

Three former INBRE scholars recently helped raise money for the **UNMC Haitian Relief and Outreach Fund**. Jessica Saunders, Tess Eidem and Christine Gilling each did 40 pushups and raised more than \$1,400. The money raised will be used to help send medical personnel and supplies to the earthquake ravaged nation.



INBRE INROADS

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INBRE's big impact

A \$30,000 DNA sequencer.

A \$23,000 centrifuge.

And a \$24,000 high performance liquid chromatography unit.

"There's no question INBRE has had a big impact on Wayne State College," said Shawn Percy, Ph.D., professor of biology.

A participant since the beginning of the program, Dr. Percy said the science department at Wayne State was able to make significant purchases that were important in transforming the biomedical lab there into a proficient, modern facility.

The investment has paid off.

Wayne State has seen one of its students go on to get a doctoral degree, another receive the prestigious Howard Hughes Fellowship, and many more go on to graduate or medical school.

"The grant also has benefitted five faculty members from three different departments through funding for supplies and classroom release time," Dr. Percy said.

Another benefit, he said, is what he is able to bring to the classroom through the resources that are now available to all of his students.

"I am now able to explore areas of science that were once only discussed in the classroom with students and take that knowledge into the lab, conduct the work and show them the process of biomedical research," Dr. Percy said.

Integrating coursework and laboratory research is a goal Phyllis Higley, Ph.D., has for the INBRE program at the College of St. Mary (CSM).

In 2009 CSM became the 11th participating institution to join the INBRE program.

"We're building our science program," said Dr. Higley. "When I joined the college in 2007 there were only three biology graduates. Today we have 40 students and two of those students are INBRE scholars."

Having the INBRE program at CSM, said Dr. Higley, will give students the hands on opportunity to learn about the scientific process, to collect and analyze data and build laboratory skills.

"We're hoping our students will build scientific competency and develop a professional demeanor through this program," she said.

Dr. Higley is putting together a unified research plan that reaches across disciplines that will include faculty in biology, math and chemistry. She is looking at focusing the research on environmental issues, such as water quality, among many other projects.

The students are enthusiastic about the program and opportunities it presents, she said.

"When we put out the call for INBRE applications this year we had four students really excited about doing research. This will be a wonderful opportunity for them," Dr. Higley said.

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INBRE's big impact

INBRE program makes a big impression on two undergraduate institutions.

Former INBRE Scholar receives international award

Haley Capek, a graduate student in the Eppley Institute at UNMC, receives international award.

The INBRE program is funded by the National Center for Research Resources. NCR is part of the National Institutes of Health, U.S. Department of Health and Human Services.



From the director

This issue of Inroads highlights a broad range of the activities and accomplishments of INBRE here in Nebraska. A key element of the program is the development of the research capacity at several undergraduate colleges in the state. I am pleased to welcome our newest institution, the College of Saint Mary, to the network of INBRE Institutions. The impact of INBRE on the campuses takes many forms, ranging from purchase of essential equipment that enables research on campuses such as Wayne State, to curriculum innovation on campuses such as the College of Saint Mary. All these activities serve to provide opportunities for undergraduates to become involved in research.

One of the most rewarding long term consequences of working with undergraduate faculty and students is being able to contribute to the success of the students. Two more of our former INBRE Scholars are completing their Ph.D. and moving on to post doctoral positions.

INBRE INROADS

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INROADS participating institutions 2010

Creighton University College of Arts and Science; College of Saint Mary's, Doane College; Little Priest Tribal College; Nebraska Wesleyan University; the University of Nebraska at Kearney; the University of Nebraska at Omaha; the University of Nebraska-Lincoln; Wayne State College; Chadron State College; Western Nebraska Community College.

brin.unmc.edu

Ethan Mann started his academic career at Chadron State College and will soon be doing postdoctoral research at Ohio State University. Nick Palermo started his career at UNO, got his Ph.D. at Creighton and will pursue postdoctoral research at the UNMC Eppley Institute. These two students, as well as the many other INBRE Scholars pursuing research careers are a testament to the talent we have in Nebraska and just how much our students can achieve when they are given the opportunities through programs such as INBRE.

It is especially rewarding to see that three of our scholars participated in a UNMC fund raising event for Haiti. Not only are our students talented, they are good citizens and caring members of the larger community. Well done.



Nick Palermo

Laying the groundwork

Before he graduates in May Nick Palermo hopes to lay the groundwork in his Ph.D. thesis that will eventually lead to an inhibitor for colorectal cancer metastasis.

As a graduate student working for Sándor Lovas, Ph.D., a professor of biomedical sciences at Creighton University, Palermo has been studying peptides using structural bioinformatics and computational chemistry. Through this he hopes to understand the relationship between protein structure and function.

Palermo joined Dr. Lovas' lab in 2006 after spending two years working with him as an INBRE scholar. For his undergraduate degree, Palermo studied computer science at UNO. He learned how to merge that knowledge with biochemistry in Dr. Lovas' lab.

Part of Dr. Lovas' lab focuses on structural bioinformatics which can be used in the design of new biomolecules such as polypeptides, so it was a perfect fit for Palermo.

"The application of computational chemistry is becoming widely used in the design of new drugs. It's an exciting tool for researchers," Palermo said.

In Dr. Lovas' lab Palermo has been working on a project involving polypeptides, synthesizing them and studying their structure and biological function.

"Nick was very helpful and produced a lot of data on his project," Dr. Lovas said. "It helped in his graduate studies that he had a computer science background and had been in the INBRE program."

Palermo wrote numerous papers on his work and so far six have been published in scientific journals, including the Journal of Computational Chemistry and the International Journal of Quantum Chemistry.

Sticking close to home, Palermo has accepted a position as a post-doc working for Amar Natarajan, Ph.D., an associate professor with the Eppley Cancer Institute at UNMC. There he hopes to work on small molecule design and computational chemistry related to protein to protein interaction.

"I'm looking forward to joining Dr. Natarajan's research team and working on new projects. I love the work I do because I can say at the end of the day I've done something to further scientific knowledge," Palermo said.

Former INBRE Scholar receives international award

Haley Capek, a graduate student in the Eppley Institute at UNMC, received a best presentation award at the International Student Research Forum in Queensland, Australia in November.

Capek was among three students to receive the award. In all, 46 other student participants from four universities from around the world presented at the forum. Her project was titled "The Role of Amyloid Precursor-Like Protein 2 in Cancer's Evasion of the Immune Response" and was selected for the award by other student participants.

"This was a highly-competitive contest among some of the finest students from very prestigious institutions," said Jialin Zheng, M.D., director of the UNMC Asia Pacific Rim Development Program and

associate dean for graduate studies. "As such, it speaks volumes of Haley's work and the research done by UNMC students that she received this honor."

Capek was one of 12 UNMC students who attended the forum – the fourth year that UNMC has participated. They were joined by colleagues from: The Institute of Medical Science at The University of Tokyo; The Graduate University of Chinese Academy of Sciences; and Griffith University.

At the forum, students shared their research and culture with peers from around the world. Previous forums had been held in Omaha, Beijing and Tokyo.



Ethan Mann

From graduate studies to The Ohio State University

The moment he joined Ken Bayles's lab in 2005, Ethan Mann hit the ground running.

He quickly became an expert on the complexities of confocal microscopy, growing biofilms (think microbial colonies) and writing grants.

For the last two years he's been funded by the American Heart Association to study Staphylococcus aureus commonly affecting heart valves.

It doesn't surprise Dr. Bayles, a professor in the department of pathology and microbiology at UNMC that Mann has done so well.

"He came at the beginning of a paradigm shift for our lab that required new technology and Ethan just jumped in head first and mastered it, he was not intimidated at all," Dr. Bayles said. "He'll be missed when he graduates in May."

Dr. Bayles said Mann helped develop new ways of thinking about S. aureus and the

role of cell death when it forms a biofilm, tracking its development through confocal microscopy.

Mann recently accepted a position at The Ohio State University in the lab of Dan Wozniak, Ph.D., who works on Pseudomonas aeruginosa, another biofilm-forming pathogen and major infectious agent in patients with Cystic Fibrosis.

"Dr. Wozniak has a history of mentoring junior faculty and is successful at getting funding. I'm looking forward to working with him," he said.

"It's a good fit," Dr. Bayles said. Mann is easygoing, inquisitive and knowledgeable with a confidence and maturity that is uncommon in graduate students, he said.

Mann credits Dr. Bayles and INBRE for helping him gain the confidence he needed to be a successful researcher. While INBRE gave him the skills to navigate a lab, Dr. Bayles gave him the freedom to pursue his own research interests and still keep focused.

"Dr. Bayles teaches you to work independently and how to balance the pursuit of a novel finding without losing momentum on your current research project," Mann said.

INBRE, he said, helped lay the foundation for his success.

"I've had no trouble getting through my graduate program with the experience I had as an undergraduate. By the time I got to graduate school I had done so many rotations I was well prepared. In order to get a head start in graduate school you have to have that experience that INBRE provides," Mann said.