the university of texas at austin
CHEMICAL Compositions
chemistry & biochemistry departmental newsletter
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WEST WING OF WELCH HALL GETS A TRANSFORMATION

Welch West Wing new HVAC system viewed from the Tower

Steve Martin reviews the lab specifications with contractor, Tommy Crenwelge

The Chemistry Building was named for Houston millionaire Robert Alonzo Welch (1872-1952) in 1974, but did you know that Welch Hall is really three buildings in one? The original chemistry building, built in 1892 at a cost of about $25K, was destroyed by an electrical fire in October 1926. The “29 building,” located along 24th Street at the corner of Speedway, was erected from 1929-31 at a cost of $900K. The “West Wing,” constructed from 1959-61, added about 42,000 square feet to the department. The “new building” or “78 addition” south along Speedway cost over $20M and added about 247,000 square feet to the building, making Welch Hall one of the largest buildings on campus.

The ‘29 building was renovated in 1980-81. Funding had been approved to renovate the West Wing and plans were well under way in October 1996, when a fire occurred on the fifth floor of the West Wing in one of the organic labs. The University worked with the Austin Fire Department to re-evaluate its building design, leading to the Welch Hall Safety Improvements Project that implemented a number of safety features for the whole of Welch Hall.

The result is that the remodeled West Wing has a number of modern lab, safety and energy conservation features. The fourth and fifth floors are dedicated to synthetic chemistry, having a total of nearly 60, six-to-eight foot fume hoods plus one bio-safety hood. All the labs have individual emergency

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IN THIS ISSUE

Marvin Hackert

FROM THE CHAIRMAN

Season Greetings to all our friends and alumni of the Department of Chemistry and Biochemistry at UT - Austin.

It's Done!! Or should be by the time you read this newsletter. After three years of jackhammers, construction fences, etc., I am pleased to report that both the Welch Hall Safety Enhancement Projects and the West Wing Renovation Projects are completed. Actually, the sprinkler system, new chemical storeroom, and other safety related projects were completed a year ago. This fall the Welch West Wing renovation project and the exhaust manifold project for 1929 addition were completed (see p. 1). We plan to move back into the West Wing by the end of the year and start the process of recovering the space temporarily occupied during the construction.

On the recruiting front, we had another very successful year, hiring four new assistant professors (pp. 8-9). Dr. Michael Krische (Ph.D. Stanford) and Brian Pagenkopf (Ph.D. Montana State) are synthetic organic chemists. Drs. Jacek Nowakowski (Ph.D. Berkeley) and John Tesmer (Ph.D. Purdue) are structural biochemists who joined our department as joint hires with the Institute for Cellular and Molecular Biology. Plans are to recruit three new faculty for the coming year.

Once again I am pleased to report improvements in our infrastructure that support our faculty and students. Last year we were awarded a shared instrumentation grant from NSF with matching funds provided by the College to acquire a new CCD (Charge-Coupled-Device) based X-ray diffractometer for the department (p. 7). We have also created a multimedia/graphics lab for the department that is housed in the former chairman's suite in the West Wing (p. 7). Finally, our faculty have been very successful in being awarded instrumentation grants related to the analysis and fabrication of materials, with large grants coming from the Keck Foundation, the Welch Foundation, and the establishment of a Beckman Technology Center in the department.

This is my fifth (and final) year as chair of our department. I agreed to stay on an extra year to see the various building projects to completion and to help with the transition. Now we are able to focus more on program construction rather than building construction. Paul Barbara is chairing our strategic planning committee to update our last strategic plan done in 1994. His committee has been meeting weekly since the beginning of this fall. We will also be bringing in an external review committee next spring. Both of these processes are important as we plot our path into the next millennium.

Once again, I want thank all of you who have contributed to our department with your resources of time and money. Dean Rankin formed a Promethean Society to recognize UT faculty and staff who have given generously to the support of the College of Natural Sciences and its departments. We have much to be grateful for and it was truly gratifying to see so many of our faculty on the list of members. We are again thankful to the Welch Foundation for awarding $300,000 to the General Libraries to support statewide access to chemical information resources. The General Libraries will use this funding to expand and enhance its collection of chemistry reference materials and provide statewide access to this information. This fall's newsletter includes a complete list of friends who have donated to the department during the past academic year. It is a pleasure to recognize and acknowledge the vital role that such individuals and organizations play in helping us maintain and improve our quality programs at UT-Austin. Whether it be in the form of scholarship assistance, adding to our endowed lecturer or faculty positions, gifts to the library fund, or our patio project, I hope that you will consider us when you plan your charitable contributions. The financial support of our alumni and friends is a critical factor in helping us to meet our mission of excellence in both teaching and research. We are honored by your generosity.

We wish you all a very merry Holiday Season!! We do appreciate hearing from you and want Chemical Compositions to be your resource for keeping up with what is happening in your department.

— Marv Hackert

NEWS FROM THE MALLET LIBRARY

Chemists know that reactions come in all kinds: some are slow and steady, and some can be explosive. The same is true in the chemical information arena. Online journals have been gaining momentum steadily for several years, but 1999 has seen a quantum leap in the number of "e-journals" available to UT students and researchers. A year ago, only a handful of chemistry-related journals were available online at UT. Today, nearly 200 are available. The UT System has recently signed agreements with the American Chemical Society and Elsevier ScienceDirect to bring hundreds of titles to the computer desktops of users on all the UT campuses. Other publishers with deals in place or pending include the Royal Society of Chemistry, Wiley Interscience, Springer Verlag, the American Institute of Physics, IEEE, and numerous others across all disciplines.

For the time being, most online journals merely duplicate their printed counterparts, generating printouts that look exactly the same as the paper version on the library shelf. But eventually publishers will add more digital-only features to their web journals, such as molecular graphics, animations, numerical data files, hyperlinked references, and space for margin notes and feedback, that will make the journals come "alive" and render the print formats a pale shadow. Someday, authors will submit articles electronically to a database, rather than to a journal editor, and the journal itself, so long the bastion of the chemical literature, will "unbundle" itself into a series of huge article repositories that the researcher can search, read, and contribute to. Peer review will continue as always, but it too will become faster and more dynamic.

Over time, as backfiles grow, this will bring major changes to the way chemists —particularly graduate students —use the "library". Depending on one's point of view, this can be both positive and negative.

Chemists still love the feel and comfort of the paper journal. It's browsable, portable, durable, and familiar. The great challenge of the scientific information revolution will be to incorporate the best features of the print into its digital successors. In many cases, the end result is still a paper printout, but using the journals online saves a great deal of time otherwise spent fighting photocopy machines or hunting down an issue that's not where it's supposed to be. In addition, the online journal doesn't close at 11pm on weeknights, either: it's available 24 hours a day, anywhere the user happens to be, whether in the lab in Welch Hall or at a conference in Sydney.

Such convenience comes at a price, however. Some faculty have noted that they don't come to the library nearly as often anymore, and since not everything is online (and never will be), researchers risk missing important pieces of information they might otherwise find if they were browsing in the library. Few online journals will ever extend back before the mid-1990s, so users still have to come to the library to find older information. Online journals are also very expensive, and they add to the already enormous budget burden afflicting all libraries. (The popular idea that electronic information is cheaper than paper is definitely a myth!)

David Flaxbart, Mallet Librarian

The Library is evolving, but it's not going away. Whether physical or virtual, it will remain an essential place in chemical research. The Library's challenge is to stay on the cutting edge by leveraging limited resources to provide the maximum amount of information to users as quickly and conveniently as possible.

To stay abreast of the rapidly changing information landscape, visit the Mallet News web page at http://www.lib.utexas.edu/Libs/Chem/ and see for yourself. We welcome your questions and input.

—David Flaxbart

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Reminiscences

Charles M. Maddin, FAIC

Charles M. Maddin, FAIC

B.A. Anthropology 1950

Ph.D. Chemistry (Ayres) 1953

After graduation, I joined the Dowell Division of the Dow Chemical Company where I served as a laboratory supervisor for 28 years, then became associated with environmental issues for the remainder of my career as an analytical chemist. I continued to serve as a consultant for the Dow Chemical Company and Schlumberger on environmental matters relating to Dow's former Dowell Division.

In the UT Chemistry Department, my best friend was and still is Gene Berg (Ayres, 1952; LSU, 1952-82). I also feel indebted to one of Leon Morgan's students, Norman Justus, who explained Morgan's statement, "it is obvious that . . ." by producing two blackboards of math. I have never forgottten Norman who died shortly after graduation. I remember Stan Simonsen for his course in polarography with endless lab exercises and his personal encouragement. Al Meyer (deceased) helped fill in the blanks on concepts not yet mastered in that course.

I remember UT as a great experience, with Felsing, Watt, Matsen, Lochte, Hackerman and Hatch. I best remember Hackerman for signing my final oral papers so that he (Hackerman) could attend a baseball game; so baseball helped get me through any embarrassing questions Hackerman might have asked.

I have always been very proud to be a UT graduate and to have had Gib Ayres as my mentor and lifelong friend.

"Thank you, Dr. Ayres"

Gib Ayres was my teacher, mentor and friend in that order, but the most important to us both was our friendship that lasted 48 years.

In the fall of '48, Gib had agreed to let Dr. S. H. Lee teach the primary analytical course for chemistry majors, Chem 812, while Gib would teach the 1-semester course for non-majors. Lee did not teach with the authority that Gib displayed, and that led many of the students to drop the course. Gib said, "I knew something had to be done"; so, he took over the reins of CH812 in the Spring semester. That was my first contact with him, and he was indeed a master teacher and a gentleman. The precision with which he finished each lecture often brought a "Thank you, Dr. Ayres" expression from the students. He made a pitch for analytical majors at the end of the course that fit in with what I wanted to become.

Fortunately for me, it all worked out well in the "what is it and how much game" with the Dowell Division of Dow Chemical and their successor, Schlumberger, 33 years as an employee and 13 as a consultant in environmental matters.

Gib took on the first black student to obtain a Ph.D. degree from UT, Ray Floyd Wilson, with whom I shared a research lab. When graduation day came in 1953, five of the twenty graduating in chemistry were Ayres' students. Ray and I are the only two living now. The mentality of the administrators at that time was that having a black student march in the graduation exercises would be a problem in that nobody would want to walk down the aisle with him. Gib said "Hell's bells" (his only cuss words), "I'll walk with him." In the end, there was no problem, and there was nice applause when Ray was hooded. One of my aunts remarked that he must have been a popular student, but it was really just a congratulatory applause for being the first to achieve the extraordinary.

Gib took his graduate students to LSU between semesters for their analytical symposia. There we heard Peter Debye, Frank Welcher, Fritz Feigl, Herb Walsh, A.J.P. Morgan, Charles Reilley, and many of the who's who in the world of chemistry. After Ray Wilson came on board as a graduate student, Gib was told that they could not house him in a dormitory with the rest of us at LSU. Gib just quietly canceled the symposium trip that year to avoid embarrassing Ray. A gentleman indeed!

Fortunately for me, I got to travel to Dow locations and to Austin on business a number of times. When

we had a hearing on wastewater discharge permits, I went as a technical representative. About 1972, before Gib retired, the technical man for the State challenged some of the analytical data that I had rounded off to retain the accuracy of the least accurately known figure. As I explained that, he said, "you sound like one of Dr. Ayres' students." Of course, that was a thrill for me, and I could hardly wait for a recess so that I could call Gib and tell him I was accused of being one of his students. Before he died, he could not recall that incident, but I shall never forget it.

Gib's first encounter with President T. S. Painter left him feeling that he made a big mistake telling Painter that he was primarily a teacher and a research man second. I was in no position to know what transpired, but Gib had an offer to go to Penn State and told us that PSU would accept all his graduate students in the package. While we pondered the possibility of going to State College to become Nittany Lions, things worked out for him to stay at Texas. I'd rather be a Longhorn anyway.

George Watt had counseled Gib to get his research program going and let the teaching slide when Gib joined the faculty. He resented that to his dying day. One contrast of the two personalities I remember from Watt's inorganic course was a note from the custodian to ask the students not to leave pop bottles (aluminum cans were not invented yet) in the lecture room. "Now I've told you; so, do as you damn well please," he said.

Watt was active in ACS and in consulting with DuPont so he planned his hour exams to coincide with his out-of-town schedule. In the fall of either '50 or '51, Watt had scheduled an hour exam for a Monday after the UT/SMU game on Saturday when Doak Walker and the Ponies were due to take the Horns. Texas won and UT declared Monday a holiday. I was scared of Watt and wasn't about to skip the exam. A number of students did take the holiday and Watt was fuming at the next lecture session. "Holidays declared by the University do not apply to the Graduate School and certainly not to the Department of Chemistry," he told us and further stated that "Whenever I schedule an hour exam, nothing short of God can change it!" He gave a make-up exam, and I was glad I did not have to take it.

My visits with Gib were memorable. In 1981, I helped conspire to get him named as the outstanding alumnus of Taylor University in Upland, IN, where his father had been Dean for many years. As a surprise to Gib, I attended and had a delightful time. In making his address, he didn't mind poking fun at himself and mentioned that student evaluations of the teacher and courses were done at UT, and he read one that stated, "The only excuse for this course is to give something to do for an old professor with tenure." All was quiet but broke out in laughter as Gib said "and he spelled it T-E-N-I-O-R!"

Gib Ayres

I attended the 100th UT anniversary in '83 and Gib took me to dinner at the San Francisco Steakhouse where he obliged the waitress by giving the swing a good ride.

Ultimately, a stroke took him to a rest home in Bedford, TX, near DFW. Fortunately, my travels took me through DFW about twice a month or more, and I worked in a visit with Gib whenever possible. The day he was transferred to a hospital for amputating one of his legs, I met his daughter and son-in-law there before I went into his room. Our emotions were so high we had tears streaming down our faces as we held each other's hands. We couldn't say a word but we communicated. He managed that disability well with his wheelchair, and we had many more occasions to visit.

I knew things were getting bad when he decided to give his typewriter away. I thought it was the old manual job with pica type when I agreed to take it, but it was a Smith-Corona electric. I had it put in first class condition and it is my mainstay for typing hazardous waste manifests to provide five legible copies. After I took it, he mentioned that he thought he could still type "The lazy fox jumped over . . .." He never gave up.

My last visit near the end of May 1997 preceded his death by a little over a week. He was a friend indeed. That relationship superseded all the chemistry we love so well. Analytical Chemistry has served UT well with the likes of Al Bard and now Larry Faulkner at the helm. I used to accuse Gib of being like Merlin the Magician who lived backward and already knew the future. We never knew how really great it was going to be when he began to direct our paths.

Continued from page 1.

gas shutoffs, and the fume hoods have "built-in" acid storage and slide out vacuum pump platforms. These are variable air volume fume hoods so that the airflow remains sufficient even when the sashes are opened for workers to set up their experiments. Lab air pressure is sensed as well and automatically adjusted. A heating, ventilation and air conditioning system was installed with a heat wheel that allows the exhausted air to precondition the temperature of the incoming air, resulting in substantial energy savings. The new, two-story penthouse was designed with space to accommodate a future heat wheel HVAC system to replace the present system in the 1929 wing as well. Some of the six-foot fume hoods and all door hardware are ADA compliant.

Less extensive remodeling was done on the 2nd and 3rd floors of the West Wing, but the 3rd floor features one new lab, an additional classroom, conference room and the department's new multimedia center located in the space that formerly was the chairman's office suite. Of course, the whole area has the safety features of a sprinkler system, fire separation and modern fire alarm system.

With the completion of the West Wing renovation project, we come to an end of three years of intensive construction activity in Welch Hall. Our faculty, students and staff can now look forward to using these facilities, and we invite you to visit the department and see all the changes that have been made over the past few years.

P.S. - You can see pictures of the early chemistry buildings and learn more about the early history of our department at **http://www.lib.utexas.edu/Libs/Chem/history/history.html**

HOFFMAN PROMOTED TO ASSOCIATE PROFESSOR

As far back as I can remember, I have always wanted to understand how nature works, and I love solving complex puzzles. This probably explains my attraction to structural biology. During my first six years at UT, I have been using nuclear magnetic resonance (NMR) to investigate the structures of molecules that perform important biological functions.

David Hoffman

This is a particularly exciting time to be working in structural biology, since recently developed molecular biology techniques have provided us with tools to approach the most interesting problems. Our group has been studying RNA structures that regulate protein synthesis in retroviruses, and components of the translational apparatus that play key roles in protein synthesis. I am most proud of our determination of the three-dimensional structures of a family of RNA pseudoknots, a ribosomal protein, and most recently, a translation initiation factor. In each case, our structural information has provided insights into how these molecules perform their functions in living systems.

GLOBAL SCIENCE PROGRAM

Francisco Martinez (Chile), Maria Guardia (Spain), Tobias Persson (Sweden), Ulrike Voigt (Germany), Alberto Martinez (Chile)

The College of Natural Sciences sends about 40 undergraduate students each year to foreign universities, mostly in Europe, to pursue their science studies for a year or , in some cases, one semester. An approximately equal number come to us. The Department of Chemistry and Biochemistry is the most popular department for incoming students - this year we have 11 exchange students from Austria, France, Germany, Scotland, Spain, Sweden, and Switzerland enrolled in our classes. These are generally very bright, enthusiastic young people and add noticeably to the atmosphere of our classes. They also help educate our students in the realities of modern science and industry which are becoming increasingly global in character.

In return, Texas science students are currently studying in major universities in 12 different countries. The number going from Chemistry and Biochemistry is smaller than from other science departments, but an effort is being made to increase our share. A high-quality education in science coupled with the experience of a year studying science while immersed in a foreign culture and a foreign language produces a graduate that is well suited to the demands of the trans-national chemical industry. The challenging experience also leads to the development of independence and self-confidence in the participating students.

Eric Hepburn, Larry Poulsen, Joanne Williams

NEW WELCH COMPUTER FACILITY

Welch Computer Services held an open house on December 10th, 1999 in the Chemistry and Biochemistry Faculty and Graduate Student Computer Lab in Welch Hall RM 3.428. All faculty members and graduate students were invited to stop by to tour the new facility, have a digital photograph made for the Chemistry and Biochemistry Department archives, and to enjoy refreshments. Dr. Larry Poulsen, Computing Services Manager; Eric Hepburn, Computer Systems and Data Communications Specialist; Joanne Williams, Multimedia Instruction Specialist; Mahmood Dhalla, Web Master, and several lab proctors are ready to help Chemistry faculty and graduate students with their computing and equipment needs.

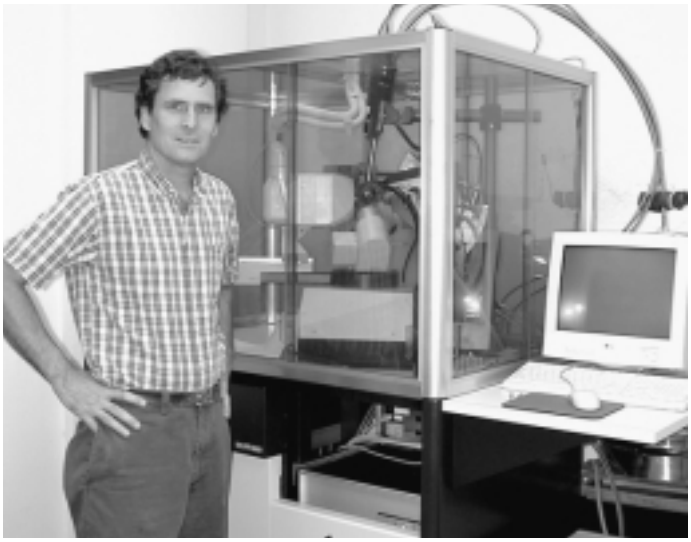
The facility houses 5 Apple Macintosh G3 workstations, two Silicon Graphics 320 Windows NT workstations, two Silicon Graphics UNIX workstations, A Compaq Xeon 450 Workstation and several Dell Optiflex GX1 workstations. Printing is available on an inkjet printer, which has a wide carriage to allow poster and banner printing, on a black and white laser printer, and on the Tektronix Phaser 840 Color Printer. The Phaser, utilizing solid ink technology, has color speeds twice as fast as the typical color laser, offers high resolution printing, and can produce some colors that are unreachable on a typical color laser. Scanners and two recordable CD ROM machines are also available.

The Computer Services Facility also offers equipment checkout and reservations. Available equipment includes laptop computers, LCD projectors, digital and analog video and photographic equipment. Alumni are invited to stop by and take a tour of the new facility which is open 8:00 am to 5:00 p.m., Monday - Friday.

—Joanne Williams

NEW GRANT FOR X-RAY LAB

In the past year, the Department of Chemistry and Biochemistry received a $285,000 Chemistry Research Instrumentation and Facilities grant from the National Science Foundation. This money was used to purchase a state of the art Nonius Kappa CCD X-ray diffractometer to modernize the department's X-ray diffraction laboratory. To complement the new instrument and improve its capabilities, an Oxford Cryosystems low-temperature device was also purchased with the NSF grant money. The new diffractometer has dramatically improved the ability of the X-ray diffraction lab to service the department's growing need for single crystal structure determination. At the heart of the new system is the CCD (charge coupled device) area detector. The new detector can measure the intensities of hundreds of reflections simultaneously in the time it took to measure one reflection on the old diffractometer. Complete data sets are now collected in hours rather than days. Additionally, the sensitivity and the signal to noise ratio is greatly improved. Therefore, high quality X-ray diffraction data can now be obtained on crystals that would be too small on the old system. From the perspective of the X-ray lab, the answer to the age-old question, "Does size matter?" is "Not so much anymore". After all, the new millennium is upon us.



Vincent Lynch and new CCD detector

New Faculty

Michael J. Krische

B.S., University of California at Berkeley, Henry Rapoport

Ph.D., Stanford University, Barry Trost

Post-Doctoral Associate, Université Louis Pasteur, Jean-Marie Lehn

Methods and Materials-From Covalent to Noncovalent Synthesis

Our research program is interdisciplinary, revolving around two central themes: (i) the catalytic asymmetric transformation of basic chemical feedstocks with attendant applications in synthesis and (ii) the preparation of nanostructured materials via the "covalent casting" of self-assembled supramolecular architectures.

Our catalysis program takes on the major classes of C-C bond forming reactions for which efficient catalytic asymmetric variants do not exist (radical, photochemical and C-H activation mediated transformations). Since these classes of reactions are the "toughies", new strategies toward asymmetric induction may be required. For example, we are investigating the use of chiral molecular receptors with photosensitizing capability as enantioselective catalysts for photo-mediated processes.

The covalent capture of noncovalent objects is at the heart of our materials program. As the limits of photolithography are approached, the self-assembly of "programmed" molecular components emerges as an effective means of constructing increasingly small structurally homogenous nanoscale objects. The casting of such assemblies, for example via mineralization, preserves these superstructures in robust form, thereby enabling the design group II-VI nanocrystallite-based electronic devices and nanoparticle catalysts.

It's great to be in Austin with my wife Amy and our newly acquired doggie duo, Otter and Birch. We look forward to the exciting times ahead!

Jacek Nowakowski

B.S., University of Illinois at Chicago

Ph.D., University of California, Berkeley

Postdoctoral Associate, The Scripps Research Institute

Structural biology of nucleic acids

Ribonucleic acid (RNA) is a truly fascinating molecule. Many argue that all life on Earth began with it, others predict that in the future it will be used to cure genetic diseases. Regardless of these exciting prospects it is universally known that RNA is absolutely essential for life. Within a living cell, a host of structured RNAs participate in a mind-boggling variety of processes including transcription, protein biosynthesis and signaling. How can a deceptively simple polymer which is built of only four monomers display such a variety of functions? My laboratory would like to answer this question through the investigation of the three-dimensional structures of RNAs (and RNA-protein complexes) and relating this information to RNA function. The main methods used in my research are X-ray crystallography and NMR spectroscopy, but I've been known to rapidly switch experimental approaches in order to solve problems on hand.

On a personal note, I was born in Mielec, a small town in southeastern Poland. At the age of 11, I started a chemistry laboratory in my bedroom. This endeavor ended quickly with an apartment fire when I tried to synthesize pure silicon from sand and magnesium metal. This experiment first taught me the meaning of the word exothermic! These fiery beginnings started my long-term passion for science. I emigrated to the United States at the age of 19, and completed my undergraduate degree at The University of Illinois at Chicago. From there I moved to Berkeley where I received a Ph.D. at the University of California working on RNA structure determination using NMR spectroscopy. I spent the past two years at The Scripps Research Institute where I solved the structure of a small catalytic DNA molecule using X-ray diffraction. In my spare time, I run, bike or rock climb with my wife Amy.

Brian L. Pagenkopf

B.S., University of Minnesota, Twin Cities

Ph.D., Montana State University, Tom Livinghouse

NIH Postdoctoral Fellow, The California Institute of Technology and the ETH, Switzerland, Erick M. Carreira

Synthesis and Organometallic Chemistry

My research interests can be broadly defined as synthetic chemistry. Specifically, I am interested in the creation and application of transition metal mediated transformations and their use in asymmetric catalysis and natural product synthesis. A fundamental aspect of these efforts involves the design of new ligand motifs. Some of these ligands are designed to encapsulate a metal or provide a cage-like environment, others address limitations of existing ligands with documented utility in asymmetric catalysis, while yet a third set aims to employ siloles in light-harvesting or photosensitizing applications. The preparation of these ligand designs relies heavily on main group chemistry, especially that of boron, silicon and phosphorus. Beyond the preparative aspects of these ligands, analysis of the coordination chemistry of the corresponding transition metal complexes will be key in providing insight on the appropriate reactions to target for asymmetric catalysis or synthetic applications.

On the synthetic organic side, we are starting total synthesis projects utilizing carbohydrates as starting materials. In keeping with the organometallics theme, the key carbon-carbon bond forming reaction to quickly modify the sugar template will be achieved through a transition metal catalyzed reaction, such as carbenoid insertion. This approach strives to minimize the number of protection-deprotection steps or functional group manipulations typically found in sugar-based synthetic strategies.

I see natural product synthesis and inorganic chemistry as two anchor points of a strategic corridor, with new synthetic methodologies, including asymmetric catalysis, as topics along the path. The simultaneous investigation of these seemingly different subjects is less like fighting fires at multiple fronts than it is standing back from the trees to see the (synthetic) forest.

John J. G Tesmer

B.A., Biochemistry and English, 1990, Rice University, Florante Quiocho

Ph.D., Biology, 1995, Purdue University, Janet Smith

Postdoctoral Associate, Howard Hughes Medical Institute, UT SW Medical Center at Dallas, Stephen Sprang

Understanding the Senses: Signaling Across the Plasma Membrane

I am interested in understanding how G protein coupled receptors (GPCRs) transduce signals across the plasma membrane of eukaryotic cells, and how these signals are subsequently propagated within the cell. There are predicted to be over a thousand different GPCRs in mammals, where they control such diverse functions as sight, smell, heart rate, blood pressure, muscle contraction, cognition and emotion. GPCRs are comprised of an extracellular ligand-binding domain, a heptahelical transmembrane domain, and a cytoplasmic domain that interacts with a family of enzymes known as the heterotrimeric G proteins. Through a process not well understood, signals impinging upon the exterior of the cell induce a conformational change in the GPCR that activates the G protein bound to its cytoplasmic domain. The activated G protein then modulates the activity of ion channels or enzymes within the cell, leading to amplification of the external signal.

The primary technique employed in my lab is X-ray crystallography, which enables us to build models of large macromolecular structures at atomic resolution. In addition, much effort is spent designing, overexpressing and purifying proteins that are suitable for crystallization.

I am continuing a collaboration with Dr. Robert Lefkowitz at Duke University aimed at understanding the structure and function of GPCR kinases (GRKs). GRKs are the agents primarily responsible for receptor desensitization, a process in which the receptor becomes rapidly unresponsive to incoming signals. In my current studies I am focussing on GRK2, which is very important for myocardiogenesis and regulation of heart contractility. Defects in GRK2 function have been directly linked to heart failure in mouse models. Inhibitors of GRK2 may therefore serve as useful therapeutic agents in the treatment of cardiovascular disease. GRKs are unique in that they recognize only activated GPCRs. It is my hope that, in some form, GRKs will ultimately serve as novel and powerful tools for probing the structure and function of GPCRs themselves.

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DEPARTMENTAL M.A. AND PH.D. GRADUATES

Ph.D., Fall 1998

Zheng Chai (Whitesell/Anslyn)
Bradley J. Hall (Brodbelt)
Jason A. Holland (Hoffman)
Peter L. Houston (Kodadek/Appling)
Patanjali Kambhampati (Campion)
Jarle Lillemoen (Hoffman)
Zhiwei Qin (Gardiner)
Raymond S. Reese (Fox/McDevitt)
Geoffrey B. Saupe (Mallouk/Holcombe)
Elizabeth Stevenson (Laude)

M.A., Fall 1998

Ruhi Ahmed (Browning)
Traci L. Smith (Anslyn)

Ph.D., Spring 1999

Larry A. Cabell (Anslyn)
James W. Caras (Kitto)
Ingrid M. Fellows (Martin)
Paul J. Hergenrother (Martin)
Steven M. Lake (Lagowski)
Aubrey Lee McIntosh (Lagowski/Smilde)
Todd J. Minehardt (Wyatt)
Patricia A. Murphy (Abell)
Kelley A. Ruud (Browning)
Eric G. Schmidt (Laude)
Darrell J. Spells (Whitesell/Gilbert)

M.A., Spring 1999

Akin H. Davulcu (Anslyn)
Ronald L. DeBlanc (Martin)
Geoffrey E. Pitzer (Martin)
Guijuan Qiao (Kitto)
Vincent Tsao (Wyatt)
Chi-Hun K. Wong (Browning)

Ph.D., Summer 1999

Fatima H. Fakhreddine (Davis/Lagowski)
Chona S. Guiang (Wyatt)
Michael C. Hillier (Martin)
Andrew D. Kern (Hackert)
Chandra T. Miller (Iverson)
Sergei V. Postnikov (Willson)
Stephen E. Schneider (Anslyn)
Jim X. Shen (Brodbelt)
Lan Shen (Magnus)
Anne S. Tibbetts (Appling)

M.A., Summer 1999

Derek R. Hall (Hackert)
Christie A. Jester (Whitesell/Anslyn)
Meredith M. Murr (Iverson)

FACULTY AWARDS AND HONORS

ERIC ANSLYN ~ was named the recipient of the **Jean Holloway Award for Excellence in Teaching.**

DEAN APPLING ~ was appointed to the **Lester J. Reed Professorship in Biochemistry.**

PAUL BARBARA ~ has been elected to the **American Academy of Arts and Sciences.**


Paul Barbara

ALAN CAMPION ~ selected as a member of the **Academy of Distinguished Teachers.**

JACK GILBERT ~ was chosen as **Interim Chairman of the UT-Austin Department of Human Ecology.**

BRENT IVERSON ~ selected as a member of the **Academy of Distinguished Teachers.**

JOE LAGOWSKI ~ has been chosen to receive the **1999 James Flack Norris Award for Outstanding Achievement in The Teaching of Chemistry by the Northeastern Section of the ACS.**

DAVID LAUDE ~ was named the recipient of the **William David Blunk Memorial Professorship Award.**


Jason Shear

JASON SHEAR ~ was named among the top **100 young innovators of 1999** in Technology Review, published by MIT. A panel of Nobel laureates, CEOs, university presidents and venture capitalists made the choices.

STEPHEN WEBBER ~ was appointed to the **William H. Wade Endowed Professorship in Chemistry.**


Mike White

MIKE WHITE ~ was selected for the **1999 Southwest Regional Award of the American Chemical Society.**

GRANT WILLSON ~ was awarded the **1999 Aristotle Award** for outstanding commitment to teaching and mentoring by the **Semiconductor Research Corporation.**

ERIC ANSLYN, ANDY ELLINGTON, BRENT IVERSON, JOHN MCDEVITT, JASON SHEAR, and GRANT WILLSON submitted a successful proposal to the **Beckman Foundation** to establish a **Beckman Technologies Initiative Center at UT.**

CELANESE ACADEMIC EXCELLENCE AWARD WINNERS IN CHEMISTRY

(L to R): Prof. Marvin Hackert; Prof. Grant Willson; James P. Davidson, Outstanding Graduate Student; Jerry Dunn, Celanese; Stefan M. Miller, Outstanding Undergraduate; Jerry Broussard, Celanese; Michelle L. Reyzer, Outstanding Graduate Student; Prof. Brent Iverson

STAFF HONORS AND AWARDS

Service Awards

10 Year Awards
Chuck Cooley
Elaine Hrissikopoulos
John Leamons
Chongyang Liu
Andrea Magnus
Roger Williams

15 Year Award
Barbara Jann

20 Year Awards
Steve Ernst
Fu-Ren Fan
Steve Sorey
Teresa Winterringer

25 Year Award
James Lemburg

30 Year Award
Sandra Lax

President Larry Faulkner presents Excellence Award to Sandra Godfrey

Presidential Staff Excellence Award
Sandra Godfrey

College of Natural Sciences Staff Excellence Award
Lee Benson

College of Natural Sciences Advising Award
Chris Johnson

Department Staff Excellence Awards
Margaret Rodgers
Manuel Vargas

College of Natural Sciences Teaching Excellence Award
Dr. Ruth Shear

Ruth Shear

IN MEMORIAM

Clifton E. Dietz, B.A. Chemistry 1946, M.A. History 1948 ~ died May 19, 1999 at the age of 73. He is survived by wife, Rudy Dietz, and children Vernon Dietz, Laraine Peterson-Bracho, and Martha Teutsch.

Frances Virginia Hitt Hamilton, secretary to the graduate advisor during the 1960s and 70s passed away unexpectedly on November 4, 1999, at the age of 78. Survivors include her husband, Charles B. Hamilton of Austin, daughters, Diane Coulston and Kay Helen Wallingford, seven grandchildren, and four great-grandchildren. Fran retired from UT August 31, 1977.

Simeon Hardin Hulsey, M.D., B.A. Chemistry 1922 ~ died August 9, 1999 at the age of 100. He was predeceased by his first wife, Ruth Selby Byron, and his second wife, Virginia Kuykendall Enloe. He is survived by his son, The Right Rev. Sam B. Hulsey, and step-daughters, Mrs. Robert Sloan and Mrs. Richard Moore. Dr. Hulsey played on the UT 1920 championship football team and was a member of Delta Tau Delta and the Friars' Honor Society. He retired in 1995 after practicing medicine in Ft. Worth since 1928.

Sammy W. Ingram, Jr., Ph.D. 1959 (Hatch) ~ passed away May 19, 1999. After graduation Dr. Ingram taught chemistry at Jacksonville State University in Alabana and later served on the faculties of the University of Alabama, Troy State University and Livingston University. He is survived by his wife, Charlotte Ann Robbins, and two children, Samuel Kip Ingram and Cindy Ann Ingram. Although retired at the time of his death, Dr. Ingram had planned to resume teaching.

D'Arcy Adriance Shock, M.A. 1946 (Hackerman) ~ died March 16, 1999 at the age of 87.

Roy Charles Thompson, Jr., B.S. Biochemistry 1940, M.A. Biochemistry 1942, Ph.D. 1944 (Williams) is now deceased.

Emmette Bledsoe Wallace, M.A. 1940, died March 14, 1999. He is survived by his wife, Jean; a son, Michael Wallace; and a daughter, Martha Wallace.

ALUMNI RETORTS

1952

Thomas R. Rogers, B.S. Chemistry, M.E. (Texas A&I) 1954 ~ retired in 1994 after 40 years in Research & Development for the Chemicals Group of PPG Industries, Inc. He moved back to Georgetown, Texas and rejoined the Central Texas Section of ACS.

1967

J. David Theis, Jr., B.S. Chemistry (1964), M.A. (Cowley) ~ is President of Spectral Engineering, Inc., Fountain Valley, CA. The company specializes in applied research and development of photochromic polynuclear aromatic hydrocarbons utilizing triplet-triplet absorption for the production of nuclear flash optical protection systems. He reports, his "lifelong chemical career is applying chemistry to exotic materials problems, and it could not be better!"

1970

Robert L. Johnson, B.S. Chemistry ~ is a Research Investigator in the Chemistry Division at Glaxo Wellcome in North Carolina. He is head of the mass spectrometry and IR sections of the department.

David S. Olson, M.A. 1964, Ph.D. (Boggs) ~ works for ITT Industries, System Division, as a Program Manager, developing a long-range electro-optical pointing and tracking system for space applications.

Randall R. Reves, B.S. Chemistry, M.D. (UT Medical Branch), M.Sc. (London School of Hygiene and Tropical Medicine) ~ is in his 9th year as faculty member of the University of Colorado Health Sciences Center and Director of the Denver Metro Tuberculosis Clinic. His eldest son works for Enron in Houston, his twin daughters attend the University of Kansas and play Big 12 volleyball and basketball, and his youngest son attends the University of Colorado.

1973

D. Wayne Goodman, Ph.D. (Dewar) ~ chemistry professor at Texas A&M University, College Station, presented a research paper on recent advances in uncovering physical and chemical properties of gold nanoclusters on titania (TiO2) at the 16th meeting of the North American Catalysis Society. That system recently caught the attention of major chemical manufacturers who look for catalysts that can improve the efficiency of propylene oxide production.

Sister Hildegard (Judith A.) Varga, Ph.D. (Becker), Master of Theological Studies 1992 ~ reports she is back to using a little of her chemical knowledge in her position as Vice-Chancellor/Archivist for the Roman Catholic Diocese of Amarillo. Since receiving her Ph.D., she has worked as an assistant professor (Nicholls State) then Staff Chaplain (St. Vincent Infirmary Medical Center) after becoming certified as a healthcare chaplain. She entered St. Benedict Monastery in 1995.

1975

Ricardo "Richard" Fuentes, Ph.D. (Morgan) ~ advises that after 21 challenging years in Dow Chemical's R&D department, he has been assigned to Dow's New Business Corporate Venture Capital organization. His responsibilities as Project Director include advanced technology investigations for future venture capital investment in early stage startup companies.

1979

Robert C. Ligday, M.A. (Bard) ~ retired from the U.S. Air Force in 1996 and is seeking a new career in the Minnesota/Wisconsin region.

1980

Upali Weerasooriya, Ph.D. (Gilbert) ~ received the 1999 Samuel Rosen Memorial Award, given for a significant advance or application in the principles of surfactant chemistry by a chemist working in industry within the U.S. Upali is a research associate with CONDEA Vista in Austin.

1982

L. Edward DeMoll, B.S. Chemistry (1973), Ph.D. (Shive) ~ has accepted a position in the new Biological Chemistry Division at the University of Kentucky.

1991

Claire Mazow Gelfman, Ph.D. (Robertus) ~ is a Research Biochemist at the University of California, Davis studying the molecular basis for eye diseases. She and husband Gary proudly announce the birth of their daughter, Tamara, on April 26, 1999.

Frank A. Quinn, Ph.D. (Kitto) ~ reports he is currently a Scientific Affairs Manager in the Worldwide Marketing Group of Abbott Labs. He coordinates external customer studies, publication of R&D and customer data, and scientific training of the sales force.

Walter Torres-Hernandez, M.A. (1989), Ph.D. (Fox) ~ writes that since getting his degree, he worked as a postdoc at York University in Canada, did consulting work in Columbia, and joined the Faculty of Science at Universidad del Valle. He married in 1998 and became the proud father of the "cutest twin sisters this side of the world." He is now looking for career opportunities in the USA.

1992

Charlie Chunyang Peng, Ph.D. (Boggs) ~ is president/CEO of PhDD, Inc. (Pharmaceutical Design and Database). The company web site, BioChemMall.com, will provide chemical and biological structural information online free for researchers and free software tools for chemists.

Robb Wilson, B.S. Chemistry, Ph.D. 1999 (University of Michigan) ~ accepted a tenure track position as an assistant professor at Louisiana State University-Shreveport.

1995

Chad Wren, B.A. Biochemistry ~ works as a chemist for Aerospace Technologies, Inc. in Dallas.

1996

Elaine S. Brigham, Ph.D. (McDevitt, Mallouk) ~ accepted a new position at Litton Laser Systems as principal chemist in Orlando, FL.

Michelle C. Foster, B.S. 1990, Ph.D. (Campion) ~ performed a postdoctoral fellowship at Indiana University in Bloomington before accepting a faculty position at the University of Massachusetts in Boston.

1997

Max K. Leong, M.A. (1993), Ph.D. (Boggs) ~ started his new job with the Division of Biotechnology and Pharmaceutical Research at the National Health Research Institute in Taiwan. He is engaged and wedding plans are for the end of this year or early next year. Max reported that, although close to the center of the September Taiwan earthquake, he is all right.

Denise Marie Perreault, Ph.D. (Anslyn) ~ finished a NIH postdoctoral fellowship with Prof. Laura Kiessling at UW-Madison and is currently employed as a Staff Scientist in synthetic chemistry at EPIX Medical, Inc. in Cambridge, MA.

1998

Nonyerem N. Osuji, B.A. Biochemistry ~ participated in AmeriCorp NCCC in Washington, DC after graduation. He is now a first-year medical student at The University of Texas Medical School in Galveston. Nonyerum writes, "UT Austin is a great institution. It has prepared me for life experiences."

Postdoctoral Fellows

Arunachalam Kannan (Gilbert) ~ joined the Department of Organic Chemistry, University of Madras, as a Senior Research Associate.

Mark Seymour, (Lagowski) ~ has accepted a new job as Adhesives Program Manager with Quantum Corporation.

TEXAS EXES E-MAIL

All UT graduates are eligible to register for a free, lifetime e-mail address that ends in "@alumni.utexas.net." This is not an e-mail provider, but a forwarding service. An alum need only notify family/friends once of the Texas Exes address, and all e-mail will be forwarded to his/her "real" e-mail address. Should an alum change to another provider, he/she needs only update the forwarding address in the Texas Exes system, and e-mail will follow.

In addition to an e-mail address, a Texas Exes online e-mail directory is available. Exes may search for college friends by name, college and graduation year. To protect an individual's privacy, only e-mail addresses are displayed. Mailing addresses and phone numbers are not available.

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