NDSU | COLLEGE OF ENGINEERING

COLLEGE HAPPENINGS

April 16, 2019

FROM THE DEAN

SROIs to Improve and Measure Teaching Quality

Near the end of each semester students are asked to complete Student Rating of Instruction (SROI) surveys for their classes. The data collected includes numerical scores related to the instructor's ability to communicate effectively, fairness of the procedures for grading, quality of instructor feedback, as well as overall course and instructor ratings. The evaluations also include comments from the students about the perceived quality of the course.

These *summative* evaluations (done at the end of the course) provide feedback to the professor so that they can make improvements the next time they teach. Unfortunately, the concerns raised in the student teaching evaluations for a given instructor/course one semester appear, all too often, in subsequent evaluations the next time they teach, indicating that faculty are not always acting to improve their teaching based on student ratings. To make more substantial improvements in our teaching, I encourage our faculty to discuss their evaluations with another professor or their department chair when they receive their evaluations from the spring semester. This consultation will help to prevent faculty from just rationalizing the ratings or from "just trying harder" without a clear plan for improvement.

Evaluations also can be done during the semester, so that in-course corrections can be made. Such evaluations made during the course, called *formative* evaluations, can be as simple as asking students to respond anonymously to questions on a notecard, chatting with students informally, or meeting with representatives from the class. Formative evaluations allow the instructor to change things that are not working, and I encourage our faculty to provide time for these activities when they teach. For formative evaluations, faculty should plan to discuss the results of the evaluation and an improvement strategy with the class, since this increases students' satisfaction.

The use of student evaluations to make administrative decisions is somewhat controversial (especially when salary, tenure or promotion decisions are involved), and I've heard from faculty members in the past about their perception of the problems with reliability, validity, and extraneous variables (e.g. class size, student participation, grades and course workload) related to student evaluations. Of course, the evaluations will be most useful if we have the broadest participation possible, which is why we encourage all students to participate, and to provide measures of how many students have completed the evaluations for each course. Reliability increases with increased participation; one study reports the correlation coefficient of reliability of student ratings (that is their consistency for whatever it is they are measuring) increases from r=0.74 with ten students to r=0.90 with twenty-five students.[1]

While there are some extraneous variables which effect student ratings, the effect is usually quite small.[2] The common criticism that faculty can buy ratings by requiring very little work and by easy grading does not appear to be true. On the contrary, courses with higher workloads were consistently rated higher.[1, 3] In addition, research has shown that grading more easily and teaching easier courses has a negligible impact on student evaluations.[3]

Phil Wankat and Frank Oreovicz, in their book *Teaching Engineering*,[4] respond to the question, "Can a Professor 'Buy' Student Ratings?":

> Yes, a professor can "buy" student ratings by two different methods. First the professor can load all the extraneous variables in her or his favor. Thus, the professor could arrange to teach a small, nonlaboratory, elective class to seniors and graduate students. The course would be scheduled at a convenient time, and the TA would be from the United States. If possible, the students would be initially interested in the material. The professor would give A's to all the students on the A-B border. This set of conditions can buy a slightly higher rating, but it cannot turn a poor teacher into a good one.
>
> The second approach is to present material clearly and communicate with the students. Organize the material and give clear objectives. Follow a logical presentation scheme with a minimum of tangents. Present many examples and real-life applications. Cultivate a pragmatic, let's-get-things-done attitude. Show enthusiasm, interest, and a love for the subject. Stimulate the students intellectually and have a significant breadth of coverage. Be available for questions both in and out of class. Have a sense of humor. Use a good textbook which is integrated into the course. Arrange matters so that the workload is high, but not unreasonably so. Have fair examinations and a clearly defined grading system. Encourage group interactions both within and outside the class. Develop a team concept with the students—a team whose job it is to learn the material. Keep the students active and incorporate a variety of modes of presentation. If all these things are done, then the professor will have done a good job and will have earned the high ratings he or she will receive.

While student evaluations should not be the only way to evaluate teaching effectiveness, they are an important tool, when properly administered and interpreted, along with other methods, which can be used to help improve the education of our students.

[1] March, H. W., "Student's evaluations of university teaching: Dimensionality, reliability, validity, potential bias, and utility," *J. Educ Psychol.*, 76, 707 (1984)
[2] McKeachie, W. J., "Research on college teaching: The historical background," *J. Educ Psycol.*, 82, 189 (1990)
[3] Schneider, G., "Student evaluations, grade inflation, and pluralistic teaching: Moving from customer satisfaction to student learning and critical thinking," *Forum for Soc. Econ.*, 42, 122 (2013)
[4] Wankat, P. C. & Oreovicz, F. S., *Teaching Engineering, Second Edition*, West Lafaeyett, Indiana: Purdue University Press (2015).

IN THE NEWS

Student competition raises more than $8,000 for teen fighting cancer

NDSU Steel Bridge Team to compete for 7th national title

Biomedical engineer to visit NDSU for Distinguished Lecture Series

Business ideas shine during NDSU's Innovation Challenge

STEM Kids Camp featured live on Valley News Live: Video 1, Video 2, Video 3

CONGRATULATIONS

Mijia Yang from the **Department of Civil and Environmental Engineering** was selected by the editor of the Journal of Aerospace Engineering as an ASCE 2018 Outstanding Reviewer.

Haneesh Jasuja, a Ph. D. student in the **Department of Civil and Environmental Engineering**, recently won third prize in the poster presentation at the 3rd Annual Graduate Student Council Research Symposium.

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 23, **Red River Valley ASABE Sectional meeting**. Events include a tour of Aldevron and dinner at Old Chicago. Get more details and register here.

Monday, April 29, **Promotion-to-Professor Luncheon**. The session will feature remarks from Interim Provost Ken Grafton and a question and answer session facilitated by Dean Scott Wood. Register here.

Tuesday, April 30, **NDSU FORWARD Advocates will offer an Ally Workshop** from 1:00 to 3:00 p.m. in the Memorial Union Mandan Room. Interested men faculty and postdoc/graduate students should register here.

Wednesday, May 1, **open forum sponsored by FORWARD and the Commission on the Status of Women Faculty**. The commission is soliciting feedback on NDSU Policies 103 and 304 that provide guidance and structure when filling administrative, faculty, and staff positions. 3:30 – 4:40 p.m. in the Memorial Union Century Theatre.

Saturday, May 11, **NDSU Spring Commencement**. The ceremony for the College of Engineering will be held at 10:00 a.m. at the Fargodome. Faculty and staff who wish to participate in the academic processional will wear caps and gowns and march by academic rank and seniority. To register, please go to http://www.ndsu.edu/commencement/facstaff/ and complete the necessary form.

NIH GRANT WRITING WORKSHOPS

On April 25, Dr. Meg Bouvier [Meg Bouvier Medical Writing] will present three workshops:

How to Write an NIH R-Series Application
Thursday, April 25, 2019 | 8am-1pm | Memorial Union Hidatsa Room
The target audience for this session is NIH R01 and R15 grant program applicants.
This workshop will cover the following topic areas:

- **Preparation:** *Key steps to take before you write a successful NIH submission*
- **Specific Aims**: *How to write the most important page of an NIH submission*
- **Significance and Innovation:** *How to "sell" your project to NIH reviewers*
- **Approach:** *How to write the section that correlates most closely with your overall score*

Mistakes Commonly Made on NIH Submissions
Thursday, April 25, 2019 | 1pm-2pm | Memorial Union Arikara Room
This lunch-time session covers mistakes commonly made on NIH submissions, and will include a question and answer period with Dr. Bouvier.

Building Your Biomedical Research Funding Portfolio
Thursday, April 25, 2019 | 2pm-3pm | Memorial Union Hidatsa Room
This session will discuss funding options including those outside NIH that could help build and diversify your funding portfolio.

Seating is limited, and priority will be given to faculty.
Registration is required.

SUMMER NATURE CAMP OPPORTUNITY FOR FACULTY

During the first two weeks in June, we will have 25 Native American tribal college students on the NDSU campus for the ND EPSCoR-sponsored NATURE Summer Camp. Faculty will once again have the opportunity to meet these young people and show them the enjoyment they receive from their scientific quests.

There is also an opportunity to work with 1 to 3 students during the 2nd week of camp, so they can get hands-on experience in the research that you do and then do a presentation about it to their peers.

To take part, go to the doodle poll. If you have any questions about this opportunity please email Scott Hanson.

SUSTAINABLE AGRICULTURE AND ENVIRONMENT CONFERENCE

Halis Simsek and **Igathinathane Cannayen** from the **Department of Agricultural and Biosystems Engineering** are among those organizing the "6th International Conference on Sustainable Agriculture and Environment" scheduled for October 3-5, 2019 in Konya, Turkey.

Details of this conference can be found here.

You can submit your research abstract if the topics/scope of the conference is fit to your research area.

CAREER CENTER CLASSROOM PRESENTATIONS

The NDSU Career Center is pleased to offer a variety of career services presentations that can be incorporated into your curriculum.

To request a presentation please use the online request form.

LECTURE CAPTURE SOFTWARE CHANGE

In addition to Blackboard migration, the University System has opted to transition NDSU's lecture capture solution from Tegrity to Yuja beginning with Summer 2019 courses.

- Yuja features include the ability to record audio and video lectures, capture screens, and even cast your class/event live. They also have the ability to build quizzes into videos so students have to answer at various points in a video.
- Content that you've created in Tegrity will be moved into Yuja for you, so you do not have to worry about backing up your existing content. Instructions and training for publishing this content to your classes will be available soon.
- For resources, including an overview video and FAQs, visit: https://www.ndsu.edu/its/instructional_services/multimedia/yuja_lecture_capture_and_video_hosting/

More details, including training dates and resources will be emailed in the coming weeks.

FUNDING OPPORTUNITIES

American Society of Heating, Refrigeration & Air-Conditioning Engineers: Undergraduate Equipment Grants

The American Society of Heating, Refrigeration, & Air Conditioning Engineers (ASHRAE) Undergraduate Program Equipment Grants Program provides grants to engineering, technical and architectural schools worldwide with the goal of increasing student knowledge, learning and awareness of the heating, ventilation, and air conditioning (HVAC) industry. Grants shall be used to fund equipment and supplies for undergraduate projects and 2-year technical school projects that focus on ASHRAE-related topics.

Application deadline: December 15, 2019

NSF: Research Experiences for Undergraduates (REU) Sites and Supplements

The National Science Foundation (NSF) Research Experiences for Undergraduates (REU) program supports active research participation by undergraduate students in any of the areas of research funded by the NSF. REU projects involve students in meaningful ways in ongoing research programs or in research projects specifically designed for the REU program.

This solicitation features two mechanisms for support of student research:

1. *REU Sites* are based on independent proposals to initiate and conduct projects that engage a number of students in research. REU Sites may be based in a single discipline or academic department or may offer interdisciplinary or multi-department research opportunities with a coherent intellectual theme. Proposals with an international dimension are welcome.

2. *REU Supplements* may be included as a component of proposals for new or renewal NSF grants or cooperative agreements or may be requested for ongoing NSF-funded research projects.

Undergraduate student participants in either REU Sites or REU Supplements must be U.S. citizens, U.S. nationals, or permanent residents of the United States. Students do not apply to NSF to participate in REU activities. Students apply directly to REU Sites or to NSF-funded investigators who receive REU Supplements. To identify appropriate REU Sites, students should consult the directory of active REU Sites.

REU Sites proposal deadline: August 28, 2019

RECENTLY FUNDED GRANTS

- David Ray Steward (PI). NDSU Subaward: Mixed Approaches Towards Effective Collective Management of Groundwater Resources. $87,011 from the U.S. Department of Agriculture. 10/01/2018 – 05/31/2021.

RECENTLY SUBMITTED PROPOSALS

- Xuefeng Chu (PI). North Dakota Water Resources Research Institute 104(b) Program. $92,335 from the U.S. Geological Survey. 06/01/2019 – 05/31/2020.
- Di Wu (PI), Dong Cao (CPI). Integrated Real-time Satellite Solar Power Forecast and System Strength Surveillance System for Enhancing Situational Awareness for Operation of Inverter-based Distributed Energy Resources. $2,313,948 from the Department of Energy. 09/01/2019 – 08/31/2021.
- Beena D Ajmera (PI), Wenjie Xia (CPI). Data-Enabled Prediction of Shear Behavior of Fine-Grained Soils under Cyclic Loading. $452,966 from the National Science Foundation. 01/01/2020 – 12/31/2022.
- Danling Wang (PI), Qifeng Zhang (CPI). Innovative Sensing technology based on Ti10C2 MXene and TiO2 nanocomposite for monitoring anticancer effect through omega-6 related dietary care in cancers. $98,372 from the Bill and Melinda Gates Foundation. 07/01/2019 – 12/31/2020.

RECENT PUBLICATIONS

For 2019, 37 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:

- Huang, Ying, Yi Bao, Genda Chen, and Zhi Zhou. 2019. "A Constrained Cylinder Model of Strain Transfer for Packaged Fiber Bragg Grating Sensors Embedded in Inelastic Medium." *Structural Control & Health Monitoring* 26 (5): e2335. https://doi.org/10.1002/stc.2335.
- Eslaminejad, Ashkan, Mariusz Ziejewski, and Ghodrat Karami. 2019. "An Experimental–Numerical Modal Analysis for the Study of Shell-Fluid Interactions in a Clamped Hemispherical Shell." *Applied Acoustics* 152 (September): 110–17. https://doi.org/10.1016/j.apacoust.2019.03.029.
- Shukla, R., and K. Sumathy. 2019. "Design Approach of a Density-Driven Solar Water Heater System: A Study in North Dakota." *Journal of Thermal Analysis and Calorimetry* 136 (1): 113–20. https://doi.org/10.1007/s10973-018-7723-8.
- Xie, Yanmei, Huojun Yang, Zhijun Zuo, and Zhili Gao. 2019. "Optimal Depth-to-Span Ratio for Composite Rigid-Frame Bridges." *Practice Periodical on Structural Design and Construction* 24 (2): UNSP 05019001. https://doi.org/10.1061/(ASCE)SC.1943-5576.0000419.

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.