

CHEMICAL *Compositions*

chemistry & biochemistry
departmental newsletter

The Mallet Chemistry Library : a History

Origins

THE CHEMISTRY LIBRARY has existed as long as the University of Texas. Its history closely follows the development and expansion both of the Chemistry Department and of the General Libraries, from modest beginnings in the late 19th century to national prominence today. Dr. John W. Mallet, the first Chairman of the Faculty and Professor of Chemistry, had noted the importance of an adequate library as early as 1882, a full year before classes began. The information needs of faculty and students were, however, treated rather casually by early administrators and Regents. Until 1890 the University consisted of a single structure, Old Main, and had no separate library building until Battle Hall was completed in 1911.

Like most academic science libraries in the United States at the time, the Chemistry Library began as a departmentally-controlled collection that was only loosely affiliated with the University Library. The chemistry professor was responsible for spending a small library budget to purchase needed books and journals, which — although technically owned by the University Library — were then housed in the department's labs and offices. The library had no staff apart from a secretary or stenographer doing double duty in the library room. Staff and graduate students had keys to the rooms where collections were housed, and oversight of the facility was minimal at best. Again, the faculty took its library resources seriously. The chemical library received prominent mention in early UT course catalogs:

The University has the beginnings of a well-selected chemical library, which will be open to the students at proper times. The principal foreign and American chemical journals on the shelves of the library offer to the advanced students all the current literature of the science.

-- *University Catalogue, 1884-85*



Dr. John W. Mallet, first UT chemistry professor

During the 1884-85 session, the Department's library appropriation was \$200, not all of which was spent. In 1887-88 the Regents made no funding available for library purchases at all, but some journal subscriptions were maintained by student contributions. During this period, the chemical library seems to have been located in Edgar Everhart's laboratory in the basement of Old Main. (Everhart succeeded Mallet as chemistry professor in 1884.) The catalog of 1888-89 mentioned that the library was receiving the *American Chemical Journal*, *Chemische Berichte*, and *Zeitschrift für Analytische Chemie*.

Growing Years

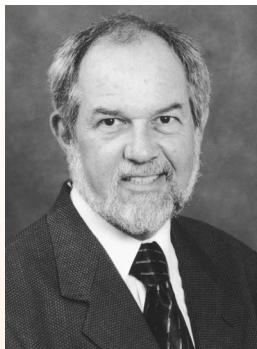
By 1892, when the Chemistry Department moved from the basement of Old Main to the new Chemical Laboratory building, the library collection numbered around 500 volumes, which were housed in Everhart's second floor office. When Dr. Henry Harper took over the Chemistry Department in 1894, he began a campaign to expand the library's collection and budget. Harper and his colleagues felt strongly that a good chemical library was as essential to quality research and teaching as modern laboratory facilities and equipment — a fact that remains true today.

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FROM THE CHAIRMAN



Jim Holcombe

As with all universities across the country, this past couple of years has been a time of budget uncertainties and financial shortfalls. With student education and faculty needs topping the “must fund” list, many other items were placed on hold in hopes of improved economic times. This spring an unprecedented golden parachute package was available to those staff members who were eligible to retire as a means of trimming costs, and refilling the positions required very

strong justifications. Chemistry had only two retirees (**Joyce Thoresen**, our placement officer and Newsletter Editor; and **Kenneth George**, a machinist). **Ray Davis** entered phased retirement this semester where he will be teaching alternate semesters only for the next three years. Fortunately, we will continue to have Ray’s selfless input and insights on departmental and university issues during that time.

In spite of these tough economic times, faculty hiring proceeded according to long-term hiring plans thanks to the forward-looking desire of the administration to see the faculty grow. We acquired three excellent new faculty members who started this fall semester: **David Graham**, **Lara Mahal** and **Whitney Yin**. You can read about their research interests and backgrounds in later pages of this newsletter. All three are incredibly bright, energetic and excellent teachers and researchers. We are currently in the process of continuing the growth of the faculty as we proceed in our search for 2-3 additional faculty members. Things are looking very fine.

Historical funding changes for Texas’ universities have just taken place during this past legislative session that will bode well for the University over the long run. Universities will have the power to set the tuition rate with the approval of the Board of Regents. This occurs in many states and allows improved opportunities to charter a path into the future that is less strongly impacted by legislative forces. President Faulkner appointed a Tuition Policy Advisory Committee consisting of administrators, faculty (including our own **Marv Hackert**), and students to make a detailed budget analysis of our immediate and future needs. They recommended a new Academic Sustainability Tuition, which was endorsed by the administration and recently approved by the Board of Regents. This should start a significant influx of funds to take care of much needed renovations in Welch Hall, as well as other facilities. Things are looking good.

Last year **David Hoffman** and **Mike Krische** (with the assistance of **Ben Shoulders** and other faculty), successfully landed two federal grants to improve our NMR facilities; and **Mehdi Moini** and faculty colleagues were similarly successful in getting external funding to purchase two new mass spectrometers. One of these was a major instrument grant (\$1.3M) to purchase a high-end, state-of-the-art FT-ICR. Additionally, major

matching funds have been set aside by the University to seek additional funding to enhance the NMR facilities next year. To this end, we are directing efforts to allow our facilities to serve as a major regional, if not national, resource centers for science in these key areas. With such major changes in these facilities, we are now “rearranging the furniture” to insure adequate space for these not-so-small additions to the family. I offered my garage if we got in a space pinch, but several were quick to point out that I couldn’t even fit my own car in there yet alone an FT-ICR. (My wife was also somewhat reluctant, being fearful that the magnetic field would disrupt the microwave and we would both starve to death.)

As you’ll note on p.6, kudos and awards continue to flock to the faculty. At this juncture, I must acknowledge the efforts and energies of **Andy Ellington** (Awards Chairman for the past 3 years) in his quest to insure that appropriate faculty had their names in the bin for consideration for a number of these prestigious honors. Andy runs a massive research program and is an enthusiastic and dedicated teacher. It always pleases me to see a person with “two full plates” taking time to further assist the Department and his colleagues. (Looking at Andy’s daily accomplishments vis-à-vis my own, I can draw only one conclusion... he doesn’t sleep! Any other conclusion would only make me feel inept.)

I hope that you had a chance to read the lead story by our librarian, **David Flaxbart**, on recapping the library’s history. David has done a yeoman’s job of balancing reduced library budgets with faculty and student needs. Additionally, he has continued Aubrey Skinner’s tradition of researching and documenting the history of the Department. Finally, let me call your attention to the “centerfold” that has resulted from a multiyear effort by **Marv Hackert** with assistance from **Joyce Thoresen**. In this graphical depiction of the faculty history you should see familiar names, regardless of when you attended UT. (At first I was somewhat dismayed that, in this graphical presentation, there was nearly the same vertical distance between me and the “founding fathers” as there was between me and the recent hires. However, I took some solace in the fact that this wasn’t the case when comparing horizontal distances.)

In closing let me note that after uncertain budgetary times, the new financial *modus operandi* recently hammered out by the University and the State should bode very well for the University, the Department and the students. I believe that this opens up possibilities for all of us to make a quantum jump to a new level in excellence in education and research. The Department is already in the process of exploring how we can best utilize the opportunities that now present themselves.

Keep in touch. Feel free to send us comments and questions; and, in your daily life, stay as far away from equilibrium as possible!

— James A. Holcombe
Professor and Chairman

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The Chemical Laboratory, home of the Chemistry Department from 1892 to 1926. It stood near where the Biology Greenhouse is today.

The enormous annual output of chemical research is an excellent index of the progress of chemical science.... In addition to the enlargement of the stock of apparatus and chemicals, it is sadly in need of better Library facilities. The immediate needs include: Liebig's Annalen, complete; organic solvents; chemicals; new tables, and plumbing. -- Harper's annual report of 1898-99, published in the *University Record*, August 1899.



First volume of *Liebig's Annalen* (1832); acquired by the library in 1899.

In 1899, with the Regents' help, a complete run of *Liebig's Annalen der Chemie* (1832-96) was purchased for \$700 from a laboratory in Germany, an event that Harper called "one of the most important events in the history of the School of Chemistry." This and other acquisitions enhanced the collection, which already included runs of the *American Chemical Journal*, *Chemische Berichte*, *Journal of the American Chemical Society*, *Chemisches Zentralblatt*, *The Analyst*, *Annales de Chimie et de Physique*, *Zeitschrift für analytische Chemie*, and a handful of other major titles. By 1901 the collection contained over 3,000 volumes. Under the faculty's guidance, the library continued to grow steadily during the first decades of the 20th century, adding back runs and new subscriptions to major journals. But the chemistry collection generally was not represented in the University's main card catalog, and the library's existence was largely unknown to persons outside the department.

There is no record of any specific person in charge of the library before 1925, although Prof. Harry Lochte was the faculty supervisor. He wrote the earliest known report on the chemistry library in March 1924. While Lochte was not trained in library administration, his reports over the next few years showed genuine insight into the problems facing early academic libraries, and many of the challenges he described are still challenges today: funding, cataloging, subscription currency, equipment, staffing, and space.

A Narrow Escape



Ruins of the Chemical Laboratory, the day after the fire.

The Chemistry Library survived a major disaster in the early hours of October 16, 1926, when a fire that started in aging wiring destroyed the old Chemical Laboratory building. Thanks to the foresight of Drs. Harry Lochte and William Felsing, the library had been moved earlier that year from its firetrap quarters on the second floor to a room near a ground floor exit. When the fire alarm was sounded, Lochte organized firemen to hold the flames at bay while the library's collection was covered with wet tarpaulins, and then carried out of the building. Most of the books and journals were saved, though some volumes bear the scars of smoke and water damage to this day. The rest of the building was a total loss, however, and

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many research notes, instruments, and most of the department's theses were destroyed.

The famous chemistry library was being transferred to safe quarters as soon as possible after the fire this morning. According to Dr. Felsing, many of the journals and books kept here could not be replaced, being research reprints and notes that are not duplicated in print. One set is valued at over \$1500, and there is a set of the "Annales de Chimie sic et de Physique" dating from 1789 that is very rare, besides about 3500 other journals and hundreds of books.

-- *Austin Statesman*, October 16, 1926.

The library was relocated to quarters in the new Biology Building next door while a new chemistry building was constructed. The Chemistry Library moved into the fourth floor of the new Chemistry Building (today known as Welch Hall) in 1931. The separate Pharmacy Library moved in with it at this time. In 1934 the library was named for Dr. Mallet, UT's first chemistry professor.

Mid-Century

By the 1920s, departmental collections had been expanding out of control, and card catalogs and circulation files were not being properly maintained. Book losses were a growing problem. Services and hours were erratic. There was a clear need for closer supervision and oversight. During this period the University Library, under new librarian Ernest Winkler, began to exercise more control over the established departmental libraries scattered across the campus. (In 1922, there were as many as 23 separate library collections and units on campus.) As part of this process, the task of selecting books and journals passed from faculty to trained librarians, and library staffing and hours became more formalized.* The chemistry faculty strongly resisted an attempt to take away their library keys, and the Chemistry Library remained the only branch where non-library staff had access to the facility after hours.

Alice Wupperman (1929-40) was the first Chemistry Library supervisor employed by the Library rather than the Department. The war years were a time of great turmoil and turnover for the entire campus, and clerical workers came and went frequently during this period. Martha Thurlow (1944-49) was the first professional librarian employed in the Chemistry Library, followed by Ivan Trombley (1949-51). In 1951 Aubrey Skinner took over the job of Mallet Librarian. He observed laconically in an early memo, "Library open 61 hours a week. Space a problem, need a useable typewriter." Skinner persevered to face the challenges, and over the course of a 34-year career became indelibly associated with the Mallet

Library and well known in Texas for his interests and writings in local and library history.

The 1950s and 60s were years of considerable stability for the library. The Pharmacy Library moved out in 1952, but the collection continued to grow rapidly, surpassing 25,000 volumes in 1965. This growth reflected the overall explosion of the scientific literature in the postwar decades, despite a perennially tight library budget for books and journals. But the overall nature of libraries and library services changed little until the advent of photocopy machines in the 1960s and electronic databases in the 1970s. The library obtained its first in-house photocopy machine in 1963. The Xerox 914 was the world's first plain paper copier, and though it was slow (7 seconds per copy) and hefty (648 pounds), it revolutionized the copying of materials, which previously had to be duplicated via laborious wet-process methods.

The primary challenges for the Chemistry Library during this period were a chronic lack of space and staff, and the loss of thousands of books due to the proliferation of library keys. Inventories in the mid-1970s indicated that nearly 10% of the collection was unaccounted for. The opening of the Collections Deposit Library in the mid-1960s helped to relieve some of the overcrowding in the shelves. The library was finally air-conditioned in 1964, after many decades of sweltering summer days that were hard on students and books alike. (The library had opened as early as 7 a.m. during some summers, so that students could do their library research in the early morning hours.)



Aubrey Skinner,
Mallet Librarian, 1951-85



Today this room is a graduate student lounge, room 4.132. Two levels of stacks were located through the openings to the right.

The Mallet Library had quickly outgrown its fourth floor home, but it was not until 1978 that an addition to Welch Hall allowed the library to move to its present, more spacious quarters under the new central courtyard. This new facility, more than four times larger than the previous library, contains over 10,000 square feet of floor space, 14,000 linear feet of

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shelving, and 150 seats. At the time of the move, the collection filled less than half of this space. In 1993 the new Library Storage Facility opened on the Balcones Research Campus in north Austin, enabling the library to store thousands of older and fragile books and journals, thus ensuring adequate collection space for some years to come.

The Electronic Revolution - and New Challenges

The transition to a digital library began in the 1970s. Change was gradual at first: databases were few and hardware was hard to come by. The first online searches of the Chemical Abstracts database were done in the mid-70s, using primitive teletype terminals connecting to the Lockheed database system (later known as Dialog). The General Libraries automated its circulation system in 1983, and in 1988 the UT online catalog, UTCAT, was unveiled, making card catalogs obsolete. In 1988 the library installed its first microcomputer, an IBM XT, soon followed by an even more antique IBM PC. A modem provided a slow connection to the outside pre-Internet world of remote databases. Students and faculty now could have direct access to Chemical Abstracts online via the Dialog "U-Search" service in the library. The library also had a CD-ROM player, and our first database was the Aldrichem DataSearch CD in 1990. A CD-ROM network was established across the General Libraries in 1992, enabling users to access various bibliographic databases from any library for the first time.

It was the advent of the World Wide Web that accelerated the revolution by making many resources available on one's own computer with standard, user-friendly browser software. The first Mallet Library web home page went online in 1994. Scientific journals began launching Web versions in the mid-1990s, which have substantially reduced the use of the corresponding printed journals and may one day make them entirely obsolete. Web journals from the American Chemical Society were licensed by UT in 1999. Online access to Beilstein Crossfire (1997) and SciFinder Scholar (2000) made chemical literature searching much easier regardless of the researcher's location on campus. The steady addition of digital information resources has greatly expanded users' access to scientific information.

On the down side, economic pressures in the early 1980s began to erode library budgets nationwide, and UT was no exception. A stagnant economy, the Oil Bust, and steadily reduced legislative funding forced UT libraries to cancel journals for the first time in 1986. This painful ritual was repeated in 1988, 1990, 1992, 1995, and also in more recent years. The sciences suffered the most, because scientific information has always been the most expensive, and steady inflation of journal prices has far outstripped the library's ability to maintain its collections. This "serials crisis" has continued unabated for nearly twenty years, and is actually now made worse by the proliferation of online journals and databases, which add to the overall cost of information. Contrary to popular myth, electronic information is not free or cheaper than print, and in many cases is much more expensive. By the turn of the century, UT was spending nearly \$700,000 per year on chemical information resources in all formats.



The Mallet Library in 2002.

A New Century

Today the Mallet Chemistry Library maintains over 86,000 volumes covering all areas of chemistry, biochemistry, chemical engineering, and nutrition and food science. This collection is supplemented by access to hundreds of electronic journals and databases.

All libraries are now in a period of profound transition, from repositories of printed knowledge to gateways to vast aggregations of digital information. The library of 2050 will probably look nothing like the library of 1950. Changes that would have been unimaginable only a decade ago have transformed the nature of scientific communication and information retrieval, and will continue to do so. The printed scholarly journal itself may soon be a quaint relic. But the library will not disappear. It is uniquely positioned to organize and provide access to a wide array of information resources, and to help the University turn out information-literate graduates. As Henry Harper envisioned over a century ago, the Chemistry Library is, more than ever, a vital resource for teaching and research, and it is one of the most valuable assets of both the Department of Chemistry and Biochemistry and the University of Texas.



David Flaxbart

— David Flaxbart, Chemistry Librarian

* See also: Moloney, Louis C. *A History of the University Library at the University of Texas, 1883-1934*. (PhD Dissertation, Columbia University, 1970), which provides an exhaustive history of the early UT library system.

Do you have reminiscences or anecdotes about the Chemistry Library over the years? We'd like to hear from you. Send them to chem@lib.utexas.edu.

A Web version of this article is available at:
<http://www.lib.utexas.edu/chem/history/mallethist.html>

Faculty Awards and Honors



Bard receiving Presidential Citation from University President Dr. Larry Faulkner

Allen J. Bard—received the Presidential Citation from President Faulkner at the UT@120 celebration. The Presidential Citation program was established to recognize the extraordinary contributions of individuals who personify the University's commitment to the task of transforming lives. The University does not award honorary degrees, and these citations are designed to salute persons whose service exemplifies the values shared by the University community. In addition, The Weizmann Institute of Science conferred the title of Ph.D. Honoris causa to Professor Bard. The conferment ceremony took place on November 10, 2003 in Rehovot, Israel.

Brent Iverson—together with Dr. George Georgiou, received the 2003 Research Excellence Award for best research paper from the university's Cooperative Society for the *Nature Biotechnology* article.

Cynthia LaBrake—selected as a recipient of a 2003 College of Natural Sciences Teaching Excellence Award.

Stephen F. Martin—awarded the 2003 Wyeth Research Award for outstanding work in the areas of natural product synthesis and bioorganic chemistry. In conjunction with the award, Professor Martin presented lectures at Wyeth Research in Pearl River, NY and at Columbia University, where the award was presented.



Cynthia LaBrake



Brian Pagenkopf

Brian Pagenkopf—selected as a recipient of a 2003 College of Natural Sciences Teaching Excellence Award.

J. Mike White—inducted to the Academy of Distinguished Teachers at a ceremony in September celebrating UT@120.

C. Grant Willson—2004 recipient of the ACS Award in Applied Polymer Science sponsored by Eastman Chemical Company. This Award is given by the Division of Polymeric Materials. Willson is being recognized for his pioneering contributions to the development and advancement of polymers for photoresists in microelectronics manufacturing. The Awards Ceremony will be on Tuesday, March 30, 2004, at the 227th ACS National Meeting in Anaheim, CA.

David Vanden Bout Promoted to Associate Professor

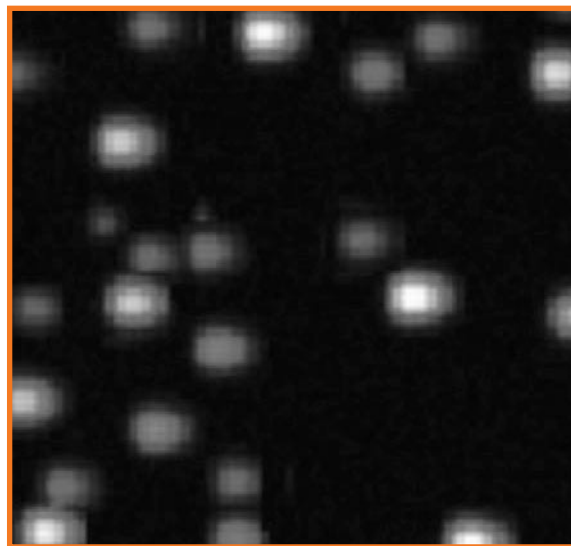
Research in the Vanden Bout group continues to use and develop novel microscopy and spectroscopy techniques to probe *heterogeneous* materials. For several years we have been studying how molecular interactions affect the electronic and optical properties of organic electronic materials. The systems we have focused on are polymer (plastic) materials that emit light when hooked up to a battery. These polymers have potential applications in plastic displays and solar converters. To address some basic molecular questions in these systems, we are beginning to construct nanoscale functional devices in which the polymer chains are packed in different ways (highly ordered parallel to the electrodes, perpendicular, totally random, etc...). We are also investigating the role of photochemistry in these devices. To characterize the material on the nanoscale, we continue to develop the technique of near-field scanning optical microscopy (NSOM). For characterizing molecular order in materials, we have developed a fluorescence anisotropy technique. More recently, we have coupled time-resolved fluorescence measurements with the NSOM. We will utilize these new techniques not only in the study of the electronic polymers, but we have begun a recent collaboration with Carlos Silva from Cambridge University to study the molecular structures of protein fibrils.

A second focus of our research is on the understanding of molecular motion in liquids and polymers near their glass transition. Recent experiments have shown that super-cooled liquids and polymer melts are spatially heterogeneous - composed of regions in which molecules move on different timescales, some of them fast, some of them slow. We have used single molecule spectroscopy (SMS) to follow the rotational motions of individual dye probes in systems near their glass transition. In SMS, fluorescence dye probes are diluted at extremely low concentration into the material to be studied. A laser is then focused to a small spot and scanned through the sample. The concentration of dye is so low that we have ensured that there will be either one or zero dye molecules in the laser at any given time. We can then scan the laser until we find the fluorescent molecules. This is akin to finding a needle in a haystack (actually more like finding a needle in a haystack the size of Travis County), but we can track down the needle

because it is the only thing shining orange light at us. Once we have found the molecules we can determine their orientation from the polarization of the light they emit. Because the system is so close to its glass transition (where it freezes into an amorphous solid), the molecular motions are very, very slow. A typical dye in a room temperature glass of water would rotate billions of times a second. Near the glass transition, these molecules rotate only once every 10-100 seconds so they are easy to follow in real time. We have shown that in both the liquid and polymer systems the molecular motion is broadly heterogeneous; sometimes the molecules rotate slowly and others times they are 10-100 times faster. Within any given environment, the molecules undergo simple Brownian motion. As the molecules exchange between environments (or if an ensemble of molecules is measured), they begin to show dynamics on multiple timescales. Our initial work has inspired a huge array of new experiments, ranging from examining different sized probes, to correlating rotational and translational motions, to similar diffusional measurements in biologically relevant systems.



David Vanden Bout



Flourescence image of single molecules

New Faculty: Lara K. Mahal



Lara K. Mahal

I first came to love chemistry as a high school student. Despite this, I had no plans to become a scientist, but liked chemistry enough to major in it as an undergraduate at the University of California at Santa Cruz. My decision changed and I found myself doing research in the laboratory of Professor Rebecca Braslau. Her work focused on free-radical chemistry and observing enantioselective radical reactions. After spending many a night and weekend making pro-chiral

carbon radicals, I went on to graduate school at the University of California at Berkeley. I had intended to become a synthetic organic chemist, but found myself drawn to the laboratory of a new professor, Dr. Carolyn Bertozzi, who was blending both chemistry and biology in the study of carbohydrates. I was a bit worried; after all, the last biology class I had taken was in high school, but she was willing to take a chance on me. I ended up with the “crazy” project of the lab, which involved co-opting carbohydrate metabolic pathways to remodel the cell surface utilizing ketones as a chemo-selective handle. I learned a lot of mammalian cell culture, flow cytometry and other biological

techniques to complement the chemistry, and the “crazy” project flourished. I was awarded an ACS pre-doctoral medicinal chemistry fellowship in support of my work.

In looking for a postdoctoral fellowship, I tried to focus on finding a laboratory in which I could hone my biological skills. This led me to New York City as a Jane Coffin Childs Fellow with Dr. James Rothman at the Sloan-Kettering Institute. The Rothman laboratory studies the biology of SNARE proteins, the basic vesicle fusion machinery in cells. My work in the Rothman lab focused on understanding the molecular mechanisms of calcium-dependent exocytosis in the brain. This work was done in collaboration with the laboratory of Dr. Thomas Söllner.

My research here at the University of Texas at Austin harkens back to my interests as a graduate student. My laboratory will focus on the creation of new tools for the study of glycobiology (i.e., the biology of carbohydrates) using both chemical and biological techniques. Sugars control a myriad of cellular processes including cell differentiation, cell-cell adhesion and virus-cell recognition. The recent discovery that a cell surface carbohydrate epitope is involved in the first step of human embryo implantation (i.e., the binding of the embryo to the uterine wall) illustrates the critical nature of carbohydrates in biology. Projects in my laboratory will range from creating inhibitors, to microarray technologies, to *in vivo* sensors, and utilizing these new tools to answer some very important biological questions. The long-term goal of this work is to understand the various roles of carbohydrates in biology and how glycosylation itself is controlled within the cell.

New Faculty: Y. Whitney Yin

Our understanding of mitochondria is changing. Discovery of mitochondrial dysfunction in several multi-system, degenerative disorders starting in 1962, completion of the genome sequence of human mitochondrial DNA (mtDNA) in 1980, and, most recently, realization that regulated changes to mitochondrial permeability, not nuclear function, are responsible for apoptosis have all created a renewed interest in the biology and clinical relevance of mitochondria.

We are interested in functional and structural studies of human mitochondrial transcription, specifically mitochondrial gene transcription initiation and mitochondrial tRNA and transcription termination.

Whitney is glad to be in Austin with her spouse, Dr. William Kennedy. Together they are outfitting her lab, located inside the ICMB facility. When she USED to have spare time, Whitney was active in the New Haven Civic Orchestra (violin), and enjoyed films, tennis, and classical music.



Y. Whitney Yin

New Faculty: David E. Graham

Despite what our eyes tell us, we live in a microbial world. By some estimates microbes contain half the bioorganic carbon on Earth and the majority of bioorganic nitrogen and phosphorus. My research focuses on the methanogenic microbes that are responsible for all of the biogenic methane formed in rice paddies, animal rumens, termite guts, landfills and wetlands—nearly 400 Tg/year. Such methane production is both beneficial (a potential fuel source and carbon recycling mechanism) and detrimental (reducing the calories available to livestock and contributing to global warming). In particular, we study a marine microbe, *Methanococcus jannaschii* that was isolated from a hydrothermal vent in the Pacific Ocean and grows anaerobically on H₂ and CO₂ at a balmy 83°C.

We want to know how these microbes biosynthesize a set of complex, specialized coenzymes that they use to activate oxidized C₁ compounds and carry them through successive reduction steps up to the final release of methane gas. Using classical enzymological techniques along with some new comparative techniques from bioinformatics to analyze the complete genome sequence of *M. jannaschii*, we have identified several novel enzymes involved the biosyntheses of coenzyme M (2-

mercaptoethanesulfonic acid) and coenzyme F₄₂₀ (a redox-active, fluorescent deazariboflavin compound). But we are still missing enzymes required to catalyze a number of reactions in the predicted biosynthetic pathways for the methanogenic coenzymes—projects that will occupy us for some time. We are especially curious how these biosynthetic pathways evolved and what the molecular phylogenies of the requisite genes tell us about the origins of methanogenesis on Earth.



David E. Graham

When he isn't in the lab, Dave likes to watch college basketball and is attempting to dig through the limestone in his backyard (in vain) to plant trees and other flora.

Departmental M.A. and Ph.D. Graduates

Ph.D., Fall 2002

Kyle W. Felling (Lagow)
David E. Kaelin, Jr. (Martin)
Jonathan T. Kern (Kerwin)
Eun-Soo Kwak (Vanden Bout)
Jacqueline L. Naffin (Kodadek/Hoffman)
Jeffrey M. Pietryga (Cowley)
Yeonsuk Roh (Bauld)
Steen B. Schougaard (McDevitt)
Jiandong Yin (Gilbert)

M.A., Fall 2002

Apolonio Aguilar (Magnus)
Bradley A. Flowers (Stanton)
Shirin S. Shinde (Magnus)
Adrienne E. Sochia (Krische)

Ph.D., Spring 2003

Jeffrey C. Allison (Magnus)
Gregory T. Blakney (Laude)
Christine E. Flynn (Belcher)

Daniel Hirschhorn (Kitto)
Christopher E. Neipp (Martin)
Mark J. Olsen (Iverson)
Marc D. Rodriguez (McDevitt)
Piyush Shukla (Cowley)
Suzanne L. Tobey (Anslyn)
Sheryl L. Wiskur (Anslyn)
Brian C. Trinqué (Willson)

M.A., Spring 2003

Kyriacos Agapiou (Krische)
Jenefer Alam (Liu)
Brian M. Wendelburg (Stevenson)
Jessica A. White (Lagowski)

Ph.D., Summer 2003

Nina M. Antikainen (Martin)
Adrian P. Goodey (McDevitt)
Jay R. Hesselberth (Ellington)
Brenda J. Postnikova (Willson)
Hyonseok Hwang (Rossky)

Tak Wee Kee (Barbara)
Romy Kirby (Ellington)
Jeeyeon Lee (Iverson)
Shawn C. McCleskey
(Anslyn/McDevitt)
William R. Murray (McDevitt)
John D. Piper (Kitto)
Andreas Reichelt (Martin)
Xiaoming Yan (White)

M.A., Summer 2003

Brian T. Arneson (Lagowski)
Justin D. Briggie (Lagowski)
John E. Currie (Shear)
Vidusha Devasthali (Liu)
Christopher L. Franklin (Martin)
Himali S. Hewage (Pagenkopf)
Hsiao-Ling Huang (Moini/Brodbelt)
Bradley G. Jellerichs (Krische)
Jody G. Kolakowski (Martin)
Fabian A. Rios (Bard)
Jin-Kyong A. Sok (Iverson)

Proteomics and Metabolomics: New Instrumentation Set to Lead Department into the Future of Mass Spectrometry

In the past year, two of our grant proposals were funded: one by the National Science Foundation (NSF) and the other by the National Institutes of Health (NIH). The NSF funding is for upgrading our 15-year old high-resolution mass spectrometer, and the NIH grant is for the acquisition of an ultra-high resolution and ultra-high mass accuracy Fourier transform ion cyclotron resonance mass spectrometer (FTICR MS) for the analysis of proteins (proteomics) and small molecules (metabolomics) of cells. Moreover, we are in the process of integrating our Mass Spectrometry Facility with the mass spectrometry capabilities of the Institute for Cellular and Molecular Biology (ICMB). The ICMB will provide additional funds for a high throughput, automated time-of-flight/time-of-flight (TOF/TOF) mass spectrometer for identification of proteins and their post-translational modifications. In addition to these mass spectrometers, the facility will be equipped with multi-dimensional separation techniques for automated, whole-cell lysate analysis using both the bottom-up and top-down approaches. Once in place and in addition to maintaining our present chemical analyzing capability, the combined Mass Spectrometry Facility of the Department of Chemistry and Biochemistry/ICMB will be a state-of-the-art facility for proteomics and metabolomics.

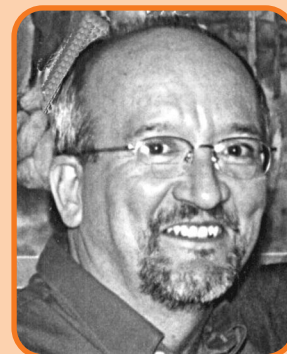
A proteome has been defined as the protein complement expressed by the genome of an organism. Genes are transcribed into mRNA that, in turn, is translated into the specified proteins, which perform the actual functions of those genes within the cell. Since only those changes that affect the amount of a protein and its activity (such as DNA mutation or the amount of mRNA expression) are important in the final analysis, identification and quantitation of proteins has become an important task. In addition, because the function of many proteins is controlled by post-translational modifications or by specific fragmentations (such as digestion by proteases) of the protein, identification of proteins and their post-translational modifications is also an essential part of proteomics.

In a technical sense, proteomics also encompasses techniques that allow rapid or more comprehensive analysis of proteins. Among these techniques, mass spectrometry (MS) with its capability to provide accurate and fast molecular weights has become an essential tool in proteomics and metabolomics. There are two general mass spectrometric approaches to proteomics: the bottom-up (or shotgun) and the top-down. The bottom-up approach involves four steps: 1) Chemical/enzymatic digestion of all the proteins of the whole cell lysate. 2) Separation of the resulting complex peptide mix-

Continued on page 15...

Faculty Timeline - Department of Chemistry and Biochemistry

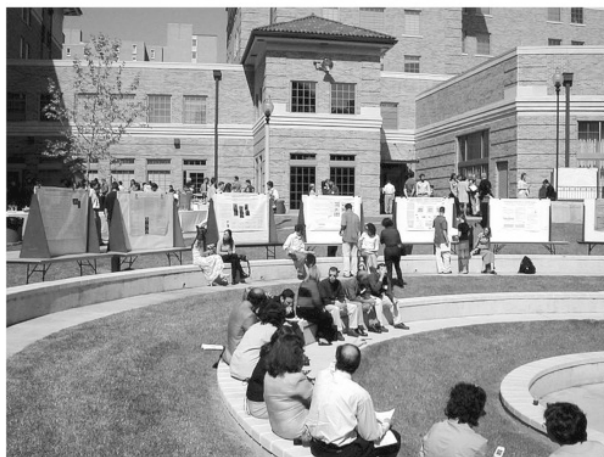
The “centerfold” of this issue of *Chemical Compositions* depicts a timeline of the faculty of the Department of Chemistry from 1883-2003, also once known as the Department of Chemistry and Chemical Engineering, and currently as the Department of Chemistry and Biochemistry. The list begins with Dr. John W. Mallet, who was one of the original eight faculty members and Chair of the Faculty when the University began holding classes in September of 1883. Listed in order of joining the department are 123 faculty. Included are four faculty (Schoch, Matsen, Morgan and Reed) with over fifty years of full-time service, and two Presidents of the University (Hackerman, Faulkner). Note that nearly half of the names in the list are still associated with the department today. This list was compiled as part of on-going projects to document the history of our department. I wish to express thanks to David Flaxbart, Steve Monti and Joyce Thoresen for assistance in compiling this list. We apologize for any omissions; please contact us at chemalum@mail.cm.utexas.edu with any additions, corrections or comments so we can update our files. Enjoy.



Marv Hackert

— Marv Hackert

Ninety-six Chemistry and Biochemistry Students Recognized 2003 College of Natural Science Honors Day Celebration



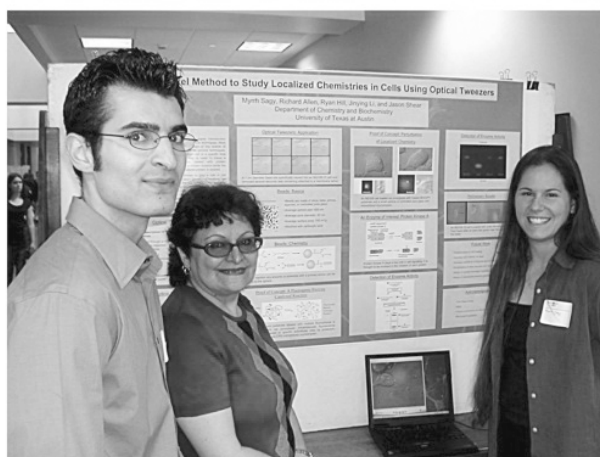
San Jacinto Residence Hall Conference Area



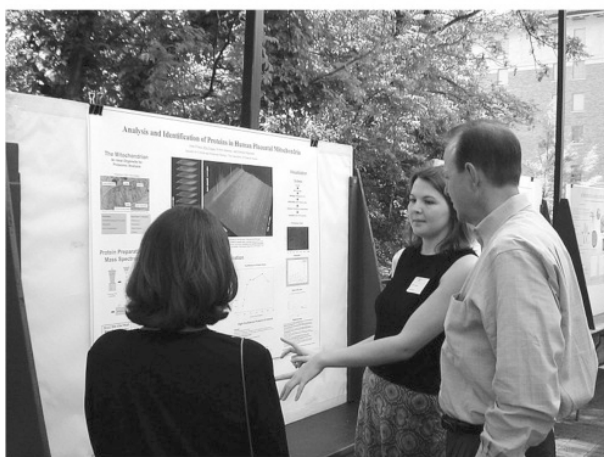
Michael Hoffman



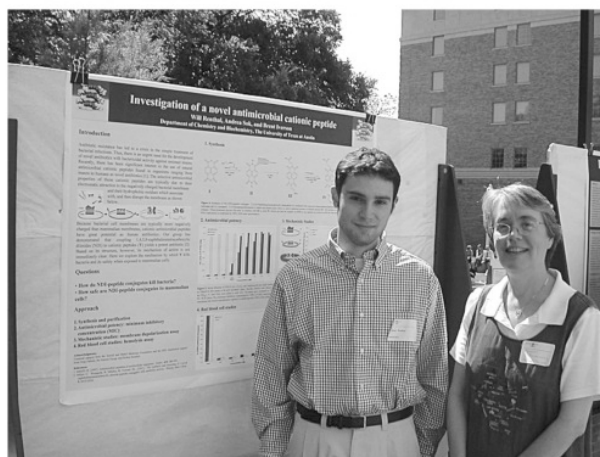
Lauren Harkinson, Dr. Karen Browning



Myrrh Sagy



Brie Fuqua



Will Renthall, Dr. Karen Browning

— by Marv Hackert

MALLET, JOHN W. 1883-1884
EVERHART, EDGAR 1884

HARPER, HENRY 1894
BAILEY, J.R. 1894
SCHOCH, EUGENE P. 1896

FELSING, WILLIAM 1918
LOCHTE, HARRY L. 1922
HENZE, HENRY R. 1927

WATT, GEORGE W. 1937
ANDERSON, ROBBIN C. 1939
WILLIAMS, ROGER J. 1939
HATCH, LEWIS 1939
SNELL, ESMOND 1939
MATSSEN, FREDERICK A. 1939
MORGAN, LEON O. 1939
BAILEY, J. R. 1939
HACKERMAN, SHIRLEY 1939

The University of Texas Chemistry and Biochemistry Faculty



1880

1885

1890

1895

1900

1905

1910

1915

1920

1925

1930

1935

1940

* This information is being reported to the best of



Organic Synthesis Laboratory Remodeled

Grant Willson and his research group celebrated the opening of their newly constructed chemistry laboratory this summer with an open house, featuring a Mariachi band. This new, state-of-the-art lab features facilities for organic synthesis and materials characterizations, including six 10-foot hoods, improved air flow handling, and a novel hood and bench layout for students, instruments, chemical storage and safety. The Willson group works on the synthesis of new monomers and polymers that could lead to and inspire new material and process designs in photoresists, lithographic imaging and biosensor materials. These advanced materials find use in various applications, most especially in the semiconductor industry. For more information on research in the Willson laboratory, see their website at <http://willson.cm.utexas.edu>.



- by Marv Hackert

...Continued from page 10

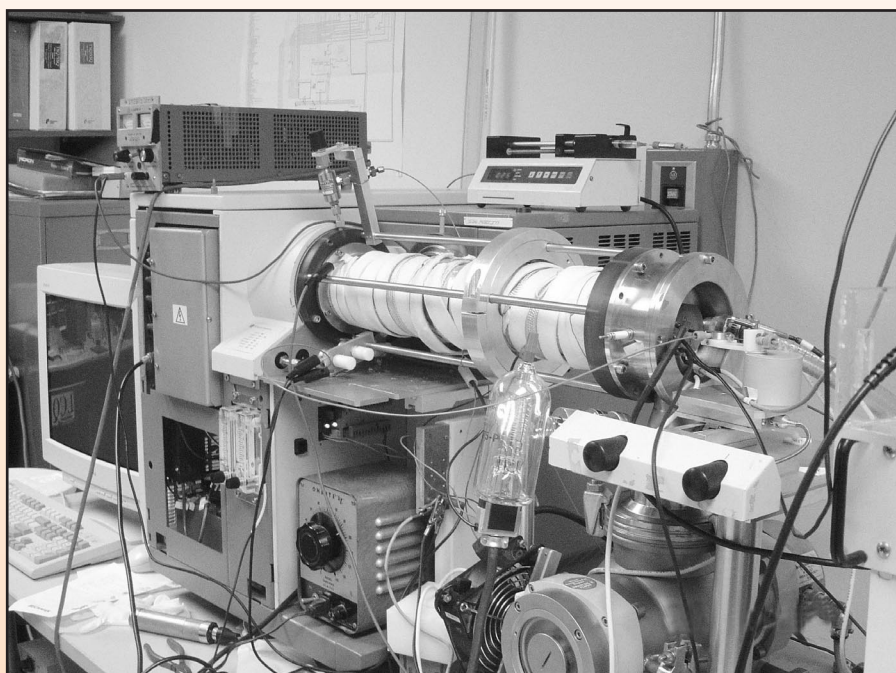
ture by multi-dimensional chromatography. 3) Analysis of the peptides by MS or MS/MS using electrospray ionization or matrix-assisted laser desorption ionization (MALDI) techniques. 4) Data interpretation including protein database searches. Because a large number of peptides are generated from the enzymatic digestion of whole cell lysate, multi-dimensional chromatography (such as ion-exchange followed by reversed phase chromatography) is needed to separate them. After separation, the peptides are analyzed on-line using electrospray ionization MS, or are deposited onto MALDI targets by a robot and analyzed off-line using MALDI-TOF MS. Because of the large number of spots, a high throughput MALDI MS with MS/MS capability, that can also provide accurate mass (~ 20 ppm), is needed to analyze these spots, underscoring the need for a TOF/TOF instrument.

Recently, a newer MS approach to proteome analysis has emerged, in which intact proteins in complex protein mixtures are analyzed by mass spectrometry and their m/z values measured. Known as the top-down approach, when used in conjunction with collision-induced dissociation (CID), electron-capture dissociation (ECD), or infrared multi-photon dissociation (IRMPD) of intact proteins, protein identification can be achieved without the need for enzymatic digestion. The top-down approach is best done using a trapping MS where one can perform IRMPD and ECD. FTICR MS, with its ion trap capability, high mass accuracy (~ 1 ppm), and high resolution ($>100,000$), is an ideal MS for top-down analysis. Because of its low mass capability, FTICR is also ideal for high mass accuracy metabolomics, as well as bottom-up proteomics (however at lower throughput compared to TOF/TOF).

In addition to running routine samples, the Mass Spectrometry Facility is also involved in research aimed to develop new instrumentation/techniques for the analysis of complex chemical/biological compounds. Once completely developed and in addition to the analysis of complex protein mixtures, the instrument will be able provide informa-

tion regarding the three-dimensional structure of proteins based on their gas phase mobility.

The acquisition of the aforementioned instrumentation, therefore, will enable us to tackle proteomics as well as metabolomics. The TOF/TOF is to be located in the ICMB, while the new high-resolution MS and FTICR, with their ancillary techniques, will be located in Welch Hall. A laboratory is being renovated in Welch to accommodate the new equipment, and appropriately trained staff will be hired to operate these instruments and interpret their data. We



Ion mobility time-of-flight Mass Spectrometer used to identify 3-D structures of proteins



Mehdi Moini

anticipate that at some time in the coming year, the facility will be fully functional and ready to serve the researchers of not only this university, but other institutions in the Southwest that lack access to state-of-the-art equipment for proteomics and metabolomics.

— Mehdi Moini

Nutrition Clinic Laboratory Closes After 22 Years

Did you know that more vitamins and their variants have been discovered or characterized at UT-Austin than anyplace else in the world? This was due to the efforts of Roger J. Williams (Professor and Professor Emeritus from 1940 to 1986) and his colleagues in the Biochemical Institute,* which he founded in 1940.

Professor Williams had long emphasized the importance of nutrition in preventing and fighting disease and of tailoring nutrition to meet individual differences in needs—part of his concept of “Biochemical Individuality.”

Professor William Shive (Professor and Professor Emeritus from 1944 to 2001), a long time colleague of Dr. Williams, started the Biochemical Institute’s Nutrition Clinic Laboratory about 1980 with the goal of developing new methods to evaluate the unique nutritional biochemistry of individuals. Over the past twenty-two years before closing its laboratory in October 2003, the Clinic has worked with nearly 3,500 patient volunteers.

Both Williams and Shive believed that tests that could evaluate nutritional individuality would advance nutritional science and its integration into medical practice. Common blood and urine tests measure amounts of nutrients present, but do not determine whether those amounts meet an individual’s biochemical needs. A person’s nutritional needs may vary greatly depending on their genetics, disease susceptibilities, and environment—including exposure to pharmaceuticals that interact with nutrients.

Williams, Shive and others at the Institute, supported by the Clayton Foundation, had pioneered the use of living microorganisms for nutritional and biochemical research. So it was natural that Shive sought to similarly test live human cells for their ability to grow in culture media with controlled

amounts of nutrients. Skin cells were considered, but potential subjects are more willing to give blood samples, so lymphocytes were selected for study. Shive first had to develop a chemically defined, protein-free, medium that would support the growth and proliferation of human lymphocytes. The medium finally selected contains only purified substances, including glucose, amino acids, vitamins and minerals—35 cell nutrients in all.

As single nutrients are omitted from the medium, the growth response of the cultured lymphocytes from different individuals differs greatly. Poor growth implies either low cellular reserves or high biochemical needs, and suggests that the cell donor would benefit from greater dietary or supplemental intake of that nutrient. Shive also developed more complex media variations to test the func-

tioning of specific biochemical pathways, such as the adequacy of folic acid for conversion of serine to glycine, or homocysteine to methionine. Still other variations measure the ability of cells to resist various biochemical stresses, including pharmaceuticals.

The Clinic made its first nutritional recommendations to volunteers in 1981. Many subjects reported impressive and diverse health benefits and returned faithfully for annual repeat testing, in some cases for 15 or 20 years. New volunteers were seldom in short supply, being referred to the Clinic by word-of-mouth or by interested physicians.

Research publications from the Clinic deal with development of the lymphocyte culture medium and new knowledge about the biochemical roles of sulfite and asparagine in human lymphocytes. A recent report deals with prevention of toxicity from statin drugs by means of coenzyme-Q₁₀ and an unidentified plasma protein. The Clinic also collaborated with the



Dr. Flora Pettit, Dr. Don Davis, and Elaine Hrissikopoulos

School of Nursing on a study of breast cancer patients, with the Texas Neural Tube Defect Project of the Texas Department of Health, and with the A-T Project, a study of the rare genetic disease, ataxia-telangiectasia. Although the Clinic has closed its laboratory, analysis of the data continues.

Since 1984, Dr. Flora H. Pettit has directed the Nutrition Clinic laboratory. Dr. Donald R. Davis joined the group part-time in 1986, helping with data analysis and controlled trials in groups and single subjects. Elaine Hrisikopoulos has been the public voice of the Clinic since 1992, taking calls from new volunteers, scheduling about 15 laboratory tests per week, and tabulating research questionnaires from subjects.

The Clayton Foundation for Research, to whom Shive donated his patent on the lymphocyte culture medium, supported the Nutrition Clinic for many years. More recently, it has been supported by the Shive Foundation, donations from grateful subjects, and Austin philanthropists, Ronya and George

Kozmetsky. Professor Emeritus Shive died in 2001 and Dr. Pettit plans to retire in January 2004. The Clinic's technology has been substantially transferred to SpectraCell Laboratories, Inc., which has performed lymphocyte culture testing for physicians and patients since 1992 at its laboratory in Houston.

The human genome project and the search for genetic factors in disease susceptibility add new interest in the Nutrition Clinic's goals of testing for individual differences in nutritional biochemistry. The Clinic's work, and that of those who follow, will hopefully bring closer the time when sophisticated nutritional testing and awareness will become common practice in medical treatment and preventive medicine.

— Donald R. Davis

* You can learn more about Roger Williams, William Shive and the Biochemical Institute on our departmental web site at: <http://www.cm.utexas.edu/bioinst/>



View of the newly redesigned south plaza of Welch Hall looking toward Inner Campus Drive. The new plaza, recently resurfaced to stop rainwater leaks into classrooms below, has become a popular venue for relaxation, study, dining and even outdoor class sessions on sunny fall days.

Alumni Retorts

1962

Zeb Rike, Ph.D. (Henze) ~ retired from DuPont last year after 40+ years as a chemist in research and quality control. He is teaching middle school science and math at St. Mary's School in Orange, after participation in the Accelerated Certification of Educators program at Lamar University.

1963

Dwaine Eubanks, B.A. (Chemistry), Ph.D. (Lagowski) ~ received the Distinguished Service Award from the American Chemical Society Division of Chemical Education. He was honored for his "creativity, foresight, ability, accomplishment, leadership and service to the Division of Chemical Education."

Edgar Meyer, Ph.D. (Simonsen) ~ reports he retired from the Biochemistry and Biophysics Department of Texas A&M after 35 years. In retirement, he "is combining science and art, inspired by the beauties of molecular architecture and the New Mexico mountains." Meyer is creating scaled models and sculptures of molecules (see <http://www.tamu.edu/biograph/>), including a model of the termite cellulase (presented to A&M Consolidated High School) and another model of COX-1 (the aspirin binding site of prostaglandin synthetase), which was commissioned by the Boston Museum of Science for an exhibit during summer, 2003.

1970

Jerry A. Broussard, Ph.D. (Pettit) ~ retired from Celanese Corporation after 30 years in various research functions in Corpus Christi, TX and Summit, NJ. Jerry, wife Ann (Grusin) Broussard (B.S., 1969; M.A., 1979, Microbiology), and sons Andrew and Matthew have relocated to Marietta, GA.

1979

J. W. (Bill) Rogers Jr., B.S. (Chemistry) 1974, Ph.D. (White) ~ is the new director of the William R. Wiley Environmental Molecular Sciences Laboratory, A Department of Energy scientific user facility at PNNL.

Nollie F. Swynnerton, Ph.D. (Morgan/Stotter) ~ manages the JACADS (Johnston Atoll Chemical Agent Disposal System) Laboratory on Johnston Island, 825 miles southwest of Honolulu. The plant completed destruction of obsolete chemical munitions stored on the island since 1970 and is now in the closure phase. Employed by Southwest Research Institute in San Antonio, he has spent 7 1/2 years there but will return to the mainland in the fall when the island is returned to the sea birds. He and his wife Julie will live in Fair Oaks Ranch, Texas, northwest of San Antonio.

1986

Ted J. Pettijohn, Ph.D. (Lagowski) ~ was named vice president of the fine and industrial chemicals division's catalysts and initiators business in the NAFTA region at Degussa Corporation. He holds more than 45 patents in chemistry and catalysis.

1989

Edwin Garcia, M.A. (Chemistry) 1985, Ph.D. (White), M.B.A. (UT Austin) 2003 ~ has been named the President and CEO of the National Society of Hispanic MBAs (<http://www.nshmba.org>).

...Continued from page 18

1994

Laura Pressley, Ph.D. (White) ~ was promoted to Senior Member Technical Staff in the Yield Management Engineering Department at Advanced Micro Devices Fab25 in Austin Texas. Pressley is the first Fab25 female engineer to be promoted to this technical level. She has been awarded three U.S. patents and has one pending all related to semiconductor processing.

1995

Matthew Karpinski, M.A. (Gilbert) ~ was awarded the Juris Doctor degree in May 2003 by University of California Hastings College of the Law.

1998

Sanjay Vashee, Ph.D. (Kodadek) ~ started employment in March 2003, with Institute of Biological Energy Alternatives after completing his postdoctoral fellowship at Johns Hopkins School of Medicine.

2000

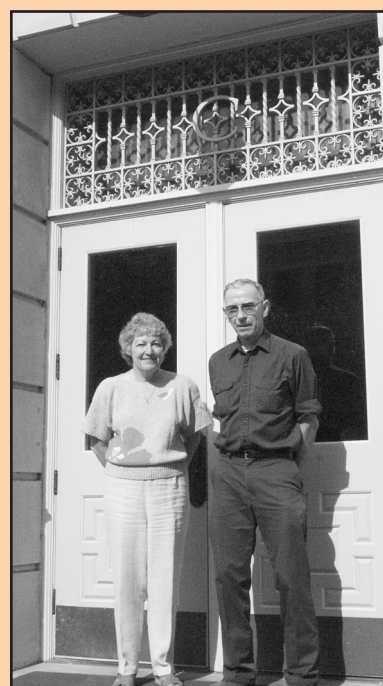
Terry S. Cohen, Ph.D. (Webber) ~ reports that when she is not busy working at DuPont Performance Coatings, she is working as a crew member on the tall ship, Kalmar Nyckel, Delaware's sea-going "Ambassador of Good Will" (<http://kalnyc.org/>).

Departmental Staff Changes

Joyce Thoresen and Kenneth George Retire

The long-time editorial coordinator of *Chemical Compositions*, **Joyce Thoresen**, retired on August 31, 2003. Thankfully, Joyce had begun working on this issue before she departed and without her expertise, this exercise would have proven much more difficult. Joyce is spending more time with her family these days and is enjoying her freedom!

Kenneth George also retired on August 31, 2003. Kenneth worked for the department for many years as a machinist in our machine shop. Kenneth also plans to stick close to home, devoting more time to the things that matter most to him.



Joyce Thoresen and Kenneth George

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IN MEMORIAM

James Walter Dvorak, B.A. (Chemistry) 1947, alumnus of Rice Institute ~ died September 1, 2003. He was 83. He worked as chemical engineer in the Houston area for many years and was a member of the American Association for the Advancement of Science and the American Chemical Society. Dvorak is survived by a sister, Barbara J. Dabold, nephews Michael Dabold, Allen Dabold, Steve Dvorak, and Mark Dvorak, as well as several great nieces.

Bruce Eric Wilcomb, B.A. Chemistry (Maine), M.S. Chemistry (Wisconsin), Ph.D. (Bernstein) 1976 ~ died February 14, 2003, at the age of 56. He was employed as a physical chemist by Environmental Health and Senior Services for the state of New Jersey for over 25 years. He is survived by his wife.

Quentin Quick, M.A. (Ayres) 1950 ~ died June 15, 2001.

Ruth Elizabeth Barrett, B.A. (Liberal Arts) 1932, M.A. (Chemistry) 1934 ~ died February 22, 2003. She was 91. She is survived by her children David Barrett and Emily White.

Elinor R. Houston (nee Rogers), B.A. (Chemistry) 1920, M.A. (Botany) 1923 ~ died September 12, 2002, two weeks short of her 103rd birthday. She actively volunteered for over 24 years and served on the board of directors of the American Red Cross of Cleveland County, Oklahoma. She is survived by six grandchildren and four great grandchildren.

Rosemary Morris Medley, ~ died April 3, 2003; survived by her husband, Harold David Medley Ph.D. (Henze) 1952, of Dallas; four children and six grandchildren.

Lisa Anne Benkowski (nee Weill), B.S. (Chemistry) Norbert College 1989, Ph.D (Ravel/Hardesty) UT Austin 1993 ~ died November 7, 2003, at the age of 36 after a courageous struggle with colon cancer. At the time of her death, Benkowski was a member of the faculty at University of North Carolina at Chapel Hill. She is survived by her husband, Michael David Benkowski; daughters, Hanna and Katherine; parents Stephen and Susan Mueller, Timothy and Faye Weill; father-in-law and mother-in-law, David and Judy Benkowski; sisters, Bridget, Tina and Katherine and their families; as well as grandparents, nieces and nephews.

James John Ferrero, B.S. (Chemistry) UT Austin 1949; M.D. UT Medical Branch, Galveston ~ died April 12, 2003, at the age of 75. Survived by his wife of 54 years, Betty Gideon Ferrero; son David and wife Lisa; daughter Lane and husband Keith; daughter Ellen and husband Richard; and daughter Martha and husband Fred; as well as twelve grandchildren and three brothers. He served in the U.S. Navy. He was on the retired staff of the Spring Branch Medical Center. Since 1993 he had been teaching at Harris County Psychiatric Center, part of the University of Texas Health Science Center at Houston. Ferrero was ordained as an Elder at First Presbyterian Church in San Antonio in 1962, and continued to be active as an Elder through the years.

IN MEMORIAM. cont.

David Israel Hernandez, B.S. (Biochemistry), 1999 ~ died June 20, 2003, at the age of 25. He was a National Merit and a Marshall Scholar, and was awarded an M.D/Ph.D. Fellowship in Neurosurgery/Neuroscience by the University of Texas-Houston Health Science Center. At the time of his death he was engaged in work related to the human genome project. He is survived by his parents, Israel Hernandez and Dietlind Smith Hernandez; brother Michael; paternal grandparents, Ramon and Catalina Hernandez; beloved companion Priscilla Brazell and her mother Jeannie.

Moise Dreyfus Levy Jr., B.A. (Chemistry), 1939; M.D. UT Medical Branch, Galveston, 1942 ~ died June 15, 2003, at the age of 84. He is survived by two sons, Dr. Moise L. Levy and wife Joanie of Houston, and Richard J. Levy and wife Anne of Dallas; three sisters, four grandchildren, twelve nieces and nephews.

Joe Gillis Hendrickson, B.S. University of Washington; Ph.D. (Hatch), 1955 ~ died September 22, 2002, at the age of 74. He worked for Boeing Company and lived in Washington for 34 years. He was active in First Presbyterian Church of Bellevue and the Boy Scouts. He is survived by Elaine Ruth (Wright) Hendrickson, his wife of 51 years; sons Hugh and Lewis; daughter Ruth Bacha; brother Sidney Hendrickson; sister Eula Buddemeyer; and seven grandchildren.

Fannie Laura Powell Tod, B.A. (Chemistry), 1939 ~ died June 17, 2003, at the age of 87. She was predeceased by her husband, Joe Lee Tod, who worked for Dow Chemical Company in Freeport. She was an active member of United Methodist Women, an avid bird watcher, and enjoyed golf and travel with family and friends. She is survived by four children, Martha Jo, Robert Powell, Mary Lee Tod, and Sarah Lynn Tod Skiles; four grandsons, three great-grandsons, and one great-granddaughter.

Ruth Ellen Barker Gray, B.A. (Chemistry) ~ died October 30, 2003, at the age of 83.

Thomas Alexander McSpadden, B.A. (Chemistry), 1940~ died September 8, 2003 at the age of 85.

Mary Terril Snell, B.A. (Chemistry), 1941 ~ died December 3, 2003, at the age of 84. She is survived by her children. Ms. Snell has the distinction of being the first female Chemistry Baccalaureate at the University.

As always, we welcome updates on your personal and professional news. Reminiscences of student experiences are appreciated also.

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