

COLLEGE HAPPENINGS

April 27, 2021

FROM THE DEAN

Preparing Our Students for Industry 4.0

Last week I attended (via Zoom) ASEE's annual Engineering Deans Institute. EDI is a yearly meeting for engineering deans to gather and discuss crucial issues facing their colleges and profession. One of the sessions led by a panel of industry leaders at Bosch, Intel, and Siemens, was on the topic of "Modernizing Engineering Education for Industry 4.0."

At the beginning of the 18th century, the first industrial revolution transitioned society with steam and water power to drive industrial changes in manufacturing and other industries. After America's Civil War, the second industrial revolution occurred due to extensive railroad, gas and water supply, electricity, and telegraph networks allowing for the fast movement of people and ideas and the development of manufacturing production lines. The third industrial revolution, occurring late in the last century, was caused by the shift from analog technology to digital electronics, especially from digital computers and digital data storage.

Industry 4.0 refers to the fourth industrial revolution, which is the current trend towards automation and large-scale data exchange in manufacturing and other engineering processes. It includes cyber-physical systems, the internet of things (IoT), autonomous systems, cloud computing, and artificial intelligence.

The panelists described a four-year skills gap study of over 500 participants from over 400 companies and identified the top five technical skills that should be grown or strengthened in the future:

1. Deep understanding of modern programming or software engineering techniques
2. Digital dexterity, or the ability to leverage existing and emerging technologies for practical business outcomes
3. Data science
4. Connectivity
5. Cybersecurity

All of the top five technical skills needed in the industrial space are digital. Interestingly, these skills closely match the new programs that the Department of Computer Science is exploring in cybersecurity, data science, and software engineering.

Likewise, the panelists had the following recommendations for engineering educators:

1. teach systems thinking,
2. foster engineering leadership,
3. strengthen communications for engineers,
4. embrace work-integrated learning, and
5. build new bridges.

If you are interested, you can watch a recording of the entire presentation from the EDI meeting [here](#).



IN THE NEWS

[Engineering assistant professor receives NSF CAREER Award](#)

[NDSU student to give Posters on the Hill presentation](#)

[Internship leads to a successful engineering career](#)

[Engineering faculty member receives endowed professorship](#)

CONGRATULATIONS

Ali Amiri, assistant professor of practice in the **Department of Mechanical Engineering**, has been selected as the recipient of the Odney Excellence in Teaching Award. Amiri will be recognized by President Bresciani and Provost Fitzgerald with a plaque at the annual NDSU Celebration of Faculty Excellence on May 13, 2021,

Adam Gladen, assistant professor in the **Department of Mechanical Engineering**, has been selected as the winner of the 2020-21 Pi Tau Sigma Excellence in Teaching Award. PTS, the honor society for mechanical engineers, began honoring faculty for excellence in the classroom back in the 1960s.

Fardad Azarmi, professor in the **Department of Mechanical Engineering**, is serving as the lead editor for the proceedings editorial board of the 2021 International Thermal Spray Conference and Exposition.

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

Tuesday, April 27, **60th Faculty Lectureship** entitled “Challenges and Opportunities in Global Agricultural Trade and Competition” by William Wilson, University Distinguished Professor. 7:00 p.m. via Zoom.

Wednesday, April 28, **UIDP Webinar: Machine Learning: What It Is and What Its Applications Are**. This webinar featuring Yiwen Xu, assistant professor in the Department of Industrial and Manufacturing Engineering, will cover the basics of machine learning, its applications as well as where the future may lead this technology. The event is free. [Register here](#).

Friday, May 7, **Making Connections: How North Dakota Native American Essential Understandings Can Help Us Connect with Native American Students, Colleagues, and Communities**. 1:30-4:30 p.m. with Lucy Fredericks, Scott Simpson, and Sharla Steever of the North Dakota Governor's Office. Register here: <https://ndsu.zoom.us/meeting/register/tJYuduiopz4pHN2p9lYIRS1dR1CFHOdZDEQx>

Friday, May 14, the **College of Engineering Ring and Pin Ceremony**. This ceremony is a blending of two significant and celebratory events, the Order of the Engineer and the Pledge of the Computing Professional. The ceremony begins at 3:00 p.m. in AG Hill 112 and simultaneously on Zoom.

Saturday, May 15, **NDSU Spring Commencement** at 10:00 a.m. in the FargoDome. Please complete and submit the [Faculty/Staff Commencement Participation Form](#) by **Friday, April 30 at 5:00 p.m.** if you plan to participate in commencement.

NSF VIRTUAL GRANTS CONFERENCE

The National Science Foundation (NSF) Spring 2021 Virtual Grants Conference will be held the week of June 7-11, 2021. Registration will be free of charge and opens on Wednesday, May 5 at 11:00 a.m. Sessions typically reach capacity very quickly, so we encourage you to register as soon as possible once the portal opens.

In the meantime, please feel free to check nsfpolicyoutreach.com for the most up-to-date information and view [recordings](#) of sessions from previous years. You may also view the Fall 2020 Virtual Grants Conference recordings on our [YouTube](#) page. For those who cannot attend the live conference, all recorded conference sessions will be available on-demand shortly after the event and posted on our [website](#) and our [YouTube](#) page.

If you have any logistical questions about this virtual conference, please contact grants_conference@nsf.gov.

SPRING COMMENCEMENT STAFF VOLUNTEERS

Spring Commencement is approaching quickly and the Office of Registration and Records is looking for staff volunteers to assist students and their families as they celebrate this accomplishment. Volunteers are asked to be at the Fargodome at **8:30 or 9:30 a.m.** for the 10:00 a.m. ceremony and **12:30 or 1:30 p.m.** for the 2:00 p.m. ceremony (start time depends on the task). We will need 22 staff volunteers for both ceremonies. Volunteers, with the exception of photo station assistants, should plan to stay for about the first 15-30 minutes of the ceremony. [Spring Commencement Staff Volunteer Sign-up](#)

OTL FACULTY FELLOW

The Office of Teaching and Learning will be hosting a Faculty Teaching Fellow for the 2021-22 academic year. The fellow position is a leadership and professional development opportunity. The program is open to faculty at the rank of associate professor or higher (tenured or non-tenured) in any discipline.

A \$5,000 supplement or payment to the Faculty Teaching Fellow's academic home department for the individual's use will be provided as compensation for the position. Applications are due May 14, 2021.

[Learn More >>](#)

CULTURAL DIVERSITY AND SAFE ZONE TRAINING

The Office of the Vice Provost for Faculty and Equity will be offering a series of the Cultural and Cultural Diversity Trainings as part of the Community of Respect series and the Safe Zone Training series via Zoom.

Cultural and Cultural Diversity Trainings:

- Module 1 Cultural and Cultural Diversity, June 10 from 10 am - noon
- Module 2, Redefining Diversity, June 17 from 10 am- noon
- Module 3, Microaggressions, June 24 from 10 am- noon
- Module 4, Confronting Bias, July 1 from 10 am- noon

Safe Zone Training:

- Level 1 "Becoming an Ally", June 8, 2021 from 1-3 pm
- Level 2 "Gender Identity and Expression", June 15, 2021 from 1-3 pm
- Level 3 "Upstander", June 22, 2021 from 1-3 pm

Register for either program here: https://www.ndsu.edu/equity/education_and_training/

Registrants will be emailed the Zoom link a few days prior to the training dates

UNDERSTANDING DIVERSITY IN STEM

The National Center for Science and Engineering Statistics (NCSES) invites you to participate in Women, Minorities, and Persons with Disabilities in Science and Engineering (WMPD) Day on May 12, 2021. The theme of this year's WMPD Day is Recognize. Celebrate. Build. Registration is required, [register here](#).

- **May 12, 2021 at 10:00 a.m. CDT**
- **Virtual Zoom Event**
- **Women, Minorities, and Persons with Disabilities in Science and Engineering: 2021 (WMPD)**
nces.nsf.gov/wmpd #WMPDday

IT UPDATES

Fall Semester Planning

- **Zoom licensing** for all NDSU students, faculty and staff will continue through the next fiscal year, so you do not need to purchase licenses if you wish to continue using Zoom. A new solution for cloud storage of Zoom recordings will likely be coming in the fall, but has not been identified yet.
- IT will continue to **support classrooms for HyFlex instruction**. They will offer instructional design consults for instructors as you plan your courses and will offer trainings and are planning videos to help instructors use the technology in the classrooms.
- Some services provided by CARES funding will go away after this school year:
 - **LogMeIn**, a service used for logging into classroom computers remotely will end in August.
 - **Labster**, a service to simulate labs for remote students, will also end in August.

Blackboard Retention Schedule

- The ND University System has clarified their revised retention schedule for courses in Blackboard. Please visit <https://kb.ndsu.edu/103249> to see a schedule of when to expect a course to be removed.

FUNDING OPPORTUNITIES

DoD: Air Force Young Investigator Research Program

The Fiscal Year 2022 [Air Force Young Investigator Research Program \(YIP\)](#) intends to support young in career scientists and engineers who have received Ph.D. or equivalent degrees by 1 April 2015 or later showing exceptional ability and promise for conducting basic research. The program objective is to foster creative basic research in science and engineering; enhance early career development of outstanding young investigators; and increase opportunities for the young investigator to recognize the Air Force mission and related challenges in science and engineering.

Deadline for White Papers: May 31, 2021; 11am

North Dakota Soybean Council: Soybean Non-Agronomy Research Funding

The North Dakota Soybean Council (NDSC) is seeking Non-Agronomy Research Funding Requests for FY 2022 (July 1, 2021 - June 30, 2022). The NDSC invites creative funding requests to address non-agronomy soybean research priorities. While NDSC will undoubtedly continue to fund many of the traditional programs that have supported the NDSC mission, emphasis will be given to proposals which creatively address the following priority:

NDSC research committee is seeking proposals that intend to utilize North Dakota Soybeans in industrial or commercial products that create a “High Value or High-Volume Demand.”

- [Download RFP](#)
- [Download Appendix A](#)
- [Download Appendix B](#)

Deadline: May 27, 2021; 4pm

NSF: Improving Undergraduate STEM Education: Education and Human Resources (IUSE:EHR)

[IUSE: EHR](#) supports projects that seek to bring recent advances in STEM knowledge into undergraduate education, that adapt, improve, and incorporate evidence-based practices into STEM teaching and learning, and that lay the groundwork for institutional improvement in STEM education. In addition to innovative work at the frontier of STEM education, this program also encourages replication of research studies at different types of institutions and with different student bodies to produce deeper knowledge about the effectiveness and transferability of findings.

The IUSE: EHR program features two tracks: (1) Engaged Student Learning and (2) Institutional and Community Transformation. Several levels of scope, scale, and funding are available within each track – see the [solicitation](#) for more information.

RECENTLY SUBMITTED PROPOSALS

- Jeremy A Straub (PI). Support for Cybersecurity Training for High School Educators. \$11,293 from the National Security Agency. 01/01/2022 - 12/31/2023.
- Jeremy A Straub (PI). Defensible & Explainable Artificial Intelligence for Secure Autonomous Orbital Spacecraft Operations, Maintenance and Repair. \$652,610 from the U.S. Air Force. 01/01/2022 - 12/31/2024.
- Mijia Yang (PI). Trace fragment shapes, sizes, and motions after impact. \$39,188 from the National Aeronautics and Space Administration. 05/16/2021 - 05/05/2022
- Ying Huang (PI). Artificial Intelligence Opportunities for State and Local DOTs- A Research Roadmap. \$40,356 from the National Academies. 08/02/2021 - 02/01/2023.

RECENT PUBLICATIONS

For 2021, 79 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:

- Afrin, Tanzina, and Nita Yodo. 2021. “A Probabilistic Estimation of Traffic Congestion Using Bayesian Network.” *Measurement* 174 (April): 109051. <https://doi.org/10.1016/j.measurement.2021.109051>.
- Bozorg-Haddad, Omid, Marzie Azad, Elahe Fallah-Mehdipour, Mohammad Delpasand, and Xuefeng Chu. 2021. “Verification of FPA and PSO Algorithms for Rule Curve Extraction and Optimization of Single- and Multi-Reservoir Systems’ Operations Considering Their Specific Purposes.” *Water Supply* 21 (1): 166–88. <https://doi.org/10.2166/ws.2020.274>.
- Enayati, Maedeh, Omid Bozorg-Haddad, Javad Bazrafshan, Somayeh Hejabi, and Xuefeng Chu. 2021. “Bias Correction Capabilities of Quantile Mapping Methods for Rainfall and Temperature Variables.” *Journal of Water and Climate Change* 12 (2): 401–19. <https://doi.org/10.2166/wcc.2020.261>.
- Faisal, H. M. Nasrullah, Kalpana S. Katti, and Dinesh R. Katti. 2021. “An Insight into Quartz Mineral Interactions with Kerogen in Green River Oil Shale.” *International Journal of Coal Geology* 238 (April): 103729. <https://doi.org/10.1016/j.coal.2021.103729>.

- Golwala, Harmita, Xueyao Zhang, Syeed Md Iskander, and Adam L. Smith. 2021. "Solid Waste: An Overlooked Source of Microplastics to the Environment." *Science of the Total Environment* 769 (May): 144581. <https://doi.org/10.1016/j.scitotenv.2020.144581>.
- Liu, Yanpeng, Lixin Zhu, Scott A. Wood, and Simone A. Ludwig. 2021. "A Future of Artificial Intelligence for Applied Geochemistry Preface." *Applied Geochemistry* 127 (April): 104905. <https://doi.org/10.1016/j.apgeochem.2021.104905>.
- Maturavongsadit, Panita, Lokesh Karthik Narayanan, Parth Chansoria, Rohan Shirwaiker, and S. Rahima Benhabbour. 2021. "Cell-Laden Nanocellulose/Chitosan-Based Bioinks for 3D Bioprinting and Enhanced Osteogenic Cell Differentiation." *ACS Applied Bio Materials* 4 (3): 2342–53. <https://doi.org/10.1021/acsabm.0c01108>.
- Mitra, Dipankar, Sukrith Dev, Jacob Lewis, Jerika Cleveland, Monica S. Allen, Jeffery W. Allen, and Benjamin D. Braaten. 2021. "A Phased Array Antenna with New Elements Designed Using Source Transformations." *Applied Sciences-Basel* 11 (7): 3162. <https://doi.org/10.3390/app11073162>.
- Sun, Dali, Zhen Zhao, Sarah Spiegel, Yang Liu, Jia Fan, Pouya Amrollahi, Jing Hu, Christopher J. Lyon, Meihua Wan, and Tony Y. Hu. 2021. "Dye-Free Spectrophotometric Measurement of Nucleic Acid -to -Protein Ratio for Cell-Selective Extracellular Vesicle Discrimination." *Biosensors & Bioelectronics* 179 (May): 113058. <https://doi.org/10.1016/j.bios.2021.113058>.
- Uddin, Rony Rajib, and Gladen Adam. 2021. "Numerical Modeling of a Photovoltaic/Microchannel Direct-Expansion Evaporator for a CO2 Heat Pump." *Journal of Thermal Science and Engineering Applications* 13 (2): 021022. <https://doi.org/10.1115/1.4047819>.
- Yang, Mijia, Shree Raj Paudel, and Zhili Jerry Gao. 2021. "Snow-Proof Roadways Using Steel Fiber-Reinforced Fly Ash Geopolymer Mortar-Concrete." *Journal of Materials in Civil Engineering* 33 (2): 04020444. [https://doi.org/10.1061/\(ASCE\)MT.1943-5533.0003537](https://doi.org/10.1061/(ASCE)MT.1943-5533.0003537).
- Zhou, De, Zhulu Lin, Siming Ma, Jialing Qi, and Tingting Yan. n.d. "Assessing an Ecological Security Network for a Rapid Urbanization Region in Eastern China." *Land Degradation & Development*. <https://doi.org/10.1002/ldr.3932>.

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*.

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