



# INROADS

A newsletter of Nebraska's Institutional Development Awards (IDeA) Networks of Biomedical Research Excellence (INBRE)

## Newsletter to share INBRE successes

This initial publication of the *INBRE INROADS* represents a new stage in the evolution of the INBRE Project. As the project has matured, we realized that we have several constituencies throughout the State of Nebraska. These include our students and faculty, but also our communities, our government officials and of course our parents, whose work and sacrifice make higher education possible for their children. Thus, we hope that through this newsletter we can keep everyone better informed about our activities and share our enthusiasm for the development of the scientific infrastructure in Nebraska.



James Turpen, Ph.D.

One question that keeps arising is, "What is the difference between BRIN and INBRE?" The initial phase of the project that started in October of 2001 was known as the BRIN, Biomedical Research Infrastructure Network. This three-year project was viewed as a planning grant, designed to get several pieces of scientific infrastructure in

Continued on next page

## Mann among six 'grads' pursuing research careers

Nebraska's INBRE program began with the intent of making research careers more accessible for Nebraska students.

Just five years old, the program already is seeing success is doing just that. Since the program's introduction, several students have gone on to graduate school.

Ethan Mann is one of those graduate students who chose to pursue his Ph.D. in Nebraska after participating in the INBRE program while at Chadron State College.

The Wayne, Neb., native is enrolled in the Biomedical Research Training Program (BRTD) at UNMC. The BRTD is a common entry program for Ph.D. study at UNMC.

Mann credits his two years in the INBRE program (then called the BRIN program) for giving him the opportunity to explore scientific research as a career.

"The biggest thing that BRIN did was give me the experience I needed to work in a research lab, a grasp of how science works and how to think critically as a scientist," he said. "I'm better prepared for the work I now do in graduate school."

Mann, who has a bachelor of science in chemistry, is one of six former BRIN scholars from around the state who are pursuing a Ph.D.

As a graduate of the INBRE program



Ethan Mann is pursuing a doctorate at UNMC. He works in the laboratory of Jim Shull, Ph.D.

Mann receives a \$21,000 stipend in financial support during his first year of graduate school.

"The support lets the student focus on going to school and conducting research," Mann said.

It also gives Mann an advantage when it comes time to find a lab in which to pursue his Ph.D. research.

Continued on next page

# INBRE provides research, teaching opportunities for Soukup

Julie Soukup, Ph.D., enjoys studying riboswitches, and she enjoys teaching students. Because of the INBRE program, she's able to do both.

"A collaboration with the medical center, as well as the students and the funding to pay them, are all essential to making this research come to fruition," Dr. Soukup said. "Without INBRE, we wouldn't have that."

Dr. Soukup is the Clare Boothe Luce Professor for Women in Science and an assistant professor of chemistry at Creighton University.

Riboswitches are RNA structures that bind small metabolites in order to control gene expression. These "natural RNA switches" are an example of how functional RNAs are engaged in fundamental cellular processes.

Dr. Soukup became interested in riboswitches after their discovery by her collaborator Ronald Breaker, Ph.D., a Yale University professor who is considered the world's leader in the study



Julie Soukup, Ph.D., left, and Garrett Soukup, Ph.D., right, with Creighton University student Kevin Klawuhn, a BRIN Scholar whom the Soukups mentor.

of riboswitches.

At Creighton, as part of the INBRE project, she collaborates with her husband, Garrett Soukup, Ph.D., an assistant professor in the Department of Biomedical Sciences at the Creighton University Medical Center. They mentor several students who are participating in the program.

"Garrett and I play a 50-50 role in

these projects," Dr. Julie Soukup said. "I appreciate the opportunity to work with him in conducting this research, and in training the students.

"I love teaching our students, and I've always loved working in the laboratory. I'm very fortunate that my department views teaching as not only in the classroom, but also in the laboratory."

Dr. Soukup's research revolves around nucleic acid structure and function. Her group uses Nucleotide Analog Interference Mapping (NAIM) to investigate the functional groups within ribozymes, deoxyribozymes and riboswitches that are needed for the activity of these molecules.

With the INBRE funding, Dr. Soukup has been able to purchase essential laboratory equipment including a minus-80 degree freezer, a water purification system and a film processor.

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## Turpen:

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place on the undergraduate campuses throughout Nebraska.

Another part of our effort was to design and implement a BRIN Scholars Program, with the goal of providing undergraduate students with the opportunity to become engaged in cutting edge biomedical research.

After two years, we were given the opportunity to compete for additional funds to keep the project going for an additional five years. However, for rea-

sons that were related to various programs supported by our funding agency, the National Center for Research Resources, it was necessary to change the name of the BRIN program to the INBRE, or Idea Networks of Biomedical Research Excellence.

We were successful in this competition, and the INBRE project began on July 1, 2004. In principal, the INBRE is the continuation of the BRIN. But, by 2004, the use of the term BRIN Scholar had been accepted by our campuses and we had three classes of undergraduate students recognized as BRIN Scholars.

We therefore, felt it would provide us with a sense of continuity if we continued using the term BRIN Scholar to identify the undergraduate students in the program.

Thus, we are now the INBRE, but those special students who represent the future of science in Nebraska are our BRIN Scholars. At this point in the project we have provided these research opportunities to 90 Nebraska students.

James Turpen is a professor of genetics, cell biology and anatomy at the University of Nebraska Medical Center. He directs the Nebraska INBRE Program. You may e-mail Dr. Turpen at [jturpen@unmc.edu](mailto:jturpen@unmc.edu)

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## Mann pursuing research

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"Traditionally the research scientist will pay the graduate student's stipend out of the grant they have received to conduct their research," explained Mann. "But I bring my own funding through BRIN."

Not to mention a familiarity of lab techniques, how a lab operates and a

unique perspective on how a research lab is run.

Currently Mann is working in the lab of James Shull, Ph.D., professor and the Ardith & Anna Von Housen Chair of the UNMC Department of Genetics, Cell Biology & Anatomy and program director of the UNMC Eppley Cancer Center.

Dr. Shull's research focuses on breast cancer. Mann's research project is to help characterize a gene of which the

absence of leads to a pathway for uncontrolled cell growth – the gene deficiency is a major contributing factor to the development of breast cancer.

Students in the BRTP program have the opportunity to rotate through any of the more than 115 research laboratories at UNMC during their first year of graduate school.

At the end of his first year, Mann will decide which lab he will join and pursue his doctoral research project.

# INBRE funding helps to keep lab on cutting edge

The questions are perplexing.  
What causes diabetes?

What drug will effectively treat lymphoma?

The answers are hidden inside thousands of tiny molecules.

Molecules that are so small they can only be seen with the help of microarray technology and DNA sequencing.

That's when researchers from around the state of Nebraska turn to James Eudy, Ph.D., director of the DNA Microarray Analysis Lab and the High-throughput DNA Sequencing Lab based at the University of Nebraska Medical Center.

"Many biological research endeavors require DNA sequencing," Dr. Eudy said. "It is critical to the research mission of the state of Nebraska to have these services available. We are fortunate to be able to provide that service to researchers."

Both labs were created with some funding from the INBRE/BRIN grant and serve as core facilities for researchers statewide.

"Researchers at any of the other INBRE affiliated campuses now have access to the services provided by these labs," said Dr. Eudy, an assistant profes-



*The purchase of this Omnicore GeneMachine robotic spotter was funded through the INBRE program.*

sor in the department of genetics, cell biology and anatomy at UNMC.

Without the funding from the INBRE program, Dr. Eudy would not have been able to purchase the Omnicore GeneMachine robotic spotter, Axon Laser Scanner and Applied Biosystems 3730 high-throughput capillary electrophoresis DNA sequencer – equipment essential to the core facilities.

"This technology is very expensive," said Dr. Eudy. "What INBRE did is provide the funding to help keep us up-to-date."

Using the robotic spotter, laboratory technicians generate the microarray slides, which in turn are used in experiments to monitor the activity levels of

tens of thousands of genes simultaneously.

This enables a researcher to determine which genes are important in relation to the biological process he or she is studying.

For example, if a researcher wanted to know what is happening in the cells of a person who has Down syndrome, he could take a sample, send it to the microarray analysis lab and the technician there would be able to analyze that sample with respect to the levels of activity of tens of thousands of genes.

"We generate the slides here in the lab, process the samples, assist with initial analysis and then send the data back for analysis," said Dr. Eudy. "Hopefully this data provides researchers more insight and enhances their research."

The microarray laboratory provided service and support to 47 different research laboratories in the 2004-2005 academic years, and the DNA sequencing lab has processed samples from 49 different laboratories since beginning to provide service in late November of 2005.

"This technology is on the cutting edge of technologies used to study biological questions," Dr. Eudy said.

## External Advisory Council serves vital role

The External Advisory Council fills several roles in its relationship with the Nebraska INBRE program, says Sam Enna, Ph.D., a member of the EAC.

The council members solicit feedback from both students and mentors, they bring fresh perspectives and ideas from other INBRE programs, and they ask questions to make sure that taxpayer funds are being used wisely.

"We really serve in several roles that I hope are beneficial to Jim (Turpen) and the rest of the group," said Dr. Enna, a professor of pharmacology, toxicology and therapeutics at the Kansas University Medical Center.

Dr. Enna is one of six members of the EAC. The others include Scott Ellis, Ph.D., the science division head at Truman State University; Michael Johnson, Ph.D., professor of medicinal chemistry, director of the Center for

Pharmaceutical Biotechnology and associate director of the Center for Structural Biology at the University of Illinois at Chicago; Suzanne Ortega, Ph.D, dean and vice provost of the Graduate School at the University of Washington; Michael Rea, Ph.D, professor of the department of biology and biochemistry and the University of Houston; and Darrell Ullman, director of the Nebraska Department of Economic Development.

Dr. Enna said the INBRE program engages formerly untapped resources to aid in the development of the state's economic development. The program's value is seen in the number of students who want to continue their scientific training and even go to graduate school. The students, he said, are doing high-level work.

"The level of sophistication that some of these students are showing is very impressive," Dr. Enna said.



The Nebraska INBRE is funded through a grant from National Center for Research Resources, a division of the National Institutes of Health.

Director: Jim Turpen, Ph.D.  
jturpen@unmc.edu

Program coordinator: William Chaney, Ph.D.  
wchaney@unmc.edu

Grant coordinator: Penni Davis  
pkdavis@unmc.edu  
402.559.3316

Newsletter staff: Bill O'Neill, Lisa Spellman  
UNMC Public Affairs  
402.559.4353

Participating Ph.D.-granting institutions:  
University of Nebraska Medical Center,  
Creighton University, University of Nebraska-Lincoln

Participating undergraduate institutions:  
the University of Nebraska-Lincoln, the University of Nebraska at Omaha, the University of Nebraska at Kearney, Creighton University, Nebraska Wesleyan University, Chadron State College, Doane College, Midland Lutheran College, Wayne State College, Little Priest Tribal College and Western Nebraska Community College.

[inbre.unmc.edu](http://inbre.unmc.edu)

# Program provides Campbell 'window' to grad school

The first time she stepped into a lab at the University of Nebraska Medical Center in Omaha, Megan Campbell was in awe.

"Here are all of these people who already have four years of school and now are in graduate school, it was intimidating," said the Grand Island native.

As a BRIN scholar, Campbell spent 10 weeks working in the lab of James Shull, Ph.D., program director of the Eppley Cancer Center, familiarizing herself with the language and techniques researchers use.

"I was scared it would be difficult," Campbell said. "But it wasn't because of the way everyone was able to relate the research to me and explain the technical and scientific terms."

Campbell, a junior at Nebraska Wesleyan University, is one of 48 undergraduate students enrolled in the INBRE program.

The program is designed to introduce students interested in the health sciences to graduate school and research.

"The program is like a window into graduate school," Campbell said. "It has really shown me all the different stages of graduate school and research."

Throughout her first year with the program Campbell learned how to clone cDNA molecules, isolate mRNA molecules and sequence the DNA molecules for analysis.

Her work culminated with a 15-minute presentation at the annual BRIN/INBRE Conference held in Grand Island in August.



Megan Campbell, center, with her parents, Tami and Brett, who attended her presentation at the annual INBRE conference near Grand Island in August.

"The conference was amazing," Campbell said. "I didn't know there were so many things to research and yet here are all of these students and each one has a different presentation."

Campbell said she came across the INBRE program while working in the cellular biology lab at Nebraska Wesleyan.

Once she found out she could do summer research and get paid for it Campbell wasted no time enrolling.

"This experience has really helped me to solidify my decision to go to graduate school," Campbell said.

Nebraska INBRE Administrative Office  
University of Nebraska Medical Center  
986395 Nebraska Medical Center  
Omaha, NE 68198-6395