As the first year of my directorship comes to a close, we have much to be proud of. Our First-Year Engineering Program continued to grow as we welcomed 1649 incoming engineering freshmen last fall, which is the largest class in our history. This represents a 15% increase from our last year’s number. Fall 2018 also welcomed our most diverse group of undergraduate students ever admitted. We were happy to see an increase of 23% in the number of women who joined our engineering program last fall.

Another highlight for the year was the addition of a new instructor, Jason Smith, to the CoRe team. Mr. Smith has been designated to lead the instruction of our EGR 102 Introduction to Engineering Modeling course. He is also teaching in the College’s AES program. He comes to us from MSU’s Biosystems and Engineering program where he is completing his PhD. He is an experienced consulting engineer with a focus on bio-based renewable energy and environmental engineering projects.

With our official start being the 2008-09 academic year, CoRe is now 10 years old! Earlier this year, we celebrated a decade of creating tomorrow’s engineers and recognized our Theme Partners, project sponsors, and program supporters who have helped us build the largest living-learning, first-year engineering program in the country. Joining us were representatives from ArcelorMittal, Bosch, Consumers Energy, Fanuc, Ford Motor Company, GE, MDOT, MSU Federal Credit Union, TechSmith, Tenneco, TheraB Medical, Whirlpool, and Williams International. We could not have had this level of success without the dedication of all involved.

CoRe has taken a new initiative to launch service-learning projects in Central America. With a partnership formed last spring with the MSU Residential College in the Arts and Humanities (RCAH) Program on Sustainability in Costa Rica, we successfully launched two fall semester projects for Costa Rican communities in EGR 100 Introduction to Engineering Design. The first project had four teams of students working with program leaders, staff, parents, and young indigenous girls to design the site plan for a new school and playground for the Girls For Success Program in Hone Creek. The other project had five EGR 100 student teams collaborating with residents, youth, area educators, tribal elders, and the U.S. Peace Corps to design a new public park in the village of Los Shiroles. We plan to follow up these projects with an Education Abroad program during Spring Break in March 2019, where our EGR 100 students will travel to Costa Rica to help our clients implement their designs.

We are happy to announce that the MSU Board of Trustees has approved an “Authorization to Proceed” with the construction of new classrooms, labs, and student collaborative spaces on the first and second floors of Wonders Hall. The remodeled space will total nearly 30,000 square feet and will be utilized for CoRe and College of Engineering courses. Construction is planned to begin in January 2019, with completion for occupancy by Spring 2020.

CoRe is excited to tell the world of its striving efforts for growth and innovation. It was well represented in national conferences this past year, with papers published and presented at the American Society for Engineering Education (ASEE) Annual Conference in Salt Lake City in June as well as the First-Year Engineering Experience (FYEE) conference held at Rowan University in Glassboro, NJ in July.

I will continue to guide our team in their efforts to develop the next generation of engineering problem solvers. Spartans Will!

Timothy Hinds
Director, First Year Engineering CoRe Experience
College of Engineering, Michigan State University
www.egr.msu.edu/core
Enhancing the First-Year Experience
Co-Curricular Highlights

As with every semester, CoRe continued its efforts in hosting a variety of co-curricular activities with new programming additions!

**A New CoRe Course:** In Fall 2018, CoRe offered a new course elective entitled “Engineering Your Future”. This class introduced students to key principles that provided them with the tools they would need for academic and leadership success during their first year at MSU. Students learned about engineering major fields, STEM study skills, time management, and Grit. They also learned a great deal about how to locate College and campus resources to improve their chances of becoming engineering majors. Through this course, students were able to connect with their peers, CoRe Corporate Sponsors, and College and university faculty. This course also centered on effective communication strategies and professionalism.

**Student Ambassadors:** CoRe employed six first-year undergraduate engineering students who were new to MSU as of Fall 2018. They joined the co-curricular team as Student Ambassadors to help with CoRe student co-curricular programming efforts (Wacky Wednesdays, CoRe Student Success Presentations, Study Groups, and Community Service Events). They served as a crucial point of contact for prospective and current students.

Student Ambassadors also served on various outreach efforts and worked to keep Peer Leaders connected to the community. At the end of the first semester, they earned an average GPA of 3.7.

**Study Groups:** Students asked and we accepted their challenge! This semester, students requested assistance with establishing study groups, and their requests were answered by CoRe. Students who were enrolled in Chemistry 151 and Math 132 were provided with classroom space to meet with their peers to review course materials for upcoming quizzes and exams. Also, provided within the study spaces were snacks and beverages.

**Engineering Exploration in Law:** Matt Jorge, a patent attorney and College of Engineering alum, provided an opportunity for CoRe students to explore potential careers in law. Having a wide array of experience in intellectual property, including patent counseling and the procurement of utility and design patents, he offered a Saturday seminar for students looking to pursue engineering and law careers.

**It Became a Wacky Wednesday!** Every week on Wednesdays, students were able to meet in Wilson, Wonders or Holden Hall for some Wacky Fun! To assist students in connecting with their peers, CoRe offered games and prizes to encourage them to socialize within their residential community.
Wednesdays found students in their perspective elevator lobbies or 1st floor lounges, having some wacky fun and competing for prizes.

**Women In Engineering at CoRe Seminar:**
Associate Dean for Inclusion and Diversity Yue Qi, kicked off our Women in Engineering at CoRe seminar entitled “Power Up Your Presence.” She explained to students that the College has built an inclusive environment and will continue to work very hard to provide opportunities for everyone to soar. She offered advice on final exam preparation and her assistance for anyone who wanted to meet for continued guidance.

In the seminar, Mimi Brown, President of AMP UP Success and an MSU alum as well as guest speaker for Women in Engineering at CoRe, provided an interactive presentation on how to stand out in the classroom along with how to create a persona that conveys confidence and competence. The presentation provided information that students could easily apply to their current academic, professional, and social development.

**Tenneco Incorporation Trailer:**
Networking, food, and an educational experience! CoRe students were presented with the opportunity to network with Tenneco employees inside their event marketing trailer positioned on campus for one day during the fall semester. Tenneco Inc. is one of the world’s leading designers, manufacturers and distributors of clean air and ride performance products and systems for the automotive, commercial truck and off-highway markets and the aftermarket. Once inside the trailer, students learned more about the company and how to gain professional skills needed to enter into the workplace.

As a CoRe Theme Partner, Tenneco interacts with students throughout the year both inside and out of the classroom setting, by creating learning experiences for students to gain critical skills that future employers seek in interns or co-operative candidates.

**Welcome To All New Students:**
All entering engineering freshmen were welcomed during the Annual Undergraduate Colloquium and Resource Fair on Tuesday, August 28, 2018 at the Breslin Center. Student groups and local businesses were on hand to help entering students to sign up for activities and services in order to kick off their Spartan experience. This year students were greeted by Rachel Hutter, a College alum and Disney Senior Vice President, International Facilities & Operations Services, Worldwide Safety & Health and Engineering. Rachel encouraged students to join campus organizations and to take advantage of opportunities both inside and out of the classroom to broaden their perspectives. She explained that faculty interactions, membership in student organizations, and professional work experiences during her time at MSU had shaped her into the Disney Imagineer that she is today!

CoRe is looking forward to a successful Spring 2019.
Academic Highlights

CoRe’s academic program is based on the principle that engagement in meaningful engineering experiences early in students’ undergraduate careers supports their success and persistence to graduation. Through our courses, EGR 100: Introduction to Engineering Design and EGR 102: Introduction to Engineering Modeling, we strive to engage students across the disciplines in team-based projects that pique their interests and give them a window into what professional engineering really is. Activities this year occurred on multiple fronts, from new faculty and projects in the courses to engaging with campus and community partners.

Experiential Projects: CoRe continued successful partnerships with the Residential College in the Arts and Humanities (RCAH) on the Costa Rica design projects, and Aptiv as an industry sponsor of the autonomous vehicle sensing project. Lab projects in EGR 100 involved a choice of seven design challenges. These were i) Solar Car Competition, ii) Cell Phone Application Inventor, iii) Designing a Heat Exchanger, iv) 3D Printing of a Cell Phone Case, v) Arduino LED Programming, vi) Costa Rica Design of a Park and School, vii) Autonomous Vehicle Sensing Design. Student teams displayed their work at the College of Engineering Design Day at the end of the semester.

New Lecture Topic in EGR 100: A fundamental part of EGR 100 is to teach students how to approach problem solving and the design process using creativity, brainstorming, and persistence. Students were introduced to Grit. In discussing this topic, the study by Duckworth, et al. (2007) was presented to the students and a discussion was moderated. Since this is a first-year engineering course, and students are faced with difficult decisions in the beginning of their academic career, the discussion of Grit is pertinent to the experiences students encounter.

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<th>Development of Grit</th>
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**EGR 100 course activities that correspond to developing Grit based on previous studies**

CoRe wants students to know where they are going next.
**Tutoring Services:** Through the generous support of our Theme Partners and industry sponsors, CoRe offers tutoring in calculus, chemistry, and physics to our engineering students. The CoRe Tutoring Center is a constant buzz of activity with students getting regular assistance with courses and targeted exam preparation.

**Industry Partner Participation:** CoRe also hosted engineering alums from General Motors, Mars Wrigley, GE and Gerdau, who served on our EGR 100 industry panels, giving students insights to co-op, internship, and full-time career positions.

**New Project in EGR 102:** Students in EGR 102 experienced a new project this semester in which they used the MATLAB Mobile™ program to extract raw data from their phones to create their own fitness app style algorithms. Students, with limited instruction, were tasked with converting phone accelerometer data into step and distance estimates based on user’s personal information (height, weight, age). They then compared their own algorithms to those used in commercial apps. For extra credit, students were then tasked with generating a metric of their own choosing, using their phone’s data. Participating students were given the opportunity to present their creations at the College of Engineering Design Day.

**New Student Feedback/Support System:** In an effort to increase student engagement and promote long-term growth, CoRe has piloted a new post-assignment/exam reflection system. Students now conclude every assignment/exam with a brief survey asking them to reflect on the lessons learned in the assignment, the areas of improvement they may have, their strategies, and their study habits. The benefits of these exercises are two-fold. First and foremost, reflection activities have been shown in other settings to improve long-term student performances and establish the habit of critical reflection in all coursework settings. Results from these reflections have also informed instructor strategies and led to several in-class changes including modifications to presentation style, the inclusion of review videos, and the creation of a study-group sign-up.
Tell the World: We were busy attending and participating at the American Society for Engineering Education (ASEE) in Salt Lake City and the First Year Engineering Experience (FYEE) Conference in Glassboro, NJ. Grit as a topic is covered with reference to the retention of the students in the College of Engineering through to their completion of the engineering degree. The effectiveness of the course material on student grit was evaluated in EGR 100, and the results of this study were presented at the July 2018 FYEE Conference in a paper titled “Examination of the Development of Grit in First-Year Engineering Students”.

Many Thanks!

Academic and Co-Curricular Support Employees

Graduate Teaching Assistants - 11
Academic Tutors - 18
Undergraduate Learning Assistants - 27
Student Ambassadors - 6
Peer Leaders - 5
Students Leaders - 5

Piloting New Grading Methodologies: In a partnership with MathWorks™, EGR 102 instructors and MSU IT have begun piloting an integration of MATLAB Grader™ into MSU’s existing LMS. Grader™ is a virtual assessment tool which allows students to receive real time feedback on their assignments.

Telling the World: As mentioned earlier, CoRe was busy attending and participating at the American Society for Engineering Education (ASEE) Conference in Salt Lake City and the First-Year Engineering Experience (FYEE) Conference in Glassboro, NJ. Grit as a topic is embedded in CoRe with reference to the retention of students in the College of Engineering through their completion of an engineering degree. The effectiveness of course material on student Grit was evaluated in EGR 100, and the results of this study were presented at the July 2018 FYEE Conference in a paper titled “Examination of the Development of Grit in First-Year Engineering Students”.

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