



Chemistry & Biochemistry

Three Win Goldwater Scholarships



In an EXCEL Scholars project, Alison Campbell '04 (right) assisted Joseph Sherma, Larkin Professor Emeritus of Chemistry, in uncovering inaccuracies in listings of active ingredients in dietary supplements.

Alison N. Campbell '04, Elizabeth L. Ponder '04, and Meghan C. Ramsey '04 were among the 300 sophomores and juniors nationwide selected to receive Goldwater Scholarships, the premier undergraduate award in science, engineering, and mathematics. Goldwater Scholars are selected for academic merit, outstanding potential, and intention to pursue careers in natural sciences, engineering, or mathematics.

Ponder, a biochemistry major with a second individualized major in cultural biomedicine, was also selected as one of just ten undergraduate students in the nation to participate in a prestigious National Science Foundation (NSF) program. She spent the summer conducting research to develop a faster, more cost-efficient method of screening cancer drugs for toxic or beneficial effects at the Keck Graduate Institute's Summer Undergraduate Research in Biotechnology and Bioengineering, Claremont, Calif.

A Marquis Scholar, Ponder has done EXCEL research with faculty and coauthored an article about the physiology of a parasitic flatworm in the journal *Parasitology Research* with Bernard Fried, Kreider Professor Emeritus of Biology, and Joseph Sherma,

Larkin Professor Emeritus of Chemistry. She also coauthored an article with Fried about the effects of temperature on the flatworm that was published in *Journal of Helminthology*. She has presented her research at the National Conference on Undergraduate Research and Pennsylvania Academy of Science.

"I hope that my research this summer, in combination with the EXCEL research I have done at Lafayette, will better prepare me for graduate school and a career in research," says Ponder, who plans to earn a Ph.D. in virology, and then teach and conduct research focusing on the human immune response to viral infections.

Campbell, a biochemistry major and Trustee Scholarship recipient, plans to obtain a Ph.D. in chemistry, focusing on organometallic research. "The rich academic setting at Lafayette, coupled with close faculty-student interaction, are providing a strong foundation for learning," she says.

As an EXCEL Scholar, Campbell conducted organometallic research with Chip Nataro, assistant professor of chemistry, and chromatography research with Joseph Sherma, Larkin Professor Emeritus of Chemistry, coauthored papers, and presented



Elizabeth Ponder '04 (right) studies the flatworm *Echinostoma caproni* in EXCEL Scholars research with Bernard Fried, Kreider Professor Emeritus of Biology.

(continued on page 3)

Gindt Receives National Institutes of Health Grant



Katie Thoren '06 (left) researched protein-folding mechanisms as an EXCEL Scholar with Yvonne Gindt, assistant professor of chemistry.

Yvonne Gindt, assistant professor of chemistry, has received a three-year, \$100,000 grant from the National Institutes of Health to continue her research with students on protein folding and aggregation, processes linked to a wide range of diseases, including Alzheimer's, Parkinson's, diabetes mellitus, and emphysema.

Chemistry major Katie Thoren '06, and biochemistry majors Steven Presciutti '05 and Maura Scolere '05 worked with Gindt on the project through Lafayette's EXCEL Scholars program, in which students collaborate with faculty on research while earning a stipend.

Gindt investigated improper folding of proteins with three students who presented their findings last year at the Intercollegiate Student Chemists Convention in Annville, Pa.

They include Meghan Ramsey '04, recipient of a Trustee Scholarship and the national Goldwater Scholarship, the

(continued on page 6)

Four Graduate with Honors

At the May commencement, four students graduated with honors in chemistry by carrying out independent research under the tutelage of a faculty member.

Stacey Wagner '03, B.S. biochemistry, worked with Yvonne Gindt, assistant professor, to investigate the rate of protein folding. A variety of diseases such as Alzheimer's have been linked to improper folding of proteins. Wagner investigated the kinetics of refolding and aggregation of two colored proteins. She discovered that even though the proteins were very similar in sequence, one protein had a tendency to oligomerize prior to refolding while the second protein simply refolded. Wagner is attending the University of Colorado at Boulder pursuing a graduate degree in biochemistry.

For her honors project, Abby O'Connor '03, B.S. chemistry, investigated the heat of protonation of 1,1'-bis(diphenylphosphino)ferrocene (dppf) and 1,1' bis(diphenylphosphino)ruthenocene (dppr). Both dppf and dppr have been bonded to a variety of transition metals and many of those compounds have found applications as catalysts. Frequently, the dppf and dppr catalysts are superior to previously known catalysts, although it is not well understood why this is the case. The heat of protonation studies that O'Connor performed determined the basicity of dppf and dppr and will aid in understanding why dppf and dppr improve some catalysts. She is attending the University of North Carolina at Chapel Hill to pursue a degree in inorganic chemistry.

In her honors thesis Amanda Ohs '03, B.S. biochemistry, investigated transition metal compounds containing a dppf ligand. In particular she focused on compounds of chromium, molybdenum and tungsten. These compounds allowed Ohs to investigate the different ways that dppf can bond to transition metals. She is now studying at the University of California, San Diego. Ohs plans to study X-ray crystallography, a technique she became interested in during her research at Lafayette.

(continued on page 6)

From the Department Head

On behalf of the department of chemistry, I am pleased to introduce the first issue of our newsletter. Whether you are a recent alum, a not-so-recent alum, or someone with little familiarity with our department, it is our hope that this periodic publication will be an interesting and informative summary of our recent departmental activities, major programs in chemistry and biochemistry, as well as the interests and accomplishments of our students and faculty.

There has been a great deal of positive change in the department of chemistry in recent years. Our physical facilities have undergone a significant expansion, including a remarkable transformation of the former Olin Hall of Science. The project was completed in January of 2001, and Hugel Science Center provides classroom and laboratory facilities for teaching and research in chemistry and physics that we believe are among the finest at any undergraduate institution. These facilities have already had immeasurable impact on our recruiting of outstanding new students and faculty, our approaches to classroom and laboratory teaching, our ability to effectively conduct student/faculty collaborative research, and the ways that we interact with students both inside and outside of our classrooms and laboratories.

There have been quite a few changes to our faculty and staff over the past several years, and our new and continuing faculty members bring to our students a strong and diverse background in various areas of chemistry, and share a sincere dedication to bringing out the best in all of our students in the classroom and the laboratory. The department continues to offer a major in chemistry with a curriculum that is certified by the Committee on Professional Training of the American Chemical Society, and we continue to emphasize our commitment to the importance of faculty/student research collaborations as a critical element of an undergraduate education in chemistry. Sparked by faculty with innovative ideas and a valuable external program review in the fall of 2002, we are in a strong position to make adjustments to our curricular offerings to ensure that we continue to offer major programs in chemistry and biochemistry that can most effectively serve our students.

The quality and success of our programs depend not only on the innovations that our faculty implement and their knowledge of educational trends in their chemical subdisciplines, but also on the feedback and advice that we receive from our alumni as they progress in their subsequent education and careers. We welcome and encourage our alumni to contact us to offer observations, recommendations, and advice that can help us to continue to adjust and update our courses and programs so that our majors can continue to be well prepared for the opportunities that await them upon graduation from Lafayette. Our students are often inspired by the successes and career directions of our alumni, and we encourage our alums to keep us up to date on their activities and to visit the department.



Michelle Ferguson '04 (right) studies ways glycerol is produced by certain algae in EXCEL Scholars research with H. David Husic, professor and head of chemistry.

A handwritten signature in black ink that reads "H. David Husic". The signature is fluid and cursive.

H. David Husic

Chemistry & Biochemistry Newsletter is published annually by the Department of Chemistry for chemistry and biochemistry alumni and students, with the assistance of the Office of Public Information. Photography by David W. Coulter, Joe Edelman, and Rick Smith. Send news, comments, and letters to the address or numbers below.

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Nataro Receives Petroleum Research Fund Grant

Chip Nataro, assistant professor of chemistry, received a \$35,000 grant from the Petroleum Research Fund administered by the American Chemical Society to continue research with students that will help the chemical community know when certain compounds are ideal to use without having to test them.

"Lafayette students are a major part of this research," says Nataro. "My students have done some great work to date, and I would say that was a big help in getting this grant. We are looking to build on the work we have already accomplished and hopefully answer some very interesting questions."

Some preliminary work for the project was conducted through Lafayette's EXCEL Scholars program by chemistry major Abby O'Connor '03 and biochemistry majors Amanda Ohs '03, Michelle Ferguson '04 and Alison Campbell '04.

"We are looking at a series of compounds that have two interesting features," says Nataro. "First, these compounds have a metal atom at the center. Second, there is a phosphorus atom at both ends of the molecule. These phosphorus atoms are capable of grabbing a second metal atom. When our molecule grabs a second metal, it is called a ligand. The unique part of our molecule acting as a ligand is that it has a metal atom at the center. There are many ligands with two phosphorus atoms, but few with a metal atom in the center."

Many studies have shown that the type of ligands the Lafayette researchers are studying behave differently than those without a metal center. They become more reactive in some cases and less reactive in others.

"The reason for these differences is not understood, and that is where we



Laura Hagopian '06 (left) works with Chip Nataro, assistant professor of chemistry, on research funded by a grant from the Petroleum Research Fund. Hagopian is investigating the effect of different organic groups on the electrochemistry of the metal center.

hope to answer some questions," Nataro explains. "To begin with, we will be looking at the free molecule. We have to understand how it behaves before we bond it to a second metal. Once we have an understanding of the compounds, we will investigate what happens when they become ligands."

"One of the best things that Lafayette offers to its students is research opportunities," says O'Connor. "Lafayette provides such an excellent environment for research. Hugel Science Center has state-of-the-art instruments and laboratories. The campus is

small enough so those who want the chance to do research have the opportunity to do so. My choice to come to Lafayette was definitely the best decision I ever made."

"Lafayette has wonderful facilities," adds Ohs. "The small, strictly undergraduate atmosphere allows students to get opportunities that puts us ahead of most other students elsewhere." ■



Three Win Goldwater Scholarships

(continued from page 1)

research at an American Chemical Society meeting.

Campbell discovered her love of chemistry in fifth grade when she won first prize at her first science fair. She enjoyed "the uncertainty and excitement of experimentation, working through the logical process of inquiry, seeking explanations for findings, and developing defensible conclusions." Already dedicated to a career in chemistry, she says, "the research projects have strengthened my career choice. The laboratory provides me with the opportunity to make a

contribution to the scientific community."

The goal of Ramsey, a neuroscience major, is to obtain an M.D./ Ph.D. in biomedical research investigating the biochemical mechanisms that cause diseases in humans and treatment options. This will "allow me to conduct important research on humans that I could not do with just a Ph.D.," she says.

Ramsey has conducted EXCEL research on phycocyanin and DNA photolyase with Yvonne Gindt, assistant professor of chemistry. "Every day I am presented with challenges and obstacles," she says. "Working through

problems rationally when there is not always an apparent logical answer has been extremely rewarding."

Ramsey also investigated tumor biology at the Mayo Clinic as a Mayo Summer Undergraduate Research Fellow. ■



Faculty Update

JOANNE FOLLWEILER, visiting assistant professor

Her recent research interests include the synthesis of sulfur substituted porphyrins, the role of microwave radiation in rates and yields of organic reactions, and the oxidative process involved with antioxidants such as gallic and citric acids. Her present pedagogical focus is developing new analogies for the mole.

YVONNE GINDT, assistant professor

She is currently studying the fundamental processes that occur with protein folding and oligomerization to active protein complexes. She is using a unique protein system, phycocyanin, to study these fundamental processes. The research is funded through NIH. In the last two years, several students have contributed to this research. As an EXCEL scholar, **Jessica Jamhoury '03**



developed some of the basic procedures necessary to denature the protein. **Stacey Wagner '03** initiated studies on isolated α and β subunits of phycocyanin for her honor's thesis, and **Steven Presciutti '05** is continuing those studies as an EXCEL scholar. **Meghan Ramsey '04** (pictured above) worked out the procedures for using a stopped flow mixer to study the refolding of the $\alpha\beta$ heterodimer using absorption spectroscopy. **Katie Thoren '06** is building upon Ramsey's work using fluorescence spectroscopy to monitor the binding pocket kinetics of the heterodimer. **Katelyn Connell '04** and **Maura Scolere '05** have initiated projects studying the higher order structures of hexamer and trimers. Connell will continue her studies to complete an honor's thesis.

Along with protein folding processes, Gindt is also interested in the DNA repair enzyme, DNA photolyase. She is using absorption and emission spectroscopy to study the mechanism that the enzyme uses to recognize damaged DNA. Ramsey is measuring the kinetics of photolyase binding to DNA in which the damage on the DNA is either at the end of the strand or in the middle of the strand, and will continue this work for her honor's thesis.

KENNETH HAUG, assistant professor

A specialist in computational kinetics and surface growth, Haug worked with **Nate Lonergan '04** (pictured right) this past summer on a computational project that examines the growth patterns of Ni-Cu alloy surfaces formed during epitaxial (atom-by-atom) growth. An understanding of the detailed mechanism by which such metallic surfaces grow is useful for control of the surface morphology and therefore of the chemical, electrical, and magnetic properties of high performance alloys which are of interest in microelectronic device engineering as well as in catalysis. Experiments have shown that epitaxial growth can give rise to rough or smooth surfaces depending on the growth conditions, indicating that a variety of competing mechanisms is involved. The computational research is designed to give a detailed atomic/molecular level understanding of such mechanisms that can then be compared with experimental results. This work is a direct extension of previous



research that was carried out by several students in Haug's group over the last several years: **Nhat-Khai N. Do '98** published in *Phys. Rev. B*, 60, p. 11095, (1999); **Timothy Jenkins '99** published in *J. Phys. Chem. B*, 104, p. 10017, (2000); **Jessica Jamhoury '03** published in *J. Phys. Chem. B*, 106, p. 11253 (2002); and **Gretel Raibeck '03**, submitted to *J. Phys. Chem. B*.

TINA HUANG, assistant professor

Huang started at Lafayette this fall, having most recently served as a staff scientist at the National Institutes for Standards and Technology. She earned her Ph.D. in analytical chemistry at the University of Kansas. Huang's teaching responsibilities include analytical and introductory chemistry, and she will be carrying out research involving surface measurement techniques to characterize biomolecule-modified surfaces and biosensor development.

H. DAVID HUSIC, professor and department head

The 2003-04 academic year is Husic's seventh as head of chemistry. "It has been both a challenging and rewarding time, with the construction of Hugel Science Center, the associated renovation of the former Olin Hall of Science, and many changes in the faculty and staff members in the department," he says. Husic (pictured right with **Gina Nubile '01**) teaches three biochemistry courses, as well as a First Year Seminar that focuses on topics relevant to risk assessment, management, and analysis. He continues to study various aspects of photosynthetic carbon metabolism in the unicellular green alga, *Chlamydomonas reinhardtii*. For many years he has worked with students to study aspects of the mechanism for inorganic carbon acquisition and concentration, and the roles and properties of the carbonic anhydrase enzymes that are involved in the process. In the past year with the work of **Michelle Ferguson '04** and **Karin Hessler '03**, they have made progress in the characterization of the pathway for the accumulation of glycerol in this alga, which accumulates as osmoregulatory solute in response to osmotic stress. This new work is an extension of research that Husic initiated many years ago, and began to revisit during a sabbatical leave in 2001.



WILLIAM MILES, associate professor

Varun Mehta '06, an electrical and computing engineer major, worked with Miles during the summer of 2003. Mehta's project is a continuation of the research started by **Katelyn Connell '04** (pictured right), who looked at the furan approach to the synthesis of Vitamin D analogues. Connell successfully completed the first phase of this project, which resulted in a paper that appeared in *Tetrahedron Letters* earlier this year. Mehta has made significant progress in the synthesis of calcitriol, the hormonally active form of Vitamin D and the most important synthetic target in the area of research; Miles hopes to publish this work early next year.



Miles also gave seminars on the Vitamin D work at the national meeting of the American Chemical Society in August 2002 and the Middle Atlantic Regional Meeting at Princeton University this June.

CHIP NATARO, assistant professor

Since his arrival in 1999, Nataro's research has focused on organometallic chemistry with particular interests in thermochemical, electrochemical, and catalytic studies. He primarily looks at compounds containing bidentate phosphines that have a metallocene backbone. These phosphines have seen extensive use as ligands in catalysis. It is generally known that the metallocene backbone makes for a good catalyst, but it is not well understood why. He is seeking to answer that question using a variety of methods.



As part of her senior honor's thesis, Abby O'Connor '03 investigated the basicity of two of these metallocene-containing phosphines. By determining how basic these phosphines are, a measure exists of how electron donating they are in comparison to other phosphines. In her senior thesis, Amanda Ohs '03 (pictured above) investigated the electrochemistry of chromium, molybdenum, and tungsten compounds containing dppf in a variety of bonding modes. Goldwater recipient and EXCEL Scholar Alison Campbell '04 has been looking at the catalytic activity of compounds containing dppf and dppr. She gave an oral presentation of her work at the American Chemical Society this September. This work has been funded in part by a grant from the Petroleum Research Fund administered by ACS.

Nataro is involved in a number of collaborations. The senior thesis of Dan Ruddy '03 was a continuation of a project begun as an REU program at the University of Pennsylvania. Nataro has also had numerous crystal structures determined by Dr. Arnie Rheingold at the University of California, San Diego. It was through this collaboration that Nataro met Chris Incarvito '96 who is a co-author of a recent paper.

CHARLES NUTAITIS, associate professor

His research is in the area of organic synthesis, focusing on the development of new synthetic methodologies as well as total synthesis. The synthetic methodology research employs sodium borohydride in combination with carboxylic acids to accomplish transformations not possible with the use of sodium borohydride alone. Nutaitis and Tom Greshock '99, Steve Houghton '00, Lynn Moran '99, and Melissa Walter '99 were coauthors of "Reduction of Pyridyl Carbinols with Sodium Borohydride/Trifluoroacetic Acid," published in *Organic Preparations and Procedures, International*, 2001. Brett Swartz '04 is currently applying this methodology to the reduction of 1,3-azole based secondary alcohols.

The total synthesis portion of Nutaitis' research is primarily in the area of aromatic heterocyclic chemistry as well as natural products. Emphasis is on the synthesis of new heterocyclic ring systems and natural products total synthesis. Megan Brennan '02, who is currently pursuing a Ph.D. in organic chemistry at Stanford University, developed a synthesis of three new pyrido[2,7]naphthyridines; an article will be submitted for publication in the near future. A project focusing on the total synthesis of angoluvarin, a natural product

isolated in 1987 that has never been synthesized, is nearing completion by Nutaitis and his students.

JOSEPH SHERMA, Larkin Professor Emeritus of Chemistry

An emeritus professor since 2001, Sherma continues an active research program, working closely with students. His research program focuses on two areas: analytical method development, and interdisciplinary research in analytical chemistry and invertebrate



biology. He and his students develop and validate new and improved quantitative high performance thin layer chromatography (HPTLC) methods for analysis of pharmaceuticals, food and beverage ingredients and additives, cosmetics, dietary supplements, and pesticides in environmental samples.

His second research area involves collaboration with Bernard Fried, Kreider Professor Emeritus of Biology. Their joint work began in the 1980s and has included studies on the chemical content (i.e., lipids, phospholipids, pigments, sugars, amino acids, and metal ions) of parasitic flatworms and medically important snails, pheromones released by parasites and snails, and the chemical composition of various snail food items.

Students whose research Sherma has supervised recently include Alison Campbell '04, Beth Ponder '04, and Jessica Schneck '04. Among their research projects, which have all involved analyses by quantitative HPTLC, Ponder determined the free pool amino acid content of four larval stages of the medically important digenetic trematode *Echniostoma caproni*, Campbell developed and validated a new method for assay of tablets containing the laxative bisacodyl, and Schneck analyzed the neutral lipids and phospholipids in *Helisoma trivolvis* snails maintained on different diets. Daniel Ruddy '03 worked with Sherma on research that led to the development of three new HPTLC pharmaceutical analytical methods. Caitlin Sullivan '05 (pictured above) is working as an EXCEL Scholar with Sherma this semester.

Sherma's and Fried's interdisciplinary research has been supported for the past three years through the Dreyfus Foundation Senior Scientist Mentor Program. Sherma has applied for renewal of this grant to fund their work with students over the next two years on the analysis of lipids and compounds of other classes in the medically important leech *Hirudo medicinalis* and the economically important land snail *Helix pomatia*. The latter is the edible snail used for escargot throughout the world. *H. medicinalis* is used in human medicine in the treatment of wounds that require the use of the natural anticoagulant (hirudin) produced in the salivary gland of the leech. An invited journal article describing in detail the collaborative program and listing their publications with research students (mostly biochemistry majors) is available at <http://www.soc.nii.ac.jp/scs/pdf/22-1_17.pdf>. ■



Gindt Receives National Institutes of Health Grant

(continued from page 1)

premier undergraduate award in math, science, and engineering.

"This project was very exciting because proteins are essential components of organisms, including humans," says Ramsey, a neuroscience major and varsity soccer standout. "If protein structure can be better understood, then it may open doors to understanding diseases that result from proteins that do not fold properly."

Trustee Scholarship recipient Stacey Wagner '03, who graduated cum laude with honors in biochemistry, used biochemistry and physical chemistry techniques to investigate protein isolation and stabilization. Her work included growing *E. coli* bacteria engineered to produce excess amounts of the protein being studied. The addition of a small molecule or inducer to the bacteria caused production of the protein, which she later analyzed.

Wagner and Ramsey coauthored a paper with Gindt and other researchers that was presented last August at the annual meeting of the American Chemical Society.

Biochemistry major Katelyn Connell '04

examined protein folding mechanisms by treating a protein with a dye.

"The EXCEL research is a great opportunity to be exposed to different techniques," Connell says. "It's not like the classroom; it's like nothing I've ever done before. It's real hands-on experience."

Connell, Wagner, Ramsey, Gindt and other researchers wrote a research paper presented last August at the 18th annual Conference on Raman Spectroscopy in Budapest, Hungary, and published in its proceedings.

Gindt says her research is just starting to uncover the importance of protein folding and aggregation in biochemical processes.

"Chemical reactions in biological systems are controlled and catalyzed by large molecules called proteins," she explains. "In many cases, the protein molecules must associate, or oligomerize, with other protein molecules to form an active complex that is actually responsible for carrying out the chemistry. For example, the structure that carries the oxygen in your blood, hemoglobin, is actually a complex of four proteins. In other cases, proteins that normally act alone in a biological system can associate in an undesirable way that causes problems for the biological system; Alzheimer's Disease appears to be an example of unfavorable protein association."

The basic underlying forces that cause proteins to associate are not well understood, partially due to the challenges of studying such large molecules.

"We are still unsure about what steps must occur to either prevent or facilitate protein association," says Gindt. "To study such processes, we have selected a model system with some unique features that allow us to follow the actual association steps."

Most protein molecules are colorless to the human eye and do not absorb visible light. Gindt's model system, phycocyanin, evolved in blue-green algae to specifically absorb visible light for photosynthesis.

"The protein contains a colored entity that is sensitive to both the folding state of the protein and its association state. Therefore, by monitoring the amount of visible light absorbed by the colored entity, we can determine if the protein molecule is in its proper shape and if the protein has associated with other proteins. Since we can monitor the amount of light absorbed with time, we are able to decipher the intermediates that form going from one state of the protein to another as we monitor the rate of these reactions. These experiments will allow us to learn more about the basic biochemistry that is involved when proteins associate in either favorable or unfavorable ways." ■

Four Graduate with Honors

(continued from page 2)

During the summer before his senior year, Dan Ruddy '03, B.S. chemistry, was part of a Research Experience for Undergraduates (REU) sponsored by NSF at the University of Pennsylvania where he worked with Dr. Donald Berry on polymers containing a germanium backbone. These polymers have a variety of potential applications, but the particular focus in the Berry group is their function as Light-Emitting Diodes (LED). Ruddy was looking at how fixing the position of aromatic groups off of the main polymer chain affected the properties of the polymer. Ruddy is now studying inorganic chemistry, with a particular interest in polymers/materials, at the University of California at Berkeley. ■

2003 Graduates

Catherine Buttolph
A.B. Chemistry

Susan Heinsohn
A.B. Chemistry

Karin Hessler
B.S. Biochemistry
Summa Cum Laude
Phi Lambda Upsilon
Merck Index Award

Jessica Jamhoury
B.S. Chemistry
Cum Laude
Pi Delta Phi

Herbert Kennedy III
A.B. Chemistry
Charles L. Albert '08 Trophy
Track Prize

Abby O'Connor
B. S. Chemistry
Cum Laude
Honors in Chemistry
Sigma Xi
Phi Lambda Upsilon
Pi Mu Epsilon
American Institute of
Chemists Award

Amanda Ohs
B.S. Biochemistry
Cum Laude
Honors in Chemistry
Sigma Xi
Phi Lambda Upsilon

Daniel Ruddy
B.S. Chemistry
Summa Cum Laude
Honors in Chemistry
Sigma Xi
Phi Lambda Upsilon
Pi Mu Epsilon
American Chemical
Society Division of
Polymer Chemistry Award

American Chemical
Society Prize
American Chemical
Society Undergraduate
Award in Analytical
Chemistry
Chemical Rubber Company
Freshman Achievement
Award
J. Hunt Wilson '05 Prize in
Analytical Chemistry
William Forris Hart '27
Chemistry Prize

Jennifer Stroka
B.S. Biochemistry
Cum Laude
Phi Lambda Upsilon

Stacy Wagner
B.S. Biochemistry
Cum Laude
Honors in Chemistry
Sigma Xi

Meredith Walburg
A.B. Biochemistry



Recent Faculty Publications

Joseph Sherma, Larkin Professor Emeritus
"Thin Layer Chromatographic Analysis of Free Pool Amino Acids in Cercariae, Rediae, Encysted Metacercariae, and Excysted Metacercariae of *Echniostoma caproni*." [co-authors Elizabeth Ponder '04 and Bernard Fried] *Journal of Liquid Chromatography & Related Technologies* (2003) 26, 2679-2684.
"Development and Validation of a High Performance Thin Layer Chromatographic Method with Densitometric Detection for the Determination of Bisacodyl in Pharmaceutical Tablets." [co-author Alison N. Campbell '04] *Acta Chromatographica* (2003) 13, 109-116.

H. David Husic, professor and department head
"Dissolved inorganic carbon concentration mechanism in *Chlamydomonas moewusii*." [co-authors D. Ghoshal and A Goyal] *Plant Physiology and Biochemistry* 2002, 40, 299.
"The oxidative photosynthetic carbon (C₂) cycle—an update and unanswered questions." [co-author D.W. Husic] *Reviews in Plant Biochemistry and Biotechnology* 2002, 1, 33.

William Miles, associate professor
"Furan approach to the synthesis of the A-ring of Vitamin D analogues." [co-author K. Connell '04] *Tetrahedron Letters* 2003, 44, 1161-63.
"The oxa-Pictet-Spengler reaction of 1-(3-furyl)alkan-2-ols." [co-authors S. Heinsohn '03, M. Brennan '02, D. Swarr '03, P. Eidam '01 and K. Gelato '01] *Synthesis* 2002, 1541.

"Modeling the drug discovery process: The isolation and biological testing of eugenol from clove oil." [co-author P. Smiley] *Journal of Chemical Education* 2002, 79, 90.

Charles Nutaitis, associate professor
"Reduction of pyridyl carbinols with sodium borohydride/trifluoroacetic acid." [co-authors T. Greshock '99, S. Houghton '00, L. Moran '99 and M. Walter '99] *Organic Preparations and Procedures International* 2002, 34, 332.

Yvonne Gindt, assistant professor
"Resonance Raman investigation of structural properties of DNA photolyase." [co-authors O. Sokolova, A. Gopal, S. Wagner '03, M. Ramsey '04 and J. Schelvis] *Biochemistry* 2002, 41, 165.

Ken Haug, assistant professor
"Kinetic Monte Carlo study of the effects of hydrogen on the 3-D epitaxial growth of Ni(100) and Ni(110)." [co-author J. Jamhoury '03] *Journal of Physical Chemistry B* 2002, 106, 11253.

Tina Huang, assistant professor
"Analysis of Thiols and Tyrosinase-Modified Carbon Paste Electrodes Based on Blocking of Substrate Recycling." [co-authors T. Kuwana and A. Warsinke] *Biosens. & Bioelect.* 2002, 17, 1107.
"EC-FIA Study of Ion Partitioning at High Surface Area Carbon Fiber Electrodes." [co-authors R.S. Kelly, B.D. Coleman, P. Inkaew and T. Kuwana] *Analytical Chemistry* 2002, 74, 6364.

Chip Nataro, assistant professor
"Ruthenium cluster compounds containing 1,1'-bis(diphenylphosphino)ferrocene (dppf): An electrochemical analysis and the crystal structure of [Ru₃(CO)₁₁]₂(μ-dppf)." [co-authors A.R. O'Connor '03 and A.L. Rheingold] *Journal of Organometallic Chemistry* 2003, 679, 72.

"Group 10 metal compounds of 1,1'-bis(diphenylphosphino)ferrocene (dppf) and 1,1'-bis(diphenylphosphino) ruthenocene: a structural and electrochemical investigation. X-ray structures of [MCl₂(dppr)] (M = Ni, Pd)." [co-authors A. Campbell '04, M. Ferguson '04, C. Incarvito '96 and A. Rheingold] *Journal of Organometallic Chemistry* 2003, 673, 47.

"Electrochemistry of Ru₂Cp'2(CO)₄ and Ru₂Cp'2(CO)₃(PMe₂) and the estimation of Ru₂(μ-H) bond dissociation enthalpies." [co-author K. Rourke '01] *Journal of Organometallic Chemistry* 2002, 656, 181.

Mike Chejlava, laboratory/instrumentation specialist
"Use of a modified flatbed scanner for documentation and quantification of thin layer chromatograms detected by fluorescence quenching." [co-authors A. Campbell '04 and J. Sherma] *JPC-Journal of Planar Chromatography-Modern TLC* 2003, 16, 244.

"Effects of *Euhaplorchis californiensis* (Trematoda) infection on metallic ions in the host snail *Cerithidea californica* (Gastropoda)." [co-authors S. Kaufer ('02), J. Sherma and B. Fried] *Parasitology Research* 2002, 88, 1080. ■

Lehigh Valley ACS Awards Scholarship to Evans '05

Biochemistry major **Ryan Evans '05** recently received the Organic Chemistry Scholarship from the Lehigh Valley Section of the American Chemical Society. Evans, a Marquis Scholar, scored the highest on an organic chemistry test administered by the Lehigh Valley section.

"Ryan is undoubtedly one of the best students we have ever had in organic chemistry over the past 16 years," says **Charles Nutaitis**, associate professor of chemistry. Among approximately 1,200 students who have taken organic chemistry

since Nutaitis has taught the class, only a handful have earned marks as high as Evans', the professor notes.

The award follows a summer-long collaborative research project in which Evans fed, infected, observed, and dissected tiny, disk-shaped snails. He conducted the work as an EXCEL Scholar with **Bernard Fried**, Kreider Professor Emeritus of Biology, and **Joseph Sherma**, Larkin Professor Emeritus of Chemistry.

"We were hoping to see more closely what diet and parasitism do to these snails, since they are an important model in the life cycles

of countless parasites that also infect humans," says Evans, who is co-writing a paper on the subject with Fried and Sherma.

Evans hopes to continue his biochemistry studies in graduate school. "I enjoy the freedom I am given to explore these situations and the excitement of finding new knowledge when the results come in." ■



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New Leopard Prowls the Halls of the Hugel Science Center



A leopard has been seen roaming through the chemistry department. The first sightings occurred this spring during a number of open houses for prospective students. Springing from the mind and artistic talent of Stacey Wagner '03, this leopard has become the official mascot for the chemistry department. While the leopard currently resides on the department poster and web site, it is hoped that it will appear at other events and functions, such as the annual thrashing of the biology department in softball. However, our leopard is not yet complete. It is missing a name. Many have been suggested including: Linus, Lewis, Lavoisier and Le Chatelier. If you would like to vote on a name or suggest another, please contact the department. We will update the voting on the department web page. ■

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Alumni/Alumnae Information Update

Let us know what you have been doing since leaving Lafayette. Share special memories of faculty, students, or courses from your days as a chemistry major.

Name: _____

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Special memories of the chemistry department: _____

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