Chair's Report
Renovation and Improvement

I am delighted to share news of the completion of a yearlong project to renovate and refurbish part of the teaching and research facilities on the fourth floor of Corcoran Hall. Many of you will recall Corcoran 405 as a very large teaching lab that had been used for more than 30 plus years for qualitative and quantitative analysis and for a sequence of Experimental Chemistry classes. This room is where Professor Wren conducted Qualitative Organic Analysis and Professor Vincent held forth with Qualitative and then his famous Quantitative Analysis courses. No doubt, there were years of memories tied up in that room. But with curricular changes, including greater emphasis on undergraduate research and individualized instruction, the facility was increasingly underutilized.

Although a plan to renovate the facility into several research laboratories had been on the table for several years, major impetus for an action plan came with the huge success of Professor Vertes’ initiative to the Keck Foundation and NSF. With the announcement of full funding for those proposals, the University committed to renovation of the Corcoran Hall space.

Planning for the project included arranging for appropriate space for the Vertes program, developing suitable space for the current program in Quantitative Analysis, setting aside space for the preparations for the Introductory Courses experimental work, and establishing an accessible location for program instrumentation. The research space needed to be open and flexible with sufficient access to utilities to permit variation and change as the nature of the research effort shifted over time. The teaching spaces needed to accommodate the evolving nature of Quant, Instrumental, and PChem, while also providing access to the department’s dual use instrumentation.

We believe that we achieved those goals now that the project has been completed. As the pictures above reveal, a beautiful, new research space has been provided for the Vertes group. An open lab design, with overhanging utility struts providing access to “clean” and normal power, gases, exhaust and cooling lines, can accommodate four instrument stations and workplaces for the postdocs, graduate students and undergraduates associated with the program. The teaching spaces have been divided into a “wet” lab, which will serve as the principal home for Quant and an “instrument” lab, which will serve as the principal home for PChem and Instrumental. PChem and Instrumental will both have space in the “wet” lab for the preparations and storage that were always a point of concern in the previous arrangements. And Quant will use the “instrument” space for several of its experiments and the independent projects that conclude its lab program. A previously designated instrument lab will now provide a separate space with its own hood for preparations for the teaching program.

A couple of mysteries surfaced during the project. While emptying the cupboards, we found a couple of boxes of very small vials with crystalline inorganic salts dating from 1900 with beautiful labels in an excellent handwriting. Further along as the demolition was underway, an attic room was revealed above a balance room at the north end of the quant lab. The room contained several bags of dried leaves and seeds of unknown origin and a number of 25-50 liter flasks and mantels. If anyone can shed some light on these mysteries, we would love to hear about it.

**This renovation was a tremendous undertaking for all involved.**

We are especially grateful to Academic Affairs, the College of Arts and Sciences and the Department for funding for the project. Colleagues from the University’s Division of Architecture, Engineering and Construction and from the Department met weekly throughout the year to plan and execute the project with the Architect and Construction team. We are very proud of the new space and invite you to visit and see it for yourself.
Bourdon F. Scribner  
Graduate Student Scholarship In Chemistry

I am delighted to announce that GW Graduate and Department Friend, Bourdon F. Scribner, B.S. ’33, has made a generous outright gift of $500,000 to the Bourdon F. Scribner Graduate Student Scholarship in Chemistry this June. Bourdon chose to support the program in this manner so that we could begin immediately using the endowment payout to provide financial assistance to graduate students enrolled in the Department. The details of the award process have been left to the Department to determine how best to utilize the funds. Current thinking is to use the payout to provide summer stipends to a number of students so that they will be able to focus completely on their dissertation research in the summer rather than have to teach or work for the financial support that they need to live on while pursing their graduate studies. The summer months are a very critical time for students to make progress on their research. Providing support for this period in the year multiplies the effect of the stipend because of the focus the students are able to achieve, while freed of the academic year distractions.

I had the pleasure of meeting Bourdon and his wife Sally this summer at his apartment in Annapolis. Some of you will know that Bourdon was an avid sailor and chose to retire to Annapolis to be able to pursue his passion for boating. Though that phase of his life is past now, Bourdon remains surrounded by photos of the water and the boats he captained. He is always ready to share stories of his travels, boating experiences, and involvement with Alpha Pi chapter of Alpha Chi Sigma, of which he was chapter President. Among the materials he has shared, I thought the paper he authored on “Carrier-Distillation Method for the Spectrographic Analysis and Its Application to the Analysis of Uranium-Bas Materials” was of particular interest and connection to current research in the Department. For example, we have research currently underway on Uranium-Metal Organic Frameworks (Cahill group) and high sensitivity analysis (Montaser).

Caress Endowment  
Graduate Student Scholarly Travel

Rather discretely over the several years before he retired, Professor Edward and Dr. Virginia Caress established an endowed fund to support the travel of graduate students in chemistry to present their research and participate in conferences. Perhaps it was Ed’s years in the Dean’s Office responding to regular requests for travel funds for our graduation students that was the origin of this benefaction. Practically every research group does go to one or more conference each year and it had been quite a challenge to get enough funding together to meet the demand of full funding for all the participants to be attend those conferences and meetings. This new endowment will help us meet the challenge and was used for the first time this past summer for a special need by one of our research groups. The fund was very helpful to the group that had used up its allotment of travel funds for the year, but had an important presentation to make at one remaining conference.

Meader Family  
Donation to the Chemistry Fellowship Program Fund

The Department is grateful to Susan Menke, M.Phil. ’70, who set up a new charitable gift annuity with the University in the name of the Meader Family. The beneficiary of the annuity when the gift is realized will be the Chemistry Fellowship Program, which we reported last year had reached the level of an endowed fund.

To Bourdon and Sally Scribner, Edward and Virginia Caress, and Susan Menke we express our sincerest appreciation. Your incredible generosity and consistent support will help us to move forward and meet our mission within the University of first-rate teaching and top-tier research.
In Memoriam

Sadly, we note the passing of Professor Emeritus Charles Naeser and Professor Emeritus David White.

David G. White began his career in chemistry with a Bachelor’s degree in chemical engineering from Cornell University in 1950. His five-year program had been broken up by a stint in the Army Signal Corp from March 1946 through September 1947. He received his Ph.D. in 1954 from Harvard University where he studied under Eugene Rochow. His dissertation on the Alkylation of Silane was completed by September of 1953.

Professor White joined the faculty of George Washington as an Assistant Professor of Chemistry in the fall of 1953, hired by Charles Naeser. From the outset of his career at GW, Dave’s interest was in teaching general and inorganic chemistry, with time out for an NSF sponsored sabbatical in Japan in 1960 and another sabbatical in 1980 to study geochemistry. His early research was in the area of boron-nitrogen heteroaromatic compounds with support from the Public Health Service. Generations of students took a section of general chemistry with Dave. He did not shy away from taking on the sections devoted to the engineering students, sharing the same deep love of chemistry with all who took his classes. He was also instrumental in developing the course on experimental methods and ensuring sound library skills for our majors.

From 1965 until shortly before his retirement to half time in 1990, Professor White chaired the Committee on Graduate Admissions and served as the advisor to our graduate students. During this period the department relied on him to maintain the continuity of the graduate program. He was renowned for his meticulous records and the careful, thorough, and personal advising provided to each of the students. As early as the mid-60’s he was advocating strengthening the infrastructure for graduate study in the sciences at the University. His “one simple request” of 1964 was for a laboratory manager, which came to fruition when Raymond Johnson was hired to run the Chemistry stockroom.

Dave loved boating and for many years spent his summers in Annapolis sailing with his wife of 45 years, Marjory. He went to full retirement in 1994, spending much of his remaining years working on a genealogy project, tracing the history of his family. Dave had suffered from pancreatic cancer since May of 2002, finally succumbing to the cancer in early March of this year at the Community Hospice of Washington. Professor Emeritus David G. White was 78 and will be sadly missed.

A native of Mineral Point, Wisconsin, Charles R. Naeser held a B.S. degree in Chemistry from the University of Wisconsin, Madison (1931), and a Ph.D., University of Illinois (1935). His Ph.D. research established the atomic weight of gadolinium.

Professor Naeser joined the George Washington University Department of Chemistry in 1935, where he served for 41 years, including 23 years as Chairman. He retired in 1976. During his tenure he specialized in teaching introductory general chemistry and advanced inorganic chemistry. He authored a laboratory manual for general chemistry and published in various chemistry journals. After years of teaching how to perform chemistry experiments in freshmen chemistry labs, he penned Naeser’s Law which is seen today in many calendars: “You can make it fool-proof, but you can’t make it damned fool-proof.” Who could possibly forget his humorous Christmas and Halloween lectures, in which he used the elements of “Earth, Wind, Fire and Water” to his advantage and brewed up thermite reactions, dichromate volcanoes, hydrogen-fueled air transport, and solutions showing holiday colors or the renowned “Helium Lecture,” where he demonstrated the properties of helium by sucking the gas from a balloon and delivering the rest of the lecture in a voice which bore an uncanny resemblance to Daffy Duck. He was a truly inspired and gifted instructor, for which he was recognized as the recipient of the Washington Academy of Sciences’ highest teaching award. In 1962, he received the Washington Chapter, American Institute of Chemists Honor Award for “Chemistry Teaching and Research in Inorganic Chemistry.” In 1969, he received the Alpha Chi Sigma Professional Service Award for service to the chemistry profession.

A Fellow of the American Association for the Advancement of Science and the American Institute of Chemists, he served as
President of the Chemical Society of Washington, was listed in “Who’s Who in America,” and was a widely published and widely cited author in Chemistry. From 1942 to 1945 he served as a Captain in the U.S. Army Chemical Warfare Service and was the Scientific Advisor to the Headquarters, European Command, in Heidelberg Germany from 1950 to 1951. In 1940, he developed a technique to enrich uranium for the U.S. Naval Research Laboratory, which played an integral part in the development of atomic power. (At the time, however, he was unaware that this research would be used for the atomic bomb).

Professor Naeser was a Charter member of the George Washington Faculty Senate, on which he served for 11 years. He served as Chair of the Senate Committee on Faculty Performance from 1962 to 1966, on the Faculty Performance and Development Committee from 1966 to 1971, and on the Senate Committee on Professional Ethics and Academic Freedom during the 1970s. He was the recipient of the Senate’s very first “Distinguished Service Award” in 1967.

Professor Naeser was a teacher extraordinaire, widely respected researcher, and active participant in innumerable public and University service activities. His outside interests included fishing, taxidermy and birding, and for over 63 years he banded birds for the U.S. Fish and Wildlife Service. He passed away at age 94, March 5, 2005, following a brief period of congestive heart failure. An interment service took place in September at the Columbarium, Arlington National Cemetery.

Chemistry By the Numbers

Twenty-one new multiyear grant proposals totaling about $8.2 million were submitted since May 2004 to external granting agencies and organizations. Almost $1.7 million in new multiyear funding was actually awarded by the External Sponsors, during that cycle. $285K was awarded from Internal GW funds to chemistry faculty, who submitted 5 proposals totaling $285K. As of June 1, the department had 23 active awards from external sponsors valued at about $4.2 million for their life.

Colleagues published 41 papers, journal articles, or conference proceedings during the year. An additional 4 papers have been accepted and 9 more have been submitted as well. Furthermore, colleagues gave 31 contributed talks or posters at meetings and conferences, and delivered some 35 invited talks at conferences, Universities, and other sites. Five patent applications were submitted by Professors Miller, Montaser, Vertes and Wagner.

Nine new doctoral candidates matriculated during 2004-2005, swelling our graduate student population to 30. The number of chemistry majors continued to increase to a total of 61 declared major advisees as of spring 2005. Total undergraduate enrollments in chemistry courses rose again this year by 5% to 3144 final registrations for the academic year. Summer session registrations have risen 66% since 2000. Twelve students were registered for undergraduate research in the fall, while eleven were registered in the spring. Our majors won 1 each of the Gamow, Luther Rice, Britt and Vincent Fellowships/Scholarships for the year.
Kudos

Congratulations to Faculty

Christopher Cahill
Professor Christopher Cahill, was selected to receive a Bender Award from the University for Teaching Excellence.

Akbar Montaser
Professor Akbar Montaser, has been invited to join the Editorial board of Applied Spectroscopy.

Akos Vertes
Professor Akos Vertes, was a Visiting Professor at the Swiss Federal Institute of Technology and awarded an Academy Award Fellowship of the Royal Flemish Academy of Belgium for Science and the Arts while on sabbatical this year.

Professor Akos Vertes, was invited to present at an NSF sponsored “Broader Impact” symposium at the fall ACS meeting.

Martín Zysmilich
Professor Martín Zysmilich, was nominated as one of two GW nominees for The Carnegie Foundation's U.S. Professor of the Year Program.

Wagner, Cahill, Teng, Montaser, Vertes, Sadtchenko, King, Miller and Ramaker
Professors Wagner, Cahill, Teng, Montaser, Vertes, Sadtchenko, King, Miller, and Ramaker were awarded new or renewed grants.

Congratulations to Students

Kaveh Jorabchi
Kaveh Jorabchi was awarded a prestigious Summer Graduate Fellowship from the ACS Division of Analytical Chemistry.

Dan DeLill

Lauren Borkowski
Lauren Borkowski won a travel award to the American Crystallographic Association Meeting in Orlando, Florida, May 28 – June 2, 2005.

Rob Doe
Rob Doe was nominated for an ARCS Foundation Fellowship.

Mark Frisch
Mark Frisch was accepted to the National School on Neutron and X-ray Scattering at Argonne.

Maria Puccio and Eric Fallows
Maria Puccio and Eric Fallows received travel grants to the recent meeting of the Combustion Institute.

Elisheva Pauli
Elisheva Pauli received one of four new NAI Student Research Scholarships from The NASA Astrobiology Institute to carry out experiments at the Mars Simulation Chamber at Leiden University, Holland.

Daniel Mittelberger
Undergrad Daniel Mittelberger received a Goldwater Fellowship.

Salar Samii
Undergrad Salar Samii received the Vincent Fellowship for the summer.
Faculty in the News

Henry Teng
Featured in Spectroscopy
Assistant Professor of Chemistry and Geosciences Henry Teng has published work which will appear on the cover page of Spectroscopy and which is also the feature article of this month in the journal. The paper, entitled “AFM Measurement of Step Kinetics for the Growth and Dissolution of Crystallites,” discusses two atomic force microscopy (AFM) techniques that have been used successfully to quantify step movement: direct and indirect measurement. See http://pubs3.acs.org/acs/journals/cover_art.page?incoden=inocaj

Cahill’s Work Appears on the Cover of Inorganic Chemistry
A research group including Chris Cahill, Assistant Professor of Chemistry, and collaborators at Pacific Northwest National Lab has been featured on the cover of Inorganic Chemistry, one of the premier journals in the field. To view the cover of the May 2, 2005 issue, go to: http://www.spectroscopymag.com/spectroscopy/article/articleDetail.jsp?id=166470

Vertes’ Work Awarded Prestigious SAB Prize
Professor Vertes and his co-authors, A. Bogaerts, Z. Chen and R. Gijbels at the University of Antwerp in Belgium, received the prestigious 2003 Elsevier/Spectrochimica Acta Award honoring the most significant article published in this top journal during that year. The paper entitled “Laser ablation for analytical sampling: what can we learn from modeling?” (Spectrochimica Acta B, 2003, 58, 1867-1893) demonstrates the usefulness of a gas dynamic model for the description of atmospheric pressure laser sampling of solids for chemical analysis. In an ongoing collaboration between the GW and Antwerp groups the model, originally developed by Prof. Vertes in the early nineties for laser solid interactions in vacuum, was extended to treat laser plume expansion at atmospheric pressure. The award consists of $1,000 and the picture of the author appears on the front cover of an upcoming issue of Spectrochimica Acta.

Junior Scholar Incentive Awards — 2005
Columbian College of Arts and Sciences congratulates the winners of the 2005 Junior Scholar Incentive Awards. Thirty-two proposals were submitted to the JSIA program. A panel made up of senior faculty from the humanities, sciences and social sciences read and ranked the proposals. The top 8 were funded at $8,600 each (2 from the humanities, 2 from the social sciences, and 4 from the sciences). The recipients from chemistry are:

Henry Teng, Assistant Professor of Chemistry and Geosciences
Measuring Surface Electric Properties Using Newly Available Scanning Electrochemical Potential Microscopy: Surface electrochemical properties (such as surface charge and surface potential) are fundamental aspects of materials and knowing these properties is critical to material synthesis and application. Traditionally, surface charges are determined by an acid-base titration method but this method has several limitations and clear and definitive identification of iso-electric positions may not be recognized on titration curves. The Junior Scholar Incentive Award will be used to upgrade to the use of a more accurate method, scanning electrochemical potential microscopy (SECPM). The equipment has been acquired through other grants and the JSIA will be used for summer support so that Prof. Teng can devote his time to becoming proficient at this technique and collect the first data sets on quartz, feldspar, and calcite, three of the most common rock forming minerals.

Zhengtao Xu, Assistant Professor Chemistry
Novel Hybrid Organic-Inorganic Semiconductors: The research funded by the Junior Scholar Incentive Award builds upon recent discoveries (at GW) of organic-inorganic semiconductors, and will enable Prof. Xu to work on synthesizing novel hybrid semiconductors that effectively integrate the advantages of the organic as well as the inorganic components. This research emphasizes the close interaction between synthetic chemistry and the various aspects of solid state science and engineering, and has important implications for speedy and robust development of organic electronics. The JSIA will be used to fund summer support.

Chemistry Faculty Member receives a GW Award
Continuing a 29-year tradition, The George Washington University has selected three members of the GW community to receive the “GW Award” for their lasting contributions to the University. The awards were presented at the GW Commencement ceremony on the Ellipse. This year’s honorees included David Rowley, professor emeritus of chemistry. David has contributed to the GW community for over 35 years through advocacy, advising, and support for students of the sciences. He introduced innovative techniques in the classroom by instituting computer simulations into the general chemistry laboratory program. Rowley is well known for devoting time to his students outside of the classroom, serving as a pre-med advisor, an admissions interviewer for the joint B.A./M.D. program, and the faculty advisor of the Saudi Arabian Medical Student Program. Also, he has played many administrative roles throughout his tenure, including associate dean for the former Graduate School of Arts and Sciences, deputy director of the University Honors Program, chair of the Department of Forensic Sciences, and for decades has led the faculty into the University’s Doctoral Hooding Ceremony.

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Department of Chemistry
Alpha Chi Sigma

Chapter News

The Alpha Pi chapter of Alpha Chi Sigma has accomplished much in this past year. We volunteered at Kidsfest in the fall which is an event where local children can participate in fun science experiments. In the spring we hosted girl scouts at Corcoran Hall and showed them simple demonstrations which helped them earn a science badge. The Wednesday night free chemistry tutoring was again very successful as GW students regularly showed up for help in their chemistry classes. While we inducted 11 new members this year, 17 brothers graduated. We want to thank the graduating brothers for their efforts this year. We are also very excited for this upcoming year because the Alpha Pi chapter is hosting the Tetra Banquet, an event involving all the nearby Alpha Chi Sigma chapters. We also hope this upcoming year will allow us even more chances to volunteer and help out in both the GW and local communities.

Cahill Group

The Cahill Group enters its sixth year with some departures as well as new faces. Dr. Shannon Morrison received his Ph.D. entitled “Reverse Micelle Synthesis of Nanoparticulate Metal Oxides” and is headed to Virginia Commonwealth University for a post-doctoral position. Undergraduate Jaqui Danek graduated and headed north to the University of Rochester for a lab technician position while applying for graduate admission (location TBA) for Fall 2006. We also welcome Karah Knope from Lake Forest College in Illinois. Karah will begin her PhD studies in the fall of 2005. New undergraduate researchers include Deepak Chander and Walled Kurtom.

Veteran graduate student members Lauren Borkowski, Dan DeLill, Mark Frisch and Noel Gunning, along with undergraduate Dan Bozzuto have all had a banner year. Dan Bozzuto participated in a National Science Foundation Research Experience for Undergraduates (NSF-REU) program at Northwestern University. Dan DeLill was selected as an ARCS Scholar (Achievement Rewards for College Scientists), a prestigious title that comes with $15,000 towards tuition. Lauren Borkowski participated in the Carnegie/DOE Alliance Center (CDAC) workshop at Argonne National Laboratory and Mark Frisch published his first paper — in Dalton no less! Noel Gunning will finish his MS shortly and has also managed to publish some sound contributions.

Despite all of these wonderful achievements of the group, the biggest news is perhaps the arrival of a single-crystal x-ray diffractometer purchased from an NSF grant. The new ‘Bruker APEX II CCD’ is arguably the most powerful machine of its kind and makes determination of molecular level structure relatively routine. Since its arrival in March, we have solved some 30 new structures. Time to get writing!

The funding situation continues to be strong. June marked the receipt of a $282,000 three-year Department of Energy grant to examine the hydrothermal chemistry of uranium oxide phases. This award will make hiring of a post-doctoral associate possible and move the group into some new areas.

New Faculty

The department is delighted to welcome Dr. Henry Teng as its newest faculty member. For a variety of reasons, the Department of Earth and Environmental Studies was closed last year as a free-standing unit and the faculty allowed to choose new departments with which to affiliate.

Professor Teng chose to affiliate with Chemistry and was given the new title of Assistant Professor of Chemistry and of Geosciences. Dr. Teng received his B.S. degree in 1982 from Nanjing University and an M.S. in 1994 from Temple University. He completed his doctorate in 1999 at Georgia Institute of Technology under Patricia Dove, earning awards for Research Excellence, Dean’s Fellow in the College of Sciences, and Best University Research (Surface Science). After a post-doctoral appointment at Argonne National Laboratory from 1999–2000 with Neil Sturchio, he joined the George Washington University Department of Earth and Environmental Sciences in 2000. With major funding from ACS-PRF, NSF and DOE, Henry continues to publish extensively on mineral surface geochemistry (especially biomolecule-mineral surface interactions) and mineral dissolution mechanisms. Dr. Teng adds strength in materials, surface science and crystal chemistry to the growing cross-disciplinary Materials Science program in the Department.
During this past academic year, Prof. Miller was on sabbatical and used the time to work in the laboratory at GW as well as to work in laboratories at M.D. Anderson Cancer Center, Rice University, and the Aculight Corporation (a Seattle-based laser and optics company). In addition, Prof. Miller scratched a life long itch and rode a bicycle across the country with his son, Garrett. A website devoted to this adventure can be found at http://www.bikedust.org.

Returning group members included Brendan McAndrew, Postdoctoral Scientist, and Maria Puccio, a 2nd Year Ph.D. student. Eric Fallows, a first year Ph.D. student who did his undergraduate work at Boston University, joined us in January. Summarized below are some highlights from the various research areas. Further details can be found on the Internet at http://home.gwu.edu/~houston.

Studies in Combustion

This is an ongoing project that has been the basis of continuing support from the National Science Foundation. During the last year, Maria worked with the probe to analyze gasses extracted from both stable and acoustically forced, flickering flames. The emphasis of this program is to understand molecular growth processes (i.e., soot formation). Not only is this problem of importance in understanding health impacts of combustion effluents, it is now thought that radiation forcing from so-called “black carbon” is an important, if poorly understood, variable in controlling climate change. Maria’s work this year has been to refine sampling and data analysis protocol for direct sampling mass spectrometry. The same approach has been applied to analyzing products of flame to which pyridine has been added to elucidate the role of fuel nitrogen in both formation of nitrogen oxides and incorporation of nitrogen into larger PAH’s as well as particulate carbon.

Finally, Eric has been developing a “smart” fire sensor that would simultaneously detect the concentrations (and rate of growth of concentrations) for carbon monoxide, hydrogen cyanide, acetylene (all products of incomplete combustion) and carbon dioxide. It is our hypothesis that different regimes of combustion (from smoldering through flaming combustion) generate unique signatures in these quantities that could be reliably used to distinguish unwanted fire events from false alarms. The sensor is based on cw laser cavity ring down spectroscopy. Although never likely to displace residential CO and smoke detectors, technology such as this would be valuable for the protection of capital in larger commercial and industrial facilities.

Miller Research Group

Cavity Ring Down Spectroscopy

In addition to the near infrared sensor work mentioned above, we have continued our work with prototypes of JPL’s Type II Interband Cascade lasers; a new source that provides relatively high powered, single mode lasers in the mid infrared. During Miller’s trip to Rice, researchers in their Laser Science Group and Miller demonstrated detection of formaldehyde with these lasers at the tens of parts per billion level. Miller also worked with a laser under development at Aculight that uses near infrared fiber laser and amplifier to pump an Optical Parametric Oscillator to produce coherent midinfrared light. The incorporation of the Aculight laser into a CRD sensor is the subject of several pending proposals with applications in planetary exploration, atmospheric monitoring, medical diagnostics, and homeland security.

Development of Optical Tools for Bio-chemistry

Glauco Souza, who defended his dissertation last year, moved to the MD Anderson Cancer Center, part of the University of Texas Medical Center in Houston, to investigate application of Surface-Enhanced Raman scattering (SERS) using gold nanoparticle aggregates for the detection of bacteriophage binding events. GW is continuing to collaborate with MDACC in the further development of this technology. Miller presented an invited talk at a Laser Diagnostics Gordon Conference in early August describing this collaboration.
**Professor Akbar Montaser**

Professor Montaser and his group continued their research program, addressing from theory to practice, novel plasma sources and sample introduction devices for optical and mass spectrometry. Department of Energy and several industrial firms sponsor this research. The primary aim is to ultimately develop measurement technologies that will, compared to the existing technology, offer better selectivity, sensitivity, precision, reliability, and ease of operation; allow chemical analysis at reduced cost with less sample consumption and minimal waste generation; diminish instrument size and cost; and simplify analytical measurements. The research team submitted, has in press, or published 11 manuscripts, and presented 15 papers at national and international meetings, including 10 invited and plenary lectures at major conferences and institutions worldwide. Professor Montaser was also invited to organize and chair four symposia on micro- and nano-nebulization and advances in plasma spectrometry at the Federation of Analytical Chemistry and Spectroscopy Society (FACSS) conference and Pittsburgh Conference. He also chaired symposia at 1) 17th Annual Conference ILASS — Americas and 2) Plasma Science and Technology at the 16th International Vacuum Congress, and was invited to serve on the Editorial Board of Applied Spectroscopy Journal. The group filed two patent applications on a “smart nebulizer” and a “smart spectrometer”.

Members of the research team made progress and shined in their research and in the scientific community. Kaveh Jorabchi received three prestigious awards this year: 1) American Chemical Society — Division of Analytical Chemistry Graduate Fellowship for summer 2005; 2) the 2005 Society for Applied Spectroscopy Graduate Student Award; and 3) the 2004 Society for Applied Spectroscopy Best Student Poster Award at FACSS. The award news and his picture appeared in Analytical Chemistry and Applied Spectroscopy Journal. He published three articles and presented four papers at national meetings. Three graduate students (K. Kahan, K. Jorabchi, and C. M. Nechita) received the 2004 FACSS Graduate Student Travel Scholarship for their presentations. The undergraduate research scholars also were recognized through several awards. Daniel E. Mittelberger received the prestigious Goldwater Scholarship for two years in a national competition, and the FACSS Student Travel Scholarship for his joint presentation with his graduate student mentor, Kaveh Kahan. Salar Samii and Jonathan Levine won, respectively, the 2005 and the American Chemical Society Vincent Prize for research at GW in summer 2005 and the American Chemical Society Award from GW Chemistry Department.

Finally, Kaveh Kahan has completed his PhD research and will defend his Dissertation in September. He already has accepted an important job offer from Perkin-Elmer/Sciex Corporation. Over the past year, Kaveh Kahan has published four papers in collaboration with other group members, filed two patent applications (with K. Jorabchi), and presented four papers at major conferences. Kaveh will be missed by all of us, and we wish him the best. Fortunately, two new PhD students, Jessica Gray and Ryan Brennan, have joined the group this year and have started their research in several areas. Results of their research, in collaboration with other group members (Kaveh Kahan, Kaveh Jorabchi, and Cristina Nechita), will be presented at upcoming ACS, FACSS meeting, and Winter Conference on Plasma Spectrochemistry.

We are grateful to previous members of the group, who despite their departure from GW, still contribute to the publication of manuscripts as the result of our joint research. We are happy to report that since the last Newsletter, Dr. Craig Westphal and Dr. Billy Acon have been employed by Dupont and the FBI, respectively. We congratulate Dr. Su-Ann O’Brien and Mr. Terrell Murdock for the birth of baby girl Savanna, who is now 9 months old.

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**Joan Hilderbrandt**

Joan Hilderbrandt continues as the Coordinator of the laboratory courses for Honors Chemistry (Honors 33/34), Contemporary Science (Chem. 3/4) and General Chemistry (Chem. 11/12). These laboratories take place in Corcoran 402 and in Acheson Hall on the Mount Vernon Campus. (Approximately 120 students per semester now complete the laboratory requirement at MVC.) Professor Hilderbrandt remains a lecturer in the Chemistry 11 and Chemistry 12 series. She will be the Departmental Advisor for the Graduating Class of 2009. Joan will continue her recent appointment as the advisor for the 7-year BA/MD program.
Professor David Ramaker

Prof. Ramaker and his group continued work this year on the utilization of x-ray absorption spectra (XAS) to study operating fuel cells. This year was marked by three milestones:

1. The teaching of General Chemistry (Chem 11) for the first time. Up to the present he taught Physical Chemistry, a junior/senior course, and Chemical Bonding, a graduate course (many readers of this article may remember these courses). Prof. Ramaker indicates that although teaching Chemistry 11 is a different experience with many more students in a large lecture hall, he enjoyed it and will be continuing this fall.

2. The initiation of work with several new collaborators. He has continued his work with Prof. Sanjeev Mukerjee and his group from Northeastern University, Prof. Christina Roth and her group at Darmstadt University of Technology, Germany (fuel cells), and Prof. D.C. Koningsberger at Utrecht, NL (heterogeneous catalysis). However this year he also initiated work with Dr. Karen Swider Lyons and Dr. Maggie Teliska at NRL (fuel cells on oxidic supports), Prof. Bert Wechhuyzen, Utrecht, NL (time resolved XAS), Dr. Moniek Tromp, Univ. South Hampton, UK (homogenous catalysis), and Dr. Jeroen van Bokhoven, ETH, Zurich (alkanes on gold catalysts).

3. The addition of Dan Gatewood, a new graduate student, to his group. Dan will be working on the interpretation of XAS data taken both in heterogenous catalysts and from operating full cells. Dan has already had two trips to the synchrotron at Brookhaven National Lab to take data on RhS2, a possible non-Pt fuel cell showing some promise. The group has recently acquired some state of the art time resolved, in situ XAS data from MoOX on various supports; catalysts used for alkane dehydrogenation. Dan is finding some fascinating results coming from this new time resolved data.

This year Prof. Ramaker and his group published 8 papers (2 in JACS and 4 in JPC), and gave 4 papers at conferences such as the Gordon Research Conf. on Fuel Cells, and the ECS meeting in Quebec. Graduate student, Frances Scott, and the two postdoctoral fellows, Dr. Raj Zope and Denis Areshkin continue in his group, the latter funded by an NRL contract.

Professor Vladislav Sadtchenko

This year, our group celebrated its fourth birthday. Fully supported by the National Science Foundation, research has never been so exciting. While continuing development of our primary experimental apparatus, we have made several scientific breakthroughs in the physical chemistry of condensed aqueous systems. Using a combination of Ultrafast Thermal Desorption Spectroscopy, Time-of-Flight Mass Spectrometry, and Ultrafast Microcalorimetry, we investigated relaxation dynamics in amorphous ice during rapid heating, conducted studies of desorption mechanisms of water and various dopant molecules from the surface of ice at temperatures near its melting point, and obtained the first measurements of the evaporation coefficient of ice at environmentally relevant temperatures from -30 to 0°C. With the addition of another mass spectrometer, we are now capable of detailed investigations of transport phenomena in polycrystalline ices under a variety of conditions. In addition to its fundamental significance, these studies are of great interest in a variety of applied fields such as Environmental Atmospheric Chemistry.

Graduate students Haiping Lu and Stephanie Hopkins joined our group last fall and are now at the front lines of this exciting research project. We would like to express special gratitude to undergraduate research scientists Meshe Chonde and Danielle Smyla, who graduated from GW this spring and whose scientific insight and expertise were instrumental in the success of our research program.
Two major events defined the past year in the group. First, in collaboration with colleagues from Physics and Biochemistry, we embarked on a new project aimed at studying protein distributions in live tissue. As the first example, the Institute for Proteomics Technology and Applications at GW, co-directed by Prof. Vertes, in collaboration with the Children’s National Medical Center is focusing on the molecular basis of normal and abnormal muscle adaptation through studying the neuromuscular junction.

This project requires instrumentation that can not only identify peptides and proteins, but also provide information on their spatial and temporal distribution, and analyze their activity in vivo. The mass spectrometry technologies currently used to do this are limited in their ability to resolve protein functions and interactions directly. We therefore defined two goals:

1. An innovative development in mass spectrometry that will expand its capability significantly and enable the determination of spatial protein distributions with submicron resolution.
2. This new device, in effect a “protein microscope,” will be utilized to explore protein distributions in and around the neuromuscular junction in unprecedented detail.

This project received a major grant from the W.M. Keck Foundation. The $1.5 million award supports our efforts to build the protein microscope.

The work is well underway. Currently, the two major components of the system, a special mass spectrometer and a scanning near-field optical microscope are being modified for the task.

The other important event was moving our projects into a newly remodeled state-of-the-art research suite on the fourth floor of Corcoran Hall. This 1350 sq ft laboratory gives a new home to our three major projects, the DOE-funded basic investigations in laser desorption, the NSF-funded research on electrosprays and the protein microscope effort.

We were also very active on the conference and lecture circuit. Three invited talks were delivered in Belgium at the Ghent University, the Catholic University Leuven and the University of Antwerp. We presented at the Conference on Laser Precision Microfabrication in Williamsburg, VA, the Swiss Federal Institute of Technology Zurich (ETH Hönggerberg), Zurich, Switzerland, the FOM Institute for Atomic and Molecular Physics [AMOLF], Amsterdam, The Netherlands and at the 2004 Gordon Research Conference on Laser Interactions with Materials, Andover, NH.

As a sign of recognition, Professor Vertes and his Belgian co-authors received the prestigious Elsevier/Spectrochimica Acta Award honoring the most significant article published in this top journal during the year. Our paper “Laser ablation for analytical sampling: what can we learn from modeling?” demonstrates the usefulness of a gas dynamic model for the description of atmospheric pressure laser sampling of solids for chemical analysis.

Additional information on the group is available at our web site: http://www.gwu.edu/~vertes.

This year, one of the lab members, Kim Mooney, graduated with her Ph.D. She now works for the FBI in the ORISE program at Quantico, fulfilling a lifelong dream. The lab added one postdoctoral researcher, Michael Erickson, replacing Louie Rendek, who is now enjoying sunny Florida working for the Harris Corporation, and one graduate student, Chao Yan (Jerry). Four others, Robert Doe, Olivera Zivkovic, Amal Bassa and Cliff Cook continued their studies here. Rob is making great progress in developing materials for better lithium ion batteries, research which resulted in a patent application as well as a number of presentations, including two in Honolulu, Hawaii at the joint international meeting of the Electrochemical Society and the Electrochemical Society of Japan, as well as a publication. He and Cliff are also developing lithium/water batteries, a truly challenging project. Olivera is making good progress toward her degree, studying ferroelectric nanorods and nanocrystalline phosphors for field effect display technology, potentially a “next generation” replacement for LCD displays. Amal took a one-year leave of absence in January to have her first child, and will return next spring.

I’m very pleased to report that my former students are doing very well. Jennifer Nelson, my first Ph.D. student, is making her name at Penn State. Susie Keeton, who was an undergraduate researcher in the lab during her junior and senior lab, now working for CMS Field Products in Alabama, had her first child, James Edge Keeton. Congratulations! Bhoomi Bhamratt, now doctor of medicine, is in California for her internship. Khalid Hanif is finishing his first year in a postdoctoral position at the Naval Research Labs. Alejandra Echezuria is now married and working for Croda, Inc, in New Jersey.
**Professor Martín G. Zysmilich**

Professor Zysmilich holds a teaching appointment at the Department of Chemistry. Since joining the department in August 2000, his main responsibility has been teaching Contemporary Science for Non-Science Majors (CHEM 003 and CHEM 004). The steady improvement of these two courses, with the inclusion of science topics that make headlines in some of the most respected newspapers and publications in the world, as well as the use of state-of-the-art classroom technology, have kept CHEM 003 and CHEM 004 among the most popular courses at GW, with enrollments surpassing 700 students per semester.

These novel changes have also made Professor Zysmilich the recipient of the student-nominated 2002 Robert W. Kenny Prize for outstanding teaching innovation, creativity, and originality in teaching an introductory course, as well as a recipient of a Bender Teaching Award for the year 2003 in recognition of his efforts as a teacher.

Professor Zysmilich is also a member of the Honors Program, teaching the highly praised Honors General Chemistry courses, HONR 033 and HONR 034. He has been advising Chemistry majors since 2001, and joined the freshman advising team in 2004 by teaching a Proseminar for Scholarship and Advising (CCAS 001), and by participating as a Faculty Advisor in the 2005 Colonial Inauguration.

Professor Zysmilich has been appointed to the 2006 Chemistry in Context Examination Committee of the ACS Division of Chemical Education.

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**Graduation 2005**

**Undergraduate Students**

**David W. Berke-Schlessel**
Drexel University, PhD program in Polymer Chemistry.

**Meshe D. Chonde**
Worked over the summer of 2005 for The George Washington University Department of Chemistry.

**Olesya Y. Chornoguz**

**Jacquelynn Danek**
Working as lab technician at University of Rochester, Biology department. Plans to apply to graduate school.

**Mark D. Dexter**
Teaching Physics and Introductory Physical Science for a high school.

**Nathaniel D. Faggioli**
Works for a financial advising firm located in San Francisco. Hopes to return to Chemistry in future.
Dawn S. Hawkinson
The George Washington University, MS program.

Blake L. Horridge
American Baptist Seminary of the West in California, Masters program in Divinity.

Hyunwoo Kim
Applied to dental school.

Rebekah F. Kushner
Was awarded an extra fellowship, the Woodruff Graduate Fellowship at Emory University, PhD program in Biochemistry, Cell and Developmental Biology.

Matthew C. McDonough
Commissioned by the Navy and is presently at sea.

Muralikrishna Mukkamala
Applied to medical school.

Yared Z. Nurelegne
No information at this time.

David S. Penneys
University of California Berkeley, PhD program of Mathematics.

Jacqueline M. Ryan
Moved to California and plans to seek opportunities with Allergan. Also, plans to reapply to medical school, or apply to graduate school at University of California, Irvine.

Danielle R. Smyla
Worked in research position with The George Washington University during the summer of 2005. Hopes to be working in the DC Metropolitan area.

Natalie Yeakle
Worked as pharmacy technician. In 2006, plans to apply to pharmacy school at a university located in South Carolina.

Teira M. Zajac
No information at this time.

Graduate Students

Brandi Benford,
MS, Spring of 2005

Noel Gunning
MS, Fall of 2004

Kaveh Kahan
PhD, Summer of 2005

Shannon Morrison
PhD, Spring of 2005

Lida Parvin
MS, Summer of 2005

Cynthia Smith
MS, Spring 2005

May 2005 Commencement
[first row, left to right] Jacqueline Ryan, Natalie Yeakle, Nathanial Faggioli, Rebekah Kushner and Jacquelynn Danek
[second row, left to right] Mark Dexter, David Berke-Schlesel, Oleya Chornoguz and Blake Horridge
Chemistry Department
Prizes and Awards 2005

Alpha Chi Sigma
Awarded to the graduating senior with the highest academic record in chemistry courses (with at least 16 hours at GW). David Signorielli Penneys

American Chemical Society
Awarded to a student completing his or her junior year and who has demonstrated excellence in Analytical Chemistry. Jonathan Adam Levine

American Institute of Chemists
Awarded to the graduating senior majoring in chemistry, who excels in scholarship, integrity and leadership. Jacquelynn Bethany Danek and Rebekah Felice Kushner

A. D. Britt Memorial Scholarship
Awarded to one or more outstanding junior or senior undergraduate majors to carry out research in the summer. Deepak Chander

Chemical Society of Washington Prize
Awarded to the outstanding junior majoring in chemistry. Daniel James Bozzuto

Byrne Thurtell Burns Memorial Prize
Awarded to the graduating chemistry major who has show the greatest proficiency in organic chemistry as demonstrated by a written examination. Jacqueline McGinnis Ryan

William E. Fitch Prize
Awarded to the graduating chemistry major with the best written comprehensive examination in chemistry. Jacqueline McGinnis Ryan

Chemical Rubber Company Freshman Chemistry Achievement Award
Awarded to one or more freshmen who have achieved the highest records in their respective sections of Introductory Chemistry. Anika Jahn Ackerman, Nikila V. Kumar, Alexander Lee Matz and Jessica Yvonne Schmitt

Jacqueline Ryan receives Burns and Fitch Awards (left to right) Prof. Xu, Prof. Ramaker, Jacqueline Ryan, Prof. Cahill and Prof. Hilderbrandt

The Chemistry Department on retreat at Alpine Lakes, WV
Alumni News

Hyunwoo Kim, B.S. ’05, writes that she has returned to Korea and has been busy preparing for the dental admission test.

Doren Indritz, B.A. ’73, writes that he was very saddened to hear about Profs. Naeser and White. Hopefully, Profs. Caress and Rowley are healthy and enjoying their retirements!

Dr. Stephanie Holt, B.S. ’76, is practicing medicine in Parkland, FL. She visited recently with one of her sons, who is looking at colleges for next year.

Writing from Arizona, Bheru Gandhi, B.S. ’02, indicates that he is in his 3rd year of medical school and loving it! This past year he had a chance to deliver babies. I know, scary thought!

Karl Miller, B.S. ’98, stopped by to share some stories as a counterfeit specialist with the secret service. Be sure to also check out the video stream, with a guest appearance from Karl that was done by Associated Press. http://wid.ap.org/video/video/counterfeits.rm The story can be found at http://abcnews.go.com/Politics/wireStory?id=354424.

Su-Ann O’Brien Murdock, Ph.D. ’05, has taken up residence in Junction City Kansas near to where her husband is stationed. She brought her baby to the Hooding Ceremony in May.

Jack Crawford, B.S. ’82, is a Founder and Director of Managed Ventures, Inc., an information technology consulting group in Irvine, California that focuses on life science informatics needs. http://www.managedventures.com/about1.htm

Robert Pike, B.S. ’82, was promoted to Full Professor at the College of William and Mary. He just finished a five-year Henry Dreyfus Teacher-Scholar award period and has been collaborating with Prof. Cahill. He stops in on occasion with crystals structures to solve.

Craig S. Westphal, Ph.D. ’05, has taken a position as a Research Chemist in the corporate center for Analytical Sciences at the DuPont Center for Research and Development Experimental Station in Wilmington, DE.

Susan Menke, M Phil ’70, one of Ted Perros’s former students, is the Chief Technology Editor for Government Computer News. She visited the University in the fall and had lunch with Ted and Michael King. Susan pointed out that her background in chemistry gave her the ability to shift gears into a science editor status.

Carly Levin, B.S. ’03, stopped by recently on her way to the annual Nobel Laureates Meeting in Lindau Germany. Carly, a graduate student at Rice University, was one of 25 students selected by the NSF to attend the 55th Lindau Meeting. Other attending students are sponsored by DOE and Oak Ridge. (You may recall that two of Prof. Montaser’s students were attendees a few years back.) Carly also had a cameo appearance on a piece on Naomi Halas, her Rice University advisor, that aired on NOVA. While visiting MD Anderson and Rice as part of his collaborations there, Prof. Miller, Carly’s undergraduate research advisor, had a chance to go to dinner and talk about the great progress Carly has been making on her work with Nano Shells at Rice, recently passed her candidacy exam. She reports that she has maintained contact with Ed Brandt and some of the “gang” from 2003.

Tariq Nabi, Ph.D., writes that he has moved into a new apartment on Spout Run Parkway in Arlington, VA.

Meggan Wagner, B.S. ’02, is working for GlobalEmed, a provider of diagnostic tests and laboratory equipment. Her position entails setting up the laboratories and training staff on the use of the equipment. As such she has been doing lots of traveling around the world, most recently to South Africa.

After 27 years, John Van Patten, B.S. ’85, has retired from the Navy and moved back to his home in upstate New York. His first civilian job was as a Chemistry Specialist at Seton Health Systems in Troy New York. He writes that he will be leaving that position to return to school for a teaching certificate so that he will be able to teach Chemistry and Biology to High Schoolers. Good Luck John, what a great second career that will be!

Congratulations to Madeleine Jacobs, B.S. ’68, DSc (Hon) ’03, who was selected as the George Braude Memorial Lecturer by the Maryland Section of the American Chemical Society. The Award, including a cash prize and appropriate award document, provides for an annual lecture on a scientific, yet broad, topic to attract the attention of the chemists of the local section. The designee also is given discretion to designate an appropriate place for a grant to support chemical research. We thank Madeleine for designating her Department’s research fund for that grant.

Thanks to all of you who have written or stopped by over the past year. Your colleagues are always eager to learn about what is happening in your lives and careers. Such information also helps to illustrate the successes of our alumni for current students in the department. So, we continue to invite you to send an e-mail (kingm@gwu.edu) or note to the department, which we can relay to your colleagues in our next edition.
We are deeply appreciative of the Alumni gifts to the Department. Each gift, whatever the amount, allows us to further our research and educational goals. If your check is made out to the E&R Account, the money’s earmarked for our use. If not, we never see it. So please remember to cite the Chemistry Department E&R Account. Finally, many thanks to each of you and a special thanks to donors who gave $1000 or more.

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