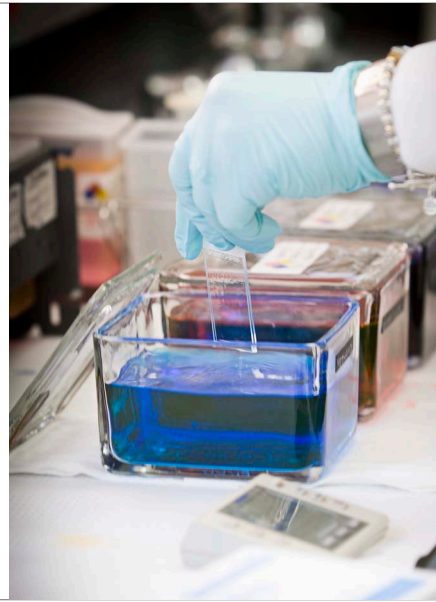


Since its establishment at the University of Nebraska Medical Center in 2001, the Idea Networks of Biomedical Research Excellence (INBRE) program has captured the excitement, imagination and vigor of students across Nebraska. It's the only two-year program in the state that supports students financially in their pursuit of scientific research.



# INBRE INROADS



# INBRE INROADS

## Unique program offers Chadron State students unique opportunities

Through a unique program from the Howard Hughes Medical Institute (HHMI), Wendy Jamison, Ph.D., department chair of physical and life sciences at Chadron State College, is able to offer her students the opportunity to discover and name new viruses.

"It's exciting for our students," Dr. Jamison said.

The HHMI Phage Hunters program began at Chadron State College last fall and is aimed at engaging college students in scientific discovery.

The discovery based phage hunters program allows students to isolate, analyze and characterize mycobacterial phage genomes. The students then get to name the novel phages they discover.

Bacterial phages number in the hundreds of thousands and occur everywhere in nature, Dr. Jamison said. Phages are little viruses that infect bacteria cells, plants or humans. Dr. Jamison's students are

looking for phages that are not infectious to humans but are found in a soil bacteria that is related to Mycobacterium tuberculosis.

While HHMI provides the course materials and faculty training for the program it does not pay for any of the lab supplies or funding for electromicroscopy analysis. Chadron State College and INBRE stepped up to help cover those costs, Dr. Jamison said.

"Chadron State agreed to increase our teaching budget so we could buy supplies and INBRE is covering the electromicroscopy cost when we take our samples to be analyzed at the University of Nebraska at Kearney," she said.

INBRE also paid for Dr. Jamison and another faculty to travel to Virginia for training in July and December.

"It's a neat program and the students appreciate knowing that they are actually contributing something to the scientific community," she said.

As an INBRE faculty associate, Dr. Jamison knows how important it is to engage students in science in ways that give them ownership of the work they are doing.

"It's these type of programs, INBRE and phage hunters, that inspire students," she said.

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UNO instructor comes full circle

The biology professor and the INBRE scholar

*The INBRE program is funded by the National Institute of General Medical Sciences. NIGMS is part of the National Institutes of Health, U.S. Department of Health and Human Services.*





#### INBRE INROADS

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

## From the director

This issue of INROAD contains highlights that are both sad and happy and mark significant changes in the development of the IDEA and INBRE programs.

First, although this is a bit sad, I want to congratulate Dr. Sidney McNary on his retirement announced at a ceremony held in his honor in February in Washington D.C. Dr. McNary was the visionary architect of the IDEA program, first with the development and implementation of the COBRE mechanism followed by development and implementation of BRIN/INBRE.

The impact of his leadership and support cannot be overstated. He was always our outspoken advocate during challenging times and our greatest cheerleader when it came to supporting all aspirations of the IDEA community.

Dr. McNary visited Nebraska on several occasions, including the dedication of the new Morrison Life Sciences Research Center at UNL and the Regional IDEA meeting in May of 2011. The Virology Center COBRE at UNL was awarded in 2000 and was among the first of these awards in the IDEA community. The wisdom of this early COBRE investment is clearly reflected in the current national stature on the virology program and the leveraging of state and private funding for the building of the Morrison Center.

Dr. McNary has always been a strong supporter of opportunities for undergraduates to become involved in

research and his dedication to INBRE has likewise resulted in tremendous progress. The highlights of our NE-INBRE are our investment in the undergraduate campuses and our support of faculty research that enables undergraduates to excel in our INBRE scholars program and pursue advanced degrees in the biomedical sciences.

In recognition of Dr. McNary's contributions to Nebraska, our governor has appointed him as an Admiral in the Navy of the Great State of Nebraska.

Another milestone and a validation of Dr. McNary's vision is a story in this issue that highlights one of our major success stories to the pipeline and the success of one of our former students.

On behalf of all of us in the INBRE program I would like to extend our congratulations to Dr. Christine (Gilling) Cutucache. A former INBRE scholar, Dr. Cutucache was an undergraduate at the University of Nebraska at Kearney who completed her Ph.D. at UNMC and has now received a faculty appointment at the University of Nebraska at Omaha.

We can all take pride in this accomplishment as it reflects the hard work and dedication of everyone that makes our INBRE such a successful program. Sidney will always be an inspiration and Christine a role model as we move forward into the next iteration of our program.

## UNO instructor comes full circle

A mechanic.

That's what Christine Cutucache, Ph.D., dreamed of being.

Fixing up muscle cars, tearing apart engines and greasing wheel bearings – she liked the complexity and challenge it presented.

Then, at the suggestion of her high school guidance counselor, Dr. Cutucache took advanced placement biology and discovered a whole new complex world.

One that included unsolved mysteries and deadly infectious diseases, the budding scientist in her was intrigued and delighted.

"I enjoy figuring out problems and both professions, in their own way, presented me with the opportunity to do so," said the newest member of the University of Nebraska at Omaha biology staff.

Fast forward several years and Dr. Cutucache is sitting in her small, cozy office in Allwine Hall on the University of Nebraska at Omaha campus, where she began teaching last fall.

## The biology professor and the INBRE scholar

It might have been Autumn Longo's first day of classes at Doane College in 2009, but it also happened to be Tessa Durham Brooks, Ph.D., first day of teaching biology.

The two didn't know it then but they would embark on a journey together that would bring some exciting research into their midst, that includes mapping out the cell signaling pathways for glutamate receptor like proteins (GLR) in the plant *Arabidopsis* and seeking its metabolic fingerprint.

"We are on an expedition," Dr. Durham Brooks said. "We don't know what we are going to find but we are excited and curious."

*Arabidopsis* is a small flowering plant that is widely used as a model organism in plant biology because it grows well in small spaces, is easily cultivated and has a short life cycle. It's a member of the mustard family, which also includes cabbage and radish.

Dr. Durham Brooks' research is focused on why this plant would need GLR genes.

"We know glutamate receptors form important ion channels in mammals that allow electrical signaling to occur between cells, as well as plays a role in some disease pathways like Alzheimer's. What we don't know is why a plant would have them," she said.

Longo, Dr. Durham Brooks said, has taken a portion of this research and made it her own.

Her research project involves using a 400 Megahertz nuclear magnetic resonance spectrometer to collect the amino acid profile of the plant as it is redirecting its growth after it's been turned on its side in response to gravity.

It's a technique she learned during her first summer as an INBRE scholar.

"No one has done metabolic profiling at Doane at all until Autumn's research project," Dr. Durham Brooks said. "Furthermore, Autumn has already found changes in the amino acid profile that will help better understand how GLR genes function."

This project, she said, has great promise and wouldn't be possible without the support of INBRE.

"Through INBRE Autumn gained the experience she needed to conduct the research and we were able to purchase the supplies we needed for the NMR," Dr. Durham Brooks said.

She's excited to be here, and talks passionately about how she wants to reach every one of her 125 students. She doesn't want her lectures to bore them, Dr. Cutucache says as she reflects on the methods she uses in the classroom – traditional lecture versus problem-based learning.

"I believe you need both to challenge the students to think critically."

As Dr. Cutucache reflects on her mentor and former college biology professor, Kim Carlson, Ph.D., assistant chair of the department of biology at the University of Nebraska at Kearney, she hopes she is just as inspiring to her students.

"I love working with the undergrads, they are hardworking and motivated," she said. "And it helps to have the support of other faculty at UNO and of my former professors."

Dr. Carlson has gotten a few phone calls from Dr. Cutucache seeking advice. She's also relied on the scientists she met when she was an INBRE scholar.

INBRE provided Dr. Cutucache the opportunity to explore the world of science at a level that cemented her desire to pursue it as a career. She decided early on

a career in academics, describing it as her calling. And now she has a whole network of colleagues and friends who are more than happy to help their newest peer become the best biology instructor she can be.

"I wouldn't be here without the INBRE program. It has given me mentors, friends, training, funding, everything I've needed to be successful," Dr. Cutucache said.

