

The Carnegie Mellon Chemist

CHEMISTRY ALUMNI NEWSLETTER



CARNEGIE MELLON UNIVERSITY
DEPARTMENT OF CHEMISTRY
February 1998

Chemistry Undergrads

Awards We are pleased to report that our chemistry majors were recognized by a number of awards in 1997. In the senior class, Matt Solitro received the Southwick Scholarship Award, the 1997 Society of Analytical Chemistry Pittsburgh Award, and was named an Andrew Carnegie Society Scholar. Everett Neal received the Lubrizol Scholarship Award and was the first chemistry major at Carnegie Mellon to be named a Fifth Year Scholar (see page 3). Kerry McIntyre received the American Institute of Chemists Award; Lee Zeiszler received the Lubrizol Foundation Award, and Shannen Allen received the Merck Index Award. Accomplishments of other undergraduates were recognized by a number of Departmental Awards including Warner Prizes, and American Chemical Society Student Affiliate awards.

1997 Graduating Class Twenty-four students received undergraduate degrees in chemistry in the May 1997 commencement, one completing the requirements for the Departmental Honors Program. Seven-graduated with University Honors, Continued on p. 3 ➡

Chemistry Outreach

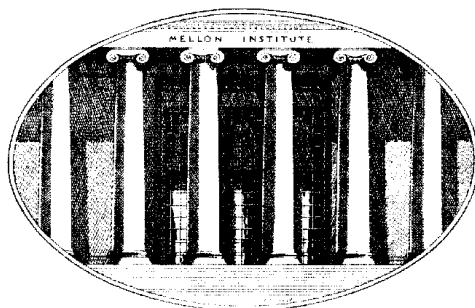
The **CMU Science Van**, under the direction of **Garry F. Warnock**, is poised to bring to area schools the excitement of highly visual demonstrations, the fun of "hands-on" classroom experiments, carefully designed teaching kits for teachers to explore and much, much more. Pre-visit materials, video-taping and a variety of "Foot Locker" science experiments and supporting materials will be available to classrooms on an ongoing basis. We are delighted that generous support from the Eden Hall Foundation will enhance the partnership between the CMU Science Van and area schools, particularly by allowing more effective contact with some of the area's resource-poor schools. That contact is one way to motivate and encourage our youth to pursue scientific careers. Science education in the middle school grades 5 through 9 is in need of major support. Middle school teachers are often asked to teach all three experimental sciences, in addition to math, even though they may have been trained in only one area. Further, many middle school science budgets are less than \$200 per Continued on p. 4 ➡

Introduction to Modern Chemistry

Paul J. Karol is developing new ways to present **Introduction to Modern Chemistry** (09-105), the first semester, main chemistry course taken by most science and engineering majors, as well as by some psychology majors.

In its new form, "09-105" is intended to focus the student's attention on modern chemistry: chemistry as practiced by today's professionals, chemistry as it impacts our lives and environment, chemistry's influence in current technologies, and items of chemical relevance that appear in contemporary media publications. To accomplish these objectives, less breadth of subject matter is covered, but what is presented is viewed in greater depth and level of sophistication. The major thrust is on the relationship between molecular structure and physical and chemical behavior. Frequently, applications from environmental, biological and materials sciences (such as the molecular basis of vision, the action of penicillin, or of the greenhouse effect) will preface the presentations of subsequent concepts and skills.

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The Department Head's Column

On behalf of the Chemistry Faculty, I am very pleased to address the Alumni of our Department, to highlight some of the important developments in the Department since our last Newsletter, and to share our plans for the future.

To summarize faculty affairs, I am pleased to note the appointment of Dr. Bruce Armitage as Assistant Professor, and the promotion of Richard McCullough to Professor, as well as the promotions of Hyung Kim and David Yaron to Associate Professor. Professor Josef Dadok retired in July 1997, from long service to the University, having arrived at Mellon Institute in 1967. The Department continues to search for a Senior Computational Chemist, and plans to open searches with priorities in bio-related chemistry and materials chemistry next year.

We graduated a magnificent senior class in 1997. Nearly all of the 24 graduates either entered graduate schools, professional schools, or gained industrial positions. We believe that the strong research component in the undergraduate curriculum helps our undergraduates compete in the world outside CMU. In fact, nearly all of the graduating students were involved in research. That research had the tangible result of 8 papers coauthored by undergraduates published in 1997 and 7 in 1996.

Last year was quite successful for Chemistry, reflected in part by an increase in the available Departmental Research Budget from \$4.2 to \$4.5 million, in spite of the increasingly tight funding situation nationally. Our graduate program enrolled 11 new students this academic year, and as detailed elsewhere in this issue, the graduating students either started new academic positions or accepted industrial positions.

Instrumentation for our research and education has significantly improved. New instrumentation in the Undergraduate Teaching Laboratories since 1996 includes: four UV/Vis spectrophotometers, FT upgrades to both 60 MHz NMRs, a research quality EPR spectrometer, a Raman spectrometer with He-Ne source, a Shimadzu HPLC with variable wavelength UV/Vis detector, 2 Dell computers for use with Hyperchem, a Gow Mac GC, the second high temperature furnace with programmable temperature controller, several balances, rotary evaporator and Mettler autotitrator; a magnetic susceptibility balance, a cyclic voltammeter, and the programmable photon counter for laser fluorescence experiment. The Center for Molecular Analysis houses a new Circular Dichroism Machine, two mass spectrometers MALDI TOF and LCQ MS, two 300 MHz NMR machines and other research grade spectrometers (UV/VIS/NIR, FT IR). This progress in research instrumentation further strengthens our undergraduate and graduate programs.

We hope and expect to continue the progress achieved during the past year into the new year. I would like to thank you, our faithful Alumni for your interest in the Department and ask you to continue to work with us to improve your Alma Mater by sending your valuable suggestions and comments.

Krzysztof Matyjaszewski

Chemistry Faculty:

B. A. Armitage
G. C. Berry
T. J. Collins
S. T. Graul
M. P. Hendrich
M. Kaplan

P. J. Karol
H. J. Kim
M. Llinás
K. Matyjaszewski
R. D. McCullough
E. Münck

G. D. Patterson
L. A. Peteanu
S. W. Staley
R. F. Stewart
K. H. Stump
C. H. Van Dyke
D. Yaron

Faculty Profiles

This issue features profiles of our newest faculty member along with one of our long-time members:

Bruce A. Armitage

joined us in the Fall, 1997. He earned a BS in Chemistry from the University of Rochester in 1988. Experiences in undergraduate research with Prof. David G. Whitten, and summers as a research intern at Eastman Kodak introduced him to the world of photochemistry in supramolecular systems. He studied photoinduced electron and energy transfer reactions between donor and acceptor molecules that were bound to phospholipid membranes in PhD research at the University of Arizona with Prof. David F. O'Brien. As a postdoctoral fellow with G. B. Schuster in 1993, he developed cationic anthraquinone derivatives as nucleic acid photocleavage agents. In '97, he moved to the University of Copenhagen to study synthesis of

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Miguel Llinás

joined CMU in 1976, following postdoctoral work at the ETH in Zürich and graduate studies and postdoctoral research at UC Berkeley, where he had gone after graduating in Physics from Córdoba National University (Argentina) in 1963. He says that he was most fortunate to have been at the right place, at the right time, and to interact with the right people, M. P. Klein and J. B. Neilands, to obtain graduate training in the applications of nuclear magnetic resonance (NMR) spectroscopy to the analysis of structure, dynamics and function in polypeptides. In the mid-sixties NMR boomed as a result of Fourier-transform methodologies, and Llinás was at the right place to land a PhD thesis project on the structural analysis of ferrichrome, a rigid cyclic metallopeptide, at a time when the first superconducting magnet spectrometers became available, pulse techniques were being developed, and the field was wide open in terms of its applications to biomolecules. Llinás moved to the laboratory of K. Wuthrich at the

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Chemistry Undergrads

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and two with MCS College Honors. Three were inducted into the Phi Beta Kappa Honor Society and five into Phi Kappa Phi. Five entered graduate schools: Colorado, Northwestern, Dartmouth, NC State and Johns Hopkins; three are attending medical school, one pursuing an MD/PhD, Virginia, Johns Hopkins and Pittsburgh; one student is pursuing an MBA, Villanova; and fifteen are in the private sector.

Undergraduate Research. The Department continues to encourage undergraduates to join research projects. Freshmen through seniors are now actively involved. There were 13 awards in the Small Undergraduate Research Grants program to Chemistry majors in the Spring and Summer/Fall 1997 grant periods (10 students, some with multiple grants). Eleven Chemistry majors were among the 200 students presenting their work at the annual Undergraduate Research Symposium held at Carnegie Mellon on May 7, 1997.

Registration: CMU students finally got a new computer on-line registration procedure in the fall of '97. The very inefficient process you remember is gone, including that RAD form. The campus went to a web based on-line registration for preregistering for the spring 1998 term. All went well, except for a delay caused by a major fire-induced computer malfunction, reportedly a result of an attempt to cook a hot dog in an toaster in Cyert Hall.

Off Campus/Summer Activities: Seven of our majors did research with faculty at the Mellon Institute and three did research at other schools (University of Minnesota, Northwestern, Argonne National Labs), and one attended the University of Sussex in the UK. At Argonne, Jennifer O'Malley took part in the Eighth Annual Argonne Symposium for Undergraduates in Science, Engineering, & Mathematics and presented her work. Two

students were counselors in Carnegie Mellon's summer programs. Students also reported employment at NIH, Los Alamos, PPG, Lucent, P&G, Monsanto, Travelers Insurance Co., and Nyack Hospital. Other student jobs reported were: worked in a Pub in England, as a ranger in New Mexico, a counselor in a Christian Youth Camp, worked on Artwork for an Organic Textbook, helped prepare a workbook on ADHDS, and worked for a distributor and direct marketing business in Hawaii.

ACS Student Affiliates The ACS Student Affiliate Chapter participated in National Chemistry Day in November by performing chemical demonstrations at the event. The legendary Student Affiliate Coke machine fell on hard times when more than \$500 was stolen from the machine in money and beverages--a new machine is on order. Plans are also proceeding for the annual Senior Banquet. The Spring service project is to assist APhIO with the Chemistry Merit Badge at Merit Badge University 1998. Social events included the usual faculty-student firesides.

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Graduate Program

Our graduate program enrolled 11 new students this academic year. The 5 students graduating with the Ph.D. degree in 1997 and the 4 graduating in 1998 started new academic positions (UC Berkeley, University of Georgia, University of Houston and Kyoto University) or accepted industrial positions (Bayer, Ethicon, W.R. Grace, Lockhart, Glen Research Corp., and Pressure Chemicals). The dedication to excellence in teaching bore fruit in awards to several graduate students: Joanne Kehlbeck received the University Student Teaching Award; Gregory Martin won the Mellon College of Science Student Teaching Award; and Nadine Fattaleh, Mani Jayaraman & Dan Savin won the Chemistry Department Graduate Teaching Award.

Fifth Year Scholarship Program

Everett Neal, a Chemistry and Industrial Management graduate, is one of only 3 students from the class of '97, and the first chemistry graduate to be a Fifth Year Scholar in '98. That program, begun in '91, offers a tuition waiver and a \$6,000 fellowship to a small number of exceptional students for one full year following the completion of their normal course of study, to broaden their educational background.

Everett is broadening his educational experience during his fifth year by exploring courses in the College of Fine Arts. He is enrolled in classes in architecture, music and design departments, and working on coordinating a lecture series called the *Art and Science Initiative*, which will explore the similarities and differences in the creativity of art and science students.

While at Carnegie Mellon, Everett did undergraduate research both at Mellon Institute and Los Alamos National Laboratory and has two chemistry articles accepted for publication in journals.

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Staff Profile

Valerie (Val) Bridge has become an indispensable part of the lives of the Department's graduate students since she joined the Chemistry Staff in August 1986. As the *Graduate Student Specialist*, Val is among the first to correspond with prospective graduate students, and to greet them and help them become oriented to our ways when they arrive to begin their studies. She makes sure that the records of their progress are complete and accurate, and gently prods the slow of foot to help them keep on schedule with the requirements of the graduate program. She does all of this while keeping a pleasant demeanor in the face of unreasonable demands from the faculty, and confused reactions from the graduate students.

Chemistry Outreach

(continued from page 1)

year, and often the study of science is limited to a textbook experience. The CMU Science Van will be integrated with other CMU outreach programs in order to enhance and enrich them. Van experiments and demonstrations will be performed on campus, at libraries, museums, Science Centers, colleges, or in short, any place where Outreach activities are happening. Anyone interested in becoming involved as a volunteer in the activities of the CMU Science Van should contact Garry F Warnock, phone: 268-4229, e-mail: warnock@andrew.cmu.edu.

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In another new outreach program slated to begin this summer, **Karen Stump**, Director of the Undergraduate Chemistry Laboratories, will be the Director of the CMU site of a new initiative of the Commonwealth Partnership, a consortium of 12 independent, private colleges and universities in Pennsylvania.

The initiative, **Building Bridges: Integrated Math and Science Transitions**, will be a three year program for K-12 teachers, run at CMU, Gettysburg and Swarthmore. It will begin with a two week workshop this summer for 24 faculty. Karen and Paul Karol involved in their last initiative entitled "IMAST: Integrated Math and Science Teaching" which ran for three years, ending in June, 1997.

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Introductory Chemistry

Continued from page 1

One consequence is that the course relies on much more than the textbook. Modern technology has been adopted extensively: the blackboard or overhead is replaced by captioned, computer-displayed graphics, with animations to help visualize 3-D material; graphs in the text are assembled piecemeal; the lecture presentation slides, plus enrichment material, are available to the student on a Web site, with links

to supplementary material as well as to archives of back exams and quizzes with answer keys; re-enforcement self-quizzes are available for twenty-four hours following a lecture.

Finally, the elementary chemical stoichiometry which opens the course has been moved off-line for self-pace learning, with abundant examples for practice, usually with a practical flavor. Proficiency, demonstrated by 85% or better on a Mastery Exam is required to pass the course (students may try six times).

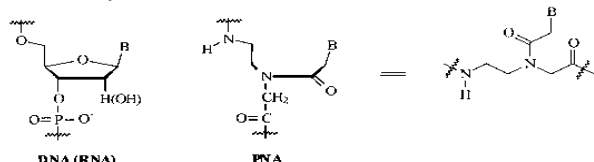
The course is under continuous development and improvement, taking advantage of input from the student evaluations at mid-term and course end. These anonymous critiques are very valuable as is input from a variety of CMU education experts keeping in touch with the progress of the course.

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Faculty Profile (Continued from p. 2)

Armitage

PNA, an analog of DNA, and study its interaction with folded RNA structures in the labs of P. E. Nielsen, one of the inventors of PNA. In PNA the nucleobases are appended to a polyamide backbone rather than the natural sugar-phosphodiester polymer. PNA forms very high affinity duplex structures with complementary DNA and RNA sequences, following the Watson-Crick rules for base-pair formation.



Bruce will continue work on PNA at CMU: Duplexes of synthetically modified PNA's will be inserted into a phospholipid membrane to develop electron transfer across the membrane, *a la* photosynthetic reaction center proteins. Success in this project could lead to new solar energy conversion technologies; Duplexes of PNA with complementary single-stranded RNA will be used map those sequences that are available for hybridization versus those that are protected. A photochemical agent attached to the PNA that cleaves the RNA backbone should lead to cleavage of the RNA at a specific site, clearly pinpointing the location of the PNA. Such a development could have great utility in both diagnostic and therapeutic applications.

Llinás

ETH in Zürich in '74, to study heteronuclear ($^{13}\text{C}/^{15}\text{N}$) NMR for polypeptide structure elucidation. Polypeptides are good models to understand proteins, which are crucial, in that they perform both structural and, as enzymes, catalytic roles in highly specific biochemical reactions. On joining the CMU faculty in 1976, he became part of the NMR group (with A. A. Bothner-By & J. Dadok), sharing use of the developing high-field (600 MHz) NMR spectrometer on protein research.

In 1980, Llinás launched a program on the structure and function of multidomain proteins involved in fibrinolysis, namely, the dissolution of blood clots. By that time biotechnology had evolved to the point of mass-generating several of the crucial enzymes involved in the activation of the fibrinolytic process. Understanding the mode of action of these proteins became a major target of his research. Currently, the field of fibrinolytic proteins has widely expanded, as research has shown that many of the key enzymes are also involved in cell migration, tissue remodeling, cancer and metastasis. Llinás' research involves collaborations with several European and American laboratories, as well as with biotechnology companies dedicated to drug development. Showing strong commitment from CMU, the BioStructure NMR lab has been expanded to include one 500 MHz and two 600 MHz state-of-the-art NMR spectrometers, share-used with C. Ho and G. Rule in the Department of Biological Sciences.

Faculty Affairs

Chemistry Research Retreat

number 7 was held in at the Hidden Valley Resort in the Laurel Highlands, the same venue used last year. The retreat, organized each autumn (as the leaves develop their fall colors) by **Eckard Münck**, affords faculty, graduate students and research associates of the Department the opportunity to meet from Friday evening through Sunday noon for seminars and informal discussion and relaxation. The research presentations are distributed among the members of the Department's research groups. The program allows plenty of time for discussion, both during the sessions, as well as during the 'free-time'. The funding for this activity comes in part from gifts from alumni and friends.

Richard D. McCullough has been promoted the rank of Professor. Rick joined CMU in '90, bringing an interest in materials chemistry to the Department. A brief account of his current interests in structurally organizing electrically conductive polymers by self-assembly into monolayer or bilayer bundles of highly conductive nanosheets appeared in the last issue of the *Alumni Newsletter* (e.g., see the Chemistry web site for an archived edition). In recent studies, new amphiphilic, regioregular alternating copolymers of polythiophene have been synthesized and are assembled at an air-water interface and transferred to a hydrophilic substrate surface to make monolayer or bilayer films. Rick was a Visiting Professor at the University of Copenhagen during '96, and Associate Head of Chemistry in '96-'97.

Bruce A. Armitage joined the faculty of the Department of Chemistry in August 1997--see the Profile on page 2 of this issue.

Hyung Kim and **David Yaron** have both been promoted to Associate Professor. Accounts of their research interests may be found below.

Garry Warnock joined Chemistry as a Visiting Professor in August 1997. He will teach courses in the undergraduate curriculum, and develop his outreach programs (see *The CMU Science Van*, on page 1). Garry had been carrying out similar responsibilities with the Chemistry Department of the University of Pittsburgh joining for several years prior to CMU.

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David Yaron is developing theoretical models of conjugated polymers and other organic semiconductors. These materials have great potential for electronic and photo-physical applications such as flat-screen displays, optical switches, low-cost transistors, and photocells. A major advantage of these materials over traditional inorganic semiconductors, is the ability to control structure both at the molecular level, through organic synthesis, and at the macromolecular level, through self-assembly processes. With a chemically accurate theoretical description of the photophysics in these materials, one can address the question, "When in the future chemists can synthesize the polymer of their choice, and self-assemble it into the 3-D structure of their choice, what choices should they make?"

The needed photophysics poses the challenging theoretical problem of describing the structure of excited electronic states. Yaron has developed an equation-of-motion method to describe the excited states of a single polymer chain, using local approximations, many-body basis-set contraction, and other computational and theoretical tricks to make calculations on long chains reliable and feasible. He has also developed a means to include the interchain interactions, since these play an important role in solid-state materials. His approach is the first to include the dynamic aspects of the dielectric response, which is critically important since due to these dynamics, the relative strength of the dielectric medium varies from electronic state to electronic state. By properly including the dynamics, his model helps resolves many long-standing questions concerning the relative strength of Coulomb interactions in these materials.

Hyung Kim is working on a theoretical understanding of solution-phase processes at a molecular level. Short-range and Coulombic interactions with the solvent environment often considerably alter the charge distribution of solute molecules. Solvation may have a significant influence on mechanisms and controlling factors of chemical reactions involving charge shift (e.g., electron/proton transfer and S_N1/S_N2 reactions) and a variety of time- and frequency-domain spectroscopies (e.g., time-dependent fluorescence and depolarized Raman scattering). To analyze these diversified effects, Kim's group has been developing theoretical models at different levels (from molecular to macroscopic), and implementing them with modern computational chemistry techniques. One recent accomplishment is the construction of an electronically polarizable potential model for liquid water ("TAB" water), suitable for molecular dynamics computer simulation studies. Unlike many existing classical force field models, the TAB model is in a quantum mechanical electronic description, so that it accounts for electronic transitions and accompanying relaxation effects. Also both linear and nonlinear electronic response of the solvent is included in its description. The simulation of some optical properties of water are in good agreement with experiment. The current thrust is to further improve the TAB description and to apply it to water and aqueous solutions at elevated temperature and pressure, e.g., supercritical water. The latter has an important implication as an environmentally-benign, alternative solvent for oxidation of organic wastes. Kim is also extending his theoretical studies to encompass solvation in a polarizable, quadrupolar solvent, such as benzene and supercritical carbon dioxide.

ALUMNI NEWS

Your generous responses to the questionnaire in the *Newsletter* and requests for continued issues are much appreciated--we now have heard from 240 of you (many more than once as you update us on your whereabouts and career)--keep it coming!

Alfred M. Malloy, BS 25, is retired, from the Naval Air System Command, where he worked as a chemical and corrosion engineer and is a Retired Navy Commander from Naval Air.

Darrell Bock, BS 48, is continuing research in psychometrics; he writes that he is very interested in the '98 Class Reunion.

Howard L. Recht, BS 48, retired from Rockwell Int'l in '87. He received a PhD in Physical Chemistry from Cornell University in '55. Now a widower, with 4 children, 6 grandchildren.

Janet Y. Barber (née Gephardt), BS 49, is retired from The Buffalo Seminary where she taught. She enjoys golf, travel, Florida and visiting her 3 children and 6 grandchildren with husband Donald, a dentist.

David R. Lide, BS 49, is the Editor-in-Chief of the CRC handbook of Chemistry and Physics

Sheila L. Pieterek (née Sullivan), BSMMC 55, retired from Procter & Gamble R&D after 6 yr to become a full-time homemaker. She enjoys traveling with her husband, also retired, and visiting her 5 daughters and 4 granddaughters.

Kermit J Reidy, BS 55, is retired, but busy as the pianist and organist for his church in Bushnell, FL, and in caring for his wife, who has been ill.

Marilyn Casey Bracken, BSMMC 57, helped organize and participated in a career panel on *Opportunities for Women in Science Careers* during the Oct '97 Homecoming; the panel, geared to current students, was sponsored by the Bio. Sci. & Chem. Departments. She is a consultant with in environmental chemistry, engineering and regulatory control. During her 30 years of experience in environmental management, she has successfully directed major business development activities, as well as environmental control programs, in the U.S. and abroad, become widely published in the field of toxic substances and environmental regulations. She has been President of Metcalf & Eddy of Puerto Rico, Senior Vice President, Federal Programs, Air & Water Technologies, and Vice President, Marketing & Business Development, Environmental Sciences Group, Applied Bioscience International, Inc. In addition, she has served as Chairman of the Management Committee of the Special Program on Control of Chemicals of the OECD and the U.S. delegation to the Chemicals Group of the OECD, as well as Deputy Assistant Administrator of the U.S. Environmental Protection Agency's Office of Pesticides and Toxic Substances.

Joseph P. Yevich, BS 62, PhD 70, is the Director of Central Nervous System Chemical Research of Bristol Myers Squibb.

Philip A. Meyers, BS 64, is a Professor in the Dept. of Geological Sciences, University of Michigan, with interests in paleoceanography; he has taken 6 cruises with an ocean drilling program.

David Chou, BS 70, is now living in Shaker Heights, OH.

Linda H. Jansen (née Hood), BS 70, was the guest speaker for *Women in Science* at CMU in January '98. She is Director of International Marketing and Sales for Lockhart Chemical Co. in Gibsonsia, PA.

Stephen S. Barshay, BS 72, is the Supervisor of analytical chemistry and radiochemistry for ABB Combustion Engineering Nuclear Operations.

Betsy Kagey (née Togut), BS 72, is doing research, consulting and teaching Environmental Health, Epidemiology & Risk Assessment at Frostburg State University. She received a PhD in '55 from the Environmental Health & Toxicology, SUNY School of Public Health; Married with 2 children, she enjoys playing the violin.

Martin T. Haber, BS 77, is reviewing new drugs for the US Food & Drug Administration, Rockville, MD; he received a PhD in Biochemistry from Brandies University in '91, and was married in 1989.

Leanne J. Henry, BS 82, is now a Captain in the Air Force, doing research in ultra-high vacuum chemical deposition of silicon/germanium materials with the Air Force Research Laboratory. She received a PhD in Physics from the University of Pittsburgh in '89, and has worked in Air Force labs at the US Air Force Academy and Wright-Patterson AFB.

Debbie Anderson, BS 93, is training in otolaryngology at the University of Texas Southwestern Medical Center after earning an MD in '97 from the University of Pittsburgh School of Medicine.

Shannon H. Bumgarner (née Hayes), BS 93, MS 96, had a big year in '96: she received an MS in Environmental Science/Industrial Hygiene from the U Texas Health Science Ctr, and married Brian Bumgarner.

Katarina Midelfort, BS 94, writes that she is "happily in graduate school" in biophysics at the University of Illinois.

Molly Dalkiewicz, BS 95, is enrolled in a Masters program at Colorado State University.

GRADUATE STUDENTS

Elizabeth P. Hartner (née Pearsall), MS 37, is retired from her position as Manager of Information Analysis, NASA/KASC, University of Pittsburgh.

Continued on the next page. ➡

ALUMNI NEWS (Continued from prior page)

Alan B. Rothman, MS 52, PhD 54, retired from Argonne's Reactor Engineering Division in 1991, now working at the Argonne National Lab, Energy Technology Division in a temporary assignment associated with transportation of hazardous materials, as well as the processing of nuclear materials for interim storage or burial. He enjoys retirement with wife Lori, physical training, travel, skiing, son and 2 grandsons.

Bernard Greifer, PhD 57, retired from the US Department of Commerce has celebrated his 75th birthday & 50 yrs with ACS; he writes that he "Has yet to 'surf' the internet" (well, 'get with it!").

Robert I. McDougall, PhD 57, retired from the Igloo Corporation in '92, taught freshman chemistry in Houston Community College for 2 yrs, and now tutors HS students in chemistry, math & physics; he has an 8 yr old adopted grandson (James).

Philip Liu, PhD 90, is working on lithographic processes for electronic storage. He writes that "It's fun and has a lot of challenges. For example, I just developed and implemented a process in our manufacturing line."

Alex Procyk, PhD 92, writes from Houston, TX, that I "haven't embarrassed the Alma Mater so far...but there's still time."

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Chemistry Newsletter on the Web

Recent issues of the *Chemistry Newsletter* may be found on the Chemistry Department Web site:

<http://www.chem.cmu.edu>

At present, the Home Page includes

- Graduate Studies
- Undergraduate Studies

- Faculty Research Interests
- along with other items for local use. Take a look, and send us your suggestions to make it more useful to you and others.

THANKS FOR YOUR SUPPORT!

We want to thank the many Alumni who have made gifts to the University and/or Department. These are extremely important to our efforts to provide a quality educational experience to our students. Gifts may be made to Carnegie Mellon, either as unrestricted gifts to the University, or as gifts designated by you to be used by a particular unit within the University (Chemistry for example!).

The Chemistry Department has many activities in both undergraduate and graduate education that benefit from your generosity in gifts you specifically designate for the Department, including:

- Grants for undergraduate and graduate students for travel to scientific meetings
- Support for Departmental Colloquia
- Support for undergraduate research projects
- The Annual Chemistry Department Retreat

You may designate gifts to the Department by explicit request to that effect, or by instructions that your gift be directed to account number 1-31296. Some of you may be able to take advantage of gift-matching programs at your place of employment. In any case, thanks again for thinking of us!

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Chemistry Alumni Directory

Many of you responded affirmatively to offer to oblige your classmates in locating you from our files. If you have not responded, and wish to do so, please check the "Yes" box in the Questionnaire below

1998 ALUMNI QUESTIONNAIRE

Please Complete and Return to
Department of Chemistry
Carnegie Mellon University
Mellon Institute
Box 166
4400 Fifth Avenue
Pittsburgh, PA 15213-2683

NAME:

(Name at CMU if different):

ADDRESS:

BUSINESS TEL NUMB:

HOME TEL NUMB:

FAX NUMB:

e-mail ADDRESS:

Make address available to Chem Alumni?

Yes ☐

No ☐

CLASS/Degree:

(Please include your degree)

PERSONAL HIGHLIGHTS & COMMENTS

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ALUMNI NEWSLETTER
DEPARTMENT OF CHEMISTRY
CARNEGIE MELLON UNIVERSITY