

COLLEGE OF SCIENCE, ENGINEERING & TECHNOLOGY



2017-2018 Annual Report Division of Academic Affairs – CSET Highlights

Executive Summary

The College of Science, Engineering and Technology is known for providing a student-centered and focused experience in some of the most sought after fields in the region, state, nation and around the globe. Our faculty, within their areas of expertise, connect with industry and many of our country's most prestigious research funding sources. We take pride in providing support courses to majors across campus while concentrating on the experience of our own majors by making sure they have opportunities to work one-on-one with faculty in research, labs and advising.

This year the college has continued to make progress on attaining its strategic goals through global actions recommended by an implementation task force (see attached). The four goal areas can be stated succinctly as (1) providing solutions for the region, (2) engaging in transformative teaching methods, (3) exploring new programs and initiatives, and (4) providing mentorship throughout the college.

This year, the university undertook a new Strategic Budget Process (SBP) that will be part of a new system for allocation of resources beginning with the 2018-19 academic year. The process identified academic and non-academic programs as candidates for investment, maintenance or reduction. Among the 4 Bachelor's degree programs identified as candidates for investment, three reside in the College of Science, Engineering and Technology: Computer Engineering, Computer Information Technology and Manufacturing Engineering Technology. Additionally, the foundational courses in Biology to support health majors was identified as a candidate for investment. Those programs are indeed areas in which we have critical needs and we are hopeful that the new SBP will lead to increased support. Additionally, new emerging programs in agriculture (as related to engineering, soils and water), analytics and health informatics will be target offerings to attract new students to MSU and support regional workforce needs.

The college continued its implementation of the third year of the University's 3-year Academic Master Plan and much of that progress is reported here. The actions undertaken in that direction create viable new directions for the college while maintaining our current strengths in alignment with our mission and goals.

The college takes great pride in sharing the successes and scholarship of our faculty and students, which are too numerous to mention in the present document. We include a brief description of a representative sampling in the report that follows. Details of many of the accomplishments in the report can be found at the CSET News & Events website (<http://cset.mnsu.edu/news.html>).

Select accomplishments in:

1. Student Success

- Student enrollments during the 2017-2018 academic year in the College of Science, Engineering and Technology are trending upwards as very strong numbers continue in new freshmen, transfer and international students, especially into the computer and information sciences and engineering majors. We are now at nearly 3,200 declared majors in the college, up 4% over last year and 23% over the past five years (with the number of graduates from the college increasing 48% over that same timespan). Growth in computer fields such as IT and Computer Engineering are the most dramatic with additional gains in Construction Management, Civil Engineering and Biological Sciences. Service courses continue to be in high demand from across campus, particularly high from the College of Allied Health and Nursing and the College of Business, putting strain on the Biological Sciences, Chemistry, Mathematics, and Statistics programs.
- The College hosted its first Involvement Fair in the CSU Ballroom this year, providing new students with the opportunity to engage with over 35 tables hosted the various academic departments, clubs and student organizations from across the college. Over 50 students assisted with event that was attended by 200 students.
- The Mathematics and Statistics Learning Center continues to see high usage with thousands of visits each year. In a survey conducted in the Center which received 1,625 responses, about one-third of all visits supported our business math (Math 130) course with statistics, college algebra and calculus students being additional heavy users. Over 50% of users spend 30 minutes to 1½ hours at a session and 93% rate their experience as either good or very good.
- Academic year 2017-2018 was a fantastic year for students supported by funds provided by the college. In total the Dean's office was able to support student travel for conferences, competitions, presentations and professional meetings from sources such as our indirect earnings account, representing travel support for approximately 85 students. This type of support has been a top priority for CSET and will continue to be as long as we are able. This is an important component of the extra-curricular experience for our students and brings recognition to Minnesota State University, Mankato with each opportunity provided to students.
- CSET employs many of our students on student help, as undergraduate TAs, graders and, of course, a steady workforce of graduate teaching assistants in the mathematics and biology areas. In addition, students are funded through the earnings of Bureau 507 and have paid internships through the long-standing relationship with Project Maverick and other campus cooperatives.

2. Diversity

A. Employees (hiring, promotion)

- During the 2017-2018 academic year, overall hiring in the College reflected that new faculty hires were comprised of 47% Non-Caucasian and 53% Caucasian ethnicity. Of the 47 % identified as Non-Caucasian, 11% were Hispanic and 89% were Asian. With regard to gender, 68% of the new

hires were male and 32% were female. The College has worked very hard to diversify its faculty through the years. The challenge we have always faced is availability of diverse candidates along with availability of women in typically underrepresented areas such as engineering and physics. While those numbers are improving, it will take years to reach equity.

- College-wide there are disciplines where we have reached impressive diversity (ethnicity) hiring goals. Of the 10 departments and 3 center staffs reporting, we have 2 departments over 62% ethnic diversity. There are 2 departments reporting at 43% and 47% respectively, another 3 departments with percentages over 30%, 1 department close behind at 29%, and the remaining 2 departments under 10%. The centers and college support team have 2 diverse women, one Asian and one African American. Gender diversity within the total college count is 33% women and 67% men. Counting the support staff and Dean's support team increases the total college gender diversity significantly. Obviously, the challenge for hiring women on tenure track lines is, again, availability.
- Promotions within the College also reflected the diverse nature of CSET. Of the total faculty promoted this year, 44% were female and 56% male. With regard to ethnicity, 44% were Asian, 12% Hispanic, and the remaining 44% Caucasian.

B. Students

- The College of Science, Engineering and Technology has undeniably the widest global representation within the university, as is the case on any campus. The STEM disciplines typically attract students from across the globe and CSET is no exception. Moreover, over the past 5 years, we have seen a 12.3% increase in our international student population, a 43% increase in our students of color, and a 12% increase in first generation students within the college, while we have also seen a 50% increase in our female population in the engineering and engineering technology program and a 64% increase in our computer information science programs. Several support programs are administered by the college to provide targeted support for the underrepresented and international student populations.
- The Advising Center collaborated with the Women's Center, Minnesota State Engineering Center for Excellence and the Society of Women Engineers to host "The WISE Networking Event" for female STEM students. The event focused on helping students develop their networking skills and included a keynote speaker, panel, time to network with local industry professionals and free professional headshots. Approximately 40 students and 20 industry professionals and faculty participated in the event.
- North Star Stem Alliance (NSSA) is a partnership of 14 Minnesota colleges and universities and three community organizations committed to supporting underrepresented minority students in earning bachelor's degrees in science, engineering, technology and mathematics. Minnesota State University, Mankato was awarded \$24,439 during this current funding cycle which was used for student travel to conferences, stipends, community building and academic enrichment activities. A total of 32 students participated in the NSSA program during the academic year. Four students attended the Society of Hispanic Engineers (SHPE) conference in November 2017. Four students attended the National Society of Black Engineers (NSBE) national convention in Pittsburgh, PA in April 2018.

- In addition to extra-curricular clubs and activities, one important CSET-sponsored organization, the student chapter of the National Society of Black Engineers (NSBE), organized and coordinated several on-campus events and participated in events aimed at the CSET diversity initiatives in K-12 outreach. This organization is comprised of an enthusiastic group of black engineering students, along with their advisor, Dr. Winston Sealy. The group also traveled to the NSBE conference in Pittsburgh, PA in April 2018 funded in part by the college and the North Star STEM Alliance grant.

3. Quality of Graduates and Programs

- Placement into internships and acceptance rates to professional schools remain high with departments reporting that over 90% of students seeking either opportunity are finding success.
- The Engineering Departments (Mechanical and Civil, Electrical and Computer, and Integrated Engineering's Twin Cities Engineering and Iron Range Engineering) successfully hosted a site visit by the Accreditation Board of Engineering and Technology (ABET) in September. All programs performed well, and expect to receive a 6-year accreditation recommendation at the end of this process (final reports will be distributed after the ABET meeting in July 2018). ABET accreditation is critical to the success of the programs and student graduates.
- The Integrated Engineering Iron Range Engineering and Twin Cities Engineering programs received the 2017 *Award for Innovation* from ABET, the national accrediting body for engineering, for "educating their students in innovative ABET-accredited programs that feature trans-disciplinary thinking, industry-sponsored project-based learning, experiential learning in context, competency-based assessments and significant exposure to professionalism, design and creativity". Most recently, the program was recognized as one of the top five emerging world leaders in engineering education in a recently published Massachusetts Institute of Technology research study.
- The exam pass rates continue to be impressive for the Fundamentals of Engineering (FE) Exam. We continue to have pass rates that well exceed national averages. For Spring 2017 and Fall 2017, the pass rates (with national average in parentheses) were:
 - Mechanical 90% (National Average: 79%)
 - Civil 88% (National Average: 68%)
 - Electrical and Computer – 100% (National Average: 72%)
- All five Mechanical Engineering program alumni taking the Principles and Practice of Engineering (PE) exam passed, as did the Electrical Engineering alumnus that took the exam (compared to the national average of 73-83% depending on emphasis area). Among Civil Engineering alumni, 15 out of 20 passed their respective PE exam.
- All Chemistry Teaching and Physics Teaching majors who took the MTLE licensure exams passed.
- One of our Earth Science-Geology graduates successfully passed his Professional Geologist exam and is now a licensed Professional Geologist in Minnesota.

- Four students took the American Society for Biochemistry and Molecular Biology (ASBMB) Certification Exam and 75% passed (National Average: 55%) with one student (25%) receiving certification with distinction (National Average: 18%).
- All graduates from the Medical Laboratory Science Program and all graduates from the Cytotechnology program have passed the Board of Certification Professional Examination administered by the American Society for Clinical Pathology (ASCP).
- The Department of Mathematics and Statistics continues to have strong placements into Ph.D. programs for graduates of its Master's programs in both Mathematics and Statistics.
- CSET is proud of the breadth and depth of the student presentations at the Undergraduate Research Symposium held on campus April 10, 2018. CSET students presented their posters and/or oral presentations which represented a vast majority of the university participation. Students and their mentors represent the following departments and programs within the college; Biological Sciences, Chemistry, Construction Management, Electrical, Mechanical, & Automotive Engineering, Geology, Environmental Sciences, and Physics.
- Kellie Wong (senior, biochemistry BS major) was awarded induction into the American Society for Biochemistry and Molecular Biology (ASBMB) Honors Society Chi Omega Lambda. Kellie was one of 52 inductees into this society in the nation this year. Kellie travelled to the 2018 ASBMB Annual Meeting in San Diego and be recognized at the ASBMB Education Award lecture.
- Steve Druschel was honored with a Distinguished Engineer Award for “outstanding lifetime achievements in and service to the profession of engineering” by the Minnesota Federation of Engineering, Science and Technology Societies, he was also named the Outstanding Engineer of the Year by the Minnesota Section of ASCE and was made a Fellow of the American Society of Civil Engineers (ASCE).
- Dr. Robert Sleezer, Integrated Engineering Department, has been awarded Certificate of Merit of the Outstanding Advising Award – Faculty Academic Advising from the National Academic Advising Association (NACADA).
- The Computer Information Science programs underwent official program review this spring with a site visit and recommendations for program improvement. The department was noted for its strong programs, innovative student experiential learning opportunities and ability to stay current in the field.

4. Academic Award Programs and Curriculum Development

- The college is continually updating its curriculum on the program level to improve student outcomes and success and to provide for new opportunities for students while serving regional needs. Important changes to curriculum at the program level during the past year included:
 - Several departments agreed to eliminate their “Admission to Major” policy, thus eliminating a generally unnecessary hurdle for students.
 - Revision were made to 15 programs, mostly small modifications, clarifications and changes to required/elective courses.

- Revisions to several minors in mathematics, actuarial science, statistics and geology were performed and the middle school mathematics minor was suspended.
- New programs were developed in several areas and have either already been proposed or will become official proposals in the fall.
 - The PSM program in Health Informatics & Analytics, a BS in Health Informatics and a Certificate in Health Informatics were all approved. These programs provide new pathways in healthcare for students to pursue, as well as pair with the existing nursing and related degrees.
 - A task force made significant progress to explore the reinstatement of the Computer Science Program. Chief among their accomplishments was the design of a stream of courses that could serve as a common core for CS, IT, MIS and CE majors. We anticipate a full proposal shortly.
 - A new MS in Mechanical Engineering (MSME) degree was approved. This degree, along with last year's new MSEE degree replace the jointly shared MS in Engineering to better target workforce needs. This degree is unique in the Minnesota State System. An undergraduate certificate in HVACR Engineering Design was also developed.
 - A new MS in Data Science was approved, thus providing student access to this emerging interdisciplinary field.
 - A graduate certificate in Cyber Risk and Analysis was approved that scaffolds with the recently launched PSM in Information Security and Risk Management.
- Supplemental instruction was delivered in Chemistry 191 to during the fall semester, after (data) analysis determined that this course was a prime candidate for such efforts.
- Members of Iron Range Engineering (IRE), Twin Cities Engineering (TCE) and administration continued development with the Iron Range Resources and Rehabilitation Board (IRRRB), Itasca Community College and IRE support staff to explore a new model of co-ops and project-based engineering. A pilot cohort is currently being planned for a summer 2019 launch.

5. Academic Course Offerings (e.g., service courses, credit hour generation)

- Demand for CSET courses remains strong and, in many disciplines, continues to grow. While the university has seen a 5.4% decrease in student credit hour production over the past five years, CSET student credit hour generation has remained virtually unchanged.
- The College of Science, Engineering and Technology had 3,167 declared majors during Fall 2017, representing a 4% increase over the previous year and a 23% over the past five years. Program awards are up 11% over last year and 48% since 2013-14 (based on 2016-17 data as 2017-18 not yet complete).
- Service remains a strong component of CSET's contribution to the university. The college produced 26% of the University's General Education credits this past year and 32% of the credits from 200-level courses and below. In fact, 70% of CSET's courses are at the 200-level or below due to the large number of programs requiring our courses as foundations to their own.
- The college is continually updating its curriculum on the course level to improve student outcomes and success and to better serve a variety of programs at the university. In addition to updating of material, learning outcomes and syllabi throughout the college, official changes in the Curriculum Design System (CDS) included:
 - Withdrew 8 courses and modified 26 existing courses (mostly clean-up changes, such as the accuracy of frequency of offering).
 - Revised 14 program narratives, updated 14 major maps, and revised 6 academic policies.

- The Department of Biological Sciences modified existing courses to reflect a growing emphasis on agriculture, in particular with their Agroecology course.
- Integrated Engineering performed a significant redesign of its course designation system to better align with project-based learning outcomes.
- New courses in IT were developed for the two new master's programs and one undergraduate program.
- Construction Management has begun revising their curriculum that requires the creation of several courses (while others are eliminated or revised) in cost accounting and construction technologies.
- Mechanical Engineering revised several courses to align with their new HVAC certificate.
- Elsewhere in the college, courses were modified in Mathematics service courses, in Chemistry and in Construction Management.

6. Special Programs, Services and Activities (non-credit/non-award activities)

This year, the enrollment and engagement in the CSET department-sponsored student clubs and department outreach activity has continued to grow and thrive. These organizations offer experience that are beneficial to not only the students involved, but also those they engage with during their activities.

- A new event was hosted this year by the Society of Women Engineers in collaboration with the CSET Advising Center and the Minnesota State Engineering Center of Excellence that offered female STEM students at MSU the opportunity to develop their network skills. The event, Women in STEM Networking Dinner, included a keynote speaker, a panel, direction on and time to network with regional industry professionals.
- The second year of DREAM (Data Resources for Eager and Aspiring Minds) data science and analytical club more than doubled its membership this year and presently exceeds 200 students. Their activities continue to thrive and stir interest in students from any different disciplines across campus.
- CSET students through their departments and through their choice student clubs came together this year to offer the first CSET Involvement Fair. This event offered new students in CSET and across campus the chance to explore all of the amazing opportunities in CSET. This event not only created interest in the CSET disciplines, but the student organizations reported it was an optimal place for new member recruiting.
- The college continues to encourage students and student groups to experience their majors in regional and national competitions. Areas such as Engineering, Mathematics, and Construction Management remain competitive in these type of events., This year, our college was able to claim a new area of active competition in data analytics. Teams from the DREAM student organization took several first place wins at the Data Derby 2018 Datathon and also the Analytics Acumen Award at the MinneMUDAC 2017 competition.
- With respect to our college's outreach activities to elementary, middle school, and high school students, the educational community, the Mankato Community at large as well as the region, many of our departments are engaged in activities that are beneficial to all involved.
 - Our faculty continue to offer special children's events that strive to create interest in the STEM fields. Chemistry and Geology offered a special mineral ID "birthday party" and has presented on rocks and minerals at the Southern Minnesota Children's Museum. A biochemistry event for elementary and middle school aged students titled M³: Mystery

or Magic of Matter sought to spark interest in STEM-related topics at an early age. The Mechanical and Civil Engineering department also offered four “Elementary Engineering” workshops at a local elementary school and the Physics Department amazed a large group of young attendees with their real life demonstrations of physics at their annual Physics Show.

- Our faculty continue to offer special opportunities for educators to learn more about specific CSET areas through programs such as engineering “Teach the Teacher” and Computer Information Science’s Code.org program.
- Several of our departments also have found the collaborative opportunity to work with other well-known organizations including 4-H, the Girl Scouts and the Boy Scouts.
- The college’s Water Resource Center works with and collaborates with a myriad of clubs and organizations, too numerous to list, that span areas in education, the environmental, planning, and even government realms.

7. Allocation of Resources (Personnel & Non-Personnel)

The college was largely able to meet demand for the number of services and required major courses. We had a significantly lower-than-average number of sabbaticals this year, which allowed us some flexibility to meet this demand. As such, we ended the year well positioned on our personnel budgets. Due to several retirements and the savings generated, we would be able to make significant investment in increasing our support staff in terms of number of administrative assistants and lab technicians, as well as an increase in hours (e.g. part-time to full time). Historically, the college had less administrative assistant help than comparable units across campus, which we hope to remedy moving forward.

College equipment and laboratory needs were largely met, due in large part to the Minnesota State Leveraged Equipment program that allocates \$500K to the university for matched dollars from industry for equipment donations in targeted areas of workforce demand, of which CSET leveraged \$486,598 in Automotive, Mechanical Engineering, Manufacturing, Electrical/Computer Engineering and Construction/Surveying/Civil Engineering. Other areas of the college benefited from \$165,600 in institutional equipment, college core equipment funding and \$38,191 in University R&R funding. Due to our strong year in grants/contracts and generated indirects, we also were able to invest heavily in faculty and student development opportunities.

8. Key Partnerships and Collaborations

A. In the University:

- Collaboration between Chemistry, Mechanical Engineering and Manufacturing Engineering Technology resulted in a paper, “Engineering Standards for Elementary Teachers: Learning about Engineering and How to Engage Students in Engineering,” being presented at the ASEE North Midwest conference.
- In response to President Davenport’s request to become a more agriculture-oriented campus, Chemistry, Geology, and Biology worked together to design a Soil Science cross-disciplinary course that will be offered Fall 2018.

- The Bureau 507 students have collaborated with different MSU departments and developed online orientation web-solution. This program (OOP) is assisting the following department is providing necessary information for students prior to arriving in Mankato.
 - Kearny International Student Services
 - New Student and Family Program
 - College of Graduate Studies
 - College of Nursing
 - Study Away Program
 - Computer Information Science Department
- Bureau 507 students are also collaborating with other units on campus to develop videos representing MSU, MSU international programs and Centennial Student Union's 150th year celebration.
- The departments of Computer Information Science, Integrated Engineering and Electrical and Computer Engineering Technology have come together to work on a key partnering activity identified as the Computer Science Task Force which is developing a new project based Computer Science major.
- Faculty in the Mathematics and Statistics Department, has been collaborating with faculty in the Mechanical and Civil Engineering Department, on an Xcel Energy Renewable Development project.
- Faculty in the Biology Department have been collaborating with faculty in the RPLS (Recreation/Parks/Leisure) on a grant for prairie restoration assessment.
- The successful proposal of the Heath Informatics programs (PSM, BS and certificate) were a direct result of a strong collaboration between Computer Information Science and Nursing faculty and staff.

B. With Other Institutions

- The Automotive and Manufacturing Engineering Technology (AMET) Department has been developing a partnership with Universidad APEC in the Dominican Republic. This includes collaboration among the faculty of both institutions to develop faculty led study abroad programs emphasizing engineering projects between MSU, Mankato and UNAPEC; this was realized in May of 2018.
- One faculty member in the Biology Department has developed partnerships with faculty at the University of Minnesota including research and projects involving the Morton Arboretum, and two projects with the Minnesota Bell Museum.
- A member of the Chemistry Department continues her collaboration with the Dr. David Thomas Laboratory at the University of Minnesota, Twin Cities and she and her graduate student presented a their research at the American Society of Biochemistry and Molecular Biology (ASBMB) Annual Meeting in San Diego in April 2018.
- Faculty in the Computer Information Science Department have been active in initiating several new areas beneficial to not only MSU, Mankato, but also other institutions in our region, state, and nationally.
 - One of their faculty is serving on the "Data Science at Non-R1" committee of the Midwest Big Data Hub (funded by the NSF). One of the goals for the committee

is to seek NSF funding to support data science curricular and research projects at non-R1 institutions.

- This faculty member is also serving as the faculty lead for the graduate data science curriculum development project, a collaborative system-wide project is managed by the Minnesota IT Center of Excellence and is funded through the Minnesota State System.
- Another faculty involved with the mentorship of Bureau 507 has been guiding the students through several projects with that include collaboration between MSU, Mankato and Riverland Community College, MSU, Mankato and Minnesota West Community College, and MSU, Mankato and Winona State University.
- The chair of the Computer Information Science Department also serves on many committees that collaborate internationally.
- Construction Management partners with other Construction Management programs in the state through a group sponsored by the Construction Management Association of Minnesota. The faculty of Construction Management have also been active in serving as members of Visiting Teams for ACCE Accreditation at other institutions.
- One of the faculty in the Department of Mathematics and Statistics serves as president of the North Central Section (NCS) of the Mathematics Association of America (MAA) and is involved in several collaborative partnerships including
 - The MAA NCS NExT Program which includes faculty members from South Dakota State University, Macalester College, Winona State University and Augsburg University.
 - MAA PIC Math Program which includes faculty members from Brigham Young University, Youngstown State University, Lee University and Worcester Polytechnic Institute.
 - Hosting the MAA NCS Annual Spring Meetings here at MSU, Mankato.
- Several faculty in the Department of Mathematics and Statistics have research and organizational partnerships with international institutions and organizations, including Daegu University, South Korea, Fudan University, China, and the University of Peradeniya Sri Lanka.
- The Integrated Engineering Iron Range faculty work to support the lower division curriculum at Mesabi Range College in conjunction with Itasca Community College which helps create a path to the four-year degree in addition to introducing project-based learning to students in their first semester of engineering. The Iron Range Engineering students conduct workshops for lower-level Iron Range Engineering students with provides both motivational experiences as well as communication experiences for the students at both ends of the spectrum.
- The Integrated Engineering Twin Cities Engineering faculty continue to work with Normandale Community College and Hennepin Technical College to develop and utilize fabrication and technology space. Twin Cities Engineering also works to develop and strengthen relationships with other metro-area community Colleges.

- Integrated Engineering faculty also have research relationships with the University of Minnesota, Twin Cities, University of California, Riverside, Carnegie Mellon University, Ohio State University, Clemson University, and University of Texas, Dallas.
- C. With the Greater Public/Community (e.g., K-12, non-profits, government agencies, business/industry):
- The Automotive and Manufacturing Engineering Technology (AMET) faculty and the Formula SAE Team Participated in the SAE Learn Twice Initiative. Through their “A World in Motion (AWIM)” educational program, SAE provided all of the kits and supplies for the activity. They worked with District 77 schools over a two week period on an engineering project. The kits were powered by a PEM Fuel Cell to produce the power for the vehicle. Working in teams, the students were to design, build, and test prototype vehicles which they must then present to an audience.
 - Biology continues its partnerships with NAAVLS accredited affiliated institutions including Hennepin Healthcare, Mpls. MN, St. Luke’s Hospital, Cedar Rapids IA, St. Luke’s College, Sioux City IA, Mercy College of Health Science, Des Moines IA, Mercy Medical Center, Sioux City IA, Sanford USD Medical Center, Sioux Falls SD, University of Minnesota, Mpls. MN, New York Methodist Hospital, Brooklyn NY, and the Mayo Clinic School of Health Sciences, Rochester MN.
 - A faculty member in the Biology Department is working with regional and state-wide MN DNR staff on prairie restoration and management assessments and has a partnership with The Prairie Enthusiasts (private land owners working on prairie restoration and management).
 - A faculty member in the Chemistry and Geology Department obtained funding from Polymet Inc., Hoyt Lakes MN, to continue his study of an ore zone in their Northmet Copper-Nickel-Platinum Group Element deposit. Collaborating with their Chief Geologist, a sample drill core of the so-called Magenta Zone within the deposit was taken to obtain data. The faculty member, along with an MSU, Mankato undergraduate carrying out petrographic, geochemical, and scanning electron microscope analysis of the ores.
 - A faculty member in the Computer Information Science (CIS) Department has been working with elementary school teachers to teach coding in their classrooms. Funding for this project was provided by Thomson Reuters and Project Maverick and each of the participating teachers received a \$500 stipend once they completed 3 conditions: 1) attend a tour of the Taylor Corporation’s innovative center, 2) dedicate time throughout the 17-18 academic year to teach coding in their classrooms; and 3) allow students from the CIS Department’s DREAM student group to spend an afternoon with the students in their classrooms and assist the elementary students with their coding.
 - The faculty of the Construction Management (CM) Department partnered in several different areas:
 - The department had their Construction Management Student Association participate with Mankato East High School in a mentorship role.

- A CM faculty member worked with ACE Mentoring, a group sponsored by Associate General Contractors. Her site was at St. Louis Park High School and she will be working to bring this program to Mankato.
- The same CM faculty member brought diversity and inclusion training into some of our CM courses and plans are to continue providing this experience to future students in their program.
- The department encouraged their students to volunteer their time to Habitat for Humanity.
- The chair of the CM Department collaborated with Nelson Mandela University and Ft. Hare University in South Africa on Human Settlement issues, as well as fostering an ongoing relationship with HAN University in the Netherlands. He also worked on developing new relationships with Windseheim University in the Netherlands and also Karlsruhe University in Germany.
- The faculty of the Mathematics and Statistics Department have had a number of opportunities to collaborate with the greater public including:
 - A faculty member served as a judge for the MinneMUDAC Competition, hosted by Optum, a data analytics company, organized by inneAnalytics partnered with Midwest Undergraduate Data Analytics Competition (MUDAC) and Social Data Science.
 - A faculty member served as an advisor for the Sri Lankan Students Association at MSU, Mankato.
 - A faculty member served as an advisor for the Math Club student participation in the Mathematical Association North Central Section's Math Competition.
 - A faculty member partnered on the MnModel Phase 4 Project with MnDOT and with the Mayo Health System on Colon Cancer research.
 - A faculty member chaired the presentation on image processing and ill-posed problems at the 2018 Joint Meetings of the Mathematical Association of American and the American Mathematical Society.
- The Water Resource Center at MSU, Mankato has over 10 different projects that include more than 25 different partners focusing on research and testing projects involving area rivers, watersheds, and pollution issues. Some of the partners include the Pollution Control Agency, Minnesota DNR, Greater Blue Earth River Basin Alliance, Martin County SWCD, Le Sueur River Watershed Network Citizen Group, Southwest Prairie Technical Services, Legislative-Citizen Commission on Minnesota Resources, and faculty from several other institutions including Utah State, Iowa State, University of Minnesota, and students and faculty at MSU, Mankato.
- The Engineering Center of Excellence also had a diverse opportunities to affect the greater public this year. Their activities spanned groups of K-12 students, K-12 teachers, 2 and 4 year postsecondary faculty and industry. These included offering Engineering Teacher Workshops for instructors of 4 year and 2 year institutions in Minnesota, worked with the area and regional science fair events, offered Engineering Interest and Exposure events for students. The Engineering Center of Excellence networked with a variety of partners, including Minnesota Workforce, the Southern Minnesota Science Museum, Minnesota Precision Manufacturing Association, the Minnesota High Tech

Association, the Central Minnesota Manufacturing, Minnesota Department of Labor and Industry, SkillsUSA Safety Training, and the Minnesota Council for Continuing Education and Customized Training, just to name a few.

9. Development and Identification of New Resources

A. Grants

- For the period of July 1, 2017 through April 30, 2018, the college has been awarded approximately \$3.9 million dollars (with two months remaining in the fiscal year) in funding from various federal, state and private contracts and grants representing about 42% of the university total. During fiscal 2018 to date, over \$4.3 million dollars of grant proposals were submitted representing 56% of the university total, with many of the outcome or decisions still unknown, representing approximately \$1.8 million dollars still pending decisions.
- The Water Resources Center continues to be active in securing grants and contracts where they have active projects with the Minnesota Pollution Control Agency, the Minnesota Department of Natural Resources, and the Board of Water and Soil Resources. The Water Resources Center generated \$701,415 in FY 2018 with new grants and remaining grants/contracts from FY 17. Of that amount, \$298,256 came from new contracts, and \$401,159 was carryover contracts, grants, and amendments. The center estimates that the potential upcoming grants and new opportunities could offer the possibility of exceeding \$1M.
- Faculty in the college received block grants from the Xcel Energy Renewable Development Fund of nearly \$1.5M in addition to last year's grants totaling around \$1M. The grants to Mechanical Engineering/Mathematics (PI: Dr. Patrick Tebbe), Integrated Engineering (PI: Dr. Jacob Swanson) and Electrical and Computer Engineering (PI: Dr. Vincent Winstead and PI: Jianwu Zeng), respectively.
- Faculty in the Department of Biological Sciences received two grants from the National Science Foundation (NSF), both with PI Dr. David Sharlin. The \$1M NSF S-STEM grant will fund the RISEbio program that introduces first year students to authentic research lab experiences while providing scholarships to students in the biological sciences. The \$575K NSF Major Research Instrumentation (MRI) grant provided the university with a confocal microscope that greatly increases our imaging capabilities that will allow faculty and students to perform to cutting-edge discoveries such as protein co-localization studies, live cell imaging, and 3D visualization.

B. Giving

- To date (05/14/2018) total giving to the College of Science, Engineering and Technology is currently at over \$3.7M for the year. This includes \$338,917 Cash Equivalent, \$1,205,000 in Future Planned Gifts and \$2,159,539 of Gifts-in-Kind. Our development officer enthusiastically continues to identify promising prospects for planned gifts and develop such opportunities to fruition.
- Equipment/supplies/cash donations eligible for the Minnesota State Leveraged Equipment Program that sends matching funds to high need areas for the State of Minnesota enabled the purchase of \$486,450 of equipment to the respective areas to further support the development

of their labs and enhance student experiences with state-of-the-art equipment. The Departments of Electrical and Computer Engineering and Technology, Mechanical and Civil Engineering, Construction Management, and Automotive and Manufacturing Engineering and Technology will be able to utilize this funding on upgrades that include virtual welders, high performance computers and multiprobe sensors, emission testing systems, robotic surveying stations, circuit trainer boards and upgrades to our power systems lab.

C. Customized Training and Continuing Education

-
- The Minnesota State Engineering Center of Excellence also hosted in partnership with the College of Science Engineering, MSU, Mankato, St. Cloud State University, the University of Minnesota Duluth and The Citadel, a 2-day Engineering Teacher Workshop at St. Cloud State University in May 2018. The Center for Excellence organized and facilitated this workshop which offered instructors in the Minnesota State System and the University of Minnesota System an opportunity to develop pedagogical foundations for teaching engineering and technology related techniques. Key speakers included Dr. Ronald W. Welch, Dean of the Citadel School of Engineering and Louis S. Le Tellier Chair, Dr. David Saftner, Department Head and Associate Professor of Civil Engineering at U of M, Duluth, and CSET's Associate Dean Dr. Aaron Budge.
- The Computer Information Science Department has agreed to enter in to a new contractual relationship with Easy Automation in an effort to provide students with real world technology opportunities. This relationship joins the current Bureau 507, Project Maverick and Distinction by Apogee projects at Mankato.

10. Challenges

- We are now at 3,167 declared majors in the college last fall, representing a 4% increase over last year and a 23% over the past five years. Our program awards are up 11% over last year and 48% since 2013-14 (based on 2016-17 data as 2017-18 not yet complete).
- The Graduate Assistantship stipend is simply becoming more and more of an issue in the College of Science, Engineering and Technology. Competitive students are receiving offers for thousands of dollars above the University's TA/GA \$9,000 and this has resulted in a noticeable reduction of highly qualified graduate students who can handle the teaching assistantship responsibilities in the areas of physics, mathematics and biological sciences, where they are essential to teach lab sections in the high demand service courses.
- Departments supporting service courses, particularly Biology, Chemistry and Geology, Mathematics and Statistics, and Physics and Astronomy are struggling to accommodate enrollment increases. In many areas, our faculty to student ratio is the highest on campus and is causing tension. We are hopeful that the Biology Health Science Curriculum area identified as a "candidate for investment" may help in this area. This is one area where the graduate assistants can be a tremendous help, but as those numbers are falling in some critical areas, so is the support they provide to large sections with multiple laboratories/recitation sections. The increased demand for Stat 154, in particular, leads to a need for more statistics TA positions to instruct those courses.
- The Department of Computer Information Science is struggling to accommodate its increasing number of majors, leading to heavy investment in overloads and industry adjuncts to continue

students towards graduation. That department, along with several engineering and engineering technology departments, are prime for attracting new students to campus in areas of high industry demand, though staffing levels are not able to do so. Support for manufacturing, agriculture, computer engineering and controls/sensors, data science and cybersecurity is needed to achieve university goals in supporting regional needs. Nationally, there has been 63% growth in undergraduate engineering enrollment from 2006 to 2015 (and only a 14.7% increase in tenured/tenure-track lines). A significant challenge for MSU Mankato is to respond to and capitalize on this demand. Similarly, we face the challenge of diversifying our faculty and students for these high demand disciplines.

11. Other

- Four CSET faculty members received Faculty Research Grants (FRG), totaling \$19,621 towards projects involving students, industry and seeding grant applications. Four CSET faculty were awarded a 2016-2018 Presidential Teacher Scholar Fellowship, representing 3 of the 5 funded university-wide awards. These projects develop concept modules, instructional technology and capstone experiences in chemistry, geotechnical engineering and mathematics, respectively. Also five Faculty Improvement Grants (FIG) were awarded to support professional development opportunities.
- Using a Request for Proposal (RFP) process, the college awarded ten faculty members reassigned time for the upcoming AY17-18, while seven faculty members completed their projects awarded for AY16-17. These reassignments are for grant writing and research endeavors and require the awardee to produce measurable outcomes to be disseminated to the college and greater academic community. The funding for this project comes from the college portion of summer surplus supplemented with some additional funding coming from individual departments.
- Through an application process, faculty member Chris Veltsos was awarded a Flies Fellowships to work with industry to increase knowledge exchange. He will be with IBM Security experts on how organizations practice incident response capabilities.
- Civil Engineering undertook a marketing and recruitment campaign as a pilot for a similar effort planned in 2018-19 across all engineering. The high enrollment in CIVE 101 is an encouraging sign such efforts have high return on investment.
- Each year the college recognizes several categories of excellence by faculty and staff. During the 2016-2017 academic year, the following awards were made: for Excellence in Teaching, Dr. Muhammad Khaliq; for Excellence in Advising, Dr. Guarionex Salivia; for Excellence in Service, Dr. Steven Kipp; for Excellence in Research, Dr. Vincent Winstead; and for Excellence in Staff Support, Ms. Margaret Durkee.

Master List of Research, Scholarship and Creative Achievement

PUBLISHED ARTICLES

Automotive and Manufacturing Engineering Technology

Agarwal, K., Kuchipudi, S., Girard, B., Houser, M., Mechanical properties of fiber reinforced polymer (FRP) composites: A comparative study of conventional and additive manufacturing method. Journal of Composite Materials, Inprint.

Ruprecht, J., **Agarwal, K.**, (March 26-29, 2018) Composite additive manufacturing for lightweight components, Aerodef, Long Beach, CA. **(SME Travel Grant Winner)**

Pahalawaththage K.P., **Agarwal, K.**, (June 17-20, 2018) Binder jetting additive manufacturing for the development of novel bioceramic bone implant materials. POWDERMET2018 & AMPM2018 conferences, San Antonio, TX. **(NSF Travel Award Winner)**

Agarwal, K., Houser, M., Vangapally, S., Vulli, A. (August 7-9, 2017) Process – Property relationships in additive manufacturing of nylon-fiberglass composites using taguchi design of experiments, Proceedings of Solid Freeform Fabrication Symposium, Austin, TX.

Agarwal, K., Vangapally, S., Sheldon, A., “Binder Jet Additive Manufacturing of Stainless Steel - Tricalcium Phosphate biocomposite for bone scaffold applications”, Proceedings of Solid Freeform Fabrication Symposium, August 7-9, 2017, Austin, TX

Ahmed, S., (October 9-13, 2017). Theory of sustained optimal challenge in teaching and learning.. Proceedings of the 2017 International Annual meeting of Human Factors and Ergonomics Society, Austin, TX, US..

Hee Jin, S. & **Ahmed, S.** (March 26-29, 2018) Anthropometric evaluation of the formula SAE car: A pilot study. 21th Annual Applied Ergonomics Conference, Atlanta, Georgia,.

Antolak, J. Paulson, P, & **Ahmed, S.** (March 26-29, 2018) Ski/Snowboard tech shop ergonomics. 21th Annual Applied Ergonomics Conference, Atlanta, Georgia.

Ryan, M., Caffin, B., Goettl, C., & **Ahmed, S.** (March 26-29, 2018) Ergonomics vs traditional squat bar: A pilot study. 21th Annual Applied Ergonomics Conference, Atlanta, Georgia,.

Jones, J., Goss, T., **Agarwal, K.** (April 5-8, 2018) Effects of fiber percentage and orientation on fixtures manufactured by nylon-carbon fiber 3D printing. National Conference on Undergraduate Research, Edmonton, OK,

Ruprecht, J., **Agarwal, K.**, (April 5-8, 2018) Scaffold manufacturing by 3D printing: Cobalt chrome - Hydroxyapatite Biocomposite. National Conference on Undergraduate Research, Edmonton, OK,

Agarwal, K., (2018) Manufacturing of fiber optic machine via additive manufacturing. Cost and performance evaluation, Report to Condux International, Mankato, MN.

Agarwal, K., (2017) Analysis of additive manufacturing for mold making. Report to Jones Metal Products, Mankato, MN.

Agarwal, K., Lean and 6 six sigma in a low volume job shop. Report to Jones Metal Products, Mankato, MN.

Biological Sciences

Ruhland CT and MF Eatwell. (2017) The effects of ultraviolet radiation on the brown midrib mutation of corn and sorghum. *Theoretical and Experimental Plant Physiology* 29: 87-94.

Cavender-Bares, J, S Kothari, JE Meireles, **MA Kaproth**, PS Manos, AL Hipp, *In press*. The role of diversification in community assembly of the oaks (*Quercus* L.) across the continental U.S. *American J. of Botany*

Hipp, A, PS Manos, A González-Rodríguez, M Hahn, **MA Kaproth**, JD McVay, S Valencia Avalos and J Cavender-Bares, 2018. Sympatric parallel diversification of major oak clades in the Americas and the origins of Mexican species diversity. *New Phytologist* 217:439-452 [10.1111/nph.14773](https://doi.org/10.1111/nph.14773)

Sharlin, D. S., L. Ng, F. Verrey, T. J. Visser, Y. Liu, R. T. Olszewski, M. Hoa, H. Heuer and D. Forrest (2018). "Deafness and loss of cochlear hair cells in the absence of thyroid hormone transporters Slc16a2 (Mct8) and Slc16a10 (Mct10)." *Sci Rep* 8(1): 4403.

Chemistry and Geology

Bissonnette DJ, Knoblich P, *List S, **Hadley M.** (2017). The impact of artificial Sweeteners on caloric intake and weight gain in rats. *Obesity (Silver Springs)*; 25 (9): 1556-1563, **DOI:10.1002/oby.21920**

Yang D, **Krois CR**, Huang P, Wang J, Min J, Yoo HS, Deng Y, Napoli JL. (2017). Raldh1 promotes adiposity during adolescence independently of retinal signaling. *PLoS One*. 12(11): e0187669.

Vorlicek TP, Helz G, Chappaz A, *Vue P, *Vezina A, and *Hunter W. "Molybdenum burial mechanism in sulfidic sediments: Iron-Sulfide pathway" *ACS Earth and Space Chemistry*. Articles ASAP (As Soon As Publishable) **Publication Date (Web):**March 20, 2018(Article)
DOI:10.1021/acsearthspacechem.8b00016.

Losh S, *Rague R. 2018, Hydrothermal oxidation in the Biwabik Iron Formation, Minnesota USA: Mineralium Deposita, doi 10.1007/s00126-017-0783-z

Computer Information Science

He, N., Bukralia R., and Huang H.W. (2017). Teaching Wireless Networking Technologies in the Internet-of-Things Using ARM based Microcontrollers. *Frontiers in Education Conference (FIE), 2017 IEEE*, Indianapolis.

*David Allen, *Jose La Luz, **Guarionex Salivia** and **Jonathan Hardwick** A simplicial pseudo-random number generator, *Journal of Information Assurance and Security*, Volume 12, Issue 4, 2017.

(Veltsos - authored articles for IBM's ITBizAdvisor.com blog (most recent at the top):

C. Veltsos. Main Takeaways for CIOs from the Global C-Suite Study - IT Biz Advisor
<http://itbizadvisor.com/2017/08/main-takeaways-for-cios-from-the-global-c-suite-study/>

C. Veltsos. CISOs Moving up in the Corporate Ladder? CIOs Shouldn't Be Worried - IT Biz Advisor
<https://itbizadvisor.com/2017/08/cisos-moving-up-in-the-corporate-ladder-cios-shouldnt-be-worried/>

C. Veltsos. Cyber Lessons from the 2017 Harvey Nash / KMPG CIO Survey Report - IT Biz Advisor
<http://itbizadvisor.com/2017/07/cyber-lessons-from-the-2017-harvey-nash-kmpg-cio-survey-report/>

C. Veltsos. What every CIO Needs to Know About Cyber Resilience - IT Biz Advisor
<http://itbizadvisor.com/2017/06/what-every-cio-needs-to-know-about-cyber-resilience/>

(Veltsos – co-authored articles)

P. Ferrillo, C. Brooks, K. Holley, G. Platsis, G. Thomas, S. Tuma, **C. Veltsos.** A national cybersecurity action plan is a serious priority | SecurityInfoWatch.com. Posted on Oct 23, 2017 at
<http://www.securityinfowatch.com/article/12375800/a-national-cybersecurity-action-plan-is-a-serious-priority>

P. Ferrillo, C. Brooks, K. Holley, G. Platsis, G. Thomas, S. Tuma, **C. Veltsos.** Here's How to Make Patching Security Holes Easier For Everyone | Nextgov.com. Posted on Oct 13, 2017 at
<http://www.nextgov.com/technology-news/tech-insider/2017/10/heres-how-make-patching-security-holes-easier-everyone/141767/>

P. Ferrillo, C. Brooks, K. Holley, G. Platsis, G. Thomas, S. Tuma, **C. Veltsos.** Cybersecurity: A fiduciary duty | Ethical Boardroom. Posted on Oct 11, 2017 <https://ethicalboardroom.com/cybersecurity-a-fiduciary-duty/>

P. Ferrillo, C. Brooks, K. Holley, G. Platsis, G. Thomas, S. Tuma, **C. Veltsos.** 3 keys to responding intelligently, publicly to a cyberattack | Fifth Domain. Posted on September 19, 2017 at
<http://www.fifthdomain.com/opinion/2017/09/19/3-keys-to-responding-intelligently-publicly-to-a-cyberattack-commentary/>

P. Ferrillo, C. Brooks, K. Holley, G. Platsis, G. Thomas, S. Tuma, **C. Veltsos.** Five Lessons on Cybersecurity Survival — Brink | The Edge of Risk. Posted on September 19, 2017 at
<http://www.brinknews.com/five-lessons-on-cybersecurity-survival/>

P. Ferrillo, C. Brooks, K. Holley, G. Platsis, G. Thomas, S. Tuma, **C. Veltsos.** Cyber Hygiene and Government–Industry Cooperation for Better Cybersecurity | Brink – The Edge of Risk. Posted on July 11, 2017 at <http://www.brinknews.com/cyber-hygiene-and-government-industry-cooperation-for-better-cybersecurity/>

P. Ferrillo, C. Brooks, K. Holley, G. Platsis, G. Thomas, S. Tuma, **C. Veltsos.** Independence Day from Hacking | Levick – Public Relations & Strategic Communication. Posted on June 27, 2017 at
<http://levick.com/blog/public-affairs/independence-day-hacking/>

P. Ferrillo, C. Brooks, K. Holley, G. Platsis, G. Thomas, S. Tuma, **C. Veltsos**. Ransomware Spreading Like Crazy Worms | Levick – Public Relations & Strategic Communication. Posted on May 15, 2017 at <http://levick.com/blog/public-affairs/ransomware-spreading-like-crazy-worms-just-makes-wannacry/>

P. Ferrillo, C. Brooks, K. Holley, G. Platsis, G. Thomas, S. Tuma, **C. Veltsos**. Fixing the Federal IT Mess Before it is Too Late | Levick – Public Relations & Strategic Communication. Posted on May 8, 2017 at <http://levick.com/blog/crisis/fixing-federal-mess-late/>

Construction Management

M. Diab, A. Varma, and K. Panthi (August 2017) Modeling the construction risk ratings to estimate the contingency in highway projects. ASCE Journal of Construction Engineering and Management, vol. 143, Issue 8.

Electrical and Computer Engineering and Technology

J. Zeng, T. Kim, and **V. Winstead**, Decoupling control for single-phase photovoltaic inverter with film capacitor, in Proc. IEEE Energy Conversion Congress & Exposition 2017. Cincinnati, OH, Oct., 2017, pp. 468-474.

J. Zeng, T. Kim, and **V. Winstead**, A soft-switched four-port DC-DC converter for renewable energy integration,” in Proc. IEEE Energy Conversion Congress & Exposition 2018, Portland, OR, Sept. 2018 (to appear).

J. Zeng, J. Zhao, and T. Kim, Modeling and control for a photovoltaic inverter with power decoupling on the AC side, in Proc. IEEE Energy Conversion Congress & Exposition 2018, Portland, OR, Sept. 2018 (to appear).

T. Kim, **J. Zeng**, X. Zhang, and S. Park, A novel phase-locked loop-enabled power estimator for single-phase power electronic converters, International Conference on Circuits, Devices and Systems (submitted)

Zhewei Gu, **Xuanhui Wu** and **Qun Zhang**, Substrate integrated e-plane waveguide (SIEW) Horn Antenna and Antenna Array, accepted by IEEE Transactions on Antennas and Propagation.

Xuanhui Wu, Danyang Huang and **Qun Zhang**, Planar substrate integrated e-plane waveguide (SIEW) Circuits That Exploits Horizontal Polarization, submitted to Journal of Applied Physics.

N. He, **R. Bukralia** and **H. w. Huang**, Teaching wireless networking technologies in the internet-of-things using ARM based microcontrollers, 2017 IEEE Frontiers in Education Conference (FIE), Indianapolis, IN, 2017.

Q. Zhang, J. Zhou, and J. Hong, Block-Wise Time Domain Large Signal Model of Carrier-Depletion Mach-Zehnder Silicon Photonic Modulators, in Optical Fiber Communication Conference, OSA Technical Digest (online) (Optical Society of America, 2018), paper Th2A.21.

G. Zhao, L. Xing, **Q. Zhang**, and X. Jia, A hierarchical combinatorial reliability model for smart home systems, Wiley: Quality and Reliability Engineering International, Nov. 2017, Online ISSN: 1099-1638.

B. Ahn and **V. Winstead** (2018), Small Signal Model Averaging of Bi-Directional Converter”, IEEE International Conference on Electro/Information Technology, Rochester, MI.

V. Winstead and S. Yang (2018), Power line communication input impedance adjustment via network load measurements, IEEE International Conference on Electro/Information Technology, Rochester, MI.

V. Winstead and C. Xu (2018), Low energy bluetooth inter-node communication schemes via randomized reconfiguration, IEEE International Conference on Electro/Information Technology, Rochester, MI.

Integrated Engineering

G. Bourdo, R. Al Faouri, **R. Slezzer**, Z. Nima, A. Lafont, B. Chhetri, M. Benamara, B. Martin, G. Salamo, A. Biris, Physicochemical characteristics of pristine and functionalized graphene, Journal of Applied Toxicology, doi: 10.1002/jat.3494 (2017).

R. Al Faouri, R. Henry, A. Biris, **R. Slezzer**, and G. Salamo, Adhesive Force between Graphene Nanoscale Flakes and Living Biological Cells, Journal of Applied Toxicology, doi:10.1002/jat.3478 (2017).

Jiang, Y.; Yang, J.; Gagné, S.; Chan, T.; Thomson, K.; Fofie, E.; Cary, R.; Rutherford, D.; Comer, B.; **Swanson, J.**; et al. (2018). Sources of variance in BC mass measurements from a small marine engine: Influence of the instruments, fuels and loads, Atmospheric Environment, 182, 128-137.

Duffy, C.M.; **Swanson, J.**; Northrop, W.; Nixon, J.P.; Butterick, T.A. (2018) Microglial Immune Response to Low Concentrations of Combustion-Generated Nanoparticles: An In Vitro Model of Brain Health. Nanomaterials, 8, 155.

Xue, J., Johnson, K., Durbin, T., Russell, R., Pham, L., Miller, W., **Swanson, J.**, Kittelson, D., Jung, H. (2018) Very low particle matter mass measurements from light-duty vehicles, Journal of Aerosol Science, 117, 1-10.

Li, C., **Swanson, J.**, Pham, L., Hu, S., Hu, S., Jung, H.J. (2018). On-road particle and gaseous emissions from a PFI and GDI hybrid electric vehicle under the cold weather condition. Under review.

Jiang, Y.; Yang, J.; Gagné, S.; Chan, T.; Thomson, K.; Fofie, E.; Cary, R.; Rutherford, D.; Comer, B.; **Swanson, J.**; et al. (2018). Black carbon measurements from a marine engine with various fuels: Impacts of catalytic stripper on black carbon measurement instruments. Under review

Kent Johnson, Liem Pham, Jiacheng Yang, Thomas D. Durbin, George Karavalakis, Wayne Miller, **Jacob Swanson**, David Kittelson, Heejung Jung. (2018). Very low PM mass measurements: The CRC E-99-2 program. Accepted, Int. J. Fuels Lubr.

Satish, S., **Swanson, J.J.**, Pui, D.Y.H., Kittelson, D.B. (2017). Gravimetric measurements of filtering facepiece respirators challenged with Diesel exhaust. Ann Work Expo Health. 61(6), 737-747

Peer Reviewed Conference Papers

Bart Johnson, **Ron Ulseth**, New Engineering education model design based research implementation, PAEE/ALE 2018 conference.

Aida Guerra, **Ron Ulseth**, Bart Johnson, Anette Kolmos, Engineering grand challenges and the attributes of the global engineer: a literature review, Sefi 2017 conference.

R. Sleezer, E. Leung, R. Bates, On teaching signals & systems in a project-based learning environment, Proc. International Conference on Acoustics, Speech, and Signal Processing, 2018.

J. Karlin, R. Bates, C. Allendoerfer, D. Ewert, **R. Ulseth**, Building your team of change champions, Frontiers in Education, October 2017, Indianapolis, IN.

R. Sleezer, T. Edgeworth*, S. Eickhoff, **J. Swanson**, and **R. Bates**, A case study for assessing program educational objectives, 2017 ASEE North Midwest Section Annual Conference, St. Paul, Minnesota, 28-29 September 2017.

K. Swenson* and **R. Sleezer**, Increasing inclusivity to increase diversity, 2017 ASEE North Midwest Section Annual Conference, St. Paul, Minnesota, 28-29 September 2017.

L. Chan*, **R. Sleezer, J. Swanson**, M. Ahrens, **R. Bates**, Difficulty in predicting performance in a project-based learning program, 2017 ASEE Annual Conference & Exposition, New Orleans, Louisiana, US, 25-28 June, 2017.

C. Schimpf, **R. Sleezer**, et. al., WIP: Visualizing design team analytics for representing and understanding design teams' process, 2018 ASEE Annual Conference & Exposition, Salt Lake City, Utah, US, 24-27 June, 2018.

R. Bates, E. Jones, A. Arnold, Career arcs that blend industry, government and military service with faculty experiences to increase diversity in the engineering professoriate, Proc. 2017 American Society for Engineering Education Annual Conference.

S.W. Choi*, (**R. Bates** mentor), Improving speech recognition for interviews with both clean and telephone speech, Journal of Undergraduate Research at Minnesota State University, Mankato, Vol. 17, August 2017. Also published in the Proceedings of the National Conference on Undergraduate Research, Memphis, TN, 2017.

M. Ganzer* and T. Pham*, (**R. Sleezer** mentor), "Design and Validation of a Low Cost High Speed Atomic Force Microscope," Journal of Undergraduate Research at Minnesota State University, Mankato: Vol. 17, Article 7, August 2017.

Mathematics and Statistics

Dr. Mezbahur Rahman, Dr. Han Wu, Sabiha Mahzabeen,* Tests for exponentiality: A comparative study. (with Mezbahur Rahman) (2017). American Journal of Applied Mathematics and Statistics, 2017, Vol.5, No.4, 125-135.

Dr. Mezbahur Rahman, Dr. Han Wu, Sabiha Mahzabeen* - A note on testing for the parameters in gamma distribution. (with Mezbahur Rahman and Sabiha Mahzabeen) (2017). Far East Journal of Theoretical Statistics, Vol.53, No.5, 251-258.

Dr. Mezbahur Rahman, Dr. Han Wu, Sabiha Mahzabeen* - Testing the shape parameter in gamma distribution. (with Mezbahur Rahman and Sabiha Mahzabeen) (2017). Far East Journal of Theoretical Statistics, Vol.53, No.3, 167-174.

Dr. Han Wu - Statistical methodological review for time-to-event data. (with Dewi Rahardja) (2018). Journal of Statistics & Management Systems, Vol.21, No.1, 189-199

Mezbahur Rahman and Thevaraja Mayoora* (2017). Simulated tests for normality. Forthcoming, International Journal of Statistical Sciences (IJSS), 15.

Md Nur Islam* and **Mezbahur Rahman** (2017). A note on beta weibull distribution MLE. International Journal of Research and Scientific Innovation (IJRSI), IV(II), 1-6.

Mezbahur Rahman and **Han Wu** (2017). Tests for exponentiality: A comparative study. American Journal of Applied Mathematics and Statistics, 5(4), 125-135. <http://pubs.sciepub.com/ajams/5/4/3>

Tsao, Y.L. (2018). The effect of constructivist instructional based mathematics course on the attitude toward geometry of preservice elementary school teachers. US-China Education Review A. 8(1), 1-10.

Tsao, Y.L. (2017). Preservice elementary school teachers' attitude towards geometry. US-China Education Review B 7(1). 15-22.

<http://www.davidpublisher.org/index.php/Home/Journal/detail?journalid=49&jx=UCER-B>.

Tsao, Y.L. (2016). Preservice teachers' knowledge of difficulties in decimal numeration. The Journal of Mathematics Learning and Research. 1, 160-161.

Tsao, Y.L. (2015). Mathematics Perceptions of Pre-service Elementary School Teachers. *US-China Education Review B*. 5(5), 299-308.

Dr. Ke Zhu and Qingchun Ji. Solvability of dirac type equations. *Advances in Mathematics*, (320C), 2017, 451-474.

Dr. Iresha Premarathna. G.A.I.C. Premarathna and L. Ellingson, 2017. Classification of protein binding ligands using their structural dispersion. In JSM Proceedings, Biometrics Data Mining Section. Alexandria, VA: American

Dr. Chia-chi Tung: Relative q-cycles, Hilbert exponent and Barlet's multiplicity. *Complex Anal. Oper. Theory* 11 (2017), no. 8, 1801-1816

Dr. Namyong Lee, E. Cheon, M. Homma, S. Kim. On a number of rational points on a plane curve of low degree. *Discrete Mathematics*, Vol. 340, Issue 6 (2017), pp. 1327-1334.

Dr. Namyong Lee, E. Cheon, Y. Kageyama, S. Kim, T. Maruta, Bull. A construction of two-weight codes and its applications, *Korean Math. Soc.* 54 (2017), No. 3, pp. 731-736.

Dr. Wiedong Chen. A regularized two-dimensional sampling algorithm, *Journal of Inverse and Ill-posed Problems*, June, 2017.

Mechanical and Civil Engineering

Druschel, SJ. Salt brine blending to optimize deicing and anti-icing performance and cost effectiveness – Phase III. Minnesota Department of Transportation Research Project Final Report 2017-45.

Dasenbrock, D.D., Axtell, P. and **Budge, A.S.** (March 2018) Axial response of a 30-inch-diameter Concrete-filled Pipe Pile During Driving, Static Load Testing, and In-Service, ASCE Geotechnical Special Publication No. 294 – IFCEE 2018: Installation, Testing, and Analysis of Deep Foundations, Orlando, FL.

Yamin, M.M., R.Y. Liang and **A.S. Budge.** (February 2018) Instrumentation and monitoring of JEF-152 landslide in Ohio. Proceedings of the University of Minnesota's 66th Annual Geotechnical Engineering Conference, Minneapolis, MN.

Physics and Astronomy

R. L. Palma, R. O. Pepin, A. J. Westphal, D. J. Schlutter, Z. Gainsforth, and D. Frank. 2018. Helium and neon in comet 81P/Wild 2 samples from the NASA Stardust Mission. *Meteoritics & Planetary Science* (in press).

J. Westphal, J. C. Bridges, D. E. Brownlee, A. L. Butterworth, B. T. De Gregorio, G. Dominguez, Z. Gainsforth, G. J. Flynn, H. A. Ishii, D. Joswiak, L. R. Nittler, R. C. Ogliore, **R. Palma**, R. O. Pepin, T. Stephan, and M. E. Zolensky, 2017. The future of stardust science. *Meteoritics & Planetary Science* 52, 1859-1898.

A.G. Dall'Asén, S. Dimas, S. Tyler, J.F. Johnston, T.R. Anderton, I.I. Ivans, J.M. Gerton, B.C. Bromley, S.J. Kenyon. Mapping the composition of chondritic meteorite Northwest Africa 3118 with micro-Raman spectroscopy. *Spectroscopy Letters*, vol. 50, 417-425 (2017).

A.G. Dall'Asén, *A.R. Stokke, *R. Paul, *R. Kayastha, B.C. Bromley, S.J. Kenyon. Mineralogical and elemental composition of carbonaceous chondrites by micro-Raman spectroscopy and SEM/EDS. 49th LPSC 2018, LPI Contrib. No. 2083, 2571-2572 (2018).

PUBLISHED BOOKS

Biological Sciences

Theis, AR and **MA Kaproth.** 2017. *Prairie Flora Guide to Blue Earth County*. Minnesota State University, Mankato. ISBN 0-9729134-5-9

Computer Information Science

P. Ferrillo, C. Brooks, K. Holley, G. Platsis, G. Thomas, S. Tuma, **C. Veltsos**, ebook entitled *The #CyberAvengers Playbook — The Non-Technical, No Nonsense Guide For Directors, Officers, and General Counsels* (2017). PDF available at <https://thecyberavengers.com/index.php/2017/09/26/the-cyberavengers-playbook/>

CONFERENCE PRESENTATIONS

Automotive and Manufacturing Engineering Technology

Agarwal, K. (April 23, 2018) 3D printing and the future of health and medicine. 44th Annual Douglas R. Moore Lecture, Minnesota State University Mankato.

Agarwal, K. (March 28, 2018) Binder jet additive manufacturing of stainless steel- Tricalcium Phosphate biocomposite for biomedical applications, Building a Healthy Community: Innovating Through Partnerships : Health Summit, Minnesota State University, Mankato.

Agarwal, K. (August 7-9, 2017) Process – Property relationships in additive manufacturing of nylon-fiberglass composites using Taguchi Design of experiments. Proceedings of Solid Freeform Fabrication Symposium, Austin, TX.

Agarwal, K. (August 7-9, 2017) Binder jet additive manufacturing of stainless steel - Tricalcium Phosphate biocomposite for bone scaffold applications. Proceedings of Solid Freeform Fabrication Symposium, Austin, TX.

Biological Sciences

Ruhland CT and Fraley* PT. (August 2017) The effects of ultraviolet radiation on decomposition of sagebrush litter collected along an altitudinal gradient. Ecological Society of America. Portland, OR.

Thole* DR, Reid* DR and **CT Ruhland**. (August 2017) The effects of ultraviolet radiation on the brown midrib mutants of *Sorghum bicolor*. Ecological Society of America. Portland, OR.

Moseman* ER and **CT Ruhland**. (August 2017) Ultraviolet radiation increases photodegradation in *Typha angustifolia* litter. Ecological Society of America. Portland, OR.

Foley, C.A.*, Roddick, J.J.*, Magnuson, E.C.*, Wang, A.Z.*, Husak, J.F., and **Cohen, R.E.** (2017). The effect of exercise on neurogenesis in the green anole lizard brain. Society for Neuroscience. Washington, DC.

Algandy, A.*, and **Cohen, R.E.** (2017). The effect of steroid hormones on neurogenesis in the green anole lizard. MidBrains. University of St Thomas. St Paul, MN.

D. Sharlin and **G. Salivia**. (2018) Thyroid hormone and smart phone apps: A partnership with the American Thyroid Association. Building a Health Community: Innovating Through Partnership. Minnesota State University, Mankato.

D. Sharlin. (2017) Teaching and Research at Primarily Undergraduate Institutions. Endocrine Society's 98th Annual Meeting (EndoCareers Forum), Orlando, FL.

C. Graber, S. Kline, and **D.S Sharlin**. (2017) Insulin-like growth factor 1 (Igf-1) positive cells are permanently reduced in the murine brain following developmental hypothyroidism. Endocrine Society's 99th Annual Meeting. Orlando, FL.

R. Cohen, A. Land, B. Martensen, D. Sharlin, & B. Smith. (2018) Helping students RISE to their full potential: The research immersive scholastic experience in biology (RISEbio) program and how it can help our students succeed. Scholars at Work Conference. Minnesota State University, Mankato.

Chemistry and Geology

Losh S. (2017) Hydrothermal “natural ore” in the Fayal Reserve Mine, Mesabi Range, Minnesota; Proc and Abstr. Inst. On Lake Superior Geol., v. 63, p. 59-60.

Losh S, *Crane D, *Huggins C. (2017) The Magenta Zone in the Northmet Deposit, Minnesota; Proc and Abstr. Inst. On Lake Superior Geol., v. 63, p. 58.

Quirk Dorr, Danae. (April 1, 2017) Tactics for facilitating flipped learning as part of a unique learning experience for every student - ACS Workshop Facilitator. San Francisco, California.

Vorlicek TP, Helz G., Chappaz A, *Vue P, and *Vezina A. (2017) Inorganic fixation of molybdenum. Presented at the V.M. Goldschmidt Conference sponsored by the Geochemical Society of America. Paris, France.

*Vue P, *Vezina A., Chappaz A, and Vorlicek TP. (2017) Reductive pathway to Mo deposition in anoxic sediments: Aqueous Mo^{VI} to insoluble Mo^{IV} via variable-composition Fe-Mo^{IV}-S precipitates. Presented at *Sci-Mix* at the Spring 2017 American Chemical Society National Meeting, San Diego, CA.

*Vue P, *Vezina A, Miller S, Casperson M. and **Vorlicek TP.** (2018) Advancing the vanadium paleoredox proxy: Defining the chemistry controlling vanadium speciation in sulfidic natural waters. Presented at the Chemical Education Undergraduate Poster Session, Geochemistry, Spring 2018 American Chemical Society National Meeting, New Orleans, LA.

Jeffrey Pribyl, Patrick Tebbe and Winston Sealy. (September 2017) Engineering standards for elementary teachers: Learning about engineering and how to engage students in engineering, ASEE North Midwest Section Annual Conference, Minneapolis, MN.

Jeffrey R. Pribyl, M. Hadley and *Scott Bowman. (March 2018) Relationship between student study time, satisfaction and exam grade in two chemistry courses, Paper presented at the 255th American Chemical Society National Meeting, New Orleans, LA.

*Voytsekhovskaya Ekaterina, **Marell, Daniel J. and Quirk Dorr, Danaè R.** (2018) Computational analysis of adduct formation between benzaldehyde derivatives and DNA. Poster Presentation. 255th American Chemical Society National Meeting, New Orleans, LA.

Quirk Dorr, Danaè R. (2018) Leveraging student need-based learning. Invited Oral Presentation. The Future of Online Learning, Nashville, TN.

Quirk Dorr, Danae R. (2018) Strategies for facilitating student need-based learning. Learning Outcomes Workshop Series- ACS Workshop Facilitator. New Orleans, Louisiana.

Wittkop C, Swanner E, Lambrech, N, Katsev S, *Grengs A., and *Widman D. (2017) Controls on iron- and manganese-mineral solubility in ferruginous lakes. Geological Society of America Abstracts with Programs, v. 49, no. 6.

Wittkop C, Bartley JK, Krueger R, Knaeble AR, Bouvier A, Georg R., St. Clair K, and *Piper C. (2017) Provenance controls on the geochemistry and radiogenic isotopic composition of Pleistocene tills in Minnesota, USA. Geological Society of America Abstracts with Programs, v. 49, no. 6.

*Kellie Wong, David. D Thomas, and **Rebecca J. Moen**. (2018) Arachidonic Acid and Oxidation in the Myosin II Motor Domain. Poster presented at the 2018 American Society for Biochemistry and Molecular Biology Annual Meeting, San Diego, CA.

Rebecca J. Moen, Megan McCarty, *Amanda Hinde, and David. D Thomas (2018) Oxidative Susceptibility of Calmodulin Cardiac Arrhythmia Mutants. Poster presented at the 2018 American Society for Biochemistry and Molecular Biology Annual Meeting, San Diego, CA.

Computer Information Science

Bukralia, R. (March 28, 2018). Using deep learning in medical image recognition. Building a Healthy Community: Health & Biomedical Summit. Minnesota State University, Mankato.

*Phillips, T., *Haan, B., **Bukralia R.** (April 7, 2018). Using text analytics to predict optimal pairing of actors for movies. National Conference on Undergraduate Research (NCUR 2018). University of Central Oklahoma, OK. (student research)

Bukralia, R. Chenard. W, Larson, S., Nagle, T. (August 24, 2017) Algorithms, transparency and ethics - Now and in the future. FARCON 2017 – Financial & Retail Analytics Conference. Minneapolis, MN.

Klammer Kruse, S. L. & Krumwiede, N. (October 29, 2017). The interdisciplinary collaborative experience of designing family-focused health informatics nursing curriculum. Sigma Theta Tau International Honor Society of Nursing 44th Biennial Convention in Indianapolis, IN.

Klammer Kruse, S. L. & Krumwiede, N. (November 7, 2017). Preparing students to take a deeper dive into the data through health informatics. American Public Health Association 2017 Annual Meeting & Expo in Atlanta, GA.

*De Silva, G., **Klammer Kruse, S. L.**, **Azarbod, C.** (2017). Using Hadoop and Hive to introduce big data solutions in a classroom environment. Proceedings of the EDSIG Conference, n.4468, Austin, Texas.

*Kolli, B., *Deverapalli, M., **Azarbod, C.**, **Klammer Kruse, S. L.** (2017). Gamification agile software for classroom projects. Proceedings of the EDSIG Conference, n.4491, Austin, Texas.

Cyrus Azarbod and Stacey VenGelderren (2018) SAFEHR. Building a Healthy Community: Health & Biomedical Summit. Minnesota State University, Mankato.

*Turner J.C., **Azarbod C**, *Wunderlin A, *Rayani F. (October 2017) Partnering to improve the student orientation experience. Minn State 2017 Fall Academic and Student Affairs Leadership Conference, Breezy Point, MN.

Norma Krumwiede EdD, RN; **Sarah Kruse PhD, RD, Guario Salivia PhD, Cyrus Azarbod PhD** (October 28 –November 1, 2017) Enhancing the experience of nurse educators and nursing students through interprofessional collaboration and innovative technologies. 44th Biennial Convention, Indianapolis, IN.

Cyrus Azarbod PhD; Stacey Ven Gelderen DNP, RN; Julie Frederick DBA; **Guario Salivia PhD**; Dharoor, Aditya ; *Flint Million. (October 28 – November 1, 2017) Innovative process of evaluating student performance using smart glass technology while providing family-focused nursing care. 44th Biennial Convention of Honor Society of Nursing and Sigma Tau International, Indianapolis, IN,.

Krumwiede N; **Cyrus Azarbod; Salivia G.** (June 14-17, 2017) Family nursing education E3: Efficiency, effectiveness, and experience. 13th International Family Nursing Conference, Pamplona, Spain.

Mark Blashack MBA; Stacey Van Gelderen DNP, RN; Julie Frederick DBA, RN; **Cyrus Azarbod PhD**; Emiel Smeenk; Brahma Konda; Bhavyaka Kolli; Alanna Robinson. (June 14-17, 2017) Through the looking glass: Application of smart glasses in nursing education & clinical practice. 13th International Family Nursing Conference, Pamplona, Spain.

Julie Frederick, Stacey Van Gelderen, Alanna Robinson, **Cyrus Azarbod, Emiel Smeenk, Brahma Konda, Bhavyaka Kolli, and Mark Blashack.** (June 14-17, 2017) Revolutionizing high-fidelity simulation education of baccalaureate nursing students with smart glass technology as an effective learning tool”, 13th International Family Nursing Conference, Pamplona, Spain.

Veltsos. (March 20,2018) Presentation on cyber risks to SMBs at Mapleton chamber of commerce, Mapleton, MN.

Veltsos. (March 13, 2018) Panelist, The evolving role of the CISO: Moving cyber security beyond the silos, cyber risk governance conference. New York City. <https://skytopstrategies.com/cyber-risk-governance-2018-ny-agenda/>

Veltsos. (2018) Presented Cybersecurity — Seven ways to keep your small business running in the era of viruses, scams, and breaches, at the Mankato Breakfast in the Cities event for MSU alumni association, on Feb 22, 2018 at the Minneapolis Club 729.

Veltsos. (2017) Presented on Cybersecurity at the Plymouth Rotary Club on Dec 1, 2017.

Veltsos.(Oct. 12, 2017) Panelist on the “Cyber security resilience and best practices on fraud prevention” panel, organized by the Minneapolis/St Paul CFO Leadership Council Chapter, Minneapolis, MN.

Veltsos. (September 28, 2017) Presented “Avoiding Disaster: Why Great Project Managers Care About Cyber Security” at the 2017 Professional Development Days (PDD) organized by the Minnesota Chapter of the Project Management Institute, in St. Paul, MN

Veltsos. (May 24, 2017). Panelist on the “CyberSecurity in the eDiscovery Realm” panel, organized by the Association of Certified E-Discovery Specialists (ACEDS), Minneapolis, MN. ACEDS is building a community of e-discovery specialists for the exchange of ideas, guidance, training and best practices, and offers e-discovery certification.

Veltsos. (May 18, 2017) Presented “7 Ways to Keep Your Small Business Running in the Era of Viruses, Scams, and Breaches” keynote at the Cybersecurity Colloquium organized by the Central Region SBDC in St. Cloud, MN.

Veltsos(May 15, 2017). Presented “As a CISO, Are You Strategic Enough?” to the 2017 Chief Security Officer (CSO) Executive Summit – “a private forum designed by CSOs for CSOs” – in Minneapolis, MN

Veltsos. (2017) Co-presented a webinar, “Know Your Numbers - Vital Signs, Immune Systems, and Cyber Risk” with Steven Grossman, VP of Strategy, Bay Dynamics. Recorded on May 4, 2017, available on demand.

Veltsos. (April 20, 2017). Presented “Professional Development - 3 Focus Areas for 2017” at the ISC2-MN chapter Minneapolis, MN. Note: ISC2 stands for International Information Systems Security Certification Consortium.

Veltsos. (April 20, 2017). Presented “Cyber Risk Dashboards — When Data Analytics and Cybersecurity Connect” to UHG/Optum DAKS webinar.

Veltsos. (Apr 18, 2017) Presented “Five Ways to Improve Your Cyber Risk Communications” to the MN chapter of the Information Systems Security Association (MN-ISSA), St. Paul, MN.

Veltsos. (Mar 14, 2017) Presented “Upward — Why We Should All Follow our CISO’s Path” at the UHG/Optum Lunch & Learn webinar.

Veltsos. (February 11, 2017). Co-presented “Social Media for Job Seekers: Do’s and Don’ts” with Abigail Crider at the 2017 Student360 conference, organized by Secure360 and sponsored by UMSA, Minneapolis, MN.

Veltsos. (2017) Presented “How to Help Your Clients Improve Cyber Risk Decision-Making” at the 2017 Midwest Legal Conference on Privacy and Data Security.

Construction Management

Lee, N. and **Kim, S.J.** (April 18-20, 2018) Factors influencing the construction industry’s shift to modular construction. Annual Associated Schools of Construction International Conference.

Kim, S.J and Lee, N. (April 27-28, 2018) Impact analysis of student-centered activities in a statics course to create student-engaged learning environments. American Society for Engineering Education Northeast Section Conference.

M. Diab and R. Gebken (April 18-21, 2018) Risk management in alternative project delivery scenarios: A construction manager/general contractor case study. The Proceedings of the ASC Annual 54th Annual International Conference, Minneapolis, Minnesota.

Wasserman, Brian. (May 24, 2018) Sustainable Livelihoods in Human Settlements. Presentation at Common Ground Conference. Detroit, MI.

5 CM students presented at the 2018 Undergraduate Research Symposium

Electrical and Computer Engineering and Technology

Zeng, T. Kim, and **V. Winstead**. (October 2017) Decoupling control for single-phase photovoltaic inverter with film capacitor, in Proc. IEEE Energy Conversion Congress & Exposition 2017. Cincinnati, OH, pp. 468-474.

N. He, R. Bukralia and H. W. Huang. (2017) Teaching wireless networking technologies in the internet-of-things using ARM based microcontrollers. 2017 IEEE Frontiers in Education Conference (FIE), Indianapolis, IN.

Q. Zhang, J. Zhou, and J. Hong. "Block-Wise Time Domain Large Signal Model of Carrier-Depletion Mach-Zehnder Silicon Photonic Modulators," in Optical Fiber Communication Conference, OSA Technical Digest (online) (Optical Society of America, 2018), paper Th2A.21.

V. Winstead and S. Yang (2018), "Power line communication input impedance adjustment via network load measurement., IEEE International Conference on Electro/Information Technology, Rochester, MI.

V. Winstead and C. Xu. (2018) Low energy bluetooth inter-node communication schemes via randomized reconfiguration. IEEE International Conference on Electro/Information Technology, Rochester, MI.

Integrated Engineering

J. Karlin & **R. Bates**. (May 15-16, 2018) Building your team of change champions: The expanded version. Clemson University.

R. Bates, R. Chavela, S. Farrell, A. Minerick & E. Specking. (April 29, 2018) Addressing challenges of inclusion, advocacy, and effective strategies. First Annual Conference of CoNECD (Collaborative Network for Engineering and Computing Diversity),.

R. Bates & R. Ulseth, (April 13, 2018) 2017 ABET innovation award winners: How IRE & TCE are Innovative. ABET Symposium.

J. Karlin, **R. Bates & R. Ulseth**, (June 28, 2017) Building your team of change champions. ASEE Annual Conference.

J. Karlin, **R. Bates & C. Allendoerfer**. (October 18, 2017) Building your team of change champion. Frontiers in Education Conference.

Mathematics and Statistics

Tsao, Y.L. (2016). Preservice elementary school teachers' attitude towards geometry. In Proceedings 2016 of Clute Institute International Academic Conference- San Francisco. p.337, CA, July 31-August 4, 2016

Tsao, Y. L. (March 18, 2015) Prospective elementary teachers' computational estimation and attitudes toward computational estimation. Minnesota State University-Mankato-Mathematics Department for Graduate Student Seminar.

Dr. In-Jae Kim gave a colloquium talk, "Stowage decisions in multizone storage systems" at Pusan National University, South Korea, on December 20, 2017.

Dr. In-Jae Kim presented an invited talk, "Some problems in retail analytics," at the 2017 Korea-China International Conference on Matrix Theory and Application on December 16, 2017, hosted by Sungkyunkwan University, South Korea.

Dr. Ke Zhu. *Solvability of Dirac Type Equations* in MAA North Central Sectional Meeting in 2018 (Scheduled on April 21, 2018)

Dr. Ke Zhu. *Solvability of the Dirac Equation and Automatic Transversality of Holomorphic Curves* in Mini-workshop of Symmetries of Symplectic 4-manifolds and Pseudoholomorphic Curves (Scheduled on May 9, 2018)

Dr. Ke Zhu. *Isometric Embedding via Heat Kernel* in Geometry and Topology Seminar in University of Wisconsin-Madison (Sept. 29, 2017)

Dr. Ke Zhu. *Isometric Embedding via Heat Kernel* in Differential Geometry Seminar in University of California-Irvine (June 5, 2017)

Dr. Iresha Premarathna, G.A.I.C. and Ellingson, L. Classification of Protein-ligand binding using their structural dispersion. JSM-2017, Baltimore Convention Center, August 3, 2017.

Dr. Iresha Premarathna, G.A.I.C. Analyzing ligand-binding proteins using their structural information. Data Science Symposium, South Dakota State University. February 12, 2018.

Dr. Iresha Premarathna, G.A.I.C. Classification of protein-ligand binding using their structural dispersion. Colloquium, Department of Mathematics.

Dr. Chia-Chi Tung: Seminario: On the existence of classical solutions of the Helmholtz equation, Luned 14 November 2016, ore 15:00-Aula 2BC30, Department of Mathematics, University of Padova.

Dr. Namyong Lee. Mathematical Association of America, North Central Section Meeting, Oct. 2017, University of Minnesota, Morris

Dr. Ruijun Zhao gave a seminar talk titled "A Method for Computing Transition Pathways of Conformational Changes of a Biomolecule" at Department of Mathematics, Statistics, and Computer Science, University of Illinois at Chicago on March 7, 2018.

Dr. Ruijun Zhao gave a seminar talk titled "Management Strategies in Malaria Models Using Optimal Control Theory" at Department of Applied and Computational Mathematics and Statistics, University of Notre Dame on October 12, 2017.

Dr. Ruijun Zhao gave a seminar talk titled "Management Strategies in Malaria Models Using Optimal Control Theory" at School of Mathematical Sciences, Nankai University, China, on July 10, 2017.

Mechanical and Civil Engineering

An undergraduate research team of Kacie Zangle and Brandon Tupper presented a poster titled “Comparison of New and Innovative Deicing Materials for Winter Roadway Safety Improvement” at the 2018 National Conference on Undergraduate Research in Oklahoma City, OK; Steve Druschel, faculty advisor.

An undergraduate research team of Jordan Bengtson, Nathan Gebhardt and Kline Barke presented a poster titled “Phosphorus Storage & Transport in Ravine Waterways” at the 2018 National Conference on Undergraduate Research in Oklahoma City, OK; Steve Druschel, faculty advisor.

An undergraduate research team of Mary Kloos and Elle Emanuel presented a poster titled “Community Ravine Slope Stability” at the 2018 National Conference on Undergraduate Research in Oklahoma City, OK; Steve Druschel, faculty advisor.

Steve Druschel participated on the Technical Tours/Local Planning Committee of the World Environmental & Water Resources Congress hosted by the Environmental and Water Resources Institute of ASCE, June 3 – 7th in Minneapolis.

Druschel, S.J. Winter Plowing and Deicing: Saving Money, Salt and Labor by Distinguishing Best Practices From Urban Legends. Road Salt Symposium, February 2018, Mankato, MN.

Druschel, S.J. Winter Plowing and Deicing: Saving Money, Salt and Labor by Distinguishing Best Practices From Urban Legends. Minnesota’s Transportation Conference, February 2018, Mankato, MN.

Druschel, S.J. Winter Plowing and Deicing: Saving Money, Salt and Labor by Distinguishing Best Practices From Urban Legends. Road Weather Technology Annual Meeting, Minnesota Department of Transportation, April 2018, St. Cloud, MN.

The ASCE Steel Bridge team finished eighth during competition at the University of Iowa, March 29 – 31st.

The MSU student chapter of ASCE hosted a meeting of the Minnesota state section of ASCE in November, with two presentations regarding Agricultural and Urban Water Quality Improvement.

Nykanen, D., Targeted calibrations to optimize the NWS Research Distributed Hydrologic Model for Runoff Risk Advisory Forecasts, NOAA Sea Grant, \$40K, 2016-2018. In collaboration with the North Central River Forecast Center, National Weather Service.

Nykanen, D., Multi-scaling analysis of rainfall and soil moisture and implications for weather and flood forecasting, Minnesota Supercomputing Institute, High Performance Computing (HPC) allocations and data storage, 2018. Renewal application submitted annually.

Tebbe, P., Wodzinski, N., and Lee, N., “Improving Vertical Axis Wind Turbine (VAWT) Performance”, accepted for the 2018 ASCE Annual Conference and Exposition, June 2018

Physics and Astronomy

Analía Dall'Asén, *Aaron Stokke, *Raka Paul, *Rohil Kayastha, Benjamin Bromley and Scott Kenyon. “Mineralogical and elemental composition of carbonaceous chondrites by micro-Raman spectroscopy and SEM/EDS”. Presented 49th *Lunar and Planetary Science Conference* in The Woodlands, Texas in March 2018

*Rohil Kayastha, *Raka Paul, *Aaron Stokke and **Analía Dall'Asén** (faculty mentor). “Mineralogical and elemental composition of carbonaceous meteorite Allende by micro-Raman spectroscopy and SEM/EDS”. Presented at the *Undergraduate Research Symposium* at MSU-Mankato in April 2018

*Tyler Benner, *Benjamin Gettis, *Lukas Halberg, *Oishik Hassan, and **Andrew Roberts** (Faculty mentor). Minnesota State University Mankato URC poster, “Investigation of Maximum Operating Voltage of a Van De Graaff Accelerator”

*Tyler Benner, *Benjamin Gettis, *Lukas Halberg, *Oishik Hassan, and **Andrew Roberts**. “Investigation of Maximum Operating Voltage of a Van De Graaff Accelerator”. Presented at the 2018 National Conference of Undergraduate Research

*Elizabeth Olson, and **Thomas Brown** “Functions of Verbal Echoing in a Conceptual Oral Exam”. Presented at the 2018 meeting of the Minnesota Section of the American Association of Physics Teachers