



BIOGEEK: The Northwestern College Biology Departmental Newsletter

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Drs. Laurie Furlong, Jason Lief (religion department), and Sara Tolsma were among the Northwestern College community members who rode across Iowa in this year's RAGBRAI. Here, they take a break from their ride to pose for a photo "somewhere in north-central Iowa."

Progress Is Made on New Science Center

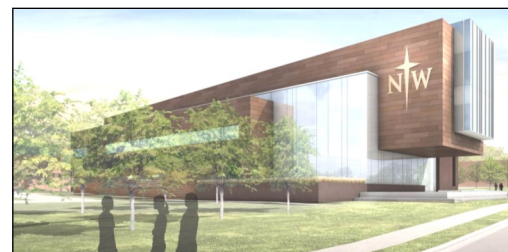
Construction has been moving along since April, when Northwestern College broke ground for its new \$24.5 million health and natural sciences center. Much progress has been made on the 61,000-square-foot facility in the southwest corner of the campus green. The center will house classrooms, laboratories and faculty offices for the departments of biology, chemistry, and nursing. The eco-friendly facility will also include a greenhouse and increased space for student and faculty research. Scheduled to be completed by August 2018, the building will create a grand west entrance to the campus on Highway 10.

"People are surprised by the size of it," says Doug Beukelman, vice president for financial affairs. "It's much bigger than they anticipated." The building's proximity to the street and the way it projects to the south makes it an obvious landmark for the western edge of campus. Beukelman also says people describe the building as "stunning" and "an awesome addition to campus." And that, he points out, comes as they are seeing what is still little more than the skeleton of the facility.

If you want to see what the new science building looks like right now, check out our webcam: <https://construction.nwciowa.edu/>



On Sept. 29, members of the Northwestern Community signed a beam that will be used in the new building.



Artist's rendering of the finished science building (top), and current view (November 9, 2017), as seen from the southwest. This will be the first view of campus as visitors approach on Highway 10 from the west.



Current view from the southeast (Fern Circle).



Current view from the Campus Green. The construction project has made fetching errant serves and passes a bit challenging for students playing sand volleyball.

Ecology Students and Profs head to TNC Preserve

In September, Laurie Furlong and Todd Tracy headed west with nine ecology students to the Nature Conservancy's 56,000-acre Niobrara Valley Preserve. Often referred to as the "biological gem at the crossroads of the Great Plains," the preserve includes boreal forest, deciduous forest, sandhill prairie, tallgrass prairie, and mixed-grass prairie biomes, and is home to at least 581 plant, 213 bird, 86 lichen, 70 butterfly, 44 mammal, 25 fish, 17 reptile and 8 amphibian species.

On the way to the preserve, the group stopped at the Butte, Nebraska sign for the obligatory photo op. While at the preserve, students were given a tour of the preserve, including an up-close-and-personal visit with the preserve's large bison herd. Students also collected samples for their invertebrate collections, hiked a prairie ridge, and kayaked a stretch of the Niobrara River, which was designated as a National Scenic River in 1991. They also performed ongoing research at the preserve, examining the effects of eastern

redcedar on soil properties and invertebrate diversity. One highlight of the trip was the discovery of a fen at the top of a waterfall. Another highlight was students getting to pick the sand-burs off of a tent that had blown away and done its best impression of a tumbleweed.



Biology and Religion Professors Co-author book

Sara Tolsma is co-authoring a book entitled *Incarnation, Evolution, and Youth Ministry: Sharing God's Love for Embodied Life* with Dr. Jason Lief in NWC's Department of Religion. This book is an interdisciplinary conversation between biology and theology on the significance of embodiment for the Christian community. The thesis: An articulation of incarnation and salvation built on a worldview that embraces evolutionary creation provides a unique foundation for practical theology and youth ministry. Because much of Western culture tries to abstract human identity, this approach will provide a new way to engage many of the issues facing young people, emphasizing the goodness of embodiment as part of being made in the image of God. The book will be published by Fortress Press as part of its Science for Youth Ministry Series.

2017 Biology Graduates



Congratulations to our twenty-one 2017 biology graduates! These grads are now representing Northwestern as graduate students at many schools, such as Rush Medical School, University of South Dakota (Medical School), University of Nebraska Medical Center (P.A. program), North Carolina State University (graduate school), Des Moines University (D.O. program), and the University of Minnesota (Pharmacy).

Classroom visits

Here are scenes from various science classes on November 9 and 10, 2017:



Tracy and Furlong's general biology (BIO115) students perform gel electrophoresis on the DNA they isolated during last week's GMO lab.



Tracy's college chemistry students attempt to determine the number of moles of gas in the classroom.



Elizabeth Heeg teaches her microbiology students about humoral immunity.



Tracy's ecology students do a mark-recapture simulation.

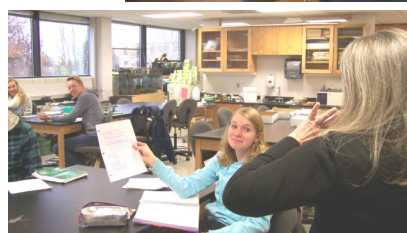


Sara Tolsma's genetics students take their exam in the genetics lab. The exam covered Mendelian genetics and pedigree analysis.



Tracy's college chem students answer a clicker question about Pascal's Law.

College chemistry students study the ideal gas law in Genade's college chem lab. →



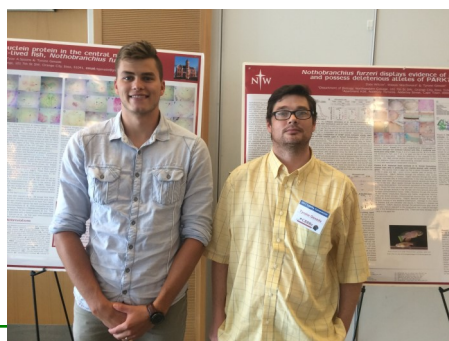
←One of Furlong's invertebrate zoology student shows off her color-coded unit outline. Furlong was quite impressed. Other students looked on enviously. :)

Students and Faculty Present Research

The 2017 Cell Biology students, along with Morgan Olhausen (Junior Scholar) and Joseph Tolsma (honors research), presented a poster at the Iowa Academy of Sciences Annual Meeting in April. The poster was entitled *Anti-proliferative Effects of Common Plant Extracts on Tumor Cells in Vitro*. The research advanced an ongoing cancer research project in Sara Tolsma's lab.

Sara Tolsma and two students, Alison Schutt and Katie Inge, represented Northwestern College SEA-PHAGES research at the 2017 SEA-PHAGES Symposium held on the HHMI Janelia Campus outside of Washington, DC in June. Schutt and Inge presented a poster entitled *Phage Hunting in the Midwest Prairie*, which described the 16 novel phages isolated by Byron Noordewier's microbiology students and the annotation of ILeKay, an adopted Cluster A1 phage, by seven honors research and directed study students. The annotation is published in GenBank, accession number MF919508.

Tyrone Genade presented two collaborative research posters at the Annual Neurobehavioral Research Symposium. Center for Brain and Behavior Research, University of South Dakota, in August: The poster *Nothobranchius furzeri displays evidence of a-synucleinopathy and possesses deleterious alleles of PARK7 in its genome* summarized the findings of his work with 2016 graduate Mawuli McDonald. The second poster, *Localization of a-synuclein protein in the central nervous system of the short-lived fish, Nothobranchius furzeri*, presented the honors research of senior Tyler Spaans.



Four NWC honors research and directed study students (Jose Muro, Samantha Bruinsma, Alex Yoerger, Alison Schutt) participated in a Phage Hackathon with students from the University of Nebraska, Nebraska Wesleyan, and Doane College in April. The students annotated phage Updawg in a one-day collaborative effort. The annotation is published in GenBank, accession number MF919538.

In September, Tyrone Genade gave an oral presentation titled *Nothobranchius furzeri: a new model organism of a-synucleinopathy* at the 3rd International Conference on Parkinson's Disease and Movement Disorders in Chicago.

In September, Byron Noordewier gave a presentation titled *SEA-PHAGES: Discovery Science for Undergraduate Students* at the Iowa Microscopy Society's annual symposium. In his talk, he described the role of his microbiology students in Northwestern's SEA-PHAGES research program.

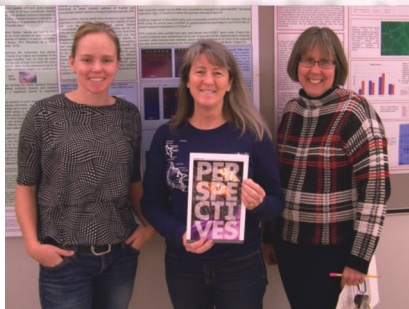


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Faculty publish article in *Perspectives*

Laurie Furlong, Elizabeth-Heeg, and Sara Tolsma shared the beautiful diversity of the natural world with others in an essay published in the Sept/Oct 2017 issue of *Perspectives: A Journal of Reformed Thought*.



An Old Testament Biologist/ Liberal Arts & Sciences Major

by Ralph Davis

In I Kings 4:29-34, we learn about David's son, King Solomon. I like to use this passage at the beginning of my human anatomy courses. Here is the passage, with some emphases and annotations that I've added:

"God gave Solomon wisdom and very great insight, and a breadth of understanding as measureless as the sand on the seashore..." [i.e., God is the ultimate source of our wisdom, insight and understanding – seek these very important treasures and ask God for them if you are lacking them in any way.]

"He spoke three thousand proverbs..." [i.e., a love and appreciation for the humanities & literature marks the wise person, and these areas of learning can bring joy to life, along with wisdom and insight.] **"... and his songs numbered a thousand & five."** [i.e., a similar love and appreciation for the fine arts will bring variety and pleasure to your life.]

"He described plant life..." [i.e., botany, the study and appreciation of plants is well-worth it – did you know that approximately 1/3 of all medicines were originally isolated from plants?] **"...from the cedar of Lebanon to the hyssop that grows out of walls."** [i.e., a well-trained life scientist is interested in both the large & small of life (cedar and hyssop, respectively), since everything is connected – did you know that you

have numerically more bacteria cells in and on your body than human cells?]

"He also taught about animals & birds, reptiles and fish..." [i.e., in addition to botany, one should understand zoology/animals... Who knows, you may be a teacher someday like Solomon. We also know that Solomon had a good grasp of human anatomy – read the Old Testament book entitled the "Song of Songs," where there is a lot of anatomy, so much so that early on certain more conservative biblical scholars believed its explicitness made the book inappropriate for canonical acceptance into the OT.]

"Men of all nations came to listen to Solomon's wisdom, sent by all the kings of the world, who had heard of his wisdom." [i.e., the bottom line: his wisdom, great insight and breadth of understanding gave him a credible influence/witness with and to others].

So what about you and me? Incorporating these areas into our lives will work for us as well. Solomon certainly wasn't perfect, but in the respects mentioned in this passage, he is a wonderful example of a biology/liberal arts & sciences major worth emulating. Just like the kind of student we (hopefully) have, and will continue to produce, in the NWC biology department!

Goals of the Department of Biology

1. **Communicating.** To be an effective biologist, one must possess the ability to communicate with other biologists in a meaningful way. Students will acquire language skills necessary for communicating the world of biology.
2. **Foundational Understanding.** To be an effective biologist, one must have a working knowledge of the fundamental concepts of biology. Students will possess a foundational understanding of biochemistry, biological structures, biological processes, biological diversity, and theories of biological origins that form the framework of biology.
3. **Depth of Understanding.** The field of biology encompasses multiple areas of knowledge. Beyond a foundational understanding of biology, students will develop depth of understanding in an area of biology appropriate to their professional goals.
4. **Critical Thinking.** Advances in biological knowledge are based upon careful experimentation and critical analysis of the data obtained. Students will develop analytical skills which will allow them to derive thoughtful solutions to biological problems. As a practical application of critical thinking, students will be able to design experiments, obtain meaningful data, and interpret those data appropriately to arrive at meaningful conclusions.
5. **Faith and Learning.** The integration of our Christian faith with the discipline of biology is central to being an effective Christian biologist. Students will begin to develop their own integrative worldview, which incorporates their understanding of biology with their theology and experiences of God and His Creation.

Activity Corner

This skeleton greets students to the Zoology/ Ecological Science office suite. How many anatomical inaccuracies can you spot on this skeleton?



Since our new building should be open for business next fall, this is the last time our gen bio students will be doing BIO115 labs in VPH room 221. Here we see a stockpile of supplies that Dr. Laurie Furlong has out for her GMO lab, along with a few extra items left over from her invert zoology lab. Can you spot the 8ish differences between photos A and B?

A



B

