Chemical *Vibrations*

Chemistry Department
Western Washington University

Annual Newsletter to Alumni and
Friends of the Department

Number 1, Fall 1992

From the Chair

Greetings!

This is our first departmental newsletter to chemistry alumni/friends and the first of what we hope will become an annual tradition. As chair of the department, a task I have taken on for much too long (ten years), I am writing this short note to reintroduce you to the department and some of its more significant history, some recent and other more dated. How do I compress 25 years into one paragraph? Naturally it's impossible, however a brief summary of personnel changes can be listed.

Fred Knapman retired in 1974, followed by Marion Besserman in 1983, Lowell Eddy in 1985 and Ed Neuzil in 1992. All are doing well with the Knapmans, Neuzils and Eddys still residing in Bellingham and Marion now in Vancouver, WA. Three faculty are currently serving in half time administrative positions: George Gerhold is Associate Dean, College of Arts & Sciences; Bill Wilson is Director of the University Instrument Center; John Miller is Science Education Director. The department has been vitalized by the addition of two new, young faculty. These two, our most recent hirings since 1970, are Gerry Prody (Ph.D. UC Davis), biochemistry, in 1983 and Mark Bussell (Ph.D. UC Berkeley), physical chemistry, in 1990.

The decade of the nineties will be one of great change for the department. A new $22 million, 65,000 square foot chemistry building is under construction and is scheduled for completion by July 1993. We have two healthy undergraduate degree programs--chemistry and biochemistry--and a small MS program which needs more attention. The department has approximately 100 students listed as majors, 30% of whom are in biochemistry, and we graduate 20-25 students annually.

Important and exciting changes are occuring in curriculum and instrumentation, especially to accomodate the rapid advances in computerization and molecular biology. Biochemistry majors, for example, are now required to take two 3 credit labs covering modern techniques in biochemistry and molecular biology while chemistry majors are required to complete a two quarter integrated lab sequence, 3 credits each, which covers inorganic synthesis and physical measurement. New state-of-the-art equipment is being purchased and introduced in lab instruction. Recent additions have included a diode array UV/VIS spectrophotometer, a new ultracentrifuge for biochemistry and a $225,000 superconducting 300 MHz NMR spectrometer, the latter acquired in part through grants from the National Science Foundation ($100,000) and the Murdock Charitable Trust ($21,500). And with the aid of further NSF grants we are investing $76,000 into instrumentation for the new physical/inorganic instructional laboratory and are beginning to equip freshman chem labs with PC's for computer interfacing.

Please come and visit us if you find yourself passing through Bellingham. And if you can wait until fall 1993, you will have the added bonus of seeing us in our new building.

Mark Wicholas

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CHEMISTRY ALUMNI EVENING

On May 21, 1992, the WWU Alumni Organization sponsored an evening reception in Seattle for Chemistry Department alumni. It was held in the Columbia Tower Club on the 75th floor of Seattle's tallest building.

The food was good, the view was excellent (the weather cooperated and we were able to view the sunset), but most enjoyable of all was the chance to renew acquaintances and catch up on alumni news--and present-day appearances. Many have actually achieved employment in the fields for which they were trained!

Over 55 alumni, faculty, staff and guests were in attendance. Many were from the Seattle area, but a few came from more impressive distances, such as Deb Gordon (BS-'81 and MS-'83 from WWU; PhD-'88 from U of Arizona), who came in from Tucson, where she is a research associate at the University of Arizona.

We look forward to organizing another alumni gathering in the near future. Most likely it will also involve an open house for the new chemistry building, so stay tuned during fall of 1993!

1991/92 OUTSTANDING GRADUATE

Congratulations to Don Stone, recipient of the Chemistry Department Outstanding Graduate Award for 1991/92. Don (formerly Hiep Doan) arrived in the United States from VietNam during the mid 80s and received his US citizenship in 1991.

While at Western, Don was the recipient of a 1990/91 Minority Achievement Scholarship and the 2-year Knapman Chemistry Scholarship. He was employed by the department as a laboratory teaching assistant and completed research projects with Mark Bussell and Ed Neuzil. Don is now at the University of California in Irvine, where he is pursuing a doctorate degree in chemistry.

1992/93 SCHOLARSHIP RECIPIENTS

Knapman Chemistry Scholarships

Brenda (Crook) Luciano has received a senior renewal of her $1,000 Knapman Scholarship. Brenda transferred to Western in the fall of 1990 with an AA degree from Whatcom Community College and one of the first WWU President's Scholarships for transfer students. She was also the recipient of a 1991/92 AAUW Scholarship. Brenda has been employed by the department as a laboratory teaching assistant/prepper since her arrival at Western, and--yes--her maiden name of "Crook" reflects that she is the daughter of one of our faculty members, Joe Crook.

Andrea Kim is the junior recipient of a $1,000 Knapman Scholarship. A biochemistry major, she previously was awarded the department's 1990/91 CRC Press Freshman Chemistry Achievement Award. Andrea moved to the United States from Korea in 1988 and graduated from Washington High, Tacoma in 1990.

Chemistry Fund Scholarship

Hiro Yamamoto is the recipient of a $1,000 Chemistry Fund Scholarship. A National Merit Scholar Semifinalist, Hiro transferred to WWU from the University of Washington, where he was a honor roll student. A chemistry major, Hiro currently is employed by the department as a laboratory teaching assistant/prepper and participates in research work under the direction of Mark Bussell.

Progressive Chemist Scholarship

Recipient of the $1,000 Progressive Chemist Scholarship is ***Anthony Diaz***, a graduate student pursuing his master's in chemistry under the direction of Mark Bussell. He also serves as the department's instrument technician.

Anthony completed his undergraduate degree at the Univ of Washington, where he received the UW 1991 American Institute of Chemists' Award and the P.C. Cross Prize as the Outstanding Physical Chemistry Student of 1990.

Tuition & Fee Waiver Scholarships

Two $500 Tuition & Fee Waiver Scholarships were awarded for 1992/93.

Rosalina James, a biochemistry major, earned an AA degree from Shoreline Community College prior to enrolling at Western. At WWU, Rosie has been a 2-year recipient of a Minority Achievement Program Scholarship and she is employed by the department as a lab teaching assistant/prepper.

Michele Keller, also a biochemistry major, has appeared on the WWU honor roll numerous times, has worked as a department lab teaching assistant and was awarded a math fellowship for 1992/93.

PROGRAM STATISTICS

During the past two years, the department has experienced large increases in general and organic chemistry enrollments (50% and 95% growth, respectively). Increased enrollments in biology majors and Huxley College students seem to be the source of most of our growth.

At the same time, we graduated two of our smallest classes--11 and 19, respectively. We expect graduation rates to return to our usual mid-20s in 1992/93.

Approximately 45% of our graduates continued on to graduate school, while the rest moved directly into the workforce.

The oil refineries in Whatcom County--ARCO and BP Oil--continue to hire our graduates, and many of our biochemistry majors find employment with Seattle area biotechnology firms.

Faculty/Staff Reports

From ***Joe Crook*** and ***Jack Weyh***: We continue to collaborate in the development and publication of computer based instructional materials for use in general chemistry. To date a total of nine programs are in use at numerous colleges and universities around the country. In the past year, we have given numbers of presentations of our work, many by invitation. Noteworthy among them were talks at the 1990 IBM Academic Computing Conference in Miami, a keynote address to the Consortium for Computing in Undergraduate Education at Allegheny College, and multiple workshop presentations at a conference on Instructional Technology for Science Faculty in Two-year Colleges in Los Angeles. We have recently completed an inorganic qualitative analysis program which features real video images of reaction mixtures to aid students in identifying unknown samples.

George Gerhold (half-time chemistry, half-time Associate Dean of the College of Arts & Sciences) reports: I divide my time between the Dean's office and computer software development. We developed and market an authoring system which is in use in several hundred sites throughout the world. More recently we have been working with IBM and the National Geographic Society on multimedia projects. One currently on the market is titled "Mammals: a Multimedia Encyclopedia." A number of us in the department are looking at ways to apply these techniques to the teaching of chemistry.

Denice Hougen reports: Yes, I'm still with the Chemistry Department! Since arriving in July of 1980 to replace the newly-retired Gertrude Becker as secretary/receptionist, I have always claimed that I would "move on" after completing my undergraduate degree in business administration. Well, in 1985, I graduated...and didn't leave. Further education was available--graduate school! In 1986, Ruth Minge retired as administrative assistant and I accepted the position, while at the same time enrolling in WWU's evening MBA program. In 1988 I completed my MBA...and didn't leave. I've run out of educational excuses so I guess it's time to confess that I enjoy my job, the people (faculty and staff) that I work with, and especially the chemistry majors that pass through the department.

Most of my time is spent on administrative support projects in areas such as fiscal management of department budgets, student personnel management (Ruth Schoonover and I share the duties of the now-departed department lab supervisor position...a victim of state budget cuts in the 80's), and special projects.

Many of the special projects have involved bringing management of the department "on-line" with the design of database and spreadsheet microcomputer applications. For instance, during the past five years, I've developed databases for management of all department budgets, chemical and equipment inventories, and student records--including an alumni database (of which you are a member). Recent summers have included project work for the new building and I look forward to the final phase--moving in next summer.

Don King reports: This fall we introduced computer interfacing into our general chemistry labs and I, along with Joe Crook and Jack Weyh, have been busy in developing interfacing experiments. We are part of a consortium of schools to receive NSF support for this project.

Our analytical curriculum continues to take on a stronger environmental focus. As part of that effort, I participated in an EPA workshop last summer in Athens, Georgia that dealt with exposure assessment modeling.

An update on ***George Kriz***, as reported by his daughter, Michelle: Apart from being a full-time professor and all-around great guy, Dr. Kriz finds the time to co-author (with Drs. Pavia and Lampman) chemistry textbooks. They have written three editions of *Introduction to Organic Laboratory Techniques*. Riding the crest of the new wave in organic laboratory instruction, they have also written a microscale edition of their laboratory textbook. They are also currently working on the manuscript for a new organic lecture textbook.

When he wishes to escape from his daily routine, Dr. Kriz either jets off to Purdue or to Atlanta to give talks at the Biennial Conference on Chemical Education meetings or he flies to Boston, where he has taken the Bruker Instruments short course in NMR and has trained to be Western's NMR Supervisor. With all this on his plate, Dr. Kriz still manages to spend time with his family, help with the dishes, and watch *The George Michael Sports Machine* every Sunday evening.

Gary Lampman reports: Don Pavia, George Kriz and I have published laboratory books for the "macroscale" and "microscale" organic laboratories. I have published a computer program for teaching organic nomenclature. My research interests include organometallic chemistry, particularly Vitamin B_{12} model compounds. This research gives my family and me an excuse to frequently travel to England in order to work with my English collaborators. My daughter, Beth, is studying history at Durham University in England.

From ***DeeDee Lombard***: I arrived at Western in 1985 where I worked in the Plaza Cashier's Office. There I met several contacts around campus which I have found very beneficial in my job here in chemistry. I transferred to the chemistry department in September of 1986 after Ruth Minge retired and Denice was promoted to Administrative Assistant. I felt very fortunate to have Denice here to train me as she held this position for several years. I don't think there is a better department on campus!

My job has gone from typing on ditto masters, running the spirit master, and massive collating to doing virtually all my work on the computer. We have top-of-the-line equipment for creation of very professional handouts, lab manuals, exams, etc. I have been working with WordPerfect 5.1 which has excellent desk-top publishing capabilities and our Hewlett-Packard Scan Jet allows us to integrate pictures, graphs, etc. into all our labs and documents.

I enjoy my 11 month appointment here which gives me quite a bit of time off in the summer and at Christmas to spend with my family. I enjoy softball and gardening in the spring and summer, and bowling during the winter.

From ***John Miller*** (half-time chemistry, half-time Director of Science Education): I am beginning my eighth, and last, year as Director of Science Education. In addition, I have primary responsibility for advising and teaching the basic courses in our M.Ed. Natural Science/Science Education Program. This graduate program, with over fifty students enrolled, has grown to be the largest program outside those in the education department. We recently added a new option in environmental studies. Unfortunately these com-

NEUZIL RETIRES

Last June, Dr. E. F. Neuzil completed thirty-three years as a Western faculty member. During his tenure, the university went through three name changes and the department went through two--almost three-buildings. Ed, however, pretty much remained the same (although some gray finally showed up in his hair).

Born in Chicago, Illinois in 1930, Ed completed his BS in Chemistry at North Dakota State College in 1952, earned a MS in Chemistry at Purdue in 1954, then took a break from education pursuits and served for two years with the Radiological Warfare Division of the U.S. Army Chemical Corps in Utah. In 1959 he completed a Ph.D. in nuclear chemistry at the University of Washington and was immediately hired by Western Washington College of Education. He was one of four chemists in the Science Department, which at the time was housed in Old Main.

Ed moved onto the fast track at Western, with promotion to Associate Professor in 1963 and to Full Professor in 1966. In both 1964 and 1967, he was the recipient of the student body's Outstanding Teacher Award, was one of the first department faculty to establish an active research program, and received numerous grants from the Atomic Energy Commission during the period 1963-75. Over the years he also authored a physical science book, a general chemistry book, and co-authored organic lecture and laboratory books with John Miller.

Off campus, Ed was active in the community within his role as a scientist. During 1961-63, he created a series of editorials for KGMI radio concerning science and public affairs topics, and during the summers of 1964 and 1965, he was the host of "Way out There," an astronomy television show for children which was broadcast on KVOS tv.

On the home front, Ed and his wife Molly built a house on Lake Whatcom a few years ago, where they have planted an extensive garden and orchard. They share the house with several dogs (Welsh springers) and welcome visits from their two young grandchildren. Ed and Molly now have a family-full of physicians: daughter Elizabeth is a pediatrician and married to a dermatologist; son Daniel is a surgeon and married to a specialist in infectious diseases. The family still enjoys the use of their Stehekin cabin on Lake Chelan and Ed continues to pursue his outdoor activities, including fishing, hiking and skiing.

We will miss Ed's unique perspective, his undampened energy, and his letters to campus newspapers (always guaranteed to "stir the pot"). We hope he will continue to visit the department often, especially when bearing gifts of fruit and produce!

mitments, plus teaching secondary science methods courses which also include supervision of student teachers, provide only limited opportunity for me to teach the one quarter organic chemistry course for the department.

From ***Donald Pavia***: Much of my recent time has been taken up with the design and planning of the new chemistry building. The building is scheduled for occupancy in Fall 1993, and I have been the main departmental contact for the architectural teams. In addition to teaching organic chemistry courses, I have continued to be active in writing instructional software and textbooks. One of my computer instructional programs, SQUALOR, a simulation of the qualitative organic analysis laboratory, won the **Best Chemistry** and **Best Simulation** awards in the 1988 national EDUCOM/NCRIPTAL competition. I am currently working on programs that teach organic spectroscopy, and a multimedia laser videodisc to teach organic laboratory techniques. In collaboration with professors Lampman and Kriz, a third edition of our popular organic laboratory textbook was published by Saunders in 1989. Working with Randy Engel of Green River Community College, an alumnus of Western, a new *microscale* version of our laboratory textbook was recently developed and published with Saunders. Currently in the works, again with Drs. Kriz and Lampman, is a textbook for the year-long organic lecture series and a second edition of our spectroscopy text.

From ***Gerry Prody*** (our lone female faculty member): For those of you out there that don't know me, I came to Western in 1984 from UC Davis. Since then I've worked primarily on developing and improving our program in biochemistry. The old chem/biol combined major is now a B.S. in biochemistry/cell & molecular biology (can you tell that the name for the major was a group effort?!). Along with Carol Trent, a new geneticist in the biology department, I have developed an intensive molecular biology lab course which gives students hands-on experience with modern techniques and strategies. Some of the equipment for this lab was purchased through a NSF grant for instructional improvements.

My research focuses on the biochemistry of an RNA plant virus. Typically, 1 or 2 graduate students and 4-8 undergraduates participate in independent research projects in my lab each quarter, some of whom also received stipends from my last NSF research grant.

My most exciting news is that I'm spending a year-long sabbatical (1992-93) at UC-Berkeley. I'm working in the laboratory of Andy Jackson in the Department of Plant Pathology, in a new 18-months-old lab (which I wish I'd seen before we designed our new chemistry building). I'm working on a different plant virus--barley stripe mosaic virus--and I am busy learning all the latest techniques. It's great!

If anyone is planning to visit the Bay Area, I can be reached at (510) 642-8042 (work, which is where I am when I'm not wine tasting) or (510) 254-9389 (home, basically for sleeping purposes only).

Sal Russo reports: I was fortunate to be on sabbatical leave at the University of Colorado in '77/78 and again in '84/85. It was a great experience for the whole family and, of course, for me professionally. The biochemistry curriculum at WWU has been enhanced by the development of computer-assisted instruction programs on amino acid and polypeptide charge behavior (published by Queue Inc.) and enzyme nomenclature. It was stimulating to present the charge behavior program at the Pacifichem Conference in Hawaii in December 1989. A highlight of that trip was a hike up Diamond Head for a magnificent view of the Pacific ocean and the city of Honolulu.

Besides my customary teaching duties, I especially enjoy working with students in the development of new experiments for instructional use, many of which have been published in the *Journal of Chemical Education*. My research studies are now in the area of the stability of thermophilic enzymes which are important to biotechnology. In my leisure time I enjoy jog-

ging with Joe Crook, hiking, barbershop quartet singing, and folk dancing.

No news from ***Ruth Schoonover***, our science technician. She feels adequately exposed in the ***Chemistry Alumni at Western*** focus article (see page 11).

John Whitmer reports: In the fall of 1990, I returned from a two quarter leave at the University of York in England. While there I worked with a group in the chemistry department developing a course for British secondary schools emphasizing applications of chemistry and the development of skills through a wide range of teaching and learning approaches. The course is currently being trialed in several dozen English schools and the final version is planned for 1992.

Mark Wicholas reports: I have just returned from a very rewarding sabbatical leave in 1991 at the University of British Columbia. This year was a time for change in research emphasis. Much of the time was spent in lab doing and learning organometallic chemistry although two months in summer were devoted to Europe: one month for work in Germany and four weeks for vacation in Italy traveling from Florence to Sicily and experiencing *la dolce vita*. Now back in Bellingham I taught one-half of our new integrated inorganic/p. chem lab, and am setting up a research lab in organometallic chemistry with $46,000 in grant money which I was fortunate to get. And to keep life interesting, I tried something radically new this summer. I was part of a scientific team doing environmental monitoring in the high arctic (Victoria Island, Northwest Territories, Canada).

From ***H. William Wilson*** (half-time chemistry, half-time Director of the University Instrument Center (UIC)): The UIC was established in 1982 to take a major role in the operation, maintenance, and repair of scientific instructional and research instrumentation. It includes machine and optics/electronics shops and a laboratory where HPLC, GC/MS, HPIC, GFAA, and a number of other commonly needed instruments are pooled and available for use by anyone who is qualified or who can be trained in their use. I spend half of my time supervising the UIC, guest/team lecturing in various departments, and overseeing the University Radiation Safety Program as the radiation safety officer. The other half of my time is spent with chemistry where I have been teaching instrumental analysis and a scattering of advanced specialty courses (group theory, atmospheric chemistry, etc).

Much of my research effort for the past ten years has been channeled into two areas: glacier chemistry and NASA projects.

The glacier project involves the sampling and recovery of ice and snow from various locations in the North Cascades. Although all of the non-water constituents of the ice are of interest, particular attention is being paid to trace and ultra trace organics, especially those that originate from anthropogenic sources. In those idle times between snow sampling trips, we have a modest research development program which is directed toward methods development for the recycling, detoxification, or disposal of hazardous chemicals.

I have been working on and off with the NASA Ames Research Center at Moffett Field in Mountainview, California. Originally, I was working on low temperature, low pressure, high resolution infrared spectroscopic lab data that was to be used to measure acetylene traces in the outer atmosphere of Jupiter. That type of data is available from Voyager I and Voyager II spacecraft flybys and it is still being analyzed. However, in 1984, I was invited to join 3 other physicists on a small team calibrating and testing a new flux radiometer that was launched on the Galileo spacecraft for Jupiter in 1990. The device will be parachuted into the Jovian atmosphere late in 1995 and will measure heat radiation emanating from deep inside the atmosphere of Jupiter. It will compare these measures with diminishing solar radiation as it descends through the atmosphere.

After the completion of the Galileo project, I joined another group doing infrared measurements on N_2O in the stratosphere. They are using a new addition of the high altitude (70,000 ft) U-2 aircraft to fly a high resolution tunable diode laser system as part of an ozone chemistry measurement project. Until now, I have spent my time making laboratory baseline measurements of N_2O at stratospheric pressures and temperatures, but in November 1991, I was in Bangor, Maine, loading and unloading our instrument on the ER-2 for flights over the interior of Greenland. The potential for an ozone hole in the Arctic vortex was the subject of the Bangor flights. The media furor over the phenomenon has arisen, in part, from the results of the ER-2 flights.

NEW FACULTY MEMBER - MARK BUSSELL

Since joining the department in September 1990, I have been involved in teaching primarily the physical chemistry lecture and laboratory sequences and implementing a research program in the area of surface chemical problems of environmental interest. Starting with the 1991/92 academic year, the inorganic and physical chemistry laboratory courses have been combined into a single integrated course. In collaboration with Mark Wicholas, new experiments are being developed which involve synthesis of inorganic compounds followed by physical and chemical measurements. Mark and I were recently awarded a National Science Foundation grant to buy equipment for this course. New instrumentation we have acquired includes a fourier transform infrared (FTIR) spectrometer, a stopped flow, rapid kinetics apparatus and equipment which will permit FTIR studies of molecules at liquid helium ($\sim$ 10 K) temperatures. These acquisitions should allow us to make the first steps in upgrading this upper division course into a state-of-the-art laboratory experience for chemistry majors.

On the research front, I have received grants from the Research Corporation and the American Chemical Society's Petroleum Research Fund to support studies in the area of surface chemistry. A research grade FTIR spectrometer is used to study the bonding and reactions of molecules adsorbed on the surfaces of heterogeneous catalysts. Experiments are performed in an ultrahigh vacuum chamber ($P < 10^{-9}$ Torr) in which samples can be cooled to 100 K and heated to 1000 K. Current research focuses on the hydrodesulfurization reaction which is used to remove sulfur from fossil fuels such as crude oil. This process is of great environmental interest as sulfur contaminants in fuel react during combustion to form sulfur dioxide, a precursor to acid rain formation. The goal of my research is to develop more efficient catalysts for the hydrodesulfurization process so that sulfur dioxide emissions can be lowered below their current levels.

New Facilities

Construction of new science facilities to replace the aging Haggard Hall began in the fall of 1991. Chemistry (Phase I) is the first of three new science buildings to be built. Biology (Phase II) and a combined Science Education/Science Lecture Hall (Phase III) will follow.

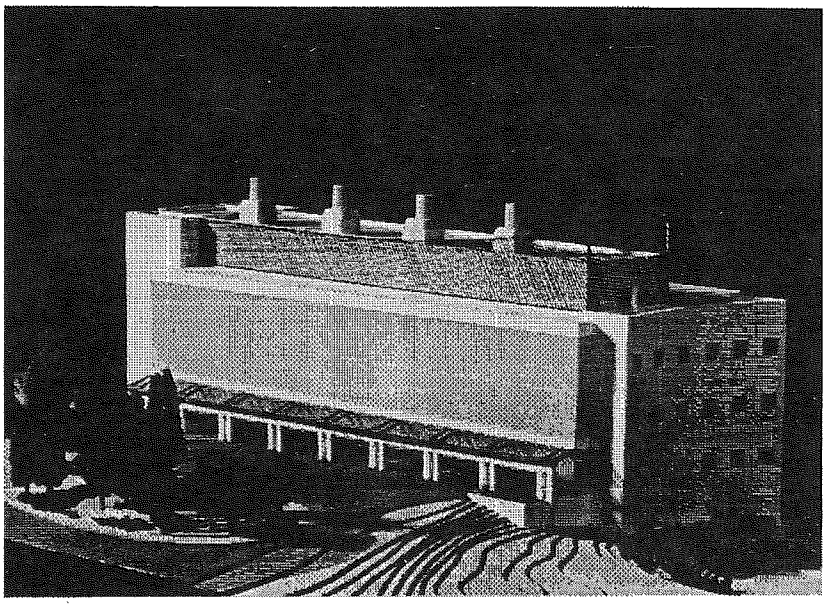
The new chemistry facility is located just south of Carver Gym, across from the Ross Engineering Technology Building. Biology will be located to the south and a third floor walkway will connect the two buildings. Chemistry construction will be completed in the summer of 1993, with the first classes in the new facility scheduled for fall quarter.

The newest ideas in health and safety will be incorporated in the building; it will have more than twice the number of hoods currently available to the department in Haggard Hall. Students will work in fume hoods. The general lab will also have small hoods at each work station.

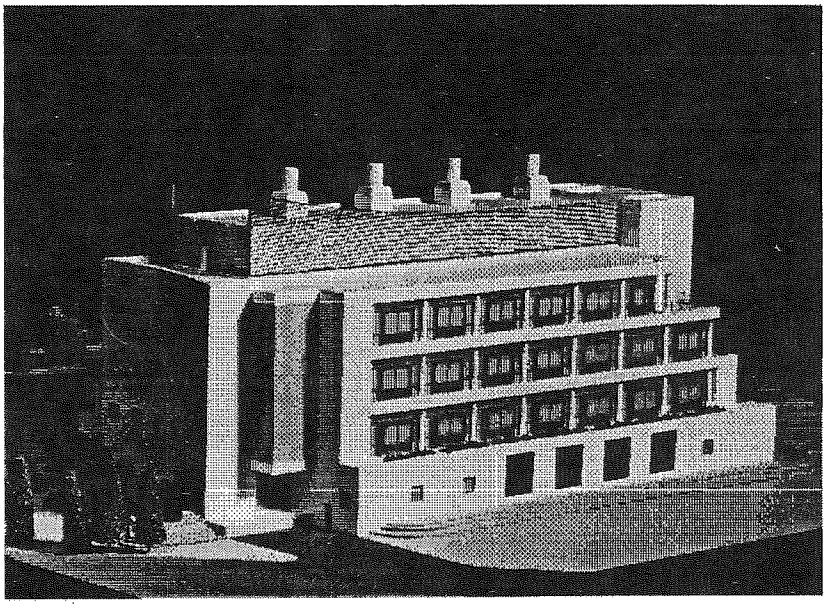
Supplies and chemical wastes will be moved between the stockroom and labs in special containment carts. A waste-disposal facility is planned, where wastes will be analyzed and packaged for proper disposal.

The building is arranged so that students and supplies enter the teaching labs from separate corridors. To accomplish this, half of each floor is teaching and half research, separated by a central supply corridor.

State-of-the-art ideas in instruction will be implemented with the new building. Computers will be used at all levels of instruction, including general chemistry, where they will be used to collect and analyze data. The labs will be networked and a special 24-station computer instructional classroom will have interactive video and multimedia capabilities and three-dimensional, high-resolution computer molecular modeling and protein modeling stations. Lecture rooms will also have multimedia capabilities.

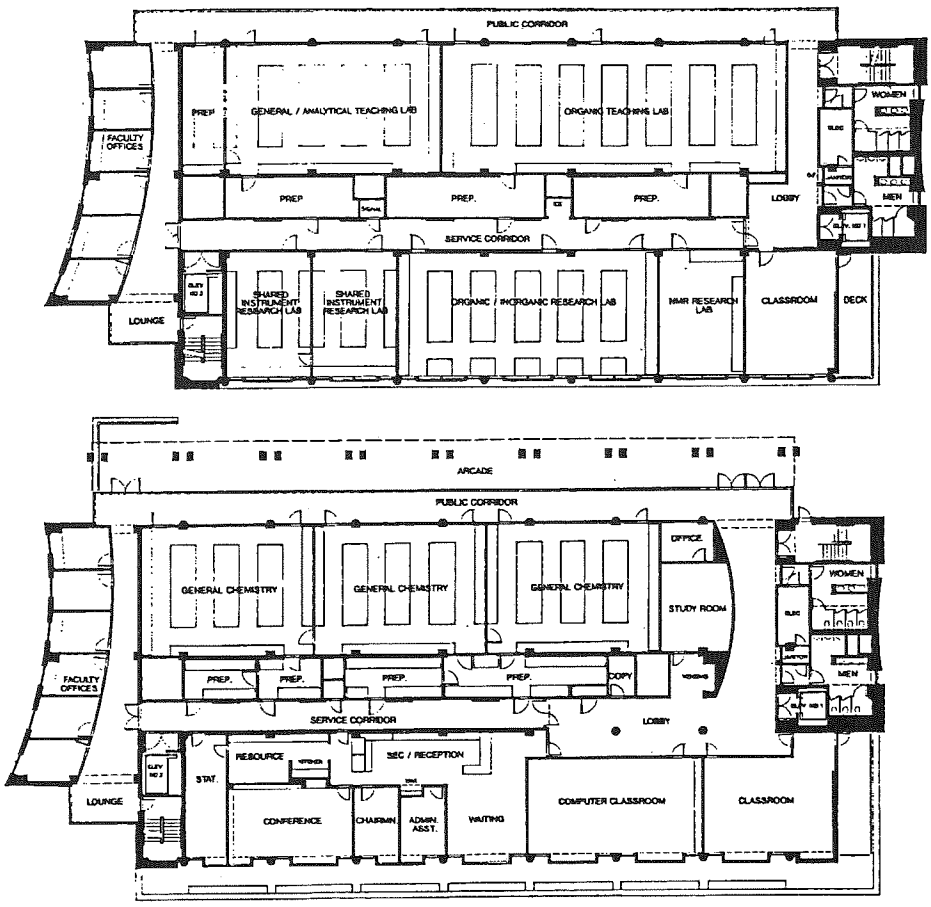


East Side of Chemistry Building, facing new Science Quadrangle.



West Side of Chemistry Building, facing Ridgeway Dormitories.

Our program will encourage undergraduates to obtain hands-on experience with modern computer-operated instrumentation, including HPLC, FTIR, 300 MHz FT-NMR and GC/MS instruments.



Second Floor Layout

Note that a private service corridor separates the teaching labs from the research labs and that students enter the teaching labs from the public corridor. The third floor is similar in design, with teaching labs for biochemistry and physical chem/advanced inorganic on one side, and research labs for biochemistry and physical/analytical on the other.

Labs for major instrumentation (GC, FTIR, GC/MS, NMR, etc.) are also located on the second floor.

First Floor Layout

The first floor includes general chemistry labs, computer classroom, student library, conference/statistical support facilities, and department administration.

Faculty offices are stacked on three floors at the north end of the building. The stockroom is located in the half basement, along with glassworking and waste disposal facilities.

Microscale Laboratories

by Don Pavia

A third edition of the popular textbook, *"Introduction to Organic Laboratory Techniques,"* written by professors Pavia, Lampman and Kriz, was published by W.B. Saunders in 1989. This book, which has been developed with the help of several generations of Western students, has now been in print for 17 years (since 1976). Working with Randy Engel--an alumnus of Western and chemistry instructor at Green River Community College--and the students at both schools, a totally new *microscale* version of this laboratory textbook was recently developed and published by Saunders in 1990. As a result of this text, the organic labs at WWU (Chem 354/355) have been converted to the new microscale techniques.

In microscale, smaller scale glassware and reduced quantities are used. Instead of using quantities of 5-50 grams for experiments, the amounts are reduced to the range of 50-500 milligrams. This reduction in scale required that new glassware be purchased for the labs. Not only are the flask sizes smaller (5 mL is typical, 20 mL is large) but the style of the glassware is also different.

The rationales for converting to microscale are many. There are reduced supply costs for the department, but a more important reason is the improvement in the personal health and safety of students and faculty that the reduced exposure to chemicals brings. Also important to our environmentally-conscious times is the reduction of disposal problems. Current practices require us to collect all laboratory wastes by type, analyze them, and dispose of them in environmentally sound protocols.

The microscale concept was first developed around 1985 by a group of professors at two small colleges in Maine. Since then the idea has rapidly gained in popularity. Economic, health and political considerations are strong drivers. Western faculty and students have been in the forefront of this movement. The Western textbook is very popular on the national scene. It is one of only *three* organic microscale books which are currently available.

DONATIONS WELCOME

Tax-deductible donations via the Western Foundation to any of the funds listed below are greatly appreciated, especially in these times of diminished state support.

- Chemistry Fund
- Holzman Chemistry Endowment
- Knapman Scholarship Endowment
- Progressive Chemist Scholarship

BREMNER CHEMISTRY SCHOLARSHIPS

In 1990, George and Marian Bremner of Lynden generously funded two $1,500 scholarships, which were awarded under their designated criteria: that one scholarship be awarded to a male student and one to a female student; and that each recipient be majoring in chemistry, a resident of Washington State and demonstrate outstanding academic potential.

Recipients of the scholarships were John Peterson and Cathy Radzewich. Cathy, a June 1992 graduate with a BS in Chemistry, is now attending graduate school at the Univ. of Washington. For an update on John, see page 10; he is one of the newsletter's alumni authors.

CHEMISTRY FUND

This is our primary fund, administered by the Western Foundation, to which most donations from the annual fund drive are made and from which we fund the widest variety of department needs.

During past years, the fund has bolstered the size of the two Tuition & Fee Waiver Scholarships and provided full funding of the Chemistry Fund Scholarship. It has also provided matching funds for purchase of equipment for the expanded biochemistry lab, funded library subscriptions for periodicals in new research areas and supplied the monetary awards that accompany the annual Chemistry Department Outstanding Graduate Award and the Sea Bong Chang Biochemistry Award.

HOLZMAN CHEMISTRY ENDOWMENT

Proceeds from the 1987 sale of real estate property donated by George and Sara Holzman of Anacortes to the Western Foundation were used to establish the *Holzman Chemistry Endowment*. The Holzmans indicated that interest income from the endowment should be used "to maintain, improve and further the programs and activities of the Department of Chemistry."

In recognition of their son, Tom, who received a M.S. in Chemistry from the department in 1976, the department has earmarked the funds for support of the graduate program. Funds will be used for purchase of research chemicals, small equipment purchases, publications' subscriptions and graduate teaching assistantship support. For example, the fund recently purchased an expensive chemical necessary for surface chemistry research being performed by graduate student Anthony Diaz in the research lab of Mark Bussell.

KNAPMAN SCHOLARSHIP ENDOWMENT

On October 28, 1988--his 80th birthday--Dr. Fred Knapman and his wife, Frances, established an endowment with the Western Foundation to "encourage and reward students of superior talent and achievement in chemistry at Western." The endowment currently funds two $1,000 scholarships which are awarded annually to one junior and one senior chemistry major.

Dr. Knapman earned a bachelor's degree from Western in 1934 and then studied at the Univ. of Washington, Columbia Univ. and the Univ. of London. During his 32-year tenure at Western, he served as Professor of Chemistry, Department Chairman and Dean of the College of Arts and Sciences. He retired from the faculty in 1974.

To date, three Knapman Scholarship recipients have graduated and begun graduate studies: Jim Sutton at Stanford Univ., Hannah Morris at the Univ. of Pittsburgh and Don Stone at the Univ. of California, Riverside.

PROGRESSIVE CHEMIST SCHOLARSHIP FUND

In the Fall of 1991, a group of local ARCO employees established the *Progressive Chemist Scholarship*, a $1,000 scholarship funded and awarded annually to an undergraduate or graduate chemistry student who "shows initiative and motivation to study and contribute within the field of chemistry."

The first scholarship was split between two June 1992 BS-Chemistry, Magna Cum Laude graduates--Roger DeClements and Mary Price. Mary left to seek gainful employment and Roger began graduate studies this fall at the Univ. of Washington.

SEMINAR SUPPORT

With the financial support of Georgia-Pacific of Bellingham and royalties from sales of CAI software, authored by various members of the department, we are able to bring off-campus speakers to campus for our academic year seminar program.

Occasionally, the speakers are "department products," such as our most recent speaker, Dr. Dutch VanDevanter (1981 BS-Chem/Biol), now an associate investigator with the Swedish Hospital Medical Center Tumor Institute in Seattle.

Thank You

We wish to thank the following friends and alumni of the Chemistry Department who have donated over the past few years to the *Chemistry Fund*, *Progressive Chemist Scholarship* and the *Knapman Scholarship Endowment*. Several donors work for agencies which offer match dollars, usually on a 1:1 basis. Employers that matched donations are noted in brackets following the donors' names.

Shaun Alexander
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Sheryl Wood [ARCO]
Mark Woodke

EQUIPMENT DONATIONS

In addition to monetary donations in support of the chemistry program, the department has been the recipient of various equipment donations--often arranged by alumni--during the past years. Recent donations include:

From Immunex, a biotechnology firm in Seattle and employer of several of our graduates, a variety of biotechnology equipment.

From STI Optronics of Bellevue, a Varian portable diffusion pumping station. Marc Norsen, a 1980 BS-Chemistry graduate, arranged for the donation.

From ARCO Refinery in Ferndale, a Parr bomb adiabatic calorimeter. The donation was arranged by Brad McCracken, a former MS-Chemistry student.

Looking Back

As the department prepares to vacate Haggard Hall within the year, we thought it appropriate to look back on some department history. What follows is an excerpt from a 1974 *Bellingham Herald* article.

"The foundations of what were to become Western's departments of chemistry and physics were established in 1909 when Harry C. Philippi came from the University of Missouri to teach chemistry and physics, joining the 29 faculty members of the Bellingham State Normal School.

In describing the single chemistry course offered at that time, the 1910 catalog stated: "The major amount of time is spent in the large and well-equipped laboratory where each student works out a course of individual laboratory experiments. The ventilation of the laboratory by an electric fan has proved to be of great comfort when working with disagreeable and poisonous gases."

When Philippi died in 1941, one of his former students, Dr. Fred Knapman, took his place as the sole chemistry teacher. With increasing enrollments after World War II, he was joined by Dr. Marion Besserman, Dr. Lowell Eddy and Dr. Edward Neuzil.

Despite the limited and rather primitive facilities available in the north wing of Old Main, this period provided good undergraduate preparation for students to become science teachers and professional chemists.

The dramatic break for chemistry came in 1960 with the transfer from two small laboratories in Old Main to the $2.5 million Haggard Hall of Science. The principal dedication address was given by Dr. Linus Pauling, winner of the Nobel Chemistry Prize in 1954 and the Nobel Peace Prize in 1962.

With its modern facilities, the chemistry program grew rapidly to its present faculty of 17, all with doctoral degrees."

Chem Careers

A continuing feature of department newsletters will be *Chem Careers*, as reported by chemistry alumni guest writers. Where are our alumni and what are they doing?

Svea Bjorkstam
Environmental Engineer
Remediation Technologies

It may be hard to believe..but I actually **LIKE** going to work in the morning! I graduated from WWU in 1986 with a BS in Chemistry. My first real job was working at ARCO Cherry Point as a lab technician. Working in the lab was always enjoyable for me and ARCO was a good employer. In fact, I hope I wind up working there again in the future. Anyway, being the "outdoors" type, I wanted to get into the burgeoning environmental field and being the "I like school" type, I wanted to go to graduate school. So after two years of working (and a bit of travelling), I went back to school at the University of Washington and graduated two years later with a MS in Environmental Engineering and Science from the Civil Engineering Department.

At present, I am working for Remediation Technologies, Inc. (RETEC) which is an environmental consulting firm with ten offices nationwide. I work out of the Fort Collins, Colorado office where the sun shines more than 300 days a year (no water though). RETEC specializes in the design and implementation of on-site remediation of contaminated groundwater, soils, and sludges. RETEC has a niche in the area of bioremediation which uses microbial action to degrade specific contaminants (I wish I had taken some biochem in school!). My experience working in the refining industry was a real benefit since the oil companies are a major client of the environmental consulting industry. Many of our projects are concerned with cleaning up water, soil and sludges that have been contaminated with petroleum hydrocarbons.

There are several different career paths one could take with an educational background in chemistry. The environmental industry has been a challenging and enjoyable one for me with plenty of field work, lab work, traveling, problem solving, writing and communicating with people.

Ed Note: Although we do not see Svea as often as when she worked next door at ARCO, we continue to follow her career progress with great interest and enjoy her visits to the department when she is in the Pacific Northwest.

Margo Hammond
Senior Lab Technician
ARCO Refinery

The main focus of my position at the ARCO Cherry Point Refinery, Ferndale, WA is the testing of final products, process streams, and environmental waste water testing. This refinery produces diesel fuel, gasoline, jet fuel, butane, propane, and calcined coke (used to make electrodes in aluminum smelting).

Equipment that is in use within the laboratory are: gas chromatograph for simulated distillations of hydrocarbon samples; atomic absorption for trace metal analysis; inductively coupled plasma, also for trace element detection; x-ray fluorescence spectroscopy for trace elements and unknown sample deposits; uv/vis spectrophotometer for water analysis (phenol, hexavalent chromium, etc.). Other equipment that is in use are: automatic titrators; column chromatography for aromatic content in jet fuel; one-cylinder knock engines for octane testing.

The equipment and testing in the lab is monitored through an extensive quality assurance program. We have to have the ability to repair and maintain our equipment as well. When a new piece of equipment is put into service, test methods and calibration manuals are written as well. We use computers extensively within the laboratory and recently had a new LIMS system installed for data entry.

The majority of work time is spent in the laboratory; however I do venture out into the refinery to perform sampling of gas and liquid streams and product tanks, and to monitor the on-line octane engines that aid in the blending of gasoline.

I have quite a few job functions that are not scientific in nature such as: being a participant with the refinery fire team and responding with the ambulance for any medical and fire emergencies; attendance on safety committees; helping to implement a recycle program within the refinery; inspecting the loading of jet fuel onto barges; testing and inspecting of local contract laboratories; and monitoring of pipeline terminal sites in Seattle and Tacoma.

Ed Note: Margo graduated from WWU with a BS in Chemistry/Biology in 1985, after serving as president of the WWU ACS Student Affiliates. In 1990, she returned as a department seminar speaker, and in 1991 Margo initiated establishment of the "Progressive Chemist Scholarship" at WWU. A truly involved alumnus!

John Peterson
Research Technician
Washington State Univ.

The Washington State University Irrigated Agriculture Research and Extension Center (IAREC) was established in 1919 with a staff of two scientists. Today 54 professionals and 100 staff members conduct research on more than 30 crops distributed over 1,190 irrigated acres. The headquarters unit, where I work, is located in the Yakima River Valley about 5 miles northeast of Prosser.

The project I work with concerns the microbiology and chemistry of Washington State wines. We process grapes grown on research plots to make wine for experiments. Our research focus is on bacteria which catalyze the conversion of malic acid to lactic acid. This "secondary fermentation" is important to the sensory characteristics of red and white wines. Forty-five native strains of malolactic bacteria have been isolated, so there is plenty to investigate.

My primary responsibility is method development for the extraction, identification and quantitation of the volatile metabolites of these bacteria. The compounds of interest include terpenes, esters, organic acids, and higher alcohols. Concentrations range from the low part per billions to part per million range. I use capillary GC-FID for quantitation and GC-MS to help with identification of the compounds. I am also involved in experimental design and routine wine analysis. The aspect of this job I enjoy most is the freedom to explore new methods and applications.

Ed Note: John graduated in 1982 with a BS in Chemistry. Then, after several years of employment as a science instructional technician at Wenatchee Community College, he returned to the WWU fold and--under the supervision of Bill Wilson--completed a MS in Chemistry in 1991. During his time as a graduate TA, John served as the department's first instrument technician, instructing students on use of the our new Bruker 300 MHz nmr.

Alumni Focus

Chem Alum at WWU

Our first *alumni focus feature* reports on seven alumni who left Western upon graduation, but eventually returned to campus as WWU employees.

Ruth (Friend) Schoonover

Science Instructional Tech Supervisor
Chemistry Department

BA-Chem in '61, BA Ed-Chem in '66, MS-Chem in '71. As you can see, Ruth can't get enough of the chemistry department! Ruth is our walking history book, as she was a chemistry student in the 50's when the science department resided in Old Main, was around for the move to Haggard Hall, and will be heavily involved--this time as a department staff member--in the move to the new chemistry building during summer 1993.

Ruth grew up in the Nooksack Valley and currently resides at the southern end of Chuckanut Drive with her husband, Bill, and various four-legged creatures. After working as a clinical chemist at Gibbs Lab in Bellingham for five years following graduation from Western, Ruth returned to complete a BA in education. In September of 1966 she was hired by the department as a science technician and began work on her master's in chemistry as well. A university reduction-in-force (RIF) during the early 70s resulted in a move to the Geology Department where Ruth worked as a research technician. In 1981, another RIF resulted in Ruth moving back to chemistry to replace Bob Holland, stockroom manager, who had recently retired.

Today--in addition to her original duties as stockroom manager--Ruth serves as the department's chemical hygiene officer, conducts safety training for all department student workers and research students, supervises lab preppers and is the department's glassworking instructor. Most importantly, she is the *barbecue boss* at department picnics.

In her free time, Ruth volunteers for several organizations and enjoys traveling, especially to their condo on Kauaii (when hurricanes leave it alone).

Terry Meredith

Scientific Services Coordinator
University Instrument Center

BA Ed-Chem in '66, MS-Chem in '73. Terry has included a variety of activities in his work career. Following graduation from Western, he taught at Lake Oswego High School for three years and then spent one year in the Peace Corps, teaching science and math to teachers in the Philippines. Terry then returned to Western to pursue a master's degree under Don King. During that time he began working with campus housing at Fairhaven, served as a residence hall director and stayed on with housing--primarily working in Maintenance and Operations Administration--for a total period of fifteen years.

By 1986, Terry was burned out and ready for a career change. He returned to school to renew his secondary teaching certificate, but in the summer of '87 the scientific services coordinator position with the university instrument center (UIC) was created. Terry applied and was hired.

Terry particularly enjoys the environmental analysis work of the UIC. He assists in the teaching of lab courses that involve instruments housed in the UIC, performs chemical analyses for directed research, and is the university's associate radiation safety officer.

And, yes, Terry does have a life away from work. He lives in a condo on Alabama Hill, with Big Rock Garden in his backyard. When pressed to describe favorite activities away from work, he admitted an interest in gourmet cooking ("everyone says that, don't they?--but I really mean it!"). Terry also enjoys the outdoors and playing acoustic guitar.

Greg Foy

MIS Coordinator
College of Business and Economics

BS-Chem/Biol in '81, MBA in '87. Of this alumni group of seven, Greg has probably ventured the furthest from his chemistry base. A native of Aberdeen, Greg attended community college prior to enrolling at Western. After graduation with honors from WWU, he returned to Aberdeen and worked for two years in construction at the Satsup nuclear plant, in order to support his family--wife Laurie and sons, Adam and Justin--who had "stuck it out" through tight economic times at school with him.

Greg and family eventually returned to Bellingham and he enrolled in the master's in business administration program (that option won out over seeking a master's in chemistry--our loss!). During that time, he developed an interest in computer management information systems (MIS), through his coursework and his work experience with computer-based projects as a graduate teaching assistant.

When the College of Business & Economics created its MIS coordinator position, Greg was hired. The position has continued to evolve over the years, with emphasis on microcomputer user support. Most recently, Greg established a college-wide networking system with 100 micros. Some of his varied responsibilities include training/teaching support in the college's student computer lab, evaluating software/hardware, reviewing periodicals (requiring a "quick read" of up to 300 pages/day), and advising faculty on computer technology.

In addition to his duties at Western, Greg has been involved in private business ventures related to computer services and he continues to teach computer classes for the WWU "After Hours" program . When not at work, he often serves as a taxi driver for his sons (the Foys live in Sudden Valley on Lake Whatcom). As for hobbies, Greg says that "hobbies can come later; any free time I can find I want to spend with my wife."

Truc (Do) Thon

Lab Instructor
Chemistry Department

BS-Chem in '82, MS-Chem in '85. At the age of 15, Truc left VietNam the day prior to the 1975 Fall of Saigon (her father was an officer in the South Vietnamese Airforce Military Intelligence). Truc and her family traveled to Bellingham and, after attending high school--with much time spent adjusting to American culture and picking up a third language, English--Truc took the GED and enrolled at Western in 1978.

Truc started out as an accounting major, moved on to foreign language, then premed and, finally, chemistry. After graduation, Truc began her varied work career in the lab at the ARCO refinery in Ferndale. In 1983 she returned to Western to pursue her master's in chemistry under the direction of Gary Lampman. While completing her thesis research, she worked in the analytical lab at Georgia-Pacific and, after receiving her MS, Truc moved to Seattle and accepted a research position

with NeoRx, a biotechnology firm. However, after two years, she abandoned the big city, returned home to Bellingham and renewed her membership in the Chemistry Summer Social Club. During 1989/90 Truc was a chemistry instructor for Whatcom Community College before we lured her back to serve as the department's vacancy pool laboratory instructor.

In the spring of 1990, Truc married Jerry Thon. They currently live in a home above Chuckanut Drive with four-month-old Alex.

Caroline (Olden) Chamblin

Research Technician
Biology Department

BS-Chem in '82, MS-Chem in '89. From a very early age, Caroline was a "campus brat," as both of her parents were on staff at Western. Fond memories of undergraduate work in the department include labs--especially working with instruments--Neuzil's nuclear chemistry class, and research work with Gary Lampman.

In 1983, Caroline accepted a research position with Immunex, a Seattle biotechnology firm. Lab work focused on isolating cell growth factors. She discovered that she enjoyed biochemistry, so after two years, Caroline returned to WWU and enrolled in the master's program, in order to obtain a formal educational background in the biochemistry field.

Gerry Prody (the department's female biochemist) had just arrived at WWU and Caroline became her first master's student, assisting Gerry with the "start-up pains" of establishing her research lab.

After receiving her M.S. in 1989, Caroline went to work for Seattle Biomedical Research Institute, where she was exposed for the first time to hard-core research in a program dependent on external grants for funding. She also was "exposed to post-docs working like dogs in the lab. It helped me decide against pursuing further graduate work!"

After about a year, Caroline heard (via the efficient WWU Chem Dept grapevine) about the impending arrival of Carol Trent (a geneticist) to join the biology department. Carol was bringing her NIH-funded research program with her to Western and was in need of a research assistant. And that's where Caroline is now--working on the third floor of Haggard Hall, pursuing genetic truths. The object of study: microscopic nematodes (worms!!).

Away from work, Caroline shares a home on Lake Whatcom with her husband, Anson, and their border collie, Charlie. They also have a sailboat and enjoy traveling. Their two month honeymoon travels included visiting the Galapagos Islands and Ecuador. Caroline is also well known within the Haggard Hall crowd for her accomplishments in chocolate cuisine.

Clint Burgess

Instrument Associate
University Instrument Center

BS-Chem in '83. Clint enrolled at Western in 1975, but left for a few years to serve with the Air Force, where he worked on aircraft electronics (a background which would serve him well in the future). Upon his return to Western in 1979, he worked for the department as a lab assistant/prepper and--during his senior year--at Georgia Pacific performing analytical testing in the pulp lab.

In 1983 Clint graduated, with honors, and was selected as the 1982/83 Chemistry Department Outstanding Graduate. That fall he began graduate studies at Stanford University. However, after a year in the program, Clint decided that it was not a good "fit" for him, so--in August of 1984--Clint returned to Western and accepted the newly-created position of Instrument Associate with the University Instrument Center.

Primary responsibilities of Clint's position include repair and servicing of academic scientific instruments, instrument instruction and research supervision, and equipment design and fabrication. Clint is a frequent visitor to our department, as we seem to have more-than-enough pieces of equipment requiring his expert attention.

In his free time, Clint enjoys the outdoor attractions of the Pacific Northwest and he is a charter member of the Chemistry Summer Social Club. Clint and his wife, Cassandra, recently celebrated their first wedding anniversary, and they spend a significant amount of time making improvements to the property recently purchased as a home site in the Ferndale area of Whatcom County.

Jody (Harwood) DeWilde

Outreach Services Coordinator
WWU Tutorial Center

BS-Chem in '86, M.Ed. in '88. Jody graduated from Western with honors and was also named the 1985/86 Chemistry Department Outstanding Graduate. With the support of a two year Woodring Scholarship, she pursued a master's in education and her teaching certification simultaneously. After student teaching at Bellingham High School, she was hired as a temporary biology instructor. This was followed by a variety of work experiences, from private tutoring to employment at ARCO as a field surveillance representative and time spent with the Private Industry Council as a employment/training counselor.

Since September 1991, Jody has been with the Tutorial Center where she is responsible for the training, supervision, and coordination of student tutors who work with groups of students outside the center. Her focus area is math/science, which is a familiar area, since as an undergraduate Jody was employed at the center as a student tutor. It was also during that time that she met her future husband, Jim, a fellow student tutor. Jim is now Jody's co-worker, as he is the coordinator of the Tutorial Center.

In her free time, Jody enjoys cooking, crafts, and playing softball in the WWU faculty/staff league.

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