ChemLetter

UNIVERSITY OF WASHINGTON
DEPARTMENT OF CHEMISTRY
VOLUME 23, NOVEMBER 2001

Dear Alumni and Friends,

Where were you on the morning of February 28th? Had you been in Seattle, you would remember very clearly. On that morning, venerable Bagley Hall, her younger sisters, and all their occupants were drawn into the sway of what history will call the Nisqually earthquake. The floors rose, fell and moved side-to-side. The windows and our nerves were severely rattled. More important perhaps is what did not happen in Chemistry that morning: Books, glassware, instruments, and chemicals did not (at least for the most part!) fall from benches and desks. The masonry veneer did not fall from the concrete core. And best of all, not one of the approaching 1000 students, staff, and faculty working in these spaces that memorable morning was injured. The excellent staff of this Department should take pride in the role their advance preparations played in keeping us safe. This trembler left us respectful of nature's power and wondering what damage a more energetic recurrence might cause.

Last fall, the Department suffered two losses, with the sudden passing of both Emeritus Professor Arthur Anderson and Professor Leon Slutsky. Andy and Leon were both important figures in the history of this Department during the second half of the 20th century. Their service to this University through their teaching and research at UW was considerable. Both served for a decade each as associate chair of this Department. We are saddened and diminished by their loss. In this issue of the ChemLetter, we are pleased to present brief biographies of both.

The staff of the Department has very recently suffered two losses of a different kind. As we go to press, both Gary Pedersen and Jane Meredith, long-time leaders of our staff, have moved to jobs elsewhere on campus. Gary took his Bachelor of Arts degree in Chemistry at UW more years ago than he cares to admit and never left us. For the last 14 years, he served as Director of Facilities and Services, the leader of our staff of 50. For as long, Jane has been Assistant Director. Gary and Jane appeared to do everything around here! The reality of course is that they relied heavily upon their excellent staff. But they did know everything about and in fact created many of the systems by which our administration operates. I am very pleased to report that Gary's replacement has been secured: Sharon Minton assumed this leadership position in July. Sharon is a returning Northwest native, who moves from the lead staff position in Chemistry at Stanford.

Every spring, the department holds its own commencement ceremony in Bagley Hall, where graduates come dressed in their caps and gowns and bring their families to the formalities. At the post-ceremony reception, Paul Hopkins (left), chair of the chemistry department, chats with Ken Walsh, former chair of the Department of Biochemistry. The undergraduate degree in biochemistry is jointly sponsored by the two departments and graduates are feted by faculty in both departments.

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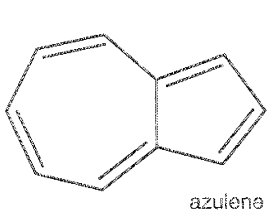
In This Issue



azulene

Ranks of Seasoned Faculty Sadly Reduced in October 2000 . . .

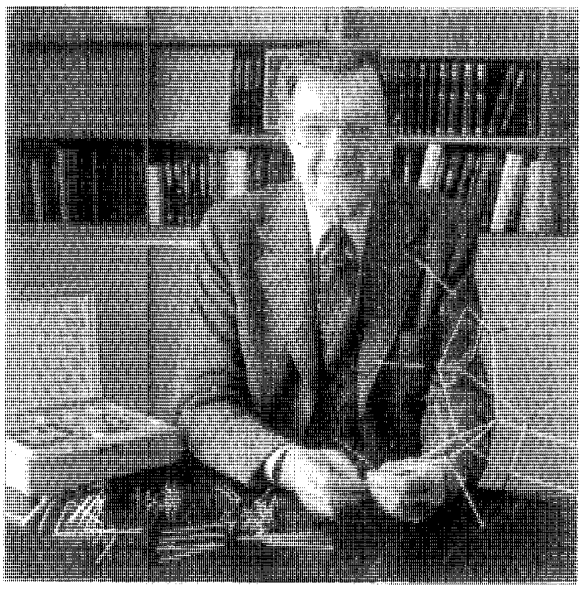
Arthur G. Anderson, Jr.

Andy Anderson was known to graduate students as a "nice guy," and was widely appreciated for his unlimited compassion toward students. Jerry Berkelhammer, a 1957 Ph.D., recalled that Andy's personality just drew students to him and he taught them to conduct research with self-confidence. He never interfered but was always available.

If Edwin Krebs, 1992 Nobel Laureate and UW emeritus professor of biochemistry and pharmacology, didn't know Andy the best, then certainly he knew him the longest. Their friendship dated back to 1936 during their sophomore year in high school. The relationship continued at the University of Illinois, where both worked in the same undergraduate organic laboratory. Upon Andy's *summa sum laude* graduation, he went to the University of Michigan, Ann Arbor, for his Ph.D. and Krebs headed off for his medical degree at Washington University. During these early years, the two served as the best man at each other's weddings.

They continued to correspond during the Second World War, with Krebs in active naval duty in the South Pacific and Andy working on the Manhattan Project at Oak Ridge, where he was in charge of the chemical analysis of final U-235 product. Following the war, Andy became a faculty member in chemistry at the UW in 1946 and when the UW medical school was started in 1948, Andy supported Krebs's decision to become one of its earliest faculty members.

Jerry Nelson, a 1950 Ph.D., was a UW chemistry undergraduate when World War II interrupted his education. After commanding a Navy ship also in the South Pacific he returned to Seattle to finish his bachelor of science degree. Despite his interest in going elsewhere for his doctorate, Jerry stayed at the UW because of the strongly favorable impression Andy made on him. According to Nelson, Andy was a very understanding advisor and although many of the war veterans didn't need much motivation, Andy was always around to offer scientific guidance. Nelson felt so keenly about his graduate experience that he later hired many UW organic graduates during his 32 years at DuPont.



Andy was Jerry's idol and he's always been grateful that Andy was his mentor.

Andy was the original experimental investigator in the field of synthetic non-benzenoid aromatic compounds. Studies on azulene provided the first demonstration of chemical aromaticity in nonbenzenoid hydrocarbons and provided important support for the more generalized theoretical understanding of aromaticity. He was one of the early pioneers of small-scale synthetic methods. Andy's later work focused on a more complex new molecular structure, dicyclopenta[et, k] heptalene, designed, again, as a test of pi-electron theories. This novel molecule was eventually synthesized in his lab and was shown to be aromatic, despite its 4n pi-electron nature.

According to Kenneth Wiberg, a former UW colleague of Andy's who is now on Yale's faculty, Andy's earlier students found that the "compounds were fun to work with since they were often brightly colored, which made it relatively easy to separate via column chromatography—the main tool for separating mixtures of solids at that time . . . Andy was one of the kindest and most generous persons I have known."

After his 1988 retirement Andy remained active, first finishing off his science around 1993. Shortly thereafter, he started researching and writing a detailed history of the department from its beginning in 1863 through 1987. In his last two years, he also wrote two science texts targeted at the general public and primary school teachers.

His committee memberships, invited lectures, and general university service assignments were numerous. He was the author of over 100 peer-reviewed papers.

Andy will always be remembered for the magic he brought to his undergraduate teaching. From student evaluations in a large third-quarter organic service class written five years before his retirement, he was universally praised. Students wrote that "Professor Anderson has to be one of the best teachers I've ever had for any subject matter . . . If he's not tenured already, I would strongly urge the chemistry department and the university to do so in a hurry . . . Professor Anderson made himself human and not superior to us. He had a wonderful sense of humor and you could tell he cared that we learned the material . . . Make the quarter longer so that we can have Dr. Anderson longer . . . I hated organic chemistry until Dr. Anderson. I even enjoyed his bad jokes."

Andy leaves behind his wife of 56 years, Sue, their three daughters, Lynn, Joyce, and Beth, and four grandchildren. The family has established a memorial fund for Andy and donations can be sent to the University of Washington, Department of Chemistry, Box 351700, Seattle, WA, 98195-1700.

Leon J. Slutsky

Leon Slutsky was born and grew up in Greenwich Village, New York City. He graduated from Stuyvesant High School and entered Cornell University at age sixteen. He graduated in 1953 after choosing a degree in chemistry, instead of philosophy, his second choice. Leon attended graduate school at MIT, where he performed his dissertation research in low-temperature physics, for which he was awarded a Ph.D. in 1957. Later that same year Leon began his academic career in the Department of Chemistry at the University of Texas in Austin. In 1961 he joined the chemistry department of the University of Washington. He often remarked that, when he came to the UW for his job interview, he thought "he had climbed up through a manhole in the roof of hell and emerged into paradise."

His early work involved experimental and theoretical investigations of the low temperature thermodynamic properties of crystalline solids, including some that undergo second-order phase transitions.

Leon and his students then developed and applied ultrasonic attentuation (acoustic absorption) methods to measure the rate constants and thermodynamic parameters of important chemical reactions in solution, including the helix-coil transition of poly(L-lysine), the intramolecular and external proton transfers of ortho-, meta-, and para-aminobenzoic acids, the multitude of simultaneous coupled proton-transfer reactions in hemoglobin, the dimerization of inorganic phosphate, and the conformational dynamics of bacitracin. In the course of this work, Leon first identified the primary mechanism by which ultrasound is absorbed in biological tissues.

Later, Leon and his graduate students developed and applied quartz microbalance techniques to measure accurate adsorption isotherms of gases, including adamantane, from low to extremely high coverages on gold surfaces.

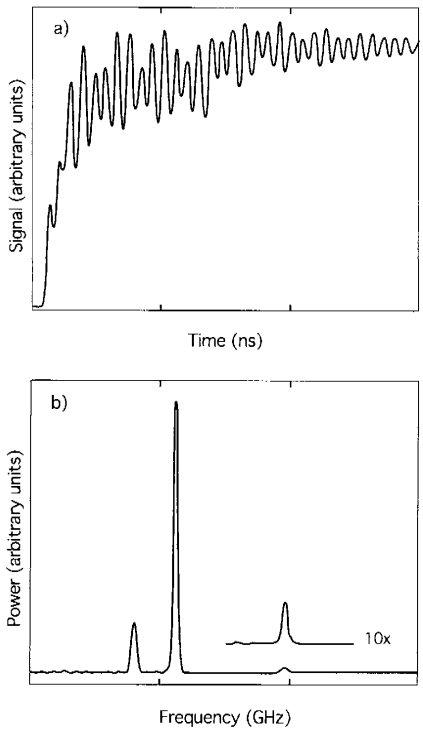
During the last decade, Leon entered into a fruitful collaboration with Professor Mike Brown in geophysics and Research Professor Evan Abramson in chemistry to develop and apply impulsive stimulated scattering (transient grating) spectroscopy to measure acoustic velocities and also thermal diffusivities of various materials in a diamond anvil cell up to very high (geophysically relevant) pressures. Together with their graduate students and postdocs, this group studied various mantle candidate minerals, for which equations-of-state extending to very high pressures were constructed using the acoustic velocity data, and also various liquids, including water and aqueous salt solutions. Via such measurements, Leon and his collaborators were able to study internuclear forces at distances large compared to covalent bonds, but short with respect to van der Waals contacts. A long-range goal was to develop models that could be predictive in estimating the conditions that prevail in the deep interiors of the larger planets.

According to one of Leon's oldest friends at the UW, fellow physical chemist Mickey Schurr, "Leon and his collaborators have left a remarkable legacy of uniquely 'bombproof' published scientific work."

Leon had a dazzling intellect that was widely recognized. As Mickey put it, "Leon operated intellectually on a different plane, but nevertheless it was easy to communicate with him, after one learned to speak 'Leonese.' Discussions with Leon enormously advanced the scholarly work of several of his colleagues, including me."

Leon's collaborator Mike Brown remembers that Leon was "always concerned much more for others than himself, never pushing his own agenda, proud when colleagues made research advances, practically embarrassed if his own work benefited from his attempts to assist others, completely ethical and fair, and accepting of others who were less capable than he."

Leon was an extraordinary teacher and mentor of experimentalists. In the early days, he demonstrated by personal example the intensity and commitment required for success on technically difficult projects, often working through the night with occasional catnaps upon a cot installed in his laboratory. Although he was always available for help when called, he trusted his students to work on their own without excessive micromanagement. David Lando, one of Leon's earliest graduate students, who has spent his career at Bell Labs (now Lucent Technologies), described Leon as possessing the finest traits of a research adviser. Not only were Leon's scientific judgement and mental acuity top notch, but he was also a supervisor who delegated well, allowing Lando to build a complex apparatus on his own over the course of nearly two years. Leon was there to help but never hovered, and Lando patterned his own mentoring after the Slutsky model.



Leon studied the acoustic properties of many different substances, among them crystalline oxygen. (A) The acoustic signal from an oxygen crystal held at a pressure of 61,000 bar and room temperature. (B) Fourier-transform power spectrum associated with (A), showing the two transverse and one longitudinal modes.

Leon knew and influenced a great many people at the UW through his service over the years in many capacities. He served in the University Senate, as chair of the Council on Faculty Affairs, on various departmental chair selection committees including one for chemistry, as an executive committee member in the Graduate School, and as a member of the Faculty Oversight Committee on Intercollegiate Athletics. This covers but a small portion of Leon's wider service commitment to the UW. As a faculty member, he was no less involved in major departmental committees and was frequently consulted when significant decisions were made.

Leon had an intrinsic affection for youngsters of all ages from toddlers to associate professors, and especially for graduate students, many of whom received abundant counsel, sympathy, and encouragement during his long tenure as graduate advisor. Leon particularly enjoyed mentoring new faculty, especially junior faculty, and he rarely missed an opportunity to nominate younger colleagues for prestigious awards. His impact in these regards is immeasurable.

Perhaps Paul Hopkins summed Leon up best when he wrote that "Leon was a brilliant and complex person. He cared deeply about both people and principles. In the final analysis, what impressed me even more about Leon was how utterly selfless he was. He came to me often asking for resources for others, but almost never for himself."

Leon was an enthusiastic and accomplished mountaineer. He loved to go into the mountains in all seasons, and together with his family and many friends he hiked, climbed, and skied extensively in the mountains of Wyoming, Idaho, Montana, Oregon, and especially Washington. Both in the city and and out among the peaks, Leon's colorful demeanor and highly original commentary provided his comrades with countless indelible memories.

Leon leaves behind Ann, his wife of 28 years. Son Jonathan is a Cornell graduate. Son Elon will be a senior at Amherst in the fall.

Chemistry Graduate Students Host Nobel Laureate and Environmentalist

F. Sherwood (Sherry) Rowland spoke to the campus community recently about "The Good and Bad Ozone: Stratospheric Ozone Depletion and Global Smog."

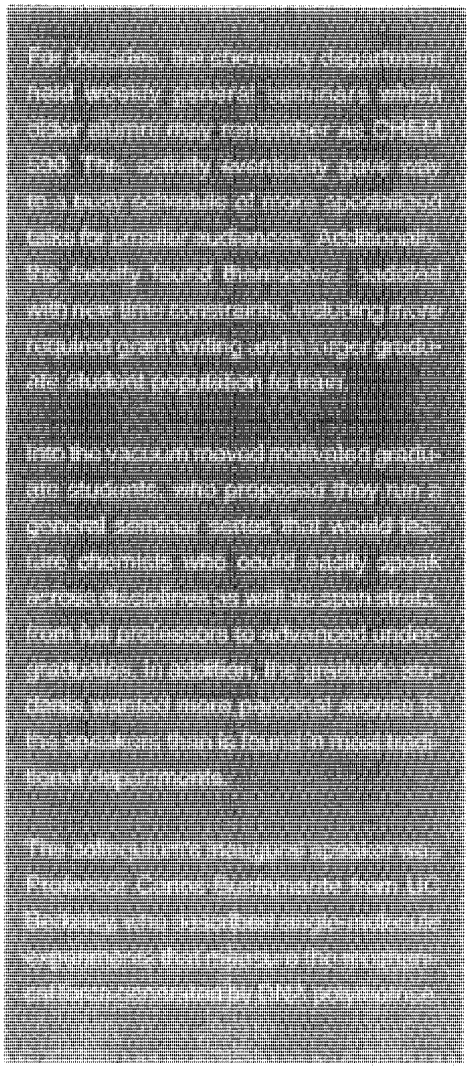
The 1995 Nobel Laureate was the second speaker in a colloquiam series established and run by chemistry graduate students with the help of their faculty advisor Professor Sarah L. Keller.

Rowland and two colleagues were the first to describe the mechanisms of certain chemical reactions involved in the depletion of the Earth's protective ozone layer when selected substances are released into the environment. More than 25 years ago, Rowland published a seminal paper which detailed how chlorofluorocarbons (CFCs) deplete the stratospheric ozone.

Professor Rowland has relentlessly pursued the science behind ozone erosion, as well as the policy implications of ozone depletion. Although hundreds of researchers have contributed in important ways to the scientific evolution of the problem, Rowland has been the major figure in bringing the issue to prominence and seeing it through to resolution under the 1987 Montreal Protocol of the United Nations Environment Program, the first international agreement for controlling environmental damage to the global atmosphere by reducing the manufacture and release of CFCs.

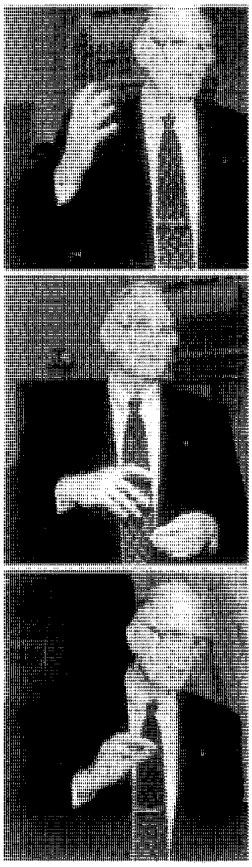
Chlorofluorocarbons had many technical uses, such as cooling media in e.g. refrigerators and air conditioners, in the manufacture of plastic foam and as propellants in spray cans such as hair spray or whipped cream. Because they are chemically stable and non-poisonous, CFCs had been considered ideal from the environmental viewpoint, but they've now been replaced worldwide by CFC-substitute compounds under the timetable of the Montreal Protocol and subsequent amendments.

Rowland and others were able to show in in the mid-1970s that CFC gases are transported up to the ozone layer, where they meet such intense ultraviolet light that they decompose. The liberated chlorine atoms contribute to a catalyzed depletion of the ozone layer. It was Rowland who helped to resolve the origin of the



"ozone hole"—a deep reduction in the ozone layer over Antarctica discovered in the early 1980s—by suggesting that CFC photochemistry in the presence of ice particles was the cause.

In 1986, a novel analysis of ground-based ozone observations first revealed alarming decreases in ozone abundances over the northern hemisphere in certain seasons. Again, these decreases have been linked with CFCs.



F. Sherwood Rowland

Rowland has also been a leader in the measurements of atmospheric methane and other hydrocarbons. Methane is a key greenhouse-active gas, it participates in stratospheric and tropospheric chemistry, and it controls the amount of water vapor in the upper atmosphere. His work defined, with clarity and accuracy, an increase in methane over the last decade that is driven by human activities.

Professor Rowland is the David Bren Professor in the Department of Chemistry and Earth Science Systems at the University of California in Irvine. He received his Ph.D. from the University of Chicago and is currently the Foreign Secretary of the National Academy of Sciences.

Cross and Dauben Lectures Given

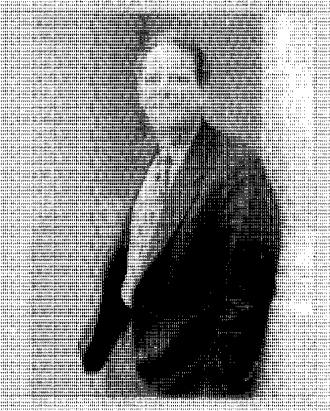
Speaker Says Science of Harvesting Light

Photosynthetic Light Gathering was the subject of Professor Graham R. Fleming's Cross Lecture last spring, which highlighted the major contributions he has made to the development of ultrafast spectroscopy and its application to problems in biology and condensed phase chemistry. Born and educated in England, Professor Fleming is currently the director of the Physical Biosciences Division of the Lawrence Berkeley National Laboratory at the University of California, Berkeley. Recently, he has pioneered applications of nonlinear coherent spectroscopies, including photon echoes and two-dimensional Raman spectroscopy. His current research interests include energy transfer in photosynthesis and ultrafast condensed phase processes probed by photon-echo spectroscopies. Professor Fleming is a Fellow of the American Academy of Arts and Sciences and of the Royal Society of London. He is also the author of over 270 publications, including a widely read monograph on "Chemical Applications of Ultrafast Spectroscopy."

Graham R. Fleming

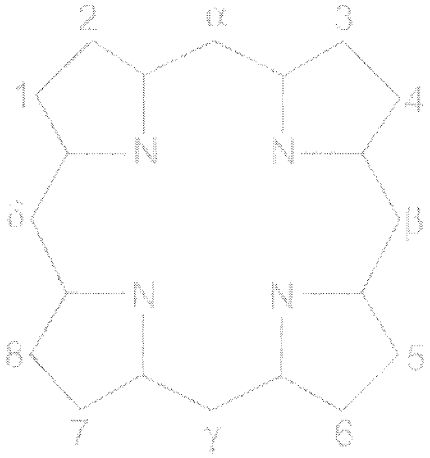
Dauben Lecturer Roams Chemistry's Theory

University of Colorado Professor of Chemistry and Biochemistry W. Carl Lineberger worked closely with the late Professor Robert R. Squires of Purdue University on the measurement of negative ion photoelectron spectra of the three dehydrobenzenes and in trimethylenemethane. Professor Lineberger's talk, delivered last year as the 21st annual Dauben Lecture, was entitled "Organic Radicals, Reactive Intermediates, and Transition States: Spectroscopy on the Reaction Coordinate" and described his joint work with Squires. Professor Lineberger has pioneered the use of a wide variety of laser based techniques to study structure and reactivity of anion ions and has recently begun work to determine the structure of transient reaction intermediates. He is a member of the National Academy of Sciences and is also a Fellow of the Joint Institute of Laboratory Astrophysics, which is located on the main campus of the University of Colorado in Boulder, and is operated jointly by the university and the National Institute of Standards and Technology (NIST).



W. Carl Lineberger

Emeritus Status Chosen by Gouterman



A Nobel Laureate, a NASA astronaut, and a co-creator of the DNA sequencer—all are former doctoral students of Professor Martin Gouterman. Add to that now an undergraduate Rhodes Scholar from his lab.

So when it came time for Martin to retire last year, a modest suggestion from him to invite another prominent porphyrin chemist to give a lecture gained momentum. Before long, it was decided to mark the day by hosting a special porphyrin symposium and dinner in recognition of Martin's prominence in the porphyrin community and for his commitment to the Department of Chemistry over the last four decades.

"New Insights into Porphyrin Aggregates, Architecture, Electron Transfer, Excited States and Photosynthesis" featured talks by Johann W. Buchler, the Darmstadt University of Technology; Jack Fajer, Brookhaven National Laboratory; and Dewey Holten, a former Gouterman Ph.D. and a professor at Washington University.

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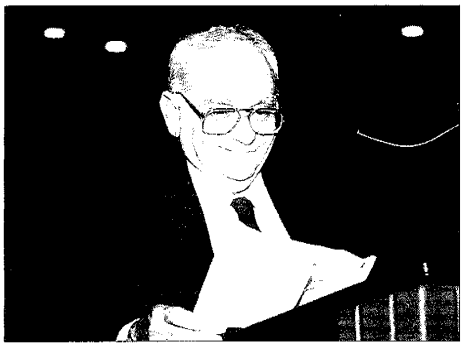
Personal after-dinner remarks were made by Alvin L. Kwiram, former chemistry chair and more recently the UW's vice provost for research. Martin and Alvin were both junior faculty at Harvard University in the 1960s and Martin was instrumental in getting Alvin to the UW when Kwiram was seeking a senior position.

The other post-dinner speakers were Paul Hopkins, chemistry chair, and Roald Hoffmann of Cornell University. Hoffmann, winner of the 1981 Nobel Prize, also gave a departmental seminar on "Three-Center Bonding Across the Periodic Table" the following day.



Martin Gouterman

Martin received his bachelor's and doctoral degrees in physics at the University of Chicago. Eschewing his original research interest in biophysics, he decided to pursue theoretical chemistry relevant to biology. Gouterman apprenticed himself to Professor John Platt, who put him to work explaining porphyrin spectra—why blood is red and grass is green. Little did Gouterman realize this decision would keep him busy for fifty years and lead to being honored last summer during a porphyrin conference in France.

Many former Gouterman students from around the United States and across the Atlantic Ocean attended the departmental retirement symposium, with one remarking that "Martin is a professor's professor." Since retiring, Martin has kept up with his science, traveled a bit, and recently, at the urging of his 17-year old son, bought a PT cruiser. As Martin says, "it's a 30s kinda car and I'm a 30s kinda guy."

Alumni and friends who traveled the globe to attend Martin's symposium included, clockwise from top left: former UW undergraduate Rich Mathies; UW Ph.D.s Diane Rawlings and David Munch; former UW Gouterman graduate students from left Willem Leenstra, Paul Smith, Louise Hanson, Dewey Holten, Artemas Antipas, Gamal Khalil, and Jim Callis; Martin and Roald Hoffmann (Gouterman's first doctoral student at Harvard); symposium speakers Johann Buchler, Roald Hoffmann, Jack Fajer, and Dewey Holten; after-dinner speaker Alvin Kwiram hugs Martin congratulations during a standing ovation; veterinarian Bill Dolowy, with whom Martin collaborated on the red fluorescence of cats' teeth, signs the guest book; Gouterman with undergraduate and graduate students John Harris, Ziggy (Rory) Uibel, Lisa Coyle, and Wayne Shinogi.

Debt of Gratitude Owed Alumnus

Bertram Thomas is a loyal man. No doubt about it.

When it came time to site the Battelle Institute's new research facility in 1945, Bert, a native Washingtonian and UW alumnus, wanted to support the Washington state economy and he also wanted scientists at the University of Washington to have the benefit of a world-class research think tank at its back door. As president of the Battelle Institute in Columbus, Ohio, it was his call as to where the new facility was situated. So, that is how what is now known as the Pacific Northwest National Laboratory came to call Richland, Washington its home.

Bertram Thomas

After earning his doctorate in chemistry with Dr. Tommy Thompson in 1933, Bert went directly to the Battelle Institute. His time as a bench scientist was short as his skills as an administrator were recognized early on. Now at 98 years young, he still laments not having had the opportunity to spend more time in basic research.

Bert was a recognized civic booster in his adopted state and was tapped by former Governor Jim Rhodes to become a trustee for the Ohio State University. Case Western Reserve also asked him to serve as a regent for their school. He was featured on the cover of "Business Week" magazine in 1965, another tribute to his financial, organizational, and political acumen. Bert was responsible for setting up laboratories around the world and received an Order of Civil Merit First Class from the Republic of Korea for his efforts.

In 1967, the UW elected him *Alumnus Summa Laude Dignatus*, which he still considers his greatest honor. Bert has also received honorary doctorates from Ohio State University, Cleveland State, Michigan Technical University, and Otterbein University in Ohio.

Accomplishment runs throughout the Thomas family. Bert's late wife Glorian was a pianist and harpsichordist who played professionally in the midwest. His oldest son Preston is an electronic engineer and another UW alumnus, his daughter Nancy is a child psychologist who still edits a professional journal, and his son Lawrence has served as chair of the Department of Mathematics at the University of Virginia.

A near centenarian, Bert remains current with scientific issues. His research on the electrical conductivity of seawater is still in use today.

From Conifers to Criminals to Chemicals

After deciding that her undercover work as a narcotics detective for the Seattle Police Department was doing little to staunch the flow of drugs on the street, Kathy Parker had a change of heart.

It wasn't the first time she'd made a 180 degree career shift. Her first full-time job after graduating from the UW in 1982 with degrees in botany and forest management had her climbing trees to collect seeds and doing statistical analyses on growth studies for the Department of Natural Resources. But the challenge of passing the physical endurance tests administered by the Seattle Police Department led her to law enforcement a few years later.

The path she took in 1989, after turning in her gun and badge and deciding there was life beyond the Blue Wall, was again a scientific one. She returned to the UW, this time earning a Bachelor of Science degree in chemistry in 1991.

Kathy Parker

After graduation this time, Kathy took a job with an United States Environmental Protection Agency contractor analyzing Superfund samples. After six months, she accepted a permanent position with the USEPA Region Ten on the Kitsap Peninsula in Washington state.

Kathy continued to perform a wide variety of chemical analyses but she also began assisting local Indian nations with analyses of their drinking water. The Shoalwater Bay nation, in particular, was experiencing an inordinately high rate of infant mortality and Kathy worked with a team of USEPA chemists to look for causative factors.

The USEPA has become increasingly involved with Indian nations and Kathy participated in the Columbia River Intertribal Fish Commission study where she examined fish for mercury contamination. The Chehalis tribe is working on an analysis of their drinking water system which has been contaminated with nonpoint source nitrate, believed to be coming from chicken farms, cattle feed lots and crop fertilization on lands neighboring the reservation.

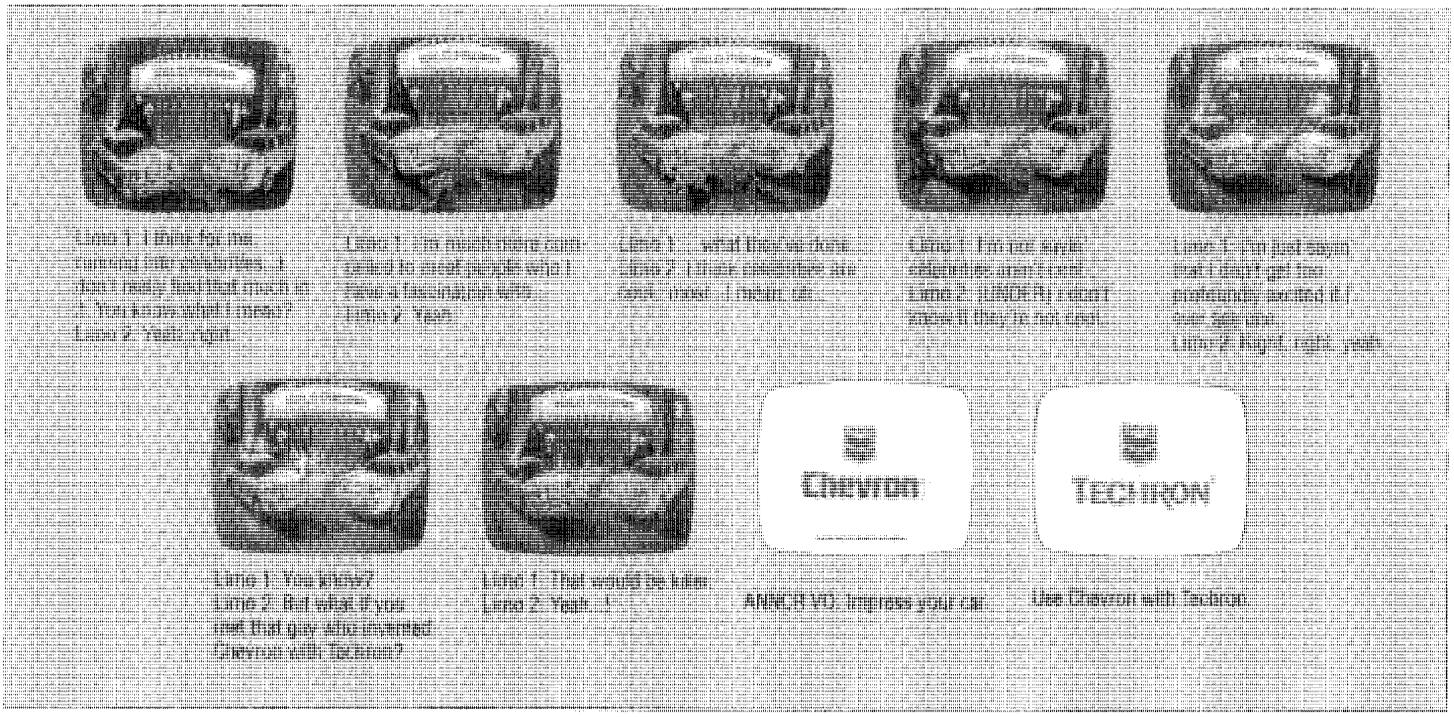
But making the world a better place isn't all Kathy does. Six years ago, she opened her own soap-making business. She now sells her products locally and she teaches soap-making to sold-out classes several times a year. Kathy's husband, Don Merry, is a home building inspector and custom golf club maker and together they built their dream house on five wooded acres on a mountain on the Kitsap peninsula, where they share the land with bears, deer and raccoons.

So instead of fending off criminals, Kathy is shooing away wild animals. Which brings us back to when Kathy was a cop. Even though she was voted the president of her police academy class and even though she passed the detective's exam, Kathy ultimately found the work disappointing. She likened the process to constantly washing dishes over and over again. Those convicted of crimes were often out on the street again in very short order and for every dealer she arrested, there were many more just waiting to take over the corner.

Kathy says today she has the best job she could ever have. Her work is consistent with her personal moral code, she thrives on the autonomy given to her by USEPA supervisors, and she is constantly learning new things about science, people and the world.

Kathy's police uniform has been replaced by a lab coat these days.

Fuel Industry Changed by Alum's Discoveries



"Leo the Limo" could have easily been called "Lewis the Limo" had Chevron marketers only realized that the assignors on the 1978 Techroline (now Techron) patents were Richard A. Lewis and Lewis R. Honnen.

And if the limousines really want to meet one of the co-inventors of the gasoline additive, all they need to do is turn to the University of Washington, where Honnen received his Ph.D. from Hyp Dauben in 1962.

Honnen points out that Techron actually grew out of patents he held for F310, a gasoline detergent he also invented at Chevron. This compound included polybutene which functionalized upon chlorination and then reacted with 1, 2 ethylenediamine. The detergent optimized at about 60% but to make it completely functional, it was necessary to add oil.

F310 was introduced in 1970 and used without concern as long as all Chevron gasolines were leaded. Around the mid-70s, however, a problem was detected when carbon built up in combustion chambers during the employment of unleaded gasoline. It was at this point that scientists needed to find an alternative to the polybutene derivative in F310 for the unleaded gas. That's when Techron was created.

Honnen's work led to a gasoline additive based upon polybutyleneglycol chloroformate, which reacted with a certain amine and became the additive Chevron was looking for to control carbon deposits in combustion engines without compromising the cleanliness of intake systems. The additive which Honnen and Lewis discovered would do the trick was poly(oxyalkylene) aminocarbanates comprising a hydrocarbyl-terminated poly(oxyalkylene) moiety composed of 2-5 carbon oxyalkylene units.

To this day, Honnen believes he could refine the system even further if he only had a lab in his Petaluma, CA home. Having left Chevron in 1982 and then retiring from the chemical industry in 1984, he now lives a quiet life, having recently been widowed.

For those interested in reading this entire patent application or the one dozen additional patents on which Honnen's name appears, go to **http://164.195.100.11/netahtml/search-adv.htm** and link to "assignee name." For those more interested in watching all the Chevron car commercials, they can be found at **http://www.chevroncars.com/**.

Milton Andrus (Ph.D. 1967) is a division scientist in the Specialty Materials Manufacturing Division of 3M in St. Paul, MN. He is also secretary of the Minnesota Section of the ACS. **Lauri Atagi (Ph.D. 1992)** works at Quester Technology in Fremont, CA while her husband, **Keith Hall (Ph.D. 1993)** works at Symyx Technologies in Santa Clara, CA. **Alexandru Bageac (B.S. Chemistry, B.S. Math, 1993)** finished medical school at Harvard University four years ago and is in a multi-year MRI research program. Following the completion of these studies, he begins a second residency, this time in radiology. His first residency was in surgery. **Robert Beckman (B.S. Chemistry, 1999)** started chemistry graduate school at UCLA last fall. Former UW chemistry faculty member **Scott Chilton** is a professor of botany at North Carolina State University. He works on plant natural products, biosynthesis and molecular biology of DIMBOA, and the biochemistry of Crown Gall and Agrobacterium. **Lori Ann (McMahon) Fortkort (M.S. 1984)** worked for several years as a chemist outside of Washington, D.C. before moving with her husband to North Carolina and becoming a full-time mom to four active children, two of whom are autistic. Lori Ann is interested in the epidemiology of autism and alumni are encouraged to contact her at 704/748-9448 if they share a similar concern. **Milton W. Goheen (Ph.D. 1964)** works at the Battelle Northwest Laboratories in Richland, WA. **Dana Harter (Ph.D. 1946)** spent his career as a professor of chemistry and dean of health sciences at Eastern Washington University. He was responsible for establishing EWU's B.S.N. program in collaboration with Spokane, WA hospitals. He died in the summer of 1999. **Karl Hermanns (B.S. 1983, M.S. 1984)** is a partner at Seed Berry, a Seattle patent law firm. In addition to his full-time practice, Karl occasionally teaches a course in intellectual property at area law schools, biotechnology companies, and in the Department of Chemistry. The course provides a overview of issues such as patents, copyrights, trademarks, and trade secret protection as they pertain to chemical and biochemical discoveries. **Khanh Hoang (B.S. Biochemistry, 1999)** has started graduate school in pharmaceutics at the University of Michigan. **Ronald Hsu (B.S., Biochemistry, 1999)** is a second-year dental student at the UW. **Dave Kuhns (Ph.D. 1997)** is a senior research chemist at 3M in Minnesota solving production problems using process analytical chemistry. To balance out his science, Dave performs regularly with "Stevie Ray's Improv Troupe" which is a comedy group similar to "Saturday Night Live" or "Second City." When Dave was in graduate school, he conducted some sonoluminescence microgravity experiments in the zero-G plane used to train astronauts known affectionately as "The Vomit Comet." **Linda Leinicke (M.S. 1967)** went on to earn an M.B.A. from Southern Illinois University at Edwardsville and is currently the manager of document control at

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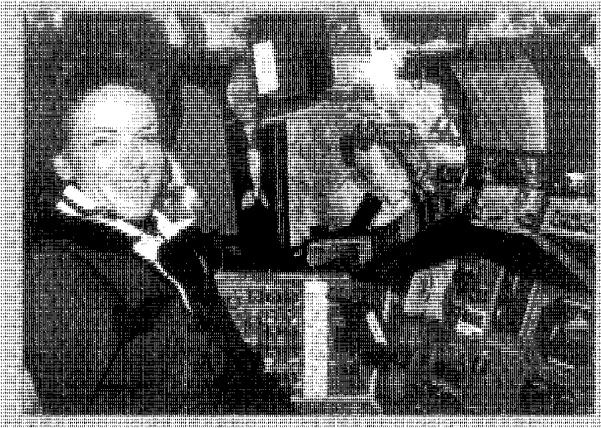
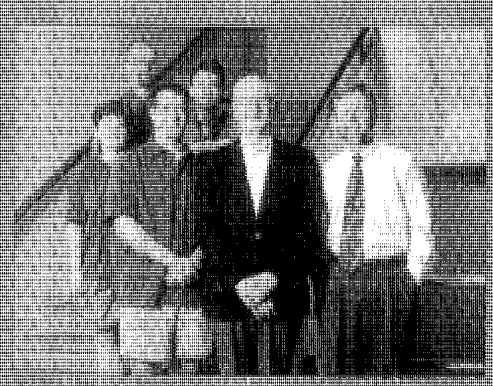
Space Cowgirl



Janet Kavandi in the foreground and Earth in the background

Dr. Janet Kavandi (CAY Ph.D. 1991) was assigned to the crew of STS-104/ISS Assembly Flight 7A, launched earlier this summer aboard the orbiter Atlantis. Its objectives included attaching the ISS Airlock and four highly pressurized oxygen and nitrogen gas tanks to the Space Station. The Airlock and gas tanks will provide station-based Extravehicular Activity or space walking capability for both U.S. and Russian spacesuits. The high pressure gas assembly augments the Service Module gas resupply system. Janet was selected as an astronaut candidate by NASA in December 1994 and reported to the Johnson Space Center in March 1995. Following an initial year of training, she was assigned to the Payloads and Habitability Branch where she supported payload integration for the International Space Station. A three flight veteran, Dr. Kavandi has logged over 33 days in space, traveling over 13.1 million miles in 535 Earth orbits. She served as a mission specialist on STS-91 (June 2-12, 1998), the 9th and final Shuttle-Mir docking mission, concluding the joint U.S./Russian Phase 1 program. She served aboard STS-99 (February 11-22, 2000), the Shuttle Radar Topography Mission which mapped more than 47 million miles of the Earth's land surface to provide data for a three-dimensional topographical map (above photo from that mission). Between flights, Dr. Kavandi has served in the Robotics Branch and as a CAPCOM (spacecraft communicator) in NASA's Mission Control Center. Emeritus Professor Martin Gouterman attended Janet's inaugural launch in 1998, as did other members of the Gouterman laboratory who worked with her at the UW.

Graduate Students Thank Fellowship Donors



Twice a day—at mid-morning and –afternoon times—graduate students, faculty, post-doctoral research associates, and other departmental research staff now gather in newly remodeled and beautifully appointed Bagley Hall space to engage in scholarly exchanges and share food and drink. At many other universities, such dedicated space is known as a "Common Room."

But in the UW Department of Chemistry, it's called "Rab's Room."

Rabinovitchs Reward Researchers

Established with a generous donation from Emeritus Professor B. Seymour Rabinovitch and his wife Flora, the room is named in Rab's honor and in appreciation of his long-standing service and commitment to the Department of Chemistry.

B. Seymour and Flora Rabinovitch

A native of Montreal, Quebec Rab received both his B.S. and Ph.D. degrees at McGill University. Prior to starting his UW academic career in 1948, Rab served in the Canadian armed forces during World War II. Rab and Flora are such Anglophiles that they own a flat in London to which they escape several months each year.

The idea of a Commons was born out of Rab's warm memories of sabbatical time spent at British universities, where scheduled breaks to enhance collegiality were a twice daily occurrence. Rab thought of his students as friends and colleagues

continued on next page

and realized many years ago that "the care and feeding" of graduate students is of great importance. From the examples he'd seen in the United Kingdom, these impromptu get-togethers provided an important occasion for fellowship among students, interaction with faculty, and the stimulation of scientific ideas. Receptions for departmental seminar speakers are also held in Rab's Room.

But, the Rabinovitch's philanthropy stretches much further than a room to engender informal discussions of scholarly issues.

Rather than establish Bagley's Commons first, Seymour and Flora donated a sum of money to endow a new graduate student fellowship. After that was in place, a private drive was conducted to secure the remaining funds for the endowment that will provide on-going support for the room. Rab's family and former students have generously contributed. Additional donations are always welcome.

Amid much fanfare, Rab's Room was dedicated last May with activities throughout the day designed to honor the Rabinovitchs. Rab's dream became a reality and many of his family members and former students—some from the far corners of North America—were there to celebrate with him.

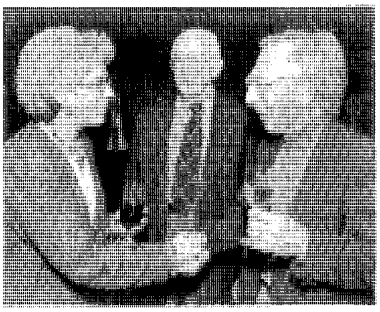
During an impressive career in chemical kinetics, Rab's scientific advances led to his reception in 1984 of both the Polanyi Medal sponsored by the Royal Society of Chemistry, and the Debye Medal sponsored by the American Chemical Society.

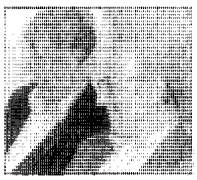
Upon retirement, Rab turned his attention to antique silver design and silversmithing. After researching the field and becoming a student himself, he has now published two books on the subjects. He has also recently established a memorial endowment in the UW School of Art's Metal Design program in memory of his late wife, Marilyn Werby, herself an artist.

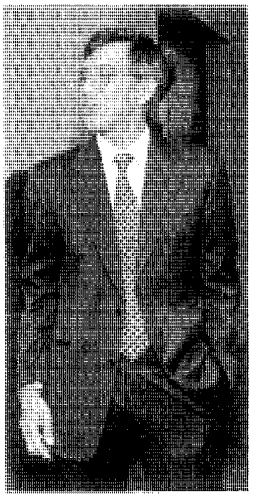
Rab has commissioned his own silver fish servers from promising young artists here and abroad. He's even polished off his own personally designed and crafted broad-bladed silver servers. This collection was the subject of a special showing at the Seattle Art Museum two years ago and at many other museums in the United States and Britain.

Rab was recently inducted as an honorary Liveryman of the Worshipful Company of Goldsmiths, London—the 700 year old guild that regulates the silversmithing craft.

Flora Rabinovitch is also internationally known for her silver jewelry art. At one point last year, Flora had simultaneous exhibits of her work in the Metropolitan Museum of Art, the Boston Art Museum, the American Craft Museum, and the Renwick Gallery of the Smithsonian. Some of Flora's earlier abstract paintings have been loaned to Rab's Room to provide even more panache to the space.

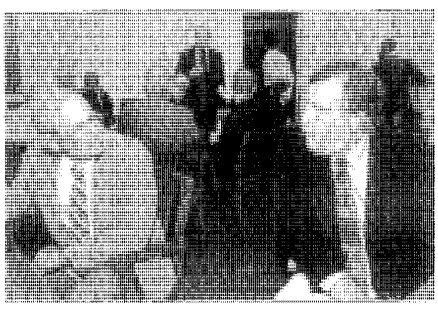






Top row: current chemistry faculty milled about during the opening of Rab's Room; Rab's daughter, Ruth, an infectious disease medical doctor, meets his first Ph.D. student, John Douglas, who lives in Spokane, WA.

Middle row: Rabinovitch Ph.D. alumni came from far and wide: Siu Chan (right) returned from eastern Canada to honor Rabinovitch; sharing old times are Jerry Current and Ted Flanagan, who traveled respectively from California and Vermont to spend time with Rab and Flora; JoAnne Lin, now living in Texas, and Spyros Pavlou, a Seattle resident, reminisce.



Bottom photo: John Simons, now living in New Mexico, catches up with Gary Whitten, a California resident. Both are also Ph.D. alumni of Rab's.

continued from page 1

The Department is in a period of relatively rapid change and renewal. Since 1995, no fewer than 15 new individuals have joined our faculty, six of these moving well-established research groups from other institutions, with the balance joining us as assistant professors. The Department now has some 40 postdoctoral research associates, and almost 200 graduate students studying toward the Ph.D.! Our teaching program is consistently awarding annually over 100 undergraduate degrees in biochemistry and chemistry; we are third largest in the nation by this measure. About 2500 students are taking freshman chemistry with us annually. The grant and contract expenditures which fuel our research program, all won through competitive applications prepared by the faculty, were last year just shy of $10,000,000, making us the largest such program in the College of Arts and Science at UW. These are accomplishments of which our students, staff and faculty can be proud.

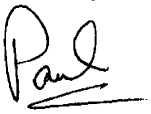
The ground under UW continues to shake in one other respect. The state-provided portion of the budget of UW, on which teaching departments such as Chemistry are so heavily dependent, has historically tracked the boom-bust economic cycle of the State of Washington. The experience of the two decades of the 70s and 80s was a five year bust followed by a five year boom. The first half of the 90s followed this trend, having decidedly been a bust. But the late 90s saw the cycle broken. The boom never came to UW, despite an extraordinary period of extended prosperity in the State. The peculiar combination of our state's tax structure and west coast verve for initiatives that cut taxes and limit government spending left UW to scramble.

It is probably not a bad thing for any organization to periodically tighten its belt, to root out inefficiencies, and generally to question its practices. But enough is enough! Faculty, staff, and teaching assistant salaries have fallen behind our competitors nationwide. The recent teaching assistant strike at UW is one manifestation of this situation. The industry solution of down-sizing our numbers to raise these salaries is not so practical, as UW faces a rising demand for classroom instruction, which reductions in faculty and staff size would unquestionably diminish. Why not shift our attention away from graduate education and toward this rising tide of undergraduates? Because the data say quite unequivocally that this nation faces a shortage of individuals with advanced degrees in science, engineering, and technology. This is not the time for UW Chemistry to pull back from graduate education.

Please know that the Chemistry ship at UW is not sinking! Though we are taking on water, we are also bailing at a fearsome rate. The value of the grants and contracts won by the faculty has risen some 40% over the last three years. The Dean and Provost have supported us generously when real opportunities have arisen. Another extremely important factor has been the growth of the Department's endowment. This is where you, our friends and alumni, have been and can continue to be an enormous help. Increasingly, we draw upon the proceeds from this endowment (about 5% pay-out per year) to supplement the meager state budget. In this way a salary that would not attract or retain a top-flight graduate student or faculty member is bumped to a competitive level. This endowment is thus absolutely critical to the continued health and improvement of this Department. Our Department's endowment stands at about $6,000,000 at this time. Our target in the near future is $10,000,000. The reality is that the proceeds from a $50,000,000 endowment in Chemistry could be invested extremely productively to further our missions of teaching and research, a mission so critical to our children's and our nation's future. Please give generously! I would be pleased to speak to any among you who wish to learn more about opportunities to help fund the UW.

I hope you enjoy this edition of the ChemLetter. If you're in Seattle, please come by to say hello.

Sincerely,



Paul B. Hopkins
Professor and Chair

Donations Continue to Fund Vital Departmental Activities: Fellowships, Scholarships, Recruiting, Research Symposia, etc.

The following individuals, corporations, and foundations donated to the Department of Chemistry from July 1, 1998 through June 30, 2000. Chair Paul B. Hopkins expresses appreciation on behalf of the department for the generous support of all its donors. He urges people to call him at 206/543-1613 or email him at chair@chem.washington.edu if any gifts were omitted from this list or if names have been inadvertently misspelled.

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Mitch-Gomez, Cindy K. and Alvaro Gomez
Mobrand, Lars E. and Kathryn A.
Monroe, Gwendolyn F. and Jeffrey
Montana, Andrew F. and Kay
Morgan, Pamela W. and O. D.
Motell, Edwin L. and H. Phyllis
Motten, Ann G. and Alexander F.
Mullen, John K. and Dori
Nakamura, Audrey T.
Nelson, Jeffrey A.
Nelson, Jerry A. and Carmen
Nelson, Mark M. and Julie
Nelson, Michael and Janet E. Oliver
Nguyen, Lehong T.
Nicol, Violet L. and Frank
Ning, Xiu-Yan S. and Craig Zhou
Norman, Richard E. and Anne True
Novartis U.S. Foundation
Numata, Robert A. and Carol F.
O'Loughlin, John F. and Mary Mann
Oakes, Kent A. and Susan V.
Ojala, Sonja M.
Olleman, Elizabeth A. and Roger D.
Olsen, Stanley H. and Vicki
Olson, William B.
Ordway, Girard L. and Marilyn
Osborne, Allan G.
Farmer, Sharon L. and Phillip S. Osborne
Oswald, Donna A.
Oswick, Katheryn J.
Pace, Carol S. and Steven A.
Paddock, Gary V. and Linda
Page, Joseph D.
Pallett, Richard D.
Parker, Marilyn A.
Parker, Susan M.
Parnell, Eileen M.
Peak, Ralph F. and Mary L.
Pearson, Louise S.
Peck, Dennis F. and Christine
Perki, Christopher M.
and Mary Perkins
Perkins, Douglas L. and Joyrene
Peters, Brock A.
Peterson, Donald L. and Juanita J.
Petruk, Lyudmila I. and Viktor
Petteway, Jason C.
Pfeifer, Delbert A. and Judith
Pham, John D.
Pharmacia & Upjohn Foundation
Philip Morris Companies, Inc.
Phillips Petroleum Company
Phillips Petroleum Foundation
Pinsky, Ann
Plastino, John B. and Erika
Plummer, David F. and Jean
Portelance, Herbert J. and Letitia C.
Predmore, David B. and Marcella
Proteau, Philip J. and Diane
Query, Matthew M. and Christine
Radomski, Janice M.
Radzewich, Catherine E.
Rajagopal, Ponni and
Natarajan Janarthanan
Ralston Purina Company
Raymond, Kenneth W.
Reeder, Seth D. and Mary
Reichgott, David W. and Christine B.
Renn, Curtiss N. and Julia A.
Rierson, C. H.
Ritter, Bernice C.
Ritter, Daniel B.
Ritter, Shirley F.
Robbins, David B.
Roberts, Michelle L.
Robins, Janis and Brigita
Robinson, Ruth C.
Rohr, Timothy C.
Romberg, Harry B.
Ronald, Bruce P. and Alice K.
Rueber, Mark S. and Jill E.
Runo, Diane T. and Steven C.
Russ, Ella S.
Russo, Phyllis A.
Sanderson, James H.
Sands, Florence M. and Walter C.
Saxberg, Bo E. and Sheila D.
Schaffer, Arnold M. and Susan
Schomber, Beth M. and Paul R.
Scott, Eric J.
Scott, Joy E.
Searfoss, Rodger C. and Beth
Selfe, Sara
Semon, Richard L. and Andrea A.
Sensor Technology
Shaw, Barbara J. and Robert
Sheeran, Norman J. and Cleora
Sherwood, Mark J.
Shibata, John H. and Celeste
Shields, William W. and Betty
Silverman, Morris B. and Wanda

Sime, Rodney J. and Ruth
Simons, John W. and Victoria
Skiens, William E. and Vesta
Sklare, Julie E.
Small, Gail B. and Gregory
Smith, Herbert E.
Smith, Paul D.
Spear, William E.
Spitzer, Kenneth D.
Starkebaum, Mary K. and Gordon A.
Steczina, Ildiko O.
Steele, George W. and Esther
Steunenberg, Robert K. and Jean S.
Stewart, James M. and Bernice C.
Stewart, Robert D. and Elaine
Stone, Joe T. and Gail A.
Stoner, John T. and Carol J.
Strand, Kurt B. and Carla
Strasser, David W. and Bobbie
Stringer, John T.
Stuhring, Glen T. and Celeste R.
Sutherland, David H. and Mildred
Sweeney, W. Alan and Sally L.
Symonds, Marylyn E. and William A.
Tamas, Gary R. and Teri
Teague, Jeanette I. and Ralph W.
The BOC Group, Inc.
The Electrochemical Society, Inc.
The Rayonier Foundation
Theodore, Louis J.
Thomson, Lowell A.
Thornton, Mark M. and Mary E.
Thornton, Perry J. and Marilyn A.
Thorsen, Shelley M.
Tobert, Elizabeth J. and Eric
Torre, Louis P. and Carolyn G.
Tracy, Joseph W. and Mary
Trautman, Jay K. and Sue Y.
Selden, Janice A. and Jay S. Treiman
Triple-Tree Farm
Turecek, Frantisek and Olga
Underwood, Bruce K.
Valley Family Physicians
Van Meter, Wayne P. and Helen
Van Ornum, Joel and Diane
Van Zandt, Thomas L. and Alice P.
Vanderbosch, Robert and Susanne
Vincow, Dina and Gershon
Viverette, Myrtle F. and Lynwood
Vonbacho, Elizabeth L. and Paul
Wacholtz, William F. and Margaret
Wagoner, Richard R.
Wakeham, Stuart G. and Brenda L.
Wallin, Ruth E. and Edward
Ward, Kenneth J. and Lynn G.
Wardinsky, Michael D. and Sherri
Warner, Isiah M. and Della
Warren, John L. and Rosana
Wasserman, Harriet M. and William J.
Waxdal, Myron J.
Waybright, Rosalie and Ryle
Wedlund, Peter J. and Shih-Ling C.
Werden, Scott H. and Rita Y. Marlowe
Westling, Mark E.
Whitaker, Tom J. and Terrye
White, Bernard H. and Joan I.
Whitenack, Donald C. and Mary N.
Whitford, Donald D. and Marilyn
Whitman, David A.
and Maura G. Donovan
Whitten, Gary Z. and Karen
Wilde, Richard E. and Sophia
Wilhelm, Mary E.
Wilkinson, William C. and Carol A.
Williams, Loren D. and Nidhi
Williams, Victor A.
Williamson, Donald P. and Kathryn
Williamson, Lorna J.
and Mark Tipperman
Wills, Max T.
Winder, Donald J.
Winter, Sharon L.
Winters, John R. and Dierdre
Wisnosky, Mark G.
Wong, Rebecca K. and David Nitka
Woo, Tek W.
Woodard, Michael J. and Nona
Woodley, Robert E. and Patsy
Worstell, Karen F. and Craig D.
Wright, Daniel A. and Elizabeth
Wu, Caicai
Wu, Jian and Hong Tian
Wurden, Glen A. and Nancy
Xia, Younan
Yarian, Dean R. and Darlyene
Yates, Ronald L.
and Maria F. Sablo-Yates
Yau, Alice Y.
Webb, Cathleen J. and Alan T. Yeates
Yoshimura, Arthur A.
Yunker, Wayne H. and Elaine
Zesiger, Judith C.
Zmiarovich, Thomas G. and Pamela

Recent Graduates

Master's Degrees

August, Summer Quarter 1998

John Bankston
Mason David Bryant
Michael Benton Free
Erin Michelle Gibbons

December, Autumn Quarter 1998

Frank Howland Carpenter, Jr.
Dirk Schweitzer
Scott Anthony Gerber

March, Winter Quarter 1999

Julie C. Adams
Kevin John Johnson
Wendy Jane Shaw

June, Spring Quarter 1999

Matthew Farrow
Eileen Puklin

August, Summer Quarter 1999

Byron Daniel Gates
Fallon Belva Savage
Stacy Marie Schulze

December, Autumn Quarter 1999

Katherine Rebecca Burrage
Jason Tyler Schuman
Charmaine Go Uy

March, Winter Quarter 2000

Teiko Breid
Leonard Sheldon Fifield
Cliff Frensley
Deanna Marie Shock
Dianne Margaret Smith

June, Spring Quarter 2000

Emily Jeanne Borda
Diane Carney
Vincent Harper Houmes
Heather Umbehocker Price
Wendy Dianne Taylor

Summer Quarter 1998

Haijun Dong, "Biosynthesis of validamycin A in streptomyces hygroscopicus var. limoneus." Professor Heinz Floss.

Christopher Lyle Stork, "Monitoring chemical systems in the presence of process and analyzer variations." Professor Bruce Kowalski.

Autumn Quarter 1998

Alexander Aronov, "Structure-based design of sub-micromolar, biologically active inhibitors of trypanosomatid glyceraldehyde-3-phosphate dehydrogenase." Professor Michael Gelb.

Jeanne Meyers Link, "Mixed-mode chromatographic separation and whole column radiation detection to improve sensitivity in radiometabolite analysis: Application to [carbon-11]-meta-hydroxyephedrine in plasma." Professor Robert Synovec.

Bryan Prazen, "Development of high speed hyphenated chromatographic analyzers and second order data analysis techniques." Professor Robert Synovec.

Susan L. Rempe, "Potential energy surfaces for vibrating hexatomic molecules." Professor Leon Slutsky.

Amy Katherine Snover, "The stable hydrogen isotopic composition of methane emitted from biomass burning and removed by toxic soils: Application to the atmospheric methane budget." Professors Paul Quay and Richard Gammon.

John Alan Stringer, "The design and analysis of solid state nuclear magnetic resonance probes for the determination of biomolecular structure." Professor Gary Drobny.

Toby Edward Young, "Water-only chemical analysis methodologies: Investigations of water liquid chromatography, subcritical water extraction, and dynamic surface tension detection." Professor Robert Synovec.

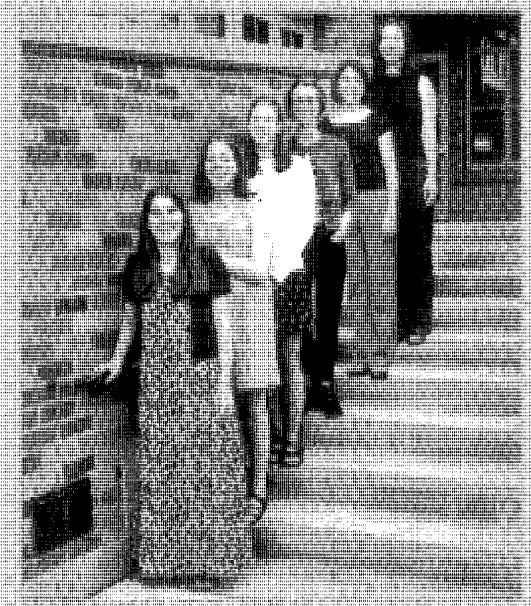
Winter Quarter 1999

M. Byron Kneller, "Controlling peptide conformations: Stabilizing helices." Professor Tomikazu Sasaki.

Alexei Nickolaevich Naimushin, "A transient polarization grating method to study tumbling and bending dynamics of DNA." Professor J. Michael Schurr.

Girls Just Want to Have Fun!!

The Y chromosome was not well-represented among the year 2000 group of Chemical Sciences Research Fellows. From top, the fellows were Michelle Su, Emily Baird, Kacey Claborn, Mebbie Beattie, Kimberly Klosoff, and Lisa Jones.



Michelle and Emily both worked with Professor Craig Roesch examining the kinetics of reactions between antigenic peptides and class II proteins of the major histocompatibility complex. Kacey studied with Professors Bart Kahr and Werner Kaminsky trying to understand the optical activity of molecular crystals, while Michelle was in Professor Sigurdsson's laboratory investigating the area of RNA labeling and ribozyme structures. Professor Sarah L. Keller was Kim's research adviser while she worked on various topics of biophysics, including the structure and function of the rubberlike polymer resilin. Lisa joined one of chemistry's newest groups, lead by new faculty Professor Nelia Frank, to study the formation of 6-4 photoproduct, a mutagenic lesion in DNA caused by UV light.

All but two women are biochemistry majors, with Kacey and Lisa both working toward their chemistry degrees.

The program, which gives honors students an immersion into scientific research from academic, governmental, and industrial points of view, is funded by the NSF, the Beckman, Dreyfus, Mary Gates and Miller foundations, UW Office of the Provost, and private contributions from friends and alumni of the Department of Chemistry. Please contact Professor Bart Kahr, honors program adviser (kahr@chem.washington.edu), if you'd like to contribute to the establishment of an endowment which would assure the continuity of this program.

Spring Quarter 1999

Peter Hodder, "Flow injection techniques for enzymatic and cellular drug discovery assays." Professor Jaromir Ruzicka.

Zhihong Liu, "Structural analysis of amylin and its analogs by NMR spectroscopy." Professor Niels Andersen.

Carmen Leah Rehder, "Quantitative microphysiometry: Development and applications." Professor Craig Beeson.

Jack S. Wiley, "C-H bond activation in iridium complexes." Professor D. Michael Heinekey.

Summer Quarter 1999

Cliona Mary Fleming, "Second order chemometric methods and the analysis of complex data." Professor Bruce Kowalski.

Wenlin Huang, "Distributions and fluxes of methyl halides in natural waters." Professor Richard Gammon.

William Thomas Grimes Johnson, "Synthesis of precursors of a highly pyramidalized alkene and *ab initio* calculations on methylenecyclopropane, cyclopropene, and 1,3-diradicals." Professor Weston Borden.

Autumn Quarter 1999

David W. Brinkley, "Thermal and photocatalytic oxidation of 2-propanol on rutile titanium dioxide (110) and (100)." Professor Thomas Engel.

Lisa M. Coyle, "Lifetime measurements on pressure sensitive paints: Temperature correction, effects of environment, and trials on new luminescent materials." Professor Martin Gouterman.

Michael Benton Free, "Thermal modulation of microcalorimetric sensors for chemical analysis." Professor Robert Synovec.

Eric Alexander Harwood, "Chemical synthesis and structural characterization of a nitrous acid interstrand cross-linked duplex DNA." Professor Paul Hopkins.

Linda Suna Jung, "Quantitative kinetic analyses of adsorption and desorption processes at the liquid-solid interface with surface plasmon resonance." Professor Charles Campbell.

Ilkka Johannes Lahdesmaki, "Flow injection methods for drug-receptor interaction studies, based on probing cell metabolism." Professors Jaromir Ruzicka and Philip Malte.

Ryan Austin Luce, "Investigations of DNA aducts of adriamycin and molecular interactions between DNA and xUBF box 1." Professor Paul Hopkins.

Jennifer Lynn Morford, "The geochemistry of redox-sensitive trace metals." Professor Steven Emerson.

Jonathan Wesley Neidigh, "Chemical shift tools in peptide folding and miniature protein design." Professor Niels Andersen.

Paul Richard Shipley, "The biosynthesis of the thiopeptide antibiotic thiostrepton." Professor Heinz Floss.

Winter Quarter 2000

Lynn Marie Amon, "Methods for calculating the free energy of atomic clusters." Professor William Reinhardt.

Tracey Lynn Baas, "The design, synthesis, and characterization of template assembled synthetic proteins." Professor Tomikazu Sasaki.

James Lynn Colony, "Studies on the biosynthesis of taxol." Professor Heinz Floss.

Steven Gregory Gerst, "The deuterium content of atmospheric molecular hydrogen." Professors Paul Quay and Richard Gammon.

Yiding Hu, "The biosynthesis of manumycin type metabolites." Professor Heinz Floss.

Keith Edward Miller, "Dynamic surface tension detector in flow injection analysis and liquid chromatography." Professor Robert Synovec.

Matthew Perry Philpott, "Time-resolved resonance Raman and femtosecond pump-probe study of chlorine dioxide (OClO) photochemistry in solution." Professor Philip Reid.

Sarah L. Keller has a childlike enthusiasm for science and there is no doubt her students have already fallen under her spell.

Her recent appointment as an assistant professor of chemistry at the UW allows her the opportunity to study the connections between monolayer and bilayer membranes. While there is considerable research on each alone, Sarah says the time is ripe for a researcher to connect the two bodies of work. In conjunction, she will study how the miscibility of lipids is related to the formation of different domains within a membrane. These membrane domains, or "rafts," are thought to have important roles in a cell membrane, such as enhancing signaling.

Her doctoral thesis in the Department of Physics at Princeton University documented how the activity of an ion channel called "alamethicin" changed dramatically with the lipid composition of the membrane. Her first post-doctoral assignment was in chemical engineering at the University of California at Santa Barbara where she did cryo electron microscopy of membrane and surfactant systems with Joe Zasadzinski. From there, she moved on to a second post-doctoral assignment in chemistry at Stanford University with Harden McConnell. At Stanford she became interested in using fluorescence microscopy to visualize domains in lipid monolayers.

A big reason that Sarah was attracted to UW's Department of Chemistry is because of its appreciation of her background in physics. Sarah notes that although many universities advertise that they are multidisciplinary, at UW there are unusually low barriers between different departments, which facilitates the flow of ideas and students from one field into another.

One of Sarah's concerns is that society should be familiar with some basic science so that good decisions can be made about topics such as energy production and use, how much stress forests and streams can actually take, and the rise of drug-resistant bacteria through the overuse of antibiotics in products such as antibacterial soap. While at Princeton, she served for a year on a committee that wrote the sexual-assault policy for the university. Although it was time-consuming and involved high emotions and difficult questions, Sarah felt that it was an important contribution to the community.

In Sarah's former life, which included some spare time, she studied art such as drawing, painting, and sculpture. Lithography fascinates her because it is entirely based on hydrophobicity and hydrophilicity. Two years ago she briefly took up pottery, and learned that the best potters have a very deep knowledge of chemistry in order to create the right blends of clay and glaze. Sarah says she's a better scientist because of the art she has done and that she's able to communicate better with machinists because she's able to sketch what she wants to build.

Sarah Keller

Other past activities include stints as a DJ at independent college radio stations. She loves traveling and has been dreaming about a trip to Turkey, but has been recently limited to countries which invite her for scientific conferences. She still tries to occasionally go dancing, biking, and hiking. Her partner, Robert Carlson, is a biological physicist.

ınd Biophysical Chemistry Research
ıssistant Professors

Younan Xia

Eighteen years ago in the People's Republic of China, less than ten percent of high school graduates were allowed to matriculate in college (and were usually told by their teachers which college they would attend). Four years later, less than ten percent of those with college degrees would have the chance to go on to graduate school.

One of the lucky few who was selected to pursue higher education is UW Assistant Professor of Chemistry Younan Xia, also an adjunct professor in the Department of Materials Sciences and Engineering.

Xia was still in China during the Tiannamen Square uprisings and even though he was far from Beijing, he kept abreast of the situation through listening to the Voice of America and watching TV from Hong Kong and Taiwan. His friends even received faxes from America.

Younan joined in the local demonstrations, as did most Chinese college students. They rooted for democracy (although it was not a concept they fully understood) and against corruption and graft. After the uprisings, Younan realized the high cost that Chinese students were paying for their disobedience. So in 1991, two years after China's most recent (and failed) revolution, he left an Institute of the Chinese Academy of Sciences and came to America to pursue his Ph.D. at the University of Pennsylvania.

He left Penn two years later with a master's degree in polymer chemistry under the direction of Professor Alan G. MacDiarmid (winner of the 2000 Nobel Prize in Chemistry). He then went to Harvard University and completed his Ph.D. and one year of post-doctoral work with Professor George M. Whitesides. Younan's work at this time was on surface chemistry, microfabrication and applied optics.

Since arriving at the University of Washington in the summer of 1997, Younan's group has been working on the development of new chemistry, physics, and technological applications related to nanostructured materials—a class of novel materials whose building blocks have at least one lateral dimension between 1 and 100 nm. Their current activities have been organized into the following three major components:

a) Development of self-assembly approaches to the fabrication of photonic bandgap crystals—a new class of materials that can control the propagation of photons in the same way as a semiconductor does for electrons.

b) Development of unconventional approaches to the fabrication of nanostructures from various types of functional materials.

c) Investigation of new phenomena associated with nanostructures such as size-confined excitation and transport of electrons.

Last year alone, Xia's scientific creativity and insight were rewarded with a David and Lucile Packard Fellowship, an Alfred P. Sloan Research Fellowship, and an Early Career Development Award from the National Science Foundation. During his first two years at the UW, he also won the Victor K. LaMer Award from the ACS Colloid and Surface Chemistry Division, and a Camille and Henry Dreyfus New Faculty Award.

Even though Younan has left his childhood home, he still mostly thinks in Chinese (except for science, now thought of only in English). He and his wife enjoy renting Chinese movies and they appreciate the strong Chinese community in Seattle. He has kept up his connections with his friends still in China and has even gone back twice to do some graduate student recruiting for the Department of Chemistry at China's most prestigious academies.

Brian Holm

Artisan and Athlete: Outstanding Staff Award Received

Brian Holm knows only one way to do things. Perfectly and at open throttle.

It doesn't matter if he's wearing his machine shop welding shield or his water skiing crash helmet, Brian works with a precision and vigor which leave little, if any, room for improvement.

Whether Brian is designing and building a scanning tunneling microscope to meet a researcher's specifications, making flow injection cells, modifying glove boxes, making commercial-quality NMR probes, fabricating a muffler for the liquid nitrogen cylinders on the loading dock which redirects sounds, landscaping his garden, performing aerial acrobats on water skis, or painting his own Christmas cards–he applies exacting standards to each task and he works with impressive alacrity.

In recognition of these qualities plus his win-win attitude, Brian was named a recent recipient of the Department of Chemistry's Outstanding Staff Award. Brian has been an instrument maker in the machine shop for the last thirteen years, and has been its supervisor for the past three.

His "job of a lifetime" requires technical acumen as well as highly developed interpersonal skills. Researchers may have only a vague picture in mind of what they need and they'll first ask for an estimate of time and the cost of supplies and labor. As Brian reviews the proposal and helps them iron out their design, he often suggests ways of making the device using less expensive materials or within a shorter time frame. His input is encouraged and he is considered an integral part of the research team. Not infrequently is he given official acknowledgment in students' dissertations.

Brian's pen rendering of his former pet, an Umbrella Cockatoo named Rocky.

Brian is also known for the ramp he designed and built a few years ago enabling the new baby ducklings born near Drumheller Fountain each spring to get in and out of the water before they learn to fly. The ramp has little wooden treads so that the chicks don't lose their footing and there is a floating dock on the bottom of the ramp for the birds to sun themselves.

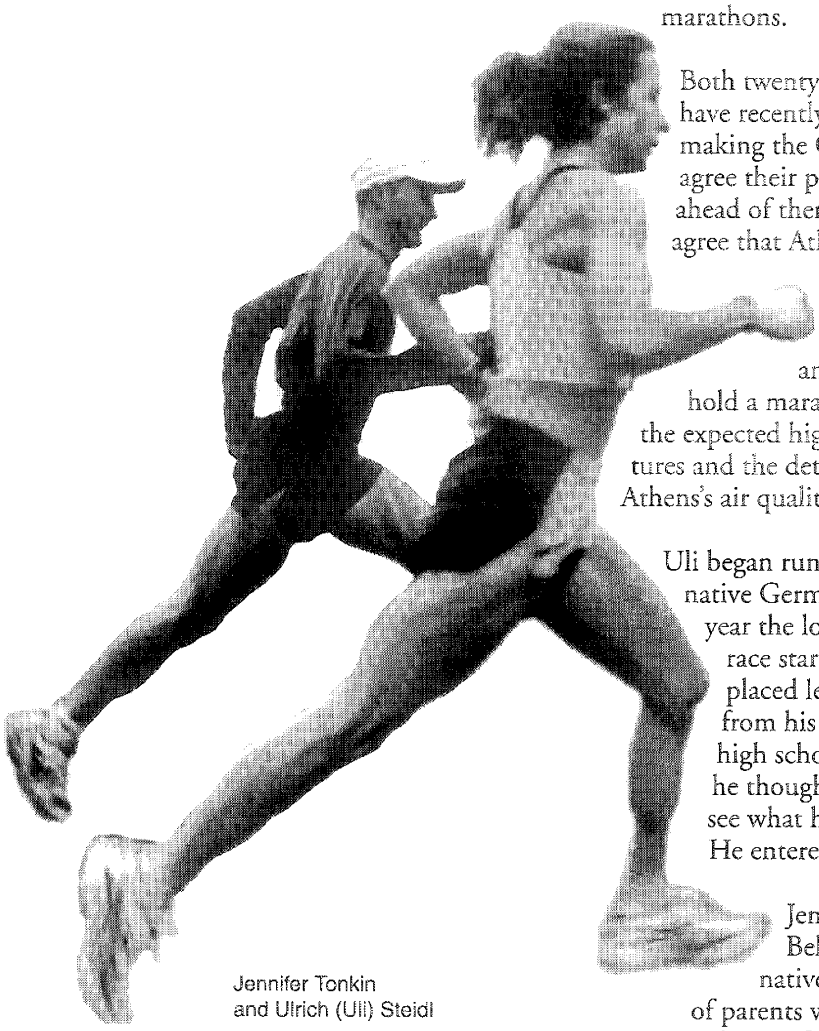
Away from chemistry, Brian's athletic talents are equally noteworthy. What started as a deathly fear of the water as a child has become a love for speed and risk. Brian now ranks nationally among the top ten water skiers in the country in his age group. The sport has three main events, combining slalom skiing with trick skiing and jumping, which is scored exclusively on distance.

Currently the nation's third best water ski jumper in his age range, Brian's longest jump is 142 feet. Because the lead boat is limited to thirty-two mph as it approaches the stationary ramp, it is necessary for the skier to generate additional speed. By increasing his arc and delaying his approach to the ramp as long as possible, Brian reaches speeds of roughly sixty miles per hour.

Brian participates in triathlons and came in second when he entered his first competition. Brian also snow skis, scuba dives, and wind surfs. He's climbed Mt. Rainier twice. However, he's not much on fishing. All that sitting and waiting, you know.

Only upon recently meeting his girlfriend did Brian's kitchen talents become evident. Before, his refrigerator was always empty and he admitted to eating out every night of the week. He even had to replace his garbage disposal a few years ago after it rusted because of neglect.

Olympic Dreams Drive Chemistry Graduate Students



Jennifer Tonkin and Ulrich (Uli) Steidl

Most chemistry graduate students become proficient at running reactions, running columns, and even running ragged, at times.

For advanced chemistry graduate students Jennifer Tonkin and German-born Ulrich (Uli) Steidl, they are equally, if not more, adept at running time trials, road races, and marathons.

Both twenty-somethings have recently come close to making the Olympics, and agree their peak years are ahead of them. Both also agree that Athens, the site of 2004's summer games, is not an ideal place to hold a marathon, owing to the expected high temperatures and the deterioration of Athens's air quality.

Uli began running in his native Germany when one year the local 10K road race starting line was placed less than a block from his home during high school. Curious, he thought why not go see what he could do? He entered. He won.

Jennifer, a Bellevue, WA native, is the child of parents who took up running in the 70s for fitness and as a youngster, she just tagged along. When she was only six years old, Jennifer ran her first 10K road race with her mom. Despite her diminutive size and the bigger kids telling her she'd never finish, she proved them wrong.

For both graduate students, their running beginnings were humble but their accomplishments today are monumental.

Uli's gone on to win a triumvirate of major northwest marathons (Seattle, Portland, and Vancouver, B.C.) and almost qualified for the 2000 Olympics after placing eighth in a marathon in Pyongyang, North Korea with a time of 2:13:56. This time met the International Amateur Athletics Federation's standard for Olympic qualification (2:14:00), but the Germans adhere to a stricter standard and require a sub-2:12:00 from their athletes to qualify for the Games.

Recently, Uli generated local headlines when he won the Seattle Marathon for the second straight year, despite some ankle problems from a little off-trail running accident the weekend before.

Jennifer also has won every major Pacific Northwest race she's entered. She is ranked 12th in the U. S. Road Racing circuit this year and during the summer of 2000, she placed 12th in the marathon Olympic Time Trials in Columbia, South Carolina. Since only the top three were allowed on the team, her consolation was a handshake from President Clinton and an invitation to the Olympic Training Center, aimed at developing the nation's top marathon runners. Jennifer has been ranked as high as eighth in the U.S. women's marathon.

While Uli waits for the post-Athens summer Olympics, he continues as a fourth-year graduate student in Professor Bob Charlson's laboratory, where he is trying to analyze organic aerosols in order to better understand their physical properties that are important input parameters for climate models. For years, scientists only measured the inorganic ions, but doing so paints an incomplete picture because in some cases, organic components are more than 50% of the aerosol mass. Uli has used electrospray mass spectrometry for molecular speciation of the organic fraction but it's not proving as useful as once hoped. Yet, he perserveres in his science as he does in his running. At the University of Portland, he won the award for the outstanding

continued on next page

OUTSTAND

graduating chemistry major. A "Global and Environmental Change Fellowship" supports Uli's research at UW.

Jennifer is a fifth-year student with oceanography professor Jim

Murray (adjunct in chemistry), where she uses a combination of field, laboratory and modeling studies to investigate the fate and transport of trace metals in the environment. Jennifer is funded by the U.S. Geological Survey and her recent samplings were taken from EPA Superfund sites around Kellogg, ID which have been contaminated by mining activities. As Kellogg is the second largest Superfund site in the United States, Jennifer's work is of great significance.

Many of the nation's top runners live and train at high altitude, which results in greater red cell production, which in turn gives a considerable boost to a distance runner's cardiovascular capacity. Despite being seasiders, Uli and Jennifer have made great progress and that makes their accomplishments that much more impressive.

Interestingly, Uli doesn't traditionally weight train for his marathons, as a lot of his daily running is up hills and that has served as adequate resistance training. At a UW sports facility, Uli's body fat content was measured at 4.5%.

In order to challenge her body in a different way, Jennifer has begun weight training because she is planning on racing on the track soon. Being adaptable and in better shape allows her to try different tactical approaches in her racing. The planning portion of a training program, as well as the training itself, are joyful parts of her sport for Jennifer. Today, her body fat composition is 8.8%.

Snow shoeing, biking 50 miles to Mt. Index and back, climbing Mt. Rainier three times . . . . . these are the things Uli does in his spare time. Jennifer also counts climbing Mt. Rainier (twice), going dancing with friends, playing classical piano, and track and field events as her interests apart from marathons.

By the time of the 2004 games, both Uli and Jennifer will be finished with their academic studies and the Olympic officials will have to address them as "Doctor." Both graduate students look forward to the opportunity of making their Olympic teams but even if that day never comes, their memories will never leave them.

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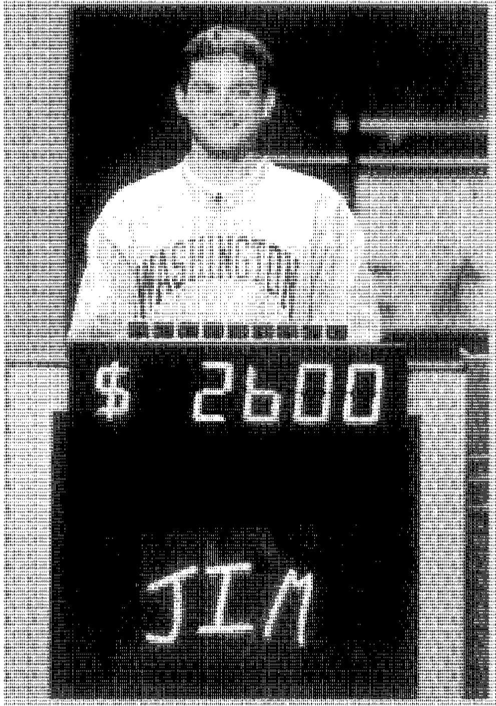
Sigma Diagnostics in St. Louis, MO. **Wesley Lingren (Ph.D. 1962)** is now retired from 40 years of teaching/research/administration at Seattle Pacific University. When he's not traveling or working on building projects, he is compiling a history of SPU's athletic program. **Tom Luther (Ph.D. 1997)** is a senior scientist at the Idaho National Engineering and Environmental Laboratory (one of the DOE's multi-program labs). Currently he is involved in the synthesis, characterization, and testing of new polyphosphazenes for use as membranes in separation and/or transport applications. He is also the system administrator responsible for a Bruker 300WB NMR spectrometer that has high resolution liquids, solid-state, and micro-imaging capabilities (it is the only one in the world that is set up to do all three). He and his wife have two children, aged five and four months. **Thao Van Nguyen (B.S. Biochemistry, B.S. Bioengineering, 1998)** has started her second year of medical school at the UW. **T. Oommen (Ph.D. 1970)** retired from the ABB Corporation in Raleigh, NC last year and also received the 'Top 100 Inventions in 2000' award from "R&D" magazine for the development of a biodegradeable, electrical insulating fluid made from vegetable oil. He remains active as a consultant and continues to publish. **Tristan Osborn (B.S. Biochemistry and Mathematics, 1996)** is in his third year of medical school at the UW, where he will earn a combined M.D./Ph.D. in biochemistry. **Philip W. Phillips (Ph.D. 1982)** is a professor of physics at the University of Illinois at Urbana Champaign. In addition to being elected a general councillor of the American Physics Society, Philip was the recipient of the 2000 Edward A. Bouchet Award of the American Physical Society. **Deborah Schindele (Ph.D. 1986)** is now living in Hawaii with her two children after having worked at ICOS Corporation in Seattle for many years. ICOS is a Bill Gates-funded biotechnology company and Debbie's responsibilities included strategic planning and corporate development. She is currently doing investing and personal strategic and financial planning in Maui and spends any free time she has with her kids–swimming, surfing, snorkeling, etc. **Shelley Slate (B.S. Biochemistry, 1998)** currently attends graduate school at the UW in the School of Public Health's Department of Epidemiology. **Jay K. Trautman (B.S. 1983, Cornell Ph.D. 1987)** is the vice president of genomics and screening technology at Praelux in Lawrenceville, NJ. **Mary Trute (B.S. Chemistry, 1999)** is in her first year of graduate study in the UW College of Forest Resources. She is emphasizing analytical chemistry in her work. **Mirna Vitasovic (B.S. Chemistry, 1999)** has started her first year of physical chemistry graduate school at the Massachusetts Institute of Technology. While at the UW, Mirna did her undergraduate research with Professor Martin Gouterman on pressure-sensitive porphyrin paint. In addition to earning Departmental Honors and Phi Beta Kappa distinction, Mirna was a *summa cum laude* graduate. She entered college through the UW Early Entrance Program when she was 14 years old and recently entered graduate school at 18 years of age. **Kevin L. Wolfe (Ph.D. 1969)** died several years ago. He had been a professor of chemistry at Texas A&M and at a past Dallas ACS meeting, his work was honored with a seminar in his memory. **Daniel Wright (B.S 1989)** earned his Ph.D. in physical chemistry from UC Berekely and now works as a computer programmer for a consulting company called AERIE in San Rafael, CA. They are involved in the telecommunications, railway, and utilities industries. Dan and his wife have a ten-year old daughter. **Jin Z. Zhang (Ph.D. 1994)** is an associate professor of chemistry at the University of California at Santa Cruz. As an experimental physical chemist, Jin studies nano-materials and polymer chemistry, photodrugs, femtosecond laser spectroscopy and ultrafast reaction dynamics at interfaces and in solutions, among other topics.

Alumna **Wenlin Huang (Ph.D. Summer 1999)** works in the Toxicology Branch of the National Center for Environmental Health (NCEH), one of the Centers for Disease Control and Prevention (CDC) units in Atlanta. Her current research is to develop a method to measure polycyclic aromatic hydrocarbons (PAH) in urine samples and write a national standard for state labs and hospitals, medical centers, etc. Her husband, on the left, has a Ph.D. in theoretical nuclear physics and did his post-doctoral work at the UW. Wenlin's doctoral supervisor, Professor Richard H. Gammon, is on the right.

Wenlin Huang



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What is "CHEMISTRY"?

Even though Jim Gibson was not a huge fan of the nightly television program "Jeopardy," he decided to participate in the contestant tryout when the show taped a week's worth of programs at the UW last summer.

After all, this was only the second time that "College Jeopardy" had filmed on a campus. The show's producers realized after taping at Berkeley last year it had a big ratings gimmick on its hands.

Jim, a junior chemistry major from Spokane, was still standing when the initial 1000 hopefuls were whittled down to a group of about ten UW students. Not bad for a guy whose tastes run more toward "The Simpsons" and "Seinfeld" rather than the "Discovery" channel.

After certifying his scholarly credentials, the tough stuff really began. First, the chosen were asked to play mock games before the producers, complete with buzzers and individual podiums and flashing lights. Not unlike a beauty contest, people were then interviewed by the producers on camera and still photographs were taken. The program's send-off was a huge "don't call us; we'll call you."

In a way, Jim was a perfect candidate for the type of often arcane answers which "Jeopardy" seeks. In addition to his undergraduate research work in Professor Karen Goldberg's laboratory on the synthesis of novel polydentate ligands for use in organometallic reactions, Jim is a history buff and he prepared for the television show by reading a few almanacs. He knows all the capitals in the world. Jim loves to read about other cultures and avidly reads foreign magazines and newspapers. He enjoys a wide range of music and he's a true fan of British culture, politics, and music.

Jim recalls that wearing television make-up for the first time was weird although staying at the tony Sheraton hotel more than made up for a little rouge and eyeliner. Each contestant was required to wear a sweatshirt from their respective schools. Unfortunately, Jim had to buy his own shirt while all the other universities supplied their students with the proper attire.

But, despite that little bit of institutional neglect, Jim loved the overall experience. Alex Trebek was a witty, mischievous guy who was instantly likeable. And, Jim says that the best part was making fourteen new friends from all over the country with whom he still corresponds and plans to visit. Not a bad legacy, considering he also won $4500 and missed being in the semi-finals by one person. Europe awaits him and his prize money.

The shows, which were scheduled to run the night after the presidential election, were delayed about a week last fall.