

COLLEGE HAPPENINGS

September 6, 2022

FROM THE DEAN

ENGR 101

At last week's all college faculty and staff meeting with President Cook, one of the points of emphasis was the importance of student retention and its impact on enrollment. This is especially true in the rigorous curriculums in the College of Engineering at NDSU, where only 50% of our students persist in the College of Engineering after 2 years. Much of the retention losses can be attributed to deficits in math literacy for some of our incoming students, and the subsequent difficulty in earning math pre-requisites to begin sophomore level engineering courses. The resulting deficit in math literacy burdens these students with high demands in remedial classes and creates barriers for the timely progression of their engineering education in their sophomore and junior years.

Student success in the calculus sequence is an additional concern. One measure of student success in a particular course is the DFW rate, the percentage of students in a course who receive a D or F grade or who withdraw (W). Over the past six years, the DFW rate for Calc I (MATH 165) averaged 30% (in 2021-22 the DFW rate for MATH 165 was 46%), Calc II (Math 166) averaged 23%, Calc III (Math 265) averaged 29%, and Differential Equations (MATH 266) averaged 22%. This is not unique to NDSU. The traditional calculus sequence, and the curricular barriers it imposes, is the primary cause of attrition in engineering programs all over the country.

One very successful approach to improving student retention in engineering was developed by Wright State University about 18 years ago. The Wright State model is based on students' early exposure to complex math and engineering concepts using practical examples in an introductory applied engineering mathematics course (ENGR 101) taught by engineering faculty that is mandatory for all incoming engineering freshmen. The traditional calculus sequence remains in the curriculum, but the ENGR 101 course substitutes the traditional calculus prerequisite requirements for core engineering courses (such as statics and circuits), reducing curricular complexity and allowing students earlier access to engineering courses. Concomitantly, the problem-based learning in the ENGR 101 course increases student motivation and fosters development of a sense of belonging and identity in engineering.

Wright State professor, Nathan Klingbeil, gives a compelling explanation of the model in a TED talk titled "Questioning the Equation," which I hope you will take time to watch.



<https://www.youtube.com/watch?v=CWCWq155hyc>

The significant success in improved student retention with the Wright State model has now been widely reported in over a dozen peer reviewed publications. This is a model that we ought to consider in the College of Engineering at NDSU. Over the next few months, Associate Dean Pryor and/or Professor David Grewell will be joining departmental faculty meetings (excluding Computer Science) to discuss more about the possibility of implementing an ENGR 101 course. Once implemented, we would also look to offer ENGR 101 as a dual credit option for high school students who want to get a jump start on an NDSU engineering degree.

IN THE NEWS

[NDSU computer expert works to strengthen cybersecurity for U.S.](#)

[NDSU faculty developing cutting-edge artificial intelligence technology](#)

[NDSU helping develop wearable smart device to predict diabetes onset \(Forum\)](#)

[NDSU scientists developing wearable A.I. technology to detect pre-diabetes \(KVRR\)](#)

[NDSU faculty develops artificial intelligence technology to predict onset of diabetes \(Prairie Business\)](#)

[Get hands on with artificial intelligence](#)

CONGRATULATIONS

Please let [College Happenings](#) know about honors, awards, new grants and other announcements so we can share them with other faculty and staff.

UPCOMING EVENTS

Thursday, September 8, **Go Global Festival**. Enjoy international flavors from local food trucks and to learn about study opportunities both domestic and abroad. 10 a.m. to 2 p.m. outside of the Memorial Union between the Bookstore entrance and the Babbling Brook.

Thursday, October 13, **College of Engineering Scholarship and Awards Reception**. 3:00 p.m. in the NDSU Memorial Union.

GLOBAL INTERNSHIP SESSION FOR FACULTY AND ADVISORS

Did you know students have the opportunity to participate in Global Internships? This session is for faculty and advisors to learn more about the [Global Internship Ireland](#), a 12-week summer program where students gain valuable work experience while being immersed in Irish culture.

Join Tanya Kramer, Assistant Director of Study Abroad at NDSU, and Chris Lawlor, the internship placement representative from Learn International, to learn about the program and discover how it may fit within your students' academic plans.

Friday, September 9th

11 a.m. to noon

Meadow Lark, MU

NOMINATIONS OPEN FOR 2022-23 AWARDS

Nominations are invited for faculty awards processed through Faculty Affairs/Office of the Provost.

Nominations may be submitted by faculty, staff, students, alumni, and administrators. *Self-nominations will be accepted to ensure that there are multiple and inclusive pathways to nomination.* Nomination materials should be sent by email to canan.bilengreen@ndsu.edu. Nominations must include a nomination letter (no more than two pages) or nomination form, accompanied by a curriculum vitae (no more than three pages), and should clearly describe how the nominee meets the award criteria. For descriptions of each award, criteria, and nomination materials, please see below or the awards web page maintained by Faculty Affairs/Office of the Provost: <https://www.ndsu.edu/facultyaffairs/awards/>.

The **Faculty Awards and Recognition Committee will review all nominations and select finalists** for each award based upon the candidate's nomination materials after the stated deadline. Please see the [awards web page](#) for information about the awards committee and nominations received in the last three years.

If you have any questions about these upcoming awards, please contact Canan Bilen-Green (canan.bilen.green@ndsu.edu, 231-7040).

BECOME A REVIEWER FOR GRANT PROPOSALS

Serving as a grant reviewer for a funding agency is one of the best ways to improve your own grantsmanship. It allows you to become familiar with the grant process, the funding agency, and the specific funding program for which you are reviewing. Additionally, having the opportunity to read and evaluate proposals can provide insight on what makes a proposal successful as well as what things to avoid.

You do not need to wait for an invitation to be a reviewer - you can volunteer to serve on a panel. Most agencies are continually looking for additional reviewers. You can let your program officer know that you are interested in being on a review panel, or, for some agencies, you can volunteer through a web portal or published process. Learn more:

- [National Science Foundation](#)
- [National Institutes of Health](#)
- [National Endowment for the Humanities](#)

FUNDING OPPORTUNITIES

DOE NOI: Hydropower

The Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy (EERE) intends to issue, on behalf of the Water Power Technologies Office, three Funding Opportunity Announcements (FOA) through the Bipartisan Infrastructure Law entitled

- Water Power Projects: Innovative Technologies to Enable Low Impact Hydropower and Pumped Storage Hydropower Growth,
- Water Power Projects: Stakeholder Insight into Hydropower R&D Issues, and
- Pumped Storage Hydropower Wind and Solar Integration and System Reliability Initiative.

Full funding opportunity announcements will be posted to grants.gov when released. [Read more >>](#)

ND EPSCoR: STEM Research, Education, and Outreach

The [ND EPSCoR](#) State Office's mission is to support efforts of participating institutions of higher education across the state that result in increased STEM research capacity and competitiveness; a stronger STEM pathway that produces our next generation workforce, educators, and researchers; and an informed citizenry that values the STEM ecosystem and economy.

Thus, the ND EPSCoR State Office is accepting proposals to fund STEM activities at EPSCoR participating institutions: research universities (RUs; NDSU and UND), master's college / university (MCU; Minot State University), primarily undergraduate institutions (PUIs; Dickinson, Mayville, and Valley City State Universities), and the tribal colleges/universities (TCUs; Cankdeska Cikana Community College, Nueta Hidatsa Sahnish College, Sitting Bull College, Turtle Mountain Community College, and United Tribes Technical College). For details, see the [Request for Proposals](#).

Deadline: Noon, September 30, 2022

ND NASA EPSCoR Pre-proposals

In response to the [NASA Notice of Funding Opportunity \(NOFO\) EPSCoR Research Announcement Number: NNH23ZHA001C](#), the [North Dakota NASA EPSCoR](#) (Established Program to Stimulate Competitive Research) is soliciting pre-proposals from faculty at [affiliate institutions](#) specifically designed to promote and expand NASA research in North Dakota. Following preliminary proposal selection by ND NASA EPSCoR, the selected pre-proposal team will work directly with the ND NASA EPSCoR office to submit a full proposal to NASA via NSPIRES.

The full RFP, online submission form, and budget sheet can be found in the [RFP announcement on the ND NASA EPSCoR website](#).

Deadline: September 23, 2022; noon

RECENTLY SUBMITTED PROPOSALS

- Xin Sun (PI). Evaluation beef quality using computer vision technology. \$50,000 from the American Meat Science Association. 1/1/2023 - 6/30/2024.
- Surya Sarat Chandra Congress (PI). Automated and Robotic Inspection of Flood Control Systems. \$133,489 from the U.S. Army. 1/1/2023 - 12/31/2023.
- Chau Le (PI). Augmenting the hearing of safety-critical sounds for highway workers using artificial intelligence. \$24,442 from the Federal Highway Administration. 3/1/2023 - 8/31/2024.

- Long Jiang (CPI). Nanocellulose as safe carrier of metal nanoparticles for management bacterial diseases in plants. \$587,552 from the National Institute of Food & Agriculture. 1/1/2023 - 12/31/2025.

RECENT PUBLICATIONS

For 2022, 90 publications by authors with the College of Engineering affiliation have appeared in various journals, according to the ISI Web of Science and submissions from faculty. Here are some of the most recent publications:

- Bin Qasim, Usama, Muhammad Mohsin Saeed, Hayat Ullah, and Hassan Imran. 2022. “Investigating the Potential of CuSCN as Hole Transport Layer for Perovskite Solar Cells for Applications in Indoor Photovoltaics.” *Japanese Journal of Applied Physics* 61 (9): 091001. <https://doi.org/10.35848/1347-4065/ac7dd2>.
- Howell, Paul, Aaron Bauer, Dali Sun, and Dharmakeerthi Nawarathna. 2022. “Impedance-Based Characterization of Healthy and Cancer Cell Derived Exosome Samples.” In *Smart Biomedical and Physiological Sensor Technology XIX*, edited by B. M. Cullum, D. Kiehl, and E. S. McLamore. Vol. 12123. Bellingham: Spie-Int Soc Optical Engineering. <https://doi.org/10.1117/12.2617270>.
- Park, Kwangsoo, Hongkyun Jeon, and Seunghyun “Brian” Park. n.d. “Disability E-Inclusion for Accessible Tourism Websites.” *Current Issues in Tourism*. Accessed August 24, 2022. <https://doi.org/10.1080/13683500.2022.2106195>.
- Straub, Jeremy. 2022. “A Modern Blackboard Architecture Implementation with External Command Execution Capability.” *Software Impacts* 11 (February): 100183. <https://doi.org/10.1016/j.simpa.2021.100183>.

See your name on this list? Help us get the word out about your amazing work by submitting it as a **Breakthrough Alert**. [This online form](#) is an easy, step-by-step guide for summarizing published research for the general public.

College Happenings is distributed to the NDSU College of Engineering staff and faculty every other Tuesday.

Read past issues of *College Happenings* [here](#).

Deadline for submissions to *College Happenings* is 12:00 p.m. Fridays.

Contact kyle.bosch@ndsu.edu to submit items for *College Happenings*.

Follow the College of Engineering on social media.

