The CoRe Experience is Committed to "Building The Whole Engineer".
Commemorating 2021-2022 - Another Challenging Yet Successful Year

July 2022

A Different Fall Experience: As the academic year comes to a close, I would like to reflect on the challenges and accomplishments of our team. The incoming Fall 2021 class included 1442 engineering freshmen. This is almost identical to the 1465 students we welcomed virtually in Fall 2020. With the pandemic subsiding, we were able to offer the 2021 class many in-person courses, while maintaining some in an online format. We plan to have our 2022 incoming class in a near-normal experience, as we expect all students, faculty and staff to be back on campus for Fall. We look forward to an exciting Fall semester.

Another Change for Colloquium: Once again, we had a format change for our Fall 2021 Annual Colloquium. In 2020, the event had two EGR 100 design projects in Spring 2022. The first had 19 students design a new school facility for students in a rural Costa Rican community. The new structure was for the Niñas Para El Exito (Girls for Success) program located in Hone Creek, Limon Province. This program makes use of after-school programming, experiential education, field trips and other curricula to improve the educational and life prospects of local campesinos and Kekoldi indigenous girls ages 8-12. The second project involved nine EGR 100 students developing a cell phone application to give tourists to Costa Rica access to produce grown indigenously, using sustainable practices by small-scale, local farmers. The project sponsor was Asociacion Valle Escondido Regenerativa (AVER) located in Monteverde, which seeks to inspire the protection of natural environments and promote sustainable and regenerative practices through responsible tourism.

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Dr. Hopkins is currently a software engineer for Marketing Technology at LinkedIn. She inspired our students with her advice on becoming good students and great MSU alumni. Additional messages were presented by alum Anna Munie of Consumers Energy, former MSU hockey head coach Danton Cole, Lt. Dan Munford of the MSU Police Department, Assistant Dean Amanda Idenma, Chemical Engineering Associate Chair S. Patrick Walton, CoRe Co-Curricular Director Carmelita Davis-King, CoRe student Peer Leader Dayana Villagran and me. Thanks to all who participated and made this successful and memorable for our freshmen.

Transition of Academic and Co-curricular Programs: Another consequence of the subsiding pandemic had us transition our EGR 100 Introduction to Engineering Design, EGR 102 Introduction to Engineering Modeling, EGR 291 Engineering Your Success and EGR 891 Technical Writing for Engineers and Scientists back to in-person and hybrid delivery formats after nearly two years of virtual classes. The change was also true of our tutoring program and co-curricular events and activities. Details of our accomplishments are included within the sections of this report that follow.

Peace Engineering Initiative: We continued our strong relationship with the MSU Residential College in the Arts and Humanities (RCAH) Program on Sustainability in Costa Rica and our joint four-course sequence in Peace Engineering. The courses consist of designing solutions for Costa Rican community partners in EGR 100, learning the post-conflict reconciliation process in RCAH 202 Transculturation through the Ages: Designing for Peace, and collaborating with RCAH 326 Topics in Community Engagement: Design for the Common Good, where RCAH students team with the EGR 100 design students to develop solutions for community projects. In 2020-21, 89 students participated in this program.

Design Justice Minor: The strong collaboration between CoRe and RCAH with the courses listed above has led to a proposed minor in design justice. The minor will prepare students to address the challenges of global conflict, globalization, climate change and sustainability to bring practical contributions towards peace building. Our intent is to offer experiential learning opportunities in community-engaged design projects, education abroad programs, and collaborations with organizations working to find just solutions to complex design problems at home, at work, in the community and around the globe. We believe the minor to be the first at a Big 10 institution and hope to have it in place by Fall.

Central America Projects: During Fall 2021, 35 EGR 100 students and 15 RCAH 326 students worked with Asociacion de Desarrollo Sostenible de San Jose Rural (The Sustainability Development Association of Rural San Jose, ADESSARU), a community-based non-profit of the Palmichal de Acosta region to redesign the 100-acre cloud forest reserve at Nacientes Palmichal. The project involved reimagining the reserve facilities into spaces focused on the environmental education of Costa Rican residents and international visitors. Students in the RCAH 203 course will travel to Palmichal in Fall to assist with implementation of these designs.

There were two EGR 100 design projects in Spring 2022. The first had 19 students design a new school facility for students in a rural Costa Rican community. The new structure was for the Niñas Para El Exito (Girls for Success) program located in Hone Creek, Limon Province. This program makes use of after-school programming, experiential education, field trips and other curricula to improve the educational and life prospects of local campesinos and Kekoldi indigenous girls ages 8-12. The second project involved nine EGR 100 students developing a cell phone application to give tourists to Costa Rica access to produce grown indigenously, using sustainable practices by small-scale, local farmers. The project sponsor was Asociacion Valle Escondido Regenerativa (AVER) located in Monteverde, which seeks to inspire the protection of natural environments and promote sustainable and regenerative practices through responsible tourism.

Don Hernan Ramirez, former ADESSARU President and Timothy Hinds, MSU CoRe Director, inspect a solar panel array designed by EGR 100 students, installed at Nacientes Palmichal (right).
Education Abroad in Central America: The RCAH 203 course in Fall 2021 had 11 students travel to Costa Rica to work with the Asociacion de Desarrollo Integral de San Luis, Monteverde (ADISL) - The Integrated Development Association of San Luis, Monteverde, the “principal medium in which the community organizes to initiate a variety of community development activities”. MSU students developed and delivered a three-day design seminar held at the San Luis Community Center. The seminar was attended by 13 local middle and high school students. The students developed informational signage and other aspects of an outlook (mirador) designed by a previous EGR 100 group. The mirador is located on La Trocha (“the trail”), a community-built road connecting San Luis to Monteverde with views of the cloud forest-covered continental divide and the Pacific Ocean. The entire group also attended the dedication of the La Trocha mirador which has been recently constructed.

CoRe Personnel: Our staff has also been busy sharing lessons learned through attending conferences and presenting papers at national gatherings such as the American Society for Engineering Education (ASEE) conference and the First-Year Engineering Experience (FYEE) conference. Both events were held virtually this past year due to travel restrictions related to the pandemic. We look forward to them returning to in-person events this year. We are happy to host the FYEE conference at MSU at the end of July and will showcase our new facilities in Wonders Hall.

New CoRe Facilities: The 30,000 square foot renovation of Wonders Hall was dedicated in December. Presiding over the ceremony were MSU President Samuel L. Stanley Jr., MSU Provost Teresa K. Woodruff, College of Engineering Dean Leo Kempel, Senior Associate Dean Tom Voice, CoRe Academic Director Jenahvive Morgan and several others. We began to use the new facilities fall semester. The project included construction of classroom and laboratory space with major emphasis on expanding project capabilities for the EGR 100 course. Another portion of the project was the construction of the new CoRe tutoring center and College computer labs.
The end of the academic year has arrived! Looking back over the year, CoRe is celebrating a great year of providing a foundation for students to build upon. CoRe focused on their academic, social and professional success. The First-Year Engineering program introduced students to mental health resources in the neighborhood, assisted in building academic skills to be successful Spartans and helped them network with key faculty members in their majors. It also connected them with their peers, and Corporate Partners. Finally, monthly newsletters were delivered to student mailboxes, which contained campus, CoRe and College updates.

Back to Campus Social Programs: As the CoRe team welcomed students back to campus in Fall 2021, we were aware of the impact that virtual learning had on some students. Many experienced technology fatigue, and forming relationships with their peers was a challenge. This was in part due to a lack of face-to-face interactions, as a result of social isolation and being on-line. To reconstruct, CoRe enacted intentional social programs that helped students form bonds with their engineering peers. Social programming took place weekly and included sports tournaments, ice cream socials, a table-top snow person construction contest, a tour of the Breslin Center and a host of other events.

“Our College is committed to your success, and will provide you with the resources and services that you will need to become a successful engineer.” - Dean Kempel

Mental Health Programs: In addition to social events, CoRe enlisted the assistance of mental health professionals to deliver programming each semester that highlighted the importance of a healthy mind and body. Mental health professionals joined CoRe throughout the academic year to deliver a consistent message - “Mental Health is self-care and self-care is for everyone”. Overall, students responded positively to the additional social programming.

Building Skills to Succeed: “Building academic and professional skills needed to become a successful Spartan Engineer” has always been the main focus for CoRe. The academic year began by offering each student an opportunity to join an organized study group for math, physics and chemistry courses. CoRe reserved classrooms for each group to meet, and ordered pizza to fuel their energy. CoRe invited faculty members to the neighborhood to share their expertise and to serve as mentors. Assistant Professor Dr. Bill Jin shared his research and how students could become a member of his mentoring program and potential candidates for his undergraduate research team.

Professional Engagement: Engineering faculty throughout the academic year engaged with students and helped to set the foundation for understanding their undergraduate majors, opportunities for career exploration, education abroad, and entrepreneurship. Students seeking to start their own business were introduced to resources provided through the Burgess Institute for Entrepreneurship & Innovation by Paul Jaques, Managing Director for Venture Creation. Mrs. Lynn Frostman, Vice President of Engineering at Zyvex Plasmonics, delivered an engaging presentation on how to excels as students, deliver on commitments and the importance of finding good role models. She also spoke about the value of time-management to develop a successful academic, professional and social skill set. In addition, Michael Nicley, with GE Renewable Energy, taught students the importance of a well-rounded resume and effective networking skills. Past CoRe Peer Leaders who are now alumni shared information on their current professional experiences. They also answered questions about how to join student organizations and what to expect during final exam week.

Additionally, Peer Leaders offered evening sessions that included a computer coding for fun webinar for beginners, study groups for major specific classes, live social media take-overs, faculty panel discussions, presentations on the undergraduate research and scholarship application process, and College major requirements. Game nights and a few laughs were shared during a live CoRe comedy show delivered by CoRe student staff before final exams.

We look forward to seeing everyone return in Fall with renewed energy and enthusiasm. Go Green!

“I felt disconnected and so I reached out to my Peer Leader and he helped me to meet friends.”

Peer Leaders invited me to dinner and I met my best friend.”

Peer Leaders at employment training (below)

Peer Leaders at employment training (below)

Academic, Professional, and Social Development: This year CoRe hosted weekly residential floor events and 115 ALL CoRe events centered on the academic, social and professional development of all students. One of the most innovative tools we have was created by a CoRe Peer Leader! The CoRe App was created as an online tool that allowed our program to advertise weekly events directly to each student’s cell phone. On the day of co-curricular programming, students were sent personal reminders to build excitement for the program. To end the academic year on an uplifting note, the first annual CoRe Gala took place. At the Gala students celebrated their academic and professional accomplishments while dancing the night away. As the final exam season approached, this event served as a moment for students to take a study break, dress up, eat a catered meal and look back on their first year at MSU with great fondness. This was another innovative program that celebrated all that they learned, experienced, shared, and accomplished.

Presentation on Biometrics by Prof Anil Jain, Computer Science & Engineering, MSU (below)

Go Green!

“I was worried about Covid19 and felt high anxiety coming to MSU. My Peer Leader connected me with a counselor in Wilson Hall, who taught me how to control my anxiety.”

Community Service at Lansing Food Bank Premise (right)

CoRe App (below)
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 engineering projects that pique their interests and give them a window into what professional engineering really is. Activities this year focused on engaging with campus and community partners.

EGR 100: An important part of the CoRe Experience is the academic program. EGR 100 Introduction to Engineering Design, is a required course for all incoming first-year engineering students. These students are introduced to the engineering profession and the engineering design process through team-based, interdisciplinary design projects and report writing.

During Fall 2021, the class continued with two entirely online sections, some partially online sections with an in-person lab and online lecture, and some fully in-person sections. This gave students choices while scheduling the course, to be able to take the course despite their varying levels of comfort and flexibility during COVID-19.

Since most labs were conducted in person (21 of the 23 lab sections), an additional design project was introduced this semester. This project involved creating an Arduino/Adafruit Gemma LED circuit, while developing Python coding and circuit soldering skills. This was the first semester students were able to use the new EGR 100 lab facilities in Wonders Hall. Therefore, this project was created to utilize the electrical lab in this new space. Additionally, all design projects were offered from the beginning of the semester to encourage utility of the new Wonders Hall EGR 100 lab facilities.

Since some lab sections still had an online lecture, lectures were given in person and then recorded for the students who were unable to attend. This also provided flexibility to students who were scheduled to be in person, in case they were unable or uncomfortable being in a lecture hall environment. Our course management system, D2L, was also redesigned and reorganized, focusing on what the students needed to accomplish each week, to ease students in using the available online resources. This change was encouraged through the feedback that was provided from the previous online semesters, and was necessary since all assignments continued to be turned in online on D2L. These online assignments provided both a faster return of graded work to the students, and immediate feedback once the assignments were graded.

“Dr. Morgan was always prepared for class and was very approachable and willing to provide aid to everyone.”

CoRe tutors helped me get through my Math class."

“The study review sessions were pretty helpful and when I needed help with my homework, I could get what I needed.”

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Costa Rica Community Design Project: Cloud Forest Reserve Design App

SD Printing CAD Drawing: Student Phone Case Design

Tutoring Services: Through the generous support of our Theme Partners and industry sponsors, we offer tutoring in calculus, chemistry, and physics to our first-year students. The CoRe Tutoring Center is a constant buzz of activity with students getting regular assistance with courses and targeted exam preparation. Due to an increasing demand, we offered review sessions for midterm and final exams in Fall and Spring semesters. Our lead tutor Leah Schlesinger was honored with the Undergraduate Student Service Award for her outstanding leadership, dedication and service toward CoRe Tutoring.

Academic Highlights

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Telling the World: An EGR 100 paper was presented at FYEE 2021. A study was developed to examine the student evaluations of the objectives of EGR 100 over three years in an effort to improve the course. A paper describing this study was submitted to the 12th FYEE Annual Conference and presented at this virtual conference in August 2021. It was titled “Assessing Achievement of Course Objectives in an Introductory Engineering Design Course.”

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EGR 100 Projects and Sponsored Projects: In EGR 100 there is a choice of seven projects. These projects are the design of a heat exchanger, creation of a phone app, 3D printing CAD drawing phone case design, creation of an Arduino/Adafruit Gemma LED circuit, water filtration design, design of a mini solar car, and Costa Rica community design. CoRe continued a successful partnership with the Residential College in the Arts and Humanities (RCAH) on the Costa Rica design projects.

Phone App Design Project: Student Mental Health Cell Phone App

Design of a Mini Solar Car Project (above)

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EGR 102 - Introduction to Engineering Modeling: This is a two-credit course offered every semester in which students learn basic mathematical modeling techniques and engineering problem-solving through engaging with real-life engineering problems. To perform the modeling, students also learn advanced Excel skills and a computer language called MATLAB.

Students in the course attend one 50-minute lecture and two 80-minute labs every week. In the lecture, students are introduced to new engineering modeling concepts and are given an open-ended engineering problem to solve for the week. In the first laboratory, students are introduced to new computer skills and allowed time to discuss their teams and the new skills they might apply to the weekly problem and develop a problem-solving strategy. They are guided by their TA who acts as a project manager. In the second lab, students are given time to work in teams to solve/model the weekly problem using the appropriate modeling software (Excel or MATLAB).

What is New in the Classroom: This year, we have experienced the joy of coming back together in person for the first time since the Covid-19 pandemic sent us to an online format. This has been a relearning experience for students and instructors alike. Many students enjoyed their first in-person college courses after semesters online, and many of our instructors (both TAs and ULAs) taught their first in-person classes this semester, despite having taught several semesters online.

It has been an enriching experience to be able to get back into the classroom and create the collegial connections that many of our students have longed for - connections they chose MSU and our program to help them foster.

To that end, we have continued to prioritize in-person group work in EGR 102. Our format now centers around weekly mini-projects that students solve as a team, using new foundational skills in Excel and MATLAB that they have learned throughout the week. Students also worked on two final projects to cap off their year.

EGR 102 students at CoRe Computer labs (below)

Group Project - Creating a Step Counter: EGR 102 students experienced a final project in which they used the new 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 of a user, based on that user's personal information (height, weight, age). They then compared their own algorithms to those used in commercial apps. To earn extra credit, students were tasked with generating a metric of their own, choosing using their phone’s data.

Individual Project - Home Solar Technology Scenario Analysis: In this individual project, students sought to perform technical and economic analyses of several scenarios for a home solar installation. To accomplish this, they were given three years’ worth of solar radiation and temperature data collected from MSU’s environweather station in East Lansing, as well as home electricity data for a standard East Lansing residence. Using this data as well as governing equations for solar panel energy production, students were asked to determine the energy produced and payback period of a solar panel system with varying battery sizes.

What is Coming Next: New in Fall 2022, EGR 102 plans to partner with various departments in Engineering to have sponsored theme weeks. During a theme week, the weekly team project previously mentioned will be “sponsored” by an engineering major that requires EGR 102. The problem for that week will be based on real world work and created in conjunction with a faculty member in the sponsoring department. Students will further have the opportunity to meet with the faculty member during normal office hours. The goal is to expose incoming students to all engineering departments and the work they do. This will help build early connections with department faculty, which are critical to future growth.

EGR 891 - Technical Writing for Engineers and Scientists: Another CoRe initiative was the development and delivery of training programs and program materials for graduate students on teaching and assessing technical writing in College undergraduate courses. Delivery of these materials was through EGR 891, which was taught both in Spring and Fall semester. The course aimed at enhancing the persuasive writing skills of our students, so they could write technical documents clearly, logically, concisely, and accurately. It was well received by students.

“Prof. Sarkar really cares about the progress of her students.” “This is the best writing course I have ever taken.”

The instruction and overwhelming student feedback led to presenting a paper and leading a workshop at the American Society for Engineering Education (ASEE)’s FYEE Conference 2021, held virtually due to the pandemic.

I am really happy I took EGR 891. I learned how good and simple writing can be. I easily learned LaTeX, thanks to Professor’s well-organized and efficient teaching approach.”

“EGR 891 made an outstanding impact over my analytical writing skills. It polished my knowledge regarding all technical documents. The class was very useful with regard to learning LaTeX.”

CoRe Students Honored at Dean’s Showcase of Stars Event: As in every year, Diversity Career Fair Recruiters connected with our best and brightest STEM students. Forty First-Year Engineering students were awarded by Corporate Sponsors. We congratulate these high-potential students and hope they continue the work they have started.

While our focus on student safety, student engagement, and success will remain, we will continue our mission to help first-year engineering students succeed. We are Spartans and Spartans Will.
WHO WILL ENGINEER TOMORROW? SPARTANS WILL.

First-Year Engineering CoRe Experience
College of Engineering, Michigan State University
219 Wilson Road, Room C101
East Lansing, MI 48825
USA

WEB http://www.egr.msu.edu/core
PHONE 517.355.6616 ext 2
EMAIL core@egr.msu.edu