

CHEMISTRY

Connection

Northwestern University Department of Chemistry • Spring 2010

New Silverman Hall Designed as Crossroads for Medical Discoveries

Northwestern's Richard and Barbara Silverman Hall for Molecular Therapeutics and Diagnostics, a new building that will encourage discoveries at the intersections of multiple scientific disciplines, was dedicated on November 12. Silverman Hall is home to approximately 245 researchers and staff in 17 research groups. The facility brings together faculty, graduate students, postdoctoral fellows, staff, and undergraduates from chemistry, other physical sciences, life sciences, and engineering to address fundamental questions in biomedical research and to develop new medicines and diagnostics.

Located at 2170 Campus Drive on the Evanston campus, the \$100 million building is named for Richard B. Silverman, the John Evans Professor of Chemistry, and his wife, Barbara. In 1989 Silverman and his Northwestern research group first synthesized an organic molecule that, as the drug Lyrica, was eventually marketed by Pfizer to combat epilepsy, neuropathic pain, and fibromyalgia. Silverman donated a portion of his Lyrica royalties to Northwestern to help fund the building's construction.

"Silverman Hall will provide state-of-the-art facilities for the important research that is being done at Northwestern," said President Morton



From left at the Silverman Hall ribbon-cutting ceremony: Thomas V. O'Halloran, President Emeritus Henry Bienen, Weinberg Dean Sarah Mangelsdorf, Barbara Silverman, Richard Silverman, Provost Daniel Linzer, President Morton Schapiro, McCormick Dean Julio Ottino

Schapiro, who spoke at the ribbon-cutting ceremony. "The interdisciplinary approach to research and teaching that is a hallmark of Northwestern will be greatly enhanced by this wonderful new building." Also participating in the ceremony were Provost Daniel Linzer and Thomas V. O'Halloran, Charles E. and Emma H. Morrison Professor of Chemistry and director of the Chemistry of Life Processes Institute.

Totalling 147,000 square feet, Silverman Hall has four stories above ground and one below. Each of the five floors has research laboratories and student offices; faculty offices are located on the third and fourth floors. The building was designed by Zimmer Gunsul Frasca Partnership, the same firm that designed the adjacent Patrick G. and Shirley W. Ryan Hall and Pancoe-NorthShore University HealthSystems Life Sciences Pavilion.

In accordance with Northwestern's policy of using environmentally sustainable design for its new buildings, Silverman Hall has been designed as a green building. The University expects the building to receive Gold Level certification from the Leadership in Energy and Environmental Design.

Chemistry Trio Honored by ACS

Northwestern's chemistry department has achieved a historic first: three faculty members have received awards from the American Chemical Society in the same year. The three were featured in a recent issue of the ACS publication *Chemical and Engineering News (C&E News)* and were honored at a March 23 awards ceremony in conjunction with the 239th ACS national meeting in San Francisco.



George C. Schatz, Charles E. and Emma H. Morrison Professor of

Chemistry, received the 2010 Peter Debye Award in Physical Chemistry, which honors outstanding research in physical chemistry. He also was named to the inaugural class of ACS Fellows.

Peter C. Stair, professor of chemistry and director of the Center for Catalysis and Surface Science, received the 2010 George A. Olah Award in Hydrocarbon or Petroleum Chemistry. The award recognizes outstanding research achievements in hydrocarbon or petroleum chemistry.



to the science of analytical chemistry, pure or applied, carried out in the United States or Canada.

Richard P. Van Duyne, Charles E. and Emma H. Morrison Professor of Chemistry, received the 2010 ACS Award in Analytical Chemistry. It recognizes outstanding contributions

Inaugural Morrison Lectures

Chemistry faculty members **Brian Hoffman** and **Mercouri G. Kanatzidis** delivered their inaugural lectures as Charles E. and Emma H. Morrison Professors of Chemistry on November 20 at the Technological Institute.

Brian Hoffman's inaugural Morrison Lecture, "Riding Three Horses," described his research group's pioneering use of electron-nuclear double resonance, a combination of NMR and EPR spectroscopies, to determine metalloenzyme mechanisms. His presentation highlighted progress in determining the mechanism of nitrogen fixation — the reduction of dinitrogen to two ammonia molecules — by the enzyme nitrogenase, a process essential for all life.

A Northwestern faculty member since 1967, Hoffman is Morrison Professor of Chemistry and of biochemistry, molecular biology, and cell biology at Northwestern. He received his undergraduate degree in chemistry from the University of Chicago and his PhD from the California Institute of Technology. His research interests include electron paramagnetic resonance and electron-nuclear double resonance (ENDOR) studies of metalloenzymes, long-range electron transfer within protein complexes, and the synthesis and application of new porphyrine metallomacrocycles. He has authored more than 500 technical publications in these areas.

Hoffman is a member of the National Academy of Sciences and a fellow of the American Association for the Advancement of Science, the American Academy of Arts and Sciences, and the International Society of Magnetic Resonance. His other honors and awards include the Royal Society of Chemistry 1997 Bruker Prize, the International EPR Society 1999 Gold Medal,



Top (from left): Weinberg Dean Sarah Mangelsdorf, Brian Hoffman, Mercouri Kanatzidis, and Joseph Hupp, then chair of the chemistry department

the Russian Academy of Sciences 2006 Zavoisky Prize, and the Max Planck Society 2008 Frontiers in Biological Chemistry Award.

Mercouri Kanatzidis devoted his inaugural Morrison Lecture, "First Comes the Synthesis: Pursuing the Unimaginable," to discussing his approach toward materials design, synthesis, and discovery as well as high-impact developments that become possible after such discoveries. He described how synthesis and discovery play a key role in chemistry, resulting in considerable progress toward "materials design."

Kanatzidis holds a joint appointment at Argonne National Laboratory's Materials Science Division in addition to his chemistry professorship at Northwestern. After earning a BSc from Greece's Aristotle University and a PhD in chemistry from the University of Iowa, he was a post-doctoral research associate at Northwestern and the University of Michigan. His broad research

interests in solid-state inorganic chemistry include exploratory synthesis in chalcogenide compounds, intermetallics, thermoelectric materials, and porous semiconductors.

Author of more than 600 publications, Kanatzidis has been named a Presidential Young Investigator, Beckman Young Investigator, Alfred P. Sloan Fellow, Camille and Henry Dreyfus Teacher Scholar, and John Simon Guggenheim Foundation Fellow. His other honors include the Sigma Xi 2000 Senior Meritorious Faculty Award, the 2003 Alexander von Humboldt Prize, and the Chemical Society's 2003 Morley Medal.

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FACULTY NEWS



Tobin Marks



Teri W. Odom



Regan J. Thomson

Tobin Marks, Vladimir Ipatieff Research Professor in Organic Chemistry, was awarded the 2010 William H. Nichols Medal in New York on March 5. One of the nation's oldest and most prestigious chemistry awards, the medal was created by William H. Nichols in 1902 to recognize creative research and provide a forum for the exchange of scholarly ideas.

Thomas Meade, the Eileen Foell Professor of Chemistry, was named the 2009 winner of the iCON Innovator Award (university level). Honoring leaders who nurture education, training, and scholarship in the life sciences in Illinois, the award was presented on October 15 in Chicago. Previous winners include Chad Mirkin, George H. Rathmann Professor of Chemistry.

Teri W. Odom, associate professor of chemistry and Dow Chemical Company Research Professor, received the 2009 Outstanding Young Investigator Award from the Materials Research Society at last year's MRS spring meeting in San Francisco. The award recognizes outstanding interdisciplinary scientific work in materials research. Odom, who holds a joint appointment in the McCormick School of Engineering and Applied Science's Department of Materials Science and Engineering, has pioneered chemical nanofabrication, a new area that combines chemistry and fabrication to assemble functional nanomaterials.

Richard B. Silverman, John Evans Professor of Chemistry, has been awarded the Perkin Medal by the Society of Chemical Industry. The prestigious international award is the highest honor conferred in the United States for applied chemistry. Silverman's interdisciplinary research group investigates the molecular mechanisms of drug action and enzymes. In 1989 he and his group first synthesized an organic molecule that was eventually marketed as the drug Lyrica.

Regan J. Thomson, assistant professor of chemistry, has won a prestigious Faculty Early Career Development Award in organic chemistry from the National Science Foundation. These highly competitive awards recognize excellence in integrated research and education. Thomson, who joined the chemistry department in 2006, will use the \$500,000, five-year grant to fund his work on new reaction design and the synthesis of complex biologically active molecules. This is Thomson's second major U.S. government grant, following a five-year RO1 award from the National Institutes of Health.

Emily A. Weiss, assistant professor of chemistry, was awarded an Air Force Young Investigator Award. Open to scientists and engineers at U.S. research institutions who have received a PhD or equivalent degree in the last five years and show exceptional ability and promise, the Young Investigator Research Program is designed to foster creative basic research in science and engineering. Weiss will focus on the study of electrochemical reduction of CO₂ at a TiO₂ electrode using quantum dots as multielectron shuttles.

Mirkin Named to Obama's Science and Technology Advisory Council

Northwestern researcher **Chad A. Mirkin** (see photo on page 4), the world's top-cited researcher in nanomedicine and one of the most widely cited chemists, has been named to the President's Council of Advisors on Science and Technology, an advisory group of the nation's leading scientists and engineers. President Barack Obama announced the names of the 20 PCAST members in a speech at the National Academy of Sciences on April 27, 2009.

"This council represents leaders from many scientific disciplines who will bring a diversity of experience and views," said President Obama. "I will charge PCAST with advising me about national strategies to nurture and sustain a culture of scientific innovation."

Mirkin is the George B. Rathmann Professor of Chemistry and professor of medicine, biomedical engineering, and materials science and engineering. Also director of Northwestern's International Institute for Nanotechnology, Mirkin is an expert in nanotechnology research and application, including nanoscale manufacturing and applications to medicine. He is renowned for his invention and development of biological and chemical diagnostic systems based on nanomaterials and is the inventor and chief developer of Dip-Pen Nanolithography, a groundbreaking nanoscale fabrication and analytical tool.

A member of the National Academy of Engineering, Mirkin has been recognized with more than 50 national and international awards for his advances. Last year he was selected by the U.S. Department of Defense as an inaugural fellow in the department's new National Security Science and Engineering Faculty Fellows Program, and in 2004 he received the Director's Pioneer Award from the National Institutes of Health; he is the only person to receive both awards.

Energy Frontier Research Centers

On April 27, 2009, the White House announced \$777 million in funding over five years for establishing 46 Energy Frontier Research Centers at U.S. universities, national laboratories, nonprofit organizations, and private firms. Of the four multi-million-dollar centers in Illinois, two are at Northwestern: the Argonne-Northwestern Solar Energy Research Center (ANSER), led by Michael Wasielewski, professor of chemistry, and the Non-Equilibrium Energy Research Center (NERC), led by Bartosz Grzybowski, professor of chemistry. The other two Illinois centers are at Argonne National Laboratory.

Fracture Putty for Bone Injuries

A Northwestern research team is part of a multi-institution initiative to produce “fracture putty,” a biocompatible compound designed to mend serious leg fractures, such as those suffered by soldiers. The two-year research project is funded by the Defense Advanced Research Projects Agency (DARPA), an agency of the U.S. Department of Defense, and includes the University of Texas Health Science Center at Houston (UTHSC-H) and Harvard University as research partners.

The research team’s goal is to develop a putty-like material that could be used to regenerate bones shattered by roadside bombs or other explosive devices. This type of injury, called a nonunion fracture, generally will not heal in a timely manner and can lead to amputation.

Samuel Stupp, director of Northwestern’s Institute for Bionanotechnology in Medicine

(IBNAM), is leading the University’s portion of the research. He and Ramille Capito, a research assistant professor in Stupp’s lab, are developing new materials based on nanotechnology



to make bone regenerate, using bioactive peptide amphiphile (PA) molecules developed at IBNAM as the major bioactive component of the fracture putty.

Serious injuries typically are repaired with bone grafts. Pins, plates, or screws hold the grafts to healthy bone, and external fixators provide support. Soldiers may require multiple surgeries and long recuperation periods, and they may not recoup full use of the injured leg. If fracture putty proves successful, injured soldiers could fundamentally regain full use of their legs in a much shorter period of time. It could also be used in emergency rooms to treat civilians injured in traffic accidents and other traumatic events.

“New technology is needed to treat in the field the devastating tissue injuries sustained by soldiers that often lead to amputation,” says Stupp, Board of Trustees Professor of Materials Science and Engineering, Chemistry,

and Medicine. “The extremely demanding requirements of such technology could revolutionize many aspects of regenerative medicine in the civilian population.”

Detecting the Undetectable in Prostate Cancer Testing

A team of Northwestern researchers, using an extremely sensitive tool based on nanotechnology, has detected previously undetectable levels of prostate-specific antigen (PSA) in patients who have undergone radical prostatectomy. The researchers found measurable PSA levels in each postoperative patient in its study, thanks to the power of the nanoparticle-based bio-barcode assay developed at Northwestern.

The study is an early indicator of how nanotechnology can be used to improve medical diagnostics and early cancer detection. In the case of prostate cancer recurrence following primary surgical treatment, patients with detectable but nonrising PSA levels could be reassured that their cancer will not recur. This reassurance potentially could be delivered much earlier than with conventional diagnostic tools. For patients with increasing levels of PSA, detected before reaching a level detectable by conventional tools, doctors could diagnose a recurrence and intervene accordingly.

The new technology is 300 times more sensitive than commercially available PSA tests. After the removal of the prostate gland, patients typically have PSA levels that are undetectable by conventional diagnostic tools.

This ability to easily and quickly detect very low levels of PSA may enable doctors to diagnose men with prostate cancer recurrence years earlier than is currently possible. Prostate cancer is the second-leading cause of cancer death (after lung cancer) for men in the United States.

“We have defined a new zero for PSA,”



says **Chad A. Mirkin**, George B. Rathmann Professor of Chemistry and professor of medicine, biomedical engineering, and materials science and engineering.

“This level of sensitivity in detecting low concentrations of PSA will take the blinders off the medical community, especially when it comes to tracking residual disease.”

Published online in October by the *Proceedings of the National Academy of Sciences* (PNAS), the study was led by Mirkin and C. Shad Thaxton, assistant professor of urology at Northwestern’s Feinberg School of Medicine. Both are members of the Robert H. Lurie Comprehensive Cancer Center of Northwestern University.

The National Cancer Institute supported this research. In addition to Mirkin and Thaxton, the authors of the PNAS paper — “The Nanoparticle-Based Bio-Barcode Assay Redefines ‘Undetectable’ PSA and Biochemical Recurrence Following Radical Prostatectomy” — are Robert Elghanian, Audrey D. Thomas, Savka I. Stoeva, Jae-Seung Lee, Norm D. Smith, and Anthony J. Schaeffer of Northwestern as well as Helmut Klocker, Wolfgang Horninger, and Georg Bartsch of Innsbruck Medical University in Austria.

A Nuclear-Waste Venus Flytrap

Not every object is food to a Venus flytrap. Like the carnivorous plant, a new material developed at Northwestern permanently traps only its desired prey, the radioactive ion cesium — leaving sodium and other harmless ions alone.

The synthetic material, made from layers of a gallium, sulfur, and antimony compound, is very selective. Northwestern researchers found it to be extremely successful in removing cesium — found in nuclear waste and very difficult to clean up — from a sodium-heavy solution. (The solution had concentrations similar to those in real liquid nuclear waste.)

In fact, it is cesium itself that triggers a structural change in the material, causing it to snap shut its pores, or windows, and trap the cesium ions within. The material sequesters 100 percent of the cesium ions from the solution while ignoring all the sodium ions.

“Ideally we want to concentrate the radioactive material so it can be dealt with properly and the nonradioactive water thrown away,” says **Mercouri G. Kanatzidis**, Charles E. and Emma H. Morrison Professor of Chemistry and the paper’s senior author. “A new class of materials that takes advantage of the flytrap mechanism could lead to a much-needed breakthrough in nuclear waste remediation.”

Capturing only cesium from vast amounts of liquid nuclear waste is like looking for a needle in a haystack, says Kanatzidis. The waste has a much higher concentration of sodium compared

with cesium, with ratios as great as 1,000-to-1. This difficult-to-achieve selectivity is why there is currently no good solution for cesium removal.

The material developed at Northwestern is porous; its atoms are arranged in an open and layered framework structure with many windows to promote rapid ion exchange. Initially, organic cations reside in the material; when the material comes into contact with the liquid, the cations leave the material by going through the windows, and the cesium ions come in. In the end, the material contains only cesium ions and no organic cations.

The research results are published online by the journal *Nature Chemistry* in the paper "Selective Incarceration of Caesium Ions by Venus Flytrap Action of a Flexible Framework Sulfide." The National Science Foundation supported the research.

Meade's Work Advances Clinical Use of Nanodiamonds

A Northwestern study shows that coupling a magnetic resonance imaging (MRI) contrast agent to a nanodiamond results in dramatically

enhanced signal intensity and thus vivid image contrast.

"The results are a leap and not a small one — it is a game-changing event for sensitivity," says

Thomas J. Meade,

Eileen Foell Professor

of Chemistry, also a Feinberg School of Medicine faculty member. "This is an imaging agent on steroids. The complex is far more sensitive than anything else I've seen."

Meade led the study along with Dean Ho, assistant professor of biomedical engineering and mechanical engineering in the McCormick School of Engineering and Applied Science. Ho already has demonstrated that the nanodiamonds have excellent biocompatibility and can be used for efficient drug delivery. This new work paves the way for the clinical use of nanodiamonds to both deliver therapeutics and remotely track drug activity and location.

Published online by the journal *Nano Letters*, the study is also the first published report of nanodiamonds being imaged by MRI technology, to the best of the researchers' knowledge.

Award-Winning Faculty and Students



Fred Northrup (second from right), director of undergraduate studies, with the 2009 Chemistry Department Scholar Award winners. As part of the May 29 student awards ceremony at the Technological Institute, Douglas R. Worsnop, vice president of Aerodyne Research, gave the 2009 Marple-Schweitzer Memorial Lecture, "Aerosols in the Atmosphere: From the Ozone Hole to Climate Change."



Franz Geiger (left) presenting the 2009 L. Carroll King Lecture Award to Joseph S. Francisco, president of the American Chemical Society



Mercuri G. Kanatzidis (right) with Peter Stang, the 2009 Basolo Medal Awardee and Lecturer

Entering PhD Class of 1969 Returns for 40th Reunion

Fourteen members of the 1969 PhD entering class in chemistry returned to campus on Saturday, June 20, 2009, for the group's 40th reunion. At a reception in the newly renovated Tech K140, they were excited to see one another and catch up on all their achievements and family news. Professors Fred Lewis and Louis Allred joined them for a photo on the steps of Tech. Assistant department chair Teri Collins led the group on a tour, and several mentioned that they had been around for the construction of the Hogan Building; they were surprised to see how much construction had occurred behind Tech since then. Lots of good news from these alumni. . . .

Katherine H. Chen (PhD '74, Lorand)

I did postdoctoral work for three years at Harvard Medical School—Children's Hospital in connective tissue diseases and cellular aging while my husband, Frank, was completing his doctor of science degree in mechanical engineering at MIT. In 1976 we relocated to the San Francisco Bay area, where Frank worked in fusion research at Lawrence Livermore National Laboratory and I completed additional postdoctoral work in connective tissue diseases at the University of California, San Francisco. After a year of training in clinical chemistry, I began working as a clinical chemist at San Francisco General Hospital, a UCSF teaching hospital, where in 1984 I was promoted to supervisor of special chemistry in the clinical laboratory. In more than 28 years there, I've expanded the special chemistry

testing menu by including GCMS for drug confirmation, flow cytometry for T-cell subset quantification, and anodic stripping voltametry for lead testing. More recently we have developed tests for toxicology using LC-tandem MS. I've enjoyed teaching these testing methods to UCSF pathology residents, clinical lab scientist students, and lab personnel, and I have continued that aspect of the position since officially retiring in 2009.

Frank is retired and has several patents for projects he has developed. Our son, Warren, graduated from the University of California, Berkeley, and is working in information technology in Chicago. Our daughter, Claire, graduated from the University of California, Santa Barbara, in computer science and works for a Los Angeles software company.

Alfred J. Gray Jr. (PhD '75, Lorand)

After working for Abbott Laboratories for 22 years, I retired in 1998. For the past 10 years I have been a business development consultant for biotechnology companies, spending half my time working in Europe. My wife, Linda, and I live much of the year just outside Dallas and the other months at our farm south of Buffalo, Texas, near the rest of our families.

Our daughter, Heather, is an accountant with Nissan in Nashville; she and her husband have a son, Caden. Our son, Scot, runs the Bank of America in Coppell, Texas. He and his wife have a daughter, Braedy, and another child on the way.

Geoffrey Greene (PhD '74, Letsinger)

I did postdoctoral study at the University of Chicago and never left. Now, 35 years later, I am a professor with an active research group focused on hormone-dependent breast cancer. My wife, Marianne, is a pathologist. I have two daughters: Kirsten (with my first wife, Esther), who lives in California, and Alexa (with Marianne), who is starting high school.

Daniel R. Kory (PhD '74, Lewis)

I left Northwestern for Rohm & Haas, where they found out I was a lousy chemist, but after a couple of patents I was named to a marketing and technology consultant position. After five years I went to Owens Corning Fiberglass in a technology forecast and acquisitions role, eventually becoming the manager of corporate strategic planning. I left after 10 years to form my own technology consulting and acquisitions business, and after building it up to a staff of more than 20, I sold it and retired. I got bored and joined a family business in northwest Ohio, becoming a partner and director of research and development. After helping take the business public, I retired. I got bored, and eight years ago I joined the University of Toledo, where I started a technology transfer office and became vice president of intellectual property and technology transfer. I work with faculty to identify intellectual property and to procure and license patents. Our spin-off businesses have generated more than 1,000



From left: Steve Pabalan, Ian Simpson, Vicky Brautigan, Kathy Chen, Rolf Myhrman, Ms. Chen, and David Wing



Geoffrey Greene



Steve Pabalan and Kathy Chen



Professor Frederick Lewis (top left) and Professor Emeritus A. Louis Allred (top row, right) with the entering PhD class of 1969 on the steps of Tech



Four reunion attendees ready to pull a Tech safety shower

new jobs in Toledo and several million dollars for the university. Along the way I picked up an MBA and a little law study.

My wife of 12 years, Elaine, is a successful entrepreneur and was president of a major Toledo company. She has two daughters: Jessica, who teaches third grade in Durham, North Carolina, and Katie, a senior at Michigan State University majoring in economics and public policy who worked for the United Nations in Geneva in summer 2009. Elaine and I have visited 43 countries together since our marriage. We play an active role in the community and participate on boards for United Way, the Toledo Symphony, and the University Foundation.

Steven S. Pabalan (PhD '76, Lorand)

I did postdoctoral study at the Papanicolaou Cancer Institute and then went to medical school at the University of Miami, where I did my medical internship and residency. Still in Miami, I have been practicing internal medicine for the past 27 years and also do photography and raise orchids. My wife, Grace Wang, practices oncology-hematology. We have two daughters: Melissa is a medical intern at Brown University, and Laura is finishing her second year of medical school at the University of Florida.

**Jennifer Runquist (PhD '74, Loach)
Alfonse W. Runquist (PhD '74, Marshall)**

My time in Milwaukee has been spent in academic settings, first in the chemistry department of the University of Wisconsin–Milwaukee and since 1991 in the biochemistry department of the Medical College of Wisconsin, where I also serve on the board of the Women in Science Committee. At MCW we have isolated and analyzed enzymes in various pathways (including cholesterol, Calvin cycle, and fatty-acid oxidation pathways). I am writing a paper (my last?) on the structure and mechanism of HMG-CoA lyase, an enzyme in the ketone body pathway.

For 10 years I was chair of the Community-Right-to-Know Committee of the Local Emergency Planning Committee, and I chair the Natural Resources Committee of the Milwaukee County League of Women Voters. I also serve on the Southeast Wisconsin Watershed Trust Science Committee, the Citizen Advisory Committee for the Milwaukee Metropolitan Sewerage District, and the County Pesticide Task Force. I was chair for the local American Chemical Society section and received the 2003 section award. Alfonse is a chemist with Alpha Aesar Company.

**John Wilkes (PhD '73, Letsinger)
Laurie Campbell (PhD '73, Lorand)**

My post-Northwestern history started with an Air Force active duty assignment to the U.S. Air Force Academy in Colorado Springs. Less than three years later I left the military for academia when I was offered a tenure-track position at the University of Colorado at Denver. (I did stay in the Air Force Reserves and achieved the rank of lieutenant colonel.) After a few years there, I took an academic position at the Air Force Academy, and that's where I've been ever since. My research interests never touched on anything I did in the Letsinger group, but he did teach us not to fear trying something new. I've had the most success with discovering new ionic liquids (room temperature molten salts) and investigating how to store hydrogen in a dense form.

The smartest thing I did at Northwestern was to marry Laurie Campbell. She recently retired from an analytical chemistry laboratory where she found a job soon after we arrived in Colorado Springs in 1973.

The department can help arrange a reunion for your class, too. Just contact Teri Collins, theresa-collins@northwestern.edu.



The Loach research group



John Wilkes



Laurie Campbell

ALUMNI NEWS

1930s

Ruth Seidel Gienapp (BA '30), one of Northwestern's first female graduates in chemistry, recently joined her brother Wilbert Seidel in Concordia, Missouri, to celebrate his 100th birthday. He is a professor emeritus of art history at Northwestern. Gienapp's 100th birthday, in April 2008, was featured in the 2008–09 *Chemistry Connection*.

1940s

John R. Ferro (BA '48) is a retired senior scientist at Argonne National Laboratory and was instrumental in founding the Chemical Heritage Foundation's science instrument museum.

Jerome Feit (BA '49) went into business as a consultant after graduation. He recalls that "one customer wanted samples of hair dyes, another of egg shampoo, and pretty soon I was in the contract manufacturing business under the name Jerome Laboratories." By 1987 the company had a 24,000-square-foot production and lab facility with 105 employees and was manufacturing and packaging more than 100 cosmetic and over-the-counter pharmaceutical items, including Grecian Formula, Odor Eaters, Lanacane, Johnson's Foot Soap, Dana Perfumes, and many Jovan products. Feit then sold the business, sold the building, and retired. In retirement he is writing and publishing music as well as drumming with a Dixieland band for the annual senior shows in Park Ridge, Illinois.

Bob Hlavacek (PhD '49, King) is retired and living in New Jersey. He was happy to get in touch with former classmate Jim Traynham.

1950s

James G. Traynham (PhD '50, Letsinger) is a professor emeritus of chemistry at Louisiana State University. Although retired for 21 years, he continues to be moderately active in chemistry activities. The sixth edition of his undergraduate workbook on organic chemical nomenclature was published last year, four decades after the first edition. An American Chemical Society tour speaker in spring 2009, Traynham is secretary of the ACS Council's committee on nomenclature, terminology, and symbols and is scheduled to present a paper at the ACS national meeting in San Francisco this spring. Traynham was inducted into the inaugural class of ACS Fellows at the ACS national meeting in Washington, D.C. He and his wife, Gredna Doty, enjoy traveling, theater, and reading.

Carlton Johns (BA '51) went into the stock market after graduation and loves living in San Francisco. He would like to hear from anyone who knows the current whereabouts of Don DeFord.

Earle Stillwater (MS '58, Klotz) is a professor emeritus of biochemistry at the University of Iowa.

Bill Vullo (PhD '59, Letsinger) enjoyed three overlapping careers: first at the bench as a senior research chemist, then as a manager of textile chemical development, and then as manager of environmental programs for the General Electric Company until his retirement in 1995. Among his many Northwestern memories, he recalls Professor Hurd's "nice sense of humor, unless you tried to cross him on a nomenclature issue, which rarely happened, as he was the acknowledged expert in the field. Professor Basolo was perhaps the most sociable of all of the

faculty members and used to relish trying to beat the graduate students at the annual softball game, where he was the faculty pitcher. Professor Dole was a quiet, soft-spoken gentleman. Professor Klotz used to amaze us as he commenced his precisely and neatly written lecture notes in the upper left corner of a large chalkboard and ended them in the lower right of a second board with not so much as a single erasure. Professor Leslie Lorand was a decent tennis player, but none of us were good enough to beat Harry Gray (PhD, Basolo)." Vullo's first student assistant assignment at Northwestern was to proofread Professor Bordwell's organic chemistry text and to assist in his organic laboratory. He recalls Bordwell as "a pleasant person, though his labs and many of his graduate students reeked with the odor of mercaptans." Vullo was grateful for Professor Hussey's help while Professor Letsinger took a sabbatical in Germany. "Letsinger encouraged me to present some of my work at a national ACS meeting in Chicago, which I will never forget." He adds that "the entire faculty was very approachable and helpful, and I am indebted to them for the fine education I received." As this year is the 50th anniversary of completing his Northwestern degree, Vullo hopes to "stop by to see the area behind Tech, where we often went swimming; many graduates of the 1950s will remember swimming at lunch time. I wonder if the chemistry department still gives cumulative exams on Saturday morning."

1960s

Robert Arnold (PhD '63, Bordwell) retired as research and development manager for a Monsanto-Exxon joint venture. Now working with

Glencoe/McGraw Hill on its high school science and mathematics texts, he edited a chapter on solid-state electronics for its physics textbook.

Umberto Belluco (postdoc '63, Basolo and Pearson) studied the reaction mechanism of platinum (II) compounds, and his pioneering research was published in a series of five papers. Belluco is now a professor of chemistry in Padua, Italy, and author of the book *Organometallic and Coordination Chemistry of Platinum*. He has been coeditor of the international journal *Inorganica Chimica Acta* since 1990 and of the journal *Inorganic Chemistry Communications* since 1999.

Yvonne Connolly Martin (PhD '64, Klotz) recently received the Herman Skolnik Award from the American Chemical Society's Chemical Information Division. It is awarded in recognition of outstanding contributions to and achievements in the theory and practice of chemical information science. Martin retired from Abbott Laboratories in 2006 but continues as a consultant there and as "Perspectives" editor for the *Journal of Computer-Aided Molecular Design*. She is currently in the final phases of updating her 1978 book *Quantitative Drug Design*.

Alan G. Marshall (BA '65), Florida State University's Robert O. Lawton Professor of Chemistry and Biochemistry, was one of two corecipients of the 2009 New Frontiers of Hydrocarbons Award, sponsored by the Italian energy company Eni. The award — a gold medal and 300,000 euros — was presented at a ceremony in Milan. Marshall also received Thermo Fisher Scientific's Award for Outstanding Achievements in Mass Spectroscopy at a

symposium in his honor at the November 2009 Eastern Analytical Symposium.

Michael Hardman (postdoc '69, Bender) has retired as associate professor of biochemistry at Massey University in Palmerston North, New Zealand.

1970s

Warren Muir (PhD '71, Pearson) is the executive director of the Earth and Life Studies Division of the National Academies. His division includes the Board on Chemical Sciences and Technology and other boards for which chemistry is important in preparing expert independent reports.

Katherine Chen (PhD '74, Lorand) received the 2008–09 Laboratory Medicine Residency Training Teaching Award at the University of California, San Francisco. Conferred by residents in laboratory medicine, the award recognizes outstanding teaching of residents at UCSF training hospitals.

Henry D. Waldon (BA '78) is a physician in St. Louis.

M. Rachel Wang (PhD '79, Hoffman) is retired and teaching part-time in Washington state.

(See pages 6–7 for coverage of the 1969 entering PhD class reunion.)

1980s

Constance Fox (MS '80, Marks) has completed 25 years as a laboratory supervisor managing chemistry labs and teaching first-year pre-professional and allied health science laboratories. She is currently at Indiana University South Bend.

Kenton Whitmire (PhD '82, Shriver) is a professor of chemistry and associate dean for academic affairs at Rice University in Houston.

William Hollenbeg (MS '83, Sachtler and Shriver) teaches high school chemistry in Fort Wayne, Indiana.

Cyril Chiang (PhD '89, Poeppelmeier) is chairman of Prime Optical Fiber Corporation in Taipei, Taiwan, and is interested in research related to fiber optics and alternative energy technologies.

1990s

Stephen Thong (PhD '90, Poeppelmeier) is director of Global R&D Oral Care at Church and Dwight Company, responsible for the Arm and Hammer toothpaste, Spinbrush, and Orajel brands. He lives in the Princeton, New Jersey, area with his wife, Wendy (WCAS '86), and children, Ben, Jeremy, and Sarah.

Mark Anderson (PhD '92, Poeppelmeier) is a technical manager in the 3M Company's building and commercial services division; he has been with 3M for 11 years. His wife, Jane, teaches at Mounds Park Academy in St. Paul. He has a 14-year-old daughter, Sarah.

Suzanne Howton Johnson (PhD '93, Lambert) has been named director of flavor creation and applications at McCormick Foods, the world's leading manufacturer and distributor of spices, herbs, and flavorings.

Geoff Koretsky (PhD '95, Kappes) is working for the Institute for Defense Analysis, a federally funded nonprofit organization that works primarily for the Department of Defense. His wife, **Toni Litorja** (PhD '97, Van Duyne), did a post-doctorate at Argonne National Laboratory with Branco Rusic and began working for the National Institute of Standards and Technology in 1999; they are the parents of Samantha, 9, and Victoria, 5. They recently visited **John Hulteen** (PhD '95, Van Duyne) and **Lisa Dick** (PhD '92, Van Duyne and Hoffman), who have two children, Jacob, 8, and Alex, 5.

P. Shiv Halasyamani (PhD '96, Poeppelmeier) is associate professor of chemistry at the University of Houston in Texas.

Paul Salvador (PhD '97, Poeppelmeier) was awarded tenure and promoted to professor of materials science and engineering at Carnegie Mellon University in Pittsburgh.

Donna Marie Smith (PhD '97, Ibers) is at Los Alamos National Laboratory. She visited the Northwestern alumni reception at the American Chemical Society meeting.

Arshiya Baig (BA '98) is a general internist on the research faculty at the University of Chicago's Pritzker School of Medicine. Her work is focused on using community-based research methods to reduce Latino health disparities.

2000s

Douglas Vander Griend (PhD '00, Poeppelmeier) was recently awarded tenure at Calvin College

in Michigan. His expertise in factor analysis, a mathematical technique for obtaining information about species without chemically isolating them, has opened up avenues of research into the dynamics of thermochromic solutions and nanomachines. Vander Griend recently pursued sabbatical research abroad in supramolecular chemistry. He and his wife, Susie, have two sons, Lucas, 4, and Asher, 2.

Chunqing Liu (postdoc '02, Lambert) was promoted to lead research scientist and will lead the Membranes Research Group at UOP in Des Plaines, Illinois. She has invented many new and promising membranes that have moved into development at UOP. Her professional credits include six patents, one book chapter, and more than 50 publications.

Paulette Guillory Gardner (PhD '04, Poeppelmeier) is working at Thermo Fisher Scientific in Maryland.

Sina Yeganeh (PhD '09, Ratner) is pursuing postdoctoral studies at the Massachusetts Institute of Technology.

Faculty and Staff

Vivian Alberici, who joined the Department of Chemistry staff in 1982 and also worked for the *Journal of Physical Chemistry*, retired in December 2009.

Arden Slotter, who was assistant chair of the Department of Chemistry in the 1980s, has retired and lives in Castle Rock, Colorado.

IN MEMORIAM

William E. Truce (PhD '43, Suter) died in January 2009 at age 91 in Boulder, Colorado. He served on the faculty of Purdue University from 1946 to 1988 and was assistant dean of its Graduate School from 1963 to 1969. Truce was internationally recognized for his research on the mechanisms and reactions of organosulfur compounds, particularly sulfones, sultones, and their metalated derivatives. His wife of 67 years, Eloise, predeceased him by three weeks. He is survived by his two children, four grandchildren, and two great-grandchildren.

Lorna "Lonnie" Collette Folk (née Hill) (BA '47) died at home in Naperville, Illinois, on September 30, 2009. Folk enjoyed sharing her time and talents with many organizations, serving as president or board member of the Girls Scouts of DuPage County, Loyola University Medical Center Auxiliary, Naperville Elderly Housing, and the Naperville, Illinois State, and National Garden Clubs. She is survived by her husband, Frank Folk (BA '45), whom she met 65 years ago in the chemistry department at Northwestern; they recently celebrated their 60th wedding anniversary. Other survivors include their 9 children and 26 grandchildren.

Albert Charles "Bert" English (PhD '49, Dole) died in Delray Beach, Florida, on April 7, 2009, at age 90. A native of England, he studied chemistry at Wingate School and the University of Durham. During World War II he did top-secret research in Montreal

for the Special Forces. English then worked for General Electric in Massachusetts before moving to the University of California, Berkeley, where he was a professor of electrical engineering and computer science. He retired to pursue avocations in music, writing, and community theater. He and his first wife, Mathilde Kland (PhD '48, Summerbell-Klotz) — also a chemist — raised twin daughters, who survive him. He later married Mildred Reid, a novelist and writing instructor, and for many years they ran a writers colony in New Hampshire and wintered in Delray Beach. After her death he resided in Florida year-round. English is also survived by his sister and brother in the United Kingdom and their families.

Warner Peticolas (PhD '54, Klotz), professor emeritus of chemistry at the University of Oregon, died on June 26, 2009, at age 79. Peticolas worked for DuPont, IBM, and the California Institute of Technology before joining the University of Oregon faculty as a full professor. He remained there for nearly 30 years, retiring in 1994. A leading expert in the field of Raman spectroscopy, he applied the techniques to new areas of biological research. Peticolas is survived by his first wife, Priscilla Schleich; his second wife, Virginia; and five children and ten grandchildren.

Patrick M. Henry (PhD '56, Pearson and Basolo), professor emeritus of chemistry at Loyola University Chicago, died on October 18, 2008, at age 80, in Wilmette, Illinois. Henry began his career in chemistry at Hercules (now

Ashland) in Wilmington, Delaware. In 1971 he moved into academia, serving as an associate professor and then professor of chemistry at the University of Guelph, Ontario. In 1981 he returned to Chicago, chairing Loyola's chemistry department until 1986 and serving on its faculty until his retirement in 2004. Henry spent most of his career exploring the reactions of olefins by transition-metal ions, with emphasis on Pd (II)-catalyzed systems, including the industrially important Wacker process. He was predeceased by his wife, Eileen, and is survived by his three children and four grandchildren.

Paul Kuznesof (PhD '67, Shriver) died on October 2, 2009, at age 68 of lung cancer. From 1970 to 1975 Kuznesof served as a professor at the State University of Campinas in Brazil, helping start its graduate research program in chemistry. After returning to the United States, he taught at the University of Michigan in Ann Arbor, Trinity College in Hartford, Connecticut, and Agnes Scott College in Decatur, Georgia. He was also a laboratory scientist for the Georgia Department of Agriculture. In 1984 he joined the FDA, managing and directing the premarket chemistry review of food ingredients. Kuznesof served in many roles before rising to the position of chief chemist at the FDA's Office of Food Additive Safety in the Center for Food Safety and Applied Nutrition. He received the FDA Distinguished Career Service Award and retired in 2007 after 23 years of service. Kuznesof is survived by his son, Adam, and two grandchildren.

Charles E. Hoyle (MS '73, PhD '76, Lewis), professor of polymer science and engineering at the University of Southern Mississippi's School of Polymers and High Performance Materials, died unexpectedly on September 7, 2009, at age 60. During more than 25 years at the university, Hoyle earned worldwide recognition for his work as a photochemist with emphasis on the photochemistry and photophysics of polymers. He authored or coauthored more than 160 refereed publications. Hoyle is survived by his wife, Karen, and their two children, Abbie and Austin.

Faculty and Friends

Curtis Borchers, who was assistant chair of the Department of Chemistry in the 1960s, died on June 23, 2009, in Wisconsin. A great administrator, facilitator, doer, and friend of the department, he is survived by his wife, Leona, and their children.

Faye Frost, widow of longtime chemistry faculty member Arthur Frost, died on February 10, 2010, of cancer at age 98 in Cottonwood, Arizona.

HONOR ROLL

Contributors to Northwestern Chemistry from September 1, 2008, through August 31, 2009

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Nancy J. Allred
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Marjorie D. Alschuler
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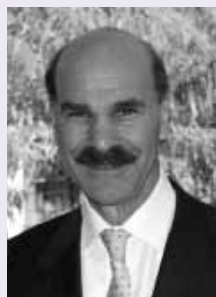
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Letter from the Chair

Welcome to Our Friends and Alumni!



“Champagne should be dry, cold, and free.”

During this first decade of the 21st century, we have embraced Churchill’s famous saying during many of the wonderful occasions that marked the milestones of our great department toward ever-increasing growth, success, and scholarship.

The opening of the Richard and Barbara Silverman Hall for Molecular Therapeutics and Diagnostics in November 2009 was the capstone

to a series of amazing events that substantially transformed the chemistry department over the past few years. Pregabalin, marketed by Pfizer under the trade name Lyrica, is turning out to be the single-biggest technology transfer deal from a university chemistry department in U.S. history. Four of the 46 Energy Frontier Research Centers, representing roughly \$80 million over as many as 10 years, are now run by Northwestern chemistry faculty and Argonne National Laboratory scientists.

Prior to this staggering success, Northwestern chemistry faculty had already raised more than \$30 million during 2009 through the department alone, let alone through the several multimillion-dollar federally funded research centers run by Northwestern chemistry faculty. Three Northwestern chemistry faculty have won American Chemical Society awards in physical chemistry just this year, and one was inducted into the National Academy of Engineering and named a member of the President’s Council of Advisors on Science and Technology last year. The department’s many awards,

accomplishments, developments, and scientific discoveries are listed on our web page, and you can also read about them in *Chemical & Engineering News*.

Chemistry at Northwestern would be nothing without the brilliant PhD and postdoctoral students working in our research groups. Northwestern has more PhD students and postdocs than any other chemistry department at a private university in the country. In fact, Northwestern is now home to the largest population of chemistry PhD students and postdocs after the University of California, Berkeley. Northwestern’s continued success as the preferred place to earn a PhD in chemistry forms the basis for a vibrant chemistry department that is characterized by a close, lively network of faculty, students, and scholars.

Our students today carry on the proud tradition of Northwestern chemistry. Our alumni are leaders in academia, industry, and government, and we are very proud of you! Please stay in touch with the department; we love to hear from you. As always, we welcome any volunteers who wish to mentor current students or who have suggestions for alumni events. We appreciate your feedback, so please contact us if you have a question or concern.

Best regards,

Mark Ratner
Chair

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