The K-INBRE Newsletter

K-INBRIEF

Kansas IDeA Network of Biomedical Research Excellence

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For more information about K-INBRE, contact your campus coordinator.

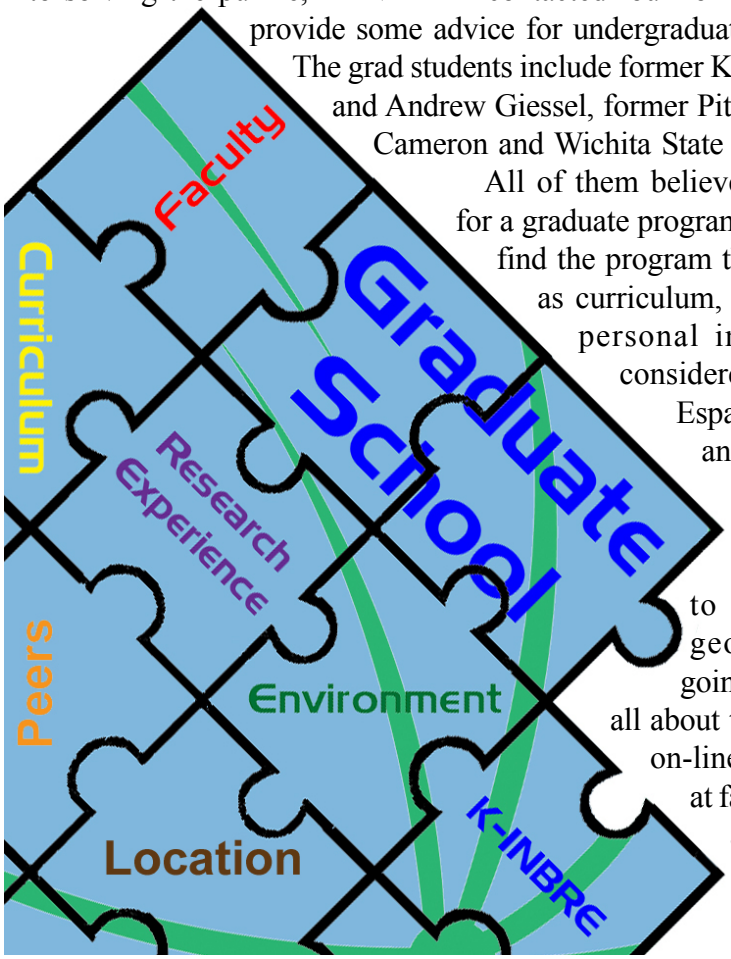
Finding The Right Fit

Grad school advice from former K-INBRE students

Joseph Chapes
Editor

Along with working on class work, research projects, and life in general, many K-INBRE students are also trying to solve the puzzle of graduate school.

Finding the right graduate program can be a challenge. To provide a little insight into solving the puzzle, K-INBRIEF contacted four former K-INBRE students to provide some advice for undergraduates.



The grad students include former KU students Brooke Barrett and Andrew Giessel, former Pittsburg State student Brent Cameron and Wichita State student Greg Esparza.

All of them believe undergraduates looking for a graduate program should make an effort to find the program that fits best. Factors such as curriculum, faculty, environment and personal interests all need to be considered.

Esparza feels it is important to answer important questions before deciding on a program.

"My first suggestion is to decide whether or not geographical location is going to be an issue. Then it's all about the science," he said. "Go on-line, read journals and look at faculty publications. If you are interested in a

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Questions and comments can be sent to jchapes@ksu.edu.

particular subject, ask yourself 'Where is the best research in this area coming from?' If you are unsure about which field of science interests you, look for programs that will give you the opportunity to sample many different scientific disciplines, and then pick the one that suits you best."

After considering these questions for himself, Esparza has gone on to the University of Iowa, where he a being mentored by Dr. George Weiner. He is currently following up on some data published by Weiner's research group that might lead to new therapies for B-cell malignancies and "an new understanding of immune regulation."

The first step to knowing what you want to do in graduate school, Cameron believes, is getting involved in research.

"If you are in undergraduate school and considering going to graduate school, make the effort to get involved in research," he said, "There is nothing else that the graduate schools like to see more and it will let you know if you are going to like graduate school. A majority of your time in graduate school is going to be spent doing original research, so you better make sure that you like it."

Cameron's experiences led him to enter the MD/Ph.D. curriculum at Case Western Reserve University in Cleveland, Ohio.

Barrett found that if you have an idea about what type of program you are looking for, then when you find the right program, you will know it. After considering a number of schools, she realized that KU was the place for her.

"Although, I was interested in getting out of Kansas simply for the experience of being truly on my own, I couldn't deny the wonderful program KU had to offer," Barrett said.

She is currently working in KU's Department of Pharmaceutical Chemistry in the lab of Dr. C. Russell Middaugh, Takeru and Aya Higuchi. Her projects involve the stabilization of macromolecules and formulating vaccines against Gram-negative bacteria species such as salmonella.

If you do not know exactly what you want to do in graduate school, it is still possible for you to find the right program, as Giessel found out.

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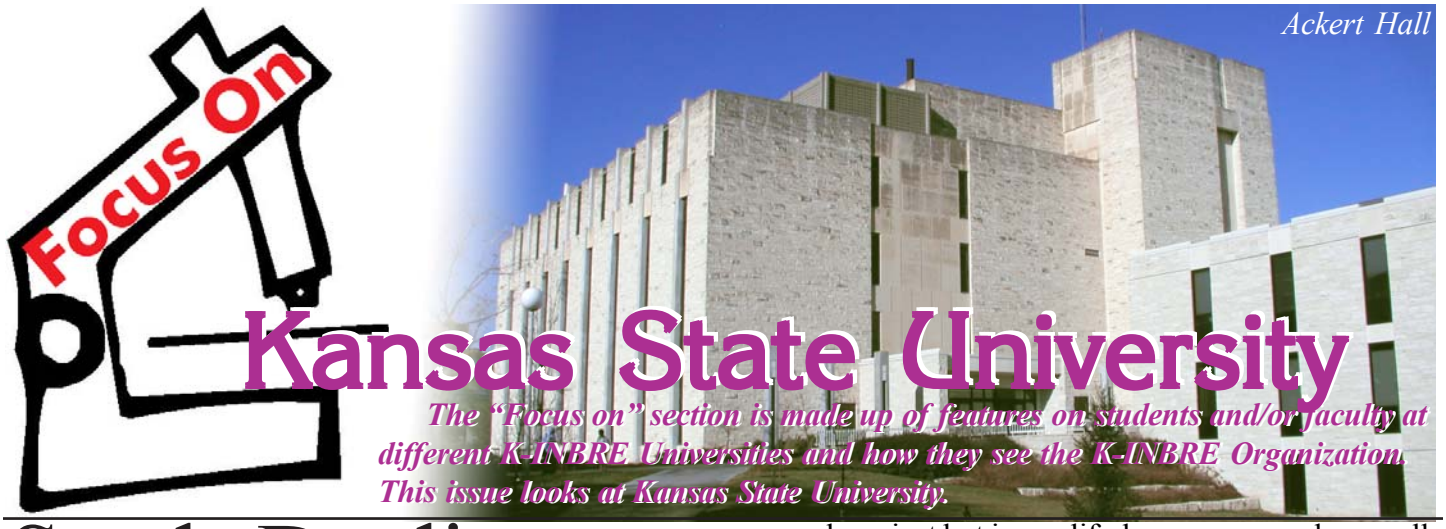

Kansas State University

The "Focus on" section is made up of features on students and/or faculty at different K-INBRE Universities and how they see the K-INBRE Organization. This issue looks at Kansas State University.

Sarah Devlin, Student

Mentor: Dr. John Tomich and Dr. Bruce Schultz
Major: Biochemistry, Pre-Medicine, Spanish Minor

What is your project?

"My project involves the synthesis of several synthetic channel-forming peptides. Previously, one of the peptides had been shown to transiently affect epithelial barrier integrity. It was subsequently shown that it also enhances the permeation of surrogate drugs across transformed human corneal epithelial (THCE) cell layers. By using electron microscopy, I was able to look at the effect that the peptide had on the THCE cell layers and show that indeed, this peptide is a lead compound that can be developed to enhance therapeutic drug delivery across the cornea without cytotoxic effects. Another channel-forming peptide, NC-1019, that was synthesized in our laboratory was shown to enhance anion secretion in MDCK cells. Currently, I have made several different amino acid substitutions to the original NC-1019 peptide, and am testing these substituted sequences to see if it is possible to further enhance anion secretion."

Sarah Devlin (Photo Submitted)

How do your mentors help you?

"Drs. Tomich and Schultz have both provided me with encouragement and motivation not only in my research project but in my life-long career goals as well. They challenge and push me to work hard to reach my full potential as a student and a researcher. They also challenge me daily to take my critical thinking and technical skills to the next level."

What is the best thing about learning about science at your institution?

"I feel that all of my professors in my science courses here at K-State have all been very passionate about their prospective fields. Their excitement about their field and their research is evident and as a student, it is difficult not to be impressed and excited as well."

How has K-INBRE helped you to expand you scientific knowledge and experience?

"I am currently enrolled in an Analytical Chemistry course and have seen the benefits of my research experience from last year. Because of K-INBRE, I have already begun to develop my analytical thinking skills and feel that I am many steps ahead of other students in my class with no prior experience. It has given me the opportunity to gain valuable laboratory and research experience, allowing me to further develop important technical and problem solving skills outside of the classroom setting.

"I have also had the opportunity to understand the world of research. I have had the opportunity to design

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Focus on Kansas State University

(Devlin, Continued)

and conduct experiments, examine my data, write an abstract and present my research at a national convention as well as at the annual K-INBRE regional conference. This is an invaluable opportunity for an undergraduate student like myself who is interested in a career in biomedical research. Through the K-INBRE program, I have already begun to create a solid foundation of skills to rely on in the future."

What do you plan to do after you graduate? Does it include a possible career choice in biomedical research?

"I plan to go on to medical school after graduation but am still planning on pursuing a career in biomedical research as well."

Laura Grauer, Student

Mentor: Dr. Dolores Takemoto
Major: Biochemistry

What got you interested in scientific research?

"I have always been interested in science, but it was my mentor, Dr. Dolores Takemoto, who pushed me to start research right away. She, along with many other Biochemistry professors, stressed the importance of getting an early start on research and I was lucky enough to be offered a job as an undergraduate research assistant in her lab."

Laura Grauer (Photo Submitted)

What is your project and its goals?

The Role of PKC g in Stress Control during Hypoxia. "My goals for this project are to localize and co-localize PKCg and PKC (before and after hypoxia and hyperoxia in lens cells in culture using confocal microscopy and specific antibody labeling. I will try to determine if the two PKC's translocate to membranes after hypoxia and hyperoxia and associate with Cx43. I want to identify signal molecules which activate PKCg but not PKC (and vice versa."

What kind of research would you like to get training in?

"I would like to (learn more about) in drug delivery mechanisms. I want to gain education and learn many techniques in finding ways to improve how certain drugs are administered or absorbed."

How does your mentor help you?

"Dr. Takemoto is an incredible mentor. Not only does she motivate me to think more deeply about my research, but she is able to produce an intense and stimulating work environment. Undergraduates work alongside graduate students and Post Doctoral researchers. I feel like I am an integral part of a team. This environment has made me stronger and better prepared for the real competitive research world."

What is the best thing about learning about science at your institution?

"KSU has one of the best undergraduate research programs in the country. The faculty here are very supportive and enthusiastic about working with students. Students are able to gain individual research experience as well as group project experience while working with their mentors. Being one of the smaller universities in the Big 12 makes it possible for students to get to know their professors and for professors to get to know their students."

How has K-INBRE helped you to expand your scientific knowledge and experience?

"Through its funding, the K-INBRE program has helped me learn numerous techniques and further develop my research experience. I have been able to

(Continued on Next Page)

Focus on Kansas State University

(Grauer, Continued)

work together with other students and faculty, including my mentor through this research. One cannot get this kind of experience without the help of programs such as K-INBRE."

In what ways do you think this experience will help you in the future?

"I know that I will have great advantage when entering graduate school due to my experience at KSU. I will have already been exposed to real research and can use these experiences to continue my education."

What do you plan to do after graduation? Does it include a possible career in biomedical research?

"After I graduate with my biochemistry degree, I plan to enter graduate school. I am looking forward to obtaining my masters degree and Ph.D. in either biochemistry or in pharmacy or medicinal chemistry. Eventually, I would love to run my own lab and direct research in a university or pharmaceutical setting."

Liang Zhang, Student

Mentor: Dr. Duy H. Hua
Major: Biochemistry

What got you interested in scientific research?

"My parents and teachers."

What was your project?

Mechanistic Studies of Antiamyloidosis with regard to the Alzheimer's Disease.

What are your goals for your project?

"Find a possible active compound that can successfully cure or prevent the formation of Alzheimer's disease."

Liang Zhang

What kind of research would you like to get training in?

"Drug design and finding possible solution for incurable disease."

How does your mentor help you?

"He helps me to understand the importance of the project that I'm working on. He gives me chances to access facilities and learn different instrumental methods."

What is the best thing about learning about science at KSU?

"The professors are very approachable outside classes to share their personal experiences on science and life with the students who approach them. The classes themselves have covered a wide range of topics that allow the students to have the choice of their interest."

How has K-INBRE helped you to expand your scientific knowledge and experience?

"K-INBRE gives me chances to meet with other students who have the same interests in research fields and share or exchange experiences."

In what ways do you think this experience will help you in the future?

"The experiences that I have gained through (K-INBRE) could allow me adjust better and faster in my future working field."

What do you plan to do after you graduate? Does it include a possible career choice in biomedical research?

"The future plan after graduation is enter graduate school in the field of biomedical research."

Congratulations 2006 Faculty Scholar Awardees!

The K-INBRE established a prestigious award program for mid-level faculty of distinction called "Faculty Scholars". The purpose of this program is to acknowledge our outstanding faculty, who are often targets of recruiting efforts by other institutions, that we highly value their contributions to our Kansas universities.

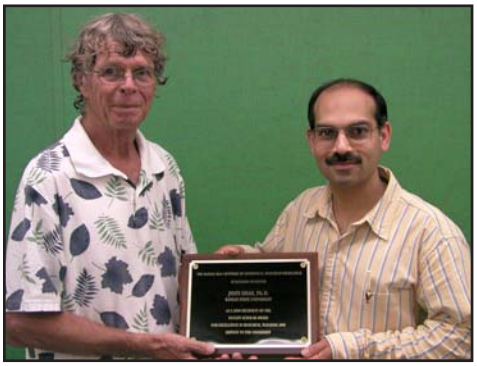
Each year, we solicit nominations from senior executives on each of the K-INBRE campuses. The criteria for the award is to have a Ph.D. degree or equivalent (MD, DVM, DDS), currently at the Assistant Professor to Associate Professor level, all tracks, a minimum of three years service in the university and an outstanding research program in Cell and Developmental Biology, including evidence for extramural funding.

K-INBRE Faculty Scholar nominations are reviewed by a committee constituted by the K-INBRE Principal Investigator. Awards of $10,000 each are made to Universities with successful candidates.

The Scholars receive an engraved plaque and usually publicity pictures in department or school publications. The winners are pictured with names in bold.

Dean of Langston University School of Arts and Sciences Dr. Clyde Montgomery, Jr. (Left) presents **K.J. Abraham** his Faculty Scholar Award.

Director of the KSU Division of Biology Brian Spooner hands **Lorena Passarelli** the Faculty Scholar Award.



Jyoti Shah (Right) receives the Faculty Scholar Award from Brian Spooner, Director of the KSU Division of Biology.

KSU Department of Biochemistry Head Michael Kanost presents **Anna Zolkiewska** the Faculty Scholar Award.

KU Faculty Scholar **Kristi Neufeld** (Left) is presented her plaque by Kathy Suprenant, Professor and Chair of the KU Department of Biological Sciences.

KUMC **Jeanne Drisko** received her Faculty Scholar award from Dr. Carl Weiner, Professor and Chair of the KUMC Department of Gynecology and Obstetrics.

University Distinguished Professor and Chair of Pharmacology, Toxicology and Therapeutics Dr. Curtis Klaassen presents **Beth Levant** her Faculty Scholar Award

Another View

Undergraduate Research Training: Is It a Good Investment?

Virginia Rider
PSU Campus Coordinator

In this time of tight funding, many researchers will ask whether special research grants targeted to states that traditionally do not receive the lion's share of NIH money is a good investment. Moreover, some of these targeted programs include money for undergraduate research training. Is there any evidence that this kind of investment pays dividends?

A paper to be published in the December issue of the *Journal of Endocrinology* titled "Progesterone initiates Wnt-β-catenin signaling but estradiol is required for nuclear activation and synchronous proliferation of rat uterine stromal cells" suggests that investing in collaborative research projects that actively involve undergraduate students is an outstanding investment. The research reported explores the potential mechanisms by which female sex steroids control the proliferation and differentiation of target cells. Rider et al. report that stromal cell proliferation by steroid hormones is regulated through the wnt-β–catenin pathways. Based on animal and cell culture studies, the authors conclude that progesterone down-regulates GSK-3â thus driving wnt signalling, but that the subsequent nuclear transport and action of the wnt effector molecules (β–catenin), needed for entry into the cell-cycle, is estrogen-dependent.

This research project involved a collaborative effort between two K-INBRE investigators (Rider and Fang) and three undergraduate K-INBRE scholars (Twarog, Jones, and Cameron). Twarog and Cameron are pursuing further training (MD) at Case Western School of Medicine where Cameron is also enrolled in the Ph.D. program. Jones has been accepted (early decision) to the Kansas University School of Medicine. Their research has been selected by the senior editor of the Journal of Endocrinology as a "hot topic". Is undergraduate research training worth the investment?

Virginia Rider obtained the Ph.D. from the Department of Zoology at Arizona State University in 1982. Rider continued her research training as a postdoctoral fellow at the Institute of Animal Physiology in Cambridge, England and at the Department of Cell Biology, Baylor College of Medicine, Houston, Texas. Rider became an Assistant Professor at Tufts University in 1987 where she developed an independent research program investigating the hormonal control of uterine cell proliferation and differentiation. Rider became an Associate Professor at the University of Missouri-Kansas City in 1994 and moved to Pittsburg State University in 2000 where she is a professor in the Department of Biology. Rider directs the premedical training program at Pittsburg State University and continues her research on hormone action in normal target cells and in autoimmune disease.

Announcements

ESU

K-INBRE students Lynett Bontrager and Daphne Jones were co-authors on an a paper that came out recently.

Lynett R. Bontrager, Daphne M. Jones, and Lynnette M. Sievert. 2006. Influence of meal size on postprandial thermophily in cornsnakes (Elaphe guttata). Transactions of the Kansas Academy of Science. 109: 184190.

- Submitted by Tim Burnett

KSU

Erica Cain, a K-INBRE Star Trainee, was awarded a travel award from the FASEB MARC (Minority Access to Research Careers) Program to attend the Annual Biomedical Research Conference for Minority Students (ABRCMS) this November in Anaheim, California. Her presentation, among over 1,000 presentations, received an award.

- Submitted by Lorena Passarelli

K-INBRE officials attend Washington, D.C. meeting

Staff report

On October 5 and 6, 2006 Drs. Joan Hunt, K-INBRE Director, Gerry Lushington, University of Kansas K-INBRE Campus Bioinformatics Coordinator, and Keith Chapes, K-INBRE Director of the Undergraduate Support Core, attended the IDeA Networks of Biomedical Research Excellence (INBRE) Principal Investigator's meeting at the National Institutes of Health (NIH) in Washington, D.C.

The meeting allowed NIH officials to brief INBRE participants on new developments at NIH, policy changes and allowed for the exchange of information amongst the country's 23 INBRE programs. Dr. Lushington presented a talk about how the K-INBRE approaches bioinformatics by delivering a talk entitled "Good Old-Fashioned Footwork: Selling Bioinformatics via Workshops, Seminars and Face-to Face Discussions." The talk highlighted some K-INBRE attempts to integrate bioinformatics into traditional research programs (See the Another View feature on Page 7).

Dr. Chapes presented a report on "Undergraduate Mentoring in the Kansas INBRE: One size Does Not Fit All." His talk emphasized the importance of knowing what happens to the students we train.

Dr. Sid McNairy, Jr., Associate Director in the National Center for Research Resources (NCRR), and the Director of the Division of Research Infrastructure (DRI) at NIH continued to stress the importance of undergraduate participation in INBRE programs. The INBRE meeting will continue to be an important regular event for program PI's and program coordinators.

The Graduate School Puzzle, cont.

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"I didn't know exactly what general area in neuroscience I wanted to study, so it was important for me to find a program with a large number of research options," Giessel said.

"Keep an open mind about the research you're interested in. I came into graduate school wanting to focus on protein structure/function relationships and have shifted to more cellular questions."

Giessel decided to attend Harvard, where he recently joined the lab of Dr. Bernardo Sabatini after a series of rotations.

One must also keep in mind that graduate school work is different than undergraduate research.

"My days are hectic and long, in ways that are different and the same as an undergrad," Giessel said, "One must be much more self motivated."

Cameron has found one must be more independent.

"You are no longer learning just what is in a textbook. You are looking at primary literature, and evaluating it," he said. "You have to decide if the evidence is strong enough for you to believe what some author is trying to convince you of. There are a lot fewer absolute 'facts' in graduate school. It is more about the strength of the evidence, and whether it fits the current model, and if it can be replicated."

In the end, all the graduate students found K-INBRE helped in their decisions about graduate school.

"My experience with the K-INBRE program solidified my thoughts about attending graduate school by giving me the opportunity to experience independent research in my senior year of undergrad at KU," Barrett said.

Esparza was also influenced by K-INBRE.

"K-INBRE was a key factor in my decision to proceed to graduate school. I feel that the opportunity provided by the K-INBRE foundation gave me an idea of what research-driven science is all about," he said. "Having spent some time in a competitive graduate program, I can honestly say that the experience gained from K-INBRE better prepared me for academic-level research."

Barrett's K-INBRE mentor was Dr. Susan Adams at KU, Cameron's was Dr. Virginia Rider at PSU and Esparza's was Dr. J. David McDonald at WSU. Giessel had two mentors, Dr. David Benson and Dr. Krzysztof Kuczera, while at KU.

If you are thinking about graduate school and considering different programs, make the most of your K-INBRE experience, learn what you like to do, keep an open mind and look for the place that is the right fit for you.