

Biochemistry News

Kansas State University – Alumni and Friends Newsletter

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BIOCHEMISTRY HOSTS ARTS AND SCIENCES ALUMNI FELLOWS

The Biochemistry Department was pleased to host this year's Alumni Fellows for the College of Arts and Sciences. Elaine L. Pearson Jacobson obtained a B.S. in Biochemistry in 1967, one of the earliest biochemistry degrees given at K-State. She then stayed on to obtain a Ph.D. working with Charlie Hedgcoth studying isoacceptor tRNAs. Myron "Mike" Jacobson, came to K-State in 1965 with a B.S. in Chemistry from University of Wisconsin at Platteville. He received his Ph.D. with Charlie Hedgcoth, specializing in separation and characterization of uncommon bases in tRNA. While here, both Mike and Elaine were active participants in the development of the new Graduate Biochemistry Group, which was formally established in 1968.



After postdoctoral studies in Utah, the Jacobsons moved to Carl Bernofsky's lab at Mayo Clinic where they began development of their life-long interest in NAD and related molecules. Beginning in north Texas in the mid-1970s, and continuing at University of Kentucky during the 1990s they developed a deep interest in poly ADP ribose and the enzyme(s) responsible for its formation and degradation. ADP ribose polymer cycles are involved in responses of cells to nuclear damage, and in maintenance of chromosomal telomeres. Niacin is of course the dietary precursor of NAD and nutritional status may modulate various NAD-mediated responses. Recognizing this relationship prompted the Jacobsons to form their own company, Niadyne, which has a long-term goal of using niacin and its derivatives for beneficial purposes.

See **ALUMNI FELLOWS** page 3

BIOCHEMISTRY HAS A NEW HOME



Chalmers Hall. New home of the Biochemistry Office and most of Biochemistry's labs

A new location and a new look have been a long time coming for the Biochemistry Offices, but have finally arrived. Moving from Willard Hall, the administrative and accounting offices are now located together in 141 Chalmers Hall with all new furniture and a new filing system. The mailroom, now used for monthly potlucks and weekly seminar receptions, received a facelift as well in its new location.

Moving from the Chem/Biochem building were the teaching labs, the NMR Core facility and the research labs of Muthukrishnan, See **NEW HOME** page 2

NEW HOME

Continued from page 1

Krishnamoorthi, Prakash, Reeck, Davis and Kanost. Anna Zolkiewska had moved from Burt to join Qize Wei who arrived in Nov. 2004 and Rachel Zufferey joined them on her arrival in Sept. 2006. Zolkiewski, Roche, Takemoto, and Tomich continue to operate their research labs along with the Biotechnology Core facility in Burt Hall.

Packing began at the end of Spring semester for a move beginning July 1, 2006. By mid-August there was very little left of the Biochemistry Department in Willard Hall or the Chemistry/Biochemistry Building. Crystal Sapp, the department accountant, was instrumental in coordinating the move. She along with Michael Kanost (Department Head) and the rest of the office staff, Rebecca Darkow, (Senior Administrative Assistant to the accountant), Melinda Bainter (Senior Administrative Assistant to the Head), Sue Wells (Administrative Assistant for the Graduate Biochemistry Group) and the students would love to have you come by for a tour of the new space.

How appropriate that biochemistry be housed in a building named for John Chalmers, who served as Vice President for Academic Affairs at Kansas State in the years 1969-1980. Prior to that he was dean of Arts and Sciences from 1963-1969. It was during Dr. Chalmer's tenure as dean that the Division of Biology was fully

developed, and the Graduate Biochemistry Group was established. One of his first actions as V.P. was initiating the outside search process that eventually brought Dave Cox to K-State as head of biochemistry.

Building Layout: *Chalmers is attached at its west side to Ackert and configured in a similar way with a core of facilities surrounded by a hallway. The top floor is new space for biology, connecting to the 2nd floor of Ackert.*

In the central lowest floor level a solid base is provided for the NMR, along with student offices, common use tissue culture facilities and cold room, autoclave etc. The NMR center director (Om Prakash), the newest faculty member (computational biochemist Jianhan Chen, arriving next fall) and the technology specialist (David Manning) have their offices in that central area. The teaching labs are located on the main floor above the NMR facilities, along with other shared facilities.

Along the north outside (as shown in the photo on page 1) there are departmental offices (ours on the main floor, the cancer center on ground floor). To the east and south sides we have three labs on each of two floors (total 12) and in a southern extension, offices for four faculty on each level.



Students, faculty, and staff are celebrating birthdays in the new **Mailroom** with a monthly potluck dinner.



(From left to right) **Crystal Sapp, Alicia Theisen, and Sue Wells** hard at work in the new **Office**.



Chunju An and Sandi Yungeberg conferring on a research project in Dr. Kanost's lab.

OUTSTANDING GRADUATE STUDENTS OF 2006

Varun Kumar Muthu Kumar is the recipient of the Biochemistry Outstanding Graduate Teaching Award and **Maria Nagy** received of the Biochemistry Outstanding Graduate Research Award for 2006. Each received \$150 in scholarship funds from the Hedgcoth Biochemistry Graduate Scholarship Account.

CONGRATULATIONS TO THE UNDERGRADUATE SCHOLARS FOR 2006-2007 SCHOOL YEAR:

University Foundation / Hughes (JS) Memorial Scholarship

Elizabeth Matile
Erin Hemphill

Hughes (JS) Memorial Scholarship

Erin Gustafson
Christopher Jones

Wanda Bates Scholarship

Erin Hemphill
Fritzi Domingo
Lucinda Gruber

Havely (David Tim) Scholarship

Derek Low
Michelle Higgins

Merrill (Fred/Virginia) Scholarship

Elizabeth Matile

General Fund Scholarship

Mohammed Sbeih
Mark Banker
Morgan Murphy
Teal Hart
Kurt Partridge

ALUMNI FELLOWS

Continued from Page 1

Mike and Elaine Jacobson are both professors in the College of Pharmacy at University of Arizona, where they have been for the past seven years. In addition they each hold a position in Niadyne Development Inc. He is Chief Scientific Officer and she is Chief Operating Officer. At the moment, various derivatives of nicotinic acid are marketed in formulations for skin application as cosmetics. Clinical trials are in progress for use of related compounds in treatment of skin cancers. Similar compounds modulate blood lipid concentrations and are under consideration for use in that area also.

Elaine and Mike Jacobson have had successful academic careers, teaching a wide range of courses, training a number of M.S. and PhD students and producing dozens of publication in peer reviewed journals. In addition, they have successfully filed about 30 patent applications for their work with niacin and its derivatives. During their visit to K-State, they each talked about their research and its translation to make tangible products.



Elaine describes her university research as “working to understand molecular and cellular responses to genotoxic stresses, particularly UV radiation and to translate that information to clinical applications in the prevention of skin cancer.” Mike notes that “to maintain the genomic integrity of the organism, individual cells within the organism must make appropriate life and death decisions. Ongoing research is aimed at understanding the molecular mechanisms by which cells respond to toxic chemicals and radiation by activating pathways that lead to repair of damage and cell recovery or to cell death by apoptosis or necrosis.” In 2005 the Jacobsons received the Roger J. Williams Award in Applied Nutrition. They have been recipients of a number of other recognitions.

One theme of their discussions was the importance of developing sound science-based methods for therapeutic interventions, particularly where the general consumer market is a target. There are many skin treatments out there, but few that are proven effective. For more information you can check out Niadyne or Nia24 on the Web.

BIOCHEMISTRY STUDENTS IN PHI BETA KAPPA

After extensive faculty review of the academic records of seniors and outstanding juniors, the KSU Chapter of Phi Beta Kappa has elected two biochemistry students to their membership for 2007: **Sarah Beth Devlin** and **Colleen Victoria Loo**. Phi Beta Kappa is the oldest academic honor society in America. Since its founding in 1776 at the College of William and Mary, Phi Beta Kappa has had a distinguished history of supporting intellectual excellence and breadth in learning. Only about 40 students with extraordinary achievement were elected this Spring from among about 3500 potential graduates.

UNDERGRADUATES IN RESEARCH

Danielle Ngaba (*Senior from Cameroon*)

I never cared about plants in my earlier life. However, everything changed since December 2003 when I started working in Dr. Davis's lab.

After being trained for a short time, I started working on my own project about phytoremediation. Phytoremediation is a very effective method to remove explosives, nutrients, organic solvents or other unwanted chemicals from contaminated soil and groundwater I have been conducting several experiments on the growth of sunflower and maize seeds with contaminants like benzotriazole, dinitrotoluene, and potassium ferricyanide.

I noted the general trend of the plant behavior, the effects of contaminants in roots, shoots and exudates.

I used different devices like infrared spectroscopy atomic absorbance, glass chromatography and HPLC. By using these devices and repeating the experiments several times, we could better understand plant behavior with these contaminants, the toxicity threshold and the handling techniques that are efficient for these types of plants.



Having these tools, we can better remediate many contaminated sites. I have learned many laboratory techniques working in Dr. Davis's lab. During the research, I learned to do my very best even with limited resources. We successfully conducted some experiments with soda bottles that we cut in half. Two of the remarkable qualities I acquired in the lab are perseverance and patience. I learned to work in groups, and my lab techniques have improved a whole lot. We have gained insight on providing a safer environment to people around the world by using phytoremediation.

Denton Shanks (*Senior from Liberty, MO*)

I believe conducting scientific research on a team is a very important experience for students, especially undergraduates. For me, the symbiotic relationship between class and research has been very strong.



Research relates the material I learn in class to actual hands on investigation and therefore makes both research and studying interesting, easier, and fun. My experience as an undergraduate research assistant has been incredible. After searching for a research position, I found Drs. Dolores Takemoto and Om Prakash's laboratories in May of '05. Since then, I have been doing collaborative research using NMR spectroscopy, protein modeling, electron microscopy and other biochemical experiments.

At the end of my first year of research, I co-authored a poster that summarized my protein structure modeling work on the C1B domain of the Protein Kinase C gamma

enzyme and its mutations. I presented this poster in Ft. Lauderdale, Florida at the 2006 annual meeting of the Association for Research in Vision and Ophthalmology (ARVO). Between the compensation from the biochemistry department and winning an ARVO National Eye Institute Travel Grant, the entire trip did not cost me a penny. This was a wonderful way to show how one year's persistence on research pays off. Since then, I have attended two more conferences, published another poster as a first author and helped publish two journal articles. It is amazing to me to have a published journal article containing the research I have been working on for the last year. Through working closely with research professors, this experience has enabled me to understand the personality and motivation of someone who has dedicated his or her life to scientific investigation. This has allowed me to build a strong connection to research and the people with in it. I now understand the excellent feeling of working on a highly motivated, academic and hardworking team. Next, I will attend medical school and plan to continue research in neurology while I learn the necessary medical clinical skills. I know my experience as an undergraduate research assistant enabled me to be one step closer towards accomplishing my professional dreams.

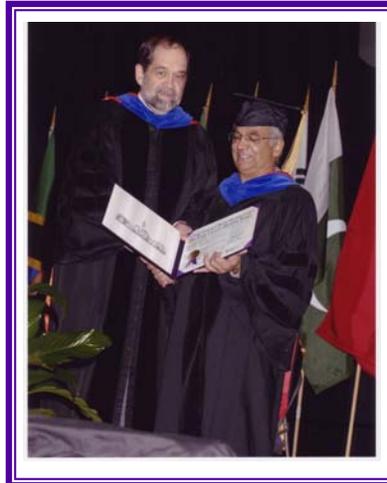
K-STATE BIOCHEMISTRY PROFESSOR, ANATOMY AND PHYSIOLOGY PROFESSOR RECEIVE THE COMMERCE BANK DISTINGUISHED GRADUATE FACULTY AWARD

K-State News Service

Two Kansas State University professors whose research is nationally and internationally known received the Commerce Bank Distinguished Graduate Faculty Award.

Subbaratnam Muthukrishnan, professor of biochemistry, and **Philine Wangemann**, professor of anatomy and physiology (also a member of the Graduate Biochemistry Group faculty), were recognized at a ceremony Friday, Dec. 8, in Bramlage Coliseum. Each received a \$2,500 honorarium. The awards are supported by the William T. Kemper Foundation and the Commerce Bancshares Foundation, and they are coordinated through the Kansas State University Foundation.

"This is the 12th year that Commerce Bank and the William T. Kemper Foundation have partnered with K-State to support the Commerce Bank Distinguished Graduate Faculty Awards," said Tom Giller, community bank president, Commerce Bank, Manhattan. "It is an opportunity for us to show our support of the university and to assist its efforts in recognizing faculty members who excel in teaching, research and the mentoring of students." Jon Wefald, K-State president, said it is encouraging to see how the partnership between K-State and Commerce Bank allows dedicated faculty to receive recognition for their accomplishments.



(Photo taken by KSU Graduate School)
Dr. R. W. Trewyn, Research Vice Provost, presents Distinguished Graduate Faculty Award to **Dr. S. Muthukrishnan**, Professor of Biochemistry, at the graduate graduation ceremony on December 8, 2006

"K-State remains grateful for the generosity of Commerce Bank and its related foundations for their support in recognizing outstanding K-State faculty members like Drs. Muthukrishnan and Wangemann," Wefald said. "The work of these two exceptional researchers is known throughout the country and the world and speaks to the caliber of faculty at K-State. Dr. Muthukrishnan's pioneering work in biochemistry exemplifies K-State's contribution to the biosciences, and Dr. Wangemann's research continues a legacy of excellence at K-State's College of Veterinary Medicine. It is heartening to see two such deserving faculty

receive the recognition they so rightfully deserve."

Muthukrishnan is known internationally for his contributions to insect and plant molecular sciences. In the 26 years he's been at K-State, Muthukrishnan and his associates have cloned several genes involved in plant defenses against fungal pathogens and insect pests, scoring several "firsts" in plant and insect gene cloning. Muthukrishnan holds a patent on the use of a biopesticide, and he and his collaborators have developed varieties of crop plants and other plants more resistant to pests and disease. His laboratories examine characteristics of genes in the red flour beetle, and his research has been supported by more than \$5 million in extramural funding. Muthukrishnan, recipient of the William L. Stamey Award for Excellence in Teaching from K-State's College of Arts and Sciences, has trained 10 doctoral students and 18 master's degree students at K-State. He earned his doctorate in his native India from the Indian Institute of Science in Bangalore. He did his postdoctoral work at several other institutions in the United States before coming to K-State in 1980. Muthukrishnan has more than 140 refereed publications, is editor of the book, "Plant PR-Proteins," has served on various review panels for the National Science Foundation and has organized conference workshops.

Thank You

*To all who contributed in the recent **Changing Lives Campaign and Telefund**. Your generous donations are very important for maintaining support for our outstanding Biochemistry students and excellence in Biochemistry teaching and research activities. Your recent gift is a most appreciated contribution to Biochemistry's programs.*

Mike Kanost

TRACKING ALUMNI



Successful Venture

Shengjiang Liu (Ph.D. 1993, Roche) co-founded Abmaxis, Inc. with postdoctoral friends from his days at Stanford University. Abmaxis was developed as a venture-backed biopharmaceutical company dedicated to the discovery and development of the next generation of optimized human therapeutic antibodies. The company developed AISIM (Abmaxis In Silico IMMunization) which is a powerful discovery engine that combines proprietary computational algorithms with biological selection for antibody optimization. The approach uses "structure-centered" rather than the standard "sequence-centered" approaches in the computational design that supported the production of humanized antibodies to target diseases. The Abmaxis approach accelerated the discovery of novel antibodies and optimizing candidate antibodies within a short development cycle.

The starting point for the process can be an antigen target, a murine, animal, or human antibody. Their success in a collaborative work with Merck led in 2006, to Merck purchasing Abmaxis for \$80 million. Thus, in his first biotech venture Liu was very successful.

Even before coming to the USA, Liu conducted research on the treatment and prevention of viral diseases with antibodies. He obtained both a M.S. in Virology and Immunology and a DVM degree both at Nanjing Agricultural University. In 1988 he co-founded and was the associate-director of the Institute of Immunology and Biochemistry at that University. Liu initiated molecular biology studies in Roche's laboratory and is an author on several publications.

After obtaining his Ph.D. with Roche, he received his postdoctoral training at Stanford University with Nobel Laureate Arthur Kornberg. He worked on the enzymes involved in the accumulation of inorganic polyphosphate in bacteria and mitochondria and developed a high through-put assay for inorganic polyphosphate. He then accepted a Scientist position at Genentech, Inc. in 1996. He was group leader in the Department of Cell Culture and Fermentation at Genentech until 2000. Some of his studies focused on rodent parovovirus isolates, a virus he had worked on in China. He developed novel technologies with one focus being isolation of therapeutic proteins.

After the development of Abmaxis (including major efforts by Liu in attracting venture capital), the successful enterprise of his company, and the purchase by Merck, he joined Bayer Healthcare Corporation in 2005 as the Head and Sr. Principal Scientist, Pathogen Safety Department. In this position, he is involved in developing bioprocess technologies to ensure that biotherapeutic methods meet the required standards. He is also involved in drug application submission marketing and manufacturing support.

Liu's wife, Liping Wang, is currently employed at Genentech Inc. Their Daughter, Ning Liu, graduated from UC San Deigo, last summer with a B.S. in Biochemistry and their son, George Liu, is 13 years old and in intermediate school.



David Hogenkamp



It is with great sadness that we announce the passing of Dr. David Hogenkamp, one of our recent graduates (2006 Spring), after a brief struggle with pancreatic cancer. A dual citizen of Canada and USA, David served with distinction in the US Army as a sergeant before joining our Department in 2002. Among his many accomplishments was winning

the prestigious Saracheck Fellowship Award as the outstanding graduate student in the field of molecular biology at KSU in 2005. He died on January 28 at his home in West Lafayette where he was pursuing post-doctoral research studies in the Department of Entomology at Purdue University. He is survived by his wife Theresa and two young sons, Jacob and Tyler. The Department thanks all alumni and friends who contributed generously towards the Hogenkamp Family Assistance Fund. Theresa may be contacted at hogen@purdue.edu.

Tracking Alumni

Glen Deloid (M.S. 1984, Cox) has returned to research. He did some work for a couple of years as an image processing expert in the 'molecular and integrative physiology' department at the Harvard school of public health, and a few months ago started a (very belated) postdoc on an NIH training grant in the same department. he will be studying the molecular mechanisms of bacterial killing by alveolar macrophages (including a genome-wide RNAi screen for genes involved in killing Francisella Tularensis - a big grant, as this is a potential bioterrorism agent) "It's been so long since I was in a lab, and everything is changed. There is so much new information. but I'm starting to get a handle on the basic signaling pathways and mediators, at least in my macrophages." He hopes after a few years to finally settle into a research faculty or industry position.

Alicia (Myers) Johnson (B.S. 2003) and her husband Matt have a happy 6 month old (as of Dec. 06) baby boy, Noah. Alicia is completing her final year at Southwest College of Naturopathic Medicine in Tempe Arizona.

Lisha Kelo (M.S. 2004, Kanost) is a research scientist working in discovery biology in projects related to diabetes and obesity at Eli Lilly in Indianapolis.

Sylvia Nemmers (M.S. 1992, Krishnamoorthi) is working toward a Ph.D in Agronomy at New Mexico State University. Her research is with arsenic in soils, and she teaches environmental chemistry.

M. M. Simlot (Ph.D. 1963, Clegg) is now retired from active duty. His last job was as Postgraduate Dean at Rajasthan Agriculture University, Bikaner in India.

Lijuan Wang (M.S. 1995, Roche) It has been long time and time has passed so quickly. My two boys are 11 and 9 years old and in 6th and 5th grade already. After I left KSU, I have been working in Caltech (7 years) and Ohio State University (present) as a researcher performing the bio experiment (protein purification and molecular biology). I really enjoyed the time in the KSU. It is a super good environment to study abroad.

Yu Yong (Ph.D. 1998, Davis) and his wife **Xiahui Zhu** (M.S. 1998, Muthukrishnan) are still living in West Roxbury, MA. Their daughter, Amy, is now a freshman at Boston University, and they are joyfully busy with a new daughter Hannah Jiayue Yu, who is now five and half months old. Xiahui is still working at Astrazeneca.

Lei Zhao (M.S. 1994, Kanost) has begun a new position as senior scientist in the Department of Hematology/Cardiology, Preclinical Research and Development, at Bayer in Berkeley, CA.

KANSAS PROGRAM HONORS BIOCHEMISTRY PROFESSOR

K-State News Service

The Kansas IDeA Network of Biomedical Research Excellence presented faculty across the state with Faculty Scholar Awards in 2006. Those honored with Faculty Scholar Awards from K-State were Lorena Passarelli, assistant professor of biology; Jyoti Shah, associate professor of biology; and **Anna Zolkiewska**, associate professor of biochemistry.

The purpose of the program is to acknowledge outstanding faculty whose contributions to Kansas universities are valued. Faculty members at the assistant or associate professor level with



Anna Zolkiewska receives Faculty Scholar Award plaque from Department Head **Michael Kanost**.

three or more years of service to the university and research in cell and developmental biology are eligible for the honor. The scholars receive an engraved plaque. Awards of \$10,000 each are made to universities with successful candidates.

The Kansas IDeA Network of Biomedical Research Excellence is funded through the National Institutes of Health Center for Research Resources for the purpose of strengthening biomedical research and training researchers in the state of Kansas.

WHY SHOULD WE EAT OUR CARROTS?



Did a parent ever tell you to eat your carrots? Did you ever wonder why? If so, now you can get three good answers. Catharine Ross, this year's Richard H. and Elizabeth C. Hageman Distinguished Lecturer in Agricultural Chemistry, is a nutritional biochemist who has spent over 20 years finding one of the most exciting of those answers. Her work during the 1980s indicated that vitamin A was important for immune function. More recent studies

have identified specific control mechanisms such as modulation of B cell population dynamics by retinoic acid, the cellular active metabolite of vitamin A. Retinoic acid, combined with polyI:C, can be used as an adjuvant in antibody production. Retinoic acid may also be protective of neonatal lungs against hyperoxic damage and have anti-cancer functions. And of course vision is dependent on vitamin A derived molecules.

Professor A. Catharine Ross is currently in the Department of Nutritional Sciences at Pennsylvania State University. Prior to 1994 she was at the Medical College of Pennsylvania in the Departments of Biochemistry and Pediatrics (Nutrition). At that institution she also served as Director of the Division of Nutrition and for graduate training in biochemistry. She received her B.S. in Zoology from the University of California at Davis, a Master's

degree in Nutritional Science and a PhD in Biochemistry from Cornell. Her work with vitamin A began during her PhD studies of chylomicrons and continued while she was a post-doctoral researcher at Columbia University. Along the way to her present prominent position and membership in the National Academy of Sciences (2003) she has identified acylCoA: retinol acyl transferase and lecithin:retinol acyl transferase as key enzymes for movement and storage of retinol. Some of her recent work has also included proteomics studies of enzymes regulated by vitamin A as well as detailed studies of mechanisms whereby retinoic acid regulates function and localization of proteins. This year's lecture title was: "Regulating a key regulator of differentiation – how is the production and metabolism of retinoic acid controlled?"

Professor Ross has been recipient of numerous awards including the Mead-Johnson and the Osborn and Mendel (basic research) awards of the American Society for Nutritional Sciences, and a Research Career Development Award from the NIH. She has been active an associate editor for several journals and books, and is now Editor, Journal of Nutrition. In addition to the usual duties as a reviewer and panel member for national agencies, she has been involved in several special groups that prepared reports or papers on vitamin A and immunity, vitamin A and cancer, impact of vitamin A supplements on child mortality. The colloquium focused on the broader issue of why you still need to eat your carrots; vitamin A status does matter.

MAKING A DIFFERENCE

Biochemistry Prep Lab Supervisor Sue-yi Huang (not pictured) and Professor Lawrence Davis were awarded a 2006 "Making a Difference Award" from the Women in Engineering and Science Program. Undergraduate student Danielle Ngaba nominated both for the award. Dr. Davis was also nominated independently by graduate student Jwan Ibbini.



(From left to right) Jwan Ibbini, Mrs. Linda Davis, Dr. Larry Davis and Danielle Ngaba at the WESP awards reception for "Making a Difference."

Dear alumni and friends,

We hope you will keep in touch with us and your former classmates by contributing to our newsletter. Would you please take a minute to send us your news about you, your career, and your family?

The Department of Biochemistry would also like to thank you for your generous support. Your donations allow us to offer scholarships, improving our ability to recruit and retain outstanding and deserving students. General funds supplement the department's operating budget to enhance the quality of education and research experiences we can provide to our students and to attract and support new faculty.

If you wish to donate to any of the Biochemistry Foundation funds (see below) please send your contribution to the Department of Biochemistry and indicate which fund you wish to support. Please call us at 785-532-6121 or email biochem@ksu.edu if you have any questions.

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Biochemistry Foundation Funds

| | |
|---------------|--|
| F17870 | <u>Biochemistry General Fund Account</u> |
| F66998 | <u>Hageman (Richard/Elizabeth) Distinguished Lectureship</u> Annual Hageman Lecture Series |
| F68342 | <u>Havley (David/Tim) Biochemistry Discretionary Account</u> Undergraduate Scholarships |
| Q53097 | <u>Hedgcoth Biochemistry Graduate Scholarship Account</u> Outstanding Graduate Teaching and Graduate Research Awards Graduate Student Travel to Scientific Meetings |
| Q71700 | <u>Hughes (JS) Memorial Scholarship Account</u> Undergraduate Scholarships |
| F79431 | <u>Merrill (Fred/Virginia) Biochemistry Discretionary Account</u> Undergraduate Scholarships |
| Q03227 | <u>Wanda Bates Undergraduate Scholarship Account</u> Undergraduate scholarships for students with financial need |
| N85330 | <u>Willard & Ora M. Ruliffson Memorial Scholarship Account</u> Scholarship for pre-dentistry or pre-veterinary students |
| F81556 | <u>Philip Nordin Memorial</u> Awards for Graduate Student Research Travel |
| F51745 | <u>Barlow Memorial Scholarship</u> |
| Q55486 | <u>R. Kenneth Burkhard Scholarship for Women in Biochemistry</u> Scholarship for Outstanding Female Biochemistry Juniors and Seniors |

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KSU Biochemistry on the World Wide Web

<http://www.k-state.edu/bchem/>

Our homepage 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.k-state.com>

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