

Biochemistry News

Kansas State University – Alumni and Friends Newsletter

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MUTHUKRISHNAN RECOGNIZED AS UNIVERSITY DISTINGUISHED PROFESSOR AND NAMED AAAS FELLOW

K-State News Service

Biochemistry professor Subbaratnam Muthukrishnan was one of three professors who received the highest honor K-State can bestow on its faculty. Muthukrishnan was named University Distinguished Professor April 11, 2007, after a university wide competition held by the provost. Muthukrishnan received a \$10,000 salary supplement and was honored at fall commencement ceremonies in December. K-State Provost M. Duane Nellis said of the newly appointed professors "I am extremely impressed with the accomplishments of these internationally recognized professors. Such faculty contribute significantly to our efforts to be among the premier land grant institutions nationally."

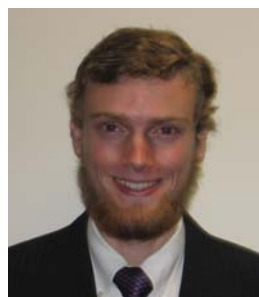


Muthukrishnan has also been designated a fellow of the world's largest general scientific society, The American Association for the Advancement of Science. Fellows are named for their scientifically or socially distinguished efforts to advance science or its applications. He and the other 470 fellows were announced in the Oct. 26 issue of the journal "Science" and will receive a certificate and pin at the association's annual meeting in February 2008 in Boston. K-State now has 15 fellows of the association, representing the fields of biology, chemical engineering, plant pathology, biochemistry, grain sciences and industry, geography, agronomy and physics. The American Association for the Advancement of Science named Muthukrishnan a fellow for his contributions to plant and insect molecular biology.

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BIOCHEMISTRY STUDENT RECEIVES GOLDWATER SCHOLARSHIP

K-State News Service



Biochemistry student Mike Reppert is among 317 students nationally to win a 2007 Barry M. Goldwater Scholarship. They were selected on the basis of academic merit from a field of 1,110 mathematics, science and engineering students nominated by the faculties of their colleges and universities. The Goldwater scholarship is for students who major in science, mathematics or engineering and plan a career in research. The scholarship provides up to \$7,500 annually for a student's final one or two years of undergraduate studies.

Reppert is a junior in chemistry, biochemistry and mathematics. He is conducting undergraduate research focused on photosynthetic reactions under K-State's Ryszard Jankowiak, professor of chemistry, and Nhan Dang, a K-State research associate. Reppert has been recognized as a National Merit Scholar, received the Phi Lambda Upsilon award for academic performance as a sophomore and is a member of both Phi Eta Sigma and Golden Key honor societies. At K-State he has been awarded the Presidential Scholarship, the William and Melissa Harold Memorial Scholarship, the Dow K-State Alumni Association Scholarship, the Travis W. Miller Memorial Scholarship, the Jack and Betsy Lambert Scholarship and the College of Arts and Sciences Excellence Scholarship. He has served as a peer minister for the Baptist Campus Center, is a member of the K-State Juggling Club and has received a black belt in kung fu. Mike Reppert is the son of Jay and Sue Reppert, of Manhattan.

MUTHUKRISHNAN

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Muthukrishnan is known internationally for his contributions to insect and plant molecular sciences. In the 27 years he has 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. His laboratories examine the organization and functions of genes involved in the synthesis and turnover of chitin in the exoskeleton of the red flour beetle. Muthukrishnan holds a patent on the use of chitinase-based biopesticide and, together with collaborators, has developed varieties of crop and other plants more resistant to pests and disease. In 2005, Muthukrishnan was part of a K-State research team that identified several enzymes involved in the synthesis, turnover and hardening of a beetle’s exoskeleton. That discovery could not only lead to better pest control, but it also could help create similar strong, lightweight materials for use in aircraft and armor. His research has been supported by more than \$5 million in extramural funding.

Muthukrishnan, recipient of the 2006 Commerce Bank Distinguished Graduate Faculty Award and the William L. Stamey Award for Excellence in Teaching from K-State’s College of Arts and Sciences, has trained 12 doctoral students, 18 master’s degree students and 15 post doctoral researchers at K-State. 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. He has been an invited speaker at scientific conferences all over the world. He is a member of the editorial board of the Journal of Plant Biochemistry and Biotechnology. He earned his doctorate in his native India from the Indian Institute of Science in Bangalore. He did postdoctoral work at several institutions in the United States, before coming to K-State in 1980.

Jianhan Chen Arrives to Complete Our Faculty Line-up

Jianhan Chen joined the department in August 2007. Most recently he was a post-doctoral fellow with Charles Brooks at the Scripps Institution in San Diego. There he worked on a broad range of molecular dynamics problems relating to protein folding. His most recent publications deal with ways to model the solvent surrounding a peptide in an implicit rather than explicit way.

Dr. Chen obtained his undergraduate degree in chemistry at the University of Science and Technology of China in Hefei. He joined that program in the same year that Li Zheng (Ph.D. 2000, Krishnamoorthi) left there, and was in the same graduating class as Qing Kang (Ph.D. 2001, Zolkiewska), but with a different major. He says that he always preferred the more physical side of chemistry, leaning over the edge into physics. His senior thesis was an attempt to produce some high temperature superconductors.

For graduate school Dr. Chen chose the University of California at Irvine where he worked in a program that was jointly sponsored by chemistry and physics departments. There he was involved with developing very clever mathematical means to make NMR work more efficiently. As a transition into Brooks’ lab he worked with Peter Wright, H.J. Dyson and others

seeking ways to get reliable models of peptide folding from limited amounts of NMR data combined with recent advances in modeling and understanding of solvents.



Dr. Chen and his wife Xueying (Sharon) Qin who also has a PhD, from U.C. San Diego, are settled in on the west side of Manhattan. Her degree is in atmospheric chemistry and she is working with Chris Sorenson in the KSU physics department. Allen Chen, their newborn son arrived just before Christmas (December 23). He is a healthy, happy baby.

If you’d like to see more pictures, or read in more detail about Dr. Chen’s research program, it is available on the department website. Dr. Chen’s e-mail address is jianhanc@ksu.edu. His office adjoins the giant window well (or some would say fishtank) on the west side of Chalmers, toward the loading area of Ackert. Recently we landscaped that area so that it should no longer be an eyesore, but a rest for sore eyes.

GRADUATE AWARDS AND SCHOLARSHIPS



Chunju An, Emily Ragan, Lucinda Sullivan, and Chansak Suwanchaichinda received travel awards from the American Society for Biochemistry and Molecular Biology, to attend the annual meeting of that society.

Michael Asiedu received an International Graduate Student Scholarship from the Manhattan Rotary Club.

Michael Barnett received a travel award from ARVO, to present research at the annual meeting of the vision society.

Alvaro Herrera and **Suma Somasekharan** have received travel awards from the KSU Center for Basic Cancer Research.

Jwan Ibbini received a 3rd place poster award at the International Phytotechnologies conference in Denver Colorado in September 2007. Her poster dealt with use of textile dye phytoremediation in teaching settings for all ages.

Maria Nagy received a \$1000 Sarachek Scientific Travel Award on the basis of her outstanding use of modern genetic techniques.

Matt Warner received recognition for outstanding efforts as a teaching assistant, while **Michael Asiedu** and **Danqiong Sun** were recognized for outstanding research work.

TOMICH RECEIVES WILLIAM L. STAMEY AWARD FOR TEACHING

K-State News Service

Kansas State University's College of Arts and Sciences recognized a biochemist, for his ability to reach students in his classrooms. John Tomich, professor of biochemistry, has been presented its William L. Stamey Award for Teaching. The award is named for William L. Stamey, a dean of K-State's College of Arts and Sciences from 1969 to 1987.

Tomich has spent the past four years further developing and teaching Biochemistry and Society, a course for non-science majors. That course was begun by W. J. Ruliffson in the late 1970s and has been much in demand over the years. Tomich said enrollment in the course has increased steadily in the past few years and now fills soon after enrollment opens. This past semester, a companion lab course was created, tested and approved as a K-State undergraduate general education course.



Tomich said Biochemistry and Society is designed to introduce students to biochemistry and the impact the field has on their daily lives. When he began teaching the course, Tomich began writing a book with a light, sometimes humorous tone that blends science with students' experiences, while throwing in a bit of pop culture. Tomich said one of his goals is to acquaint non-scientists with bioscience issues that have personal, political and ethical significance -- issues students may be asked to vote on someday.

"I believe strongly in this course. I have seen firsthand how it affects students," Tomich said. "Students leaving the course have indicated that they now have confidence to read and understand bioscience articles in news media, be more proactive in their dealings with health professionals, and use the Internet as a reference source for medical and biochemical related issues."

Tomich earned a doctorate in chemistry from the University of Waterloo in Ontario, Canada, and a master's degree in biochemistry from Purdue University. He earned a bachelor's degree in biology with a minor in chemistry from the University of Connecticut. He was a research fellow at the University of Delaware and the California Institute of Technology. He has served as director of the Biotechnology Microchemical Core facility since his arrival at K-State in 1992.

PHI KAPPA PHI INDUCTS THREE BIOCHEMISTRY STUDENTS

K-State News Service

Kansas State University's chapter of Phi Kappa Phi is welcoming more than 110 new members. Founded in 1897 at the University of Maine, Phi Kappa Phi is the nation's oldest, largest and most selective all-discipline honor society. Students elected to membership include the upper 7.5 percent second-semester juniors and the upper 10 percent of seniors, along with outstanding graduate students.

New Phi Kappa Phi members at K-State include: **Sarah Devlin**, senior in biochemistry, **Maria Nagy**, graduate student in biochemistry, and **Michael Reppert**, junior in chemistry and biochemistry.

2007 HAGEMAN LECTURE IN AGRICULTURAL BIOCHEMISTRY:

"S-Nitrosoglutathione reductase: A new player in nitrosative stress"

Heat stress is commonly a limiting factor for crop production in Kansas, even when water is not in short supply. If we could understand how heat injures plants, and engineer greater heat resistance, production of major crops could rise by a significant fraction. Therefore it was exciting when specific proteins were observed to be induced rapidly and directly by heat, and only, heat stress.

Heat stress is only one kind of stress that plants experience. Reactive oxygen and nitrogen species may be viewed as both consequences and causes of the stress response. Interestingly, nitrosylation may regulate photosynthetic reactions centers. This year's Hageman lecture focused on control of one molecule- RSNO- that is a redox responsive signal.

Elizabeth Vierling has had an abiding interest in heat stress proteins (Hsps) since her time as a post-doctoral fellow with Joe L. Key at the University of Georgia. Her pioneering work on several classes of small heat shock proteins (sHsps) showed that they have different sizes and different organelle locations. Most of the sHsps are specific to plants, unlike the large Hsps that are found to be very similar in procaryotes and eucaryotes. In Arabidopsis, there are more than a dozen sHsps in six classes, based on location and sequence similarity. The sHsps are distantly related to alpha crystallin of the vertebrate eye.

Dr. Vierling obtained a B.S. in Botany from the University of Michigan where she entered as a Merit Scholar. She

then continued for her M.S. and PhD in Biology at the University of Chicago where she worked on chlorophyll binding proteins of the photosynthetic reaction centers. Her work with Joe Key was a logical transition looking at the heat stabilization of Rubisco, another essential photosynthetic protein, production of which is dependent on Hsps. Since joining the University of Arizona, she has

continued to discover and study both sHsps and HSP100 proteins. She has published 75 or so papers on the Hsps. More recently transcription factors controlling expression of the Hsps have been of interest. An important finding is that there are seed-specific factors that induce sHsps and which appear to protect ungerminated seeds from high temperature. They may also affect seed longevity. Unraveling the control networks for this process is a major challenge. This year's colloquium was focused on such control networks. It was an opportunity for interested faculty and students to learn a lot of unpublished, exciting science.

Dr. Vierling has served as an editor for JBC, Plant Physiology, Plant Molecular Biology, and Plant Journal, as a member of the executive committee of the ASPP, and as organizer of Keystone and Gordon conferences. In 2004, she was panel manager for the USDA competitive grants on plant responses to environment. She had sabbatical leaves with Gerald Fink at the Whitehead Institute in Boston, with M. Koorneef in Wageningen (as a Guggenheim Fellow), and currently with Mark Stitt at the Max Planck Institute in Golm, Germany, as an Alexander von Humboldt Fellow.



Telefund 2008 is coming February 19 and 21.

K-STATE CANCER RESEARCH CENTER AWARDS

K-State News Service

Last spring, eight biochemistry undergraduate students at Kansas State University earned cancer research awards through K-State's Terry C. Johnson Center for Basic Cancer Research.

The \$100,000 cancer research award program provides \$1,000 stipends to students and \$1,000 to their faculty mentors for research expenses.

Students applied for the awards in the fall by co-writing research proposals with faculty mentors affiliated with the center. The winners conduct the research in the mentors' laboratories during the spring semester.



Sarah Devlin
studies
channel
forming
peptides

The program was created to help enhance participation in laboratory research by undergraduates and to

encourage students to consider careers in research and medicine. K-State undergraduate students interested in working in a cancer-relevant laboratory are eligible to apply.



Nozomi Matsumiya
synthesizes
channel
forming
peptides.

Rob Denell, center director and distinguished professor of biology, said, "This program provides exceptional students the opportunity to work closely with faculty on real research projects. We are proud of these students and confident that some of them will go on to be among the nation's top scientists and physicians."

The awards were presented at a banquet on Friday, March 30. Also attending were the center's many affiliated faculty, benefactors and friends. The center's programs are

funded through private gifts. The center is committed to furthering the understanding of cancer by funding basic cancer research and supporting higher education, training, and public outreach.

Biochemistry students (mostly seniors) receiving these research awards included: Robert Jonathan McCully; Michelle D. Amthauer; Matthew T. Basel, chemistry, biochemistry, and biology; Sarah Devlin, (with J. Tomich); Daniel K. Madgwick, (with D. Takemoto) BS/MS program; Nozomi Matsumiya, biology (now a biochemistry graduate student with J. Tomich); Linette Ngaba, junior in dietetics (biochemistry prep lab); Liang Zhang; and Denton Shanks.



Dan Madgwick
studies lens
cell proteins
from rabbit
eyes

KANOST RECOGNIZED BY ENTOMOLOGY SOCIETY OF AMERICA

Entomology Society of America

The Recognition Award in Insect Physiology, Biochemistry, and Toxicology (*sponsored by Bayer CropScience*) recognizes and encourages innovative research in this area. The 2007 awardee, **Dr. Michael R. Kanost**, received his B.S. degree in zoology and entomology from Colorado State University in 1979, and his Ph.D. in entomology from Purdue University in 1983. He did postdoctoral research at Queen's University in Kingston, Ontario and at the University of Arizona before beginning a faculty position at Kansas State University. He is now University Distinguished Professor and Head of the Department of Biochemistry and an ancillary faculty member of the Department of Entomology. Kanost's research includes investigating how proteins in insect hemolymph function in innate immune responses and the biochemistry involved in formation of the insect exoskeleton. He has published more than 120 journal articles and book chapters and is on the editorial boards of *Archives of Insect Biochemistry and Physiology*, *Developmental and Comparative Immunology*, *Insect Biochemistry and Molecular Biology*, and *Journal of Insect Science*.



2007 BS/BA BIOCHEMISTRY GRADUATES

Matthew Basel (BS S2007)

Meg Fasulo (BS S2007)

Kristen Ford (BS S2007)

Erin Gustafson (BS S2007)

Matthew Heerman (BS S2007)

Erin Hemphill (BS S2007)

Colleen Loo (BA S2007)

Daniel Madgwick (BS F2007)

Robert McCully (BS S2007)

Lydia Roberts (BS F2007)

Denton Shanks (BS S2007)

Adam Snider (BS F2007)

Liang Zhang (BS S2007)



2007 MS/PHD BIOCHEMISTRY GRADUATES

Gada Khalil Al-ani (M.S. 2007, Zufferey) *The Role of the Dihydroxyacetone Phosphate Acyltransferase LmDat in Lipophosphoglycan Synthesis, Metacyclogenesis and Autophagy in Leishmania major* (Ph.D. Student, University of Missouri Kansas City)

Michael Asiedu (Ph.D. 2007, Wei) *Characterization of the function and regulation of myosin-interacting guanine nucleotide exchange factor (MyoGEF) and centrosome/spindle pole associated protein (CSPP) during mitotic progression and cytokinesis* (Postdoc, KSU, Biochemistry Department)

Huaien Dai (M.S. 2006, Prakash) *Structural and Functional Studies of Fowlicidin 1 and of RR-1 Motif from an Insect Cuticular Protein* (Ph.D. Student, KSU, Biochemistry Department)

Radhika Dixit (M.S. 2007, Muthukrishnan) *Chitin Deacetylase Gene Family in Insects and Functional Characterization in the Red Flour Beetle*

Alvaro Herrera (M.S. 2006, Prakash) *NMR Structural Investigations of Fowlicidin-2 a novel Cathelicidin Antimicrobial Peptide from Chicken* (Ph.D. Student and Research Assistant for NMR, KSU, Biochemistry Department)

Qixin Liang (B.S./M.S. 2006, Reeck) *Laccase-1 in the Pea Aphid Acyrthosiphon pisum* (Universal Government Service, Singapore)

Jason Lauer (M.S. 2007, Takemoto) *Association of PKC γ and 14-3-3 in N/N1003A cells: NMR structure and function relationships of a peptide and its mutants correlating to the C1B1 region o PKC γ* (Instructor, West Point Military Academy)

KANSAS PROGRAM HONORS BIOCHEMISTRY PROFESSOR

The Kansas IDeA Network of Biomedical Research Excellence presented faculty across the state with Faculty Scholar Awards in 2007. Among those honored with Faculty Scholar Awards from K-State was **Michal Zolkiewski**, 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 three or more years of service to the university that conduct research



Michal Zolkiewski receives Faculty Scholar Award plaque from Department Head **Michael Kanost**.

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.

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.

**Department of Biochemistry
Chalmers Hall 141
Kansas State University
Manhattan, KS 66506
Email: biochem@ksu.edu**



Biochemistry Foundation Funds

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

Department of Biochemistry
141 Chalmers Hall
Kansas State University
Manhattan, KS 66506-3702
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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>

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