CHEMISTRY DISTILLATIONS

The Newsletter of the Department of Chemistry, College of William and Mary

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Gary DeFotis, Editor

Louise Menges, layout

Remarks by the Chair

So what can I say about "surviving" my first year as chair of the department? I have never watched the TV show with a similar name, and after this year I never will. Between budget cuts, frozen salaries, the threat of losing the Master's program (again), and the continual maintenance of aging instrumentation, it would be very easy to say that we have definitely been in a survival mode. Nevertheless, the outstanding chemistry majors we have the privilege of interacting with on a day to day basis leave me with very little doubt that this is where I belong, as the faculty in our department are here because they want to help others more than themselves.

Many of you are probably aware that the state is continuing to have substantial financial difficulties, and the impact on the department and the morale of the faculty and staff continues to grow. Salaries have been frozen for the past two years, and that will most likely continue. Five percent of our M&O budget had to be returned last year as well as this fiscal year, and it is likely that additional cuts will follow before the end of this year.

One of the most distressing times for the department came this past spring when the administration, through consultation with a budget advisory committee, targeted the elimination of our Master's program as part of the College's cost savings plan to compensate for the loss of State support. Yes, I know what you're thinking, but we can't put that in print. We realize that many of you made very successful transitions from this program into professional and doctoral programs, or perhaps into lucrative industrial positions. We also hope that you can appreciate how much we have valued our Master's students over the years for their service in the teaching labs as well as enhancing the continuity of our research program. Many of you as undergraduates worked side-by-side with most of these Master's students in research. Fortunately, through lengthy documentation and a presentation to the budget committee, the program was once again spared from the chopping block.

We have made some gains in the acquisition of instrumentation that is vital for us to remain competitive in research and teaching. New UV-VIS and FTIR spectrophotometers were installed over the past year, the latter being purchased with funds from the generous support of the administration. A new spectrofluorimeter will soon be ordered. One of my first initiatives as chair was to assess the department's instrumentation needs at all levels of our program. Reductions in state funding and the diversion of Educational Trust funds to start-up for new faculty and enhancements of campus-wide technology has been devastating to our ability to remain competitive with our peers. The report conservatively estimated that an investment of ~$300K per year would be necessary for the department to provide the research tools our faculty needs and our students deserve. Considering that the administration has allocated an average of less that $20–25,000 over the past ten years to meet our instrumentation needs, we have a lot of ground to make up. We realize that costs of this magnitude cannot be the sole responsibility of the College, and we continue to explore other avenues of obtaining crucial instrumentation (for example, see the Road Trip story). Donations from alumni to unrestricted private funds, specifically allocated to the department, can help provide us with some additional security for our most pressing needs.

I am not trying to imply that we have clouds hanging over our heads all of the time, as there continue to be many positive aspects of the program that make us very proud. We were very fortunate to have recruited Elizabeth Harbron, an organic chemist, as a tenure track replacement for Kathleen Morgan. Elizabeth has a good understanding of our mission from her undergraduate career at Grinnell, and we look forward to her participation in our teaching curriculum and research programs. Rob Hinkle will officially become an associate professor in the upcoming academic year, which he is celebrating by begin-

ning a one year research leave. Gary DeFotis was selected by the dean for a second five year term as the Garrett-Robb-Guy Chair. Carey Bagdassarian received the annual Phi Beta Kappa award for excellence in research. Bill Starnes was elected last fall as a fellow by the Society of Plastics Engineers for his long-term contribution to the plastics industry, and earlier this year Bill was selected by the Plastics Pioneers Association to its history and artifacts program, a recognition of his impact on the development of plastics.

Our research program continues to thrive, both at the undergraduate and graduate level. We had 46 undergraduates participate in our summer research program this summer. Over $615,000 in external funding was generated last year by the faculty, in part to support undergraduate research. A total of 22 publications and 37 presentations were produced last year, with 57 and 36 student co-authors, respectively. One of the key points I make to prospective students is that undergraduates are actively involved in the research of every faculty member in the department, thus the opportunities to be a part of ongoing research are fantastic.

One part of this year's newsletter that has more than doubled in length is the news from our alums. I was extremely pleased to read about so many students I have known over the years finding success through their beginnings in chemistry at William and Mary, although I recently scared myself when I realized that I will most likely be teaching some of your children in the near future. What is truly amazing is that this letter now reaches out to nearly 1700 chemistry alumni around the country and the world. Our department has truly been blessed to have so many outstanding and talented individuals pass through our classrooms and labs over the years. Our thoughts are with you, and we hope that you can continue to keep in touch.

Cheers!

Gary Rice

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Dave Thompson, inorganic
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Emeriti

Alfred Armstrong,1976

Ed Katz, 1980

Cirila Djordjevic, 1992

Trevor Hill,1992
tbhill@wm.edu

Faculty Changes

Welcome!

We welcome Elizabeth Harbron as Assistant Professor of Chemistry this fall. Elizabeth received a B.A. in chemistry and gender and women's studies from Grinnell College in 1995, doing undergraduate research with James Swartz on organic reaction kinetics and energetics. She earned her Ph.D in 1999 from UNC -Chapel Hill, where she worked with Malcom Forbes on EPR studies of molecular motion in polymers. Elizabeth then did a postdoc at UT- Austin with Paul Barbara, on single molecule spectroscopy of aromatic dyes in polymer environments, and applications of the same technique to the kinetics of RNA/protein interactions. At William and Mary Elizabeth will teach organic chemistry and related courses, and plans to pursue research into non-covalent interactions in synthetic and biological systems, using spectroscopic techniques which include single molecule fluorescence detection.

Promotions

Rob Hinkle (Associate Professor)

On leave for 2002–2003

Rob Hinkle (Research Leave)

Dave Thompson (Research Leave)

Part-time faculty, 2002–2003

Trevor Hill Fall 2002

Homer Smith Fall 2002

Selected Research Profiles

Deborah C. Bebout

My research is focused on development of new tools for studying the structure and function of metalloproteins. My research group has studied the mercury coordination chemistry of biologically relevant dipodal and tripodal amines by proton NMR, demonstrating that ^{199}Hg has larger and longer-range coupling to ligand protons than other transition metals. Other unprecedented recent achievements of my group include characterization of a Hg(II) system in which as many as six ligand environments were in slow exchange on the chemical shift time scale and demonstration of ligand conformation monitoring as a function of metal-proton coupling constant. These results provide an important foundation for investigation of metal induced protein folding by NMR. I have also recently initiated a project designed to develop biomimetic materials.

Recent Publications

D. C. Bebout, D. E. Ehmann (BS '96), J. C. Trinidad (BS '96), K. K. Crahan (BS '97), M. E. Kastner, and D. A. Parrish "Preparation of Hg(II) Complexes of Tris[(2-pyridyl)-methyl]amine and Characterization by X-ray Crystallography and NMR Spectroscopy" *Inorg. Chem.* **1997**, *36*, 4257-4264.

D. C. Bebout, J. F. Bush II (BS '98), K. K. Crahan (BS '97), M. E. Kastner, D. A. Parrish "Correlation of a Solution State Conformational Change between Mercuric Chloride Complexes of Tris[(2-(6-methylpyridyl))-methyl]amine with X-ray Crystallographic Structures" *Inorg. Chem.* **1998**, *37*, 4641-4646.

D. C. Bebout, S. W. Stokes (BS '99), R. J. Butcher "Comparison of Heteronuclear Coupling Constants for Isostructural Nitrogen Coordination Compounds of $^{111/113}$Cd and ^{199}Hg", *Inorg. Chem.* **1999**, *38*, 1126-1133.

D. C. Bebout, J. F. Bush II (BS '98), K. K. Crahan (BS '97), E. V. Bowers (BS anticipated '03), R. J. Butcher "Sterically Demanding Multidentate Ligand Tris[(2-(6-methylpyridyl)methyl] amine Slows Exchange and Enhances Solution State Ligand Proton NMR Coupling to ^{199}Hg(II)" *Inorg. Chem* **2002**, *41*, 2529.

Lisa M. Landino

Our work uses the tools of chemistry and biochemistry to understand how oxidative damage to proteins alters structure and function. Considerable evidence implicates oxidative damage in the development of several neurodegenerative diseases including Alzheimer's, Parkinson's and amylotrophic lateral sclerosis. We are studying the reaction of peroxynitrite ($ONOO^-$), a strong oxidant formed from the reaction of superoxide anion with nitric oxide, with microtubule proteins including tubulin and several associated proteins. These proteins are among the most abundant in neurons; therefore, they are likely candidates for modification by oxidants *in vivo*.

Data from our laboratory shows that microtubule proteins are readily oxidized by $ONOO^-$and that$ONOO^-$-induced damage inhibits microtubule formation. Specifically, our results show that damage to the amino acid cysteine, rather than other types of damage caused by $ONOO^-$, correlates with inhibition of microtubule formation. Currently our main objective is to identify the specific cysteines of tubulin that are oxidized by $ONOO^-$.

Additional projects aimed at understanding how reactive oxygen species damage proteins are currently underway. All projects use the techniques of protein biochemistry including: column chromatography for protein purification, SDS-PAGE, Western blotting, fluorescence labeling of proteins, reverse phase HPLC, and UV/Visible spectroscopy.

Recent Publications

Lisa M. Landino, Rifat Hasan*, Ali McGaw*, Sarah Cooley*, Kathryn Masselam*, Abigail Smith*, and Grace Kim*. (2002) "Peroxynitrite oxidation of tubulin sulfhydryls inhibits microtubule polymerization." *Arch. Biochem. Biophys.* **398**, 213-220.

Lisa M. Landino, "Activation of prostaglandin biosynthesis: peroxynitrite vs. hydroperoxides." in *Signal Transduction by Reactive Oxygen and Nitrogen Species: Pathways and Chemical Principles*, eds. M. Torres, J. Fukuto, H. Forman, Kluwer Publishing, in press.

*Middlebury College undergraduates

New Look for Rogers Hall?

In our last newsletter we mentioned that we were in the beginning phases of planning for the addition/renovation of Rogers Hall. The pre-planning for the building was completed last fall, the end result of which produced a structure with sufficient space and versatility to serve our needs for the next generation of chemistry faculty and majors.

A rough sketch of the proposed building is shown here, looking from the direction of Phi Beta Kappa Hall. The first phase of construction calls for completion of a new 25,000 sq. ft. wing which will extend behind the current building on the side adjacent to Millington Hall. The new wing will house four new lower division teaching laboratories on the first floor and ten private research labs on the second floor. The teaching labs will be equipped with ventilation hoods at each work station (yes, that's right, no more organic smells wafting into the hallways). An additional mid-sized lecture hall and open lobby area will complete the addition.

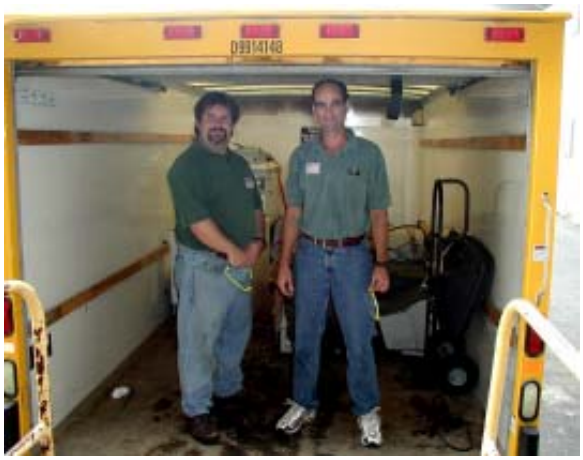
The second and third phases will involve vertical renovations of all of the existing space. The primary change will be moving the main office and library to the first floor. Additional teaching lab space will be available for the polymer and biochemistry labs as well as dedicated GC-MS, spectroscopy, chromatography, NMR, and polymer instrumentation labs. Six to seven additional private research labs will also be included in the renovated areas. A completely new HVAC system will be installed and contained within an attic space created by a new sloped roof over the existing structure.

Total addition/renovation costs, complete with furnishings and equipment, has been estimated to be approximately $20.5 million. Rogers was included in the original bond referendum to be decided in the upcoming November elections; however, we were replaced with lower priority campus projects. No one in the administration has really been able to clearly tell us how or why this happened. Veteran professors remind us that it took over ten years to get the current Rogers Hall from the planning table to brick and mortar. Given the overcrowded and unsafe conditions we live with every day, we can only hope that the College will continue to press the State legislature to provide the necessary appropriations in a more timely manner.

Road Trip

How did Rob Hinkle and J.C. Poutsma spend their leisure time after the end of the Sunday graduation ceremonies this year? Would you believe driving a rental truck into the early morning hours to Philadelphia to pick up a complete GC-MS system donated by Rohm and Haas?

We were told about the instrument's availability by Lee McPeters (Class of '73). The six year old system, originally valued at over $200K, is in good operating condition and adds many options not available with our existing spectrometers. Rob and J.C. were able to dismantle and haul the system back to the College by Monday night, although they had to finish the unloading in the middle of a thunderstorm.



J.C. and Rob pause for a photo op while loading the truck.

We look forward to utilizing the "new" GC-MS in our research and teaching programs, and are deeply grateful to Lee for making us aware of this opportunity. If there are other alumni out there working for companies that routinely replace instrumentation in good working condition, we would certainly like to hear what you have to offer as well!

Department Hosts AP Institute in Chemistry

Twenty-five high school chemistry teachers from Virginia and other states gathered in the W&M Chemistry Department during the week of August 5–9, 2002 for the second annual Advanced Placement Institute in Chemistry. Coordinated by the College's Center for Gifted Education, the AP Institutes in each of thirteen subjects are intended to help teachers learn

to teach AP courses. The chemistry course is taught with great enthusiasm by Jeannie Meriwether of the Lovett School in Atlanta. Working in conjunction with W&M Chemistry Prof. Bob Pike and Laboratory Specialists Lynda Stitzel and Derhong Shieh, Jeannie helps the teachers design and implement AP courses using college texts (remember Zumdahl?) and laboratory materials (including some of W&M's own!). This year two of our alumni, Caitlin (Freeman) Adelson (B.S. Chemistry '95) and Mark Bowie (B.S. Biology '95), were among the teachers who attended the Chemistry Institute.

Chemistry AP Institute attendees pose for a group picture near the sundial.

The AP Institute represents an important outreach for the Chemistry Department and the College. Good teaching in the high schools helps develop the top-notch students that W&M and other fine colleges and universities are seeking. Students who do well in high school AP programs earn four to eight credits of college chemistry credit on enrolling at W&M. The Chemistry Department is excited about this collaboration and hopes that it will continue for many years to come.

Undergraduate Research Activities

Chemistry Undergrad Awarded Iota Sigma Pi Scholarship

Edith Bowers is the recipient of the 2002 Gladys Anderson Emerson Scholarship awarded by Iota Sigma Pi, a national honor society for women in chemistry. Chosen in a national competition among junior female chemistry majors, Edith is the first William and Mary student to be recognized with one of these $2000 scholarships for excellence in chemistry or biochemistry. Iota Sigma Pi promotes professional development and personal growth of women in chemistry and related fields through recognition, public outreach, and the formation of supportive networks. Edith has been doing research with Debbie Bebout since her freshman year with the support of a Howard Hughes Medical Institute Undergraduate Biological Sciences Program Award and a Beckman Research Scholarship. Her research has focused on investigation of the coordination chemistry of Hg(II) with biologically relevant amines as a foundation for development of ^{199}Hg NMR as a metallobioprobe. Edith was recently listed as a co-author on a paper in *Inorganic Chemistry* and has represented the College with talks and posters on her research at regional and national conferences. Edith is a double major in physics and chemistry planning to pursue a MD/PhD degree upon graduation.

Jean Dreyfus Boissevain Undergraduate Scholarship for Excellence in Chemistry Goes to Sarah Stamps

Sarah prepares to run an NMR on a sample.

As a freshman,Sarah worked in Bob Pike's lab with the support of a Howard Hughes Medical Institute Undergraduate Biological Sciences Program Award. Her work with Debbie Bebout, funded by the Camille and Henry Dreyfus Foundation, is focused on investigation of the coordination chemistry of Hg(II) with biologically relevant multidentate ligands containing nitrogen and sulfur donors as a foundation for development of ^{199}Hg NMR methods for characterization of metalloprotein structure and folding. Sarah plans to attend medical school after graduation from William and Mary in spring 2004.

Blanton Mercer Bruner-Virginia Academy of Science Scholarship

We were pleased to be informed by the Virginia Academy of Science that an annual scholarship for $1000 had been willed from a trust fund created by Blanton Mercer Bruner (Class of '26) specifically for a rising senior chemistry major at William and Mary. The first recipient of this award was William "Skip" Brenzovich, a double chem/bio major doing research with Chris Abelt. Skip attended a special VAS awards dinner at Hampton University in May to receive his scholarship.

Graduate Programs Active in the Chemistry Department

We know that the great majority of you did your undergraduate work in chemistry here and think of the department in those terms—for which it is most noted. But there are graduate programs in the department: the chemistry master's degree program, and the Applied Science Program (by which we refer here to those faculty who participate in it with associated Ph.D. students). Now is a good time to identify the various students in these two programs along with something about their research.

Chemistry Master's Students

Erica Andriole is from Oxford, Pennsylvania, and got her B.S. from Washington College in 2000. She is working with J. C. Poutsma, studying the intrinsic gas phase thermochemical properties of some unusual amino acids which are analogs of arginine. Erica has been using both experimental measurements and computational predictions to determine the proton affinities of these species.

Brian Borne, from Portsmouth, Virginia, earned a B.S. in chemistry from William and Mary in May 2002. Brian, a Verizon Scholar as an undergraduate, is now seeking a Masters degree in chemistry. His research, conducted with Bob Pike, concerns new self-assembled metal-organic networks, which may be of importance in electronic, photonic, and porous materials. Brian is developing new caged phosphite linker molecules and their copper networks. The work is supported by the Camille and Henry Dreyfus Foundation.

Jeffrey Lee is from Danbury, Connecticut, and earned a B.S. in chemistry from William and Mary in May 2002. Jeff, one of two recipients of the department's first annual teaching assistant awards, is is now pursuing a Masters degree in the department under the supervision of Bob Pike, in collaboration with Bill Starnes. His work involves the preparation and testing of new copper complexes of melamine and mixed copper molybdenum oxides, which are of interest as potential smoke suppressants for poly(vinyl chloride). The work is supported by the National Science Foundation.

Misty Odell is from Virginia Beach, Virginia, and earned a B.S. in chemistry from William and Mary in May 2002. Misty started the Masters program in September with Chris Abelt as her thesis advisor. Her project involves the preparation of pH switches based on phenolphthalein. The work is supported by the Camille and Henry Dreyfus Foundation.

Shiyang Shang, who received her B.Sc. from Beijing University, China, graduated with an M.A. degree this past May. Working with Carey Bagdassarian, she developed a molecular dynamics alogorithm to explore relations between fluctuation dynamics and catalysis of a model enzyme. Shiyang is entering the Ph.D program in pharmacology at Cornell's Medical Center.

Jun Wang received her B.S. from Wuhan University in China in 2001 and began graduate research in Debbie Bebout's laboratory in January 2002. Her work, supported by the Jeffress Foundation, has focused on the development of biomimetic silica supported copper catalysts. In less than a month, Jun was able to overcome difficulties with the first step in the synthesis of the ligand tether, and recently the supported catalyst has been shown to be more effective than its homogeneous counterpart.

Blair Williams received his B.S. in 2001 from William and Mary, and is now in the master's program working with Carey Bagdassarian. He is developing a genetic alogorithm interface for the molecular dynamics simulations of fluctuating enzymes. The genetic alogorithm will "evolve" the structure of the enzyme towards maximal catalytic efficacy.

Jing Zhang received her B.S. in polymer materials and engineering from the Beijing Institute of Technology, ranking first in a class of 150. She obtained an M.S. in material science from BIT in 2000 and an M.S. in applied chemistry in 2001, through a joint program between BIT and the Tokyo University of Agriculture and Technology. Since August 2001, Jing has been doing research with Bill Starnes on an NSF-sponsored project dealing with the fire retardance and smoke suppression of plastic materials, especially PVC. She oversees operation of the Department's cone calorimeter, the only modern fire-testing device in use in plastics research in North American academia.

Applied Science Ph.D. Students

Donavon Delozier, a 1998 graduate of Emery and Henry College, has been doing NASA-supported research with Bob Orwoll on clay nanocomposites. Donavon increased the modulus of polyimide materials by adding small quantites of clay. This required breaking down the stacking of the alumino-silicate sheets of clay so that they could be dispersed throughout the polymer. Dispersal was achieved by decreasing the anionic character of the sheet surfaces, then adding an aromatic-amine cation surfactant to render the clay more compatible with the organic matrix. Donavon recently defended his Ph.D. dissertation and now is a National Research Council Fellow at NASA-Langley.

Xianlong Ge received his B.S. in chemistry with Highest Honors from Shandong Normal University and an M.S. in applied chemistry from the Xian Modern Chemistry Institute. He has been working since 1997 with Bill Starnes on a project partially supported by the NSF. This has produced some new chlorinated polymers with very interesting physical properties, and has revealed a remarkable new mechanism for the thermolysis of poly(vinyl chloride) (PVC) involving triplet cation diradicals as reactive intermediates.

Zhenrong Guo is from Jiangsu province of China and received his undergraduate and master's degrees from Fudan University in Shanghai. He pursues research with Dave Kranbuehl in the joint M.S. chemistry/Ph.D. applied science program, supported by an NSF-France cooperative research grant. Zhenrong's work involves use of time-of-flight techniques to measure changes in molecular mobility in order to monitor in situ changes in physical performance of polymers during polymerization and aging.

Yue "Lucy" Hu earned an undergraduate degree in chemistry from Zhejiang University in 1996, and worked at Procter and Gamble before earning a Master's degree at William and Mary working with Bob Orwoll. Her research in the chemistry/applied science programinvolves molecular imprinting, a method for preparing resins that have a unique affinity for a single chemical species. Monomers are first polymerized in the presence of the compound of interest, which serves as a template. The polyfunctional monomers have a special attraction for the template species (e.g., hydrogen bonding) and a resin forms around the template. The template is extracted from the resulting resin, leaving behind a "cavity." Resins prepared in this way can be used to separate the template species. Among its applications, the method has been used to isolate optical isomers.

Nick Jones is a 2000 graduate of William and Mary, and is pursuing a Ph.D. in the chemistry/applied science program. His research with Dave Kranbuehl is on the aging process of polyamides and polyvinylfluoride polymers used as gas-oil-water liners in flexible pipes employed to transport oil from the ocean floor to platforms. The work is supported by Exxon-Mobil, BP Amoco, Chevron-Texaco, Shell and Statoil.

Julie Warner, a 1998 graduate, received her Master's in chemistry from William and Mary, and is now pursuing a Ph.D. in the chemistry/applied science program. Her research with Dave Kranbuehl and Dave Thompson is on the development of metal oxide and metal nanoparticle polyamide films to reduce gas permeability and selectively control diffusion of hydrogen. Julie's work is partially funded by an NSF-France grant, and she is also one of 16 gradate students awarded a NASA Virginia Space Consortium graduate fellowship.

Old Rogers Recollections

A special note

This column, which has appeared in the past few issues of our Newsletter, is not really the recollections of the writer (Trevor Hill) in total. In reality, most recollections are simply regurgitations of what was told me by Alfred Armstrong, our Emeritus professor of analytical chemistry. Yes, Professor Armstrong is very much alive at 91; he doesn't get around too much but he still recollects OK!

Rogers Hall: Then and Now

I arrived on campus in the spring of 1963, hired to teach organic chemistry, and I am now officially Emeritus, which I suppose is Latin meaning retired. I would like to offer a few recollections of my own between then and now, comparing the times of the '60s with the new century.

In 1963 we had four and one half faculty, with the half member dividing his time between physics and chemistry. There was no Masters program, no Honors program and essentially no research. (Joseph T. Zung, now deceased, wrote several papers on theoretical chemistry.) Research grants in chemistry were non existent, and summer months were spent "getting ready" for the fall term because there was no coursework summer session. Our research equipment consisted of an infrared spectrophotometer (an IR 5A purchased with funds procured by Dr. Armstrong), a few Spec 20s, a polarimeter, a couple of Variacs, a few heating mantles, a magnetic stirrer and some glassware. The student population numbered about 2200 and about 10 chemistry majors were graduated per year. Elementary organic class had about 35 people: the accompanying laboratory sessions were held twice a week and taught by the same instructor, which meant you soon got to know everyone in the class; so student-teacher relationships were fairly close in the elementary classes.

The town of Williamsburg had two stoplights.

We now have 17 on the faculty, a departmental administrator, three laboratory specialists, two secretaries and a librarian. The freshman chemistry classes numbered nearly 500 students in 2001 and elementary organic classes had 376 students in 2002, so the elementary classes are essentially public lectures. Course offerings have been increased to include biochemistry, physical biochemistry and polymer chemistry. These extensions in offerings are in compliance with the American Chemical Society in interests of maintaining our ACS certification, so as to provide ACS certified degrees. We now graduate about 45–50 majors a year, with eight, for example, graduating with Honors this last spring. Our Masters program presently has nine students.

Our research funding from outside sources averages approximately $700,000 per annum, and student/faculty publication in professional journals is prolific. Research has developed into an essential requirement for current faculty. Our teaching and research laboratory equipment is presently beyond compare relative to the '60s. Our lower division laboratories have over $190,000 in laboratory equipment which includes laptops, gas chromatographs, numerous pH meters, Spec 20s and digital balances among other things. Our upper division laboratory equipment would cost up to $167,000 to replace and is mainly distributed among the physical, analytical and biochemistry laboratories.

The equipment for research (and advanced course instruction) lies in the "multi-user" category, all of which would carry a replacement tag of over $1,650,000 to be at the "state-of-the-art" level! A few of the big-ticket items (based on replacement costs) include two NMRs ($506,000), a differential scanning calorimeter ($95,000), two GC/mass spec systems ($250,000) and three HPLC systems, one not functioning, ($123,000).

I haven't counted the stoplights recently: I guess about 20.

Perhaps a few comments, observations, etc., may (or may not) be in order. The present state of the department was brought about by the Herculean efforts of a dedicated few. The criticism often heard is of the presumed growing lack of attention to the individual student who is sitting in large classes and being taught by professors who are preoccupied with research and writing papers. Surely the old days were better with the smaller classes.

Actually the student/professor relationship has improved in that about 80–90% of our graduates get to work on an undergraduate research project in their last three semesters plus oftentimes a summer, and the student may develop a mentor relationship with a professional scientist. In most schools, the elementary classes are usually large with classes diminishing in size as study interests become more select in the junior and senior years.

Some may think that graduates from the ’60s must have been a pathetic, ill-educated and unproductive lot indeed, compared to today’s graduates, who are exposed to a more sophisticated scientific education with its expensive laboratory hardware. **This is simply not true.**

The students of the ’60s, as well as those since that time, have shouldered their responsibilities very successfully; keeping in mind that while success is easily defined, its measurement is highly subjective, depending on those in political control who are pronouncing these things which are “good” for us. Our graduates do well by any measure.

News of Our Alums

We were delighted to hear from so many of you in the past year, and encourage more of you to keep us up to date with what is going on in your lives. Information about how to contact the Department is on the back page of this newsletter (or contact your favorite professor, who can forward the message).

We saw **Caitlin Freeman Adelman** (’95) this summer, when she attended a workshop for AP chemistry teachers held at William and Mary. Caitlin lives in Arlington, Virginia, and teaches chemistry at Yorktown High School.

After postdocing with Tito Scaiano at U. of Toronto, **Pam Arnold** (’95) has accepted a one year appointment there as Assistant Professor.

John Barlow (’61) and his wife live in Rehobeth Beach, Delaware.

Jeff Bergman (’97), after some graduate work at Cornell in polymers and polymer catalysis, decided to enter the working world, and joined the law firm of Rosenthal & Osha LLP in Houston as a patent agent with chemical expertise. Jeff is now also pursuing a law degree part-time and is on the law review at the U. of Houston. He finds fascinating the process of rendering inventors’ ideas into simple and legally correct patent applications.

Raymond Bleday ('76) is an orthopedic and sports medicine physician in Titusville, Pennsylvania.

Lawrence Blum ('51) is a dermatologist still in active practice in Fairfield, Connecticut. He remembers Dr. Armstrong's Chem 201 and 202 classes, and writes that he has “put a tiny bit of retained knowledge of the properties of acetic acid to good use in my formula for wet dressings to treat acute poison ivy dermatitis: [1 tsp. salt, 1 T distilled vinegar in 2 cups water].”

Caryn Carson Borg-Green (’94) is a Chemical Specialist at Leydig, Voit and Mayer, a patent law firm in downtown Chicago.

After receiving her master's at Northwestern, **Tina Bower** ('91) taught high school chemistry for 8 years, and is now a stay-at-home mom in New Jersey with two children.

Mike Buchanan (’81) received his Ph.D. at Berkeley in 1985, and worked in R&D at Eastman Kodak for 14 years before he became a patent agent for an intellectual property law firm.

Emily Buehler (’96) fell in love with Chapel Hill while getting her Ph.D., and after much thought, has decided to remain there and do something she has found she really enjoys—baking bread in a local coop bakery, in an atmosphere which feels good, smells good, and provides an outlet for her creativity.

Jim Comey (’82) has been prominent in the news lately. In Washington Post stories this summer, Jim has been quoted in his capacity as U.S. Attorney for the Southern District of New York. One involved an extradition case against an accused terrorist, and the second dealt with charges against a Russian organized crime figure accused of attempting to fix the most recent Olympic ice skating and ice dancing competitions.

Mary Beth Cox (’99) served in the Peace Corps for more than a year, stationed in Togo, West Africa, working in a Community Health and AIDS Prevention project and on maternal and child health issues. After this adventurous and unique experience, she is back home and beginning a dual master's degree program at UNC Chapel Hill in social work and public health.

Colleen Darragh ('91) works for PPG Porter Paints.

Chris Dean ('00) lives in Bristol, Tennessee, where he is a stability chemist in quality assurance at a GlaxoSmithKline antibiotics manufacturing facility there. Chris reports he is looking forward to returning to school this fall, when he enters the M.S. program in chemistry at East Tennessee State.

James DeHaan (’46) is now retired and enjoys living and working on his 33 acre farm in Colorado.

Don Doherty ('92) is a radiology resident at MCV.

George Dresser (’61) is a researcher with the Texas Transportation Institute at Texas A&M, working in the field of transportation planning. He and his wife are looking forward to retirement in a year or so.

Karrie Dyer ('93) has completed her M.D. at Duke and is doing a fellowship in pediatric cardiology at Vanderbilt.

Chris Edmunds (’98) lives in Berkeley, California, where he sculpts and works at a foundry.

Leonard Ellis (’56) and his wife are retired, and spend their winters in Florida.

Roger Emory (’86) is a plastic surgeon in solo practice in Abingdon, Virginia.

Michael Farabaugh (’91) is a chemistry teacher at Monticello High School in Charlottesville, Virginia.

Sharon Fitzhenry (’93, M.A. ’96) lives in Arlington, Virginia, and is a pharmaceutical chemist and project manager.

Jerry Fitzpatrick (’76) and his family live in Massachussetts, where he is a physician in family practice.

Gary Fletcher (’99) recently took up a research and development position with Wyeth-Ayerst Laboratories in Richmond, Virginia.

Charles Gray (’96) received his Ph.D. in organic chemistry from VCU this year and is doing a postdoc at Insmed Inc., a pharmeceutical company in Richmond. He has accepted a position at the FDA as a New Drug Reviewer at the Center for Veterinary Medicine, and begins in September.

Jim Gutheil ('96) is a resident in orthopaedic surgery at Texas Tech in Lubbock.

Paul Haase ('98) received his law degree from Georgetown in May.

Ahmed Hafez (’97, M.A.’98) received mention in a cover story for the July 2002 C&E News for work he and coworkers at Johns Hopkins University, led by Professor Thomas Lectka, did in preparing optically pure β-lactams. An important serendipitous offshoot was effecting a catalytic asymmetric reaction.

Ian Hall ('86) is a Lieutenant Commander in the U.S. Navy, and assumed command of the USS Raven last year. He and his family live in Virginia Beach.

Melanie Snyder Hoff (’83) works in the EPA's Office of Emergency and Remedial Response, which deals with cleaning up the nation's most toxic hazardous waste sites. Among her responsibilities are analysis of Superfund site data for budget and communication purposes, and writing responses to questions from Congress and OMB. Melanie and her family live in Falls Church, Virginia.

Christine Howard (’00, M.S. ’01) is currently employed full time as a laboratory technician at Virginia Commonwealth University and part time as a medical scribe with the Hanover Emergency Association. She hopes to start studies towards an MD degree at MCV next fall. Christine and **Geoff Murphy** (’98, M.S. ’99) were married in March, with many alumni and several faculty in attendance.

Thomas J. Ingram, III (’46) is a volunteer with the Baltimore Opera, and is enjoying his retirement.

Derek Jackson (’94, M.A. ’96) and **Allison Choy** (’94) were married this past summer and live in Ann Arbor, Michigan, where Derek works for Pfizer and Allison has completed a postdoc.

Jason Johnson ('01), after working for a year in process chemistry with Wyeth-Ayerst Laboratories in Richmond, has recently moved to work for Merck, Inc. in West Point, Pennsylvania.

After teaching high school, working on cholesterol research at the CDC in Atlanta, and earning his private pilot's license, **Steve Ko** (’96, M.A. ’97) entered med school at the Medical College of Georgia in 1999 with a concentration in pediatrics. Steve thinks his “clown” degree from Ringling Bros./Barnum & Bailey Circus Clown School will also help him entertain and interact with little patients in the hospital.

Dan Kopp ('97) and his wife live in Somerville, Mass, and he is finishing his Ph.D. in biochemistry at MIT.

Jay Kuemmerle ('80) is a gasterenterologist and assistant professor of medicine and of physiology at MCV, where he has been on the staff since 1993.

Muriel Liberto ('91), who got her Ph.D. at Ohio State and postdoced at Columbia, is a Scientific Advisor at Cooper & Dunham in NYC, and thinking about law school.

Courtney Lucado (’96) is a resident in internal medicine at EVMS.

Jonathan Maeyer (’99, M.A. ’01) is a chemist at Emisphere Company in Tarrytown, New York.

Matt Manning (’92) is a radiation oncologist in Greensboro, North Carolina.

Employed by BASF in Texas since her graduation in 1981, **Marie Cruz Metzger** worked in R&D, manufacturing, and quality assurance before she became a commercial manager seven years ago. Marie is now the leader for BASF's “Purchasing Hubs” in NAFTA.

Janice Moseley Langer ('92) and her husband live in the D.C. metropolitan area, where Janice is a family practice doctor in the U.S. Air Force.

Kimberly Schmidt Mulligan (’91) is an assistant professor of anesthesiology at UVA.

David Oelberg (’74) is professor and interim chairman of the EVMS Department of Pediatrics and vice president for academic affairs at Children's Hospital of The King's Daughters in Norfolk, Virginia. He and his family live in Virginia Beach.

Amy Padden ('91) got her J.D. in '94 from Georgetown Law School and is a partner at Wheeler, Trigg, & Kennedy in Denver, specializing in pharmaceutical & medical device litigation.

Sarah Prunier ('01) is a fellow at Panim, the Institute for Jewish Leadership Values, in Arlington, Virginia.

Pete Quagliano ('86) and his family live in Richmond, Virginia, where Pete is a radiologist.

After working for a chemical company in the U.S., Canada, Holland and Belgium, **Rob Roberts** ('76) is now president of his own chemical importing and distribution company.

James L. Sawyer ('46) is happily retired and travels as often as possible.

Peggy Schott ('77) received her Ph.D. in 1981 at Northwestern, and was a researcher at Georgetown University before her completion this year of an M.A. in theology. Peggy is now a member of the Dominican Order of Sisters, and has embarked upon a "new adventure in academia" teaching chemistry at Dominican University in Chicago.

Susan Shoaf ('81) was recently promoted to Senior Clinical Pharmacokineticist at Otsuka Clinical Research Institute in Rockville, Maryland, where she lives with her husband and two children.

David Silver ('71), who lives in Charlottesville, Virginia, reports that he spends his time practicing psychiatry in a public clinic, hiking, raising children, birding, and aging.

Cindy Hicks Simer ('71) worked for the NIH for several years before earning her M.S. in biochemistry from the U of Maryland. She teaches chemistry and AP chemistry at Shattuck St. Mary's, in Minnesota.

Roy Slezak ('51) is a retired obstetrician/gynocologist and lives in Utah.

Jonathan Tan ('96, M.A. '97) is a chemist with Boehringer Ingelheim Pharmeceuticals in Danbury, Connecticut.

Leigh Thompson ('91) received her M.S. in chemistry in 1994, and teaches high school chemistry at Sandia Preparatory School in Albequerque, New Mexico.

Scott Thompson ('94, M.A. '95) received his Ph.D in the organic chemistry of macromolecules with Jeffrey Moore at Illinois, and now works for 3M Corp. in St. Paul, Minnesota.

Josh Wallach ('96) earned his Ph.D. in polymer chemistry at U Conn, and he and his wife have returned to live in Williamsburg. Josh is beginning his second year teaching high school science in Middlesex County, and his wife is an optometrist in Williamsburg.

Melissa "Mike" Warfield ('51) is a retired pediatric hematologist/oncologist and Professor Emeritus at EVMS.

John Yang ('95, M.A. '96) is working on a postdoc at the Naval Research Lab in Washington, while **Ivana Verona Yang** ('96) continues her postdoc at the Institute for Genomic Research in Rockville, Maryland.

Christine Yeamans ('96), has received her M.D. from MCV, and is in pediatric residency at Johns Hopkins.

2001 Chemistry Reception

During last year's Homecoming, Chemistry welcomed Sandy Rawn Burnham ('56), Martin ('56) and Roselind Damsky, Jay Hen ('71), Carl Johnson ('71), Debbie Gibbs Sauder ('76), Tina Bower, Muriel Liberto, Amy Padden and Ashok Subramanian (all '91),Liz Minor ('92), Nathan Buchanan ('96), Josh Wallach ('96) and his wife Diane, Stacey Nevins ('97, M.A. '98), Susanna Sproul ('98), and Ron Houk,('01). We hope to see even more of you this year!

Roselind and Martin Damsky visit with Sandy Burnham.

This conversation includes, from left, Carl Johnson, Dave Kranbuehl, Jay Hen and Liz Minor.

Amy Padden, left, Tina Bower (back to camera) and Muriel Liberto.

Susanna Sproul, Stacey Nevins and Nathan Buchanan mug for the camera.

Chemistry Class of 2002 and Their Destinations

as of May 2002

ϕPBK DDow MMonroe HHonors

Junaid Haider Afridi	not reported
ϕ M Richard Anderson	graduate studies, MIT
David Bradley Bodkin	optometry school, New England College of Optometry (chem/math)
Brian David Borne	master's program in chemistry, W&M
H Thomas Edward Borsari	medical school, Georgetown (chem/comp sci)
Michael Brochu	graduate studies in chemistry, Caltech (chem/history)
Rashelle Alleyne Browne	medical school, UVA
D Ryan Joseph Carra	graduate studies in chemistry, U. Illinois, Urbanna/Champaign
M John Christopher Clements	undecided (chem/art)
H Jenine Rachel Cole	graduate studies in chemistry, U. Arizona (chem/math)
ϕ M H Kathryn Elizabeth Colyer	veterinary school, U Penn (chem/bio)
H Alexander Spencer Doyal	research at UNC-Chapel Hill
Elizabeth Anne Doyal	undecided
H Daniel Paul Gray	work as analytical chemist for 2–3 years before med school
ϕ M Fiona Ruth Grooms	work for year, then graduate studies in history & philosophy of science (chem/French)
Karl Erich Kador	undecided
Bella Korik	chemist, Electronic Materials Division, Avecia
H Stefan Dmytro Kosovych	2nd Lieutenant, Field Artillery Corps, U. S. Army
M Jeffrey Takashi Lee	master's program in chemistry, W&M
M Jennifer Michele Lim	working at INOVA Hospital, Fairfax
ϕ M H Sohini Majumdar	medical school, UVA
ϕ H Ann Marie Mikowski	graduate studies in chemistry, UVA
Gregory Adam Molnar	not reported
H Philip J. Murray	seeking employment
Sarah Ellen Norcross	master's program in secondary education, W&M (bio/chem)
Misty Dawn Odell	master's program in chemistry, W&M
M D Matthew Adam Pasek	graduate studies in lunar and planetary science, U. Arizona (geo/chem)
Mohammed Abdul Rahman	master's program in clinical chemistry, U. Nebraska
M David Abram Solomon	research in cell & neurobiology for year, then med school (interdis/chem)
Christopher Joseph Tamm	graduate studies in business, U. Pittsburgh (bus & fin/chem)
M Carolyn Kolbe Tepolt	graduate studies in zoology, U. Otago, NZ (chem/bio)
Seth Stephen Vermaaten	(Aug, 02) undecided
M H Julie Ann Viehweg	graduate studies in chemistry, Princeton
H Joshua James Wind	medical school, Loyola at Chicago

Master's Candidates and Their Destinations

Jie Guo (M.A. May '02) has returned to China.

Shiyang Shang (M.A. May '02) has entered the Ph.D. program in pharmacology at Cornell Medical Center.

Departmental Awards

William George Guy Prize in Chemistry	**Kate Colyer**
Virginia ACS Award	**Ann Mikowski**
American Institute of Chemists Award	**Richard Anderson**
Teaching Assistant Award	**Jeff Lee, Sarah Norcross**
Hypercube Award	**Matt Pasek**
Merck Index Award	**Ryan Carra, Jenine Cole Sohini Majumdar**