Executive Summary

This year the College of Science, Engineering and Technology (CSET) has made great 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. We have made excellent strides in all areas and look forward to expanding our efforts in the coming year.

The past year has brought significant change to the college with the transitioning to an interim dean, twice transitioning to new interim associate deans and adjusting to the realities of budget constraints and staffing cuts implemented in recent years. Despite these factors, the past year produced strong evidence of healing and the environment of the college is as collegial and productive as at any time in recent memory.

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

A. Manufacturing Engineering Technology student Michael Doyle, a third-year community college transfer student from Minneapolis, presented his research project mentored by Dr. Kuldeep Agarwal, “3D Printing of Stainless Steel for Engineering Applications,” at the Council on Undergraduate Research’s 18th annual undergraduate poster session at Capitol Hill in Washington, D.C. on April 28-29.

B. Nine engineering students were among 45 students from nine universities from around the world who spent a week in Windisch, Switzerland, last February to begin work on an international multi-university project sponsored by Audi, the German automobile manufacturer. The “Think 2025” project asks students to anticipate broad societal needs in the year 2025 in one of five environments: home, workplace, shopping, transit or education. The students working for “Think 2025” will be supervised by 18 faculty members from the participating universities. David Guerra-Zubiaga, an assistant professor in CSET’s Automotive & Manufacturing Engineering Technology Program, is the faculty member supervising the Minnesota State Mankato students.
C. Engineering Student Projects
   a. Civil Engineering students presented findings to various communities, lawmakers and university groups (including the Foundation Board) of a year-long flood mitigation study that was completed for the Zumbro River Watershed. The Zumbro River Flood Mitigation study, mentored by Dr. Steve Druschel and funded by the Minnesota DNR through MSU's Water Resource Center, is an effort to model the Zumbro River and its tributaries, providing an evaluation tool regarding potential features of flood protection for the communities along the Zumbro River that were affected in a September 2010 flood or previous events. This model will assist communities in examining options for flood protection features to limit the effects of future flooding events. The Zumbro River flood of September 2010 devastated about 20 communities, including Rochester, Minn. Many communities sustained substantial flood damage. They included Pine Island, Oronoco, Mazeppa, Zumbrota and Mantorville. One dam was lost, resulting in the permanent removal of a lake.

   b. The college continues to use its senior design courses in engineering and engineering technology to solve real world problems for local industry. Additionally, the Civil Engineering program continues to focus on projects for the public good, with the students aiming to inspire Greater Mankato organizations and businesses to consider far-reaching possibilities. This year’s projects studied the feasibility and impact of a passenger rail line to the Twin Cities and in reimagining Mt. Kato as a year-round resort.

   c. Mankato-based data management provider FPX, LLC, recently committed more than $700,000 over the next two years to “Project FPX,” an internship program that provides students in Minnesota State University, Mankato’s Computer Information Science Department real-world experience in the areas of software testing and development.

   d. A group of Construction Management students took part in the Student Activities Office’s Alternative Spring Break, a volunteer build with Habitat for Humanity in Los Angeles.

D. The college has expanded the ways in which it envisions student learning, hands-on experiences, and interactions with industry. In addition to continued expansion of the Project Maverick model to FPX and Brown Printing, the college has collaborated with Han University’s Buro 302 (through mutual exchanges) and has now formed our own Bureau 507 based on their model. A collaborative effort between Computer Information Science faculty members and former Associate Dean Scott Fee (now Dean of UEE), B507 will engage in industry funded, student run, faculty mentored, interdisciplinary projects that provide professional learning opportunities for students and solutions for local industry. The model has the potential, and has already begun, to spread to many areas across campus.

E. The college engages in many student competitions in the engineering, mathematics and construction areas. Of particular note, the Civil Engineering steel bridge team finished in second place at a regional competition held in Platteville, Wisconsin in March. Their second place finish qualified the team to compete against 46 other teams in the 2014 National Student Steel Bridge Competition at the University of Akron in Akron, Ohio on May 23-24.

F. In addition to the large number of participants from CSET in the on-campus Undergraduate Research Symposium (URS), the college had 26 students accepted to present at the National Conference on Undergraduate Research 2014 in Lexington, Kentucky.
2. Diversity

A. Employees (hiring, promotion)
   a. First year probationary faculty member, Dr. Winston Sealy (AMET), of African-American heritage, was added as a faculty mentor to the MAX Scholar program. He will also serve as a co-PI on the next round of the NSF grant supporting the program. Dr. Sealy is a valuable mentor and role model to our students of color.
   b. With the election of Dr. Penny Knoblich (Biological Sciences), CSET now has 4 female chairs among its 10 departments.
   c. Dr. Marilyn Hart (Biological Sciences) became Interim Associate Dean in February of 2014, following Dr. Scott Fee’s re-assignment. She will continue in the role in FY2015, adding a female to the excluded administrative designation.
   d. Dr. Puteri Megat Hamari (Integrated Engineering) is transferring from the TCE program to the Department of ECET, becoming the second female in that department. In addition to mentoring senior and graduate level projects, Dr. Hamari will provide a strong role model as one of the first professors students encounter by teaching a required introductory course for the department.
   e. The Department of Physics and Astronomy was able to hire a female physicist, becoming the second female tenure-track in the department.
   f. Dr. Leah Roue of Construction Management was accepted to the HERS Denver Summer Institute 2014.

B. Students
   a. The American Public Works Association (APWA) recently named Minnesota State University, Mankato’s Latino Engineering & Academic Day (LEAD) initiative as the winner of its 2014 Diversity Exemplary Practices Award, which recognizes individuals and organizations that have made outstanding contributions to diversity. It is the first time since the award was first presented in 1997 that it has been awarded to a Minnesota initiative or organization. It will be presented on Monday, Aug. 18 in Toronto, Ontario, in conjunction with the 2014 International Public Works Congress and Exposition at the Metro Toronto Convention Centre. Latino Engineering & Academic Day has been held annually for the last six years on the Minnesota State Mankato campus. Its mission is to increase Latino high school students’ access to higher education through a day of mentoring with engineering professionals, hands-on engineering demonstrations, Latino-specific college preparation workshops and much more. Plans have begun to offer a similar day in the metro area.
   b. Due to the success of the LEAD program, CSET collaborated with MNCEME and the Office of Diversity to offer our first African American Engineering and Academic Day. Planning for a similar program to support Women in Science, Technology, Engineering, and Mathematics (STEM) has begun and Girls Explore STEM day will take place in October.
   c. The college worked with the LGBT Center to offer the LGBT Safezone training to staff throughout the college.
   d. We have continued and expanded our commitment to strengthen the international community and our students’ exposure to international cultural issues. Specifically, CSET has been actively involved in working with the International office to bring in a large STEM Brazilian cohort, increase our exchanges to Germany (including co-ops) and the Netherlands, create an international minor and graduate certificate in Engineering and also hosted the student trip "Paris through the Eyes of a Microbiologist."
3. Quality of Graduates

A. Our college continues to have high related-employment numbers, with the most recent available data indicating that 89.8% of our students achieve employment related to their degree within one year of graduation.

B. CSET continued to have high participation in URS, with 42 faculty members (over 1/3 of our faculty) mentoring 152 students on 89 projects. Additionally, 15 different faculty members mentored the 26 students at NCUR.

C. The 2014 MNSCU Award for Innovative Curriculum went to our Civil Engineering program, largely due to the strong connection we have been able to establish between our students and industry in regards to student projects, internships and post-graduation employment.

D. The Toro Corporation continued its relationship with the Automotive Engineering Technology program with their commitment to exclusively hire from our program for their engineering testing lab.

4. Partnerships & Collaborations

A. Within the university
   
a. CSET faculty members have collaborated on a variety of projects. MET and Biology professors collaborated on a project that investigates the use of 3D printers to create bone-like material for implants. Chemistry professor Jeffrey Pribyl collaborated on numerous papers and presentations with members of Mechanical Engineering and the Center for Excellence in Teaching and Learning (student engagement in thermodynamics), English (composing in chemistry), and Education (inter-instructional learning teams). Additionally, the interdisciplinary MAX scholar faculty members collaborated with a graduate student in Experiential Education on a paper on teaching ethics to STEM majors.
   
b. Drs. Penny Knoblich (Biological Sciences), Mary Hadley (Chemistry and Geology) and David Bissonnette (Family Consumer Science), were selected for the prestigious 2014 Douglas R. Moore Faculty Research Lectureship award. This interdisciplinary collaboration culminated in their April 2014 presentation, “Obesity in America: A National Crisis.”
   
c. Bureau507, patterned after Buro302 at Han University, provides real-world, multidisciplinary, internship-like experiences for students. Eventually, this enterprise will become self-sustaining and include projects from across campus. Already students have worked with Film Studies on a project in the Twin Cities as well as Institutional and Organizational Psychology and Informational Technology Services projects. Bureau507 will provide a venue for continual broadening of collaborations across campus.
   
d. The Department of Mathematics and Statistics has a strong collaboration with the Minnesota Modeling and Simulation Center, with several faculty members teaching in their graduate certificate program and collaborating on projects.
   
e. The College of Science, Engineering and Technology has a Student Advisory Board with representation from all departments. This group meets once a month and brings issues of concern to the Dean’s attention. This forum also facilitates feedback on issues the Dean may bring forward for input from the group. This group also votes on two categories of the Excellence Awards which are awarded to faculty each fall. After careful consideration of the nominations, they choose the Excellence in Teaching and the Excellence in Advising awards.
f. The MAX scholarship program has received follow-up funding from the National Science Foundations, securing scholarships through academic year 2014-2015. The program supports $5,000 need based scholarships, renewable for up to three years. Scholars are required to attend weekly seminars and participate in interdisciplinary projects, peer-mentoring and professional development activities. The scholars are also involved with internships and research projects. During the 2013-2014 academic year the faculty team included Dr. Rebecca Bates, PI on the grant and Drs. Marilyn Hart, Deborah Nykanen, and Winston Sealy.

g. The Actuarial Science minor was implemented this year by the Department of Mathematics and Statistics in partnership with the Finance Department in the College of Business (COB). CSET and COB will co-advice students interested in adding this minor to their plan of study. There should be opportunities with local businesses and industry for internships as this is an area in high demand for employment.

h. In order for Minnesota State Mankato to achieve compliance with new EPA regulations for proper treatment of storm water, Assistant Professor Matt Durand worked with the MSUM facilities and Chandler Holland on a project specifically focused on storm water regulations as part of the Clean Water Act. Due to the growth in population of Mankato, tracking storm water run-off methods must be in compliance with EPA regulations.

i. The Department of Mathematics and Statistics collaborated with Institutional Research and the campus Information Technology unit on a Gates Foundation funded grant to improve intervention strategies in developmental math.

B. With other institutions

a. St. Paul College's Manufacturing Engineering Technology program and the Manufacturing Engineering Technology (MET) program in CSET have joined to offer a 2 + 2 program utilizing both on-line and on-location classes.

b. In September of 2013, the Minnesota Center of Excellence in Manufacturing and Engineering (MNCEME) hired Dr. Kent Carlson from the University of Iowa to be the new Director. The Center continues to represent the collaboration between MSUM and their community and technical college partners. The very successful Project Lead the Way is administered by MNCEME. This program continues to grow, having added courses for the middle school population several years ago. Project Lead the Way addresses the pipeline issues that have been a concern over the past years. The College has been the recipient of several substantial grants from MNCEME that have facilitated the upgrades to several engineering laboratories on campus. The MNCEME science and engineering summer camps bring hundreds of middle and high school students to our campus each year.

c. Dr. Quirk Dorr, Department of Chemistry and Geology, applied for sabbatical last year with intentions to update her own lab skills as a scientist and enhance better work practices with students in the classroom and research lab. She found an opportunity at the nearby University of Minnesota's Center for Drug Design. Spending time with cutting edge technology in their labs helped Dr. Quirk Dorr accomplish her intentions of both updating her lab skills with new ones and learning better work practices in the lab, knowledge of which she will bring back to teach her students.

d. The hard launch of the Twin Cities Engineering program was held in the Partnership Building on Normandale Community College’s campus in September, 2013. “A Celebration of Collaborations: Twin Cities Engineering” included an opportunity to learn about the innovative program, explore the
learning spaces dedicated to this program and visit with currently enrolled engineering students. Built around “project based” engineering curriculum, TCE is a collaboration between MSUM and Normandale, Anoka-Ramsey, Century, Inver Hills, North Hennepin, and St. Paul Community Colleges.

e. The annual Minnesota Engineering Educators’ Panel was held on the campus of the University of Minnesota in November. Deans from Minnesota’s entire 4-year engineering program offerings provided information to participants from community colleges and high schools throughout the region. The audience, primarily high school and community college advisors and guidance counselors, were able to learn the subtle differences between engineering offerings throughout the state.

f. The program developed between CSET’s Computer and Information Sciences program and HAN University continues to gain strength with approximately 5-6 students participating in this unique study abroad opportunity. MSUM students have the opportunity to work in Han’s Buro302 and now, Han students are working in MSUM’s Bureau507, gaining real-world experience.

g. Delegations of administrators from both Brazilian and German universities visited MSUM during FY14 in search of opportunities for their students to have an international experience. Approximately 30 students are expected from Brazil in academic year 2014-2015 for study in the STEM fields. Their year will include opportunities for internships before they return to their home country. CSET will have an advisor specifically dedicated to working with these students and other international students to support their programs of study.

C. With the greater public/community

a. The William Flies Fellowship was awarded to Dr. Kuldeep Agarwal (AMET) during FY14. Dr. Kuldeep’s proposal for the fellowship focused on gaining experience and understanding of the plasma nitriding process and the various processing aspects that help in designing products and to create a preliminary methodology to design and test these treatments. Dr. Agarwal worked with the leading plasma nitriding company, Advanced Heat Treat Corp.

b. Several new/revitalized advisory boards were established during FY14. Established was an advisory board for the Twin Cities Engineering program housed at Normandale Community College. Dr. Rebecca Bates (Integrated Engineering) was successful in recruiting a group from business and industry who are very supportive of the project-based program. Dr. Kent Carlson, on board with MNCEME since last September, reestablished their advisory board with representatives from industry, each partner school and MSUM. The input from his group will help to re-focus his efforts on the future of the organization.

c. The Greater Mankato Growth Group has partnered with MSUM’s College of Business and CSET to establish internships in the area of supply chain management. This is a growing area in the region and could potentially attract students interested in merging discipline specific study with business practices.

d. The Computer Information Science and Civil Engineering faculty collaborated on a project with MnDoT to develop the software GeoApp, now in beta testing.

e. CSET’s Construction Management Department and the Minnesota Construction Association co-sponsored a seminar at 7700 France in April for industry professionals. The agenda included sessions on professional presentations, business communications, and networking and sales. The audience for this seminar was young professionals who are typically knowledgeable in their disciplines but may need some extra exposure to essential soft skills necessary for success in their careers.
f. The Department of Mechanical and Civil Engineering and a mechanical engineering senior design team worked with the Southern Minnesota Children's Museum to create a ball course exhibit. CSET is positioned to continue work in the STEAM Gallery: Science, Technology, Engineering, Art and Math Maker Space. With a science lab, robotics lab and tool shop, the STEAM Gallery will be a prime location for exhibits and collaborations with CSET departments.

g. A regional "Tour of Manufacturing" was held in October and the College of Science, Engineering and Technology's Department of Automotive & Manufacturing Engineering Technology (AMET) was a featured stop on the tour. Sponsored by Greater Mankato Growth, the event provided an opportunity to showcase Trafton East 308 and Nelson Hall 105. CSET faculty, staff and students demonstrated the new 3-D instrumentation equipment and software recently donated to the college.

h. MNCEME provided funding to the Department of Electrical and Computer Engineering and Technology for the Industrial Automations Lab that allowed for the purchase of Beckhoff automation equipment. Beckhoff provided the equipment at a large discount. Students trained on this equipment are in high demand in industry. Assistant Professor Nannan He of Electrical and Computer Engineering and Technology (ECET) has published several articles on her work with real-time embedded systems and the teaching of such systems, often collaborating with fellow ECET member, Dr. Gale Allen.

i. Kuldeep Agarwal (AMET) worked with Ann Goebel, Director of Strategic Business partnerships on a MN Job Skills Partnership grant. As part of this grant conducted several trainings at Philips and Temro Industries. The trainings were on various topics as Design Failure mode and effect analysis, Design of Manufacturing and Assembly, 3D Printing, Injection molding etc.

j. The Department of Mathematics and Statistics hosted the High School Mathematics Contest, which had the largest turnout in nearly 20 years.

5. Development of New Resources

A. Grants
   a. The Pre-cast/Pre-stressed Concrete Institute (PCI) Foundation awarded $100,000 to a collaborative project between the Civil Engineering and Construction Management programs, along with Industry sponsor Wells Concrete, to develop curriculum in the pre-cast/pre-stressed concrete area. Several southern Minnesota companies in the area have indicated interest in donating several hundred thousand dollars for a new lab to supplement and support this development.

   b. The Department of Automotive and Manufacturing Engineering Technology received an in-kind software grant from Siemens Product Lifecycle Management (PLM) Software, with a commercial value of $325 million. The in-kind grant gives students access to the same technology that companies around the world depend on every day to develop innovative products in a wide variety of industries including automotive, aerospace, machinery, shipbuilding, high-tech electronics and many more.

B. Giving
   a. The ExOne Company ("ExOne"), a global provider of three-dimensional ("3D") printing machines and printed products to industrial customers, recently donated a X1-Lab printer to the Department of Automotive and Manufacturing Engineering Technology for use in teaching and research. The machine, now
valued at $100,000 had previously been housed in the department on a one-year donated lease agreement that included supplies and materials. The X1 machine is the cornerstone of the recently revamped Center for Rapid Prototyping and has made many new avenues of research possible, including the student project presented in Washington, D.C. mentioned above.

b. The Department of Physics and Astronomy has been gifted a high energy nuclear particle accelerator by the Triangle Universities Nuclear Laboratory at Duke University. This gift will make it possible to expand our Applied Nuclear Science Lab, particularly to the production of medical grade isotopes. This machine, with a replacement value in excess of $1M, will place MSU at the forefront of nuclear science training in the US, enabling MSU to establish a teaching and training center for applied nuclear physics research which can be utilized by colleges throughout the US.

C. Opportunities
   a. Bureau 507 was awarded Strategic Priority funding of $124,000 to aid in its launch.
   b. The PCI Foundation grant will allow for greater collaboration between the Construction Management and Civil Engineering program that would support increased student project collaboration, industry grants and training, and a new track in Construction Engineering.
   c. We have increased our communication and collaboration with the College of Business that is leading to opportunities with Taylor Corporation, Unisys, Thompson-Reuters and the Greater Mankato Growth Supply Chain Management workgroup.
   d. Statistician Dr. Deepak Sanjel developed an online version of Elementary Statistics to support the off-campus Nursing program that should also alleviate some pressures of having enough available seats in that course.

D. Students funded
   a. The College of Science, Engineering and Technology was awarded $55,896 from the URS for fall grants. This amount represents 72% of total funds distributed University-wide and 82% of that amount went to two departments, Biological Sciences and Chemistry and Geology, each of whom has demonstrated a strong commitment to undergraduate research as part of their departmental identities. Overall, the awarding of these grants serves as a testament to the dedication of our faculty, who serve as mentors to the students who present at the URS.
   b. The college had 26 students accepted to present at the National Conference on Undergraduate Research 2014 in Lexington, Kentucky. Funds were secured within the college through indirects to support this activity.
   c. In order to cover travel costs to Switzerland for the students involved in the “Think 2025” project, local industry was engaged by development director Patti Kramlinger and funding was secured.
   d. The Computer Information Science department completed construction of their collaborative classroom, funded from a variety of sources, though mostly the department’s own summer revenue. The classroom allows for increased hands-on programming experiences for our students.

6. Challenges (Identify the most important challenges facing the college and the strategies to address the challenges.)

A. Historically, the college has struggled to document the large amount of paperwork moving through the office and to move documents through the office quickly. We
made steps this year to streamline processes and began the scanning and electronic storage of files. We are now at the point where we rarely misplace a document or fail to send to its next location in a timely manner. We are also able to give dates on which documents leave the office and were delivered to their next location. The next aspect of this challenge is to scan the backlog of hardcopy files into ImageNow. The CSET Advising Center began that process last fall with their records and the Dean’s office will follow. Each document will be able to be tagged with keywords so that searches can be conducted quickly.

B. The Office of the Dean implemented a new collaborative task management system (web-based app Asana) to further track projects and efficiently handle the business of the college. All staff have been trained in, and moved their work, to the new system.

C. There are always space issues on campuses, especially around offices and laboratories. We have made some strides in communicating our needs through a College Facilities and Resources Committee that grew out of a previous Space Committee. In addition to space issues, the committee looks at ways in which equipment and other resources can be shared. We anticipate a great many space issues in the future.

D. Faculty time is our greatest resource and continues to be a challenge to meet our goals.
   a. Though we have incorporated a reassigned time application process, we look for ways in which a more stable system of time for research and grant writing can be maintained.
   b. A key challenge is that our current model of providing adjunct replacements (using summer funds) for reassigned time is not scalable. We hope the Academic Master Planning process produces some alternatives in the form of additional staffing or support for new mechanisms (e.g. permanent post-doc lines).

E. Staffing continues to be a challenge as many of our service courses in the lab sciences, mathematics, statistics and computer information science are full with large wait lists. We have opened additional sections, though large amounts of overload are taking their toll on productivity in other areas. Though we have worked with flipped classroom models and the development of online courses, additional staffing (and space for such staff) is likely needed. The need for support staff is also critical in many such areas.

F. Many departments have concerns on potential chair succession. We have worked to provide additional professional development opportunities for newer faculty, but may also need to advertise for an external chair in some cases.

7. Other (e.g., new/redesigned programs, developments, initiatives)

A. This year, we had several programs at various stages of the ABET accreditation process. Our Engineering Technology programs completed their report and hosted a successful site visit in October. Our engineering programs on the Mankato campus completed their 2-year interim report to ABET and our Iron Range Engineering program received the news that they were successful in obtaining full (6-year) ABET accreditation.

B. Program Reviews
   a. We concluded the 2013 Computer Information Science (CIS) program review with the Dean’s response last fall and conversations with the department on recommended changes.
b. The Department of Biological Sciences hosted their external reviewers, received a fairly positive report and has responded. The chair has met with the Provost and Dean on the recommendations. Notable changes may include better mentorship of new faculty, clearer department standards for promotion and better mechanisms for funding of laboratories.

c. The Department of Mathematical Sciences hosted their external reviewers, received a very positive report and has prepared their response for recommended changes, some of which may result in a stronger curriculum for the major.

d. The college conducted a self-study of its IT needs, including the possible addition of an ITS liaison. External reviewers will arrive in October to assess our needs and make recommendations.

C. The Twin Cities Engineering curriculum was established through our university’s procedures. The curriculum and the structure of the program options now allow for flexibility of the project based competencies while also allowing transcripts to detail a student’s area of specialization.

D. Two professional science master’s (PSM) degrees, one in Engineering Management and one in Information Security and Risk Management, had their curriculum approved this year. We anticipate a Spring 2015 start date.

8. Research, Scholarship and Creative Achievement

A. Using a Request for Proposal (RFP) process, the college awarded 14 faculty members reassigned time for AY14-15. 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.

B. Brian Wasserman (Construction Management) was certified to become an American Council for Construction Education (ACCE) Accreditation Visiting Team Lead

C. Minnesota State University, Mankato, was selected as a North America Editorial Board for the International Journal of Computer Integrated Manufacturing (IJCIM). Drs. Bruce Jones (AMET) and David Guerra (AMET) are Associate Editors.

D. Dr. David Sharlin of the Department of Biological Sciences served on a panel of experts commissioned by the American Thyroid Association to make a series of recommendations related to the study of thyroid hormone economy and action. He also serves on the Trainees and Career Advancement Committee of that organization.

E. Three CSET faculty members were chosen as Presidential Teaching Scholars for 2013-2014. Dr. Reza (Civil Engineering) developed visual learning tools for engineering students using the MATLAB software package. Dr. Veltsos (CIS) created online-ready labs for the information warfare course he teaches. Dr. Zhao (Mathematics) designed a new interdisciplinary course in computational science.
APPENDIX FOR 2013-14 ANNUAL REPORT
MASTER LIST OF RESEARCH, SCHOLARSHIP, AND CREATIVE ACHIEVEMENT

Note: Student involvement identified with a * (ex: Cronn-Mills, D. & *Werner, J. (2012) ....)

PUBLISHED ARTICLES

Automotive and Manufacturing Engineering Technology


Biological Sciences


Chemistry and Geology


Helz, G., Erickson, B, Vorlicek, T. (November 2013). Stabilities of thiomolybdate complexes of iron; implications for retention of essential trace elements (Fe, Cu, Mo) in sulfidic waters. [www.rsc.org/metallomics](http://www.rsc.org/metallomics).


**Electrical and Computer Engineering and Technology**


**Mathematics and Statistics**


**Mechanical and Civil Engineering**


**Physics and Astronomy**


**PUBLISHED BOOKS**

**Electrical and Computer Engineering and Technology**


**PRESENTATIONS**

**Automotive and Manufacturing Engineering Technology**

Agarwal, K. (July 2013). A computational framework for integrated process design of high performance parts. Proceedings of 2nd World Congress on Integrated Computational Materials Engineering (ICME) sponsored by TMS, Salt Lake City, UT.


**Biological Sciences**


Sharlin, D. (2014) Hear! Hear! Thyroid hormone and cochlear development. Department of Biology, University of St. Thomas.

Sharlin, D. (May 2014) EDCs thyroid hormone action and auditory development in animal modules. Gordon Research Conference on Environmental Endocrine Disruptors, Lucca (Barga), Italy.

**Chemistry and Geology**


Tebbe, P., Ross, S., & Pribyl, J. (June 2013) Engaged in thermodynamics - Student engagement in the classroom. ASEE Annual Conference.

Camp, H. & Pribyl, J. (February 2013) Composing in chemistry: Initiating and sustaining a multi-disciplinary collaboration. Center for Excellence in Scholarship and Research, Minnesota State University, Mankato, Mankato, MN.

Tebbe, P., Ross, S., & Pribyl, J. (January 2013). Full development of engineering scenarios to promote student engagement in thermodynamics related courses. Transforming Undergraduate Education in STEM: Building a Community to Transform Undergraduate STEM Education.


Vorlicek, T. (2013) Importance of measuring thiometalates for understanding Mo and Re geochemistry in sulfidic waters. Fall ACS National Meeting of the Geochemistry Division of the American Chemical Society, Indianapolis, IN.

**Computer Information Sciences**


**Construction Management**


**Electrical and Computer Engineering and Technology**


He, N. (2013) Incorporating on-going verification & validation research to a reliable real-time embedded systems course. ASEE North Midwest Sectional Conference.

Huang, H.W., & He, N. (October 2013) Teaching embedded system design using FPGA. ASEE North Midwest Section Annual Conference.

Huang, H.W., & He, N. (October 2013) Teaching the ARM microcontroller to keep up with the embedded industry technology change. ASEE North Midwest Section Annual Conference.
Zhang, Q. (2013) Simulation and design of coherent optical fiber communication systems. Department of Electronic Engineering, Tsinghua University (China).


**Integrated Engineering**


**Bates, R.** (June 2013). Engineering education research leaders net workshops: Mentoring, communicating and power brokering for the next generation. ASEE Annual Conference.


Habibi, M., & Alaei, M. (June 2013) Integrating professionalism in a project-based engineering curriculum. 120th ASEE Annual Conference, Atlanta, GA.

Habibi, M., Ulseth, R., & Carlson, M. (June 2013) Developing design courses in a project-based curriculum. 120th ASEE Annual Conference, Atlanta, GA.

Habibi, M., Diep, E. (June 2013) Developing an integrated motion capture and video recording for pediatric biomechanical studies. 120th ASEE Annual Conference, Atlanta, GA.

Habibi, M., & Lange, J. (June 15-18, 2014) Industry-sponsored vs. internal design projects at the Iron
Range Engineering program. 121st ASEE Annual Conference & Expo, Indianapolis, IN.


Davis, D.C., & Ulseth, R. (June 2013) Building student capacity for high performance teamwork. 120th ASEE Annual Conference, Atlanta, GA.

Mathematics and Statistics

Hannick, F. (October 2013). Hands-on experience with numerous activities for the elementary math curriculum. 2013 Conference of the South Carolina Council of Teachers of Mathematics, Greenville, SC.

Ford, J. (March 2014) Maverick comprehensive learning analytics and support system (MavCLASS): Deep, real world learning analytics to enhance student success. Annual Gateway Course Experience Conference, Indianapolis, IN.

Ford, J. (September 2013) Pre-algebra skills as a means of assessing readiness of developmental algebra students. MNADE Fall Conference, Walker, MN.

Kim, I.J. (April 2014) Eventual positivity and multivariate data analysis. Spring Mathematical Association of America (MAA) North-Central Sectional Meeting, St. Cloud State University.


**Mechanical and Civil Engineering**

**Budge, A.** (May 2013) State of practice in Minnesota Department of Transportation (MnDOT) pile driving. *SuperPile 2013–Piling Design and Construction Conference sponsored by the Deep Foundations Institute, Minneapolis, MN.*

**Budge, A.** (June 2013) Driven pile design process. *Professor’s Driven Piling Institute (PDPI) sponsored by the Pile Driving Contractors Association, Utah State University.*

**Budge, A.** (June 2013) Negative skin friction. *Professor’s Driven Piling Institute (PDPI) sponsored by the Pile Driving Contractors Association, Utah State University.*

Harold, M.D., Mattison, D.J., **Budge, A.S.** & Dasenbrock, D.D. (2014) A comparison of several static prediction methods and the driving responses of both H-Piles and pipe piles in sandy soils, *Proceedings of the University of Minnesota 62nd Annual Geotechnical Engineering Conference. University of Minnesota, Minneapolis, MN.*
Strategic Goals and Implementation Recommendations
MISSION

As educational leaders in science, technology, engineering, and mathematics (STEM), our accessible faculty advances student scholarship through innovative teaching, research expertise, and the exploration of new technologies and ideas. We prepare our students for professional careers and advanced study while connecting with local, regional and global communities.

VISION

We strive to provide a mentored educational experience to every student in our college; develop the most qualified engineers, scientists and STEM teachers; and establish our college as the preferred Master's degree provider in Minnesota.
2012-2017 STRATEGIC GOALS

SOLUTIONS

Promote quantitative, technological and analytical solutions that focus on regional issues with global connections.

TEACHING

Transform Teaching and Learning by encouraging advanced, engaging teaching methods, classrooms and laboratories guided by effective assessment of student learning.

EXPLORATION

Explore and Enrich new and existing programs and scholarly initiatives.

MENTORSHIP

Provide a mentored educational experience to every student in the college.
IMPLEMENTATION PLAN: GLOBAL ACTIONS

1. Faculty Reassigned Time
2. Prioritization for Resource Allocation
3. Reporting/Assessment
4. Publicity/Marketing/Recruitment
5. Advising/Mentoring/Professional Development
6. IFO Committees/University Policy
7. Outreach
8. Interdepartmental/Unit Communication

* Note: Specific actions were determined from the Strategic Goals (Solutions, Teaching, Exploration, Mentorship) and subsequently consolidated to form the global actions. See Implementation Plan for the mapping of each action to its strategic goal and global action.