

From Lab to Lyrica



Rick Silverman didn't start out with the goal of developing a new drug. His research revolves around enzyme function, studying the way that molecules interact with enzymes and the types of reactions that occur. As he says, "You work with the idea that if you select the right enzyme it might be important to a disease state. But of course you never really

expect to get something commercial; you think you might get something interesting scientifically."

Through a period spanning almost thirty years, Rick's research has in part led to a drug that could improve the quality of life for people who suffer from certain forms of epilepsy, neuropathic pain, and generalized anxiety disorder. The drug, developed initially by Parke-Davis Pharmaceuticals then brought to market by Pfizer, has the tradename Lyrica and the generic name pregabalin.

Rick's work with pregabalin focused on an imbalance in an inhibitory neurotransmitter, gamma-aminobutyric acid (GABA), and an excitatory neurotransmitter, glutamate; this imbalance can lead to epilepsy. If GABA levels drop, the result is too much excitatory neurotransmission, producing convulsions. One reason that the GABA levels can decrease is due to an enzyme that degrades GABA, called GABA

aminotransferase. In the late 1970's, Rick wrote a proposal to the National Institutes of Health to study compounds that inactivate GABA aminotransferase to increase the GABA levels.

Rick hoped to find a way to block GABA aminotransferase without blocking the enzyme that makes GABA, glutamate decarboxylase, so the concentration of GABA would rise. There was one drug in clinical trials that did this already, but Rick took the idea further. In 1989, Rick had a postdoc in his lab, Ryszard Andruszkiewicz, make a series of GABA analogues. The analogue's substituents were varied in size and shape with the intention and expectation that one structure might show really good inhibition of GABA aminotransferase but show no effect on glutamate decarboxylase. The results were surprising.

Studies from Rick's lab demonstrated that his new compounds did increase GABA levels, but not because they slowed degradation. Instead, the compounds increased production of GABA by apparent activation of glutamate decarboxylase. This provided a new approach to create anticonvulsants.

At that point, in 1990, Rick contacted Northwestern's Technology Transfer Office, hoping to have the compounds tested as anti-convulsant agents. Two companies offered to test the compounds. One company asked for the whole series of compounds, and the other requested only the "best" compound. The latter corporation soon responded back: they had tested the compound, and it was not effective in animals, so they were not interested.

The other drug company, Parke-Davis, responded some time later, and they had found something interesting. All of Rick's analogues except one were only mediocre anticonvulsants, but that one exception was off the charts. Eventually that compound was called "pregabalin." Interestingly, it wasn't the "best" compound that Rick's team had identified by enzymatic assays as a glutamate decarboxylase activator.

Parke-Davis had identified a very effective anticonvulsant compound of their own (later known as gabapentin with the trade name Neurontin). Since Rick's compounds did the exact

Professor Emeritus Bob Letsinger speaking to Professor Rick Silverman at the Chemistry of Life Processes Symposium.



same thing as their compound, they sent Rick their compound to test, and he found that it too showed an activation of glutamate decarboxylase. However, because only pregabalin worked in animals, Parke-Davis scientists realized that glutamate decarboxylase activation couldn't be the reason that it was effective.

After more testing, Parke-Davis learned that both gabapentin and pregabalin were effective for an entirely different reason from initially believed. The compounds block a calcium ion channel that controls release of the excitatory neurotransmitter glutamate. By interfering with the release of glutamate, they have an effect similar to increasing the GABA levels.

However, this is not why pregabalin works where the other compounds in Rick's series fail. The structure of pregabalin enables it to bind to a protein transporter that carries it into the brain, and these compounds are only effective if they are in the brain. The other compounds in his series don't bind to the transporter, so they don't get into the brain and can't show an effect. As Rick notes, "It's a lot of luck. I'm sorry to say it, but that's what research is. It's a lot of ingenuity and a lot of luck."

In July of 2004, the European Union's Committee for Proprietary Medicinal Products had approved pregabalin, marketed as Lyrica, for the treatment of neuropathic pain and as an add-on therapy for partial epileptic seizures. Pregabalin or Lyrica has been sold in the United Kingdom since September 2004; other European markets are soon to follow. In the United States, pregabalin was given an "approvable letter" by the FDA for the same two indications but not yet for generalized anxiety disorder. The FDA's final approval of Lyrica is expected within the next month or so.

Rick Silverman's lab continues to investigate new structures that react with GABA aminotransferase. His group is currently studying a new compound in conjunction with Brookhaven National Laboratory. By modifying the structure of the antiepilepsy drug vigabatrin, they came up with a compound that is a hundred times more potent and could prove useful in the treatment of epilepsy as well as in addictions, whether they be behavioral or chemical. When asked about the future of this drug, Rick replied that you never know, but then laughed, "At the very least, we're ten years away from that!"

Letter from the Chair

Greetings from Northwestern Chemistry!

For those of you who I haven't met, let me introduce myself. My name is Hilary Godwin and I became Chair of the Department in September 2004. I have been a member of the chemistry faculty since 1996, being promoted to Associate Professor in 2001 and serving as Associate Chair in Chemistry for the last academic year. My research at Northwestern is at the interface of inorganic chemistry and biology, and focuses primarily on understanding the molecular basis of lead poisoning. I look forward to meeting the

challenges that await us in the upcoming year!


The last year has been a great one for Chemistry at Northwestern, and my thanks go to Mike Wasielewski, our outgoing Chair, for all of his hard work. I also thank all of you who contributed to our successes, whether it was through participating in our Industrial Associate Program, mentoring students, or providing an individual donation. I am happy to report that our faculty received numer-

ous awards and honors over the last year. To name a few, Rick van Duyne was made a member of the American Academy of Arts and Sciences and Tamar Seideman was appointed a Fellow of the Guggenheim Foundation. We believe that next year will be equally strong: already Fred Lewis and Sam Stupp have been named recipients of a 2005 Arthur C. Cope Award and the 2005 ACS Award in Polymer

Chemistry, respectively. We hope that you will join us at the San Diego ACS Meeting in March 2005 to celebrate these accomplishments!

As always, we continue to look towards the future by asking how we can continue to make our Department stronger. Building upon our traditional strength in interdisciplinary science, we are currently planning the construction of a new building that will be dedicated to our new Chemistry of Life Processes (CLP) Institute. We anticipate that this building will be completed by 2008. In addition, the Department is currently conducting searches for two new faculty members, one in organic chemistry and the other in inorganic chemistry. We value your input and hope that you will steer outstanding candidates in our direction.

Finally, I invite you to renew your relationship with the Department over the next year. I hope that you will join us for a special symposium being held in November in honor of Tobin Marks (www.tobinstock.org). I encourage you to contact me or our new Director of External Relations, Claire Finando (c-finando@northwestern.edu), if you are interested in mentoring current students or have suggestions for alumni events. One of the greatest benefits for me as chair is the opportunity to get to know Chemistry alumni better. Northwestern is enriched by the friendships that exist between its professors and former students. Please let me know if your travels take you near Evanston; I would love to have the chance to meet you.



Hilary Arnold Godwin



Hilary Godwin working with La Kisha Girder and John Addison, two students from the Undergraduate Success in Science Program at Northwestern (<http://www.chem.northwestern.edu/~uss/>)

FACULTY NEWS

Samuel Stupp to Receive 2005 ACS Award in Polymer Chemistry



Samuel I. Stupp

Samuel I. Stupp, Board of Trustees Professor of Materials Science, Chemistry, and Medicine, has been named the recipient of the 2005 American Chemical Society Award in Polymer Chemistry.

The Award will be presented at the 229th ACS meeting in San Diego, California, and a one-day symposium will be held in his honor at that time.

The award recognizes outstanding contributions to polymer chemistry. This distinction was bestowed on Sam "for demonstrating the use of self-assembly to create polymers as nanoscale objects with defined shapes and internal order that mimic those found in biological systems." Previous awards won by Sam include the Department of Energy Prize for Outstanding Achievement in Materials Chemistry, the Materials Research Society's Medal Award for his work on self-assembly, and a Paris Sciences Medal for his lectures at Ecole Supérieure de Physique et de Chimie Industrielles in Paris.

Sam's areas of research include molecular self-assembly, supramolecular organic nanostructures, electronic and photonic properties of organic materials, biomolecular mineralization, templating chemistry of inorganic nanostructures, and biomaterials for regenerative medicine, including the central nervous system, organ cell transplantation, bone, and cartilage.

Sam is a member of the American Academy of Arts and Sciences, and a fellow of the Biomaterials Science and Engineering World Biomaterials Congress, the American Physical Society, the American Association for the Advancement of Sciences, and the World Technology Network.

Notable Faculty Awards of 2004

Daniel Appella received a 2004 Beckman Young Investigator Award.

Joseph Lambert was presented with the 2003 Harry and Carol Mosher Award from the American Chemical Society's Santa Clara Valley Section in January 2004

Tobin Marks received the 2004 Sir Edward Frankland Medal of the Royal Society of Chemistry.

SonBinh T. Nguyen was appointed to Northwestern's Dow Research Professor Chair for 2004-2006.

Mark Ratner received the 2004 ACS Irving Langmuir Award in Physical Chemistry. He was also elected as a foreign member of the Royal Danish Academy of Sciences.

George Schatz was named the Editor-in-Chief of the *Journal of Physical Chemistry*.

Tamar Seideman was the recipient of a 2004 John Simon Guggenheim Fellowship.

Michael Wasielewski received the 2004 Inter-American Photochemical Society Photochemistry Award.



Frederick D. Lewis

Fred Lewis to Receive 2005 Arthur C. Cope Senior Scholar Award

Frederick D. Lewis has been selected to receive the 2005 Arthur C. Cope Senior Scholar Award from the American Chemical Society. The award will be presented at the 230th ACS Meeting to be held in Washington D.C. in August, 2005. The purpose of the Cope Senior Scholar Award is to recognize and encourage excellence in organic chemistry.

This award recognizes Fred's contributions to the field of organic photochemistry and to the study of DNA electron transfer processes. The primary focus of his current research is the interaction of light with molecules, particularly molecules such as DNA that contain stacked arrays of light-absorbing chromophores. The absorption of light results in the formation of electronically excited molecules which can undergo a number of processes including luminescence, electron transfer, and chemical bond formation. The Lewis group's work has potential applications in the areas of imaging and molecular photonics.

Fred has also recently received the 2003 Award in Photochemistry from the Inter-American Photochemical Society and an Excellence in Teaching Award from the Northwestern Alumni Association.

Three Assistant Professors Receive Prestigious NSF CAREER Awards

Franz M. Geiger, Teri Wang Odom, and Karl A. Scheidt were awarded Faculty Early Career Development (CAREER) awards from the National Science Foundation in the academic year 2003-2004. The CAREER program recognizes and supports the early career-development activities of those teacher-scholars who are most likely to become the academic leaders of the 21st century. CAREER awardees are selected on the basis of creative, career-development plans that effectively integrate research and education within the context of the mission of their institution.



Franz M. Geiger

Franz is using his NSF funding to study environmental problems related to the presence of toxic metals in soils. His CAREER project focuses on how mineral oxide/water interfaces control the binding and chemical transport of hexavalent chromium, one of the few pollutants on the EPA priority list in contaminated soils. To this end, Franz' group applies the nonlinear optical laser spectroscopy techniques second harmonic and sum frequency generation. To broaden the understanding of environmental toxic metal transport, Franz' group is working with the Chicago-based Environmental Law and Policy Center, secondary school science teachers, undergraduate students, and Navajo tribal community leaders. The findings of his "First Nationwide Soil Science Project" and his "Navajo Water Quality Outreach Project" can be seen on the "Outreach" section of his research group's website. Franz has recently won a 2004 Northwestern Searle Fellows Award.

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Pfizer Donates Equipment to Chemistry

In February 2004, Pfizer Corporation donated over \$1.6 million in equipment to the Chemistry Department. Whereas some of the equipment was distributed to individual faculty labs, the great majority went to the Analytical Services Laboratory. With ASL as home, the new equipment is available to the greater university community, once again promoting the interdisciplinary research that distinguishes Northwestern from its peers.

Mert Livingston of Pfizer was on hand at the launch of the Chemistry of Life Processes Institute, where he was presented with a plaque from Northwestern to thank him for Pfizer's generosity. As Provost Larry Dumas said at the time, "These tools will provide critical support of new multidisciplinary work in the Chemistry of Life Processes, the Chemistry of Materials, and Catalysis and Environment."

Director of the ASL, Fred Northrup, says that the instruments will greatly bolster

Northwestern's analytical options. "The equipment donated by Pfizer will have a significant impact on the ASL's offerings. We will be able to make available to Northwestern's faculty a broad range of new services that we previously couldn't consider."

Most notably, the two additional NMR spectrometers (INOVA 400 and INOVA 500) will allow for more efficient scheduling. That in turn will make the instruments available for longer and more complex NMR experiments.

Eight new mass spectrometers have appreciably enhanced capabilities of the ASL. High resolution electrospray mass spectrometry analysis will be available for the first time, and additional HPLC/MS capacity will allow much more efficient use of this analytical technique in an open access format. The increased number of mass spectrometers will allow some instruments to be reserved exclusively for analysis of protein and peptide samples thereby providing a proteomics mass spectrometry service in the ASL that will benefit biochemists, biologists, and medical researchers throughout campus.



Provost Larry Dumas presents a plaque of recognition to Pfizer representative, Mert Livingston.

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Teri Wang Odom

Teri will use her CAREER Award to focus on new chemical approaches to nanoscale transition-metal chalcogenide materials and the characterization of their complex electronic properties using scanning probe techniques. The results of her study will provide fundamental information about materials properties that control superconductivity and charge modulation of the conduction electron density. Teri's educational outreach concentrates on integrating research activities into the classroom through summer research programs for high school science teachers and courses on nanoscale science and technology. Other awards that Teri has won include a 2004 NSF Nanotechnology in Undergraduate Education Fellowship, a 2003 David and Lucile Packard Fellowship, and the 2003 ACS Victor K. Lamer Award.



Karl A. Scheidt

Karl is using his funding to investigate novel methods for the rapid construction of complex organic structures by exploiting the unusual reactivity and versatility of metal complexes. His methods hold promise for general use in the development of new pharmaceuticals through the synthesis of complex molecular structures often displaying important chemical or biological properties. Karl is also developing versatile methods for the visualization of molecular structures. He is introducing new molecular visualization techniques throughout the organic chemistry curriculum and is establishing a high school teacher outreach program to facilitate their usage in high schools. Karl is a 2003 Northwestern Searle Fellow and recently won a 2003 Springer-Verlag Award.

Van Duyne Elected to American Academy of Arts and Sciences

Morrison Professor Richard P. Van Duyne will be inducted into the American Academy of Arts and Sciences this October in Cambridge, MA. Membership in the Academy is one of the nation's greatest honors; the 4,500 Academy members are recognized as those who have made preeminent contributions to a broad range of scholarly fields and professions. Rick's accomplishments include the discovery, development, and application of surface-enhanced Raman spectroscopy (SERS) and the development of nanosphere lithography (NSL) and its use in nanoparticle optics. His contributions have impacted all areas of science involving molecules adsorbed on surfaces and nanoparticles.

Rick joins eight other Chemistry Department professors in AAAS membership: Brian M. Hoffman, James A. Ibers, Tobin J. Marks, C. Bradley Moore, Mark A. Ratner, George C. Schatz, Samuel I. Stupp, and Olke C. Ulenbeck. Emeriti faculty Fred Basolo, Irving M. Klotz, and Robert L. Letsinger are also members.



Richard P. Van Duyne

Celebrating the Chemistry of Life Processes Institute

On April 19, 2004, Northwestern University held a symposium commemorating the launch of the Chemistry of Life Processes (CLP) Institute. This new institute will focus on several areas including medicinal chemistry, proteomics, nanobiotechnology, molecular machines, enzyme mechanisms, inorganic physiology and biological molecular imaging. The Institute's teams will develop new therapeutic agents and diagnostic methods, synthetic approaches and computational methods that can be used to understand the chemistry of fundamental cellular functions and treat human disease. The new building will house over a dozen research groups from several departments in the Weinberg College of Arts and Science and the McCormick School of Engineering. In addition, it will be home to several shared core facilities for the characterization of macromolecules and for imaging molecular processes in living organisms.

The newly established Institute was celebrated with a day of talks presented by renowned members of the Northwestern faculty and other institutions. Nobel Laureate Thomas



Weinberg College Dean Daniel Linzor presents Thomas O'Halloran with a medal commemorating the Morrison Professorship.

Cech, Director of the Howard Hughes Medical Institute of the University of Colorado at Boulder presented a lecture. Peter Schultz, Professor of Chemistry at the Scripps Institute and Director of the Genomics Institute of the Novartis Research Foundation (GNF) also spoke. Thomas O'Halloran gave his inaugural lecture as the Charles E. and Emma H. Morrison Professor of Chemistry. When one of Northwestern Chemistry Department's most well known alumni, Harry Gray, Arnold O. Beckman Professor of Chemistry and Founding Director of the Beckman Institute at the California Institute of Technology, had to cancel unexpectedly, Prof. Brian Hoffman graciously agreed to step up at the last minute, giving a talk in his place. The recent addition of two new faculty members to the Northwestern Chemistry Department was also celebrated in the Symposium with Thomas Meade and Olke Uhlenbeck speaking as well. Visitors joined graduate students, postdocs, and



Nobel Laureate Thomas Cech speaks at the CLP symposium.

faculty for a lively poster session after the presentations.

"The idea for the Chemistry of Life Processes Institute germinated in the NU Chemistry department over ten years ago. Discoveries emerging from chemical and biological sciences were resonating and stimulating advances in a variety of facets of health-related research," said Professor O'Halloran, chairman of the Chemistry of Life Processes Planning Committee. "With this in mind, Provost Dumas encouraged the department to lay the groundwork for the CLP Institute and President Bienen instructed us to plan a new type of building. The planning committee responded, proposing an environment that supports the education and training of the 21st century scientist. The design will stimulate formation of collaborative teams of chemists, biologists, physicians and engineers. To this end, the CLP building will have a larger fraction of its space dedicated to shared research resources than any of our current buildings on campus."

The Chemistry of Life Processes Institute building will be adjacent to the Center for Nanofabrication and Molecular Self-Assembly (Nano) as well as the new Pancoe-ENH Health Science Pavilion. "The CLP building will complete a network of connected buildings including the Technological Institute, Hogan Hall, the Cook Materials and Life Sciences Building and the Catalysis Center," said Tom Meade, a member of the planning committee. "On both a physical and philosophical level, the Chemistry of Life Processes Institute will provide a common ground for interdisciplinary research and stimulate new intellectual efforts in a variety of fields."

New Abbott Laboratories Lecture in Organic Chemistry

Abbott Laboratories began its support of the Abbott Laboratories Lecture in Organic Chemistry at Northwestern University in 2004. The timing of the new lectures marks a renewed commitment to organic synthesis in the Department of Chemistry. Professor Eric Jacobsen of Harvard University was the inaugural lecturer, speaking on "Privileged Chiral Catalysts." Professor Amos Smith of the University of Pennsylvania is scheduled to give the second annual Abbott lecture in late spring of 2005. According to NU Chemistry Professor Karl Scheidt, "This generous support by Abbott provides a great opportunity for the NU organic chemistry community to interact with some of the best synthetic organic chemists in the world." As always, alumni are welcome to all the lecture series.

2004 Northwestern Undergraduate Awards

Bradley Gross won the Marple-Schweitzer Award, the top overall student in academics and research.

Neal Bhamb, Grace Delos Santos, and Haina Shin won the Basolo-Oesper Award for Department Citizenship.

Benjamin Stanton won the Lewis H. Sarrett Scholarship Award (the top award in research).

Valliammai Muthappan won the R.K. Summerbell Memorial Fund Award for the highest GPA.

Anna Lakoma won the Merck Index Award.

Marc Sala, Melissa Beenen, Preeti Sukerkar, Nolan Walther, Jason Lake, and Grace Delos Santos won the Chemistry Department Scholar Awards.

Julianne Kuck won the Hyper Cube Award.

Wen Liu won the Mathcad Award.

Narayan Saha won the CRC Freshman Award.



Undergraduate award winners Ben Stanton, Brad Gross, and Valliammai Muthappan

2005 ACS Nobel Laureate Signature Award

The ACS announced the winner of the 2005 Nobel Laureate Signature Award, and for the second year in a row, the recipients were a recent Northwestern graduate and her advisor. Christy L. Haynes and Richard P. Van Duyne are the second Northwestern student and faculty member to be named to this honor since it was established in 1978. Their success follows that of So-Jung Park and Chad Mirkin in 2004.

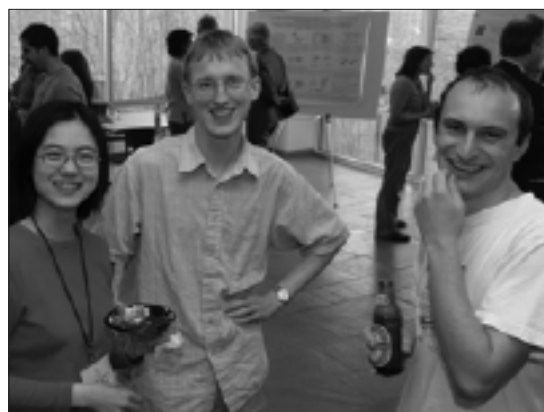
Christy L. Haynes' winning dissertation was entitled, "Fundamentals and Applications of Nanoparticle Optics and Surface Enhanced Raman Scattering." Christy is currently a recipient of the Ruth L. Kirschstein National Research Service Award Post-Doctoral Fellowship, working with Professor R. Mark Wightman at the University of North Carolina at Chapel Hill. She will begin her independent academic career as an Assistant Professor of Chemistry in Fall 2005 at the University of Minnesota.

While at Northwestern, Christy received many awards including the 2003 Northwestern University Chemistry Department Award for Excellence in Graduate Research, a 2002 Northwestern University Presidential Fellowship, the 2002 Kirkbright Bursary Award from the Association of British Spectroscopists, a 2002 Graduate Student Gold Award from the Materials Research Society, and a 2001 Analytical Chemistry Division Fellowship from the American Chemical Society.

Richard Van Duyne is extremely proud of Christy's successes, and says, "It was a joyous and rewarding experience to work with such a remarkably talented individual."



Nobel Laureate Signature Award winner Christy L. Haynes



Students and postdocs at the CLP poster session.

2004 Northwestern Graduate Awards

Matthew Russell and **Ashi Savara** won the L. Carroll King Award for Excellence in 100-Level Teaching.

Paul Endres and **Emma Kate Payne** won the Allen S. Hussey Award for Excellence in 200-Level Teaching.

Christopher Galliford and **Randall Goldsmith** won the Donald E. Smith Award for Excellence in 300/400-Level Teaching.

Donde Anderson, a former Marple-Schweitzer Awardee from the Nguyen group who is now a chemistry graduate student at Caltech, received an NSF predoctoral fellowship and an NSF EAPSI Graduate Fellowship to study in Japan.

Jeremy Barton, of Teri Odom's group, was an NSEC Fellow for 2003-2004. Jeremy's work with Teri on nanocrystal growth in nanoscale wells was profiled in a July issue of Nature.

So-Hye Cho, a graduate student from the Nguyen group, won the BP Chemicals Graduate Student Award in Environmental Molecular Sciences.

Christine Dettmer, a graduate student from the Nguyen group, was appointed an MRC fellow.

Christopher R. Graves, a graduate student from the Nguyen group, was awarded an NSERC-A fellowship.

Aaron Massari, who just graduated with a Ph.D. from Joseph Hupp's group, was awarded an NIH National Research Service Award Postdoctoral Fellowship. Aaron is currently at Stanford University.

Jason Miller, a graduate student from the Nguyen group, was awarded an ACS-DOC Nelson J. Leonard fellowship.

Emily Weiss, a graduate student working with Mark Ratner and Mike Wasielewski, was awarded one of the first three Presidential Distinguished Fellowships at Northwestern for her work in charge transfer in extended organic systems.

Undergraduate BA/BS Recipients

Zafar Ahmed

Melissa Beenen: University of California, Berkeley, Department of Chemistry, Ph.D. Program

Kathrynn Benzmler: Northwestern University, Feinberg School of Medicine

Jeremy Cook: Northwestern University, Feinberg School of Medicine

Xilei Dai: University of Pennsylvania, Biomedical Graduate Studies, Immunology, Ph.D. Program

Bao Lam Dang: Working for a year and applying to dental school

Grace Delos Santos: Northwestern University, Visiting Predoctoral Fellow under Professor Fred Lewis

Monica Dyrzc

Lillian Eichner: Working two years and then applying to graduate schools in biochemistry

Katherine Gerth: University of Colorado at Boulder, Department of Chemistry and Biochemistry, Ph.D. Program

Lia Gracey: Working for Andy Fire at Stanford University and then attending medical school

Brad Gross: Northwestern University, Feinberg School of Medicine

Emily Hagan: Stanford University, Department of Molecular Pharmacology, Ph.D. Program

Alexander Hirschi

Yaeko Hiyama: Columbia University, Institute of Human Nutrition, Ph.D. Program

Thomas Kim

Andrew King: Washington University School of Medicine (St. Louis)

Marina Kogan

Jason Lake: Vanderbilt University, Law School

Matthew Lee: Medical School

Valli Muthappan: Washington University School of Medicine (St. Louis)

David Ostrowski: Internship at Max-Planck Institute for Chemistry at the University of Mainz, then he will attend The University of Texas at Austin, Department of Chemistry and Biochemistry, Ph.D. Program

Zankhana Raval: Northwestern University, Feinberg School of Medicine

Sasha Ross: Harvard School of Dental Medicine

Marc Sala: Working in an academic lab for one year, then attending medical school

Adam Schmitt

Craig Schwartz: University of California, Berkeley, Department of Chemistry, Ph.D. Program

Haina Shin: University of Pennsylvania, Biomedical Graduate Studies, Immunology, Ph.D. Program

Ben Stanton: Harvard University, Department of Chemistry & Chemical Biology, Ph.D. Program

Preeti Sukerkar: Medical School

Herbert Sung

Anthony Tomaso: University of California Santa Barbara, Department of Chemistry and Biochemistry, Ph.D. Program

Lodewijk van Holsbeeck: Wayne State Medical School

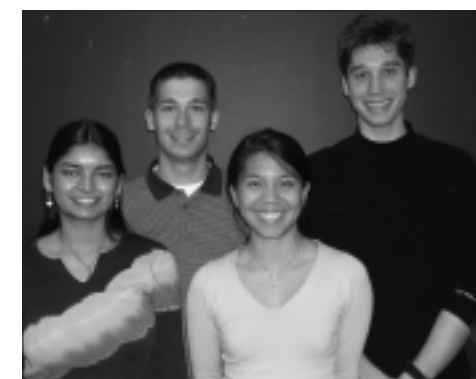
Ashish Vyas: Working at Northwestern Medical School in the Department of Cell and Molecular Biology for one year, then attending medical school in the fall of 2005

Nolan Walther: Working for a clinical or chemical research company, then potentially attending medical school

Douglas Yamada

David Yao

Zachary Zavodni: Working at Duke University for one year, then attending medical school



Chemistry Department Scholar Award winners Preeti Sukerkar, Jason Lake, Marc Sala, and Grace Delos Santos

Note: If we don't have information for you, please email c-finando@northwestern.edu so that we can include you in our update in the next newsletter.



Haimei Chen and Yingli Wang discussing a poster at the CLP event.

**Chemistry Ph.D. Recipients
December 2003:**

Tryg Jensen: New Polymerization Processes: Ring-Opening Ziegler Polymerization of Mono- and Di-substituted Methylene-cycloalkanes; Single-Site Homogeneous Copolymerization of Methyl Methacrylate and Styrene (Marks); Currently a Postdoctoral Fellow at the University of Minnesota

Rongchao Jin: Noble Metal Nanocrystals: Synthesis, Optical Properties, and Biological Applications (Mirkin); Currently a Postdoctoral Fellow at the University of Chicago

David Kaleta: Models of Protein Behavior: Action Within and Between Unsolvated Peptides (Jarrold); Currently a Postdoctoral Fellow at the University of Tennessee

Todd Kurth: Inter- and Intramolecular Electronic Interactions: Part 1. The Formation and Behavior of Fluorescent Lewis Acid-Base Exciplexes and Triplexes; Part 2. Polyaryleureas (Lewis); Currently a Research Physical Scientist at a USDA Laboratory

Andrew Metz: Metal-Organic Chemical Vapor Deposition of Cadmium Oxide-Based Transparent Conductors: Precursor Design, Film Growth, and Film Characterization (Marks/ Poepplmeier); Currently a Process Engineer at Intel Corporation

Kwasi Mitchell: Syntheses, Structure, and Physical Properties of the Al_nMq_3 Rare-Earth Transition-Metal Chalcogenides (Ibers); Currently a Research Chemist at ExxonMobil

Jason Pless: The Oxidative Dehydrogenation of Propane with Metals Oxides (Poepplmeier/Stair); Currently a Postdoctoral Fellow at the Sandia National Laboratories

Gerald Sando: Theoretical and Experimental Studies of Electron Transfer and Mixed-Valence Systems (Spears/Hupp); Currently a Postdoctoral Fellow at the Naval Research Laboratory

Eli Sone: Self-Assembly and Mineralization of Supramolecular Nanostructures (Stupp); Currently a Koshland Postdoctoral Fellow at the Weizmann Institute of Science

June 2004:

Ryan Bailey: Development and Application of Chemoresponsive Diffraction Gratings as Versatile Chemical and Biological Sensors (Hupp); Currently a Postdoctoral Fellow at the California Institute of Technology

Lisa Chen: Potential Therapeutics for Multiple Myeloma and Leukemia: The Effects of C8-Modified Adenosine Analogon Nucleic Acid Biochemistry (Sheppard); Currently a Postdoctoral Fellow at The University of Texas M. D. Anderson Cancer Center

Elizabeth Crompton: Competition among Fluorescence and Photochemical Reactions in Substituted Stilbene and Styrene Systems (Lewis); Currently a Technical Advisor at Leydig, Voit & Mayer

Michael Fuller: Photoinduced Charge Transfer within Macromolecular Assemblies and Liquid Crystal Environments (Wasielewski); Currently a Scientist at Schlumberger

Paulette Guillory: Bond Network Mediated Order in Linear Chains of $Cd(C_5H_5N)_4NbOF_5$ (Poepplmeier/Shriver)

Amanda Haes: Localized Surface Plasmon Resonance Spectroscopy for Fundamental Studies of Nanoparticle Optics and Applications to Biosensors (Van Duyne); Currently a National Resource Council Postdoctoral Fellow at the Naval Research Laboratory

Geoffrey Hutchinson: Theoretical Studies of Optics and Charge Transport in Organic Conducting Oligomers and Polymers: Rational Design of Improved Transparent and Conducting Polymers (Marks/Ratner); Currently a Postdoctoral Fellow at Cornell University

Motoya Kohtani: Polypeptide Structure in the Gas Phase: Alpha Helices and Compact Globules (Jarrold); Returned to Japan

Aaron Massari: Spectroscopic and Electrochemical Characterization of Dye-Sensitized, Multilayered, and Molecular Photovoltaic Solar Cells (Hupp); Currently an NIH Postdoctoral Fellow at Stanford University

Yue Pan: Design, Syntheses and Mechanistic Studies of Gamma-Aminobutyric Acid Aminotransferase Inhibitors (Silverman); Currently a Postdoctoral Fellow at The University of Texas

Bryan Rabatic: Mineralization and Characterization of Novel Self-Assembling Amphiphilic Systems (Stupp); Currently a Postdoctoral Fellow at Argonne National Laboratory

Brian Rous: Spectroscopic Analysis of the Interaction of Lead with the Glucocorticoid Receptor DNA-Binding Domain: A Possible Mechanism of Lead Toxicity (Godwin); Currently a student at Midwestern University's School of Pharmacy

Dean Shahriari: Hydrothermal Synthesis of 3R-CuAlO₂ and Related Delafossite Oxides (Poppelmeier); Currently a Patent Agent at Canton Colburn, LLP

Contributors to the Department of Chemistry September 1, 2003
to August 31, 2004

Bernard H. & Martha S. Adelson
Marjorie D. & Frank Alschuler
Mark T. Anderson
Vartkess A. & Alice B. Apkarian
Augusta S. Arthur
Anthony G.M. Barrett
Donald & Nancy Barry
Richard Bosch
Fred Basolo
Mr. & Mrs. Robert J. Bouril
Cherlynlavaughn Bradley
Albert T. & Phyllis Brault
Carol A. & Robert F. Broman
Anne C. & John C. Brothers
Christopher Bull
John L. Burmeister
Susan B. Butts
Ernest E. Campaigne
Merle W. Carlson
Marvin H. Caruthers
Julie A. Chapman
Andrew C. Chan
Dean W. Chandler & Gail L. Peek
Stanton Ching
Shaun Clancy
George A. Clowes
Irwin A. Cohen
Noal Cohen
Steven Alan Cohen
Paul E. Correa
Samuel C. Creason
Sue C. Cummings
Dr. & Mrs. Howard G. Cutforth
Theodore W. Cutshall
Xilei Dai
Thomas J. Dannhauser
David C. Darwin
Dr. & Mrs. Donald D. DeFord
Esther Anne Dickens
Malcolm Dole, Jr.
Earl Doomes
Rostyslaw Dowbenko
Ryan W. & Jean Wisner Dupon
Harry S. Edwards
Paul E. Ellis, Jr.
Dietrich M. & Elaine Fabricius
Mengmeng Fahrni
Joseph Feder
John E. Fedyski
Morton and Jean Fefer
John R. Ferraro
Hermann Faubl
Rodney B. & Kathleen Case Finzel
Connie B. Fischbein
Sherri R. Forrester
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1940's

Allen G. Debus (B.S., 1947) edited a book that has been published in 2004, *Alchemy and Early Modern Chemistry: Papers from Ambix*. *Ambix* is the journal of The Society for the History of Alchemy and Chemistry.

Harold Wittcoff (Ph.D., 1943, Riegel) co-authored a book with Mark Green entitled *Organic Chemical Principles and Industrial Practice*, designed to show the relevance of the first year of organic chemistry. He and his wife, Dorothy, spent last fall in England and Israel, where he presented short courses on "The Industrial Organic Chemistry Industry."

1950's

William Hime (Non-degree, 1948-1951, DeFord) presented a paper in September on his experiences in over three hundred depositions and 100 trials. He and his wife of 54 years, **Nancy Price Hime** (B.A., 1950), are avid golfers and are on a quest to play all the 70-some courses in Hawaii. They are down to the last dozen.

Jerome Horwitz (Postdoc, 1951, Fernando) has created the anti-tumor SH-80 series, recently licensed to Sanofi-Synthelabo; he discovered it working under a five-year grant from the National Institutes of Health National Cancer Institute awarded in early 2000. At 85, Jerome is one of the oldest recipients ever of such a grant.

Norm Neureiter (Ph.D., 1957, Bordwell) has been appointed a Distinguished Presidential Fellow for International Affairs at the National Academies. In May 2004, he accepted a position as the first Director of the newly established Center for Science, Technology and Security Policy of the American Association for the Advancement of Sciences (AAAS) in Washington, DC.

1960's

Philip Bays (B.A., 1963, Summerbell & Hussey) reports that he continues to teach chemistry at Saint Mary's College in Notre Dame, Indiana, this fall entering his 28th year on that campus.

Ian Butler (Postdoc, 1965-1966, Basolo & Pearson) will be stepping down on December 31, 2004 from his position as Associate Vice-Principal (Research) at McGill University. After a year's sabbatical, he will return to teach and research in the Department of Chemistry for at least two years before even considering retirement. His wife, Pam, and he became grandparents for the 9th time in September.

Alvin Crumbliss (Ph.D., 1969, Basolo) received the 2004 David and Janet Vaughn Brooks Distinguished Undergraduate Teaching Award at Duke University, where he is a Professor of Chemistry.

Harry Gray (Ph.D., 1961, Basolo & Pearson) reports that in November 2003 he received an honorary doctorate from the University of Copenhagen in a ceremony attended by Queen Margrethe II (of Denmark); in April 2004 he received the Benjamin Franklin Medal in Chemistry in a ceremony at the Franklin Institute; and in May 2004 he received the Wolf Prize for Chemistry from the President of Israel.

Wayne Stalick (Ph.D., 1969, Pines) is moving to Central Missouri State University after 32 years at George Mason University. He will be the Chair of a new department of Chemistry and Physics.

Cooper Langford (Ph.D., 1960, Burwell) formally retired from the faculty of the University of Calgary on the 30th of June, 2004. However, he continues to the Coordinator of the Program in Science, Technology, and Society and to be active in graduate student supervision and research.

Andrew Williams (Postdoc, 1965, Bender) is an Emeritus Professor of Organic Chemistry at the University of Kent. He is pleased to let us know that in 2003 he authored a book, *Free Energy Relationships in Organic and Bio-organic Chemistry*.

Andrew Wojcicki (Ph.D., 1960, Basolo) participated in the 15th Summer School on Coordination Chemistry in Szklarska Poreba, Poland, in June 2004. He also lectured at Warsaw Technical University.

1970's

Dietrich M. Fabricius (Ph.D., 1977, Lambert) has begun employment with PharmAgra, without moving from his North Carolina home, after working for DuPont and its corporate descendants in the area. His daughter Anne currently is an undergraduate at Northwestern.

Jack Gosnell (Ph.D., 1971, Lambert) is now President and CEO of International Professional Executive Development, or iPED, a firm which focuses on the commercial, governmental, and academic spheres of China, Russia, and the U.S. He headquarters in Falls Church, Virginia, but is frequently in China and Russia.

Jim Kaduk's (Ph.D., 1977, Ibers) big news is that earlier this year he was elected Chairman of the Board of Directors of the International Centre for Diffraction Data (Newtown Square PA), the organization that produces and maintains the Powder Diffraction File database.

Stephen Leone (B.A., 1970, Shriver) is the recipient of the 2005 Peter Debye Award of the American Chemical Society.

Michael (Majchrzak) Major (Postdoc, 1977-1978, Lambert) is president and CEO of Cambridge Major Laboratories in Wisconsin. In 2003 they broke ground on a new pharmaceutical production facility in Germantown, WI.

Wallace Oliver, Jr. (Ph.D., 1970, Lambert) has retired from BP after many years in the legal department (including when the company was Amoco) and taken a job in the law firm of Welsh & Katz in the Chicago area.

Hsing-nin (Sean) Sun (Ph.D., 1975, Lambert) has begun private law practice in Houston after many years with petroleum and chemical companies.

William Wachter (Ph.D., 1976, Marks) was named "Innovator of the Year" together with seven other scientists and engineers from the ExxonMobil downstream organization for fundamental and applied research associated with fluid catalytic cracking (a process that produces nearly 50% of the gasoline consumed worldwide). He and his family moved from Baton Rouge, Louisiana to Annandale, New Jersey in 2001.

1980's

Bill Catus (Ph.D., 1982, Allred) continues to work as a Senior Scientist at Chemical Abstracts Service in Columbus, OH, doing abstracting/indexing, French translation, and CAS Help Desk customer support. His daughter Rachel at age 4 is getting into the science 'Why?' stage, a good review of basic science principles!

John Grant (Ph.D., 1987, Stair) continues with 3M in Minnesota and now has responsibility for strategic planning and external business development for 3M Industrial Services and Solutions. John was also pleased to return to NU as a student, albeit for a week, at the Kellogg Graduate School of Management in March of this year.

Bill Henderson (Postdoc, 1988-1989, Shriver) remains at the University of Waikato in New Zealand, and has been Chair of Department for the last three years. He maintains research interests in phosphorus chemistry, transition metal chemistry and mass spectrometry. His wife (Angela) and he have two children - Laura (4) is about to start school next year, and Liam (2 at Xmas).

Damian Krysan (Ph.D., 1989, MacKenzie) is currently a Pediatric Infectious Disease Doctor at the University of Michigan Children's Hospital and is also doing research on the role of processing proteases in yeast cell wall function. He and his wife, daughter (6 years) and son (2 years) live in Ann Arbor, MI.

Harald Lauke (Postdoc, 1983-1984, Marks) writes that he is now the President of the BASF South East Asia Regional division of the BASF Group, residing in Singapore. He is married and has four children.

Lenore Martin (B.A., 1983, Martin) gave birth to a beautiful baby girl, Leah Elizabeth Ribner-Martin on February 20, 2001. A year and a half later, she was awarded tenure and made an Associate Professor of Cell and Molecular Biology at the University of Rhode Island.

Tom Richmond (Ph.D., 1984, Basolo & Shriver) was recently awarded a Park Teacher's Fellowship at the University of Utah. This Fellowship will support the development of an improved Advanced Inorganic Laboratory course at Utah.

Avi Ulman (Postdoc, 1978-1980, Ibers) will be changing affiliations beginning October of 2004. He will move his laboratory and research activities to Bar-Ilan University in Israel.

1990's

Rabin Bissessur (Postdoc, 1994-1996, Shriver) is now tenured and has been promoted to the rank of Associate Professor at University of Prince Edward Island.

Buford Lemon (Ph.D., 1999, Hupp) reports that **Melinda Keefe** (Ph.D., 2001, Hupp) and he were married in July, 2001. They've been working at Dow in Core R&D-Central Research and living in Midland, MI since 2001. They've spent the last few years traveling, seeing as much live music as possible, and attending a bunch of post-grad school weddings from NU folks.

Marc Levisky (B.A. with honors, 1996, Silverman) got married on March 30th, 2003, to his NU med school sweetheart, Natalya Lvoff. He is serving with the Army, and is the Director of Emergency Medicine Research and an Attending Physician at Darnall Army Community Hospital in Texas. Marc is scheduled to be deployed to Iraq in December of this year.

Andrew Lyon (Ph.D., 1996, Hupp) reports that he was promoted to Associate Professor at Georgia Tech in 2003. In the same year, he and his wife added a fourth member to their family - Olivia joined Trevor (age four).

Arthur Mar (Ph.D., 1992, Ibers) was promoted from Associate to Full Professor of Chemistry in July 2004 at the University of Alberta. In 2003, he was awarded the Faculty of Science Research Award and the Faculty of Science Award for Excellent Teaching.

D. C. Jeff Pyun (B.A., 1997, Lambert) has completed his Ph.D. at Carnegie-Mellon University with Kris Matyjaszewski and has begun a postdoctoral position with Jean Frechet at the University of California at Berkeley.

Anne Reynolds (B.A. with honors, 1999, Godwin) is currently finishing up her graduate studies at the University of Minnesota. She will be the Vice-Chair of the 2005 Gordon Research Conference: Graduate Research Seminar in Bioinorganic Chemistry. In September of 2003, she married Troy Ryba in Minneapolis.

Winston C. Tse (B.A., 1998, Lambert) has completed his Ph.D. at Scripps Institute with Dale Boger and has taken a job at Gilead Sciences.

Qingwu Wang (Postdoc, 1997-1999, Marks) was recently promoted to Principal Materials Scientist at Agiltron, Inc.

Elizabeth Willneff (B.A., 1997) received her M.Sc. in Chemistry from the Free University Berlin. She will complete her Ph.D. in Chemical Engineering this fall at the University of Manchester Institute of Science and Technology with Professor Roger Davey. She and her husband, Sven Schroeder, have one son, Seth, who will turn three in December.

Hongwei Wu (Ph.D., 1998, Lambert; PD, 2000, Sheppard) has had her second child and has moved from Pharmacia to Hospira, a spin-off of Abbott Laboratories.

2000's

Jason Babcock (Postdoc, 1998-2000, Marks) is still working as a Senior Research Scientist for Ultramet in the Los Angeles area, developing engine components for the next generation space shuttle. Jason and his wife, Jennifer, had their first child, Wyatt Everett, on July 1, 2003.

Jinhui Chen (M.S., 2002, O'Halloran & Nguyen) continues his Ph.D. study in chemistry at the University of Michigan-Ann Arbor, living with his wife, Chunyan. They have a son, Yibo Chen, born on March 28, 2004.

Nicki Edleman (Ph.D., 2002, Marks) is "still living it up" in the Hudson Valley, NY with her family, and is working as a development engineer at IBM. Her husband, Kirk, and Nicki celebrated the birth of their first child, Jocelyn Rose Edleman, on May 16th of this year.

Mike Forrester (B.A., 2002, Silverman) is an M.D./Ph.D. student at Duke, recently finishing his second year. His Ph.D. in Biochemistry will be in the area of protein structure/enzymology. His clinical/medical interests are primarily in hematology and oncology.

Chunqing Liu (Postdoc, 2000-2002, Lambert), after a two-year postdoctoral position at the University of Illinois Urbana-Champaign, has begun employment at UOP in the Chicago area.

Lijun Liu (Ph.D., 2002, Lambert) took a postdoctoral position for two years in Biomedical Engineering at Northwestern and started work last spring with Schlumberger Corp. in the Houston area.

Paul Maggard (Postdoc, 2000-2002, Poepelmeier), now an Assistant Professor at North Carolina State University, received a Beckman Young Investigator Award in 2004.

(continued on back)

In Memorium

Professor John Pople passed away this Spring at the age of 78. He had been a member



of the Northwestern Chemistry Department since 1986. He is remembered fondly by his colleagues. "John was a great scientist - he changed the way chemists do chemistry, and provided greatly enhanced capabilities for the chemical community

in its quest to understand what molecules actually do," Mark Ratner recalls.

John received the Nobel Prize in 1998 for "developing computational methods making possible the theoretical study of molecules, their properties and how they act together in chemical reactions." The first computer program that John designed was GAUSSIAN, which is now used in universities and chemical corporations worldwide.

John received the Insignia of a Knight Commander of the Civil Division of the Most Excellent Order of the British Empire in 2003. His other awards included the Wolf Prize in 1992, the 1998 ACS Award in Theoretical Chemistry, and the 2002 Copley Medal from the Royal Society. He was awarded an honorary degree from his

alma mater, Cambridge University, in 2001.

Mark Ratner remembers John's extraordinary character, "John was a man of astounding insight, incredible range and depth, remarkable humility, directness, warmth and the very highest standards. He had a very subtle and delicious sense of humor, and was always very supportive of his discipline, his colleagues and his institutions. I remember many wonderful moments, such as the time he instructed me in how an Englishman eats asparagus, and how he challenged my understanding of thermodynamics by asking me to calculate the entropy of a fried egg."

John is survived by his daughter, three sons and eleven grandchildren.

Dianne de Haseth passed away at the age of 54 after a two-year struggle with cancer. Dianne had worked in the Department of Chemistry since 1991, first for the undergraduate program, then as Department Assistant and finally as the Program Assistant for Tom Meade. She is survived by her husband and four children. Dianne will always be remembered for her wonderful personality and professionalism.

Melissa Merlau (Ph.D., 2001, Nguyen & Hupp) and **Bob Johnson** (Ph.D., 2002, Hupp) wedded in August 2004.

Yoshihiro Koide (Postdoc, 1999-2002, Marks) is an Assistant Professor of the City University of New York.

David J. Krodel (B.A. with honors, 2000, Lambert) has moved from graduate school to medical school, which he begins this fall at Stanford University.

Deanna J. Mitchell (Ph.D., 2000, Silverman) is a Senior Associate with Booz Allen Hamilton, focusing on Strategy Management Consulting.

Bernd (Ben) Sehgal (Ph.D., 2002, Godwin) is now working as a postdoc in the laboratory of Prof. Jonathan Jones in the Department of Cell and Molecular Biology at Northwestern's Feinberg School of Medicine.

Jon Veinot (Postdoc, 2002, Marks) began as an Assistant Professor at the University of Alberta after leaving the Marks' Group. On August 26, 2004, his wife (Leah) and he had their second daughter, Jocelyn Veinot.

Keith Watson (Ph.D., 2001, Nguyen & Mirkin) was promoted to R&D Specialist in Core R&D at The Dow Chemical Company. He and his wife, Martine, are expecting their first child in early December.

Mary Beth Williams (Postdoc, 2001-2002, Hupp), now an assistant professor at Penn State University, received a Packard fellowship in 2003.

Guosheng Wu (Ph.D., 2001, Schatz) did a postdoc at Lilly for 2 years. This January, he joined Concurrent Pharmaceuticals Inc. as a research scientist, working in computer-aided drug design.

Let us know how you are doing!

You can either email updates

to Claire Finando at

c-finando@northwestern.edu.

or you can mail updates to:

Claire Finando

Department of Chemistry

Northwestern University

2145 Sheridan Road

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Please include your name, contact

information, and the name of

your advisor.

Upcoming Events for Chemistry

Friday, October 22nd, 2004

4:45 p.m.

The 2004 Fred Basolo Medal Lecture for Outstanding Research in Inorganic Chemistry
Professor Malcolm H. Chisholm; The Ohio State University

Friday, November 5, 2004

11:00 a.m.

The American Chemical Society 2004 Inorganic Chemistry Award Lecture
Sponsored by Aldrich Chemical Company, Inc.
Professor Herbert W. Roesky; University of Göttingen

Saturday, November 6th, 2004

1:00 p.m.

The 2004 L. Carroll King Memorial Lecture
Professor Herbert W. Roesky; University of Göttingen

Friday, November 5, 2004 – Sunday, November 7, 2004

Tobinstock

In the fall of 2004, Dr. Tobin Marks turns 60. Research associates, alumni, and collaborators will come together to celebrate his career. We welcome you to join us.

For more information, please see the calendar link at www.chem.northwestern.edu/resources

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