Dennis Peters, left, and William Carroll*

*BELOW: A member of the audience (the young woman in the apron) participates in a chemistry demonstration with Matt Nance, the department's lecture demonstration technician, and Sarah Webb, PhD'03, during WonderLab's Chemistry Kick-Off.*



Anne Fraker



## LECTURE SERIES, SPECIAL LECTURES, & SYMPOSIA



### Lectures

Because of the Distinguished Lecture Series, our faculty, research associates, and students are able each year to learn first hand about the cutting-edge research of outstanding chemists from around the world. The lectures during this academic year were not exceptions.

Joel M. Harris, distinguished professor of chemistry at the University of Utah, Salt Lake City, delivered the Lilly Distinguished Lecture on Nov. 12, 2003. He spoke about "Raman Spectroscopy of Liquid/Solid Interfaces and Dispersed Particles." Harris has published more than 175 invited articles, chapters, and patents. He has also delivered more than 200 invited lectures.

The Frank C. Mathers Lecture presented on March 24 by John E. Johnson, Department of Molecular Biology, The Scripps Research Institute, La Jolla, Calif., was titled "Platforms, Motors, and Springs: Virus Capsids as Reagents for Nanotechnology." With nearly 200 publications, Johnson has served or is currently serving on seven national and international advisory boards. He also currently serves on five editorial boards for journals in virology and structural biology.

Malcolm Green, professor of chemistry, Oxford University, Oxford, England, gave the Raymond Siedle Lecture on April 14. It was titled "The Chemistry of Single Wall Carbon Nanotubes: The World's Smallest Crystals." Included in the many awards Green has received are the Chemistry Society Medal in Transition Metal Chemistry (1978), the Royal Society of Chemistry Medal in Organometallic Chemistry (1985), the Davy Medal of the Royal Society (1995), and the Sir Geoffrey Wilkinson Medal and Prize from the Royal Society of Chemistry (2000).

### Symposia in 2003

The 13th annual Inorganic Alumni Symposium occurred on Oct. 3, 2003. The principal speakers were **Katherine Glasgow**, PhD'00 (with Malcolm Chisholm), from GE Plastics; **Roger Kuhlman**, PhD'96 (with Ken Caulton), from Dow Chemical; **Ben Xue** (postdoctoral associate with Malcolm Chisholm), from the University of Tennessee; **Stephanie Castro**, PhD'96 (with George Christou), from Glenn Research Center; and **Bryan Eichhorn**, PhD'87 (with Malcolm Chisholm), from the University of Maryland. A

## Another Tracy M. Sonneborn Award

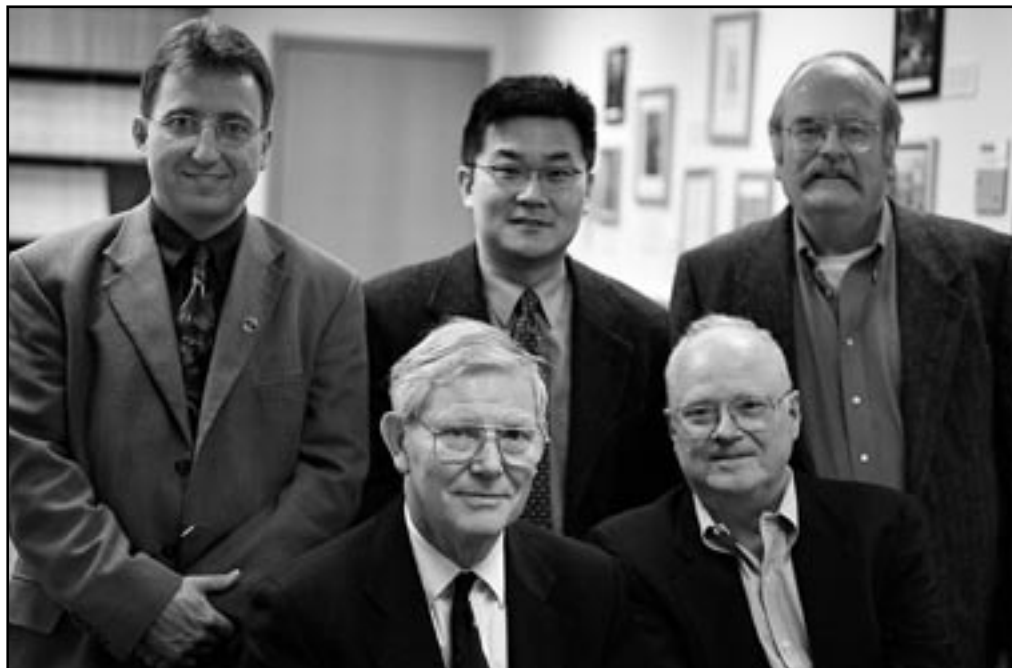
Although our chair mentioned this award briefly in his letter published in last year's *IU•Chemistry*, we believe that this singular honor deserves additional coverage.



Milos Novotny

"An honor for the honored" is an apt description for the Tracy M. Sonneborn Award because it honors those who are already either distinguished professors or named professors. The recipient of the award for 2003, Milos Novotny, Distinguished Professor of Chemistry and Lilly Chemistry Alumni chair, certainly meets that criteria. His research also has special distinction. In addition to participating in the design of the experiment that is part of the analysis of Martian soil, his research has profoundly influenced the fields that are now called proteomics, glycomics, and metabolomics.

Following a long and impressive line of chemists who have won this prestigious university award, Milos received his award and presented his lecture, "Enhancing Interdisciplinary Thought and Methodologies: Biochemical Complexity In and Around Us," on Nov. 5, 2003, in the IMU.



dinner at Le Petit Café followed the symposium. A picnic at Hardin Ridge the next day completed the event.

Sponsored by Pfizer; the third annual Symposium for Excellence in Undergraduate Chemical Research took place on Sept. 27, 2003. Eight faculty members from four-year colleges who have made significant contributions to research and to the mentorship of chemistry undergraduates spoke. Dr. Bruce Roth, vice president, Pfizer, GRD, gave the keynote address. Professor P. Andrew Evans and Dean Michael McGerr gave the welcome speech, followed by our eight visiting faculty members' presentations. The symposium concluded with a dinner and award ceremony.

Front, from left: Malcolm Green and Allen Siedle; rear: Jeffrey Zaleski, Mu-Hyun "Mookie" Baik, and Lee Todd

## FACULTY PROFILE:

John  
Richardson

# *Second fiddle to no one in chemistry*

A biochemist. Quiet. Unassuming. Friendly. These are the adjectives I have associated with John Richardson during the 30 or so years that I have known him. More recently, I have added another: Retired.

But in early December 2003, when I met him at the coffee shop in Borders to gather material for this story, I found two other adjectives of equal importance: enthusiastic and fervent. He shows enthusiasm when discussing his research, with the words coming more forcefully, clearly showing his excitement and continued dedication to his research. But John's enthusiasm does not stop there — he shows the same passion for music. He is also fervent when discussing his family so that his demeanor changes and a caring gentleness shows through.

John was born in Pittsfield, Mass., a town in which his father, who was an electrical engineer by education, worked for General Electric and focused on the practical applications of plastics rather than electrical matters. John moved with his family about 40 miles southwest to Springfield when he was 7. Three years later, he began violin lessons.

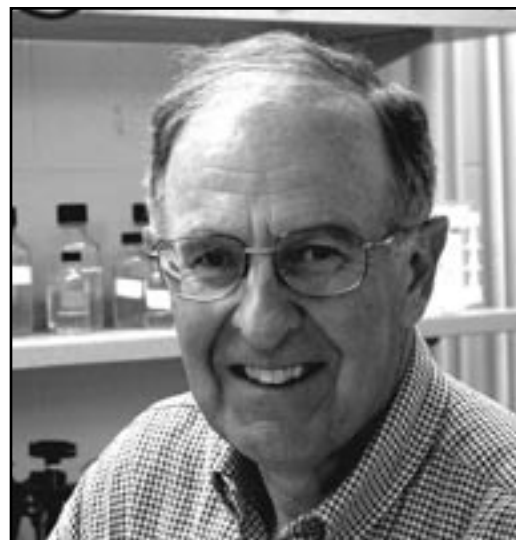
At 14, he went to a private boarding school, where his studies emphasized the arts. Nevertheless, John also did a lot of farm work while he was there, getting up at 5 a.m. and, among other chores, collecting sap buckets for maple syrup and cleaning out gutters on a barn.

He attended Amherst College, choosing to major in physics rather than music. His undergraduate project dealt with oxygen isotope fractionation. But Amherst College had no orchestra at that time, so John played in the Smith College orchestra located in nearby Northampton.

After Amherst, he moved eastward, enrolling in Harvard's graduate school, where he worked for James Watson, an IU graduate and co-discoverer of DNA's double helix. His thesis concerned the structure and function of RNA polymerase, the enzyme responsible for copying DNA sequences into RNA in the process of gene expression. John received his PhD in 1965.

Although his violin saw very little of John during his time in Cambridge, John's interest in music remained. He often went to the Club 47, where his roommate was the manager and where Joan Baez got her start (before John's time in Cambridge). There he heard both folk music and bluegrass music and met many people associated with music in this genre.

Four years in Europe as a postdoctoral fellow followed graduate school, with two years at the Institut de Biologie Physico-Chimique in Paris and two years at the Institut de Biologie Moleculaire



*John Richardson*

in Geneva. During this time, he met Lislott, married her, and a son was soon born. John, with his family, returned to the United States for another year of postdoctoral experience, this time with Benjamin Hall at the University of Washington.

He interviewed at IU in early 1970 immediately after an interview at the University of Iowa. When he arrived at the Bloomington airport, he experienced weather that was 20 degrees warmer than that at Iowa City, and he heard country music in the airport terminal. Unfamiliar with the Midwest, John thought that Indiana was surely in the South.

Riley Schaeffer was the department's chair, and Gene Cordes was John's host for the visit. John liked what he saw in the department, and the department liked John. He was hired and arrived permanently in September 1970.

He began working on two projects: the role of torsional stress in DNA on the process of transcription (DNA-directed RNA synthesis) and the structure and function of a transcription termination factor called rho. He soon received funding from an NIH grant, funding that would be continuous for the next 30 or so years.

John published a number of well-received papers in both of these fields. He believes one of his most notable contributions was to show that torsional stress does not affect the extent of local unwinding of DNA during the transcription process. He believes that he is best known, however, for showing that the rho factor uses ATP hydrolysis for its function and that it makes use of two kinds of RNA interaction sites.

John returned to the violin after he received tenure, playing in the Bloomington Symphony Orchestra in the second-violin section. But his

*(continued on page 11)*

❖  
*The mechanisms by which RNA are copied from DNA, the primary step in gene expression, have been John Richardson's research interest since he has been in Bloomington.*





Although **Marvin Carmack** is retired, he found time to publish a paper about the chirality of the disulfide in prion proteins, suggesting this chirality may be responsible for different preferences of folding between the normal protein of the nervous system and the rogue, fatally ineffective form.

**Richard DiMarchi** gave three plenary lectures, one at the University of Louisville, one in Singapore, and the other in Switzerland; a paper at ADA 64th Scientific Session; and another paper at a Gordon Research Conference. He co-chaired the Pharma/Biotech CSO Conference and served on the UCSF Prion Advisory Board and the MPM Advisory Board.

**Andy Evans** presented four plenary lectures at various symposia about stereodivergent construction of cyclic ethers using catalytic bismuth tribromide and new organometallic carbocyclization reactions for the construction of complex natural products. He also gave invited seminars at 13 universities and companies.

In addition to the awards listed in the chair's letter in this issue, **Gary Hieftje** was elected to Fellowship in the Royal Society of Chemistry. He is also a consultant for Leco Corp. and Los Alamos, the chair of the editorial board for the Royal Society of Chemistry journal titled *Journal of Analytical Atomic Spectrometry*, a member of the Review Committee for Chemistry Division of the Los Alamos National Laboratory, and a member of the review committee for the Institute for Analytical Science, Dortmund, Germany. During the year, Gary also found time to deliver seven plenary lectures and 12 invited lectures.

**Jeffrey Johnston** received an IU Outstanding Junior Faculty Award and the Yamanouchi Faculty

Award (renewed for a third consecutive year). He was also appointed to the 2004 Beckman Scholars Advisory Panel. He delivered 21 invited lectures including one at the Gordon Research Conference on Stereochemistry.

**Charlie Parmenter** was honored with a special issue of the *Journal of Physical Chemistry* (vol. 107-A, no. 49, December 2003). This so-called *Festschrift* is filled with more than 40 research articles by his former students, postdocs, and scientific colleagues from around the world. It also gave him a chance to summarize the scientific achievements of his students in his Bloomington labs over the past 40 years.

**Dennis Peters**, who continues to serve as chair of the Division of Organic and Biological Electrochemistry of the Electrochemistry Society, attended a meeting of that society in San Antonio, accompanied by four graduate students (**Parichatr Vanalabhpattana**, **Michael Johnson**, **Bianna Smith**, and **Peng Du**). While there, he presented two papers, one co-authored by **Parichatr Vanalabhpattana** and the other by **Jacques Simonet**. He presented another paper co-authored by **Danielle Goken**, PhD'03, **John Tomaszewski**, **Jonathan Karty**, and **James Reilly** at a similar meeting in Honolulu. Peters also presented research lectures at Calvin College in Grand Rapids, Mich., and Hope College in Holland, Mich.

For more faculty news, see page 6.

— *Rupert Wentworth*

## Richardson

(continued from page 10)

interest in music has not been limited to playing the violin. John and his wife, Lislott, making full use of many musical programs and theater offered at IU, regularly attend operas, chamber music recitals, and symphonic concerts. Indeed, John says that "music has been a major part of my life in Bloomington."

John and Lislott have two children and one grandchild, all residing in Geneva, Switzerland. John says his post-retirement plans have not yet gelled, but I suspect that he will never be far from good chemistry and good music.

— *Rupert Wentworth*

## ACS

(continued from page 8)

emony. The recipient for 2004 was **Paul Hae-Yong Park** from Carmel, Ind. He graduated from IU in May 2004 with a BS in chemistry and is now attending the IU School of Medicine. As always, the SISACS sponsored several TGIF wine and cheese functions throughout 2003–04. The functions were held in the University Club of the Indiana Memorial Union and have had moderate turnouts, with our best turnout of more than 100 people in August.

The SISACS sponsored National Chemistry Week to enhance the public's awareness of the wonderful contributions of chemistry. NCW was celebrated the week of Oct. 17–23 with a theme of "Health and Wellness." The annual event unites ACS local sections, industries, schools, and individuals in communicating the importance of chemistry to the quality of life; this year's NCW was much enhanced with the great support from our local section student affiliate volunteers. Our section offered a series of activities including chemical demonstrations, hands-on activities for kids and families, contests and games, Boy Scout merit badges, poster competitions for students from elementary school to high school, and an open house including tours of the chemistry building at Indiana University. We habitually have a strong turnout from the area schools, and many educators incorporate the NCW into their curriculum.

For the calendar year 2004, **Kate Reck** is the chair, **Dan Mindiola** is the chair-elect, **Levi Simpson** is the secretary, and **Steve Wietstock** remains as treasurer and career services coordinator. The NCW coordinator is **Alice Dobie-Galuska**. **Jeff Zaleski** is our local section counselor, with **Kenneth Caulton** as our alternate counselor.

— *Kate Reck*

## STAFF PROFILES:

Tom Hacker  
Mike Jackson  
Don Chatten

# *Important trio retires from department*

The undergraduate chemistry program marches on in winter, spring, summer, and fall, rain or shine, snow or sleet. Tom Hacker, Mike Jackson, and Don Chatten contributed mightily to this program, making certain that the march did not miss a step.

...ept at making 50 liters of this solution. However, that was exactly the task that faced Mike when he joined the undergraduate chemistry program because the general chemistry labs sometimes require huge quantities of solutions of known concentrations. Mike, who studied chemistry

while he was in the Navy, taught himself how to accomplish this daunting task using calibrated carboys rather than volumetric flasks.

Tom and Mike also share a significant honor. They received the prestigious 2000 Indiana University Staff Merit Award for their work in the general chemistry labs. One supporting letter said, “(They) labored diligently and cheerfully through the years to bring the general chemistry program to the prominence that it deserves.”



From left, Tom Hacker, Mike Jackson, and Don Chatten



*And now these three men who have affected the lives of tens of thousands of undergraduates, hundreds of graduate students, and scores of faculty members have retired.*



Tom stocked the lab drawers and maintained the glassware, spectrophotometers, and balances for the general chemistry labs; Mike prepared the solutions for those labs; and Don did both of these jobs for the organic chemistry labs.

Before coming to their jobs in our department, each of them was in the Armed Services. Tom, a Vietnam veteran, served in a special reconnaissance unit with the 101st Airborne Division. Mike was a storekeeper aboard a destroyer, but his battle station was the forward gun turret fuse setter. Don served with the Air Force in Texas, Illinois, Alaska, and Maryland.

After joining our department (Don in 1968, Mike and Tom in 1970), each was associated initially with Syl Brown. (Some of you may remember Syl. As the head of the stockroom during the 1960s and early 1970s, he was somewhat arbitrary in his approach to providing chemicals and glassware for the department ... but that's another story.) Tom fondly recalls yearly hunting trips in Oklahoma with him. Mike and Don remember working with him in the stockroom before they took on the jobs in the undergraduate chemistry program.

Tom's penchant for tinkering with cars and other mechanical devices was undoubtedly helpful when the department sent him to a school in New Jersey for repairing *Mettler* balances, balances that in those days were entirely mechanical in their operation. Tom became the department's *Mettler* repairman.

All of us who are chemists are familiar with preparing one or two liters of a solution of known concentration, but few, if any, of us would be ad-

Although Don has many talents, he has a special flair for recalling funny incidents in the undergraduate chemistry program. For example, he tells the story of a young lady who had been working with salmon testes in an experiment. She approached her associate instructor with this question: “I have been working with this stuff during the entire lab period, but I forgot to wear gloves. Will I get pregnant?” (We can only wonder what she thought the issue from this union would be. A mermaid?)

Each of this trio says that a lot of changes occurred during the 30 or so years they worked in the program. To name a few, we went from pouring virtually all expended solutions and water soluble solids down the drain to almost nothing down the drain. We also went from very little attention to safety to safety being one of the foremost concerns of each experiment. And we went from almost no use of computers to giant computers that filled a room to hand-held computers, as well as bench-top computers that monitor experiments.

And now these three men who have affected the lives of tens of thousands of undergraduates (who generally did not realize that their lives had been affected), hundreds of graduate students (who served as AIs and often did not know that their lives had also been affected), and scores of faculty members (who depended on them for lab set-ups as well as lecture demonstrations) have retired. We miss them.

— Rupert Wentworth

## STAFF NEWS



This year brought many staff changes, particularly due to an early retirement incentive offered by the state of Indiana to eligible PERF retirees. This was a one-time offer, and seven staff took advantage of this opportunity. In order by retirement date, these include Larry Sexton, Don Chat-ten, Tom Hacker, Mike Jackson, Larry Mobley, Ann Martin, and Deon Osman. All together, we lost seven staff and a cumulative total of 231 combined years of service to the Department of Chemistry! Such loyalty and dedication is extraordinary and the loss of all that expertise is a real hardship. We had several retirement recep-tions to show our appreciation for their extreme dedication and for their many contributions to the department.

We had our annual staff reception at the IMU Tudor Room on May 6. **Mary Swarthout** was the recipient of the Chemistry Outstanding Staff Award and was honored for her dedication and excellent service to the department over the past 26 years. Mary joined the department in 1978 as research secretary to professors Hayes and Hieftje and transferred to the chair's office as chair's secretary in 1988. In 1989, she was promoted to her present position as the chair's administra-tive assistant. We also celebrated the following IU service anniversaries: **Doug Garvin** (research machinist apprentice), 20 years; **Eleanor Board-man** (research secretary to Professor Novotny), 15 years; and **Nancy Collier** (research secretary to professors Evans, Montgomery, and Widlanski) and **Paul Ludlow** (electronics technician), both with 10 years. The attendance was fantastic, and many retirees returned to attend the event.

**Thomas Stromberg** joined us in October 2003 as our coordinator of UNIX systems. He relo-cated from North Carolina, where he was a senior UNIX administrator at Böwe Bell & Howell in Durham. Thomas served as a systems administra-tor in several capacities before that position, in-cluding two opportunities in Sweden. He also has significant experience with clustering, computer security, and open source.

**Carol Koetke** was hired in January 2004 as editorial specialist in the Ortoleva Cell and Virus Theory Center. Carol has 14 years of experience as an editor, working in the fields of medicine and math, and has significant experience with various publishers. She previously worked in a very similar position at the University of Kentucky and had recently edited a book on chemistry as a freelance editor before she joined our department.

**Sara Lowe** also joined us in January as Profes-sor DiMarchi's research secretary. Sara had just completed her master's degree in the School of Library and Information Science at IU, and her husband has begun a PhD program here.

She previously worked at IU's Department of Religious Studies while completing her degree. Formerly, she was an administrative secretary at the Research Division of the Puget Sound Blood Center in Seattle.

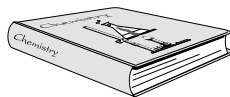
Our Electronics Instrument Service created a new support staff position, and **Scott Terrell** was able to move into this position in June. He had worked there hourly since October 2002. Scott majored in electronics and minored in computers during his two years at Ivy Tech.

**Larry Sexton** retired in February after 36 years as a research machinist III in our Edward J. Bair Mechanical Instrument Service. Larry had addi-tionally handled the role of supervisor of our Stu-dent Machine Shop, and, over the years, he had helped many graduate students put their research questions into mechanical solutions. We lost 36 years of experience, wisdom, and expertise upon his retirement. However, we were very fortunate to find **Bruce Frye**, who replaced Larry in July as a research machinist III. Bruce had completed an associate in applied science degree in drafting and CAD technology from Ivy Tech and had exten-sive work experience. He transferred from Cook Inc., where he had been the supervisor of Cook's machine shop for the past six years. Additionally, he is skilled in TIG and MIG and CNC wire elec-trical discharge machining (new to our shop).

**Don Chatten** retired in April after working in our organic teaching lab for 36 years. During this time, he had overseen several moves of the organic labs and many more curricular changes. His story is told on page 12 in this issue.

*(continued on page 14)*

## LIBRARY NEWS



Roger Beckman became the head of the Chemistry Library on June 1, 2004, and he is also the head of the Life Sciences Library. A search for a reference librarian who will work in both libraries is under way. Amanda Lavender, our computer support person, was on maternity leave from Jan. 16 through March 5. Alison Rollins was our SLIS graduate assistant during 2003–04. She will be replaced by Andrew Klein for 2004–05.

There is some good news and some bad news on the collections side. The bad news is that the IUB libraries had to cancel 10 percent (in dollar terms) of their journal subscriptions for the 2005 fiscal year because allocations are not keeping up with price increases. That means it will be more difficult to purchase new journals and additional electronic archives and other new resources that become available. It was a struggle to find enough journals to cancel to keep our current access to SciFinder Scholar, the chemical abstracts database.

The good news is that we were able to obtain end-of-fiscal-year funds from the Main Library to purchase the Royal Society of Chemistry archive, an archive containing all articles published by the RSC (and its forerunner societ-ies) from 1841 (the first issue of *Memoirs and Proceedings of the Chemical Soci-ety*) to 1996. That means we have access to virtually all issues of the American Chemical Society and the RSC journals.

— Roger Beckman

## Staff news

(continued from page 13)



Ann Martin

**Larry Mobley** retired in May after 26 years in the position of senior lab attendant in the chemistry scientific stores. His position was an integral part of that operation, and he had helped generations of graduate students and researchers by filling their orders and providing supplies for their research needs.

**Tom Hacker** and **Mike Jackson** both retired in May also, after 33 and 34 years of service, respectively. Both were senior lab attendants in our freshman teaching labs — our *only* attendants in those labs! Their stories appear on page 12.

After the retirement of both Tom and Mike, **Kimberly Aumann** joined our undergraduate program in a new position of undergraduate laboratory coordinator in July. Her responsibilities are to develop new teaching labs and assist in curriculum development, teaching, and supervision of all aspects of the undergraduate laboratory program. Kim has a master's of arts in teaching in chemistry from IU and a BS in biochemistry from Calvin College. She had previous experience as an AI in the department, having taught six different courses, and also had tutored in chemistry. This new position is part of a new "team" approach and partially replaced our two freshman lab assistants and our one organic lab assistant, who recently retired.

**Ann Martin** retired in May after 34 years as a research secretary. Ann joined the department in 1966 and assisted Professor Henry Mahler for a couple of years as his research secretary, until she moved from the Bloomington area. She returned to Mahler's office in 1971 and continued with him until his death in 1983. Ann assisted in phasing out his research office and labs, and later that year she joined Professor Malcolm Chisholm's research group, where she continued until his departure. In January 2000, she was assigned to another research secretary position and has worked for professors De Souza, Dragnea, Ewing, Martyna, Parmenter, Zaleski, and Zwanziger over the recent years. In fact, Ann has worked with nearly all of our faculty, but particularly with the inorganic and physical chemists.

**Deon Osman** retired in June after 33 years of service in our NMR lab and research computer group. He began in 1971 as an electronics specialist and in 1988 was promoted to senior NMR technician. Deon was instrumental in developing our NMR lab to state-of-the-art instrumentation when commercial equipment did not have the needed capabilities. His expertise was in the field of radio frequency electronics, and he was invaluable in troubleshooting complex systems. As the instrumentation in the NMR area matured, we were able to switch Deon into other areas where his experience was needed. In 1997, he began working in our research computer services shop, where he has helped develop computer research systems for many faculty groups over the years.

**John Karty** was hired in June as the manager of our mass spectroscopy laboratory. John completed his PhD under the direction of Professor Reilly in the area of biological mass spectrometry. Vast experience in biological mass spectrometry brings a much-needed expertise to the lab and augments the lab's current capabilities. John received his BS in chemistry from Purdue University.

**April Dressel** joined the department as research secretary to professors Clemmer, Jacobson, and Peters, replacing **Kaycia Myers** in August. Kaycia returned to her former position here in the department for the summer and has now returned to Purdue for the fall semester. April is an IU graduate with a BA in English and East Asian languages and cultures. She worked previously in the Office of International Admissions and had internships in the Department of English and in the Victorian Studies Program. Additionally, she had courses in German, Japanese, Russian, Arabic, and Italian.

On a more personal note, **Heather Brummett** and her husband, David, had a baby boy, Logan James, on Sept. 28, 2003. Logan is now walking, talking, and making kisses!

— Judy Crandall

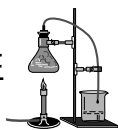
## CHEMICAL INFORMATICS

Two students completed work for the MS in chemical informatics during the 2003–04 academic year. **Leah Sandvoss** is now an information scientist in the La Jolla Laboratories of Pfizer Inc. **Jason Gretencord** is a systems administrator with Archer-Daniels-Midland in Decatur, Ill. **Meeta Pradhan** completed her MS at the IUPUI campus and is now working with Peter Ortoleva's group. Eleven students are currently in the two-year MS program, seven at IUPUI and four at IUB. It is anticipated that the first students will be admitted to the PhD program for the entering class of fall 2005. That program awaits only board of trustees and Indiana Higher Education Commission approval.

New faculty hires with research interests in chemical informatics are **David Wild**, visiting part-time assistant professor, and **Santiago Schnell**, assistant professor. Wild's research interests include organization and analysis of large chemical data sets, high-performance computing for chemical informatics, advanced molecular descriptors, and the lab of the future. Schnell studies complex biochemical pathways and reactions in *in vitro* and *in vivo* conditions, as well as pattern formation through segmentation in early embryogenesis. These two join **Mu-Hyun "Mookie" Baik**, who has a two-thirds appointment as assistant professor of informatics. **Gary Wiggins** completed his first year as full-time director of the School of Informatics program in chemical informatics and interim director of the program in bioinformatics. He spent the second half of the year on sabbatical leave, which included lecturing and consulting for the University of Belgrade chemistry faculty. Other places visited while in Europe were Sheffield, England, and Budapest, Hungary. Wiggins also attended the Third Beilstein Institute Workshop in Bolzano, Italy. At the fall 2003 ACS national meeting, Wiggins received the Meritorious Service Award of the Division of Chemical Information.

— Gary Wiggins

## GRADUATE NOTES



During the 2003–04 school year, Professor **Jeffrey M. Zaleski** was director of graduate studies. Serving with him on the Standards Committee were professors **Kenneth G. Caulton**, **Gary M. Hieftje**, **Lawrence K. Montgomery**, **Martha G. Oakley**, and **Charles S. Parmenter**.

The Graduate Admissions Committee was chaired by **David R. Williams**. Evaluating the hundreds of dossiers submitted to the department were professors **Richard D. DiMarchi**, **Stephen Jacobson**, **Martin F. Jarrold**, **Jeffrey N. Johnston**, and **Daniel J. Mindiola**.

### Award winners

**Erich Baum** was awarded the Abbott Fellowship and was a recipient of the Wendell P. Metzner Award. Baum received a BS in chemistry from Wright State University in 2001. In the fall of that year, he started graduate school at Indiana University in the Department of Chemistry under the direction of Professor P. Andrew Evans. His research in Evans's group has focused on the development and expansion of the inter- and intramolecular rhodium-catalyzed [4+2+2] cycloaddition reactions. Concurrent with this project, Baum is also investigating new synthetic methods for the construction of medium rings. He is also working on the total synthesis of the fusicoccin diterpene, (+)-epoxydictymene.



*Erich Baum*

**David Dye** was awarded the Chester Davis Fellowship. Dye completed his undergraduate studies at Samford University, where he earned a BS degree in chemistry with a minor in physics. He started his graduate studies at Indiana University in 2001 in the laboratory of Professor Jeffrey M. Zaleski. His synthetic research has focused on the development of photo-reactive metalloenediynes that can undergo Bergman cyclization upon long wavelength



*David Dye*

photolysis. In addition to these synthetic pursuits, he is also involved in a variety of spectroscopic projects, ranging from the study of the coordination environment of lead peptides to the shifts in molecular vibrations associated with phase transi-

tions of liquid crystals. This work has included the development of several pieces of custom spectroscopic equipment for use in these studies.

**Gerardo Gamez** was awarded the Kraft Fellowship. He obtained a BS in 1999 from the University of Texas at El Paso with a major in chemistry and a minor in biology. At UTEP, Gamez performed undergraduate research in the laboratory of Professor Gardea-Torresdey, developing a cost-effective method of using plant dead tissues (e.g., leaves, roots, and stems) to remove heavy metal contaminants (e.g., Cr, Pb, Cu, Cd, and others) from aqueous systems. In addition, he obtained an MS from UTEP with a major in chemistry and an emphasis on environmental science. During that time his research was focused on an environmentally friendly method of recovering gold ions and producing gold nanoparticles with plant dead tissues. Currently, Gamez is a PhD candidate in the analytical chemistry program at Indiana University Bloomington. His present research in Professor Hieftje's laboratory involves the fundamental study of plasmas that are routinely used in analytical spectrochemistry, such as the inductively coupled plasma (ICP) and glow discharge (GD), through laser scattering, laser induced fluorescence, and emission-based techniques. Specifically, these techniques allow the observation of the behavior of key plasma species such as electron number density, electron temperature, electron energy distribution, plasma gas temperature, and analyte number densities, among others. The purpose is to understand the fundamental mechanisms better to improve the plasma analytical performance.



*Gerardo Gamez*

The Procter & Gamble Fellowship and the Felix Haurowitz Award were awarded to **Benjamin Nugent**. Nugent obtained his BS in chemistry and mathematics (double major) from Central Michigan University in Mount Pleasant, Mich. After graduation in May 1997, he worked for three years as a research chemist at Dow Corning Corp., working on the discovery of new synthetic routes to organosilane compounds. In 2000, he enrolled in the Indiana University graduate program to work under Professor Jeffrey Johnston. His work in that group has centered on the development of novel reaction methodologies. Currently, Nugent is working on the design of new catalyst ligands for use in the asymmetric aza-Henry reaction.



*Benjamin Nugent*

**Peter Mikulecky** was the recipient of the E.M. Kratz Fellowship (endowed by Mr. and Mrs. W.W. Gasser Jr.) and was presented with the Henry R. Mahler Award. Mikulecky grew up

*(continued on page 16)*

## Graduate notes

(continued from page 15)



Peter Mikulecky

in Whitefish Bay, Wis., just outside Milwaukee. After four years in the Army as an Arabic linguist/interrogator, he attended the University of Wisconsin-Eau Claire. Mikulecky majored in biochemistry/molecular biology and performed undergraduate research on the mechanism of action of the antifungal agent, Amphotericin B, under the direction of Professor Scott Hartsel. Subsequently, Mikulecky worked as a research technician for professors Evelyn Jabri and Andrew Feig, here at IU. He began graduate study at IU in 2001, under Professor Feig. His graduate research has focused on structural changes in RNA. Using model systems such as the hammerhead ribozyme, he has investigated the thermodynamics of RNA folding to demonstrate the energetic importance of the heat capacity change associated with folding, as revealed by the striking phenomenon of RNA cold denaturation. Furthermore, he has shown that folding of the hammerhead ribozyme helical junction is entropically driven and appears to be stabilized predominantly by diffusely bound ions. Mikulecky has also investigated RNA structural changes involved in bacterial stress response, as mediated by the ring-shaped protein, Hfq. In *E. coli*, for example, the physiological response to lowered temperature involves a kind of post-transcriptional regulation wherein "riboregulator" RNAs base pair with regulatory regions of target mRNAs to either promote or inhibit mRNA translation. These regulatory RNA-RNA interactions are somehow facilitated by Hfq protein. Mikulecky has contributed to the understanding of how Hfq binds the riboregulator involved in cold shock, DsrA RNA. Further, his work has helped demonstrate that the Hfq contains at least two distinct RNA binding surfaces — one for A/U-rich regions adjacent to helical stems, such as found in many riboregulators, and another surface for polyadenosine sequences, such as found on mRNAs.

The Richard Slagle Fellowship was awarded to **Abdullah Sayyed-Ahmad**. Sayyed-Ahmad graduated from Bethlehem University, Bethlehem, Palestine, in 1999 with a BS in mathematics and physics. After graduation, he worked with Professor Henry Jaqaman of Bethlehem University on some theoretical aspects of heavy ions collisions. In fall 2000, Sayyed-Ahmad started his graduate research under the supervision of Distinguished Professor Peter Ortoleva. His research interests include developing theoretical and computational models to understand structure and behavior of macromolecules and living cells. He has developed an efficient nonlinear partial differential equations simulator for solving the Poisson-Boltzmann equation to study electrostatic effects on macromolecules and proteins in electrolyte media. Sayyed-Ahmad is also working on utilizing different types of steady-state and time-dependent bioanalytical experimental data (microarray, metabolic, NMR, etc.) to objectively calibrate cell models using information theory. This work has applications in drug and treatment discovery.



Abdallah Sayyed-Ahmad



Richard Beardsley

The Merck Analytical/Physical Fellowship was awarded to **Richard Beardsley**. Beardsley received his BS in chemistry from the University of Pittsburgh at Bradford in 2000. He began his graduate studies at Indiana University in fall 2000. Beardsley currently works for Professor James P. Reilly doing research with employed chemical derivatizations to facilitate the identification and quantification of proteins by mass spectrometry.

**Ann Marie Staub** holds an American Heart Fellowship. She received a BS in biochemistry from Seton Hill College in 2001, and she currently works for Professor Martin Stone.



Ann Marie Staub

**Beili Quan** received the Linda and Jack Gill Fellowship. Quan received a BS in chemistry from Fudan University, and she currently works for Professor Richard D. DiMarchi.

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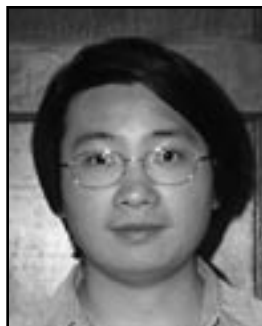
Other fellowship recipients were **Pari-chatr Vanalabhpatana**, Anandhamahidol Foundation Scholarship; **Chee-Yuen “George” Chan**, Croucher Foundation Scholarship; **Gerardo Gamez**, Dean’s Fellowship; **Thaddeus Jones**, Mays Fellowship; **Vanvimon Saksmerprom**, Royal Thai Government Fellowship; **Max Fontus**, McNair Fellowship; and **Aleem Fazel**, Pfizer Fellowship.

Research and University Graduate School fellowships were awarded to: **William J. Andrews**, **Stella Aniagyeyi**, **Brad C. Bailey**, **Emily Barter**, **William Broshears**, **Alan Cusak**, **Anja Dancevic**, **Suraj Dixit**, **Andrew Donnell**, **Gholam Ebrahimian**, **Ryan Fenno**, **Michael Fultz**, **Julienne Green**, **Holly Herbert**, **Thaddeus Jones**, **Pilsoo Kang**, **James Klein**, **Michael Lawler**, **Taewoo Lee**, **Corey Lust**, **Sarah Mabbett**, **Peter Mikulecky**, **Nathan Miller**, **Colleen Neal**, **Nickie Peters**, **Julie Pigza**, **William Pitcock**, **Beili Quan**, **Kelly Rask**, **Sarah Richer**, **Justin Riddle**, **Brigitte Robinson**, **James Sawyer**, **Bo Shen**, **Levi Simpson**, **Timothy Troyer**, **Christopher Weitzel**, **Zhiyin Xun**, **Bruce Yoder**, **Ling Zhao**, **Zexi Zhuang**, and **Lloyd Zilch**.

### Annual honors and awards

At the Chemistry Honors Banquet in April 2004, the following students were honored:

E. Campaigne C500 Award: **Chee-Yuen “George” Chan**



*Chee-Yuen Chan*



*Timothy Troyer*



*Amy Hilderbrand*



*Andrew Szumlas*

## Congratulations to recent graduates!

### PhD degrees awarded

**Bailey, Robert** (analytical, Nie, November 2003), postdoctoral research, Emory University, Atlanta

**Barnes, James** (analytical, Hieftje, December 2003), postdoctoral research, Los Alamos National Laboratories, Los Alamos, N.M.

**Datta, Amita** (biological, Stone, November 2003), postdoctoral research, Eli Lilly, Indianapolis

**Doering, William** (analytical, Nie, September 2003)

**Goken, Danielle** (analytical, Peters, December 2003)

**Hart, Robert** (physical, Zwanziger, March 2004) postdoctoral research, Argonne National Lab, Argonne, Ill.

**Karlinsey, Robert** (physical, Zwanziger, December 2003)

**Leahy, David** (organic, Evans, January 2004), research scientist II, New Brunswick, N.J.

**Navid, Ali** (physical, Ortoleva, March 2004)

**Paterson, Jill** (biological, Daleke, November 2003)

**Plummer, Scott** (organic, Williams, August 2003), senior research scientist, Albany Molecular Research Inc., Syracuse, N.Y.

**Sanudo, Eva** (inorganic, Christou, December 2003)

**Stuart, Douglas** (analytical, Nie, December 2003)

**Taraszka, John** (analytical, Clemmer, May 2004), research scientist I, Novartis Institute for Biomedical Research, Cambridge, Mass.

**Tasic, Uros** (physical, Parmenter, April 2004)

**Watson, Lori** (inorganic, Caulton, May 2004)

**Webb, Sarah** (organic, Oakley, April 2004), editorial intern, *Discover Magazine*, Disney Corp., New York

**Weitzke, Elizabeth** (physical, Ortoleva, May 2004), postdoctoral research, University of Connecticut Health Center, Farmington, Conn.

### MS degrees awarded

**Cassely, Aaron** (analytical, Novotny, October, 2003)

**Herbert, Mark** (organic, Williams, May 2004) medicinal chemist, Anadys Pharmaceuticals Inc., San Diego

**Hoffman, Julia** (analytical, Novotny, December 2003)

**Smith, Colin** (organic, Johnston, May 2004)

**Venkatraman, Nithya** (biological, Daleke, December 2003)

Wendell P. Metzner Memorial Award:

**Erich Baum**

Felix Haurowitz Award: **Benjamin Nugent**

Henry R. Mahler Award: **Peter Mikulecky**

Instructor Awards: **William Andrews**, **Arugadoss Devakumar**, **Amy Hilderbrand**, **David Johnson**, and **Andrew Szumlas**

*Photos in “Graduate Notes” are courtesy of the chemistry graduate office.*



Martha Oakley is the associate chair for undergraduate studies.

This past year has been another year of change for the undergraduate program, changes that include new job descriptions for the staff, a new general chemistry program to implement, and the simultaneous retirement of our entire undergraduate laboratory support staff.

Our new laboratory support team contains both old and new faces. **Steve Wietstock** has taken over as director of undergraduate laboratories and will also continue his efforts in outreach activities. In July, we welcomed IU MAT alumna **Kim Aumann** to our support team as coordinator of undergraduate laboratories. **Matt Nance**, who is beginning his second year as our lecture demonstration technician, will also play a key role in our undergraduate labs.

Last fall, we introduced a new two-semester general chemistry curriculum called "Introduction to Chemistry and Biochemistry." The first of these five-hour lecture-lab courses was taught in the fall by **Kate Reck**, **Martin Jarrold**, and me. **Jill Robinson** and I taught the course in the spring. The second-semester part of the course was launched in the spring by **Dennis Peters**, **Martin Stone**, and **Caroline Jarrold**. Thanks to the efforts of these colleagues and the two dozen or so dedicated graduate and undergraduate students who served as associate instructors for these courses, the new program is off to a terrific start.

One of the important goals of these courses is to expose students to the array of career opportunities in the chemical and biochemical sciences. Each semester, we have brought in outside speakers in these areas to tell the students about their career paths. Speakers for this year included our own **Richard DiMarchi**, as well as **Dawn Brooks** from Eli Lilly, an IU alumna who received her PhD in David Williams's group, and **Wendy Saffell-Clemmer** from Baxter Pharmaceuticals. Our alumni are an important source of inspiration for our undergraduate and graduate students, so if you plan to be in the area and would be willing to speak to our students, we would love to hear from you.

Kate Reck and Jill Robinson were also vital to the development of our general chemistry curriculum, and they continue to be involved in curriculum development in inorganic (Reck) and analytical chemistry (Robinson). In just her third year of teaching at IU, Kate Reck's teaching efforts were recognized with a Student Choice Award, an award presented to only five faculty members in the university each year. We are also pleased to welcome **Andrea Pellerito**, an organic chemist, to our teaching faculty. She is in the final stages of finishing her PhD work at Michigan State University.

In May, we honored three longtime and key members of the undergraduate support staff, **Don Chatten**, **Tom Hacker**, and **Mike Jackson**, who retired. A little bit more about this trio can be found on page 12 of this issue. Don, Tom, and Mike, we wish you well, and we'll miss you.

Also in May, we held our first internal graduation ceremony, an event allowing us to recognize each of our graduating seniors (see the accompanying photo). This ceremony, organized by **Alice Dobie-Galuska** with lots of help from **Heather Brummett**, occurred in the Harry G. Day lecture hall with **Harry Day** in attendance. Our department chair, **David Clemmer**, spoke about the accomplishments and potential of science, and he charged our graduates to challenge themselves and strive for excellence as they move into the next phase of their careers. The accomplishments and activities of each student were described and each student's family was recognized. Incoming students will have big shoes to fill!

— *Martha Oakley*

## Scholarships and awards

C117 Award: **Eunice K. Choi** and **Janelle Aaylene Kenzor**

S117 Award: **Kimberly Mae Masden**

C106 Award: **Megan Laurel Fisher** and **Benjamin Gordon Northcutt**

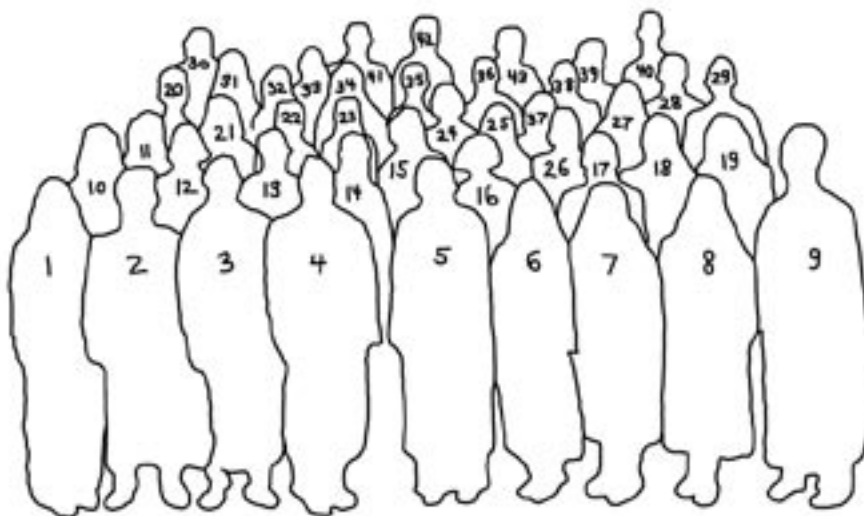
C126 Award: **Adam Paul Roth**

Chemistry Honor Roll: **Troy Sagan Alexander**, **Khadem Mohd Al-Rumaithi**, **Erin Renee Badenhop**, **Michael Yoon-Phil Bang**, **Julie Deeann Barger**, **Rebecca Ruth Baxter**, **Emi E. Bays**, **Carla Marie Beatty**, **Anna Kathryn Bedwell**, **Natalie Marie Best**, **Mark J Bieszka**, **Gregory William Bishop**, **Todd Leo Budreau**, **Matthew Tyler Burk**, **Alex S Burn**, **Dustin Kent Carfield**, **Jean Chung**, **Sarah Kathleen Colvin**, **Adam Daniel Comer**, **Erica Marie Daniel**, **Anshuman Das**, **Mark Brandon Deleeuw**, **Kathryn Elyse Dickerson**, **Irina Michaela Dunayevich**, **Richard Norman Facko**, **Justin Thomas Farlow**, **Rebecca Marie Forest**, **Emily Kathleen Free**, **Michael Fuchs**, **Philip Charles Gach**, **Vaughn Christopher Ganiyu**, **StephanieAnn Gerig**, **Michael Aaron Goodman**, **Shawn Travis Greathouse**, **Theodore J Gries**, **James Allan Hall**, **Amanda Louise Hall**, **Sheena Marie Hayes**, **Shannon Lynn Henning**, **Katherine Elaine Hersberger**, **Abram Samuel Hess**, **Amy Marie Ho**, **Lindsay A. Hughes**, **Michael Andrew Ischay**, **Erin Kay Jefferson**, **Chad Walton Katona**, **John Fielding Kellie**, **Ryan Paul Kilgore**, **Irene Kim**, **Zinia Kwon**, **Stephen Paul Lathrop**, **Joseph Matthew Lee**, **Joseph Tien Yo Lee**, **Grace Lin**, **Lauren Michelle Loew**, **Justin Matthew Long**, **Brock Aaron Martin**, **Kimberly Mae Masden**, **Denver J. McDaniel**, **Andre Gerardo Melendez**, **Robert Wesley Mertz**, **Stephen Edward Meyers**, **Evan Thomas Miller**, **Anthony Mitchell**, **Jennifer Jean Morrow**, **Alexander Murphy-Nakhnikian**, **Andrea Lindsay Nold**, **Brooke Marie Norman**, **Elizabeth Anne O'Bryan**, **Patrick Eugene O'Neill**, **Trent James Oman**, **Samuel L Oyer**, **Anita Panchanathan**, **Paul Hae-Yong Park**, **James Travis Patterson**, **Aaron Ryan Pitzele**, **Christopher Lloyd Pomeroy**, **Trevor Franklin**

Price, Raymund Dacles Ramirez, Hannah Joy Rhoads, Bryan Harris Schmidt, Adam John Sedia, Daniel Edward Shelby, Vlad Valentine Simianu, Laura Marie Sliker, Mark T Smith, Travis Robert Smith, Pamela Alisa Sontz, Amy Annalee Swanson, Clayton Robert Taylor, Andrea Marie Tenbarge, Sienna Marie Teschen-dorf, Sarah Jean Teter, Esther Marie Tristani, Tedi Sasho Vlahu, Nicholas Leroy Wolf, John Michael Zaborske, Stephen Albert Zent, and Matthew Michael Zipse

Chemistry Honors Program: Troy Sagan Alexander, Michael Yoon-Phil Bang, Carla Marie Beatty, Noah Meyer Benjamin, Adam Daniel Comer, Natalie Kay Cygan, Kathryn Elyse Dickerson, Eric Joseph Espinosa, Michael Aaron Goodman, Shawn Travis Greathouse, Theodore J. Gries, Katherine Elaine Hersberg-er, Michael Andrew Ischay, Michael Andrew Kilgore, Irene Kim, Denver J. McDaniel, Alan B. McIntosh, Anthony Mitchell, Andrea Lindsay Nold, Nicole Elaine O'Neil, Paul Hae-Yong Park, James Travis Patterson, Travis Robert Smith, Pamela Alisa Sontz, Nicholas Leroy Wolf, and John Michael Zaborske

Phi Beta Kappa: Troy Sagan Alexander, Natalie Marie Best, Ashley Ann Cretella, Shawn Travis  
(continued on page 20)



2004 graduating seniors with faculty: 1. Monica Mann 2. Evan Miller 3. Matt Zipse 4. Chair David Clemmer 5. Professor Martha Oakley 6. Natalie Thompson 7. Shannon Henning 8. Deepthi Yelavarthi 9. Andre Melendez 10. Tanisha Simmons 11. Jennifer Cable 12. Stephanie Wilson 13. Trent Morgan 14. Aaron Pitzele 15. Lauren Loew 16. Christina Linton 17. Susan Conroy 18. Misha Taber 19. Kathryn Yoder 20. Paul Swain 21. Rebecca Obrecht 22. Maxim Kostylev 23. Sonal Patel 24. Megan Landis 25. Natalie Best 26. Andrea Nold 27. Professor Kate Reck 28. Eric Espinosa 29. Clifton Macke 30. Professor Steven Wietstock 31. Andrea TenBarge 32. Amanda Hall 33. Amanda Lennen 34. Katherine Mercer 35. Margaret Baumgartner 36. Troy Alexander 37. Amy Swanson 38. Travis Greathouse 39. Professor Emeritus Harry Day 40. John Zaborshe 41. Ted Gries 42. Alan McIntosh 43. Charles McCrory



## Undergraduate notes

(continued from page 19)

Greathouse, Jennifer Lynn Griffith, Stephen Jess Helms, Ryan Paul Kilgore, Bikram Singh Malhi, Andre Gerardo Melendez, Paul Hae-Yong Park, and Misha Lee Taber

Howard Hughes Medical Foundation Capstone Scholarships: Eric Joseph Espinosa, Shawn Travis Greathouse, Theodore J. Gries, Alan B. McIntosh, Christopher Paul Moore, James Travis Patterson, Amanda J. Walker, and John Michael Zaborske

John H. Billman Summer Scholarship for 2004: Robert Givens Kellogg

Harry G. Day Scholarships for 2004: Adam Daniel Comer, Scott Halasz, Abram Samuel Hess, Neil Ramolia, Pamela Alisa Sontz, and Samuel Sudhoff

Ira E. Lee Summer Scholarships for 2004: Stephen Jess Helms and Katherine Elaine Hersberger

Frank Mathers Undergraduate Summer Research Scholarships for 2004: Noah Meyer Benjamin, Gregory William Bishop, and Noah Herron

Earl G. Sturdevant Summer Research Scholarship for 2004: Michael Andrew Ischay

Votaw Undergraduate Research Scholarship for 2004: James Travis Patterson and Amanda J. Walker

Eli Lilly Organic Chemistry Summer Scholarship for 2004: Travis Robert Smith

Pfizer Summer Undergraduate Research Fellowship for 2004: Carla Marie Beatty

Honors Division Summer Scholarships for 2004: Aalo Gupta, Amy Hoffman, Daniel Edward Shelby, and Kristina Stephenson

D.J. Angus-Scientech Educational Foundation Most Improved Student Award for 2004: Lindsay Michelle Wilson

R.J. Grim Scholarships for 2004: Gregory William Bishop, Robert Givens Kellogg, James Travis Patterson, Vlad Valentine Simianu, Travis Robert Smith, and Esther Marie Tristani

William P. Klinkenberg Award for 2004–05: Tedi Sasho Vlahu

Andrew Loh Scholarship for Analytical Chemistry for 2004–05: Daniel Edward Shelby

Lubrizol Scholarships for 2004: Kathryn Elyse Dickerson, Katherine Elaine Hersberger, Brock Aaron Martin, and Amanda J. Walker

John H. and Dorothy McKenzie Scholarship for 2004–05: Kimberly Mae Masden

Dennis G. Peters Scholarships for 2004–05: Noah Meyer Benjamin, Adam Daniel Comer, and Abram Samuel Hess

Enola Rentschler Van Valer Trafford Scholarship Awards for 2004–05: Grace Lin and Laura Marie Sliker

Francis and Mildred (Ecktery) Whitacre Scholarships for 2004–05: Carla Marie Beatty and Stephen Jess Helms

Russel & Trula Sidwell Hardy Scholarship: Denver J. McDaniel

Merck Index Awards: Nicholas Richard Abel, Jason Kyun An, and Christopher Paul Moore

Analytical Chemistry Award: Gregory William Bishop

William H. Bell Awards: Kathryn McGovern Calhoun, Joseph Matthew Lee, and Jonathan David Steinhofner

Hypercube Scholar Award: Theodore J. Gries

American Chemical Society Award: Paul Hae-Yong Park

Joseph B. Schwartzkopf Award: Shawn Travis Greathouse

Mary Frechtling White Award: Andrea Lindsay Nold

James C. White Award: Matthew Michael Zipse

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## ALUMNI PROFILE:

### George Bodner

## An extraordinary educator

*What is the empirical formula of a compound of xenon and fluorine that is 63.3% Xe and 36.7% F?*

Finding the answer —  $\text{XeF}_4$  — is a *routine exercise* for a teacher, who with many years of experience would use a linear, “forward-chaining” method, stringing together a logical sequence of steps and progressing smoothly from the initial information to the answer. But this question — a routine exercise for a teacher using a simple algorithm — becomes a challenging *novel problem* for a student who encounters this task for the first time. The teacher’s method gives the student an unrealistic idea about how new and thorny problems are actually attacked, providing no indication of false starts, dead ends, and even illogical attempts that a successful problem-solver might use when encountering a novel problem.

George Bodner, PhD’72 (with Lee Todd), addressed this dilemma in his 2003 Nyholm lecture titled “Problem Solving: The Difference Between What We Do and What We Tell Students To Do.” Aware of the conclusions reached by others about problem solving in mathematics, he found that an “anarchistic” model describes what successful problem-solvers do when they work on novel problems in chemistry. (Don’t be confused by the word anarchistic. George is not referring to the doctrine that governments are unnecessary, oppressive, and undesirable; instead he means lacking order or control, another definition of anarchism.) Trying something and then trying something else if the first try fails — trial and error, a method singularly lacking in order and control — has significant importance in this model, a model that suggests that problem solving is cyclic, reflective, and can sometimes appear irrational.

If you do not teach general chemistry, the following question may be a novel problem for you rather than a routine exercise, and it will help to convince you that George’s model is correct.

“A sample of a compound of xenon and fluorine was confined in a bulb with a pressure of 24 torr. Hydrogen was added to the bulb until the pressure was 96 torr. Passage of an electric spark through the mixture produced Xe and HF. After the HF was removed by reaction with solid KOH, the final pressure of xenon and unreacted hydrogen in the bulb was 48 torr. What is the empirical formula of the xenon fluoride in the original sample?”

At first, the problem may appear to be seamless without any apparent starting point. You probably will not be able to find the solution using a linear, “forward-chaining” method, stringing together a logical sequence of steps and progressing smoothly from the initial information to the answer. Questions like “Don’t I need to use the ideal gas law in some way?” might run through your mind. If so, you might wonder about the volume of the bulb and the temperature of its contents. You might try to write chemical equations that reflect the reactions described in the problem, and at some point you might get up for a cup of coffee before coming back to the problem. George even suggests that you might strike your forehead and say, “Son of a ...”

All of these actions and reactions amount to “playing with” the problem (a process George recommends for a true problem-solver). How many cycles and how many false starts did you need and how many dead ends did you encounter before you came back to the ideal gas law and recalled that the partial pressure of each substance  
*(continued on page 24)*



❖  
*‘Learning and teaching are not the same thing — I can teach, and teach well, and the students may not learn a thing.’*

— GEORGE BODNER



*George Bodner and friend*

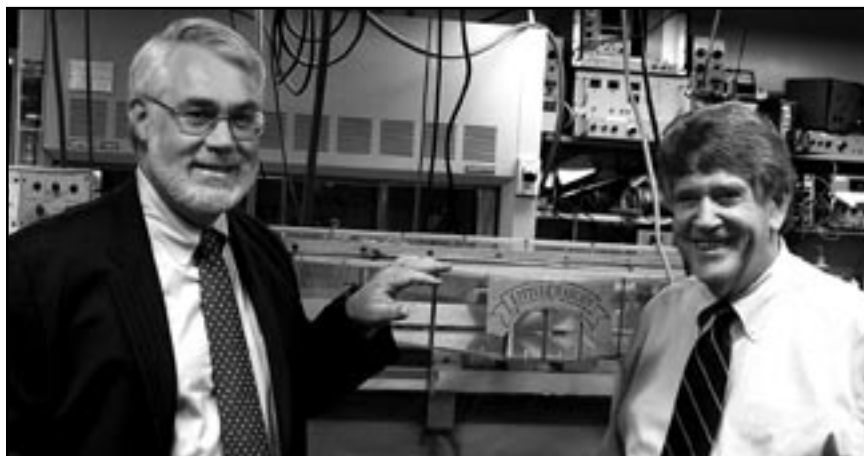
## ALUMNI PROFILE:

### George Atkinson

# Chemist and statesman

George H. Atkinson, PhD'71, received a Distinguished Alumni Service Award from President Adam Herbert on June 20, 2004, recognizing his many accomplishments in the U.S. Department of State as well as those in chemistry.

He is presently the science and technology adviser to the U.S. secretary of state. In the midst of numerous international issues involving science that are on the State Department agenda, it is perhaps surprising to learn that George is the only member of the department with long experi-



George Atkinson, left, with his PhD mentor, Charles Parmenter

ence as a practicing scientist. As such, he travels frequently as a participant or as a negotiator on the business of State. In fact, this aspect of his job caused him nearly to miss the award ceremony because of a late arrival in Bloomington from Vienna. One of his accomplishments at State has been the establishment of a program with broad university support to bring tenured science and engineering professors into State on a year's leave with a subsequent five-year commitment to consulting. These so-called Jefferson Fellows bring a long-term component of science expertise to U.S. international affairs.

Currently, he is engaged in a wide range of science policy issues while creating a new governmental framework within which the societal consequences of advances in science and technology can be rapidly identified and accurately evaluated. The formulation of a new series of Global Symposia on Emerging Science and Technology is of particular interest. This series is being organized with the U.S. National Academies in an effort to engage the science and technology community in Iraq by creating a mentoring relationship between the Iraqi and American science and technology communities.

George is in Washington, D.C., on leave from the University of Arizona where he is a professor of chemistry and of optical science. He began his career at Arizona when he moved from Syracuse

University in the late '70s to assume the chemistry chairmanship, which he held for six years. He still maintains (somehow) his well-known research program with emphasis on the problem of vision using coherent time-resolved laser Raman studies of bacteriorhodopsin pigments. In the midst of administration and research, he also started and nourished a Tucson company for laser intracavity detection of trace impurities in gas mixtures used for manufacture of computer chips.

During this time, teaching was not ignored. Since he is a physical chemist, he is genetically programmed for large freshman classes and did not resist the call. The students of one arranged to have him awarded the university prize for the best teaching. It's an award that all of us at IU except Dennis Peters (who has one) envy.

George was distinguished even as a graduate student in the Parmenter group. In the tense public drawing of numbers for the draft during the Vietnam war, his birthday was picked last: number 366 (don't forget leap year).

His second most distinguished act was to have his PhD research, or at least part of it, consume almost an entire issue of the *Journal of Molecular Spectroscopy*. It has since become a classic study of the UV absorption spectrum of benzene vapor. For the first time, the vibrational bands with their angular momentum components were completely and, most important, securely assigned. George did this by traveling to the Herzberg spectroscopy laboratory in Ottawa, Canada, where for a period of a few months he was kindly provided with the facilities to rephotograph the vibrational bands at high resolution. With a comprehensive set of band positions and contours, he then displayed in Bloomington the mental virtuosity of a chess master to pull out the assignments from a mountain of data and detailed theory. George relied extensively on a second set of spectroscopic data, namely single vibronic level fluorescence probes of many benzene bands produced with his graduate student colleagues. It was the first major use of this new technique developed in Parmenter's group to take the guesswork out of the shaky and often defective art of band assignments. George's assignments were and still are correct.

He is the recipient of the Senior Alexander von Humboldt (Germany), the Senior Fulbright Award (Germany), the Lady David Professorship (Israel), and the SERC Award (Great Britain). He has been a visiting professor at distinguished universities and research institutions in Japan, Great Britain, Germany, Israel, and France. He has more than 170 publications, as well as 66 U.S. and foreign patents.

— Charles Parmenter and Rupert Wentworth



**Michael J. Badnarik**, '76, won the nomination to run as president of the Libertarian Party over Memorial Day weekend in Atlanta. Originally from Hammond, Ind., he now lives in Austin, Texas.

**Dawn A. Brooks**, PhD'98, was promoted to head of chemical product research and development at Lilly.

**Donald W. Buck II**, BS'02, writes that he will marry Jennifer A. Lazarus, BA'02, in May 2005. The Baltimore resident is currently attending Johns Hopkins School of Medicine and can be reached at [dbuck2@jhmi.edu](mailto:dbuck2@jhmi.edu).

**William E. Creek**, BS'45, retired from Pfizer Inc. after 32 years in sales and management. He and his wife, Katherine (Martin) Creek, GN'47, live in San Antonio.

**Marilyn D. Ezri**, BS'70, MD'74, was appointed associate professor of medicine in cardiovascular medicine at the Medical College of Wisconsin and

assistant director of the electrophysiology laboratory at Froedtert Hospital, Milwaukee.

**Jeffrey B. Frank**, BA'97, graduated in May 2003 from the Illinois College of Optometry and is now working in private practice in Sycamore, Ill. He can be reached at [jbf44@hotmail.com](mailto:jbf44@hotmail.com).

**Gary M. Gaddis**, BA'79, PhD'84, MD'86, writes, "I have been serving as the Missouri Endowed Chair for Emergency Medicine since January 1999 at St. Luke's Hospital of Kansas City, one of the hospital's affiliated with the University of Missouri-Kansas City School of Medicine. My wife, Monica, and I will celebrate our 25th wedding anniversary this May and will send our oldest child to college this fall at the University of Miami." The Shawnee, Kan., resident can be reached at [garmongad@aol.com](mailto:garmongad@aol.com).

**Gennaro J. Gama**, PhD'74, is a technology transfer manager at the University of Georgia Research Foundation Inc. He and his wife, **Jessica C. Kissinger**, PhD'95, live in Athens, Ga., and can be reached at [ggama@charter.net](mailto:gama@charter.net).

**Benjamin Greenberg**, BA'36, retired after more than 50 years in medicine. He lives in Jamaica, N.Y.

(continued on page 24)

## 50 YEARS AGO

J.P. Ormsby, '11, of Kansas City, Mo., reports that he spent three months in Europe last summer. He is retired after 38 years in paint development.

Edward G. Bobalek, PhD'42, is the co-author of *Organic Protective Coatings*. He is an associate professor at the Case Institute of Technology.

Faculty and their families were guests of the chemistry faculty at Purdue. It was a pleasant day.

## Necrology

We received notices of the following deaths of alumni since the 2003 issue of *IU•Chemistry*:

- Donald Ramon Aldrich**, BA'47, Jan. 16, 1997  
**Alice I. Russ Anderson**, BA'40, Sept. 22, 2003  
**Donald L. Anderson**, BS'60, July 3, 2004  
**James E. Barnes**, BA'69, MS'71, June 29, 2004  
**Calvin A. Berg**, BS'50, Aug. 17, 1995  
**Harold J. Blumenthal**, BS'47, MA'49, Aug. 17, 2003  
**Joseph A. Borho**, BA'54, July 6, 2003  
**Phyllis v. Rutan Boucher**, BA'44, MA'46, Jan. 16, 2004  
**Leon J. Brown**, MA'42, April 3, 1992  
**Ernest A. Brunoehler**, BA'43, Jan. 25, 1991  
**Archie T. Clark**, BA'54, March 18, 1988  
**William H. Cripe**, BA'42, MD'50, Dec. 12, 2002  
**Joseph A. Davis**, BS'51, MA'52, PhD'55, March 4, 2004  
**David Dee**, MS'64, Jan. 8, 2004  
**Walter E. Diltz**, BA'42, June 27, 2003  
**Otis W. Fortner**, BS'40, MA'41, Jan. 6, 2004  
**Le Mar Gelman**, BA'42, March 10, 2004  
**George E. Ham**, PhD'44, April 4, 1994  
**Warren A. Heinly**, BA'45, March 15, 2002  
**John R. Helms**, BS'42, Jan. 26, 1998  
**Clarence J. Hochanadel**, MA'41, PhD'43, May 4, 2004  
**Jonah C. Ifegwu**, BS'80, July 1997  
**Marvin Jacoby**, BA'40, MA'41, Jan. 7, 2004  
**Robert E. Jenkins**, BA'41, MD'44, Dec. 25, 2003  
**Dwight M. Kimble**, BS'42, Aug. 14, 2001  
**Malcolm A. Kochert**, BA'62, MBA'63, Aug. 14, 2003  
**Frank H. Kratli**, BA'32, MA'33, Nov. 5, 2003  
**Charles A. Labotka**, BA'43, MD'45, July 24, 2003  
**Robert J. Lee**, MA'38, PhD'41, Sept. 4, 2003  
**Barbara M. Kelley Lind**, MA'47, PhD'48, Jan. 1992  
**William B. Lindsey**, MA'50, PhD'52, Feb. 4, 1993  
**Marjorie Miller Mann**, BS'43, July 20, 2004  
**John W. Matt**, PhD'67, June 3, 2004  
**Ronald W. Matthews**, MA'69  
**Eugene W. McDonald**, BA'69, MD'73, April 18, 2004  
**James L. McFarling**, MA'55, April 18, 1995  
**Owen T. Montgomery**, BA'75, JD'78, May 6, 2003  
**William A. Moser**, BA'50, Jan. 14, 2004  
**Leo P. O'Brien**, BA'54, May 1978  
**Quentin W. Osburn**, BA'42, Dec. 10, 2003  
**Robert E. Page**, BA'53, March 9, 1993  
**Sylvia E. Gladstone Plank**, BA'36, Nov. 27, 2000  
**John F. Quinn**, BA'35  
**William G. Roessler**, BS'40, MA'42, PhD'50, Aug. 31, 2003  
**Justin A. Rubin**, BA'47, August 1981  
**William R. Ruegamer**, BS'43, Feb. 7, 1998  
**Ivan W. Scott**, BA'33, MD'36, Feb. 6, 2004  
**Michael J. Sells**, BS'02, July 11, 2004  
**Ruth L. Boxell Shelley**, BS'49, Jan. 24, 2004  
**Walter T. Sokolski**, BA'48, Sept. 8, 2001  
**Richard Dale Stayner**, MA'45, PhD'46, Oct. 17, 1988  
**Howard W. Stephen**, BA'46, July 23, 1999  
**John B. Stone**, BA'31, MA'32, Aug. 14, 1998  
**Eldred W. Stout**, BA'38, DDS'42, March 23, 2004  
**Robert O. Stuart**, BS'85, MD'89, Jan. 10, 2004  
**Joseph P. Szokolay**, BA'40, MD'42, April 22, 1998  
**Joseph W. Thiel**, BA'31, June 1987  
**Jack K. Walker**, MA'44, Dec. 30, 1997  
**Doris L. Spahr Wright**, BA'42, Feb. 10, 2000  
**Donald K. York**, BA'35, Dec. 22, 1999  
**Jack P. Young**, PhD'55, Nov. 8, 2003

## Alumni news

(continued from page 23)

**Feisel A. Istrabadi**, BA'86, JD'88, was featured in a March 2004 article in the Bloomington *Herald-Times* while working for the U.S. State Department's "Future of Iraq" project. After helping draft Iraq's interim constitution, he returned to his duties in Indiana as a Valparaiso attorney and an Iraqi activist. In August, Istrabadi was appointed as Iraq's acting permanent representative and ambassador to the United Nations.

**Michael L. Junker**, BA'64, writes, "After 40 years of working in the chemistry and chemical engineering professions, I have retired. I am trying to change the direction of my life in two ways: One, I'm venturing into the consulting business, giving advice for the chemical processing and elastomer industries; and two, I am also a rancher, with a small ranch with purebred Charolais (cattle) and horses. My Blue Heeler, Toby, keeps everyone in line at the ranch. My wife, Linda, has

retired, too. She is taking riding lessons." Junker can be reached at phdj@aol.com.

**Demetrios N. Kaiafas**, BA'89, MD'93, writes that he works at a busy pain management practice in Clearwater, Fla., and welcomed a baby daughter in May 2004 with his wife, Dara. He can be reached at dkaiafas@tampabay.rr.com.

**John "Jay" M. McGill**, PhD'90, was promoted to director of discovery chemical research at Lilly Research Laboratories while also winning their Chairman's Ovation Award.

**Philip S. Perlman**, PhD'71, was elected as a fellow of the American Academy of Microbiology. The associate dean for the University of Texas Southwestern's graduate school lives in Dallas and can be reached at intronman@aol.com.

**Michael J. Sells**, BS'02, is an assistant coach for the North Central High School hockey team in Indianapolis. He can be reached at msells@colorcon.com.

**Taha Z. Shipchandler**, BA'99, ACLA&M'99, MD'03, writes, "I am a resident of ENT-Head and Neck Surgery, and my wife, Laurie O. Shipchandler, MD'03, is a resident in pediatrics. We are enjoying Cleveland." They can be reached at tshipchandler@hotmail.com.

**Alexandra Shawn Sylvia**, BA'93, JD'96, is a partner at the Indianapolis law firm of Plews Shadley Racher & Braun and can be reached at asylvia@psrb.com.

**Scott A. Todd**, BA'97, is the national accounts manager for Cook Inc., a medical-device manufacturing company in Bloomington.

**Mansukhlail C. Wani**, PhD'62, received the 2003 Distinguished Alumnus Award from the Indiana University College of Arts & Sciences Alumni Association. The principal scientist at the Research Triangle Institute of North Carolina co-discovered the anti-cancer compounds Taxol and camptothecin. He lives in Durham, N.C., and can be reached at mcw@rti.org.

## Bodner

(continued from page 21)

in a gaseous mixture is proportional to the number of moles of that substance (providing the volume and temperature are constant)? With this recollection, the novel exercise quickly reduces to a routine exercise in which you determined once again that the compound is  $\text{XeF}_4$ . Any frustration that you felt will be doubled or tripled for a student with no experience who is led to believe that the problem's solution is a straightforward exercise.

The anarchistic model has helped George understand many of the observations that he has made during the 17 years of teaching general chemistry. A task that is a routine exercise for a student's instructor is often a novel problem for the student. Watching the instructor wade effortlessly through the task is not usually a sufficient teaching tactic. The student must stumble on his or her own personal algorithm for completing the task. The process may appear disorganized or even irrational to the teacher, so that intervening to show the student the "correct" way of obtaining the answer is tempting. While intervention may make the teacher feel good, it doesn't necessarily help the student.

George has also faced other intriguing issues. One of these, getting tenure at a major university, is by no means a routine exercise; it is a novel problem of major proportions, but a problem he learned to solve. Not only has he achieved tenure at Purdue, but he is now the Arthur E. Kelly Professor of Chemistry and Education.

That success has led to other rewards, with 2003 being particularly significant for George. He netted the Nyholm Medal from the Royal Society, the Pimentel Award in Chemical Education from the American Chemical Society, and a Distinguished Alumni Award from his undergraduate alma mater, the State University of New York at Buffalo. Prior to 2003, he received the Chemical Manufacturers Association Award in Chemical Education in 1989. Closer to home, his department and his university gave him six teaching awards between 1979 and 1990. But recognition from students at Purdue is not lacking, because George received the Alpha Lambda Delta "Best Freshman Professor" Award for 1989-90. He is also the author of more than 80 papers and 30 books and laboratory manuals.

Newly married, his other primary interests outside of the academic life are his motorcycle and his jazz guitars. George claims to have clocked more than 100,000 miles on motorcycles. He recently sold a couple of his guitars, so he is down to only seven.

— Rupert Wentworth

## Trivia about chemistry

Did you read the trivia question on page 7?  
Check your answer with the answer below.

? ? ?

Answer: The 14 states are Alabama (alumi-  
num, Al), Arkansas (argon, Ar), California  
(calcium, Ca), Colorado (cobalt, Co),  
Georgia (gallium, Ga), Louisiana (lantha-  
num, La), Maryland (mendelevium, Md),  
Minnesota (manganese, Mn), Missouri  
(molybdenum, Mo), Montana (melt-  
nerium, Mt), Nebraska (neon, Ne), North  
Dakota (neodymium, Nd), Pennsylvania  
(protactinium, Pa), and South Carolina  
(scandium, Sc).



# CHEMISTRY HONOR ROLL 2003

Abascal, Mel  
Abraham, Aleyamma  
Ake, Robert  
Allen, Thomas & Patricia  
Anders, Timothy  
Anex, Deon  
Apathy, John & Susan  
Appleton, Burton  
Aronoff, George & Angela  
Arvan, Peter  
Ayers, Timothy & Irene  
Bacon, William Jr. & Mary  
Bair, Edward & Dorothy  
Baker, Raymond  
Ball, Donald  
Balliet, Craig & Margaret  
Bannister, Thomas  
Barajas, Alicia & J. David  
Bart, John  
Bartholomew, Rudolph & Mary  
Basinger, Bradley  
Batal, David  
Bates, Alec  
Baxman, Horace  
Beauchamp, John & Teresa  
Beckman, Jean  
Beeson, James  
Bensko, Nicholas  
Berk, Genia  
Bhandiwad, Vidya  
Black, Lawrence  
Boehne, John III  
Bonsib, Stephen & Christine  
Borders, Alvin & Mary  
Boxman, Charles  
Bradley, David  
Brand, Ludwig & Sheila  
Brandes, Ellen  
Briner, Robert  
Bromer, William & Patricia  
Bron, Walter & Ann  
Brooks, Dawn  
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Buck, Robert & Gertrude  
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Chiu, Gracy Py  
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Coduti, Mary  
Cohen, Lucinda & Caleb  
Colvin, Oliver & Arline  
Colyer, Robert & Lynne  
Combs, Jan Arvin & James  
Corning, James & Kelly  
Coulehan, William  
Coveleskie, Joan Marie  
Cox, Standiford  
Crawley, Larry & Joyce  
Crelter, Arnold  
Crisel, John & Rae  
Crofts, Bradley  
Czuba, Leonard & Judith  
Davidson, Donald  
Davis, Dwight  
Davis, Ralph  
De Las Alas, Vincent & Kimberly  
DeHoff, Anthony & Jill  
Dellacqua, Christopher & Pearl  
DeMattia, Gregory  
Dennis, Meta  
Di Marchi, Richard & Sue  
Dieball, Donald  
Dinner, Alan  
DiPierro, Michael & Barbara  
Doherty, Michael & Mary Lorenz  
Dolley, Stephen & Martha  
Dorman, Linneaus & Phae  
Douglas, Bryce  
Douglas, Judith & Robert  
Dransfield, Janene  
Dransfield, John & Janet  
Druelinger, Melvin & Judy  
Duerr, Ann  
Duffy, Terence & Claudia  
Dugan, LeRoy Jr. & Dorothy  
Dupler, Murphy & Jacqueline  
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Earl, Donald & Dorythe  
Eaton, Merrill Jr. & Louise  
Ebeling, Richard  
Edmonson, Keith  
Elcock, Douglas  
Ellenbogen, Leon & Roslyn  
Everitt, Joan  
Fernandez, Reet  
Ferris, James  
Fesenmyer, Lynn  
Fields, James  
Flynn, Michael  
Foley, Sally  
Folkerth, Virginia & Richard  
Forgey, William  
Foye, William & Lila  
Frank, Bruce & Linda  
Franz, John & Martha  
Frohman, Charles & Evelyn  
Galley, Paul  
Garrett, David & Sharon

Gasser, Wilbert & Mary Kratz  
Gilinski, Perla & Isaac  
Gnewuch, Charles & Julie  
Goldhammer, Alan  
Golgart, Carl & Patricia  
Gotlib, Robin & Josh  
Graber, Christopher  
Grant, Phyllis  
Grant, Raymond  
Gratz, Rachel & Conrad  
Greenberg, Benjamin  
Griffith, Charles & Gloria  
Guthrie, Frank & Marcella Glee  
Farrar  
Gwaltney, Charles & Catherine  
Haag, Robert  
Hall, Richard  
Hammel, Richard & Marcie  
Hammersley, Vernon & Sue  
Hamori, Paul  
Hanson, Deborah  
Harrison, Nancy & Russell  
Hatfield, L. Shirl & Gloria  
Hatfield, Lowell & Virginia  
Hauber, David & Mary  
Hawkins, Christopher & Donna  
Hay, Gene  
Hays, Robert  
Heil, Janet  
Hein, Scott & Claudia  
Helt, Leonard & Linda  
Hensley, Albert Jr. & Wilma  
Herman, Rayna & Christopher  
Hespen, Robert  
Hickam, Robert  
Hieftje, Gary & Susan  
Hillhouse, Gregory  
Hine, Susan  
Hodes, William  
Hodes, Zachary & Judy  
Hoham, Christopher  
Holden, Arthur Jr.  
Howard, John & Stacie  
Hudson, James  
Huffaker, Donald & Clara  
Huffman, John & Carolyn  
Hugli, Tony & Judith  
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Indiano, E. Victor  
Irick, Neil & Susan Anderson  
Iung, Orestes  
Janetos, Nicholas  
Jarosinski, John  
Jasper, Steve  
Jeffcoat, Alex & Elaine  
Jenkins, Celia  
Jewett, John  
Ji, Chang  
Johnston, Hugh & Mary Boppell  
Johnston, Maynard  
Joy, William & Jo  
Jurayj, Jurjus  
Kagel, John Jr.  
Kammmer, David  
Kaplan, Maxine  
Karich, John

Kaufman, Michael & Sonja  
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Keilsohn, Jerry  
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Kelley, Everett & Elizabeth  
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Kelly, William & Gertrude  
Kidd, Frank Jr.  
Kindig, John & Wendy  
Kindsvater, John  
King, Gerald  
King, John & Julianne  
King, Peter & Ellen  
Kinnaman, Rob & Cheryl  
Kirkpatrick, Charles & Denise  
Kleindienst, Tadeusz & Juedi  
Klinkenberg, Iris  
Klute, Robert & Carol Schoeffel  
Koch, Carolyn  
Kochell, Jay & Jean  
Kovach, Paul & Susan  
Chintis-Kovach  
Kramss, Richard  
Kratli, Frank  
Krauth, Stanley Jr. & Jane  
Kreek, Thomas  
Kreighbaum, William & Carolyn  
Krieger, Nancy  
Krieger, Paul & Barbara  
Kriz, George Jr. & Carolyn  
Krueger, John & Patricia  
Krueger, Kathryn  
Kuehl, Guenter & Christel  
Kunka, Michael & Mary  
Kurtz, Wendy

(continued on page 26)

## 25 YEARS AGO

James Reilly joined the faculty as an assistant professor.

Those who attended the usual social hour during the ACS meeting in Washington, D.C., included Ray, PhD'72, and Lisa, MS'75, Childers; William Coleman, PhD'70; and Ernest Davidson, PhD'61. The Campaignes, the Carmacks, and Harry Day represented the faculty.

Mansukh Wani, PhD'62, visited Ernest Campaigne in the spring.

## Honor roll

(continued from page 25)

La Belle, Ellen & Frank Jr.  
 La Perriere, Daniel & Leona  
 Lablanc, Robert & Elizabeth  
 Lagenaur, Carl  
 Lanterman, Elma  
 Larson, John & Sarah  
 Laswell, Joann  
 Laughman, Gene & Gail  
 Lawrence, Donald & Joyce  
 Leahy, Jeanette  
 Leal, Joseph  
 Lee, Jun-Sing  
 Leonelli, Joseph & Susan  
 Letsinger, Robert & Dorothy  
 Levetown, Herbert & Bernice  
 Levy, Melvyn  
 Lewis, Larry & Ricki  
 Lewis, Ronald  
 Lidster, Reuben  
 Light, James & Nina  
 Lin, Luan-Ho & Cheyeh  
 Linder, James & Laura  
 Logan, Ted & Ruthanne  
 Loge, Gary  
 Lohnes, Vida Trafford & Jonathan

McAnally, Robert & Dara Spivack  
 McCann, Peggy  
 McCarthy, John & Kara Morgan  
 McChesney, James  
 McGillivray, Bette Tillman  
 McGorrin, Marlene  
 McLaughlin, Gordon III & Cheryl  
 Meyer, Wendell & Barbara  
 Mickelson, Kenneth  
 Mickley, Lori & Kendall  
 Middendorf, Max & Eva  
 Milbourn, Frank  
 Miller, Kenneth  
 Miller, Loyd  
 Miller, Roger & Linda  
 Miller, Steven  
 Misra, Raj Narain  
 Mitchell, Patrick & Frances  
 Moore, Patricia  
 Moore, William Jr.  
 Morgan, Gary  
 Morice, William & Elizabeth  
 Morrison, Irena & Ralph  
 Moss, David & Kathleen  
 Cornely-Moss  
 Mudd, Daniel  
 Mueller, Thomas & Gretchen  
 Mulholland, Ramon & Ruthe

Parr, Robert & Jane  
 Paterson, Bruce & Maggie  
 Patterson, Katherine  
 Paulson, Donald & Elizabeth  
 Paur, Richard & Sandra  
 Pendley, Rex  
 Perugini, Francesca  
 Peters, Dennis G.  
 Pletcher, Terry & Marga  
 Poppa, Ryal & Ruth Ann  
 Potratz-Driver, Paula & Orlando  
 Driver  
 Powell, Glenn  
 Pramuk, Dawn  
 Prather, P. David  
 Pratt, Ralph Jr.  
 Qualkinbush, James & Brenda  
 Barker  
 Radding, Jeffrey  
 Rambo, Joe & Elisa  
 Rampy, Larry  
 Rasmussen, C. Royce  
 Raths, Richard & Carmen  
 Raymer, James  
 Reed, Robert & Carlene  
 Reeder, Lisa  
 Reisz, Gerald  
 Reix, Thierry  
 Reynolds, Donald  
 Ricca, Daniel  
 Rice, James  
 Ricketts, John & Lucille  
 Rinker, Jennifer & Robert Jr.  
 Rio, David  
 Rio, Susan  
 Rodriguez, Jose  
 Rogers, Philip  
 Rolf, Ramon  
 Rosen, Irving  
 Rouhana, Rudolph & Odile France  
 Rush, Glenn & Mary  
 Sachs, Nancy  
 Salinger, Evelyn & Gerhard  
 Samson, William  
 Sathe, Sharad  
 Sattelberger, Alfred  
 Saturday, Kathy  
 Sawicki, Robert & Elizabeth  
 Schepartz, Saul  
 Schilling, Beth & Jerry  
 Schindler, Ann  
 Schmidt, Francis  
 Schroeder, Robert  
 Schuh, Merlyn & Judy  
 Schuster, Danae  
 Schuster, Thomas  
 Scroggie, Richard  
 Searle, Bernard & Norma  
 Selby, Thomas  
 Shanks, John  
 Sharp, Scott & Rhonda  
 Long-Sharp  
 Shih, Chung & Mei Chih  
 Shiner, Vernon J. Jr. & Reva  
 Shoaff, Lou & Miriam  
 Shull, Lisa & Douglas  
 Shull, Steele & Peggy  
 Shull, Willa  
 Shurig, John  
 Shutske, Gregory  
 Siedle, Allen & Veronica  
 Sievert, H. William & Alice

Sigel, Carl  
 Smith, Homer Jr.  
 Smith, Michael L.  
 Smith, Roger  
 Smith, Walter Jr. & Miriam  
 Sollman, Paul  
 Sorensen, Roger  
 Spees, Michael & Darcy  
 Springer, Mary Alice & Tom III  
 Sprunger, Walter  
 Stammer, Charles & Shirley  
 Stanway, James Jr.  
 Stapleton, Patricia  
 Staroverov, Viktor  
 Staszewski, James & Angela Zagala  
 Pratt, Fredrick & Claudia  
 Stevens, Loren & Wava  
 Stevens, Michael  
 Stewart, Richard & Jean  
 Stocker, Jack  
 Stoner, Allan  
 Streib, Kirsten  
 Sullivan, Daryl  
 Surdzial, Ronald  
 Sutton, Christopher  
 Sydor, Robert  
 Tally, Charles Jr.  
 Tan, Loon-Seng & Katharine  
 Tang, David  
 Tang, Kenneth & Betty  
 Tankersley, Patrick & Regan  
 Tanner, John Jr.  
 Tharp, Wesley  
 Thieneman, Andrew Jr. & Martha  
 Tolzmann, James & Margaret  
 Troyer, Brenda & Ted  
 Urbach, Herman & Joan  
 Vanatta, Lynn Ellen  
 VanBenschoten, James  
 Vandersloot, Georgia  
 Vertin, Steven & Jean Mondesire  
 Vigna, Robert & Mary  
 Vincent, John & Sharon  
 Vogel, Paul & Mary  
 Vorhes, James & Frances  
 Voyles, Gretchen & Andrew  
 Wagner, Martin & Barbara  
 Wagner, Martin & Ching-Shu C.  
 Waiss, Elaine  
 Wakim, Jubran & Judith  
 Waling, Buford & Frances  
 Walter, Paul  
 Wani, Mansukhlal & Ramila Dahl  
 Warfield, Timothy  
 Warren, Wayne  
 Waters, L. Leslie & Mary  
 Watkins, Richard  
 Watts, Daniel & Karen Bush  
 Weaver, Larry  
 Wehlacz, Joseph  
 Weiller, Katheryn  
 Weiss, David & Linda  
 Welp, Lisa  
 Welty, Willis & Catherine  
 Wesolowski, Dennis & Mary  
 Wesselman, Harold  
 Wessling, Elizabeth  
 West, Ralph Jr. & Katheryne  
 White, James & Mary  
 White, Robert  
 White, Thomas  
 Widener, Rexford & Judith

## 17 YEARS AGO

Although events of 15 years ago are our usual focus, the cicada choir that accompanied everyone and every event in the summer of 2004 brings back the memory of their orchestrations when they were last here 17 years ago. Ronald Reagan was president and IU had just won a NCAA basketball championship, while James Krom and Seiichi Noda received the Outstanding Senior Awards. The cicada's 17-year cycle stretches back many millennia. An ancient Greek poem celebrates their melody with the following lines:

*Esteemed you are by every human  
 As the summer's sweet-voiced prophet.  
 The Muses loved you, and Apollo too,  
 Who gifted you with a high-pitched song.*

Long, Steven & Della Speer  
 Loucks, Tadd  
 Luther, Lars & Janet  
 Luthy, James  
 Madding, Gary  
 Mahoney, Wayne  
 Mahony, Mary  
 Mair, James Jr.  
 Mann, Robert & Marjorie  
 Marcus, Spencer  
 Marks, Bruce & Donna  
 Marquis, Edward & Thelma  
 Marsella, John & Gail  
 Marsh, Max & Elizabeth Jane  
 Marshall, Cambrel & Francine  
 Marsischky, Gerald  
 Martin, Jerry  
 Martin, Loren  
 Maskalick, David & Kathleen  
 Matthews, Ronald & Carolyn  
 Mayo, Dana & Jean D'Arc

Muser, Frani Blough  
 Myers, Elisabeth  
 Nagarajan, Ramakrishnan & Alice  
 Nagle, Joel  
 Naples, F. John  
 Nash, Brian & Amanda  
 Nicholas, James & Gloria  
 Niehaus, Nancy  
 Noel, John  
 Northuis, Jill & Michael  
 Nowatzke, William & Kristine  
 Nugent, William & Susan  
 O'Connor, Hazel  
 Odom, Jerome & Toni  
 Oster, Greg  
 Ottensmeyer, Edward III  
 Owens, Kevin & Judith  
 Edling-Owens  
 Paget, Charles  
 Palomaki, Jack & Anne  
 Pantely, George & Sharon

Williams, Martin & Jane  
Willis, Donald & Nancy  
Wilson, Joseph  
Wilson, Larry  
Winger, Dwight & Cindy  
Winkler, Ted & Andrea  
Winner, Bernard & Adele  
Winslow, Robert & Margaret  
Wissinger, John  
Wittig, Erland  
Woods, Howard III  
Wright, James & Monacettia  
Yacko, Mark  
Yancey, Mark & Roseanne  
Yates, Marvin & Janice  
Yoder, Steven & Eileen Hostetler  
Young, George  
Young, Jean  
Youngman, Randall & Karen  
Zhao, Zhong-Quan  
Zimmerman, Michele & Kerry  
Zimmerman, Morris  
Zirkle, Charles

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