

University of Michigan Chemistry NEWSLETTER

Letter from the Chair

It is customary for the Chair of the Department to comment on some of the noteworthy events of the past year in this annual newsletter to our alumni and alumnae. As the new Chair, it is my pleasure to continue this tradition.

This fall has been a transition semester due to the announcement in late September that our Chair of two years, William Roush, had accepted a position with the new Scripps Research Institute in West Palm Beach, Florida. Bill received the proverbial opportunity of a lifetime to be on the ground-floor of this auspicious initiative as Executive Director of Medicinal Chemistry, Associate Dean of the Graduate program and Professor of Chemistry. Bill has been a wonderful colleague and Chair. During his tenure at Michigan the past seven years, the Department has advanced and thrived. During this period, 19 new faculty have joined the Department. This past year, our external research grants have grown to over \$15M. The graduate student and postdoc cohort is currently approximately 325 strong. The undergraduate program continues to be a national leader with innovative courses and initiatives. While the entire Department plays a role in this upward trajectory, Bill has been a special contributor. We all regret Bill's departure but realize that he has received an unusually attractive opportunity to build a new program at a stellar institute. We wish him well.

Professor Emeritus Robert Kuczkowski, Chair of the Department 1991-97, was recruited to return to active duty while the Dean and Department began the usual

process of selecting the next Chair. Bob had recently returned to Ann Arbor after a two-year stint as a visiting program officer in the Chemistry Division at the National Science Foundation in Arlington, VA. The Department is grateful for his willingness to serve on short notice and for his outstanding efforts at leading the Department during this interim period.

During the process of selecting a new Chair, it is traditional for the Dean to consult with the faculty via letters and a visit to the Department. Following the visit in October by Dean Terrence McDonald, the Department was also pleased to have President Mary Sue Coleman and Provost Paul Courant attend a faculty meeting in November. They were updated on our achievements and aspirations for the future. In turn, they lauded the Department on its steady improvement and growth, and expressed continued support from the administration. With this support and the Department's remarkable period of growth in both research distinction and teaching excellence, which has received national attention, I was both honored and proud to be installed as the new Chair, as of March 1, 2005 until July 2010.

Let me give a sense of the direction and strength of the Department. In fall 2002, it developed its most recent vision statement - commonly called the 5-year Plan. This calls for maintaining strength in the core areas as faculty retire and are replaced but with an eye to building research excellence at the interface of interdisciplinary areas especially materials and biochemistry/chemical biology. The operative principle

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2004 - 05

The Regents of the University of Michigan:

David A. Brandon, Laurence B. Deitch, Olivia P. Maynard, Rebecca McGowan, Andrea Fischer Newman, Andrew C. Richner, S. Martin Taylor, Katherine E. White, Mary Sue Coleman, ex officio. Mary Sue Coleman, president.

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is to emphasize the traditional molecular perspective and chemistry based orientation that is at the heart of chemistry programs.

The strength of the Department is evidenced by two figures - number of research workers- 375 (325 graduate students and postdocs plus as many 50 undergraduate researchers at various periods during the year), and research funding - \$15,800,000 in FY04. Both place us in the Top-Ten nationally in those categories.

Another interesting figure is the number of assistant professors, currently 12, almost 1/3 of the tenure track cohort. This is in large part the result of replacement hiring as the wave of expected faculty retirements (the 1960's group) has materialized, and will continue. This group (25% women) is an exciting, dynamic body that has considerably energized the Department.

Since we have last sent out the news letter, Assistant Professor Barry Dunietz has joined the Department. Barry's field is theoretical and computational chemistry. He received his PhD under the direction of Richard Friesner at Columbia and was a postdoc at Berkeley in the group of Martin Head-Gordon. Theodore (Ted) Goodson III also joined the Department this fall as

Professor. Ted was on the faculty at Wayne State University previous to joining us. He is a physical chemist who applies spectroscopic techniques on interesting materials and macro molecules. We are delighted to have these faculty add strength to the physical chemistry cohort in the Department. I am also pleased to announce that John Montgomery will be joining the faculty as Professor in September 2005. John is a rising figure in organic chemistry synthesis. We will have more information on this appointment in the next newsletter.

The undergraduate program continues to be a source of pride, both in the quality of the course offerings and the students. The total numbers of chemistry and biochemistry majors is currently 258, a growth of 22% since 2000. Melanie Sanford and Brian Coppola are co-PIs of the NSF Research Experiences for Undergraduates grant that was renewed in 2004 for four years. Brian continues to attract considerable interest for his efforts with the "Chemical Sciences at the Interface of Education" (CSIE) program, which is designed to train students at the undergraduate, graduate and postdoctoral levels who aspire to careers as future faculty members. Brian and Mark Banaszak Holl have been experimenting with "studio teaching" of a section of general chemistry. This involves integrated lab/lecture teaching from the lab bench rather than the lecture hall.

These are some of the recent changes in the Department and related programs. There are other important ones that would make this letter too lengthy to discuss more fully - so I will briefly mention only one more. Gary Glick, a steering committee and I, have been working on a new Chemical Biology

Interdepartmental PhD degree program. Fourteen chemistry faculty will be affiliated with the program. Students are being recruited for the inaugural class of entrants in fall-2005. In sum, the Department is healthy, vibrant, strong and evolving.

You will see elsewhere in the newsletter accolades to the faculty and students. We look forward to an active recruiting year of faculty and students that I will report to you next year. I hope this gives you some indication of the vibrancy of the program. The future looks bright, despite budget difficulties at the state level that have led to some core budget attrition notwithstanding. We are working with the administration to free up space and resources needed to maintain our upward momentum in teaching and research. Come and visit us and see what is going on. My office is always open for alumni/alumnae visitors.

We are most grateful for your contributions and support of our endeavors to empower the next generation of our citizenry. The loyal donors to the Department's various gift funds, scholarships and endowments are enumerated elsewhere in this newsletter. Please continue this support which is vital to the Department's activities. On behalf of the students and faculty who benefit, I thank you sincerely.

Best wishes for the New Year (belatedly).

Carol Ann Fierke, Chair
Jerome and Isabella Karle Professor of Chemistry, and Professor of Biological Chemistry

Department of Chemistry

Newsletter

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Spotlight Profiles on Faculty

We highlight faculty members to let you know of their special accomplishments in the past year. Although the choice is difficult, considering the numbers of outstanding people in Chemistry at Michigan, we hope you agree this group deserves recognition.



Omar Yaghi

Research in my group is highly interdisciplinary with ongoing projects at the interface of chemistry, biology, and materials science and engineering. The focus is on the design and construction of porous frameworks from molecular building blocks of inorganic clusters, metal-organic complexes, organic macromolecules, peptides and proteins. Emphasis is placed on design of porous structures and control of their pore metrics and chemical functionality to produce materials with well-defined chemical structure and highly specific function. This approach has resulted in an extensive class of crystals and bulk materials having unusual physical and chemical properties. We have instituted collaborations with a large number of major chemical and auto companies to develop the applications of these materials in hydrogen storage and other gas storage and separations, liquid separations, polymerization catalysis, sensors and more recently drug transport, to mention few.

An important development regarding the application of our materials (referred to as MOFs: Metal-Organic Frameworks) in hydrogen storage is especially exciting. One of the biggest challenges to employing hydrogen as a fuel is finding means of store it without use of impractically low temperature or high pressure. Hydrogen is the ultimate fuel as it produces water as a byproduct when burned. We have recently discovered MOF crystals that act as sponges for hydrogen storage, capable of filling up with hydrogen (and other gases) and later releasing them.

The crystals have been designed and prepared by ‘stitching’ together zinc oxide clusters which act as joints, and organic linkers which act as struts to produce an extended porous framework into which hydrogen can be stored and transported. When the materials are exposed to hydrogen at room temperature and under modest pressure, they take up hydrogen immediately. It is now possible to design MOFs that absorb incrementally more hydrogen. Our best prototypes store two percent of their weight in hydrogen at room temperature and pressure, and the materials have the potential to store much more.

MOFs are exceptionally porous at the molecular scale, with surface areas of more than 3,000 square meters per gram. This allows their use for many other applications such as sequestering CO₂ as a greenhouse gas from the atmosphere and separation of polycyclic organics. We’ve shown that MOFs can absorb voluminous quantities of nitrogen and organic vapors.

The materials have several other advantages. Namely, they’re made from low-cost starting materials including zinc oxide, which is used in sunscreen lotion, and terephthalate, which is a component of plastic soda bottles. They are simple to make, and manufacturing yields are high.

Since we’ve developed the basic chemistry of linking building blocks into frameworks, our research is moving in the following specific directions:

Specific projects being actively pursued in my research group are listed here. Some projects are done in collaboration with several colleagues at University of Michigan, Northwestern University and Arizona State University. We call ourselves The Design and Discovery Group.

1) Low density solids: design and synthesis of metal-organic frameworks (MOFs). Design of framework structures in which metal oxide clusters act as ‘joints’ and the organic linkers as ‘struts’ to produce highly porous crystals (ca. 4,800 m²/g) with the lowest density ever recorded for a crystalline material. These remarkable properties are found to be useful in gas storage, in particular hydrogen and methane storage for fueling automobiles, laptops, cellular phones and other mobile electronics. At present some MOFs are being prepared inexpensively in kilogram quantities.

2) Hierarchical structures: inorganic tetrahedral frameworks based on metal sulfides. Use of hydrothermal synthesis techniques to synthesize ordered metal sulfide frameworks and polyhedra in which the building blocks progressively increase in size from 5-100 Angstroms without changing their overall tetrahedral geometry. These types of materials have been found to be useful as fast ion-conductors.

3) Smart crystalline sponges: light-weight and resilient organic frameworks. Use of organic synthesis techniques to produce crystals of extended cross-linked polymers for their use as highly selective binding agents, fluorescent tags, and gas sensors.

4) High-throughput and combinatorial synthesis of materials. Development of the practical aspects of using these techniques in the (a) chemical syntheses of solid state crystalline materials, and (b) their characterization by employing high-throughput X-ray single crystal and powder diffraction techniques.

5) Materials informatics: grammar and taxonomy of the design and construction of extended chemical structures. Given the vast number of structures that could result from assembly of molecular shapes, how do we as designers (a) identify the most important topologies that should be expected to form, (b) determine how are they distributed among known crystal structures, and (c) find means of interpreting, organizing, and classifying this data for the purpose of developing systems of grammar and taxonomy for the design of extended structures, the rationalization of existing structures, and the prediction of new ones.

6) Biocompatible capsules: protein and metal-peptide functional assemblages. Use of symmetric proteins and peptides to construct porous protein networks and ordered metal-peptide frameworks for their applications to drug transport, sequencing and as sensors.



Ioan Andricioaei

New Faculty

Ioan Andricioaei

Assistant Professor of Chemistry, Research Assistant Professor, Bioinformatics
Ph.D., Boston University
Theoretical and Computational Chemistry

Our research explores theoretical and computational topics at the interface between structural molecular biology and physical chemistry. It hinges on the central theme of developing and applying computer and modeling methods to describe, in terms of dynamics and thermodynamics, biologically important molecular processes, with the aim to complement, enhance or predict experimental findings. Research directions include:

Computer Simulations of DNA-Binding Machines. Protein-DNA interactions are essential in such crucial cellular functions as replication, repair, transcription or recombination. Many enzymes at and ahead of the replication fork affect large DNA fragments. For instance, topoisomerases undo DNA knotting. Others, like helicases and polymerases, are biomolecular motors: they use the energy of binding and/or hydrolysis of nucleotides to do mechanical work on the DNA fragments to which they bind. We have an avid interest in the theoretical description of these fundamental genetic processes through massively parallel computer simulations.

Dynamics-Function Relationships. Connections to NMR Relaxation. An accurate measure of free energy, important for protein/RNA stability or ligand binding, has to include the entropy manifested in molecular flexibility. On the experimental side, this dynamic aspect is brought in by developments in solution NMR spectroscopy, which measures motion by relaxation experiments. Molecular dynamics simulation is an important tool to complement these measurements and to connect dynamics to entropy.

Enhanced Sampling in Path Space. Many important equilibrium and kinetic properties of chemical systems (including proteins and nucleic acids) can be cast in terms of paths in multi-dimensional spaces. Sampling and optimization algorithms that we have developed for the conformational space can be generalized and adapted to the space of paths. We see fertile ground for theoretical and computational work on several categories of paths, from chemical-reaction paths, to paths in the sequence space of evolving proteins.



Barry Dunietz

Barry Dunietz

Assistant Professor of Chemistry
Ph.D., Columbia University
Theoretical and Computational Chemistry

Computational quantum chemistry (QC) has the ability to provide microscopic insight on complex systems which is difficult to obtain by other tools. However, the extension of current methodology for such purposes is still far from trivial. The research we plan to undertake, will further enhance the use of QC methodology for complex systems. New methodological extensions required for the study of systems relevant for material science and biology will be suggested and implemented. Focus is provided to investigate processes involved with excited state dynamics of such extended systems.

Biological systems serve as one obvious category of complex systems. Specifically, we are interested in reactions related to photochemistry. Time Dependent DFT (TDDFT) emerges as a highly appropriate method for studying excited states. Recently, TDDFT technology has provided microscopic insight on the relevant excited states of the heme-CO ligand photodissociation process. Other interesting photochemistry reactions will be investigated.

Another category of complex systems being considered are related to material science. A major challenge for surface science research is to identify the surface properties

crucial for catalysis. Electrochemistry is characterized by an additional complexity due to the liquid-solid interface. Microscopic description of the reaction mechanism can be gained by employing relatively simple models. A recent example is the investigation of CO electrooxidation process, a reaction with importance for fuel cell technology. Study of other surface mediated reactions is planned.

A related research effort will be provided to study systems of relevance for molecular electronics. The fundamental unit in molecular electronics consists of a “molecular wire” (MW) connecting two leads. Upon applying a potential bias on the leads, charge is transferred through the connecting molecule. With the recent success of experiments to measure charge transfer through MWs the need for accurate theoretical models describing these systems has been highlighted. Research in the group will be aimed to devise new methodologies for studying current-voltage relations in molecular junctions as well as applying these methodologies to interesting systems.

Finally, research to extend and improve current QC methodology for investigations of open shell systems is planned. The need for devising low cost and yet qualitative treatments of open shell systems is a well accepted notion. Possible directions involve method development based on localized perturbation and the coupled cluster ansatz theories. The aim is to devise a qualitative reference function, which may be used for higher order corrections.

Theodore Goodson, III

Professor of Chemistry

Ph.D., University of Nebraska

Physical Chemistry, Organic Materials, Nonlinear and Time-resolved Spectroscopy,

Quantum Optical Effects in Novel Materials

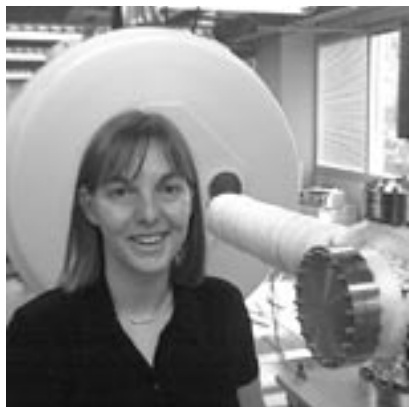
Our research group utilizes a number of spectroscopic techniques towards investigating the optical properties and applications of novel organic macromolecular materials. A major emphasis is placed on the new properties observed in organic macromolecules with branching repeat structures as well as organic macromolecules encapsulated with small metal particles. These materials have been suggested to be candidates for a variety of applications involving light emitting devices, artificial light harvesting, strong optical limiters, enhanced nonlinear optical effects, quantum optical effects and as sensors in certain organic and biological devices.

Utilizing steady-state spectroscopy as well as ultra-fast time-resolved fluorescence (upconversion) and absorption (pump-probe) measurements, our research is focused on probing the kinetics of the fast energy redistribution processes that occur in branched (and related) macromolecular structures. With the additional use of fluorescence anisotropy decay measurements, we have characterized the fundamental limits of interaction in different molecular architectures. Investigations of novel larger branched structures as well as more fundamental investigations are used to probe the important structure-function relationships in these systems. These investigations are coupled with measurements of interactions and electronic dephasing in the branched (aggregate) systems with 3-pulse photon echo spectroscopy (3PEPS). This combined approach allows for the analysis of the energy transfer, interaction strength, dephasing, as well as other important physical properties of particular macromolecular systems.

The research in the group is also directed at the use of organic branched structures for applications in nonlinear optics as well as quantum optical and quantum interference effects. The investigations of strong interactions in particular multi-chromophore systems suggest that there is a possibility of enhanced transition dipole moments. This has been observed in organic branched structures in our laboratory. New methods, both synthetically and optically to enhance the nonlinear response of organic branched macromolecules are developed in this research effort. These measurements are combined with two-photon-emission and degenerate-four-wave mixing experiments to fully characterize the complete response of novel materials.



Theodore Goodson, III



Kristina Hakansson

Kristina Hakansson

Assistant Professor of Chemistry
Ph.D., Uppsala University
Fourier Transform Ion Cyclotron Resonance Mass Spectrometry for Biomolecular Identification and Structural Characterization

Our research focuses on applying state-of-the-art mass spectrometric techniques to the following areas: 1) identification and characterization of protein post-translational modifications; 2) mapping macromolecular contact surfaces; and 3) exploration of the gas-phase fragmentation behavior of various biomolecules following ion-electron interactions. A major goal is to excel in both analytical technique development and biologically relevant problem solving.

Electron Capture Dissociation (ECD) is a recently developed fragmentation technique for gas-phase peptide and protein ions. ECD can cleave backbone bonds with retention of weakly-bound post-translational modifications, thereby allowing their localization while simultaneously resulting in amino acid sequence information. By contrast, the main dissociation pathways in slow-heating techniques, such as infrared multiphoton dissociation (IRMPD), are loss of and cleavage within modifications. IRMPD can therefore identify the presence of modifications, and provide complementary structural information. We incorporate ECD and IRMPD into the field of proteomics to specifically target modified proteins at low (pmol) levels.

Solution-phase hydrogen/deuterium exchange in combination with mass spectrometric detection of proteolytic peptides is a valuable tool for characterization of protein-protein interactions. The exchange rates of amide hydrogens at contact surfaces generally slow down several orders of magnitude compared to hydrogens accessible to the solvent. We utilize the ultrahigh resolution ($m/DmFWHM$ of several million) and ppm mass accuracy of Fourier transform ion cyclotron resonance mass spectrometry (FT-ICR MS) to improve peptide assignment, protein sequence coverage, and mass increase measurements. We also apply this technology to characterize protein-nucleic acid and protein-carbohydrate interactions, and explore the possibility of employing ECD to increase structural resolution.

Finally, we are interested in extending the radical ion chemistry of ECD and other techniques based on ion-electron interactions to structural characterization of a larger variety of biological molecules, such as oligonucleotides and oligosaccharides. Fragmentation patterns of both positive and negative ions are investigated, and should provide insights for a deeper understanding of these processes.



Melanie Sanford

Melanie Sanford

Assistant Professor of Chemistry
Ph.D., California Institute of Technology
New Synthetic Methods, Catalysis and Asymmetric Catalysis, Organometallic Chemistry

Research in my group focuses on problems at the interface of organic and inorganic chemistry. In particular, we work to discover, understand, and exploit the unique (and often highly selective) reactions between organic substrates and transition metals in order to address current challenges in organic synthesis. Some problems of particular interest include the development of catalysts for the selective functionalization of C-H bonds, the asymmetric synthesis of heterocycles, and the stereoselective formation/elaboration of metal enolates. Students in my group will gain experience in the synthesis and characterization of organic and organometallic compounds, the discovery of new reactions, and the application of these new reactions in organic synthesis and catalysis. Importantly, our research relies heavily on mechanistic investigations to direct both the development and the optimization of catalytic processes. Two projects of particular interest are described below.

Oxidation of Carbon-Hydrogen Bonds

A first area of interest involves the development of new, highly selective methods for converting unactivated arene and alkane C–H bonds to new functional groups (including alkyl/aryl acetates, ethers, halides, amines, cyanides, arenes, alkenes and alkynes) and applying these transformations to the synthesis and functionalization of complex organic molecules.

Synthesis of Chiral Heterocycles

A second project involves the design of novel transition metal catalysts for the asymmetric synthesis of chiral heterocycles (e.g., epoxide, aziridine, pyrrolidine, and tetrahydrofuran derivatives), which serve as important structural motifs in a wide variety of natural products. Our approach to these molecules involves the oxidation of olefins with environmentally benign oxidants such as dioxygen and nitrous oxide.

Faculty News

Larry Bartell is the recipient of the Metz-Starck award given this past week at the Austin Symposium on Molecular Structure. This international award recognizes scientists who have made major contributions to the study of molecular structure with preference given to the fields of microwave spectroscopy, high resolution infrared spectroscopy, and gas-phase electron diffraction.

Congratulations to **Hashim Al-Hashimi** for receiving the 2004 Ralph E. Power Junior Faculty Enhancement Award. This award is sponsored by Oak Ridge and is available to junior faculty at Oak Ridge Associated Universities member institutions. These awards are intended to enrich the research and professional growth of young faculty and result in new funding opportunities for them.

Brian P. Coppola has been awarded the 2004 Professor of the Year for the State of Michigan for his contributions to chemical education and future faculty development. The award is given by the Council for Advancement and Support of Education (CASE) and The Carnegie Foundation for the Advancement of Teaching.

The 2004-2005 winner of the Society for College Science Teachers (SCST)/Kendall-Hunt Outstanding Undergraduate Science Teacher Award (OUSTA) is **Brian P. Coppola**. Professor of Chemistry, Associate Chair for Curriculum and Faculty Affairs, and the Arthur F. Thurnau Professor in Chemistry at the University of Michigan.

Kristina Hakansson is the recipient of a 2004 Searle Scholar Award. This is an outstanding accomplishment - a highly

competitive award program. Kristina is the second member of the Chemistry Department to receive this honor.

Marc Johnson, Anna Mapp and Zhan Chen are recipients of 2004 NSF Career Awards.

Congratulations to **Anna Mapp**, who is the recipient of the prestigious 2004 Alfred P. Sloan Foundation Fellowship in Chemistry. These annual awards are intended to enhance the careers of the very best young faculty members in specified fields of science.

Rowena Matthews has been elected a member of the National Academy, Institute of Medicine.

Mark Meyerhoff has been named the Philip J. Elving Collegiate Professor of Chemistry effective September 1, 2004 - August 31, 2009.

The 2003 Farrel Lytle Award for outstanding contributions to synchrotron science involving SSRL was awarded to **James Penner-Hahn**, in recognition of his imaginative application of x-ray absorption spectroscopy in all of its variations to a large and diverse collection of important biological and biochemistry problems over the past twenty years. It was noted by many of the people who nominated Jim, that during this same period he has also focused with equal vigor on training the next generation of biophysical X-ray spectroscopists.

James Penner-Hahn and **James Coward** have been elected Fellows of the American Association for the Advancement of Science.

Paul Rasmussen has been selected as one of the Harold R. Johnson Diversity Awardees for 2004. The Harold R. Johnson Diversity Service Award recognizes faculty whose service contributes to the development of a more culturally and ethnically diverse campus community. Paul has made major contributions at the College and Graduate School through his broad efforts to expand the recruitment of underrepresented minority students, not only into chemistry, but into all of the natural science departments on campus.

William Roush is the 2004 recipient of the ACS Ernest Guenther Award for Natural Products Chemistry.

Congratulations to **Melanie Sanford** who has been named a recipient of a Beckman Young Investigator Award. The Arnold and Mabel Beckman Foundation makes grants to non-profit research institutions to promote research in chemistry and the life sciences to foster the invention of methods, instruments and materials that will open up new avenues of research in science. The Beckman Young Investigators (BYI) Program is intended to provide research support to the most promising young faculty members in the early stages of academic careers in the chemical and life sciences. Melanie is also a recipient of a Camille and Henry Dreyfus New Faculty Award.

Camille and Henry Dreyfus Foundation announced that **Nils Walter** has been named a recipient of the 2004 Camille Dreyfus Teacher-Scholar Award. This year's list of recipients is truly impressive.

John Wolfe received a 3M Nontenured Faculty Award. This is an unrestricted research award funded by the 3M Contributions Program. John has also been named the recipient of the 2004 Amgen Young Investigator Award and has received a NIH grant starting in 2005.

Omar Yaghi appointed Robert W. Parry Professor of Chemistry

Professor Omar Yaghi was installed as the Robert W. Parry Collegiate Professor of Chemistry on Oct 27, 2004 by Dean Terrence McDonald (College of Literature, Science and the Arts), at a ceremony in the Rackham Amphitheatre. Prof. Yaghi presented a lecture on the occasion entitled "Crystals Full of Nothing for the Storage of Hydrogen".

Collegiate chairs are awarded to distinguished faculty in the College in recognition of their leadership and achievements. Prof. Yaghi was honored for his groundbreaking work on the synthesis and characterization of open structure metal-organic frameworks, which show great promise in applications as gas storage materials (H_2 and CH_4), polymerization catalysis and separations. Collegiate chairs also honor former faculty members or distinguished alumni/ae. Prof. Yaghi chose Robert (Bob) Parry as the namesake for his chair. Bob was a member of the faculty from 1946-1969. A much beloved colleague and teacher, Bob rose to national leadership during his tenure at Michigan. He was a founding editor of *Inorganic Chemistry*, president of the American Chemical Society, and a recipient of the Priestley Medal,

Ed Vedejs received the 2004 HC Brown Award for Creative Research in Synthetic Methods, as announced in *Chemical and Engineering News*.

Omar Yaghi has been awarded the 2004 Sacconi Medal from the Italian Chemical

the highest award from the American Chemical Society. Bob moved to the University of Utah in 1969 where he is Professor Emeritus. Bob directed some 40 PhD and postdoctoral students during his tenure at Michigan. They subsequently established the Robert W. Parry endowment fund to support a graduate student researcher. The endowment currently provides a summer fellowship for a graduate student every 1-2 years.

Bob and Marj Parry journeyed from Salt Lake City to participate in the day's activities that included a reception and dinner attended by over 40 colleagues and friends. They were joined by their son, Mark, Marj's sister and her husband, Ernest and Connie Upton, and several of Bob's former students, including Prof. and Mrs. Robert Paine, Prof. and Mrs. Du Shriver, Sr. Susan Fleming, Prof. Charles Heitsch, Prof.

Society. Information about this award for excellence in Inorganic Chemistry is available on the following website: <http://www.cerm.unifi.it/FondSacc/medal.html>. Omar has been named the Robert W. Parry Collegiate Professor of Chemistry.



Front row l to r: O. Yaghi, R. Weaver, R. Parry, S. Fleming, D. Badger
Back row l to r: R. Kuczkowski, C. Heitsch, R. Paine, T. McDonald, D. Shriver

Richard Weaver and Prof. David Badger. Several of Prof. Yaghi's former mentors, friends and colleagues attended the event including Prof. Walter Klemperer, Prof. Michael O'Keeffe and Prof. Morton Munk. Other attendees at the dinner were faculty and staff from the Chemistry Department, Mechanical Engineering and various University administrative offices. The current holder of the Parry graduate fellowship, Stephen Caskey, also attended and was introduced at the dinner.



Tamiika Hurst

Graduate Student Profile

Tamiika K. Hurst is a Ph.D. student in the research group of Carol Fierke. Her thesis research is in the area of enzyme-based biosensor development. As an undergraduate at Wayne State University, Tamiika became involved with *The National Organization for the Professional Advancement of Black Chemists and Chemical Engineers* (NOBCChE, pronounced No-be-shay).

This national organization has been in existence since 1972. It supports the growth and development of underrepresented scientists and engineers through programs geared toward academic excellence, professional development and community involvement. Its annual meeting each spring brings together students, educators, industrial scientists and administrators to focus on research accomplishments and career development. Job recruiting and networking is actively pursued in at this time. Tamiika serves as the

2004-2005 NOBCChE National Student Representative and is very active in the University of Michigan Student Chapter. She also has served as past president of the Michigan State Student Chapter and as the

Midwest Region Student Representative. We salute her dedication to the NOBCChE community and goals, and wish her success in her leadership role this year.

Graduate Program News

Opening Remarks and Presentation of Awards - Dr. Carol Fierke, Chair, Graduate Committee and Professor of Chemistry

Annual Awards

Florence Fenwick Outstanding Graduate Student Instructor Award

Presented to graduate students who taught undergraduate courses in chemistry during the academic year. Winners are chosen for their innovation in the lab or classroom, teaching evaluations, and recommendation of faculty. These awards are provided from the Florence Fenwick Memorial Fund.

Pascale Leroueil (Banaszak Holl)
Shaela Reidy (Sacks)

Wirt & Mary Cornwell Outstanding Graduate Student Research Award

Presented to graduate students based on research advisor recommendation, publications, posters, meeting presentations, uniqueness of research and nature of research. These awards are provided from the Wirt and Mary Cornwell Prize.

Dinari Harris (Walter)
Jesse Rowsell (Yaghi)

American Chemical Society Outstanding Graduate Student Award for Research and Teaching

This award is given by the Huron Valley Section of the American Chemical Society. It is intended to recognize achievement in teaching and research by a graduate student.

Matthew Clarke (Chen)

Milton Tamres Outstanding Teaching Award

This award is named after Professor Milton Tamres who was a master teacher. It recognizes outstanding cumulative teaching service.

Melissa Getz (Al-Hashimi)

Robert & Carolyn Buzzard Graduate Chemistry Student Leadership Award

The Leadership Award is given to a graduate student who has shown the skills of a leader of many. The person takes an active role in the Department - assisting with graduate recruitment; working with faculty and staff to provide a better environment for graduate



Florence Fenwick Outstanding Graduate Student Instructor Award: Shaela Reidy, Vincent Pecoraro



Wirt and Mary Cornwell Outstanding Graduate Student Research Award: Vincent Pecoraro, Omar Yaghi (accepting for Jesse Rowsell), Dinari Harris, Nils Walter



ACS Outstanding Student Award for Research and Teaching: Vincent Pecoraro, Matthew Clarke



Milton Tamres Outstanding Teaching Award: Melissa Getz, Mrs. Tamres



Robert and Carolyn Buzzard Graduate Chemistry Leadership Award: Robyn Gdula, Vincent Pecoraro



Abbott Laboratories Graduate Fellowship in Synthetic Organic Chemistry; Vincent Pecoraro, Peris Gorka



Bristol-Myers Graduate Fellowship: Lisa Julian, Vincent Pecoraro

students; also serves as morale and welfare support person. This award is provided by Robert and Carolyn Buzzard.

Robyn Gdula (Johnson)

Seyhan Ege ADVANCE Travel Awards

The ADVANCE Travel Award is given to female students who are interested in an academic career and will be attending a conference.

Joslyn Kravitz (Pecoraro/Carlson)

Andrea Sudik (Yaghi)

Megan McGuigan (Sacks)

Nissa Westerberg (Fierke)

ADVANCE Travel Awards

Stephanie Gantt (Fierke)

Amelia Fuller (Mapp)

Julia Clay (Vedejs)

Suping Zheng (Lubman)

Emily Jameson (Kennedy)

Fellowship Recipients

Abbott Laboratories Graduate Fellowship in Synthetic Organic Chemistry

Peris Gorka (Vedejs)

Bristol-Myers Graduate Fellowship

Lisa Julian (Roush)

Eli Lilly Graduate Fellowship

Anthony Boitano (Glick)

Amelia Fuller (Mapp)

Kan Zhu (Lubman)

National Science Foundation (NSF) Fellowship

Stephanie Gantt (Fierke)

Maria Rhodes (Walter)

Scott Shaw (Vedejs)

Natalia Melcer (Yaghi)

Robert W. Parry Fellowship

Stephen Caskey (Johnson)

Pfizer Graduate Fellowship in Organic Chemistry

Aaron Minter (Mapp)

Rackham Merit Fellowships

Fellowship support funded by the Rackham Graduate School for students from historically underrepresented groups.

Tara Lynn Conser (Coward)
Joseph Gallegos (Francis)
Tamiika Hurst (Fierke)
William C. Johnson (Chen)
Rebecca Tinsley (Walter)
Ricardco Lira (Roush)
Michael Orozco (Sension)
Zikiya Norton (Mapp)
Frank Vazquez (Geva)
Salena Whitfield (Sanford)

Rackham One-Term Dissertation Fellowship

Beth Knapp-Reed (Roush)
Jeff Bartolin (Banaszak Holl)



Eli Lilly Graduate Fellowship in Organic Chemical Biology and Analytical Chemistry: Vincent Pecoraro, Amelia Fuller

Regents' Fellows

Support for students provided by the Regents of the University

Zuzanna Cygan (Banaszak Holl)
Timothy DeVries (Vedejs)
Trisha Duffey (Vedejs)
Emily Jameson (Kennedy)
Joshua Ney (Wolfe)
Scott Shaw (Vedejs)

Margaret and Herman Sokol Graduate Fellowship in Chemistry

Cheryl Loch (Chen)



UNCF/Merck Graduate Science Research Dissertation Fellowship

Dinari Harris (Walter)

Robert W. Parry Inorganic Chemistry Fellowship: Vincent Pecoraro, Stephen Caskey

Training Grants

Cellular Biotechnology Training Program (CBTP)

Katherine Hicks (Fierke)
Kristin Smith (Fierke)

Chemistry-Biology Interface Training Program (CBI)

Training Grant provided by National Institutes of General Medical Sciences for research at the interface of chemistry and biology. Includes units of Chemistry, Biological Chemistry at the Medical School and Medicinal Chemistry in the College of Pharmacy.

Susan Deeter (Vedejs)
Gina DeVault (Roush)
Melissa Bobeck (Glick)
Linelsey Gottler (Marsh)
Robert Rarig (Vedejs)
Jenny Rush (Glick)
Thomas Sundberg (Glick)
Debra Touw (Pecoraro)



Pfizer Graduate Fellowship in Organic Synthesis: Vincent Pecoraro, Aaron Minter



Regents Fellowships: Vincent Pecoraro, Tim DeVries, Emily Jameson, Trisha Duffey



Margaret and Herman Sokol Graduate Fellowship in Chemistry: Vincent Pecoraro, Cheryl Loch

Graduate Assistants in the Area of National Need (GAANN)

Enhance teaching and research capacities of chemists to meet the needs of emerging industries vital to our technological competitiveness and to supply our colleges with faculty to meet the 21st Century teaching and research missions.

Rebecca Basse (Zellers)
Alex Hansen (Al-Hashimi)
Kami Hull (Sanford)
Pascale Leroueil (Banaszak Holl)
Rajan Pragani (Roush)
Kendra Reid (Kennedy)
Shaelah Reidy (Sacks)
Jennifer Thomas (Wolfe)

Integrative Education and Research Training Program (IGERT)

Training grant sponsored by the National Science Foundation for research in materials chemistry.

Annabelle Benin (Yaghi)
Adam Grzesiak (Matzger)
Jamie Nichols (Zellers)
Katherine Plass (Matzger)
Lidaris San Miguel (Matzger)
Michael Stewart (Johnson)

Medical Scientist Training Program (MSTP)

Steven Rowe (Mapp)

Molecular Biophysics Training Grant (MBTG)

Caleb Behrend (Kopelman)
John Hoerter (Walter)
Miguel Pereira (Walter)

Pharmacological Sciences & Biorelated Chemistry Training Program (PSTP)

Heather Hartman (Fierke)

Sokol Visit

Each year the Department sponsors a reception to welcome distinguished benefactress, Mrs. Margaret Sokol to campus. The yearly visit provides an opportunity for Mrs. Sokol to meet with current and past recipients of the Margaret and Herman Sokol Graduate and Undergraduate Fellowships established in 1991.

In addition to the Sokol Scholars program, Mrs. Sokol is responsible for the Margaret and Herman Sokol Faculty Award in the Sciences program. Faculty award recipients are selected by Rackham Graduate School and give a lecture on campus in the spring. Professor Vincent Pecoraro is the recipient of the 2005 Sokol Faculty Award.



2003-04 Sokol Award Recipients

Cheryl Loch, Graduate
Curtis Schneidis, Graduate
Keary Engle, Undergraduate Summer Research
Anders Nilsson, Undergraduate Summer Research

Graduate Degrees

Doctorates for August, December 2003 & May 2004

FALL 2003 PHD GRADUATES

- Aponick, Aaron** William H. Pearson
(2-Azaallyl) Stannanes in Synthesis: (1) Formal Syntheses of (t)-Aspidospermidine, (t)-Aspidospermine, and (t)-Quebrachamine and (2) Tandem Double Allylation/Ring Closing Metathesis Reactions.
- Cole, Allwyn** Roseanne J. Sension
Ultrafast Transient Absorption Studies of Coenzyme B Analogs and Derivatives: Biological Activity of Alkylcobalamins.
- Emal, Cory** William R. Roush
Design and Synthesis of Mechanism-Based Cysteine Protease Inhibitors and Pro-Apoptotic 1,4-Benzodiazepines.
- Neitz, R. Jeffrey** William R. Roush
Total Synthesis of the Structure of the Putative Landomycin Agylcone, Revision of the Structure and Studies Directed Toward the Synthesis of the Proposed Structure of the Landomycin Agylcone.
- Oh, Bong Kyun** Mark E. Meyerhoff
Biomimetic Nitric Oxide (NO) Generation at Interface of Polymeric Material Doped with Copper(II)-Complex.
- Pickett, Jennifer Susan** Carol A. Fierke
Investigations Into the Transition State of The Reaction Catalyzed by Protein Farnesyltransferase.
- Tobin, Daniel A.** James E. Penner-Hahn
XAS Investigation of Zinc Metalloproteins and Enzymes.
- Wildman, Katherine Anne Henzler** Ayyalusamy Ramamoorthy
The Mechanism of Lipid Bilayer Disruption by the Human Antimicrobial Peptide, LL-37.
- Witker, David L.** M. David Curtis
Factors Influencing Electronic and Ionic Conductivity in Ion-Coordinating Conjugated Polymers.
- Yamaguchi, Yoshinori** Michael D. Morris
Two- and Three-Dimensional Image Analysis in Bioanalytical Measurement Systems.
- Zajac, Matthew A.** Edwin Vedejs
Synthesis of the Diazonamide A Macrocyclic Core

WINTER TERM 2004 PHD GRADUATES

- Alexander, Matthew D.** James K. Coward
The Synthesis and Characterization of Gamma-Glutamyl Aldehydes and Epoxides Designed as Inhibitors of the Cysteine Protease Gamma-Glutamyl Hydrolase.
- Batchelor, Melissa May** Mark E. Meyerhoff
Synthesis and Characterization of NO-Releasing Agents/Polymers for Biomedical Applications.
- Cygan, Zuzanna T.** Mark M. Banaszak Holl
Palladium Complexes with Germylene Ligands: Synthesis, Structure, and Reactivity.
- Dahlgren, Gabriella** Robert T. Kennedy
Dynamic Measurements of Metabolism and Secretion in Islets of Langerhans by Amperometry and Fluorescence Microscopy.
- Filippakopoulos, Panagiotis** Dimitri N. Coucouvanis
Design and Synthesis of Supramolecular Molecules and their Use as Carriers for the Facilitated Transport of Biomolecules across Lipophilic Barriers.
- Flamme, Eric M.** William R. Roush
The Development of a Novel Double Allylboration Reaction: I. Synthesis of 1,5-Anti- and 1,5-Syn-Diols II. Methods for the Formation of Trans-2,6-Disubstituted 5,6-Dihydro-2Hpyrans. Progress towards the Synthesis of Amphidinol 3.
- Frost, Megan C.** Mark E. Meyerhoff
Improving the Hemocompatibility of Hydrophobic Polymers via Nitric Oxide (NO) Release: *In Vivo* Evaluation of NO-Releasing Silicone Rubbers and the Development of S-Nitrosothiol Derivatized Polymer Fillers.
- Huhta, Marja S.** E. Neil G. Marsh
Studies on Two Radical Enzyme Systems: Glutamate Mutase and Benzylsuccinate Synthase.
- Knapp-Reed, Beth A.** William R. Roush
I. Studies toward the Total Synthesis of Scytophycin C. II. Optimized Synthesis of Vinyl Sulfonamide Inhibitors of the Cysteine Protease Cruzain.
- MacKay, James A.** Edwin Vedejs
Nucleophilic Catalysis using Chiral Phosphines.
- Mans, Douglas M.** William H. Pearson
Aza-Bridged Bicyclic Amines from (2-Azaallyl)Stannanes and the Total Synthesis of (+)-Cocaine.
- Matzapetaki, Emmanouil** Vincent L. Pecoraro
Use of Heavy Metal Binding *De Novo* Designed α -Helical Peptides as Models for Understanding Metalloproteins.
- McClure, Craig P.** James E. Penner-Hahn
Investigation of Biological Metal Sites by X-Ray Fluorescence and X-Ray Absorption Spectroscopy.

Mergott, Dustin William. R. Roush
Total Synthesis of (-)-Spinosyn A.

Owens, Thomas Michael Mark M. Banaszak Holl
Formation and Reactivity of Alkylsilane-Based Monolayers on Gold.

Pankuch, Jessica James K. Coward
New Fluorescent Peptide Substrates for Studying the Mechanism of Gamma-Glutamyl Hydrolase.

Park, Sung Hyun Raoul Kopelman
Kinetics of Diffusion-Limited Reactions in Confined Domains: Spatio-Temporal Studies with Experiments and Numerical Calculations.

Slutsky, Morris E. Neil G. Marsh
Investigation of the Effect of Cation- π and Quadrupolar Interactions in Alpha Helical Peptides.

Soyer, Orkun Richard A. Goldstein
Evolutionarily Motivated Computational Methods for Analysis of Protein Sequences.

Watson, Christopher J. Robert T. Kennedy
Monitoring Extracellular Amino Acids in the Brain by Microdialysis Coupled On-Line to Capillary Electrophoresis.

Weng, Tsu-Chien James E. Penner-Hahn
X-Ray Absorption Spectroscopy Studies on Redox-Active Manganese.

Whiting, Joshua J. Richard D. Sacks
Development of Separation Enhancement Techniques, Component Testing and Enhancement, and System Modeling of a Field Portable Gas Chromatograph.

Xu, Hao Raoul Kopelman
Sol-Gel – and Polyacrylamide Based Optical Pebble Manosensors for Intracellular Oxygen and Glucose Imaging.

Zhu, Kan David M. Lubman
Development of Comparative Proteomics Method Based on Chromatofocusing and Non-Porous Reversed Phase HPLC On-line ESI TOF and Its Application to Breast Cancer Study.

Masters Degrees for August, December 2003 & May 2004

Holly Baseski	Jamie Nichols
Annabelle Benin	Michael Rossi
Nathan Buchanan	Dustin Sawall
Xiaoyun Chen	Jonathan Shackman
Gordon Lambertus	Wei Tang
Benjamin Markovitz	Panagiotis Tsiolis
Natalia Melcer	Peilin Yang



2004 Awards Lunch

Undergraduate Program News

Capital Campaign

Improving undergraduate education via future faculty education.

We have invented a unique strategy for instructional development. Our faculty team up with student collaborators – from undergraduate students to post-doctoral fellows – to carry out impressive and advanced work in education. Students from all levels who are thinking of becoming professors work with

faculty in designing, implementing, assessing, and documenting instruction at the same time they are developing research skills. This system will ultimately produce a new generation of faculty members for whom the integration of teaching and research is second nature.

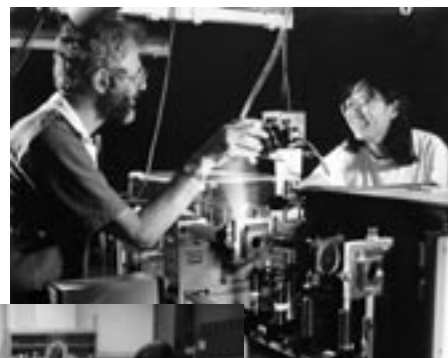
Our program on instructional development through future faculty education is titled “CSIE” for *Chemical Sciences at the Interface of Education*, and Professor Brian Coppola is its Director. This program is at the leading edge of faculty education and has given the department a terrific advantage in recruiting both students and faculty over the past few years. One key resource

was a set of federally funded graduate fellowships from the US Department of Education. Unfortunately, this DOE program is closing down.

Permanent funding is needed to sustain CSIE, which has already enabled our faculty to work on projects that directly impact undergraduate education. Last year, the College of LS&A announced that it was going to expand the CSIE concept in the College by initiating a capital campaign effort. Although this large-scale endowment strategy is being built, College-wide efforts do not move as nimbly as a department's. We want to be able to continue our momentum as the local and national leader in this work.

Hence with this note, we are making a special appeal to any of our alumni who might be interested and able to help us create

either bridging or permanent funding for CSIE in the department, or who have ideas for how to engage and attract such funding. Please contact Professor Brian Coppola bcoppola@umich.edu (734-764-7329); or Professor Emeritus Robert Kuczkowski (734-764-7540); kuczkows@umich.edu by phone, e-mail, or regular mail if you wish to explore any ideas. Thanks in advance for your help and advice as we move to maintain this important program.



Research Experiences for Undergraduates (REU) Program Summer 2004

The National Science Foundation creates opportunities for undergraduates to join research projects each summer. One of the principle vehicles of NSF support for such projects is through the Research Experience for Undergraduates (REU) program.

The REU program involves students in ongoing research projects and proposals being conducted at the University of Michigan, and thus allows them to experience first-

hand how basic research is conducted at an internationally prestigious university.

For the past 14 years, the University of Michigan has invited students from around the country to spend a summer on campus working closely with faculty and graduate student mentors, conducting research in their area of interest. The REU program is an excellent way to reach into the student talent pool and encourage the participation in chemical research of women, underrepresented minorities, persons with disabilities, and students from institutions where research opportunities may be limited.

The Department of Chemistry provides abundant opportunities for individuals to work in tandem as researchers, educators,

and students, engaged in joint efforts that encourage educational discovery through a range of learning perspectives. The REU program reflects the Department's conviction that collaborative intellectual relationships are an essential component of successful learning experiences. Dr. Brian P. Coppola coordinates the Department's REU program, which runs for 10 weeks during the summer. Dr. Melanie Sanford is the co-PI on the NSF project.

In response to the increasing requests from non-U.S. citizens for summer research experience such as the REU program provides, the UM Rackham Graduate School this year provided matching funds to bring two such undergraduate researchers onto campus in an expansion of the traditional program.

Summer 2004 REU Participants

Stacy Dean
Brenda Frazier
Anne DeSimone
Jia Cheng Guo
Cheryl Heitzman
Noah Iskandarani
James Manning
Yurdanur Turker
Fernando Uribe
Caroline Vizthum
Crystal Wong
Kelsey Yee

Wooster College
Washington Jefferson College
Muhlenberg College
Jiatong University
Hillsdale College
University of Wisconsin
College of William and Mary
Bilkent University
Inst Tech de Estudios Superiores
College of New Jersey
St John's University
University of Puget Sound

Kennedy
Yaghi
Sension
Banaszak Holl
Roush
Andricioaei
Barker/Stillman
Barker
Yaghi
Mapp
Meyerhoff
Sanford



2004 Undergraduate Awards

CRC Press Freshman Chemistry Achievement Award
 First Year Chemistry Achievement Award

Alpha Chi Sigma First Year Student Award
 Outstanding Second Year Student Award
 Outstanding Third Year Student Award
 Carlene Friedley Scholarship
 Lubrizol Scholarship

National Starch Chemistry Scholarship
 American Chemical Society Analytical Chemistry Award
 Merck Index Award to Outstanding Seniors

Honors Council Vanko Memorial Award
 ACS Huron Valley Section Leadership Award
 Seyhan N. Ege Award of the University of Michigan
 Women in Science and Engineering Program
 American Institute of Chemists Chemistry Award
 American Institute of Chemists Biochemistry Award

Dylan Moreland
 Andrea Haber, Peter Hasiakos, Marty Tam, Loc Thang, Derek Peters

Keary Engle
 Alison Hardin
 Luke Janik
 Melissa Gondert, Rebecca Farmer

Lev Prasov
 Todd Senecal, Sahand Rehnama-Moghadan, Shailesh Agarwal
 Rebecca Farmer

Yu-Chen Hu, Esther Joo, Rahul Karamchandani, Katherine Kleaveland, Joseph Sootsman

David Arps
 Dustin Bringley
 Kate Longcore

Paul Tanis
 Karen Abrashkin



AXE Award: Zhan Chen, Keary Engle, Vzoma Anyanetu



Sokol First Year: Kerry Engle, Peter Hasiakos, Derek Peters, Andrea Haber, Loc Thang



ACS Award: Dustin Bringley, Brian P. Coppola



Undergraduate Scholarships: Lev Prasov, Rebecca Farmer, Shailesh Agarwal, Sahand Rehnama-Moghadan, Todd Senecal, Eric Chanowski



Upper Class Awards (front left to right) Karen Abrashkin, Joseph Sootsman, Esther Joo (back left to right) Dr. John Godfrey, Prof. John Wolfe, Alison Hardin, David Arps, Paul Tanis, Rebecca Farmer, Prof. William Roush



Wise Award: S. N. Ege, Kate Longcore



Summer Research Fellowships (first row left to right) Ari Kestler, Janice Shih, Angela Liang, Benjamin Lack, Costas Lyssiotis (second row left to right) Shailesh Agarwal, Bethany Schroeder, Lev Prasov, Sanyo Tsai, Rebecca Farmer, Zachary Tolsyka, Todd Senecal, Alan Poon (back left to right) Maxim Burgman, James Haskins, Luke Janik, Eric Chanowski

Bachelors Degrees

December 2003 and May 2004 Graduates

Chemistry

Donald Allison
Sandra Baek
Darryl Boyd
Dustin Bringley
Kathryn Gardner
Chrostopher Hunt
Tyrone John
Jennifer Karr
Rami Kassis
Sarah Kilbourne
Jonathon Kivela
Sarah Larson
Kate Longcore
Adam Lubert
Montsine Nshom
Brandon Odom
Jeffrey Schade
Brian Simmons
Joseph Sootsman
Paul Tanis
Virginia Tanis
Nicole Tuttle
Cortney White

Biochemistry

Karen Abrashkin
Donald Allison
Douglas Anderson
Stephan Antonucci
David Arps
Sandra Baek
Michael Conedera
Kathryn Gardner
Samuel Gattis
Claire Griffiths
Kimberly Guo
Kristen Harris
Glenn Hauk
Julia Head
Martin Hencz
Jillian Horning
Yu-Chen Hu
Eli Iacob
Sunil Jeganathan
Clark Johnson
Esther Joo

Neil Kamdar
Rahul Karamchandani
Joseph Kenwabikise
Katherine Kleaveland
Jessica Leeb
Hung-Liang Lin
Kate Longcore
Corey Miller
Brandon Odom
Jennifer Olson
Mitesh Patel
Christine Schumacher
Jeffrey Snyder
Jasmine Stannard
Naeem Tahir
Nicole Tuttle
Roberto Vega Morales
Kathryn Verhoeven
Anthony Woodward

Visit our website at <http://www.umich.edu/~michchem>
for the latest news.

Gifts

Contributions from private and corporate donors received from July 1, 2003 – June 1, 2004

(* Indicates corporate matching funds.)

Alumni Discretionary Fund

Karen and Terrence Storrie Adams
Theodore and Phyllis Anderson
Rene and Lynne Bergero
Barbara T. Booker
James Brewbaker
Leslie and Marsha Browne
Lillian Butler
Elmer and Alice Carlson
Gary and Sally Chipman
S. Thomas Cleveland
John Constantino
Alice Corey
Frederick and Marilyn Crane
Sue and John Delos
Russell Dickerson
Virginia Dilkes
Judith and Richard Doyle
Vincent and Roxanne Drnevich
David and Priscilla Ebdon
Seyhan Ege
Kenneth Egger
Pui and Helen Fan
Larry Fink
Eunice Fraser Connors
Howard and Lori Friedman
Ralph Friedrich
Brent and Cristina Fuller
Scott and Jackie Funt
Howard Garrett
Thomas Giordano
J.M. and B.J. Burroughs Goldberg
Erik Hembre
Steven Henry
Terrence Hilty
Ora Hogan
James Holcombe
Walter Holloway
Thomas Houser
Elizabeth Hugel
James and Irene Jackson
Theodore Jacob
Anne and Paul Jacobson
Douglas Kalvin
Phyllis Karseboom
Matthew Kendziorski
Norman Knight
Joseph and Jeanne Lagowski
Robert Landowne

Yan-Hui Liu
Gordon Lockyer
Richard Loeppky
George Lowrie
David Lustig
John McBride
Donald and Mary Meyer
Denise Moote
John Muentner
Amos Newton
Richard Nuenke
Randolph Otto
Gordon and Mary Ellen Heyde Par-
rington
James and Joan Van Pelt Pivnichny
James Reh
Sarah Reybuck
Omer Robbins
John Rosemergy
Warren Russ
Morley and Maureen Russell
James Samanen
Klaus Schmiegel
Erich and Suzanne Schulz
Ronald Seamans
Elaine Shafrin
Joseph and Elfreda Shepard
Kristi and Hillary Snell
Robert Sowers
Clark Swayze
Walter Syrkowski
Lazarus Thomas
John Tomlinson
Robert Tripp
Howard Un
Jon Williams
Grace Yee

Bachmann Memorial Lecture Fund

John and Wilma Petrasky
Robert Gregg

Chair's Discretionary Fund

Lawrence Bartell
R. Damrauer
Kenneth Egger
David and Sheila Gelman Greenblatt
Isabella and Jerome Karle
Masato Koreeda
Antone Lott
Paul Zittel

Chemistry Dept Fund

Don Chapel
David and Shirley Emerson
Phyllis Garland
Steven Goates and Juliana Boerio-
Goates
Thomas Gougeon

Barry Hart
Viola Sanvordenker
Tracy Sloane
James Thirtle
George and Dorothy Towe
Hing and Shiu Tse
Joel Wolfe

Chemistry Graduate Fellowships

Daniel and Jean Ricca

Chemistry Strategic Fund

Richard Anderson
Nora and James Bahr
Michael and Linda Balogh
Francis Belill
Barbara Booker
John Bruesch
Diane Burley
Stuart Butters
William Cartwright
Elna Clevenger
Eugene Coleman
Richard Cook
John Costantino
Renee Cribbins
Dan Curtis
Patricia Dahlstrom
Natalie Dales
Colleen and Lee DeKay
Robert and Ruta Dickens
Joseph Dolfini
E. John Duguid
Sue Egging
Bernam and Shirley Fraley
Joan Frank
Thomas Gallagher
Lucia Gilling
Mark Goulet
Tony Greco
David Greenblatt
Dean Griffith
Milton and Dorothy Heller
Arno and Helen Heyn
Sarah Hoyt
William Jackson
Kevin and Deborah Jungquist
Norman Kay
Roger Kucway
Alice Kushner
James and Victoria Larson
David Lieberman
David Littleton
Harry Luton
John and Helen Mahaney
Myrtle McLain
George Mendenhall
Dawn Merritt
Deanna Mitchell

Thomas and Peggy Moyer
Edward North
Michael O'Neil
Richard Osborne
Gordon and Nancy Parker
J. Gregory and Anne Reid
Evelyn Rice
Manuel Rosenbaum
Thomas Rosseel
Carol Roth
Gloria Salavarria
Helen Schaefer
Norman and Mirella Smith
Paul Smock
Frederick Spike
Clare Spitler
Duane Sunderman
Lois Swick
Lazarus Thomas
Edwin Vedejs
S. John Vernarelli
Mary M. Wood
Barbara Zahm

Departmental Scholarships

Timothy Merkel
Mark and Christina Rearick
John and Andrea Seavitt
Kelly Bruce Tripplett

H. H. Willard Memorial

Richard and Beverly Northrop
Taft Yutaka Toribara

James E Harris Scholarship Fund

Marian Harris

Kent P Lenini Memorial Fund

Richard Bard
John Callen
Steven Gaudioso
Janet Haartz
James and Christine Sabatowski

Milton Tamres Teaching Award

Donald and Marjorie Carter

PAS Smith Schol Fund/ UG Scholarship Fund

Roy and Judith Pointer

Peter A.S. Smith Fellowship

Jerome Horwitz

Robert & Carolyn Buzzard Grad Chem Student Leadership

Robert and Carolyn Buzzard

Robert Parry Scholarship Fund

Earl Alton
Louis and Wanda Rachels Centofanti
Charles and Leona Heitch
Edward Mellon
Robert and Bonnie Paine
Donald and Eleanor Schultz
Duward Shriver
Wayne Smith
John and Mary Yoke

Sokol Fellowship

Margaret Sokol

Alumni News

E-Mail: chem.alum@umich.edu

If errors or misstatements are noted in any of the following items, the Editors of the Newsletter would appreciate such being called to their attention. Mistakes can, and do, inadvertently, creep in. Corrections can easily be inserted in the next edition.

Sultan Tawfiq Abu-Arabi (PhD 1982, Ashe) is president of Irbid National University in Irbid, Jordan. He was awarded the Western Michigan University Chemistry Alumni Distinguished Award for 2004.

John Bates (PhD 1975, Dunn) left his position as Senior Scientist at Argonne National Laboratory and is now owner of Lockport Street Gallery, an international fine art gallery in Plainfield, IL.

John F. (Jack) Bruesch (BS 1940; MS 1941) is retired from American Cyanamid Co. in Stamford CT and Bridgeville, PA. He and his wife of 58 years, Thelma Rand (BA 1939, Mount Holyoke Col.) are living in Connestee Falls, Brevard, NC.

Christian F. Casper (MS 2001) is a technical writer in the spectroscopy products group

at the Kaiser Optical Systems Inc. in Ann Arbor and a graduate student in English at Eastern Michigan University.

Kenneth A Christensen (PhD 1997, Morris) is an assistant professor in the chemistry department at Clemson University. He previously was a postdoctoral fellow in the Department of Microbiology and Immunology, University of Michigan and in the Department of Microbiology and Molecular Genetics, Harvard Medical School.

Richard J. Cook (BSC 1969 Green; PhD 1973, Princeton) is in his 8th year as president of Allegany College in Meadville PA. Prior to that, he spent 16 years on the chemistry faculty and seven years as Provost at Kalamazoo College.

David W. Emerson (MS 1954; PhD 1958, Smith) is Professor of Chemistry, Emeritus, University of Nevada, Las Vegas. He is still involved in research and advising graduate students on a volunteer basis.

Brian Farrer (PostDoc, Pecoraro) is currently at Merck doing preformulation studies.

Ryan Fields (BS 1998; MD 2003, Duke) is a resident in cardiothoracic surgery at

Barnes-Jewish Hospital, Washington Medical Center in St. Louis, MO.

Aimee (Guider) Freeman (BS 1990) is at Amgen Inc. in Thousand Oaks, CA. She is working in the Protein Purification Process Development group.

Wade Freeman (MS 1964; PhD 1967, Liu/Blinder) is Professor Emeritus at the University of Illinois, Chicago. He retired in May 2001. He is active teaching courses part-time in the department and consulting.

Scott Gilbertson (MS 1982; PhD 1988 Chicago) is Robert A. Welch Distinguished University Chair in Chemistry, Director of Program in Chemical Biology, Department of Pharmacology and Toxicology at the University of Texas Medical Branch, Galveston.

David Gottfried (BS 1984,; PhD 1991, Stanford) has been promoted to Senior Research Scientist at Georgia Tech Research Institute. He works on the development of chemical and biological sensors based on planar optical waveguide interferometry.

Amy M. Heintz (BSC 1996) is at the Battelle Memorial Institute in Columbus, OH. She completed her PhD in Polymer Science

and Engineering at the University of Massachusetts, Amherst.

Todd A Houston (PhD 1993, Koreeda) has moved to Australia where he is Lecturer in the School of Science at Griffith University, Nathan.

Richard N. Hurd (BS 1946; PhD 1956, Minn.) is retired from the pharmaceutical industry. He operates Hurd and Associates, Inc., a consulting business in regulatory affairs and product development, in Evanston IL.

Alan Hutchcroft (PhD 1969, Lawton) is Professor Emeritus of Chemistry, Rockford College where he served for 36 years. Dr. Hutchcroft held many leadership positions on campus – committee chair, department chair, division chair and was Gordon H. and Violet J. Bartels Endowed Chair in Chemistry from 1984-2002. He was the recipient of the 2003 Excellence in Teaching Award. His retirement citation includes many commendations for his service; it concludes “Alan loves chemistry, he loves students, and he loves his college – and he has taught us well”. In retirement he will remain active as freshman and pre-health advisor.

Anne L. (Mosher) Jacobson (BS 1949; MS 1951, Northwestern) is retired in WA. She retired in 1993 after working in Illinois, Alaska and Washington.

Timothy Jiggins (BSC 1992; MSPH 1997, Alabama-Birmingham) has been promoted to Lieutenant Commander, United States Public Health Service. He is detailed to the United States Coast Guard, Safety and Environmental Health Detachment, Honolulu.

Bruce Justice (PhD 1961, Westrum) retired in 1992 and lives in Traverse City. He cooperates with Prof. Westrum with presenting and publishing low temperature heat capacity data and associated correlational/computational information.

Douglas M. Kalvin (MS 1978, Marino; PhD 1985, Woodard) is a research chemist at Abbott Labs in Abbott Park, IL. He works in a high throughput organic synthesis group developing methodology for the synthesis of compound libraries for lead optimization of potential drug candidates.

Hilary Luderer (BS 1996) is pursuing a PhD in Cell and Microbiology at Washington University, St. Louis, MO.

Sridhar Narayan (PhD 2003, Roush) is a postdoctoral research associate at the Scripps Research Institute in La Jolla, CA.

Joel Nemes (PhD 2003, Curtis) is a Research Chemist at Gentex Corporation in Zeeland MI.

Jonathan C. Noetzel (MS 1984) has retired from the US Air Force where he recently served as an analyst and assistant to the Secretary of Defense “think tank” director examining national strategies to meet US security goals. He will be working for Booz-Allen Hamilton, Inc. a Washington DC-based contract services company, as an analyst examining the future of warfare.

Scott Osborne (PhD 1996, Glick) is a Section Head at Proctor and Gamble in Cincinnati, OH

Jung Jin Oh (PhD 1991, Kuczkowski) has received the “Swiss-Korean Outstanding Research Efforts Award” from the Korean Ministry of Science and Technology. He is a Professor of Chemistry at Sook Myung Women’s University in Seoul.

Rebecca Appleman Peebles (PhD 2000, Kuczkowski) has been appointed assistant professor of chemistry at Eastern Illinois University, Charleston IL. She is the recipient of a Start-Up Grant for Undergraduate Institutions from the Camille and Henry Dreyfus Foundation.

Jennifer Pickett (PhD 2003, Fierke) is Scientist, Chemical Research, Immunomedics, Inc., in Morris Plains NJ. She provides research support for investigational new drug filings.

Paras N. Prasad (PD 1975, Kopelman) has been awarded the 2004 Morley Medal by the ACS Cleveland Section. He is Distinguished Professor and Samuel P. Capen Chair at SUNY, Buffalo.

Moira Ringo (PhD 1999, CE Evans) works as a pharmaceutical development investigator for Glaxo Smith Kline in North Carolina.

Jerry Robertson (PhD 1959, Smith) retired from 3M as executive vice president, life sciences sector in 1994. He is active on several corporate boards.

Valarie Benezra Rosen (BSC 1993; PhD 1998, MIT) is a patent attorney at Choate, Hall & Stewart in Boston. She received her JD degree in June 2003 from Harvard.

Stuart Rothstein (PhD 1968, Blinder) is Professor of Chemistry and Physics and Director of the Brock Institute for Scientific Computation at Brock University, St. Catharines, Ontario.

Michael Rothman (PhD 1980, Bartell/Lohr) is president of Michael Rothman & Associates, LLC, a consulting firm that focuses on pattern recognition and data analysis in business applications.

Lewis Rubinson (BS 1991; MD 1997, Northwestern; PhD 2004, Johns Hopkins) is starting the 5th year of a Pulmonary and Critical Care fellowship at Johns Hopkins and concurrently works on medical response to bioterrorism at the Center for Biosecurity at the University of Pittsburgh Med Center.

David M. Seeger (PhD 1991, Korzeniewski) is treasurer at CrystaTech, Inc. in Austin TX.

Gilbert J. Sloan (PhD 1954, Vaughan) is retired from DuPont. He is now a research associate at Norquay Technology, Inc. in Chester, PA. He develops syntheses and purification methods for industrial clients.

Richard L. Waite (BS 1991; MS Ed 2000, Northern Illinois) is a science teacher in Bridgeport MI.

Scott Weinert (BS 1995; PhD 2000, Northwestern) is a postdoctoral research fellow at Purdue University.

Douglas Whittington (BSC 1994) has moved to Amgen, Cambridge Research Center, Cambridge, MA after completing a postdoctoral fellowship appointment at the University of Pennsylvania.

Grace Yee (BS 1998) worked at Pfizer (Ann Arbor) in medicinal chemistry and is now a Material Transfer Analyst at the University of California, Irvine’s technology transfer office. She is also a business development intern at Vialogy, a high tech start-up, in Altadena. She is pursuing an MBA in entrepreneurship at the University of Southern California. She writes that she is willing to answer questions any student might have about a career in pharmaceutical research, academic technology transfer, business development for high tech start-ups and biotech/medical device entrepreneurship.

David Zaziski (BSC 1998; PhD 2003, UC-Berkeley) is working as a Business Development Associate at Nanosys, Inc, a Silicon Valley based nanotechnology startup.

In Memoriam

We have learned of the deaths of the following alumni, alumnae and friends of the Department.

Alloa Caviness Anderson, wife of Lee Anderson, former chair of the chemistry department from 1949-1966, passed away in Traverse City, MI in April 2004. She was 103 years old. After retiring, Alloa and Lee made their home in Leland, MI. Alloa was an active member of various national genealogical groups as well as a teacher of genealogy courses at Northwestern Michigan College in Traverse City.

Paul Hayes Cardwell (PhD 1941, F. Bartell) died on May 11, 2004. He joined Dow Chemical after graduation where he was assistant manager of instrument management. In 1968 he moved to Deepsea Ventures Inc in Hayes, VA, an ocean mining firm, where he was director of research until his retirement in 1979. He leaves four children, three grandchildren and two great grandchildren.

John M. Chemerda (PhD 1939, Bachmann) passed away April 9, 2002. Dr. Chemerda worked for Merck for 30 years, retiring in 1977. He received "The Directors Scientific Award" from the Merck Board of Directors, the highest honor Merck bestows on scientists who have made distinguished contributions to the company through their research. In his honor, Merck established the John Chemerda Lecture Series at Penn State, his undergraduate alma mater.

J. Wayne Cole a former post-doc with Werner Bachmann during the period 1938-39 passed away. He was a retired consultant.

Robert G. Craig (BS 1944; PhD 1955, F. Bartell) died April 9, 2003. He was Emeritus Marcos Ward Professor of Dentistry and Dental Materials at the University of Michigan and a director of the materials program.

S. Arthur Fournier (BS 1947) passed away in March 2001.

Marian Chu Hallada (MS 1959; PhD (Ed) 1982) passed away March 12, 2003 in Ann Arbor. Marian retired from the department as Lecturer and Coordinator of General Chemistry in 1996. She previously taught in the Ann Arbor school system. Her popularity as a teacher was founded

on her sensitivity to student difficulties, her fairness, and her clear lectures and help sessions. She leaves three children and three grandchildren.

Arno H. A. Heyn (BS 1940, PhD 1944, Willard) died on December 5, 2005. He was Emeritus Professor of Chemistry at Boston University.

Leroy Kleem (PhD 1945, Bachmann) passed away in Jan. 2003. He was Emeritus Professor of Chemistry at the University of Oregon. He retired in 1990.

Alfred J. Kniessel (BS 1952; MD 1956) passed away Aug 15, 2004. Dr. Kniessel was chief of pathology at St. Mary's Hospital in Decatur IL for over 30 years. He was chairman of the board of the Illinois State Medical Society and served as treasurer. He served on the board of trustees of the American Medical Society. He was chairman of the Illinois State Insurance Services in Chicago and the Illinois Hospital Development Authority. He was a founding member of Community Health Improvement Center in Decatur. Dr. Kniessel was very appreciative of the mentoring received from Bob Parry when he was an undergraduate. His family requested that memorial gifts be made to the Robert W. Parry Scholarship fund.

Jan Nyboer (MS 1929; DSc 1932; MD 1935) died April 21, 2000. Dr. Nyboer was Emeritus Professor of Physiology, Wayne State Medical School. He retired in 1976.

John Lawrence Oncley, Professor Emeritus of Chemistry and Biological Chemistry, died July 14, 2004. Professor Oncley received his PhD from Wisconsin in 1932. He was appointed to the faculty of the Harvard Medical School in 1939. During World War II, he worked on developing methods for separating blood into its various components and for purifying gamma globulins from blood. This work was the start of modern immunology. His work in the 1940's and 1950's defined high density and low density lipoproteins (HDL and LDL), so called good and bad cholesterol. For this work he was elected, in 1947, as the youngest member of the National Academy of Sciences. Professor Oncley came to the University of Michigan in 1962 as the founding director of a new interdepartmental Biophysics Research Division. He stepped down as Director in 1976 and became emeritus in 1980, although he continued to be advisor and mentor to younger colleagues and students long after his formal retirement. The J. Lawrence Oncley Lecture was established in 1982 in

honor of his central role in establishing the discipline of biophysics. Professor Oncley is survived by two daughters, two step children, a brother and their families.

Elmer K. Raunio (PhD 1949, Bachmann) died Sept. 27, 2003. He was Professor of Chemistry and Dean of Letters and Science emeritus at the University of Idaho. He joined the faculty in 1949 after two years with Hercules Powder Co. After serving as chair of chemistry, he worked in administration as assistant and associate dean before assuming the deanship in 1971. He was twice voted an outstanding professor by UI students and was named an outstanding educator in 1975. He retired in 1981. He is survived by his wife, Margaret, two daughters and five grandchildren.

Roy M. Seppala (BS 1952) passed away. He was a technical sales representative for Alcolac Inc. in Baltimore Md.

Arno Spatola (PhD 1966, Longone) passed away on July 5. Dr. Spatola was professor of chemistry at the University of Louisville and director and cofounder of the Institute for Molecular Diversity & Drug Design at the university. He was president and chief executive officer of Peptides International, a biochemical company specializing in peptide products and synthesis. He was the current secretary of the American Peptide Society. He is survived by his wife and daughter.

Fredrick Y. Wiselogle (ScD 1936, Bachmann) died on Sept 18, 2002. Dr. Wiselogle was an associate professor of chemistry at Johns Hopkins University from 1936-1946. During WWII he coordinated a program to develop new anti-malarial agents at Johns Hopkins. This culminated in the publication "A Survey of Anti-malarial Drugs, 1941-1945" and identification of chloroquine as effective in the prevention and treatment of malaria. These efforts earned him the Certificate of Merit awarded by President Truman. In 1946 he joined the staff of the Squibb Institute for Medical Research where he worked on drugs for tuberculosis, arthritis, tranquilizers, and antibiotics among others. He represented the Squibb team in receiving the Lasker Award for the discovery of Isoniazid, a drug for the treatment of tuberculosis. Following his retirement from Squibb in 1972, he moved to Lake Odessa, MI where he served on the governing boards of numerous civic and community organizations. His wife, Charlotte, four children and seven grandchildren, survive him.

Faculty

Hashim M. Al-Hashimi, Assistant Professor, Chemistry and Assistant Research Scientist, Biophysics Research Division. *Chemical Biology*.

Ioan Andricioaei, Assistant Professor, Chemistry and Research Assistant Professor, Bioinformatics. *Chemical Biology*

Arthur J. Ashe III, Professor. *Organometallic Chemistry*.

Mark M. Banaszak Holl, Professor. *Synthetic and Mechanistic Solution, Surface, and Solid State Chemistry*.

John R. Barker, Professor, Chemistry and Atmospheric, Oceanic and Space Sciences. *Chemical Kinetics, Atmospheric Chemistry*.

Larry W. Beck, Assistant Professor. *Analytical NMR Spectroscopy of Materials; Zeolite Catalysis*.

Heather A. Carlson, J. D. Searle Assistant Professor of Medicinal Chemistry and Chemistry, *Computational Chemistry, Drug Design, Theoretical Biophysics*

Mary Anne Carroll, Professor, Chemistry and Atmospheric, Oceanic and Space Sciences. *Atmospheric Chemistry*.

Zhan Chen, Dow Corning Assistant Professor. *Biomaterial and Polymer Surface, Biocompatibility*.

Mary Sue Coleman, UM President and Professor of Chemistry

Brian P. Coppola, Arthur F. Thurnau Professor, Organic Chemistry. Coordinator of Undergraduate Organic Chemistry Curriculum. *Science Learning and Instructional Methods*.

Dimitri Coucouvanis, Lawrence S. Bartell Professor. *Synthesis, Structures and Reactivities of Metal Clusters and Supramolecules*.

James K. Coward, Professor, Medicinal Chemistry and Chemistry. *Bioorganic Chemistry and Medicinal Chemistry*.

M. David Curtis, Professor, Chemistry and Macromolecular Science and Engineering. *Organometallic and Conducting Polymers*.

Barry Dunietz, Assistant Professor. *Theoretical and Computational Chemistry*

Carol A. Fierke, Jerome and Isabella Karle Professor, *Biological Chemistry*.

Anthony H. Francis, Arthur F. Thurnau Professor. *Magnetic Resonance, Vibrational and Electronic Spectroscopy of Materials*.

Eitan Geva, Assistant Professor. *Theoretical and Computational Chemistry*.

John L. Gland, Professor, Chemistry, Chemical Engineering, and Applied Physics. *Solid State and Surface Chemistry, Physical Chemistry*.

Gary D. Glick, Werner Bachmann Professor. *Bioorganic Chemistry, Molecular Recognition*.

Theodore Goodson, III, Professor. *Physical Chemistry*

Henry C. Griffin, Professor. *Nuclear Chemistry: Gamma-Ray Spectroscopy of "Hot" and "Cold" Nuclei*.

Melinda Gugelchuk, Lecturer, *Organic Chemistry*

Kristina Hakansson, Assistant Professor. *Analytical Chemistry*.

Marc J. A. Johnson, Assistant Professor, *Inorganic Synthesis*

Robert T. Kennedy, Hobart H. Willard Professor, Chemistry and Pharmacology. *Analytical Chemistry*.

Nancy K. Kerner, Lecturer, Coordinator of General Chemistry Laboratory. *Chemical Education, Learning and Instructional Methods*.

Raoul Kopelman, Kasimir Fajans Professor Chemistry, Applied Physics, and Physics. *Analytical/Physical/Biophysical Chemistry*.

Masato Koreeda, Professor, Chemistry and Medicinal Chemistry. *Synthesis of Natural Products, Small Molecule-DNA Interaction, Chemical Carcinogenesis, Glycobiology*.

David M. Lubman, Professor. *Biological Mass Spectrometry, Spectroscopy and Instrumentation*.

Anna K. Mapp, Assistant Professor. *Organic Chemistry, Chemical Biology, New Synthetic Methods*.

E. Neil G. Marsh, Associate Professor. *Enzymes, Structure, Mechanism and Specificity; Protein Engineering and Molecular Recognition*.

Rowena G. Matthews, Robert Greenberg and Research Professor, Chemistry, Biological Chemistry and Life Sciences Institute. *Biological Chemistry*.

Adam J. Matzger, Assistant Professor. *Organic, Polymers/Organic Materials*.

Mark E. Meyerhoff, Philip J. Elving Professor. *Bioanalytical Chemistry, Electrochemical and Optical Sensors*.

Michael D. Morris, Professor. *Analytical Laser Spectroscopy and Imaging; Electrophoretic Separations*.

Kathleen V. Nolte, Lecturer. *Organic Biochemistry*.

William H. Pearson, Adjunct Professor. *Organic Synthetic Methodology*

Vincent L. Pecoraro, Professor. *Synthetic Inorganic and Bioinorganic Chemistry*.

James E. Penner-Hahn, Professor. *Biophysical Chemistry and Inorganic Spectroscopy*.

A. Ramamoorthy, Associate Professor and Research Scientist, Chemistry and Biophysics Research Division. *Structural Studies of Biological Molecules*.

Paul G. Rasmussen, Professor, Chemistry and Macromolecular Science and Engineering. *Polymer/Inorganic Chemistry*.

William R. Roush, Warner Lambert/Parke Davis Professor. *Organic Chemistry*.

Richard D. Sacks, Professor. *High Speed Analytical Separations*.

Melanie S. Sanford, Assistant Professor. *Organometallic Chemistry*.

Roseanne J. Sension, Associate Professor. *Physical Chemistry, Ultrafast Laser Spectroscopy*.

Robert R. Sharp, Professor. *Multidimensional and Multiquantum NMR of Paramagnetic Systems*.

David H. Sherman, John G. Searle Professor, Chemistry, Medicinal Chemistry, Microbiology and Immunology, Life Sciences Institute. *Medicinal Chemistry*

Jadwiga Sipowska, Lecturer, *General Chemistry*

Edwin Vedejs, Moses Gomberg Professor. *Organic Chemistry*.

Nils G. Walter, Dow Corning Assistant Professor. *Chemical Biology*.

John P. Wolfe, Assistant Professor. *Organometallic Chemistry*.

Ronald W. Woodard, Professor, Medicinal Chemistry and Chemistry. *Medicinal Chemistry*.

Omar M. Yaghi, Robert W. Parry Professor. *Materials Chemistry*.

Charles F. Yocum, Alfred S. Sussman Professor, Biology and Chemistry. *Biological Chemistry of Photosynthesis*.

Edward T. Zellers, Professor, Chemistry and Environmental and Industrial Health. *Environmental-Analytical Chemistry*.

Erik R. P. Zuiderweg, Professor, Chemistry and Biophysics. *NMR Studies of Biomacromolecular Conformation and Dynamics in Solution*.

Professors Emeriti and Emerita: **Lawrence S. Bartell**, **S. M. Blinder**, **Thomas M. Dunn**, **Seyhan N. Ege**, **B. J. Evans**, **Adon A. Gordus**, **Robert L. Kuczkowski**, **Richard G. Lawton**, **Lawrence L. Lohr**, **Daniel T. Longone**, **Joseph P. Marino**, **Christer E. Nordman**, **Peter A. S. Smith**, **Leroy B. Townsend**, **Edgar F. Westrum, Jr.**, **John R. Wiseman**

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