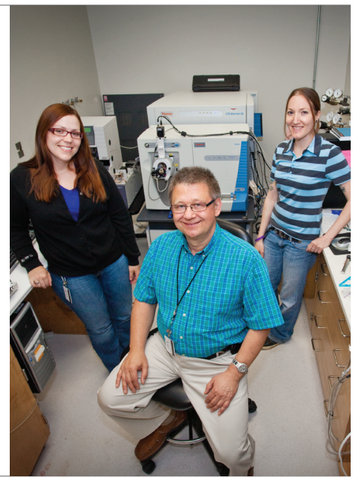
University of Nebraska Medical Center

986395 Nebraska Medical Center
Omaha, NE 68198-6395
Address Service Requested

Pictured left to right are: Melinda Wojtkiewicz, researcher, Pawel Ciborowski, Ph.D., director of the **Mass Spectrometry and Proteomics Core Facility at UNMC**, and Stacy Wolfe, a research technologist. Behind them is the Thermo Electron's LTQ Orbitrap XL ETD mass spectrometer used for analysis of peptides with post-translational modifications, protein quantification and identification.



in this issue

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Teaching with confidence

Spoon feeding kids science concepts just to have them repeated is not the best way to teach.

"We have to get back to the scientific method and let the kids explore science through active participation in the classroom and open-ended discussions," said Betsy Barent, a high school science teacher in Firth, Neb.

Students need to be critical thinkers, she said. Her ideas are reinforced by her INBRE mentor, Teri McGinn, Ph.D., an assistant professor of biology at Nebraska Wesleyan University.

"She gave me the confidence to continue to use these methods in the classroom," Barent said.

Barent's involvement with the INBRE program came from a $600,000 educational supplement through the National Center for Research Resources, a division of the National Institutes of Health. The recovery act funds are designed to recruit high school students and science teachers to spend two summers doing research in INBRE-supported laboratories on undergraduate campuses.

But Barent is getting much more than eight weeks access to a university lab each summer.

To wrap up a unit on cell structure, function and behavior Barent turned to her INBRE mentor for guidance. Dr. McGinn suggested Barent give each student a microscope slide with an unknown cell. The student had to figure out where the cell came from based on what they learned in the unit.

At first the students were apprehensive, she said, "They weren't sure where to go with it." But Barent kept asking them questions, guiding their discovery. They worked on the project for two weeks.

In the end all of the students figured out what cell they had and turned in their written conclusions.

Betsy Barent's enthusiasm for science is evident when she steps into the classroom.

It was a victory for a teacher who often doesn't see her students excited about a class project. Barent credits Dr. McGinn for helping to make this happen.

"Her cell biology background was helpful," Barent said. "She offered advice on which type of cells to present to the kids and what questions to ask."

Barent returns to Dr. McGinn's lab in June to the work she started last summer. She can't wait to get back.

Said Barent: "I feel very lucky to be a part of this. It has been a great experience not only for me, but for my students' as well."

INBRE INROADS

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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

Editor
Lisa Spellman
UNMC Public Relations
402.559.4693

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brin.unmc.edu

From the director

Time flies. We are beginning our 10th year of INBRE and preparing to welcome our new class of INBRE Scholars. We are also in the process of adding two new INBRE faculty on our undergraduate campuses. We have made a lot of progress since our humble beginning with the BRIN program back in 2001.

One of the highlights of last year that will continue this year is our initiative to involve high school teachers and students in our summer research programs. This initiative was started with stimulus funding and has proven to be a tremendous success.

It is never too early to get students interested in science and provide opportunities to do meaningful biomedical research. However, the key to long term sustainability is getting the teachers involved and provide them with opportunities and information that will enable them to apply their experiences in their class rooms.

I draw your attention to an article in this issue of INROADS where Betsy Barent eloquently shares her thoughts about her experience.

We have also had our best year ever in terms of the number of INBRE Scholars who have decided to pursue careers in biomedical research. We have eight INBRE Scholars who will be enrolling in graduate programs at all three of our training campuses, (UNMC, UNL and CUMC).

We also have several additional scholars who will be enrolling at graduate programs at other top rated universities outside of Nebraska.

Some of our scholars have had to make difficult choices between offers of admission at Universities such as Johns Hopkins, Stanford and MIT, to name just a few.

I will never grow tired of pointing out the tremendous talent we have here in Nebraska and sharing the hard evidence of this talent to all who will listen. INBRE is serving us well and our future is in good hands.

Finding her niche

The moment Aspen Workman knew she would be a research scientist came the first summer she joined the INBRE program.

With aspirations to be a veterinarian, Workman joined the lab of UNL virologist, Clinton Jones, Ph.D., studying the herpes virus in cattle and humans.

At the end of the summer, Dr. Jones told her the work she did would be published. That was in 2005. Today Workman is a third-year graduate student at the University of Nebraska-Lincoln.

"Just knowing that the work I did was important enough to be published was inspiring," Workman said.

While Workman was initially drawn to Dr. Jones' lab initially because of the work he did in veterinary medicine, the exposure she gained during her two years in the INBRE program led her down a different path. Workman rejoined Dr. Jones' lab after graduating from Doane College in 2007. She continues to explore the role of herpes virus infections in cattle and humans, in particular what causes an outbreak after the virus has gone dormant.

Aspen Workman

"I really like studying the persistence of the herpes viruses," Workman said.

Workman has published four research articles on the topic. She constantly looks for new ways to challenge her own hypothesis and come up with new ideas.

"Each day you learn something new that will make you think about your research in a different way," she said. "Is there a gap in the literature, something that hasn't been addressed yet? It's exciting and challenging at the same time."

Undergrad uncovers love of research

Derek Moormeier's childhood dream hangs on the living room wall of his parents' Roca, Neb., farmhouse. A crayon drawing of two little boys surrounded by the animals Moormeier and his friend hoped to help one day. Eventually, ecology evolved into biomedical research. This fall, the former INBRE scholar will pursue a doctoral degree at the University of Nebraska Medical Center.

Moormeier first dipped his toes in the science pool during college. Intent on taking courses that would lead to medical school, Moormeier spent his freshman year studying biology only to realize a career in medicine was not for him.

Soon he found himself navigating the research labs at Wayne State College and meeting professors who encouraged, guided and introduced him to the INBRE program. While at Wayne State, Moormeier joined the lab of Doug Christensen, Ph.D., to study Listeria monocytogenes, a bacteria that has the unique ability to get the host cells to voluntarily engulf it.

Through Dr. Christensen, Moormeier had the opportunity to go to a national research meeting in Chicago last year. There he encountered researches from around the world and listened to Al Gore talk about global warming.

"It was awesome," Moormeier said.

Working in a research lab was challenging, Moormeier said, especially the first summer he joined the INBRE program. Concepts in genetics, microbiology and even lab basics, flew over his head. Moormeier spent his free time studying just to learn the vernacular. Eventually things got easier.

Then the day came when Moormeier had his first scientific breakthrough. It was late in the afternoon. Moormeier had just left to attend his last class of the day when he got a text message from his lab partner.

"We got a potential hit on the protein."

Finally, after a year-and-a-half of work to isolate and purify the protein from the bacteria, Moormeier and his lab partner had done it. He went straight home and shared the good news with his roommates, his high school sweetheart and his parents.

"It was so amazing," he said. "I couldn't believe we were doing this research at Wayne State – it was so cool."

Calling Nebraska Home

Evolutionary biologist Dawn Simon, Ph.D., wouldn't have moved from Canada to the middle of Nebraska if she couldn't be part of the INBRE program.

But the idea that she would have funding for lab supplies and paid release time to pursue her research was too inviting to pass up. The move also brings Dr. Simon, who grew up in eastern Iowa, closer to home.

Now, as the newest INBRE faculty associate, Dr. Simon is an assistant professor of biology at the University of Nebraska at Kearney. There she studies introns, stretches of DNA strand that are naturally removed prior to the formation of a functional product, such as protein. If this process is disrupted, the intron can cause the gene to become non functional and can lead to disease, such as bladder cancer, Dr. Simon said.

After finishing her post-doc at the University of Calgary, Dr. Simon came to UNK in January of 2009. She teaches evolution, microbial diversity and an introductory biology lab.

She will spend her summer mentoring a local high school science teacher and student as well as an undergraduate student in her lab.

"I'm excited to be able to share my knowledge with the students and teacher," Dr. Simon said.

Dawn Simon, Ph.D., at right, an evolutionary biologist at the University of Nebraska at Kearney, is excited to share her lab with Kayla James, a senior at Kearney Catholic High School. James will spend the summer learning lab techniques thanks to funding from an educational supplement through the American Recovery and Reinvestment Act.