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

The K-INBRE Newsletter

K-INBRIEF

Kansas IDeA Network of Biomedical Research Excellence

Spring 2007 Volume 5 Issue 4

K-INBRE members participate in IDeA Central States Conference

Staff Report

Over 150 people attended the IDeA Central States Conference that was held in Fargo, North Dakota May 21-22, 2007.

The meeting was organized by Dr. Don Schwert, Program Coordinator for the North Dakota INBRE. The meeting's goal was to bring people together from INBRE and COBRE programs in the States of Oklahoma, Kansas, Nebraska, South Dakota and North Dakota to share ideas about building COBRE-INBRE relationships, envisioning the INBRE program in the future, discussing research and interactions of INBREs with tribal colleges, building bioinformatics programs and how INBREs may include students in K-12.

Dr. Gerry Lushington, K-INBRE Bioinformatics Core Director, talks at the IDeA Central States Conference. (Photo by Patrick Miller)

In particular, Dr. Gerry Lushington, Director of the Kansas INBRE Bioinformatics Core, gave a talk "Strategies for Bioinformatics Core Facilities: Starting a new core and/or preparing for the next INBRE / COBRE."

Dr. Michael Sayre, Program Official for the National Institute of Research Resources reaffirmed the importance of INBRE programs and he pointed out how the NCRR Reporter, a publication of the NCRR (www.ncrr.nih.gov/e-Reporter), recently presented an article that highlighted how INBRE programs can involve and interest undergraduates in research because of INBRE-facilitated collaborations.

Other K-INBRE attendees included, Heiata Chapman, K-INBRE Assistant Director, Jan Lyon, K-INBRE Administrative Assistant, and Dr. K. J. Abraham, Langston University Campus Coordinator and S.K. Chapes, Director of the K-INBRE Undergraduate Support Core.

K-INBRE Administration

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Dr. Peter Smith

Assistant Director
Ms. Heiata Chapman

Administrative Assistant
Ms. Janette Lyon

Undergraduate Support Core Director
Dr. Stephen K. Chapes

Bioinformatics Core Director
Dr. Gerald Lushington

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Mr. Joseph Chapes

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Dr. Tim Burnett, ESU
Dr. Stephen K. Chapes, KSU (Co)
Dr. Bridget Chapin, HINU
Dr. William Hendry, WSU
Dr. Michael Madden, FHSU
Dr. James Orr, KU
Dr. Virginia Rider, PSU
Dr. Larry Williams, KSU (Co)

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

New KU, Haskell Campus Coordinators

Recently, KU and Haskell Indian Nations University had new people step into the role of campus coordinator.

At Haskell, Bridget Chapin has replaced Tom Dixon as campus coordinator and at KU, James Orr has taken the place of Eric Munson.

Dr. James Orr (Photo Submitted)

Dr. James Orr has been at KU for 31 years and has had a great deal of experience in administration, serving as the Chair of the Division of Biological Sciences from 1992 through 2006.

"In addition to my interest in administrative tasks, I appreciate the importance of research participation as part of a student's undergraduate education," Orr said. "Broadening the opportunities for our undergraduate students to participate in research activities within our faculty research labs is a goal that I value."

As campus coordinator at KU, Orr can help students get valuable laboratory experiences as undergraduates.

"For many students their only contact with laboratory science is through completion of laboratory classes" Orr said. "Although laboratory classes are an essential component of our curriculum, 'cookbook' laboratories often present an unrealistic picture of the challenges and rewards of research. Students who enter our research labs are often surprised, or in some cases frustrated, by the trial and error nature of research . . . Undergraduate research experiences provide a realistic view of research to our students."

A Letter from the Director

Dr. Joan Hunt

Dear Friends of the Kansas INBRE,

As we have just completed the second half of Year 6 of the BRIN/INBRE program in Kansas, I thought that you might enjoy an update on happenings this spring. As many of you know, the January K-INBRE Symposium had its first encounter with inclement weather. Yet attendance was at an all time high and due to the resourcefulness and ready commitment of all, the event seems to have turned out well. Evaluations indicated that all aspects from food and locale to speakers and posters were highly rated. So, to continue this success, we have contracted for the 2008 Symposium again to be held at the Intercontinental Hotel on the Plaza in Kansas City. The dates are January 19th and 20th, so hold these dates!

Our INBRE campuses are widely distributed across the state so visits by your administrative team mean full day trips. This spring we visited Pittsburg State University, Emporia State University and Washburn University in Topeka, and have a visit coming up to Haskell Indian Nations University in Lawrence later in June. The deans, department chairs and other campus personnel have been invariably hospitable and enthusiastic about the program. They, together with the faculty and students on each campus, have offered important ideas about new directions for the Kansas INBRE as we start preparing for our renewal application next year. But the bottom line was that administrators, faculty and students were most appreciative of the special benefits the INBRE has brought to their campuses. We have our Campus Coordinators, Virginia Rider, Tim Burnett and Janice Barton, to thank for effectively delivering the program and for planning these visits.

The Scientific Steering Committee (Drs. Abrahamson, Corbin, Cohen, Denell, Bousfield, Hunt, Smith) has also been at work. First, the committee assessed the outside reviews for applications for pilot, bridging, core and recruitment grants and came up with a prioritized list of awardees. Heiata and Jan have now completed all of the subcontracts, quite a job as we made ten pilot, one bridging, six core facility and five recruitment awards for a total of $681,569 in research awards. Added to $100,000/year for each of our four Major Starter awardees, $90,000 for the coming year to support Summer Scholars and Star Trainees and $80,000 to Faculty Scholar awardees, Year 7 of the K-INBRE supports our students and faculty working in Cell and Developmental Biology with more than $1.2 M. Second, the Scientific Steering Committee reviewed six-month progress for our four Major Starter Awardees (Davido, Nishimune, Johnson, Thorpe). It was a pleasure for all of us to see the exciting projects and innovative thinking from each of these new investigators.

Coming up is the Network Steering Committee on June 28, to be held at the KTEC building in Topeka. We are looking forward to hearing reports from each of the Campus Coordinators, and to meeting and talking with three new Coordinators K.J. Abraham (Langston), B. Chapin (Haskell) and J. Orr (KU-Lawrence).

Thanks again to the many of you who have contributed substantially to the success of the Kansas INBRE. Our goals of building cutting edge technology, supporting our faculty members and helping students to choose biomedical research as a career pathway have been copied by many other programs and I continue to believe strongly in their value for Kansas. I will be attending a meeting of the INBRE Principle Investigators in July where the subject of the program will be elements of the RFA to be issued for five years of renewal. If you have ideas or suggestions please send them along.

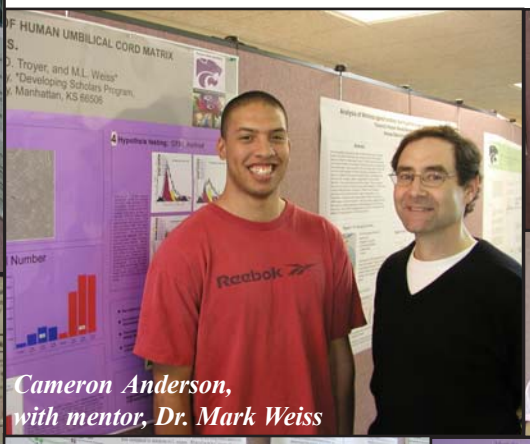
Have a splendid summer and best to all,
Joan

KSU Division of Biology

Undergraduate Research Scholars Forum

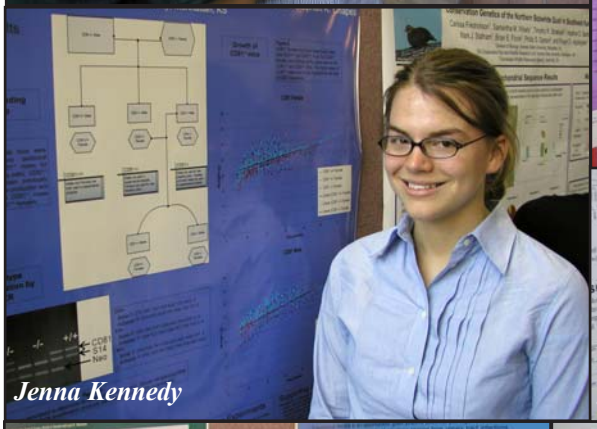
On Thursday, April 19, the KSU Division of Biology hosted the 2007 UndergraduateResearch Scholars Forum in the Chalmers Hall Atrium. Over 40 undergraduates presented their research in poster form during the event. Twelve students who were supported by K-INBRE are pictured below. Laura Grauer is not pictured but also presented.

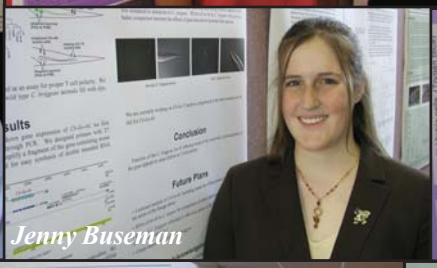

Sarah Devlin


Cameron Anderson, with mentor, Dr. Mark Weiss

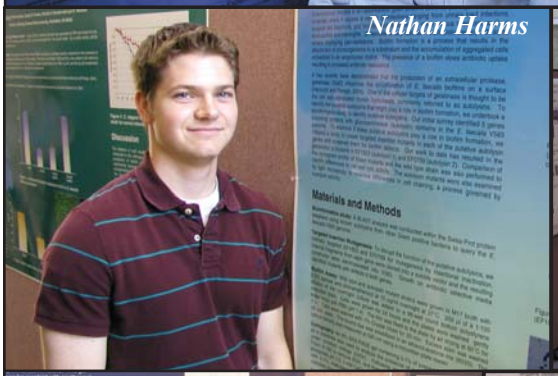

Lindsey Bertels

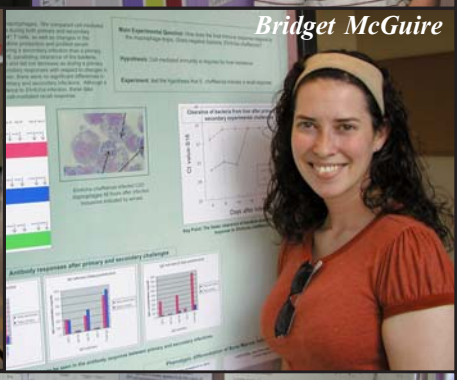

Kate Swain


Jenna Kennedy


Jenny Buseman

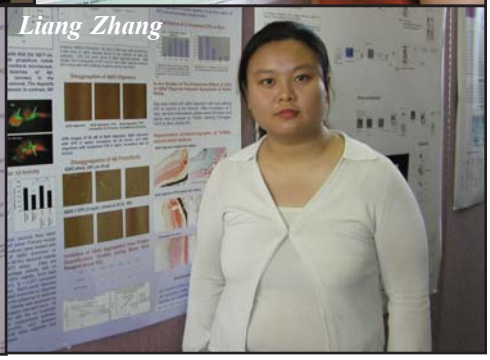

Nathan Bammes


Nathan Harms


Bridget McGuire


Kaley Morris


Susie Suozzo


Liang Zhang

Another View

OWNING the scientific method Through Active Learning

Eric J. Simon
Contributing Writer

When I first began to teach introductory biology, my teaching goals centered on conveying content knowledge. That is, my objective was to cover a list of topics to a certain level of detail. As I gained experience, I realized that one of the most essential concepts we convey to our students is not content knowledge, but process knowledge: the scientific method, what it is, how it is applied, and its limitations. In many introductory biology courses, discussion of the scientific method occurs right at the start of the semester, when many students (particularly non-science-major students) are at their most apprehensive. The scientific method can seem like a foreign concept, something that "those wacky scientists" do, replete with jargon and formality. But to succeed in the course, all students must learn about the scientific method, and the best way to do that is through active participation. How can teachers make uninitiated students comfortable enough to dip their toes into the scientific waters? I've found that with a minimum of prompting, most students can see that they are, in fact, inherently familiar with the scientific method (often to their great surprise). Thus, one important point that I try to convey right away to my introductory students is that they *can*, and indeed they *do*, apply the scientific method in their every day lives.

The key is to make a connection between the formality of the scientific method (hypothesis, methodology, results, conclusions, etc.) and their normal mode of thinking. I start with an every day example: Imagine that you have completed your homework and you want to relax by watching TV. You push the power button on the remote and nothing happens. I'll ask the first student in a row "What would you do?" That student will make a suggestion, such as "Check the batteries," "Whack the remote," or "See if the TV is unplugged." I then ask the next student how they would apply that idea. They will make a suggestion such as "Change the batteries" or "Check the power chord." I make up results of that inquiry and provide them to the next student, saying that the TV still doesn't work, so what now? We continue down the row, students making suggestions, testing them, and deciding what to do next, until on the third try I tell the students that they were successful and the TV now works.

I then turn to the next row in the classroom and ask them to recast what just occurred using the formal terminology of the scientific method. We'll start with an observation ("I observe that the TV isn't turning on") and then the first idea. I force the students to use formal phrasing, such as "I hypothesize that the TV isn't coming on because the batteries are dead", which usually elicits some chuckles. We continue this way through designing an experiment, conducting the experiment, collecting data ("I checked the plug and it was in the wall"), drawing conclusions ("My hypothesis that the TV was unplugged is not supported by the data"), and then revising the hypothesis and repeating for each of the three ideas presented by the class.

Such an exercise quickly reinforces that the scientific method is just another way of describing *how they act and think every day*. They quickly see

(Continued on Page 8)

Eric J. Simon is an Associate Professor of Biology at New England College in Henniker, New Hampshire. He teaches introductory biology to both science majors and non-science majors, as well as upper-level courses in genetics, microbiology, and molecular biology. Dr. Simon received a B.A. in Biology and Computer Science and an M.A. in Biology from Wesleyan University, and a Ph.D. in Biochemistry at Harvard University. His research focuses on innovative ways to use technology to improve teaching and learning in the science classroom, particularly among non-science major students. Dr. Simon is a co-author of *Essential Biology* (3rd Ed.), *Essential Biology with Physiology* (2nd Ed.), and *Biology: Concepts and Connections* (5th Ed.), all published by Benjamin Cummings.

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 Emporia State University. (Photo by James Garvey)

James Alan Brandon, *Student*

Mentor: Dr. Eric Trump
Major: Chemistry

What was your project and its goals?

Derivatives of Apigenin. "(Its goals were) to produce derivatives of apigenin that would retain its flavonoid properties, and be soluble in something besides pyridine."

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

"The Chemistry faculty at Emporia State University care about the latest discoveries . One can learn many things from their disagreements. Since I have no educational aspirations, I like the fact that many of the faculty have experience in industry."

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

"This was the first time that I did research in which the result was not already known. In some ways, this was frustrating, since it is hard not to blame researcher error, when instrument tests indicated I did not get the product I wanted."

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

"I received more time on instruments that I will only use for a short time in other classes. Next time, I hear someone talk about how much a drug costs, I can give a good justification on the expense of R&D."

What do you plan to do after you graduate?

"I plan to work in industry. In a few years, I will try to get a Masters in Chemical Engineering.

Michelle Gilkerson, *Student*

Mentor: Lynette Sievert
Majors: Biology and Chemistry

What was your project and its goals?

Thermoregulation and Metabolic Rates of Corn snakes. "(It attempted) to build a detailed picture of the metabolic rates as related to thermoregulation of corn snakes."

What got you interested in scientific research?

"My high school biology teacher was previously a field ecologist and he had the best stories, this just seemed exciting to me. I sought out research my freshman year. Lynette Sievert took me on to her group the spring semester of that year."

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

"My future plans are in Physical Organic Chemistry,

(Continued on Next Page)

Focus on Emporia State University

Gilkerson, Continued

particularly photochemistry."

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

"The department is small, which allows me to know every professor in my majors and have them know me. If there is something I need for my research or my studies that Dr. Sievert can not answer, we can lean on the other faculty members."

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

"The small glimpse into the research world has provided me with an idea of graduate school. Also I have gained a greater respect for writing of research papers and literature searches."

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

"It has provided me with a foot up on other undergraduates applying to graduate schools because I have presented papers and several posters. I will also have a publication when I am finished with my research this year and have a few years of laboratory experience behind me."

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

"I will be attending the University of Florida Chemistry Graduate School in pursuit of a doctoral degree. My research will be in Physical Organic chemistry, some aspects of my research, however, can be used for biomedical research."

Eric Trump, *Mentor*

Time at ESU: 20 years
Specialty/Expertise: Medicinal/ Synthetic Organic Chemistry

Eric Trump (Photo Submitted)

Where did you get your training?

"I recieved a Ph.D. in Chemistry from Kansas State University. Other training included an NSF Research Opportunity Award in which I conducted summer research at the University of Kansas in 1992. I took a sabbatical in 1995 at Lawrence Berkeley Laboratory in which I learned techniques in nucleoside and DNA synthesis as well as radiolabeling with tritium. I have learned additional synthesis techniques through collaborations with the Eppley Institute for Cancer Research in Omaha, Wake Forest University School of Medicine, and the University of Kansas Department of Medicinal Chemistry."

How did you get interested in scientific research?

"My undergraduate organic chemistry professor really got me interested in organic chemistry and encouraged me to apply for graduate school."

How do you help the K-INBRE students at ESU?

"I provide instruction in synthesis and instrumental analysis technique. I have had two undergraduate students that I mentored and one of them decided to go on to graduate school.

Why do you think K-INBRE is a beneficial program?

"It provides financial support for students along with funds for supplies and equipment to conduct research. The research that my students and I have conducted has provided some preliminary data for grant applications. The Annual Symposium give students an opportunity to present their research and to learn about the research that others are doing. It has also fostered collaboration between Tim Burnett, an ESU faculty member in biology, and me."

Why do you think it is important to involve undergraduates in research?

"There is no substitute for 'hands on' learning. Students acquire skills that are needed to succeed in industry, or in graduate school. It is also important because it gives faculty mentors an opportunity to get to know their students better."

Another View: *Owning the Scientific Method, continued*

that we all conduct a dozen such inquiries a day, we just don't formalize them. To reinforce this point, I give them a homework assignment: write down three more instances of conducting a scientific inquiry that occur over the remainder of that day. First, they must write the examples as a standard narrative, describing the events as they would to a friend. Next, they must rewrite each example in the language of the scientific method (as if writing a lab report). I begin the next class by having students read each other's examples. They range from the mundane to the slightly profound, but they are all real and personal.

I further reinforce the common use of scientific inquiry during the first lab. I join the students in a circle with a cardboard box in the center. I ask one student to observe the box. (Unseen by the students, the box has a cardboard partition inside it as well as a rubber ball, a dice, an envelope half-filled with sand taped to the inside of the box, and a cotton ball.) The first student makes an observation and hands the box to the next student, who states a hypothesis. As the box is passed around the circle, successive students design an experiment to test the stated hypothesis, gather data, and draw a conclusion. If the students have settled upon a correct idea, I open the box, revealing and removing the object, and the students start again. This continues, giving each student multiple chances to participate, until students conclude, "The box is empty." At that point, I reveal the presence of the cotton ball, demonstrating that the scientific method has limitations; it does not always bring scientists to correct conclusions.

Through this series of exercises, I hope to guide the students into a state of ownership of the scientific method. Once students appreciate that they, too, apply the scientific method in their everyday lives, I can begin to teach them specific course content placed within the established context. This is a good first step in helping students to succeed in the course and in developing the next generation of "citizen scientists."

Major Starter Grants

The following are the new Major Starter Grant Awardees for year 7.

Name	***University***	***Project Title***
David Davido	KU-L	Viral and Host Responses to HSV Infection
Michael Johnson	KU-L	The Impact of Dopamine Signaling on Fragile X Syndrome Behaviors
Hiroshi Nishimune	KUMC	Voltage Gated Calcium Channels as Scaffolding Proteins for Synapse Formation
Chris Thorpe	KSU	Tail Morphogenesis in Zebra Fish

Pilot/Bridging Projects

The following K-INBRE Pilot/Bridging projects were awarded for year 7.

Primary Investigator	***University***	***Title***
Chang, Kyeong Ok	KSU	Bile acids in the replication of Hepatitis C virus
Michel, Kristin	KSU	Transcriptional profiles of Anopheles gambiae hemocytes
Singh, Chingakham, R.	KSU	The role of RNAbinding initiation factors in protein synthesis
Von Ohlen, Tonia	KSU	Identification of transcriptional targets of Ind
Wei, Qize	KSU	Pitx2regulated genes in leftright development and cardiac morphogenesis
Huan, Jun	KU-L	Cellular pathogen gene identification via graph data mining
Tang, Liang	KU-L	High resolution structure of the type III secretion system
McCarson, Kenneth, E.	KUMC	CNS Sites Where Estrogen Modulates Hyperalgesia
Nothnick, Warren B.	KUMC	AEBP1 and ovarian physiology
Vivian, Jay L.	KUMC	Generation and analysis of a mouse model of KlippelTrenaunay symdrome
Wright, Douglas E.	KUMC	Role of Myelinated Cutaneous Axons in DiabetesInduced Proprioceptive and Balance Deficits