
DEPARTMENT OF BIOCHEMISTRY

KANSAS STATE UNIVERSITY

Alumni and Friends Newsletter

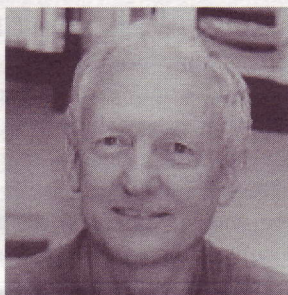
Fall, 2000

Head News

Charles Hedgcoth

This newsletter essentially marks my first year and a half as Head of the department, and, other than office staff changes, we are proceeding in a stable manner with continuing outstanding achievements by an accomplished faculty. I started the move into the headship by replacing the departmental secretary who had departed by essentially moving Dedra Woydziak, who had been serving as Office Assistant III sharing duties between the main office and with Crystal Sapp in the Business Office, into the secretarial position. Then we filled Dedra's vacated position. And then we filled that position again with Tina Anderson. Although this year's newsletter was formulated by Dr. Muthukrishnan, Dedra gets credit for turning it into a newsletter. The office staff was a major factor in preparing a document for the first USDA review since 1991. That review, conducted last May, provided some interesting points for consideration, including recommending addition of a faculty position for someone in the area of plant transcription factors. The review was supportive of the current efforts of departmental faculty.

In regard to the Ackert II construction plans, which Dr. Roche referred to in the 1999 newsletter as having "continuous changes", there is good news and there is bad news. The bad news is that the funds available for completing the construction (to house nine of the biochemistry faculty and the NMR facility along with the Center for Basic Cancer Research and some Biology space) is somewhere between three and four million dollars short. Keep those contributions coming. The bad news may also be the good news because we are not likely to be moving to



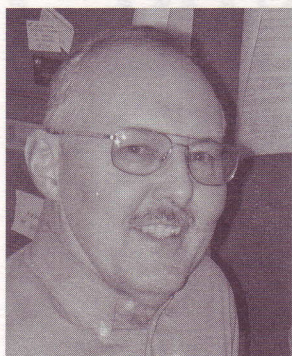
Ackert II in the Spring of 2002. We elected, could say refused, to go until everything is in place and fully functional for our outstanding research programs. A delay also means some of us won't have to worry so soon about reducing our square footage of research operating space or discarding thirty-five years of accumulated research materials which aren't going to fit into Ackert II.

Faculty continue to be successful in obtaining extramural research funding so that the current operating level continues at over \$1 million, with over \$1 million in new grants this fiscal year and a continuing \$5 million in individual and collaborative multi-year grants. In the last newsletter, Dr. Roche lamented that the totals would have been greater if his NIH grant had been renewed. Well, it has been renewed for a four-year period for about \$1 million; so, his program continues at full speed (although he always seems to feel it can go even faster).

The three-year student credit hour fee to be applied toward teaching laboratory equipment has provided us with \$123,000 for replacement of ageing equipment and purchase of new items for upgrading the teaching laboratories. Introductory Organic and Biochemistry, General Biochemistry, and Biochemistry I & II laboratories all have been positively influenced. Although all faculty have had input, the main thrust has been through the efforts of committee chairs Drs. Takemoto, Krishnamoorthi, and Kanost with strong committee service by Drs. Wang, Muthukrishnan, Tomich, and Zolkiewska. New equipment permitted us to revamp Biochemistry II Laboratory into four 1-credit hour labs: Protein Structure, NMR, and Recombinant DNA I & II. Student response has exceeded capacity, except for the NMR Laboratory, which still has a good enrollment. We are hopeful that the funding program will be continued so that we can add the other \$120,000 of identified, but unfulfilled equipment needs.

Read on for information about Rae Marie (Dodge) Crisel, first graduate of the B.S. program, faculty research, and notes on current students and alumni.

Agricultural Chemist Honored By Research Agency



Dr. Karl J. Kramer won an award for his work in insect science and novel pest control technology. Dr. Kramer, an Adjunct Professor of Biochemistry, was named an USDA Agricultural Research Service "Senior Research Scientist of 1999" and received a plaque, a cash award and additional funding to support his research program to develop biological controls for stored product insects. He is a biochemist at the Grain Marketing and Production Research Center where he investigates insect skeletal structure and metabolism, molting and digestive enzymes and their inhibitors, and the use of biopesticides and insect growth regulators for insect pest control. (Web site: <http://bru.usgmrl.ksu.edu>)

Floyd P. Horn, Agricultural Research Service administrator commented on his research: "Results from Dr. Kramer's studies have substantially added to a body of knowledge about the biochemistry of insect growth and development. His work is important for preharvest and postharvest insect pest management programs, including the commercial development of insect growth regulators, transgenic plants, and biological control agents by the agricultural biotechnology industry."

Dr. Kramer was selected as the top scientist in the Northern Plains Area (Colorado, Kansas, Montana, Nebraska, North and South Dakota, Utah and Wyoming). He has authored or co-authored more than 200 scientific papers, book chapters and review articles. He has been on the editorial boards of *Insect Biochemistry* and *Molecular Biology* and the *Journal of Entomological Science*. Dr. Kramer, a fellow of the American Association for the Advancement of Science, was cited for exceptional contributions to insect biochemistry, particularly cuticle biosynthesis and degradation, metabolic regulation, neuropeptides and insect growth regulators. He has served as president of Kansas State University chapters of the American Chemical Society and Sigma Xi.

Dr. Kramer is a native of Evansville, Indiana. He has a B.S. in Chemistry from Purdue University, a Ph.D. in Chemistry from the University of Arizona, and postdoctoral training in biochemistry from the University of Chicago. He joined the Agricultural Research Service in 1974. At K-State he has served as a mentor for many graduate students, postdoctoral research associates, and visiting scientists from foreign countries.

International Plant Workshop Organized by KSU Professor

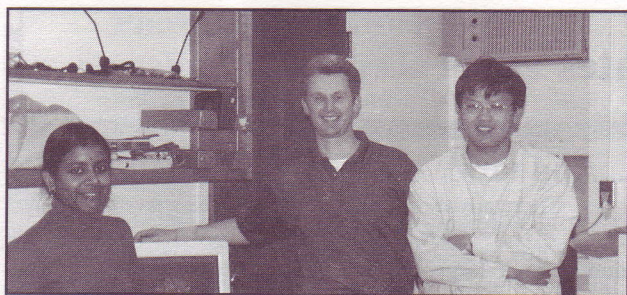
Dr. Xuemin Wang with Professor Zhang Qifa (host in China) organized an international plant biology workshop, "Advanced Plant Biochemistry: Signal Transduction and Metabolic Engineering," in China during the summer of 1999. Dr. Wang received funding from the American Society of Plant Physiologists, which provides funding for gatherings to exchange scientific information.

The two week long workshop was held at Huazhong Agricultural University in Wuhan, Central China. "It attracted a broad audience across China; approximately 160 plant biologists from 25 higher learning and research institutions," Wang reported. The workshop introduced the latest developments in signal transduction and metabolic engineering and fostered collaboration and information exchange between scientists.

The event featured lectures, seminars, and group interactions during the day and laboratory exercises in the evening for professors, graduate students and researchers. Eleven guest speakers from Canada, China, and the United States gave presentations in the workshop. "The participants exhibited great enthusiasm and dedication to teaching and learning. The lectures were well organized and received. The group discussions were highly interactive and insightful. Some of the evening laboratory exercises lasted until 2:00 am," Wang recalled. The workshop concluded with an excursion to the Three Gorges of central China and a visit to the construction site of the world's largest hydro-dam.

2001 Hageman Lecturer

Dr. Virginia Walbot will be the Richard H. and Elizabeth C. Hageman Distinguished Lecturer, April 30 and May 1, 2001. Dr. Walbot is a Professor in the Department of Biological Sciences at Stanford University. Previous Distinguished Lecturers in this series, made possible through the generosity of Dr. and Mrs. Hageman, are Dr. Eugene W. Nester (University of Washington, 1998), Dr. Maarten J. Chrispeels (University of California at San Diego, 1999) and Dr. Brian A. Larkins (University of Arizona, 2000). Our web site at www.ksu.edu/bchem/Hageman can be used to obtain further information on the Hageman Lecturers.



Smith Research Group: Chitra Rajappa (Postdoc), Dr. Paul Smith, and Hongxing Lei (Graduate Students)

Computer Simulation of Biomacromolecules

Paul Smith, Biochemistry, Kansas State University

Understanding the mechanism by which proteins fold continues to be an active area of biochemical research. While much progress has been made over recent years, there is still no generally accepted method for predicting protein structure from a sequence of amino acid residues. Our lab is involved in using computational approaches to improve the current understanding of protein folding in an attempt to decipher some of the basic rules involved.

Computers provide the researcher with the possibility of selectively modifying certain interactions to determine their effect on the ability of a protein to fold correctly. They also enable us to look more closely at the character of the denatured state of proteins. Originally, denatured proteins were considered as totally random chains in solution. However, recent experimental and theoretical studies have shown this to be a gross simplification. The presence of residual structure in the denatured state is changing our thinking concerning the interactions which stabilize both the native and unfolded states. The properties of the denatured state have to be determined if one is going to use this as a starting point for protein folding studies.

Currently, we are using computational methods to simulate protein folding. This is a difficult task as even modern day computers can only simulate the realistic motion of proteins over times of microseconds (at best), while most proteins fold on the second time scale. Hence, one has to make approximations concerning the interactions between groups within the protein and also the effect of solvent on these interactions. With these approximations, protein simulations on the order of milliseconds can be obtained. The major question is the validity of the approximations. We are working on ways of understanding the effects of solvent (water) on the properties of peptides and proteins in an effort to improve these approximate methods.

In addition, we are continuing our efforts to understand the effects of cosolvents on the properties of biomacromolecules in solution. This is an area which can benefit from the atomic level insights provided by computational approaches. We are applying new approaches to elucidate the effects of cosolvents. From our studies, it seems apparent that the characteristics of the denatured state obtained by heating, or on the addition of urea or guanidinium chloride, are different.

Finally, we are also collaborating with Professor Krishnamoorthi in an attempt to use computer simulation to understand and rationalize the changes induced by amino acid mutations in a small trypsin inhibitor. In particular, we are studying the effects of adding or removing disulfide bonds on protein stability.

The use of computational methods to study biomacromolecules is increasing rapidly. The current steady increases in computer power (approximately an order of magnitude every 4-5 years) suggests that computer based approaches will become more and more useful and can provide valuable additional information to compliment existing experimental techniques. We're in for an interesting ride. We'll keep you posted!

Tell us about YOURSELF!

Let your friends know what you are doing. Fill out the form below and mail to: Department of Biochemistry, Kansas State University, 104 Willard Hall, Manhattan, KS 66506-3702 or e-mail us at biochem@ksu.edu

Name: _____

Address: _____

City: _____

State: _____ Zip: _____

Degree/Year: _____

Current Position/Employer: _____

Tell us about YOURSELF! Include professional activities, honors, civic involvement, family, etc.

Undergraduates

Then...

Rae Marie (Dodge) Crisel was the first graduate of the undergraduate biochemistry program. She received her Bachelor of Science in Biochemistry during the summer of 1965. Looking back on her undergraduate experience at KSU she recalls, "I think the curriculum

(biochemistry) was created just for me. I had been bouncing between chemistry and biology and couldn't make up my mind. My senior year, the biochemistry curriculum was introduced to me, and my credits fit perfectly." Rae Marie did graduate research in the laboratory of Dr. Clegg characterizing Component VI, a lipoprotein, from the blood serum of diethylstilbestrol treated birds. After receiving the M.S. in 1968, she accepted a position at Eli Lilly & Company in Indianapolis.

"During my career with Eli Lilly, I held a number of positions. As a protein biochemist, I worked on influenza and pneumococcal vaccines; as a molecular biologist, I worked on the human insulin and growth hormone projects." While working at Eli Lilly, Rae Marie also met her husband, John Crisel, an engineering major from the University of Illinois and Eli Lilly employee. Together they had three sons and Rae Marie took a five year leave from research to raise them. When her youngest son started school, Rae Marie was called into research once again. "I returned to Lilly as a biochemist and worked for a short time as a technical support chemist for the Humulin manufacturing process. My career then took me into the management track." She started managing various research projects and was appointed Department Head of Human Growth Hormone Manufacturing.

In December of 1999, Rae Marie and John retired. "I am very grateful to Eli Lilly for a wonderful career. It is a company that cares a great deal about its employees, and that caring is what drew me to them in the first place. "Respect for People" is one of the primary values of the company, and it is a great place to find rewarding careers." Not only did they leave behind careers at Eli Lilly, but their two oldest sons have chosen careers at the same company, while the youngest is finishing his college education.

Today Rae Marie and John are enjoying their retirement, traveling and learning new skills such as tennis and golf. They are looking forward to celebrating their 30th wedding anniversary and the marriage of one son in the coming year.



...And now

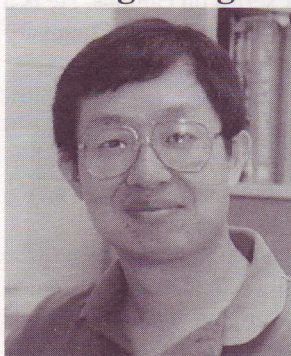
There are about 50 undergraduates currently seeking B.A. or B.S. degrees in biochemistry. Among these students are a large number with quite varied experience including efforts as dual majors in chemistry, biology, and pre-professional programs. Twelve undergraduates are recipients of one or more scholarships, including those made possible by generous donations of our alumni. Fourteen of our undergraduates work as student research assistants or are taking a problems course in biochemistry research laboratories.

One of our current undergraduates came to us from the Philippines by way of Ft. Riley. Marisol S. Castaneto-Noel is in the B.S. curriculum in Biochemistry, works in the laboratory of Dr. Reeck, and is the Cadet Battalion Commander of the KSU Army ROTC. She enlisted in the U.S. Army when she was 17 and worked as an Emergency Medical Technician at Ft. Riley for over three years in a MASH unit and at Irwin Army Community Hospital in the



Emergency Room. Marisol was initially interested in Medical School, and before her enlistment expired she received a federal scholarship from the ROTC Cadet Command to attend KSU for a bachelor's degree. She has successfully made the transition from a full-time soldier to a full-time student and cadet while engaging in cadet physical training three times a week, studying military tactics, drill and ceremony, and operations, attending military science classes, and taking the course work toward a B.S. in Biochemistry. Along the way she took a problems course with Dr. Reeck and purified and studied beta-amylase from *Tenebrio molitor*, (yellow mealworm) and *Sitophilus oryzae* (rice weevil). She has assayed different insects for the presence of cellulase and xylanase and excised salivary glands from pea aphids for construction of a cDNA library. Exposure to the research environment induced Marisol to alter her plans, and she now intends to obtain a graduate degree and pursue a research career in the Army with her goals including assignment at the U.S. Army Medical Research Institute of Infectious Diseases. Marisol's goals in her own words are "...serving this country both as a dedicated Army officer and a motivated biochemist".

Phospholipase-Mediated Signaling Pathways in Plants



Xuemin (Sam) Wang,
Biochemistry, Kansas State University

Phospholipids provide building blocks of cell membranes and also a crucial source from which cells produce metabolic regulators and second messengers. Phospholipases are a group of diverse enzymes that hydrolyze phospholipids. Activation of phospholipases is often the initial step in producing cellular messengers. The research is to provide understanding of the role of lipid-based signaling pathways in plant growth and responses to biotic and abiotic cues. The current studies involve: i) characterizing phospholipases generating lipid messengers, ii) determining upstream effectors that up- or down-regulate phospholipases, iii) identifying downstream targets of lipid-mediated signaling pathways, iv) unraveling the networks among different lipid-signaling processes, and v) determining the physiological functions of lipid-mediated signaling pathways. Meanwhile, information from these studies is being applied to manipulation of the membrane-based signaling processes for engineering crop plants with improved productivity and tolerance to stress.

Information obtained by the students, postdoctoral associates, and visiting scientists has improved greatly the current understanding of phospholipase D (PLD) in cell signaling. PLD mediates various cellular processes, including those leading to vesicular trafficking, cytoskeletal rearrangement, cell proliferation, reproduction, and defense responses. The molecular cloning of the first eukaryotic PLD from plants (work of Jim Dyer, Liwen Xu, and Ling Zheng) moved the PLD research to a molecular realm. Subsequent identification, cloning, and characterization of novel types of plant PLD established that PLD is a family of heterogeneous enzymes (work of Kirk Pappan, Wensheng Qin, Cunxi Wang, and Chunbo Qin). PLD isoforms differ in catalytic and regulatory properties (work of Kirk Pappan), and the mechanism of activation by Ca^{2+} and polyphosphoinositides has begun to be understood (work of Li Zheng in collaboration with Prof. Krishnamoorthi). Mutagenesis and heterogeneous expression of PLDs have also provided insights into the catalysis and function of PLD (work of Doreen Glodowski and Yan Kong). Regulated activation of PLD has recently been documented in various plant processes, including wounding, phytohormones, and environmental stresses (work of

Stephen Ryu, Lu Fan, Yongming Sang, Weiqi Li, Chris Zien). Manipulation of PLD and its products in the cell has documented the roles for PLD in senescence, germination, and plant responses to water and temperature stresses (work of Suqin Zheng, Decai Cui, Yongming Sang, Cunxi Wang). Currently, experiments are underway to isolate knockout mutants for multiple PLD isoforms (work of Cunxi Wang, Tara Wood, Dustin Garrels, and Adrienne Williams).

Other research includes studies on the interplay between different signaling pathways and the roles of membrane lipid dynamics in cell functioning. Progress has been made in understanding the interaction between phospholipase- and oxylipin-signaling pathways (work of Cunxi Wang), identification of novel classes of phospholipase C (work of Dahao Ling and Chunbo Qin), and determination of downstream targets for lipid messengers (work of Yongming Sang). In collaboration with Professors Ruth Welti (Biology), Jan Leach (Plant Pathology), and Todd Williams (KU Mass Spectrometry Center), my group is using metabolomics and functional genomics to massively profile membrane lipid metabolites and to determine membrane lipid dynamics in plant stress responses.

Undergraduate Awards

The year 2000 has proved to be a successful year for the Department of Biochemistry undergraduate program. In April, Stephanie Russell Bollmann and Jacob Taussig were among four K-State students awarded the Barry M. Goldwater Scholarship. This is a federally funded award designed to encourage students to pursue careers in math, science, and engineering.

Stephanie is a senior with a dual major in biology and biochemistry. She plans to graduate in December of 2001 and relocate to Boston with her husband, Paul. There, she hopes to attend graduate school and develop a career in medical research.

Jacob is a pre-med senior with a dual major in biochemistry and chemical science. He plans to graduate in May and has been accepted at the University of Kansas School of Medicine for the fall 2001 semester.

Chris Johnson, a senior in biochemistry/pre-med, was named a 2000 Student Awardee of the American Institute of Chemistry Foundation. This award recognizes outstanding students majoring in chemistry, chemical engineering, or biochemistry. Chris has been working as an undergraduate laboratory assistant to Dr. Prakash in the NMR facility. Upon graduating from K-State, Chris would like to attend medical school.

Alumni News

Glen DeLoid (M.S. 1984, Cox), after spending the past 12 years programming and developing 3D medical imaging software, plans to re-take the boards and seek a medical research position with a biochemical/biomedical company.

Lenora 'Alayne' (Ward) Burton (B.S. 1990) moved to the Kansas City area and in 1992 was employed as a research scientist for XenoTech. She has been promoted to managing their data processing department.

Maryam Hazegh-Azam (Ph.D. 1993, Reeck) moved to the Los Angeles, California area. She is currently employed as a senior scientist at Nichols Institute Diagnostics.

Christina Chang (Ph.D. 1988, Davis) is currently living in San Diego, California and employed as an Assistant Research Scientist at the University of California-Davis. Last fall she received a 5 year NIH grant to investigate the role of NDP kinase in tumor metastasis.

Jiasheng 'Jason' Song (Postdoc 1990-1993, Hedgcoth) is currently at the University of Wisconsin-Madison, Department of Biochemistry, working on a project to identify the physiological ligand(s) for the Ah receptor.

Jim Dyer (Ph.D. 1996, Wang) is working as an Assistant Professor at Montclair State University in New Jersey. This year he received two grants, one from USDA and the other from American Chemical Society Petroleum Research Funds.

Jason Baker (Ph.D. 1999, Roche) accepted a position as an Assistant Professor in the Department of Biology at Missouri Western State College in St. Joseph.

Myron 'Mike' Jacobson (Ph.D. 1970, Hedgcoth) and wife **Elaine** (Ph.D. 1971, Hedgcoth) moved to the University of Arizona/Arizona Cancer Center in Tucson. He has accepted a professorship in Medicinal Chemistry and she has a professorship in Pharmacology and Toxicology.

Haobo Jiang (Ph.D. 1994, Kanost) and wife **Yang Wang** (M.S. 1994, Kanost) moved to Oklahoma State University in Stillwater. Haobo is an Assistant Professor in the Department of Entomology and Plant Pathology and Yang works as a research assistant in his lab.

Lei Wang (M.S. 1995, Muthukrishnan) is a postdoc in the Department of Medicine at Yale University School of Medicine.

Andrew Sae (Ph.D. 1969, Cunningham) revisited K-State in March as a guest speaker for the American Chemical Society seminar series on campus. He is a Professor Emeritus in the Department of Chemistry at Eastern New Mexico University.

Karinne Cortes (M.S. 1999, Mueller) moved to Aiea, Hawaii and accepted a position with the Hawaii Biotechnology Group. Her research involves molecular biology and virology and she also serves as the network administrator for the company.

Jessie English (B.S. 1985), while a postdoc at the University of Texas Southwestern Medical Center, worked on a research project where she was involved in the discovery of a protein kinase, WNK1, featured on the cover of the *Journal of Biological Chemistry*, June 2, 2000 issue. After completing her training in Texas, she accepted a position in the Department of Biological Research-Oncology at Schering-Plough Research Institute in Kenilworth, New Jersey.

Joseph Jilka (M.S. 1983, Roche) is currently the vice president of product development at ProdiGene, a biopharmaceutical and industrial protein firm based in College Station, Texas. In November 2000, a news release announced their two-year grant award for researching a method to develop an edible vaccine for HIV from transgenic corn.

Kuo-Chang 'KC' Zen (Ph.D. 1995, Muthukrishnan/Kramer) is currently employed at the Institute of Molecular Biology, Academia Sinica, Nan-Kang, in Taipei, Taiwan.

Graduate Student Awards

Yi Cao, doctoral student, and Jeff Fabrick, master's student, were chosen for the Biochemistry Outstanding Graduate Teaching Assistant Award for the year 2000. Yi was a GTA for Introductory Organic and Biochemistry and works with Anna Zolkiewska on the role of ADAM12 protein in muscle cell adhesion, communication and fusion. Jeff was a GTA for General Biochemistry Laboratory and works with Mike Kanost on immune response proteins in *Plodia interpunctella*, an insect pest of stored products.

Tao Peng and Li Zheng, both doctoral students, were co-winners of the Graduate Student Research in Biochemistry Award for the year 2000. Tao (Roche's lab) investigates the functions of lipoyl lysine prosthetic groups in the catalysis and regulation of the PDC. Tao also is characterizing one of the regulatory kinase isoforms. Li (Krishnamoorthi and Wang labs) successfully defended in December his dissertation based on studies of how calcium and phosphatidylinositol-4, 5-bisphosphate regulate the activity of plant phospholipases.

Recent graduates from the Biochemistry Graduate Program

Student	Degree, Year	Major Professor	Current Position
Karinne Cortes	M.S. 99	Mueller	Research Assistant/Network Administrator for the Hawaii Biotechnology Group in Aiea, Hawaii
Yan (Julie) Kong	M.S. 00	Wang	MBA Student at Kansas State University
Sarah Lewis	M.S. 00	Takemoto	Medical Student, University of Kansas
Dahao Ling	M.S. 00	Wang	Research Assistant II, Department of Cardiology, University of Texas, SouthWestern Medical Center
Congcong Ma	Ph.D. 99	Kanost	Scientist II, Molecular Biology, Synthesis & Arrays Business Unit of Applied Biosystems in California
Suha Saleh	Ph.D. 00	Takemoto	Postdoctoral Student at Georgetown University Medical Center
Hui Yang	M.S. 00	Seib	Technician, Norte Dame/Mishawaka, IN area
Maria Zavodszky	M.S. 99	Krishnamoorthi	PhD Student, Dept of Biochemistry, Michigan State University
Hong Zhang	M.S. 00	Muthukrishnan	Research Assoc, AXYS Pharmaceuticals, San Francisco, CA
Zhihong Zeng	M.S. 99	Davis	Research Assistant, Department of Biology, KSU

Notes from the Biochemistry Undergraduate Program

We are delighted with the continuing strength of the undergraduate program. There are about 50 majors currently. Thanks to the financial support from KSU and Biochemistry alumni, a number of these students are scholarship winners. This year's awardees are:

Premier scholarships:

Jacob Taussig (Sr., Manhattan, KS)	•Goldwater
Amanda Rathbun (Fr., Hutchinson, KS)	•Foundation
Stephanie Russell (Sr., Manhattan, KS)	•Goldwater
Timothy VanWye (Fr., Valley Center, KS)	•President's

Departmental scholarships:

Kyle Brownback (Jr., Lyndon, KS)	•Hughes
Dustin Garrels (Fr., Wichita, KS)	•Havley
Chris Johnson (Sr., McPherson, KS)	•Hughes
Chris Schmidt (Sr., Topeka, KS)	•Merrill
Jacob Taussig (Sr., Manhattan, KS)	•Havley

Other scholarships:

John Birky (So., Newton, KS)	•Arts & Sciences
Kyle Brownback (Jr., Lyndon, KS)	•Arts & Sciences
Kyle Brownback (Jr., Lyndon, KS)	•Sherrid Cancer
Marisol Castaneto-Noel (Sr., Manhattan, KS)	•Heaton
Bianca Luna (Fr., Garden City, KS)	•Memorial
Elizabeth Rayburn (Sr., Spring Hill, KS)	•Taylor
Jacob Taussig (Sr., Manhattan, KS)	•Arts & Sciences
Jacob Taussig (Sr., Manhattan, KS)	•Seaton
Vladimir Yevseyenkov (So., Whitewater, KS)	•Memorial



Kansas State University

Department of Biochemistry

104 Willard Hall
Manhattan, KS 66506-3702
313

Address Service Requested

Nonprofit Organization

U. S. POSTAGE

PAID

Permit #525

Manhattan, Kan. 66502

KSU BIOCHEMISTRY ON THE WORLD WIDE WEB

<http://www.ksu.edu/bchem/>

Our home page contains information on the Department of Biochemistry, faculty, undergraduate and graduate programs, courses, seminar, and core facilities. Other K-State-related pages that might be of interest:

KSU Alumni Foundation <http://www.ksu.edu/alumni>

E-Collegian Newspaper <http://www.spub.ksu.edu>

City of Manhattan <http://www.manhattan.org>