

# UWF Chemistry

## 2012 Department News



### Department News

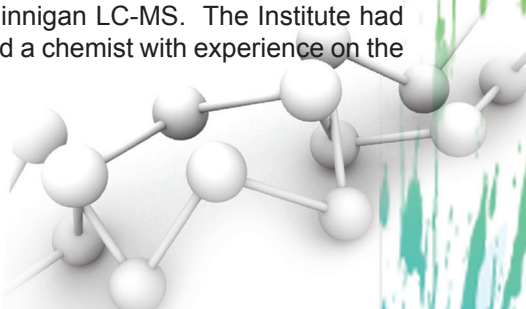
The two years since our last newsletter has been a busy and exciting time at the University of West Florida and in the Department of Chemistry. As of fall 2012, UWF has 12,000+ students enrolled and had ~1400 freshman, both all-time records. Dr. Bense has exciting new plans for growing the University which include new student dorms, new academic programs, as well as new athletic programs (maybe even FOOTBALL!!).

In Fall 2011, there were 153 chemistry majors in the Department of Chemistry and we anticipate graduating 23 new chemistry alumni this academic year. UWF Chemistry students continue to excel in many areas including a very active chemistry club (see later section), increased participation in undergraduate research, and presentations at regional and national scientific meetings. Most recently, we had students present their research at undergraduate research meeting at the University of Memphis and University of North Florida, the Florida Section of American Chemical Society Annual Meeting (FAME), and the National ACS meeting in Anaheim. A group of 12 students attended the National ACS Meeting in San Diego to present nine research posters.

In last two years, more than 48% of our Chemistry graduates have been accepted to chemistry graduate schools at such schools as the University of Oregon, the University of Florida, Florida State, University of Georgia, and more. In addition, 33% of our recent graduates found employment in the chemical industry directly after graduation from UWF with such companies as Pall Corporation, BASF, Pegasus Labs, and McSwain Engineering. Additionally, several recent chemistry graduates have gone to medical and pharmacy schools.

The Department has also benefited from in-kind gifts from various chemical companies. We have received glassware, several gas chromatographs, a prep LC, an HPLC, two GC-MS's, and LC-MS from Solutia of Massachusetts, Pall Corporation, Ascend Performance Materials, and several other companies. We also purchased several new instruments including an IR spectrometer and a UV-Visible spectrophotometer. These items have become vital components of the hands-on experience gained by UWF Chemistry students.

For example, Robby Pelot, BS '10, received a job offer before graduating from Roskamp Institute in Sarasota due to his extensive experience on the new Thermo-Finnigan LC-MS. The Institute had a similar model LC-MS and wanted a chemist with experience on the instrument.





# in this issue

Department News

page 1

Chairman's Letter

page 2

Faculty Updates

page 3

Research Updates & External Grants

page 4

Faculty Pubs & ThermoFisher Donation

page 5

Alumni Student News

page 6

Giving To The Department

page 4

Like Us



Visit Us on the Web at  
[UWF.edu/Chemistry](http://UWF.edu/Chemistry)

## William D. Smart Seminar Series in Chemistry

In February 2011, Mary Smart provided an additional \$10,000 to the Smart Seminar Series in Chemistry. The new gift will allow for expansion of the seminar series to include additional speakers, international scientists, and much more. With William Smart's passing in the March of 2007, Mary continues to participate in the seminar series by attending the public lectures. The seminar series continues to make a tremendous impact on our program. As an example, Josh Brown, a UWF Junior Chemistry Student, was recruited by Dr. Summers during his April visit to conduct summer undergraduate research at UMBC. Josh had a wonderful experience working with Dr. Summers, and will be returning as a student in the MD/PhD program at UMBC in the summer of 2012.



*Dr. Daniel Nocera*

In February 2010, the Chemistry department hosted Daniel Nocera, the Henry Dreyfus Professor of Energy at the Massachusetts Institute of Technology. Dr. Nocera is best known for his research in alternate energy, developing an efficient solar fuel cell featuring a renewable catalyst. He delivered a rousing lecture at IHMC, Personalized Energy for 1 (6 Billion): A Solution to the Global Energy Challenge, followed by a day of discussions with faculty and students and a final seminar at UWF.



*Dr. Michael Summers*

In April 2011, UWF chemistry graduate ('80) Dr. Michael Summers returned to give the Smart lectures. Dr. Summers is a Howard Hughes Medical Institute Investigator at the University of Maryland, Baltimore County, and he received the 2003 AAAS Mentor Award for his role in mentoring underrepresented groups in science. He is perhaps best known for his research using NMR techniques to develop 3D models of HIV viral proteins.

On April 7th, Dr. Summers gave a lecture at IHMC titled The molecules of HIV-1: What they look like and how they can be inhibited. The UWF seminar was followed by a reception co-hosted by the Chemistry department and the UWF Alumni Association. Current

UWF students enjoyed his reminiscences about his time as a student and memories of Drs. Peter Tanner and Jerry Gurst.

The William D. Smart Seminar Series in Chemistry was established in 2005 by Bill and Mary Smart. This endowment has enabled the Department of Chemistry to bring distinguished chemical scientists to campus to present and discuss cutting-edge scientific research as well as issues of interest to an educated public.

## New Faculty



**Dr. Chris Nicholson** is a Visiting Instructor of Chemistry teaching Organic and General Chemistry classes and labs. Chris received a B.S. in Chemistry from Rose-Hulman Institute of Technology in 2002 and a Ph.D. in Chemistry in 2010 from the University of Notre Dame for work in molecular modeling and computational analysis of polyketide anticancer natural products. Chris comes to the area with his wife Laurae who works at Eglin Air Force Base. Outside of class Chris is the Secretary for the local section of the American Chemical Society and also an avid athlete who has competed in numerous triathlons and running races.



**Martha Sarasua** will join the Department in Fall, 2012 as a lecturer where she will coordinate the fundamentals of general chemistry labs as well as student academic advising. She obtained her B.S. in Chemistry from UWF and a doctorate in Physical Chemistry from the University of North Carolina at Chapel Hill, NC. Her specialization was in quantum mechanics, biophysics and laser spectroscopy. Dr. Sarasua then received her medical degree from the same university while serving on the adjunct faculty of the Chemistry Department. She pursued residency training in Neurology and Psychiatry at the Medical University of South Carolina while serving on the faculty of the Departments of Psychiatry and Pharmacy. Dr. Sarasua then completed residency training in Psychiatry at Cleveland Metropolitan General Hospital affiliated with Case Western Reserve University. She maintains an active part-time practice of Neuropsychiatry in Pensacola, FL. Dr. Sarasua remains active in research in the areas of neuropharmacology, plant medicines, traumatic brain injury, post traumatic stress disorder, and advanced theories of brain function and consciousness.

## Faculty Updates and News

**Dr. Fred Hileman** moved to a lecturer position in fall 2011. He teaches organic lecture and lab, analytical lecture and lab and general chemistry lab. Fred is the indispensable "go-to" expert for anything pertaining to GC-MS. He has been responsible for obtaining a variety of analytical instruments. This includes several gas chromatographs which have been used in BP oil spill studies, for organic chemistry lab and a faculty research lab. He recently was given a liquid chromatograph/mass spectrometer which is currently being used to support both internal research and area industry projects. He also received two GC/MS systems from the Solutia plant in Massachusetts and is in the process of making them operational. The department has benefited greatly from his 30 years of industrial experience.

**Dr. Karen Molek** has moved into a tenure-track assistant professor position following one year in a visiting line. She is VERY excited to be in this position and brings a great deal of energy to the department. Karen's defining moments have been seeing her recruitment efforts come to fruition and the continuous refining of her teaching skills through class demonstrations. Her recruitment efforts have included recruiting chemistry majors from her General Chemistry class and sparking interest in BA students enrolled in her Basic Physical Chemistry class. Karen is busy setting up her research lab where her students are stretched WELL beyond the normal chemistry curriculum having to learn electronics, computer programming and computer-automated-design programs. The noise of her vacuum pumps has become a lively background noise in the chemistry department.

**Dr. Tim Royappa** was promoted to full professor. During this time he has received numerous teaching awards including being inducted into the Distinguished Teaching Hall of Fame for receiving his third career Distinguished Teaching award. He has been the faculty advisor for our award-winning chemistry club with only a brief hiatus. He has an active research group whose interests include functionalized hyperbranched polymers and mathematical modeling of multivariable systems. Tim was awarded \$8,296 for an Instructional Technology Enhancement Project (ITEP) to create a functional Chemistry Computation Teaching Space. The room has been upgraded to improve instruction by installing an instructor computer, projector, screen and Mathcad software on all the PCs in the room.

**Dr. Pamela Tanner** was awarded \$58,365 for an ITEP grant to incorporate the MeasureNet electronic measurement network and data collection system into the general chemistry labs. It is a two year project which includes funding for installation of the system and paid student assistance. The project is ahead of schedule. Both sections of General Chemistry I Lab had an opportunity to complete the gas law experiment using the new system in summer 2011. All sections will use it for the gas law experiment and a select cohort will use it for the new thermochemistry experiment in the fall 2011 semester.

**Leo ter Haar** continues to serve as Director for the School of Science & Engineering where he has been successful in increasing the endowments for the allied departments. He has been funded by NASA for a study on the impact of nanophases on the performance of fuel cells, batteries and solar cells and has been collaborating with engineers at GM on the impact of nanostructures in electrochemical systems.

**Dr. Pam Vaughan** was tenured and promoted to associate professor. In fall 2010, she established the Office of Undergraduate Research which provides project and travel grants to undergraduate students from all majors. She also chairs the local section of the ACS's Women Chemist Committee. Pam has an active research group with research interests that include the photoreactivity of benzoquinones. As lead PI on a collaborative grant between Biology and Chemistry, she secured external funding from the Merck Corporation (\$120,000). This program provides stipends for eight students per year for four years. Additionally, she has been the project coordinator for the ACS Project SEED program. Currently, Pam is serving as Co-PI for the NSF Advance Program grant Enhancing a Supportive and Inclusive Culture for Recruiting, Retaining, and Advancing Women Faculty in STEM for \$598,354.

**Dr. Michael Huggins** continues to serve as chair of the Department. Mike's research interests are focused on the synthesis and characterization of pyrrole-based systems for hydrogen bonding and molecular recognition. In addition, he has been involved in several industrial synthesis projects with four different companies that lead to being co-inventor on a patent. Mike co-authored a workbook on 2-D NMR with Jerry Gurst and David Lightner (University of Nevada, Reno) that was published in 2011. During the past year, he co-chaired the Academic Visioning committee which initiated UWF's academic master plan for 2012-2017.



# RESEARCH UPDATES



The Department of Chemistry participated in the UWF Teacher Institute for Physical Science (TIPS), a collaborative program to increase the science content knowledge of active middle and high school science teachers. The program was a collaborative effort between the UWF Departments of Chemistry, Physics and Computer Science with the UWF School of Education and included the Escambia, Santa Rosa and Okaloosa County school districts. Funded through three Florida Department of Education grants totaling \$999,876, more than 40 teachers participated in at least one aspect of the program with 22 teachers completing the entire program and five participants being awarded a Master's Degree in Curriculum Instruction from the UWF School of Education. The teachers ranged from middle school science and math teachers to high school chemistry and physics teachers and represented all three counties.

Participants in the program took both lecture and lab courses in chemistry and physics as well as mathematics and educational pedagogy courses at the graduate level over seven semesters, that were specifically designed to increase the teachers' confidence in and understanding of scientific concepts. The courses involved a mix of face-to-face and online instruction and

always included ample hands-on laboratory experiences. In chemistry, Michael Huggins, Tim Royappa, Pamela Vaughan, Pamela Tanner, Martha Sarasua, and Larry Smith taught various aspects of the chemistry courses related to general and organic chemistry. In addition to lectures, science demonstrations, and hands-on laboratory experiences, the grant also allowed UWF to provide ~\$40,000 of equipment for the teachers to take back into their classrooms.

The Departments involved in this effort continue to look for new ways to continue/expand efforts to assist with K-12 science education. Additional programs are in the works.

## *BP Oil Spill - Fred Hileman*

The BP oil spill during the Spring of 2010 provided a real opportunity for the Chemistry Department in cooperation with the Center for Environmental Development and Bioremediation (CEDB) to give assistance to the local authorities in understanding the extent and impact of the oil spill on the Pensacola area. This began with routine analyses of water and beach sand for the presence of aliphatic hydrocarbons which make up the major components of the oil. As the spill continued and was then contained, these aliphatics began to disappear and our analyses then shifted to the more recalcitrant compounds, in particular the polynuclear aromatics (PNAs). At first they could be detected in the sand and water but as time when on the levels decreased and an alternative technique for determining contamination had to be found. The new technique centered on the use of the Coquina Donax variabilis (Coquina clam) as an indicator of oil contamination. This little clam is a filter feeder and lives in the intertidal zone, exactly where the oil contamination would be expected to be found. An analytical technique was developed where tissues from these clams from various beach locations were digested and taken through an extensive cleanup procedure to isolate the PNAs that were present. These PNAs were then analyzed by gas chromatography/mass spectrometry using stable isotopes of the PNAs to permit routine part per billion (1 part in  $10^9$ ) level analyses. This analysis has concentrated on the primary components of the PNAs including anthracene, phenanthrene and chrysene. Levels found in these clam tissues are typically over 200x the concentrations found in the surrounding sediment making these little clams excellent sampling devices for accumulating the PNAs for subsequent analysis. To date, the clams harvested from the Perdido Key area have shown the highest levels of PNAs which is consistent with Perdido Key being one of the more significantly impacted areas along the Florida coast.

## 2010-2011 EXTERNAL GRANTS AWARDED

### *External Competitive Grants Awarded*

- Huggins, Co-PI (three total PI's) 2011 Florida Department of Education, Teacher Quality Grants Program; Total Award: \$288,000. (Phase III)
- Huggins, Co-PI (three total PI's) 2010 Florida Department of Education, Teacher Quality Grants Program; Total Award: \$344,491. (Phase II)
- Huggins & Royappa, Co-PI's (six total PI's) 2009 Florida Department of Education, Teacher Quality Grants Program; Total Award: \$344,491. (Phase I)
- Vaughan, Co-PI (five total PI's) 2011 National Science Foundation ADVANCE program, Total Award: \$598,354.

### *External, Non-competitive Contracts Awarded*

- Huggins & Dr. Alan Schrock Pall Corporation, Membrane Cross-linker Synthesis, \$33,066, 2011-12
- Hileman & Huggins (three total PI's) BioBlend, BioBlend Technologies Consultation, \$61,973.
- Huggins and Dr. Alan Schrock Segetis, Synthesis and Characterization of Novel Polymers, \$17,614, 2010-11.
- Huggins, Pall Corporation, Synthesis of Norbornene Derivatives, \$6,664, 2010.
- Royappa, Plasmine Technology, Paper sizing products, \$5,914, 2010.

# Faculty Publications

## Patents -

1. Nitzman, A.; Huggins, M.; Reeves, J.; Royappa, A. "Imidized and Amidized Rosin Compositions for Paper Sizes and other Applications", Plasmine Technology, Inc, patent filed in US, June, 2010.

## Publications - Books, Book Chapters or Invited Review Articles

1. Huggins, Michael T and Boiadjev, Stefan, E "Molecular Recognition with Dipyrinones", Encyclopedia of Supramolecular Chemistry, 2010, posted online April 6, 2010, awaiting printing of actual book. (INVITED; PEER REVIEWED)
2. Huggins, M. T.; Lightner, D. A.; Gurst, J. E. 2D NMR-based Organic Spectroscopy Problems; Prentice-Hall: Upper Saddle River, NJ, 2011.

## Peer Reviewed Journal Articles - [Undergraduates Underlined]

1. Walton, Ian; Davis, Marauo; Yang, Liu; Zhang, Yong; Tilman, Destin; Huggins, Michael. T.; Wallace, Karl J. Mag. Res. in Chemistry, 2011, 5, 205-212.
2. Huggins, Michael T, Salzmeda, N. Lightner, D. A. "Dipyrinones as a Receptor for Carboxylic Acids" Supramolecular Chemistry, 2011, 3-4, 226-238.
3. Pamela P. Vaughan, Avery Bullock, Fabien Joux, Wade Jeffrey "The effects of solar radiation on the stability of 3H-thymidine and 3H-leucine during bacterioplankton production measurements" Limnology and Oceanography: Methods, 2010, 8, 562-566.
4. Pamela P. Vaughan, Paul Novotny, Nicole Haubrich, Luther McDonald, Michael Cochran, Julia Serdula, Raid W. Amin, Wade H. Jeffrey, "Bacterial Growth Response to Photoactive Quinones" Photochemistry and Photobiology, 2010, 86, 1327-1333.
5. Pamela P. Vaughan, Michael Cochran, and Nicole Haubrich "Quinone Photoreactivity: An undergraduate experiment in photochemistry" Journal of Chemical Education, 2010, 87 (12), 1389-1391.
6. A. T. Royappa, V. Suri, S. E. Genet and D. J. Pope "Some New Closed-Form Empirical Modified Lennard-Jones Potentials" Journal of Undergraduate Chemistry Research, 2010, 9, 102-105.

RESEARCH

# ThermoFisher Scientific Donates Instrument

By Lauren Haggett, University Communications



Liquid Chromatograph/Mass Spectrometer

A \$35,000 scientific instrument donated to the University of West Florida will enable chemistry students to have hands-on experience as undergrads. Thanks to the chemistry department and the diligent efforts of Frederick Hileman, Ph.D., research associate, Visiting Assistant Professor in Chemistry and mass spectrometry expert at UWF, the department is now the new home to a liquid chromatograph/mass spectrometer (LC/MS). The new instrument is superb for analyzing highly polar compounds, a class of compounds that could not be readily analyzed before at the University.

"I look forward to using the LC/MS with my current undergrad research," said Kyrsten Mckeand a junior majoring in Biochemistry. "It has an endless amount of applications and is a great addition to the department."

Hileman saw the need for an LC/MS at UWF and approached the manufacturer, ThermoFisher Scientific, last year about donating one of their expensive instruments to the University. In January 2011, Hileman received the phone call he and the chemistry department had been waiting for. The manufacturer had taken a LC/MS on trade and was willing to donate the instrument to UWF.

The LC/MS arrived at UWF at the beginning of the year, and there was no time to waste in setting up the equipment. "The students are standing in line waiting to be able to use the new instrument," said Hileman. "We have the equipment in house right now and are running the necessary power and gas lines. It just so happens that the service man for this instrument, Mark Mager, lives in Pensacola and is a graduate of UWF. He is donating his time to install the LC/MS for us and to give us the initial training."

The LC/MS will provide UWF students a new set of eyes for analysis that was not previously available. "Having this capability is invaluable for our students who will now be trained and experienced in using this type of instrumentation when they leave UWF," said Hileman. "We will be using the LC/MS to study water samples from the Gulf of Mexico and analyze it for Corexit, the surfactant that was put in the gulf to disperse the oil after the Deepwater Horizon Oil Spill in April 2010."



# Alumni/Student News

Chris Culbertson, '91, was presented with the Distinguished Alumnus award on April 2, 2011. Several chemistry faculty were in attendance at the awards ceremony which was attended by Chris and his daughter. It was wonderful to catch up on his active life and distinguished career. He is now an Associate Professor at Kansas State University where his research interests focus on "developing novel separation and sample handling components for microfluidic (Lab-on-a-Chip;  $\mu$ TAS) devices and then using these devices to solve interesting bioanalytical problems with special emphasis in the areas of protein separations and single cell analysis." Following graduation Chris received his Ph.D. at the University of North Carolina at Chapel Hill ('96) and went on Oak Ridge National Laboratory where he was a postdoctoral associate (1996-98) and a research scientist (1998-2002). He was the recipient of the ACS Division of Analytical Chemistry Young Investigator Award in Separation Science in 2006. In 2006 he also earned a \$530,000 NSF grant to develop the "lab-on-a-chip" technology. In 2007, he went on to win a Masao Horiba award presented during a special ceremony at Kyoto University in Japan. He is the recipient of a five-year CAREER award from the National Science Foundation and Kansas State's Segebrecht Distinguished Faculty Achievement Award. The UWF alumnus awards are given to those graduates who work to help and promote the university and Chris is certainly an exemplar of that dedication.



## Chemistry Club Awards

In 2010, the Chemistry Club received a Green Chemistry Chapter award from the American Chemical Society. The club president that year, Deborah Barkley, was particularly active in getting the club to participate in Earth Day and other "green" activities.



Also, in 2011, the Chemistry Club received an Honorable Mention award from the ACS for its activities in the 2010-2011 school year. That year, club president Matt Savoie (left in photo at left) was successful in cooperating with other student organizations to host a joint club fair and barbecue next to the science building (photo at right). The club also reached out to elementary school students as part of a local Science Saturday event during National Chemistry Week. They've set the bar high for this year's club members!

## 2010-11 and 2011-12 Undergraduate Scholarships in Chemistry

The Department of Chemistry awarded \$10,000 in scholarships in the 2010-11 academic year and \$13,900 for the 2011-2012 academic year to ten and twelve undergraduate chemistry students, respectively. The endowed scholarships included the Ralph K. Birdwhistell Scholarship and the Grace Chiu Scholarship which are in honor of two of the founding faculty members in the Department of Chemistry. We also awarded the Pall Corporation scholarship that is annually supported by Pall Corporation and is directed towards students from Escambia and Santa Rosa counties pursuing a degree in chemistry. Pall has been a wonderful supporter of the chemistry program at UWF via additional support for Project SEED and the hiring of chemistry undergraduate student interns.

Numerous department scholarships were also awarded to deserving students that demonstrated excellent performance in their chemistry programs. The faculty of the Department of Chemistry are very pleased and proud to be able to provide financial support to students pursuing an education in chemistry.

All scholarship awards are supported entirely from the very generous donations of alumni, faculty, and friends of the UWF Department of Chemistry.

## Giving to the Department

### Supporting the Department

**News from the UWF Foundation:** The Foundation strives to ensure that all donations are quickly processed and that the appropriate details are efficiently communicated to the corresponding UWF departments and programs. During this fiscal year, the Foundation has implemented a database and accounting software conversion designed to streamline and enhance all processes and procedures. However, during this conversion and until all reports are written, rewritten and updated, departments are experiencing a delay in receiving reports of the gifts designated to their respective departments and programs. If you have not been thanked specifically by the Chemistry department, please be patient during this period of transition. We appreciate your support.

**Founding Chemistry Faculty Endowment:** With the assistance of many generous donors, the Department of Chemistry is proud to announce that the Founding Chemistry Faculty Endowment has been established in the UWF Foundation. The endowment was created to award scholarships in honor of the founding Department of Chemistry faculty – Drs. Birdwhistell, Chang, Chiu, Gurst, Halpern, and Tanner. As most of you know, these inspirational chemists were the original faculty members who were hired shortly after UWF opened its doors in 1967. Each of the six stayed at UWF for at least 30 years before retirement. During their time at UWF, they mentored hundreds of students who went on to be scientists, physicians, educators, and more. This endowment will ensure their dedication to UWF and its students will always be remembered. With an initial balance of \$25,000+, we anticipate awarding the first Founding Chemistry Faculty scholarship in the fall 2012 to a deserving chemistry student.

### 2010-2011 Chemistry Supporters

The Department would like to thank the following alumni and friends for their generous support during the 2010-2011 academic year. This allows us to offer undergraduate student scholarships and awards, in addition to enhancing our instructional and research activities. Thank you very much and we hope you can continue this philanthropic support.

GlaxoSmithKline  
CIBA Specialty Chemicals Foundation  
Proctor & Gamble Matching Gift Program  
Pall Corporation  
IMS Health, Inc.  
Cardinal Health Foundation, Inc.  
Dr. Mark E. Ates  
Ms. Gabriela Bambrick-Santoyo, MD  
Mr. and Mrs. Wayne F. Beyer, Jr  
Dr. and Mrs. Johnnie L. Bilbrey  
Dr. Kurt R. Birdwhistell  
Mrs. Miriam P. Birdwhistell  
Mr. Jeremy Michael Bosso  
Drs. Wayne and Christie Brouillette  
Mrs. Elizabeth S. Calhoun, REM, CESM  
Dr. Allen D. Clauss  
Mr. and Mrs. John F. Cline  
Dr. Christopher T. Culbertson  
Ms. Debbie L. Dahlin  
Ms. Carrie A. Delcomyn  
Ms. Dayle A Dierks  
Ms. Marsha Lee Endy  
Mr. Sandor F. Genet

Mr. Richard J. Gilmartin  
Mr. Paul G. Hinson  
Dr. Michael T. Huggins  
Mr. Robert W. Joseph  
Dr. Larry Manziek  
Mrs. Jamie L. Moore  
Mrs. Dana K. Nagel  
Dr. Alan Nitzman  
Dr. Arun T. Royappa  
Mr. Swadesh R. Samanta  
Dr. Cossette J. Serabjit-Singh  
Mr. Egbert J. Serrao, M.D.  
Mrs. Mary J. Smart  
Dr. Scott K. Spear  
Mr. Dewey Denvar Steadman  
Dr. Michael F. Summers  
Ms. Elaine S. Swanson  
Mr. and Mrs. Charlie L. Switzer  
Dr. Pamela and Mr. David Tanner  
Dr. and Mrs. Stephen P. Tanner  
Mr. and Mrs. Larry W. Tucker  
Dr. Pamela P. Vaughan  
Mr. Jack D. Watt





Department  
of Chemistry

College of Arts  
and Sciences

11000 University Parkway • Pensacola, FL 32514

2012

# UWF Chemistry Department

