

Suzanne & Richard Pieper Family Foundation
Endowed Chair for Servant Leadership



College of Engineering
UNIVERSITY OF WISCONSIN-MADISON

Annual Report
October 2020

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Servant Leader Chair for the UW-Madison College of Engineering

The Suzanne and Richard Pieper Family Foundation endowed a servant leader chair position at the UW-Madison College of Engineering in the fall of 2008. The mission of the chair is to “help prepare future leaders in their chosen fields to live lives of service to others by teaching and exemplifying character and moral values. Their examples and actions will lift up society, enrich organizations and communities, and have a positive effect on the least privileged.”

The current chair is Greg Harrington, who also serves as associate department chair for the Department of Civil and Environmental Engineering and is responsible for oversight of the department’s undergraduate program of over 400 students. Greg also teaches and conducts research in the area of drinking water engineering, which has given him opportunities to serve local communities with their drinking water needs and to help students perform drinking water development projects in developing countries. For these efforts, Greg was awarded the Ragnar E. Onstad Award for Service to Society in May 2015 and the Harvey Spangler Award for Innovative Teaching and Learning Practices in March 2020, both from the College of Engineering. He was also honored as the 2019 “Partner of the Year” by UW-Madison’s Center for Leadership and Involvement for his collaboration on the Multi-Institutional Study of Leadership.

Greg works closely with a Servant Leadership team to support the implementation of programs furthering the Foundation’s mission. Mark Kueppers has been collaborating with the team since 2014. Although he no longer has a formal appointment with the College of Engineering he has been instrumental in helping the chair with assessment efforts, particularly with the Multi-Institutional Study of Leadership (MSL). Mark continues to serve as the Director of UW-Madison’s Center for Leadership and Involvement, overseeing the direction and vision of the center. Mark has been integral in helping to provide campus insight and connections to the Pieper Chair.

Also assisting the team this year have been Barb Kautz and James Yonker. Barb is the Assistant Director of Leadership Development at UW-Madison’s Center for Leadership and Involvement and James is a member of the Research and Data Management group in UW-Madison’s Division of Diversity, Equity, and Educational Achievement.

New to our team this year is Paige LaPoint, Director of Student Organizations and Leadership Development in the College of Engineering. The Engineering Student Development office advises the 55+ registered engineering student organizations, providing student leaders with the leadership training, support and resources necessary to implement quality programs and events. The office also assists student organizations with special event planning, budgeting and financial oversight, organizational development and more. In addition to her student organization oversight, Paige has been instrumental in creating the new Emerging Leaders in Engineering program for the college and in helping us reinvigorate the leadership education activity that was suspended in 2018-19. We are thankful to have Paige join us and we enjoy the energy she puts into leadership development for our students.

We are pleased to provide the Pieper Family Foundation with this annual report summarizing our activities through August 2020 and our goals for Academic Year 2020-21. The report is organized in accordance with the criteria set by the foundation to conduct its annual evaluation. We have also included specific information identifying how the funding provided for the Servant Leader Chair has made an impact. We look forward to receiving feedback from the foundation on our activities and to continuing our work into the coming year.

Criterion 1 – Outcomes Baseline Data

Typical Thinking that Goes into Evaluating the Criterion

“The servant leader chairs, with the exception of one, established this criteria before the chair was awarded, expressed in the form of a graph. In all cases this has been done through standard student surveys that the school was already conducting. From those surveys, questions were selected that represent the values, characteristics, actions, and involvement of someone representative of a servant leader. Institutions were asked to plot this going back five or six years as a baseline. The document established the database that will then be used in the future. The alumni portion of this is more elusive and each school has its own unique process. Whatever the benchmark that is established for the school, it’s compared historically going back as many years as possible both for the school and their peers in other schools, which is then continued each year in the future. This is a one-time award.”

Academic Year 2019-20 Progress

As noted in previous reports, we continue to track data in the senior exit survey that is administered by Skyfactor Inc (formerly Educational Benchmarking Inc). Our baseline data is from the 2007-08 academic year, the year prior to the one in which the college received the Pieper Family Foundation award. Our analysis of data since the baseline year is presented in our section on Criterion 3.

We acknowledge that the Skyfactor survey measures important traits of leaders but does not directly address the attributes used to describe servant leaders. Thus, we helped fund the campus-wide and College of Engineering implementation of a survey used by the Multi-Institutional Study of Leadership. This survey also focuses on leadership knowledge using the Social Change Model of Leadership development, which has been tentatively mapped to servant leadership. This survey was administered in 2015 and 2018 with Greg Harrington and Mark Kueppers as co-principal investigators for the entire UW-Madison study. Please note that we participate in the MSL once every three years. Our MSL work is described in more detail in our section on Criterion 5.

Academic Year 2020-21 Goals

We will continue with our campus-wide leadership role in MSL for the coming year. Please see more in our discussion of Criteria 3 and 5.

Criterion 2 – Baseline Acceptance of Servant Leadership

Typical Thinking that Goes into Evaluating the Criterion

“Clear indication that the school is functioning with the qualities of a servant leader; building community, listening, awareness, stewardship, conceptualization and foresight, commitment to the

growth of people and empathy. Displayed in multiple examples of what the school is actually doing will validate this area. It is not unusual that the institutions that receive the Chair already have these types of programs underway. If they are of substantive magnitude, both locally, community, nationally, and internationally, one could expect to receive this one-time award.”

Academic Year 2019-20 Progress

Since our initial report for Year 2008, we have continued to refine our approach, increase our participation, and expand our involvement across campus in servant-leadership activities. Most notably, we have advanced from learning about servant-leadership toward a deeper adoption and commitment to the servant-leader model by aligning it with the broader college and campus commitments to leadership development. Based on the input of our Servant Leadership team, the recently developed UW-Madison Leadership Framework highlights specific leadership competencies and values that are directly connected to Servant Leadership characteristics. These include, but are not limited to, the following:

Servant Leadership Characteristics	UW-Madison Leadership Framework
Awareness	Self-Awareness
Persuasion	Fostering Bridge-Building & Collaboration
Commitment to the Growth of People	Supporting Learning & Development of Others
Building Community	Connection and Community

Most importantly, the UW-Madison Leadership Framework is based on the concept of leadership as the phenomenon of positive change in an individual, group or community’s beliefs, values or behaviors. This dovetails with the Servant Leadership philosophy of being in service to others and not for the purposes of power and authority. Since 2008, we have continued to explicitly integrate Servant Leadership into programming and courses and we have now helped to support campus by ensuring that these principles are being addressed on a campus level. Specific examples are further presented in our section on Criterion 6.

Academic Year 2020-21 Goals

Please see our discussion of Criterion 6.

Criterion 3 – Outcomes Measures Above Demographic Norms

Typical Thinking that Goes into Evaluating the Criterion

Measuring each year what was established in Criterion 1. The baseline data graphs represented in Criterion 1 are updated, both the peer group and the school. If this is considered qualitative data in the minds of the foundation, they will receive an award. If the alumni data is missing, the award will not be made at maximum. If the norms in the institution are reasonably above average, one can expect a higher level award. If there are things missing, one can expect a lower level.

Academic Year 2019-20 Progress

Senior Exit Survey

When receiving the Servant Leader Chair Endowment back in 2008-09, we used results from our senior exit survey to establish baseline performance for Criterion 1. In all of our annual reports since that time, we have continued to use results from that survey to provide longitudinal analysis for Criteria 3 and 4. Rather than provide all of the data from that survey for this report, we summarize and discuss the results of those questions that have relevance to leadership education. We also provide a comparison of our student perceptions with the perceptions of students at peer universities.

The senior exit survey is administered by Skyfactor Inc (formerly known as Educational Benchmarking Inc, EBI) and is taken by seniors at numerous engineering programs across the nation. This allows us to compare the perceptions of our students with the perceptions of students at other engineering programs. For each academic year, we receive the mean response for engineering students from UW-Madison, for engineering students within participating Carnegie peer group programs (research intensive universities), and for engineering students from all programs that participate in the exit survey.

We use statistical analysis to determine:

- whether our students' perceptions are significantly better or worse than perceptions of students at our peer programs, and
- if our students' perceptions are improving or declining with time.

Because a change in educational practice will generally take four to six years to be observed in a senior exit survey, we evaluate the above items over four to six year time intervals.

We selected the following nine questions to analyze for this report:

1. Satisfaction with value derived from team experiences.
2. Satisfaction with value of engineering program student organization activities.
3. Satisfaction with leadership opportunities in engineering program extracurricular activities (Question asked on 2010-2014 surveys) / Satisfaction with the engineering program having extracurricular leadership activities (Question asked on 2015-2020 surveys).
4. Satisfaction with your fellow students' ability to work in teams.
5. Satisfaction with your fellow students' level of camaraderie.
6. Degree that engineering education enhanced ability to function on multidisciplinary teams (Question asked on 2010-2013 surveys) / I am confident that I can function on multidisciplinary teams (Question asked on 2014-2020 surveys).
7. Degree that engineering education enhanced ability to understand ethical responsibilities (Question asked on 2010-2013 surveys) / I am confident that I can understand ethical responsibilities (Question asked on 2014-2020 surveys).

8. Degree that engineering education enhanced ability to understand professional responsibilities (Question asked on 2010-2013 surveys) / I am confident that I can understand professional responsibilities (Question asked on 2014-2020 surveys).
9. Degree that engineering education enhanced ability to recognize the need to engage in lifelong learning (Question asked on 2010-2013 surveys) / I am confident that I can recognize the need to engage in lifelong learning (Question asked on 2014-2020 surveys).

An example of the data is provided in Figure 1 for the third question in the above list: “satisfaction with leadership opportunities in engineering program extracurricular activities.” This figure shows our students’ satisfaction with leadership opportunities and compares their mean satisfaction level with the mean satisfaction level of students at other engineering institutions. The scale on the y-axis has a minimum value of 1 (very dissatisfied) and a maximum value of 7 (very satisfied). The remaining data are provided in Appendix A.

Statistical analyses showed that UW-Madison COE students had a significantly better perception of leadership opportunities at UW-Madison than did peer students of their own institutions. For the most recent three years, there was a visible upward trend in the data shown in Figure 1. However, there was no statistically significant improvement or decline in UW-Madison COE student perceptions of leadership opportunities. A change in survey question for the 2014-15 academic year likely contributed to the observed decline for all three cohorts in that year (see Item 3 above).

When considering the other questions in the same manner, we reached the following conclusions from the Skyfactor survey:

- Our students had significantly better perceptions of the following items than students at participating Carnegie peer institutions and at all participating institutions:
 - Satisfaction with value derived from team experiences.
 - Satisfaction with value of engineering program student organization activities.
 - Satisfaction with leadership opportunities in engineering program extracurricular activities.
 - Satisfaction with fellow students’ ability to work on teams.
 - Satisfaction with fellow students’ level of camaraderie.
 - Satisfaction with how engineering education enhanced ability to function on multidisciplinary teams.
 - Satisfaction with how engineering education enhanced ability to understand professional responsibilities.
 - Satisfaction with how engineering education enhanced ability to recognize need to engage in lifelong learning.

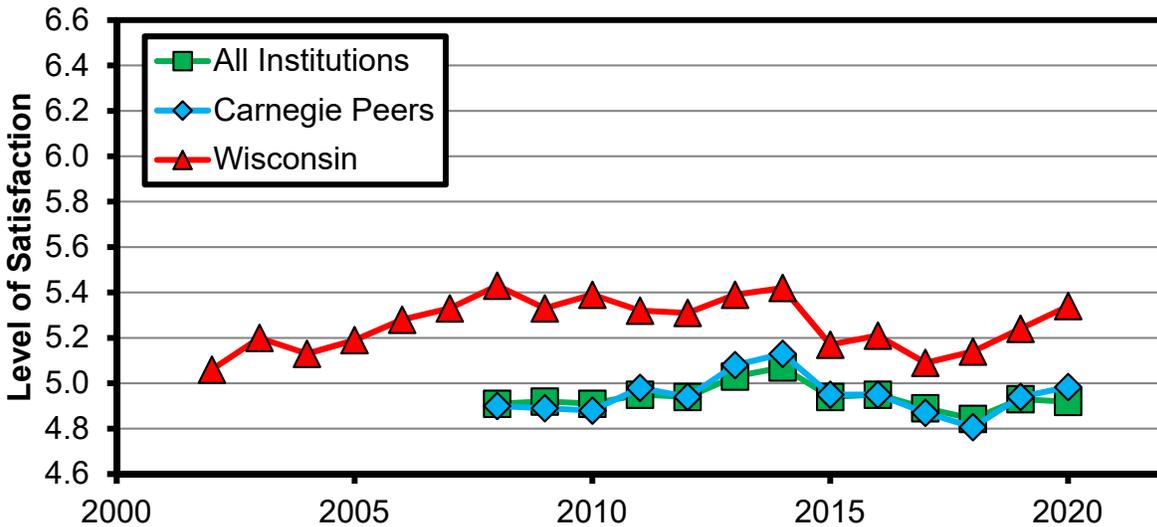


Figure 1. Mean level of satisfaction with leadership opportunities in engineering program extracurricular activities. The x-axis is organized on an academic year basis, so that 2015 refers to the 2014-15 academic year. The Pieper Servant-Leader Chair at the UW-Madison College of Engineering began in the 2008-09 academic year. A change in survey question for the 2014-15 academic year likely contributed to the observed decline for all three cohorts.

Multi-Institutional Study of Leadership

As noted in Criterion 1, UW-Madison students participated in the MSL survey in 2015 and 2018. Because this continues to be a new initiative for our team, we describe this activity in more detail in our section on Criterion 5. Furthermore, because the MSL survey provides more relevant information for the mission of the Pieper Chair, we have dropped using data from the National Survey of Student Engagement (NSSE) as an assessment tool for leadership outcomes.

Academic Year 2020-21 Goals

As noted in our section on Criterion 5, we will continue to participate in the MSL with the UW Center for Leadership and Involvement and the UW Division of Diversity, Equity, and Educational Achievement to further dissect the data and better understand how our engineering students compare to the general student body. Once the MSL 2021 data are processed in 2 to 3 years, this will transition from an initiative to a routine assessment measure.

Criterion 4 – Outcomes Measures Phenomenally Above Demographic Norms

Typical Thinking that Goes into Evaluating the Criterion

If Criterion 3 is profoundly above the norms and a result of the program indicates that they are continuing to track in that way, you can expect awards at this level. For example, on a scale of 1-10, a typical peer institution might be a 4 or 5. A typical institution that would have been considered for a chair might be a 6. Phenomenal performance might be an 8 or a 9. We would expect eventually most of the institutions will be tracking at a 9, which would tend to maximize this award.

Academic Year 2019-20 Progress

The primary distinction between Criteria 3 and 4 is whether outcomes measures are above demographic norms or phenomenally above demographic norms. In our section on Criterion 3, we described how our students perceive our college relative to how other students perceive their colleges. While we have shown that our students perceive items such as leadership opportunities to be above demographic norms (Criterion 3), we defer to the foundation's judgment on whether these perceptions are phenomenally above demographic norms (Criterion 4). As an example, the Skyfactor database used for Criterion 3 is based on a scale of 1 to 7. Converting this to a scale of 1 to 10, our Year 2019-20 scores were in the range of 7.5 to 9.1, an improvement above our Year 2007-08 scores of 7.1 to 8.0. For comparison, our peer institutions' students had perceptions ranging from 6.8 to 8.1 in the baseline year and from 6.9 to 8.7 in Year 2019-20. While our scores are certainly at or near the level of 8 noted by the foundation for Criterion 4, the peer institution averages are also significantly higher than the 4 to 5 range noted for Criterion 4.

Academic Year 2020-21 Goals

As noted above, the primary distinction between Criteria 3 and 4 is whether outcomes measures are above demographic norms or phenomenally above demographic norms. Thus, our goals for Criterion 4 are similar to those already stated for Criterion 3.

Criterion 5 – Breakthrough Venture Promising New Beginnings in Acts of Goodness

Typical Thinking that Goes into Evaluating the Criterion

We are attempting to encourage the institution, its faculty and student body to think beyond their envelope, searching for new ways of networking and collaboration, whole new approaches to enrichment and effectiveness. This is not about ideas, it is about validated actions. If those actions include the institution, the community it lives in, the world it lives in nationally and internationally, and they are phenomenally above it or have exhibited a breakthrough and others are following, this would be a max award. If they have something that is really promising and covers all those areas, it might be on the lower end of the scale. An activity that has some promise will likely

receive a rating of “1” while an activity that is transformational or systemic will likely receive a rating of “3.” An activity that is both transformational and systemic – the ideal synergistic nurturing – may receive a rating of “5.”

Academic Year 2019-20 Progress

In 2019-20, we continued to advance our work by supporting leadership efforts that focused on transformational and systemic change. The primary accomplishments we report below are: 1) the hiring of a new Director of Student Organizations and Leadership Development by the College of Engineering, 2) campus and College of Engineering participation in the Multi-Institutional Study of Leadership, and 3) our continued participation in the summit of the Big Ten Leadership Educators Network.

Director of Student Organizations and Leadership Development

Paige LaPoint was hired to serve as the College of Engineering’s Director of Student Organizations of Leadership Development for the 2019-20 academic year. Paige’s time is approximately 50% in student organization activities and 50% in leadership development activities, although there is considerable overlap in these roles. Focusing on her leadership development activities, Paige accomplished the following in her first year:

- Created COE’s first formal leadership development program, titled “Emerging Leaders in Engineering”. This program is partnered with the Leadership Certificate program (<https://cfli.wisc.edu/leadership-certificate-info-packet/>) offered by the university’s Center for Leadership and Involvement. Appendix B contains a summary of Paige’s first-year work and includes a short description of this program.
- Worked with the Servant Leader Chair to create a new upperclassmen course titled “Applied Leadership Competencies in Engineering.” This required a significant administrative lift – creation of a proposed syllabus and a course proposal in the university’s course proposal system, followed by approval from multiple campus units. Paige is offering the course for the first time in Fall 2020. The course syllabus is provided in Appendix C.
- Partnered with UW-Madison’s UniverCity Alliance and the Servant Leader Chair to include two community-based projects as part of the new course. The projects include an evaluation of autonomous transport implementation for Brown County and improving career exploration opportunities for students in the Adams Friendship School District. Appendix C also contains the scope of services for each of these projects.
- Worked with the Servant Leader Chair to reinstate funding for students and student organizations to lead service-learning or community outreach projects that “lift up society, enrich organizations and communities, and have a positive effect on the least privileged.” Funded projects are aligned with the Pieper Family Foundation belief that human goodness is not simply innate; it requires action and service to others; and that character is inspired and facilitated in cultures, organizations, and families by and through the example of enlightened leadership. Reports from three funded projects are provided in Appendix D.

- Joined the UW-Madison task force for the Multi-Institutional Study of Leadership. Paige has already implemented recommendations from the task force report into her leadership course and program.
- Developed a network of young alumni to serve as mentors for students in the emerging leaders program.

Multi-Institutional Study of Leadership (MSL)

As we have previously reported, the MSL is an international research program focused on understanding the influences of higher education in shaping socially responsible leadership capacity & other leadership related outcomes (e.g., efficacy, cognitive skills, and resiliency). Beyond a research program, the MSL is an international movement toward more effective, evidence-based college student leadership development, and results can be evaluated with other leadership models in mind (including Servant Leadership, see Figure 2). More than 80 institutions of higher education have participated in this study.

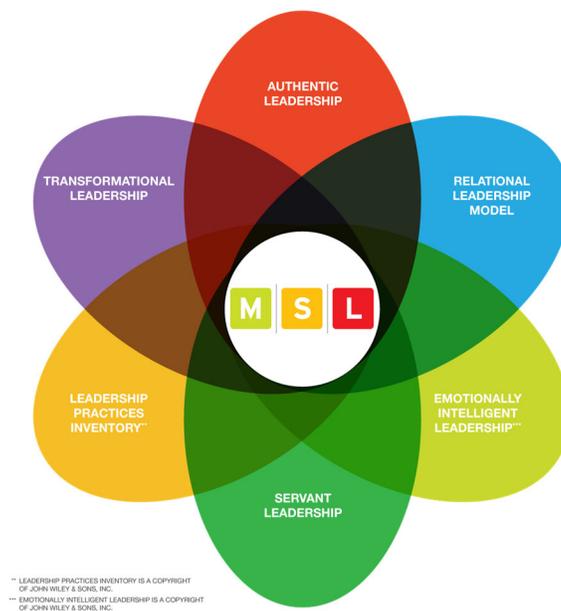


Figure 2 – Visual model of the Multi-Institutional Study of Leadership

During the 2019-20 academic year, we successfully completed a full statistical analysis of the Year 2018 survey completed by undergraduate students across campus. Greg Harrington serves as co-principal investigator for the study, along with Mark Kueppers. Mark is the director for UW-Madison’s Center for Leadership and Involvement.

The analysis was documented in a technical report while key findings and recommendations were summarized in a task force report, several fact sheets, and a webinar attended by more than 60 leadership educators from UW-Madison, Big Ten institutions, and the Milwaukee School of Engineering. Appendix E includes the task force report and fact sheets. All documents were posted at the Leadership @ UW website: <https://leadership.wisc.edu/research/>. Members of the Pieper Foundation and the Pieper Foundation Board are invited to browse the site.

One key purpose for our participation in the study is to serve as a vehicle for continuous improvement of leadership education programs at UW-Madison. As noted in the task force report, one of the key findings was the lack of difference between undergraduate engineering students at UW-Madison and the rest of the undergraduate population. This allowed the task force to make recommendations for improvement that applied across the campus these recommendations did not need to be tailored to specific colleges or schools on campus. As noted earlier, Paige LaPoint has already adopted some recommendations for her leadership course and her emerging leaders program.

Big Ten Leadership Educators Network

Greg Harrington continues to work with Big Ten partners to help sustain the participation of peer institutions in research and continuous improvement efforts via the MSL. The pandemic has challenged institutions to find ways to fund this effort and continued advocacy will be needed in the coming year or more of uncertainty.

Academic Year 2020-21 Goals

College of Engineering Center for Education Innovation

In September 2020, the College of Engineering announced plans to create a center focused on engineering education and innovation efforts. The center is initially proposed to include the Collaborative for Engineering Education and Teaching Effectiveness (CEETE), the UW Engineering Grand Challenges Scholars Program, the Pieper Foundation Servant Leadership Program, the Undergraduate Learning Center, freshmen experiences, capstones, teaching professors, and more. An associate director will be hired. Donor support will provide up to three professorships completely focused on teaching and learning. Greg Harrington and Paige LaPoint have already volunteered to help craft the leadership education component of this initiative and we will report on new developments in our next annual report.

Multi-Institutional Study of Leadership

Greg Harrington and Mark Kueppers are now serving as the campus-level Principal Investigators for the 2021 MSL. Our new initiative for 2021 is to survey the entire undergraduate population of UW-Madison, almost 2.5 times as many students as we have invited to participate in previous editions. This will help us better analyze the least privileged, most marginalized student populations on our campus, so that we can ensure effective delivery of leadership education on a

campus-wide basis. As noted in previous reports to the foundation, after completing participation in the 2021 and 2024 editions of the MSL, we will likely have enough longitudinal data to replace the EBI data used for Criteria 1, 3, and 4.

Now that MSL outcomes are mapped to the outcomes of the UW-Madison Leadership Framework, we will continue our work with the Center for Leadership and Involvement to analyze the data from that perspective. This will help establish a data-based continuous improvement program for coordinated leadership education programming. In a similar vein, the new national-level co-principal investigator for the MSL is Ben Correia-Harker, who is the Associate Director for Engineering and Innovation Leadership Development at Marquette University. Greg Harrington will be reaching out to Ben and the other Servant Leader Chairs to develop a more formal mapping program between MSL metrics and Servant Leadership metrics.

Big Ten Leadership Educators Network

The Big Ten Leadership Educators Network remains committed to meeting annually in an effort to advance the field of leadership education. The University of Wisconsin has been identified as the hosts for the next meeting. If the pandemic allows, we will be hosting this event in July/August 2021. If the 2021 event ends up being held by videoconference, we intend to host the 2022 event. Our next steps in the Big Ten MSL coalition are to work on data analysis and use the results to assist in identifying priorities for leadership education across the conference.

Criterion 6 – Carrying Out Mission of the Chair

Typical Thinking that Goes into Evaluating the Criterion

This is a follow-up of Criterion 2 and is an annual consideration. Is there a broad range of deliverable areas with some reasonable quantity of people involved carrying out the mission of the chair as agreed to and accepted by the institution?

Academic Year 2019-20 Progress

As we discussed at last year's meeting, we have decided to be more judicious in distinguishing between initiatives and routine work of carrying out the chair's mission. We continue to be involved in several campus-level and college-level activities as follows:

1. **Chancellor's Scholars Program.** Dr. Harrington continues to serve as a Chancellor's Scholar mentor, designed to increase educational opportunities for academically talented underrepresented minority students. More information on this program may be found at <http://www.provost.wisc.edu/csp.htm>.
2. **College of Engineering Student Leadership Center.** After our one year hiatus, we continue to work with student organizations in the SLC to offer financial support (up to a total of \$10,000) for UW-Madison College of Engineering students to lead service-

learning or community outreach projects that “lift up society, enrich organizations and communities, and have a positive effect on the least privileged.”

3. **Community-Based Involvement in Engineering Classes.** We continue to work with connections at the Morgridge Center for Public Service and the UniverCity Alliance to bring community-based projects to the Senior Capstone Design course in the Department of Civil and Environmental Engineering. Over the past year, we have performed projects for communities in Pepin, Green, Dane, and Iowa Counties. We have also partnered with our Guatemala unit of Engineers Without Borders to work on school and water supply projects in our freshman engineering class.

Academic Year 2020-21 Goals

We are looking to maintain our Servant Leadership programming opportunities while believing we can expand these opportunities with a new Education Innovation Center. Paige LaPoint will also have a year of her work behind her and will continue to engage in community building for student organizations and in her leadership education program.

Criterion 7 – Servant Leader that Leads at an Element or Segment of our World

Typical Thinking that Goes into Evaluating the Criterion

Is there evidence that a professor in their nurturing locally, community, nation and world is consistently contributing or leading service model versus the power model? Are there multiple students participating in that level? Such a critical mass would be considered promising and obviously if such a leader or professor nurtures someone else who moves into that level, you could expect the maximum award.

Academic Year 2019-20 Progress

We appreciate the foundation’s work to modify a few words for this criterion in the criteria table. As requested by the foundation, Greg Harrington and the chairs from MSOE and Ripon will be prepared for a conversation on this criterion at the meeting on November 4.

Regarding our progress on this criterion during academic year 2019-20, Paige’s implementation of the Emerging Leaders in Engineering program was accompanied with a system to follow students and alumni mentors in the years to come. We are confident that the creation of this infrastructure will provide us with a sound, systematic approach to identifying students and alumni to highlight for this criterion at this time next year.

Academic Year 2020-21 Goals

We are also confident that the college’s new leadership program will instill and reinforce the service-oriented values that our students commonly carry forward into their careers. While we

wish to approach this criterion with some humility, we believe there are a significant number of our former engineering students who are bringing positive change to the world while exhibiting the attributes of servant leaders. This belief is reinforced by the large number of students who are planting the seeds for such service while they are on campus.

We believe we now have the ability to track our students and alumni in ways that our fellow servant leader institutions do. Paige and Greg will continue to work together to nominate one or more students in next year's annual report.

As we have indicated in previous years, we hope to use the Servant Leader Chair endowment to continue encouraging engineering students to participate in activities that serve underprivileged communities both locally and in developing countries. Our funding of student projects focused on providing clean water to impoverished communities and exposing the STEM fields to underrepresented communities is contributing to positive social change. We look forward to participating with and supporting our communities in making the world more just and humane.

Appendix A – Senior Exit Survey Data for Questions Relevant to Leadership Education

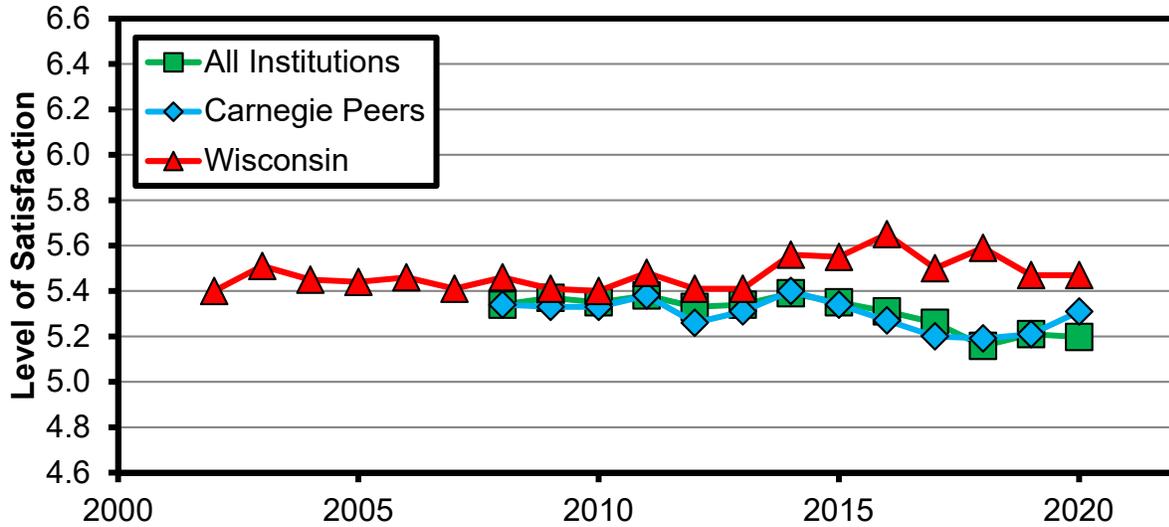


Figure A1. Mean level of satisfaction with value derived from team experiences. The x-axis is organized on an academic year basis, so that 2015 refers to the 2014-15 academic year. The Pieper Servant-Leader Chair at the UW-Madison College of Engineering began in the 2008-09 academic year. The scale on the y-axis has a minimum value of 1 (very dissatisfied) and a maximum value of 7 (very satisfied). For the most recent six years, the difference between Wisconsin and peer engineering institutions was statistically significant at a 95% confidence level. For the same period, there was no statistically significant improvement or decline in student perception at Wisconsin.

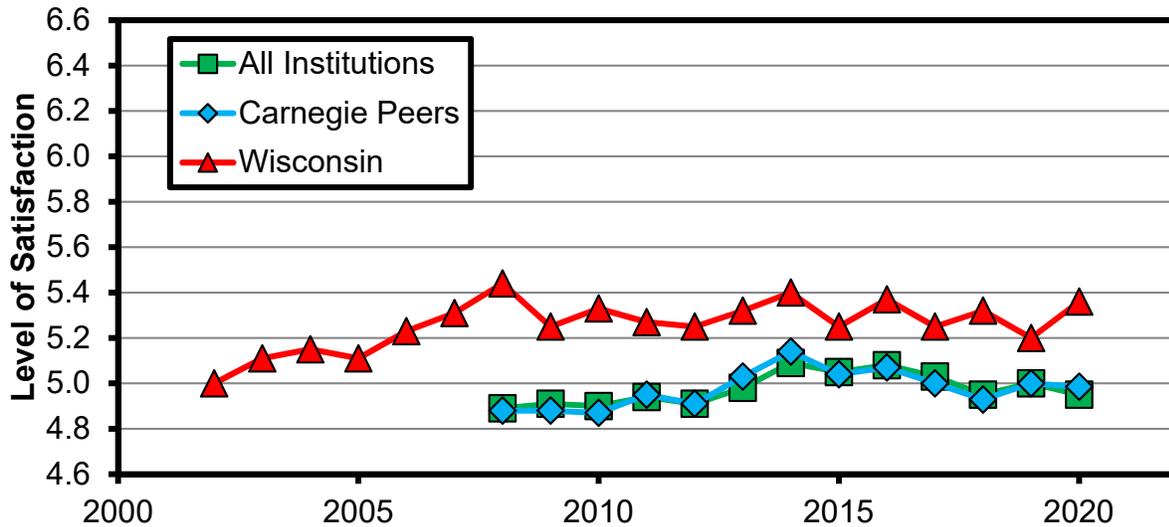


Figure A2. Mean level of satisfaction with value of engineering student organization activities. The x-axis is organized on an academic year basis, so that 2015 refers to the 2014-15 academic year. The Pieper Servant-Leader Chair at the UW-Madison College of Engineering began in the 2008-09 academic year. The scale on the y-axis has a minimum value of 1 (very dissatisfied) and a maximum value of 7 (very satisfied). For the most recent six years, the difference between Wisconsin and peer engineering institutions was statistically significant at a 95% confidence level. For the same period, there was no statistically significant improvement or decline in student perception at Wisconsin.

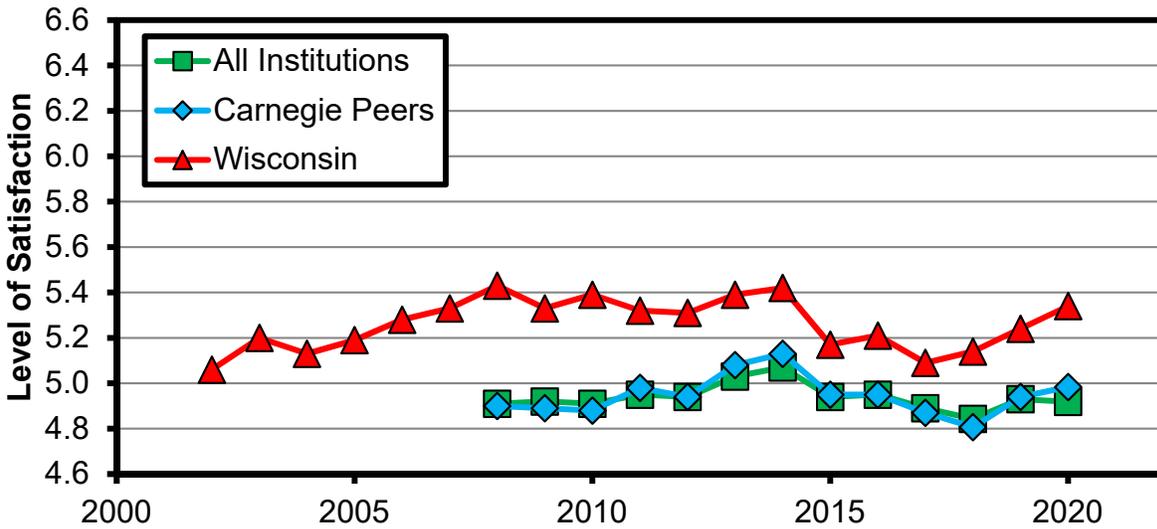


Figure A3. Mean level of satisfaction with leadership opportunities in engineering student organization activities. The x-axis is organized on an academic year basis, so that 2015 refers to the 2014-15 academic year. The Pieper Servant-Leader Chair at the UW-Madison College of Engineering began in the 2008-09 academic year. The scale on the y-axis has a minimum value of 1 (very dissatisfied) and a maximum value of 7 (very satisfied). For the most recent six years, the difference between Wisconsin and peer engineering institutions was statistically significant at a 95% confidence level. For the same period, there was no statistically significant improvement or decline in student perception at Wisconsin.

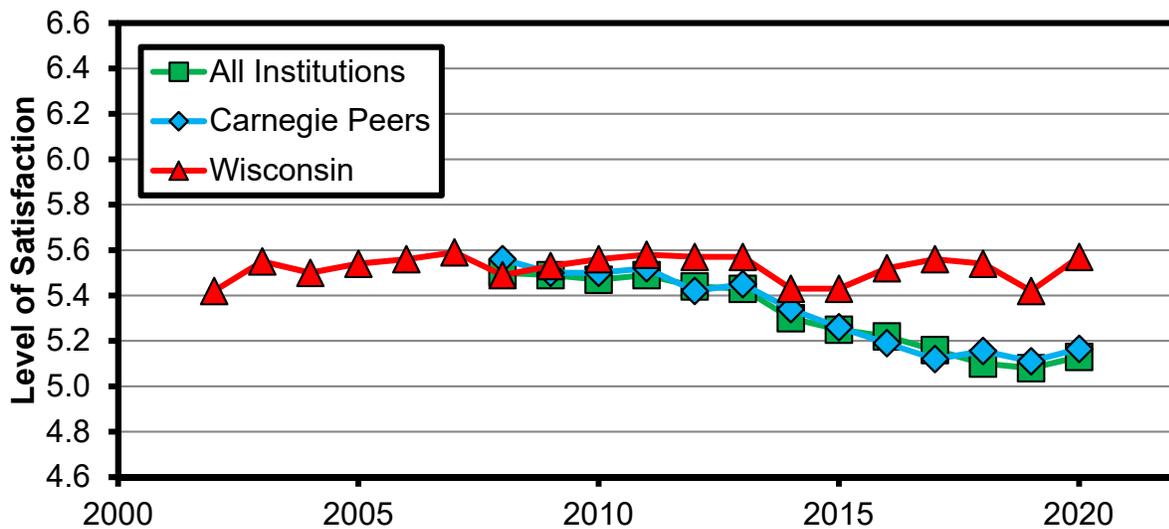


Figure A4. Mean level of satisfaction with fellow students' ability to work in teams. The x-axis is organized on an academic year basis, so that 2015 refers to the 2014-15 academic year. The Pieper Servant-Leader Chair at the UW-Madison College of Engineering began in the 2008-09 academic year. The scale on the y-axis has a minimum value of 1 (very dissatisfied) and a maximum value of 7 (very satisfied). For the most recent six years, the difference between Wisconsin and peer institutions was statistically significant at a 95% confidence level. For the same period, there was no statistically significant improvement or decline in student perception at Wisconsin.

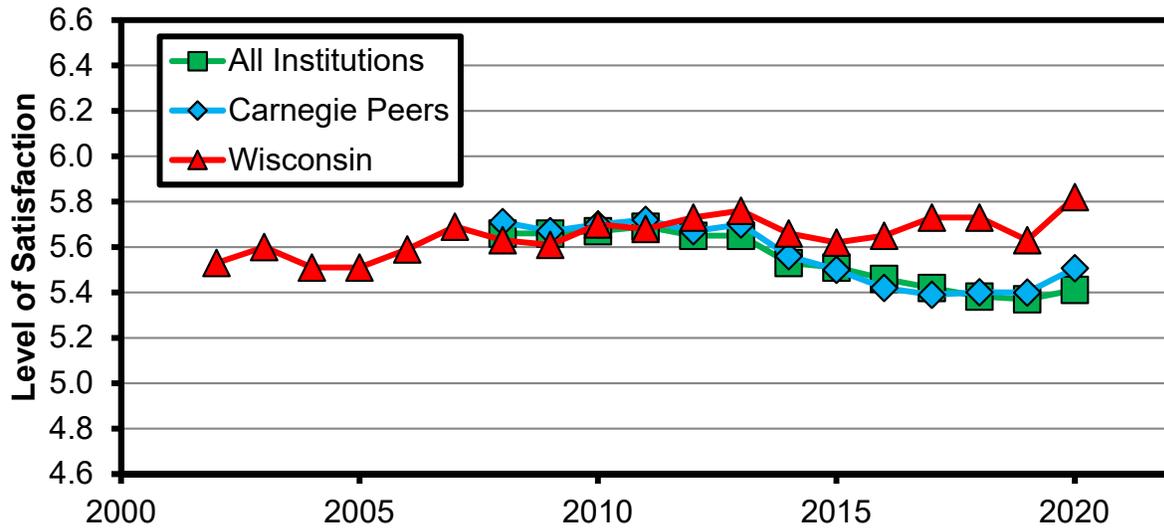


Figure A5. Mean level of satisfaction with fellow students' level of camaraderie. The x-axis is organized on an academic year basis, so that 2015 refers to the 2014-15 academic year. The Pieper Servant-Leader Chair at the UW-Madison College of Engineering began in the 2008-09 academic year. The scale on the y-axis has a minimum value of 1 (very dissatisfied) and a maximum value of 7 (very satisfied). For the most recent six years, the difference between Wisconsin and peer institutions was statistically significant at a 95% confidence level. For the same period, there was no statistically significant improvement or decline in student perception at Wisconsin.

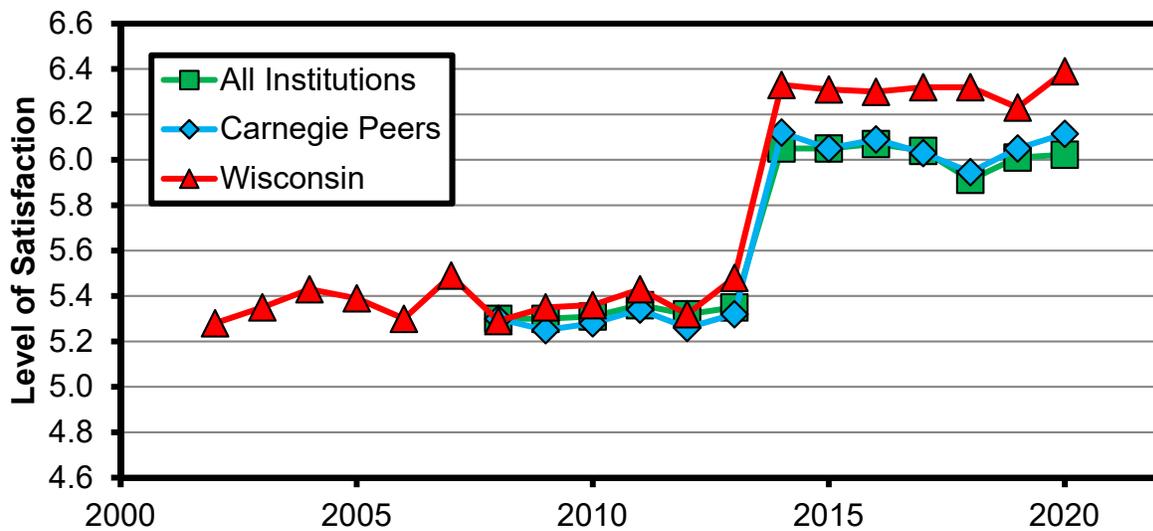


Figure A6. Mean level of satisfaction with how engineering education enhanced ability to function on multidisciplinary teams. The x-axis is organized on an academic year basis, so that 2015 refers to the 2014-15 academic year. The Pieper Servant-Leader Chair at the UW-Madison College of Engineering began in the 2008-09 academic year. The scale on the y-axis has a minimum value of 1 (very dissatisfied) and a maximum value of 7 (very satisfied). For the most recent six years, the difference between Wisconsin and peer institutions was statistically significant at a 95% confidence level. For the same period, there was no statistically significant improvement or decline in student perception at Wisconsin. The large improvement for all institutions in 2013-14 was likely due to a rephrasing of the question asked in the survey.

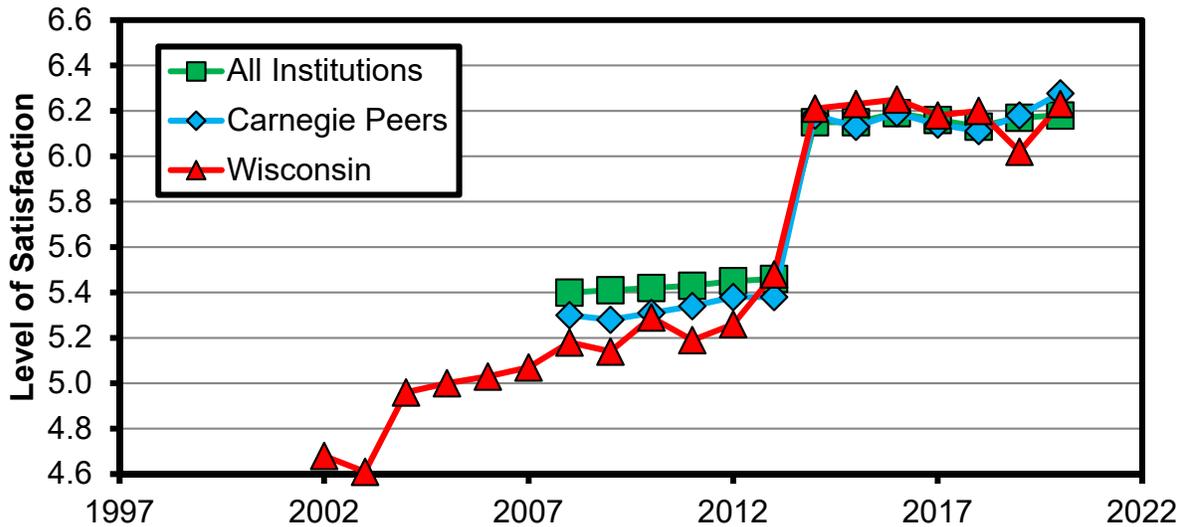


Figure A7. Mean level of satisfaction with how engineering education enhanced ability to understand ethical responsibilities. The x-axis is organized on an academic year basis, so that 2015 refers to the 2014-15 academic year. The Pieper Servant-Leader Chair at the UW-Madison College of Engineering began in the 2008-09 academic year. The scale on the y-axis has a minimum value of 1 (very dissatisfied) and a maximum value of 7 (very satisfied). For the most recent six years, the difference between Wisconsin and peer institutions was not statistically significant at a 95% confidence level. For the same period, there was no statistically significant improvement or decline in student perception at Wisconsin. The large improvement for all institutions in 2013-14 was likely due to a rephrasing of the question asked in the survey.

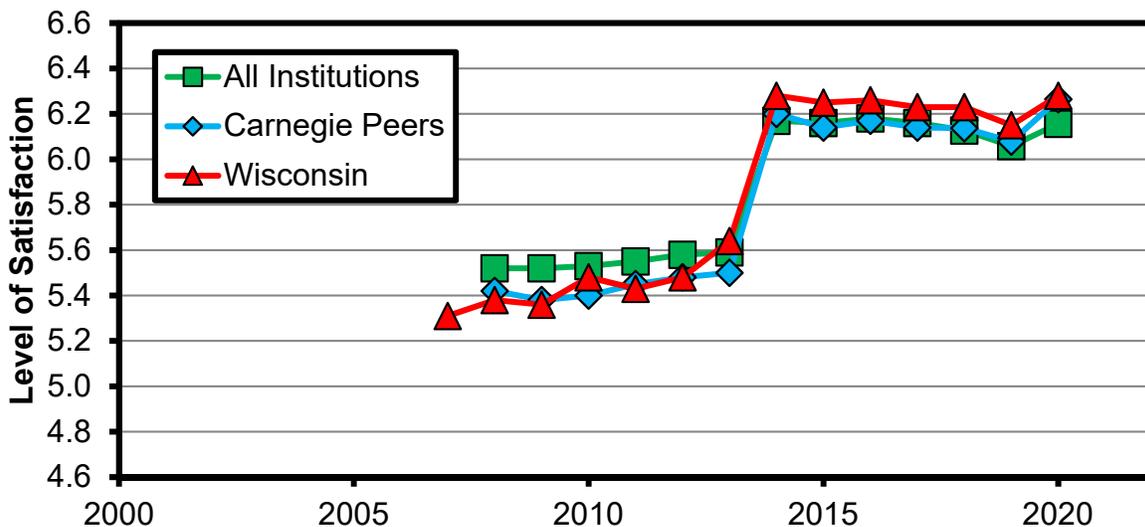


Figure A8. Mean level of satisfaction with how engineering education enhanced ability to understand professional responsibilities. The x-axis is organized on an academic year basis, so that 2015 refers to the 2014-15 academic year. The Pieper Servant-Leader Chair at the UW-Madison College of Engineering began in the 2008-09 academic year. The scale on the y-axis has a minimum value of 1 (very dissatisfied) and a maximum value of 7 (very satisfied). For the most recent six years, the difference between Wisconsin and peer institutions was statistically significant at a 95% confidence level. For the same period, there was no statistically significant improvement or decline in student perception at Wisconsin. The large improvement for all institutions in 2013-14 was likely due to a rephrasing of the question asked in the survey.

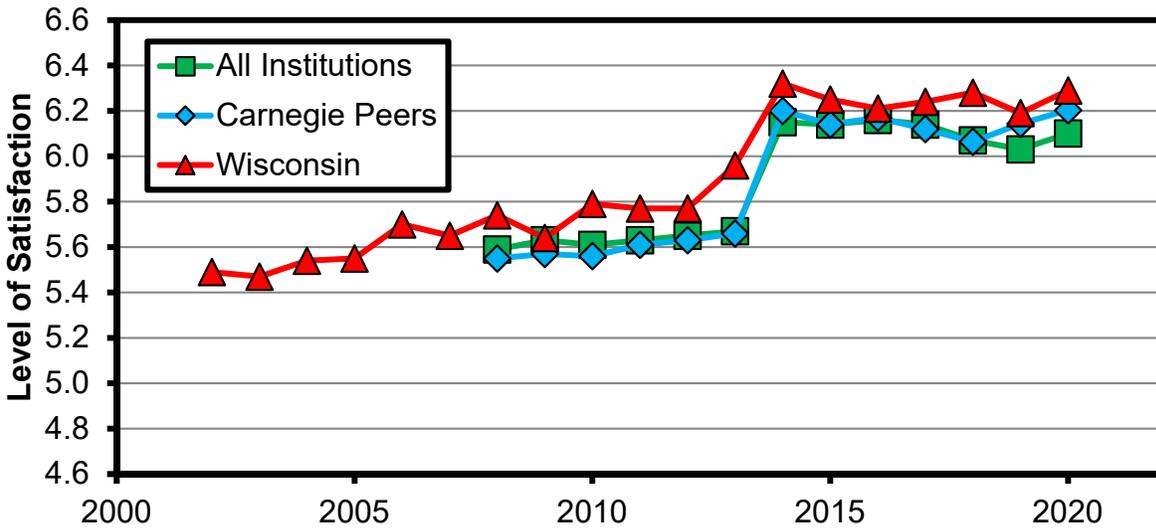


Figure A9. Mean level of satisfaction with how engineering education enhanced ability to recognize need to engage in lifelong learning. The x-axis is organized on an academic year basis, so that 2015 refers to the 2014-15 academic year. The Pieper Servant-Leader Chair at the UW-Madison College of Engineering began in the 2008-09 academic year. The scale on the y-axis has a minimum value of 1 (very dissatisfied) and a maximum value of 7 (very satisfied). For the most recent six years, the difference between Wisconsin and peer engineering institutions is statistically significant at a 95% confidence level. For the same period, there was no statistically significant improvement or decline in student perception at Wisconsin. The large improvement for all institutions in 2013-14 was likely due to a rephrasing of the question asked in the survey.

Appendix B

Curricular and Co-Curricular Initiatives in Engineering Student Development

Paige LaPoint

Director of Student Organizations and Leadership Development
College of Engineering, University of Wisconsin - Madison

INTRODUCTION

During the 2019-2020 school year many advancements were made in the College of Engineering to not only further the importance of leadership education, but *servant leadership* education. In August 2019, Paige LaPoint was hired to serve as the Director of Student Organizations and Leadership Development for the college. In her role, Paige oversees the 50+ organizations that exist in the college, assisting them with their recruitment, retention, finances, and other needs. In addition, she is the advisor to the Wisconsin Engineering Student Council (WESC), which serves as an umbrella organization to the COE organizations.

GETTING ACQUAINTED

To get acquainted, organizations needed to schedule 1:1 advising appointments with Paige to discuss the health of their organizations, as well as determine how they are developing their students' leadership skills. Many organizations knew they were developing key leadership skills and competencies, however, putting words to those experiences proved to be difficult. As such, it is now required that:

1. Organizations attend a leadership development workshop hosted by either Paige or another leadership training office at UW-Madison. Topics range from “Emotional Intelligence” to “Ethical Community Partnerships when Volunteering”. Organization presidents must determine how many students from their organizations will attend this training with Paige in their 1:1 meeting. Success for each organization looks different, and this is discussed in the 1:1
2. Student organizations must attend a yearly policy meeting to ensure they are abiding by best practices and guidelines set forth from the university.
3. Organization presidents will meet with either Paige or the VP of Student Organizations once per semester to discuss the health and wellbeing of their organizations.

Additionally, Paige is working with WESC to determine how funding is awarded to student organizations, and ways to incentivize organizations to participate in activities that ring true to the mission of not only engineering, but servant leadership. Currently the executive board of WESC is reviewing their funding and making strategic decisions on how they want to structure their requirements for organizations, as well as their own programming to align with this.

EMERGING LEADERS IN ENGINEERING PROGRAM

This year also saw the development of the college's first leadership development program. In conjunction with a group of 10 COE students, the Emerging Leaders in Engineering program came to fruition. Interest in this program far exceeded our expectation, with nearly 200 students indicating interest in participating and 22 students being admitted.

The program itself progresses through the UW-Madison Center for Leadership and Involvement's (CfLI) Leadership Certificate (<https://cfl.wisc.edu/leadership-certificate-info-packet/>), asking students to complete all necessary requirements in the academic year. While the leadership certificate itself comes from CfLI, all required experiences occur through the engineering program. As such, students first enroll in INTEREGR 303: Applied Leadership Competencies in Engineering, a new three credit course taken in the fall semester. Students engage in the process of self-discovery, group work, and community partnerships. Students are placed into groups to work on community projects that ask them to engage both their "engineering brains", while developing their professional skills. We have partnered with UniverCity Alliance (<https://university.wisc.edu/>) to be paired with two local counties in the state of Wisconsin who are working to better their communities for the current academic year.

In addition, students are also placed with an alumni mentor to discuss their experiences in the program, as well as to receive guidance and feedback while they navigate their time as an undergraduate student.

In the spring, students will continue to work towards the requirements set forth by CfLI to obtain their certificate, involving themselves in student organizations, leadership development workshops and training, and completing community service hours.

ENGINEERING STUDENT ORGANIZATIONS

- Based on self-reported data from student organizations we went from 1,589 engineering students involved in student organizations during the 18-19 school year, to 1,993 last year (a 25% increase)
- We created and developed the first cohort of the Emerging Leaders in Engineering program, garnering interest from 178 students in total, and accepting 22 students of nearly all engineering majors into our first class.
- Our student organizations won various awards (five organizations reporting winning a combined 8 awards, both nationally and locally):
 - SWE (Society of Women Engineers):
 - Awards Won at WE19 (SWE's Global Conference): SWE Gold Outstanding Collegiate Section Award, a Best Practice Award for Outreach, and a Best Practice Award for Mentoring

- Award Won at WE Local Des Moines (SWE's Local Conference): SWE 2020 WE Local Outstanding Professional Development Event Award
- WiHST (Wisconsin High Speed Transportation):
 - Won - Foxconn Smart Cities, Smart Futures Competition in December 2019 (How to Create the Smart Region)
- SHPE (Society of Hispanic Professional Engineers)
 - Awarded a Multicultural Council grant from the Multicultural Student Union to fund an event in November: An Evening with Dr. Alberta Gloria.
- Insight Wisconsin and EWB (Engineers Without Borders):
 - Both organizations had members win a Wisconsin Idea Fellowship
 - EWB was awarded the fellowship for their project to install a water treatment and distribution system in Camarones, Ecuador to provide a safe and reliable water supply year-round to 500 people in a rural community.
 - Insight Wisconsin's Biomass Briquette Stool team won the award for their project, which serves to mitigate deforestation in Kenya by developing a biomass briquette machine which would create a more sustainable fuel alternative to replace wood.
- We awarded three student organizations Pieper Servant Leadership grants (funding of \$7,500 in total split evenly amongst all three)
 - Funding SWE to facilitate their Engineering Tomorrow's Careers camp for June of 2021
 - Funding EWB for the Ecuador project (see above)
 - Funding SHPE for their Puentes a STEM (Bridges to STEM) event

Appendix C

Syllabus and Project Descriptions for **INTEREGR 303: Applied Competencies for Engineering Leadership**

**College of Engineering****1. COURSE TITLE AND NUMBER**

INTEREGR 303 - Applied Leadership Competencies in Engineering

2. CREDITS AND CONTACT HOURS

3 credits, 3 contact hours per week

3. CANVAS COURSE URL

<https://canvas.wisc.edu/courses/221049>

4. COURSE DESIGNATIONS AND ATTRIBUTES

None

5. MEETING TIME AND LOCATION

Tuesdays and Thursdays from 4:00-5:15
311 Wendt Commons

6. THE COURSE IS

Elective

7. INSTRUCTIONAL MODE

Face-to-face

8. HOW THE COURSE MEETS THE CREDIT HOUR POLICY

This class meets for two, 75-minute class periods each week over the fall semester and carries the expectation that students will work on course learning activities (volunteering, reading, reflecting, writing, etc) for about 3 hours out of the classroom for every class period. There is a volunteer component to this course that will require you to work on a project in coordination with a local Wisconsin community with your peers both inside and outside of class.

9. INSTRUCTORS AND TEACHING ASSISTANTS**9.1 Instructor Title and Name**

Paige LaPoint, Instructor

9.2 Instructor Availability

Wednesday from 1:00-2:00pm.

9.3 Instructor Email/Preferred Contact

plapoint@wisc.edu
608-262-2496

10. OFFICIAL COURSE DESCRIPTION

Introduction to basic leadership theories and perspectives; application of said theories to real-life experiences (both engineering and otherwise) through reflections, course discussion, readings, and experiential education in their local communities. Social Change Model of Leadership Development and Servant Leadership theory, viewed through an Applied Critical Leadership Theory lens.

11. REQUISITES

None

12. LEARNING OUTCOMES

12.1 Course Learning Outcomes

- Identify the leadership role that engineering professionals play in service to a breadth of social, political, environmental, economic, and global issues
- Apply and reflect on the “Seven C’s” of the Social Change Model through engaging as servant leaders in a stewardship service project
- Apply teamwork and leadership skills necessary to embrace individual differences and help groups collaborate on shared aims and values
- Identify and describe one’s own individual strengths, and be able to identify and honor the strengths in others
- Communicate comfortably and professionally with peers, practicing engineers, and adult professionals
- Reflect upon and understand one’s own responsibility to strive for self-awareness, empathy, authenticity, vulnerability, and curiosity when working on leadership skill attainment
- Utilize a critical race perspective to address leadership challenges found in personal and professional experiences to achieve change in response to power, domination, access, and achievement imbalances.*

*Note: outcome language from Santamaria & Santamaria (2012), p. 7

12.2 ABET Student Outcomes

3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

13. BRIEF LIST OF TOPICS TO BE COVERED

- Overview of prevalent theories regarding leadership
 - Social Change Model of Leadership
 - Servant Leadership Theory
- Identifying the strengths of the team and the individual (Clifton Strengths)
- Emotional intelligence, communication, teamwork and group dynamics
- Creating personal and professional goals that align with one's values
- The role of the engineer in both leadership and servant leadership
- Diverse voices in leadership development

14. DISCUSSION SESSIONS

N/A

15. LABORATORY SESSIONS

N/A

16. REQUIRED TEXTBOOK, SOFTWARE & OTHER COURSE MATERIALS

- None. All necessary materials will be provided by the instructor.
 - "Leadership for Social Change"--Helen S. Astin, 1996
 - "The Case for Servant Leadership"--Kent M. Keith, 2008
 - "Strengths Based Leadership"--Tom Rath, Barry Conchie, 2008
 - "Resolving Conflict Rationally and Effectively"
 - "No Hard Feelings"--Liz Fosslein, Mary West Duffy, 2019
 - "Applied Critical Leadership in Education"--Lori J. Santamaria, Andres P. Santamaria, 2012
 - "Emotionally Intelligent Leadership: A Guide for College Students"--Marcy Levy Shankman, Scott J. Allen, Paige Haber-Curran, 2015
 - "Difficult Conversations: How to Discuss What Matters Most"--Douglas Stone, Bruce Patton, Sheila Heen, Roger Fisher, 2010

17. GRADING

This course is heavily project and reflection-based; it emphasizes the importance of reading the material, participating and listening during class discussions, and synthesizing your thoughts into reflection pieces. Successful students will put in the effort to learn more about themselves and their fellow students.

Discussion Participation: 15% An overall assessment will be made of each student's continued participation in class discussion throughout the course. The instructor of this course will continuously evaluate the degree of critical thoughtfulness displayed by each student during the discussion to assess if the reading was completed and reflection from said reading occurred. Attendance will also be used as a metric to determine overall participation in the course.

Participation Grade Guidelines

A: This student comes to class prepared to think carefully, making connections between readings and topics discussed in the course. They are willing to take the lead in discussion periodically, posing interesting questions or taking risks by answering tough questions. This student avoids dominating discussion, instead participating mindfully in conversation with other students, considering their ideas and responding thoughtfully and respectfully. They help to create a sense of a shared conversation in the group as a whole.

AB: This student does most of what an A student does, but may be slightly lacking in one area – for instance, they may be a conscientious reader and thinker who tends not to listen to other students or otherwise dominates conversation instead of engaging in productive deliberation. Or, they may have been late to class a few times without informing the instructor 24-hours prior. Another example of this student would be missing a reading or two, and therefore lacking in overall contribution to the conversation.

B: This student participates often, but not consistently. They may attend every class and do all the readings but avoids actively participating in discussion, instead only responding to questions or adding periodically to others' ideas. This student may participate well, but may have missed a class and did not inform their instructor 24-hours in advance, or failed to submit the makeup assignment after their absence.

BC: This student may be a frequent but superficial discussion participant. At times the student may seem to have not completed readings, though they usually come to class prepared.

C: This student is intermittently prepared for class (e.g., participates well but has missed two classes without informing the instructor prior and did not submit a makeup assignment). They may have moments of excellent contribution, but rarely participate beyond the occasional superficial comment.

D: This student very rarely participates in course discussions. When they do, their participation lacks substance and does not add much to the overall conversation.

F: This student has missed three classes without submitting a makeup assignment and/or attends most classes but never participates.

Class Presentations: 15% Students will be assessed on one individual presentation (5%) and one group presentation (10%).

Reflection Papers: 15% Students will submit several reflection papers throughout the semester regarding the various topics discussed. Reflection papers provide a way for the instructor to assess if students are understanding the material being covered.

Final Reflection Paper: 25% This final paper will discuss themes discovered throughout the semester, as well as answering questions provided in the prompt.

Volunteer Project Proposal and Final Paper: 30% A large portion of the class surrounds your volunteer project, the proposal you submit (10% of grade), and the final product for the community partner (20% of grade). This volunteer project asks for you to employ your “engineering brains”, while simultaneously understanding your due diligence as engineers to serve others. As such, you will collaborate with communities in Wisconsin to work on a project that utilizes your skills. You (and the team you will be paired with for this project) are expected to work with said partners to review the Scope of Service document that has been assigned to your group and complete the deliverables that have been outlined in the document, as well as those that have been discussed with your partners. Once you review your scope of service and work with both your mentors and project leads, you will write a project proposal with your team and submit it for approval to your instructor, as well as the local non-profit. Once it has been approved by both entities you and your team will utilize the class periods that are not being held to complete your approved project.

Overall Grading Scale

A	90% or more
AB	85-89.9%
B	80-84.9%
BC	75-79.9%
C	70-74.9%
D	60-69.9%
F	Below 59.9%

18. EXAMS, QUIZZES, PAPERS & OTHER MAJOR GRADED WORK

- As listed above, two presentations will occur throughout the course. Both of these presentations will take place in class. One will be individual, and the other will be with the group students are assigned to. It is the expectation that the group members collaborate equally in the preparation and presentation of their assignment.
- All reflection papers (final or otherwise) are to be submitted electronically in Canvas by the end of the due date (11:59pm). The group volunteer project proposal will be due via Canvas to the instructor by the end of the due date (11:59pm).
- Your sign-in sheet will be due in class on 12/8/2020

19. HOMEWORK & OTHER ASSIGNMENTS

- Homework will be posted on the course Canvas site and announced during class.
- It is the expectation of your instructor that reflection papers are done on an individual basis, and group work is completed equally amongst the group.

- Fellow group members will complete assessment sheets on their groups to help the instructor assess if all group members were contributing equally to the effort of the team.
- Late assignments will lose 10% per day late unless prior approval from the instructor.
- Attendance for class is required and will be taken at the beginning of each class. Attendance will play a role in your overall participation grade. If you must miss a class period it must be cleared with the instructor *before* the class period via email.

20. OTHER COURSE INFORMATION

N/A

21. SAMPLE COURSE OUTLINE

<i>Date</i>	<i>Theme</i>	<i>Topic</i>	<i>Homework</i>	<i>Due</i>
9/3	Introduction	Review syllabus, course expectations, etc. Intro to course and projects	Input preference for project into canvas.	9/8
9/8	Introduction	Larry from CfLI	Read "The Engineer of 2020" ch. 4	9/10
9/15	Introduction	The Engineer of 2020 discussion. Value Setting discussion. Begin discussing the projects.	Read "Leadership for Social Change", Reflection # 1: Value Setting	9/17
9/17	Introduction	Group work. Astin's "Leadership for Social Change" review.	Reflection # 2 " <u>Emotional Intelligence</u> "--Create group work contracts and determine "team lead" (due on 9/24)	9/22
9/22	Individual	Consciousness of Self theme...group work time	Take Strengths Assessment and schedule 1:1--Continue Group Project--Create group work contracts and determine "team lead"	9/24
9/24	Individual	Discuss Strengths, continue with group work	Prep for Strengths Testimonials Presentation--Continue Group Project	9/29
9/29	Individual	Strengths Testimonials (presentations)	Continue Group Project. Submit Project Proposal based on Scope of Services	10/1

10/1	Individual	Strengths Testimonials (presentations)	Continue working on project	10/6
10/6	Community Project	Work Time	Read "No Hard Feelings" Ch. 4 Handout-- Reflection #3	10/8
10/8	Individual	Congruence Exercise	Reflection #4 -- Identifying Your Why	10/13
10/13	Individual	Commitment--personal development plans	Reflection #5 --Personal Development Plans	10/15
10/15	Group	Group Work Time	Read Strengths Based Leadership Book Part Two	10/20
10/20	Group	Collaboration--Team Strengths Activity	Read "No Hard Feelings" Ch. 5	10/22
10/22	Group	Work Time	Work Time--submit working draft of work	10/27
10/27	Leadership Diversity	TBD	Read "Resolving Conflict Rationally and Effectively", as well as "No Hard Feelings" Ch. 6 and submit Reflection #6 (Canvas)	
10/29	Group	Controversy with Civility discussion	Read "The Case for Servant Leadership Ch. 3	10/27
11/3	Community	Citizenship--Discuss Servant Leadership-- Presentation	Read "The Case for Servant Leadership Ch. 4"	10/29
11/5	Community	Morgridge Center Speaker	Reflection #7 --The Danger of a Single Story (via CfLI Certificate)	11/5
11/10	Group Work	Group Work	Group Work--prep for check in	
11/12	Group Work	Work check-in		
11/17		Emotional Intelligence Convo	Competency Essay Due	11/19
11/19	Community Project	Group Project		
11/24	Community Project	Group Project	Reflection #8 Leadership Modules (via CfLI Certificate)	

12/1	Engineering Leadership	Guest Speaker (Diverse Perspective)		
12/3	Community Project	Group Project	Work Time	
12/8	Community Project	Presentations		
12/10	Community Project	Presentations	Final Project Due	12/15

RULES, RIGHTS & RESPONSIBILITIES

· See the Guide's to [Rules, Rights and Responsibilities](#)

ACADEMIC INTEGRITY

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison's community of scholars in which everyone's academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review. For more information, refer to <https://conduct.students.wisc.edu/academic-integrity/>.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

McBurney Disability Resource Center syllabus statement: "The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA." <http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php>

DIVERSITY & INCLUSION

Institutional statement on diversity: "Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. Disrespectful behavior or comments directed toward any group or individual will be addressed by the instructor.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world." <https://diversity.wisc.edu/>

Scope of Services for Student Teams in
Inter Egr 303: Applied Leadership Competencies in Engineering
Improving Career Exploration Opportunities for Adams-Friendship School District (AFSD)
Adams County, Wisconsin
Fall 2020

Project Background

AFSD seeks creative ways to get their students to explore a variety of careers inside and outside of Adams County. The school has homeroom/advisory periods where teachers can work with students complete an online program (called Xello), but it seems like the teachers do not always take full advantage of their time together.

Project Objectives

1. To provide AFSD with suggestions for how to better get teachers to accept and engage in a role as advisor during the advisory time.
2. To provide AFSD with ideas for how to make career development material incorporated into core subject classes.

Scope of Services

Students will provide reports that address the project objectives. This might include doing some focus groups with teachers to understand what the barriers are to them going deeper with students. Students will produce some documents that help make it easier for teachers to assume their role as advisors. Students will also produce concrete documents that make it easier to connect their lessons to the real world of work and careers in various disciplines. Ideas will be evaluated by:

- Feasibility of implementation and buy-in by teachers
- Feasibility of implementation and buy-in by counselors
- K-12 student buy-in and interest
- Inclusive of careers that are prominent in Adams County, but also do expose students to careers beyond Adams County
- Budget-neutral solutions
- Solutions are with respect to existing content within Xello
- Engaging local employers

Data Available:

- Sign-in information available for Xello (so UW students can understand the program better)
- Contact information for teachers, some K-12 students, and other counselors
- Any other relevant data about usage for Xello? Or career interests of the K-12 students?

Communication:

One project lead from the group will communicate weekly with Evelyn Kabke (kabke_e@afasd.net) and Tim Jensen (jensen_t@afasd.net)

Scope of Services for Student Teams in
Inter Egr 303: Applied Leadership Competencies in Engineering
Evaluation of Autonomous Vehicle Route Alternatives
Brown County, Wisconsin

Fall 2020

Project Background

Brown County has been investigating the possibility of piloting an autonomous vehicle route in three different areas of the county:

- Downtown Green Bay
- The Lambeau Field/Stadium District
- Green Bay-Austin Straubel International Airport

Some preliminary work done by Jon Riehl (UW-Madison TOPS Lab) identified one potential route in each of these three areas, which helped the county think through some basics of cost and functionality.

Project Objective

The objective of this project is to recommend which of the three route alternatives makes most sense for installing a pilot autonomous vehicle route.

Scope of Services

Each student team shall provide a report titled “Evaluation of Alternative Autonomous Vehicle Testing Routes for Brown County, Wisconsin.” The report shall include the following:

- Introduction and project objective, including brief description of each proposed route
- Critical review of previous studies and reports, to include discussion of:
 - Connected vehicle (CV) technology (including DSRC, C-V2X, 4G, and 5G), to include units and range of service
 - Autonomous vehicle tests in other communities, to include:
 - Societal, economic, and environmental impacts on the community
 - Technical hurdles encountered and overcome, including weather-related items
 - Vehicle interaction with CV technology
 - Infrastructure interaction with CV technology (e.g., cameras, traffic signals, fiber optic network, etc.)
- Discussion of pertinent:
 - Regulatory codes
 - Professional standards
 - Professional guidelines for measuring project success (e.g., ASCE’s Envision System)
- For each of the three alternative routes, provide the following route-specific analysis:
 - A detailed review of the route and its existing conditions
 - Overall route length
 - Types of neighborhoods served: residential, commercial, industrial, tourist, etc.
 - Street names and status (arterial, collector, etc.), plus lengths and widths of each street

- Traffic volumes, including seasonal and diurnal effects
- Crash incident reports
- Opportunity for CV technology implementation with existing infrastructure (including the existing fiber optic network)
- Other pertinent conditions
- Review of economic sustainability, to include:
 - Initial (installation, capital) and life-cycle (operating, maintenance) costs of CV technology, specific to the route
 - Financial benefit to Brown County, its citizens and its businesses
 - Alignment with existing economic development plans
 - Potential for future route expansion
 - Impact on financial viability of public transportation
 - Other pertinent items
- Review of environmental sustainability, to include
 - Fossil fuel use
 - Air emissions
 - Other pertinent items
- Review of social sustainability, to include
 - Roadway and pedestrian safety
 - Who benefits and/or loses
 - Barriers to overcome in adoption of the technology
 - Connections to existing public transportation systems, including bus routes, bicycle/pedestrian trails, and parking lots
 - Other pertinent items
- Political feasibility
 - Description of neighborhood support or opposition to the route, to include both existing and anticipated support or opposition
 - Description of elected city and county official support or opposition to the route, to include both existing and anticipated support or opposition
 - Description of appointed city and county official support or opposition to the route, to include both existing and anticipated support or opposition
 - Description of how the above items would be covered by the local media
 - Other pertinent items
- Using the above key categories, compare the three alternative routes. Use a decision matrix with the above criteria to assist with the comparison. Emphasize which criteria differentiate the routes from each other.
- Recommend the best route to the county.

Data Available:

- Autonomous vehicle PPT explaining each route
- Information about 5G discussions in Brown County
- Brown County Community Area Network (BCCAN) Map/Information
- Existing plans for development close to the proposed routes
- Any other data request that may come forth as we move through the process

Communication:

One project lead from the group will communicate weekly with Brown County's Deputy County Executive, Jeff Flynt (jeffrey.flynt@browncountywi.gov).

Appendix D

Student Organization Progress Reports for Servant Leadership Projects

Pieper Servant Leadership Fund Progress Report Ecuador Program, Engineers Without Borders

Since receiving the generous support from the Pieper Servant Leadership Fund, the Ecuador Program of Engineers Without Borders (EWB) has experienced a renewed understanding and commitment to the principles of servant leadership. Despite the uncertain circumstances of the pandemic, the Ecuador program has explored and introduced creative ways to practice awareness, stewardship, growth, careful listening and community building thus far that will carry into the school year. With careful and considerate planning, our student servant leaders aim to sow the most effective group structure and dynamic needed to ensure implementation and overall project success when the time comes.

The Camarones water project was born of servant leadership itself in 2017, as the leaders in town sought the assistance of the EWB Ecuador group to achieve a clear goal: to install a water treatment and distribution system that provides Camarones with a safe and reliable water supply year-round. Currently, the Camarones community obtains water from local water trucks where families can purchase five-gallon jugs. However, flooding during the rainy season makes it difficult for these trucks to access the community, leaving residents to depend on a nearby river as their main source of water. This river is contaminated with *E. coli* and aerobic bacteria, posing a major health concern for the community. As a non-profit volunteer organization, the Ecuador team must raise the vast majority of project costs. The support of the Pieper Fund would alleviate the equivalent of the costs of materials to construct the three central water stations in our final plan, or about a third of the costs expected for the first implementation trip. Although this is a challenging benchmark to meet, it is nothing compared to the cost of human health, for which the team is committed to funding the most sustainable and effective system design for Camarones.

As student leaders working to complete a water supply project in another country, awareness is a crucial skill. The Camarones community, students in EWB-Ecuador, and financial donors have an immense amount of trust in our project leadership, largely due to the consciousness that we have demonstrated in our work. With the emergence of COVID-19 during the spring semester, awareness as leaders has become more important than ever. Despite the fact that in-person meetings for student organizations were suspended in March, our project team remained committed by working remotely to finish the pre-implementation rough draft in April, an 80+ page document. Recognition of the additional challenges faced by community members, students, and mentors during the pandemic was critical to ensuring effective communication between parties as work on the water project progressed. With international travel currently suspended for student organizations, our August 2020 trip to begin construction of the water system is postponed. It is unclear when the next opportunity to reschedule that trip will be, given the uncertainty of travel at the moment. However, the impact that COVID-19 has had on the community in Camarones prompted us to work with our NGO, Ceiba Foundation, to address immediate needs in Camarones. Through email and social media, we pursued donations to help Ceiba put together care packages that provided food and PPE to families in Camarones and other nearby communities. Moving forward into the 2020 fall semester, awareness will remain a focal point of our leadership strategy. It will aid us in facilitating collaboration between our project's

various parties, simultaneously meeting the immediate needs of our students in Madison and families in Ecuador.

As a student-led organization, it is important to build a strong sense of stewardship so we can provide a successful, sustainable foundation for current and future operations. Because we are held to report deadlines by EWB-USA, we are diligent in addressing our work in a timely, planned manner. At the start of every semester and at various checkpoints along the way, we make a shared group calendar of important dates and a timeline of tasks to accomplish. Project managers (PMs) are responsible for keeping this information up to date, exchange best plans of action with the team, and supporting these to ensure objectives are met. As such, we will commence the EWB year in September with this planning and grounding session, while dynamically adapting throughout the semester. A large portion of this semester's work will involve iterative revision of the pre-implementation draft. Completing technical reports requires collaboration not only between students, but also professional engineering mentors, members of Ceiba, and notable members of Camarones. In a proactive effort, PMs took the lead earlier this summer on reviewing the feedback from EWB-USA on the pre-implementation draft despite the end of the academic semester. To effectively address and outline action items for the rest of the group, our leaders reached out to mentors and contacts in Ecuador time and again, demonstrating initiative to address issues quickly and correctly. Keeping in contact with our community is especially important during the summer to show we are committed to the success of this project. In addition to raising donations for the care packages, the team shared important COVID-19 health and safety information and EWB-USA wash station design materials related to sanitation with Ceiba to support our partner communities and the surrounding area. Even during these challenging times, the leaders of our group are committed to and feel responsible for preparing students to make positive change with lasting consequences. This fall, we will continue to work together to inspire students and community members, equip the Ecuador Program with the necessary resources for continued partnership, and further cultivate stewardship towards this basic human rights cause.

One of the primary reasons many students join Engineers Without Borders is because they are seeking multi-dimensional growth. Evolving from an undergraduate to a real-life engineer and working member of society requires experience on real engineering projects. The Ecuador team looks to optimize these learning opportunities, offering members to take part in a project greater than oneself to grow into their best fit. We aim to push our intellectual and personal limits for the sake of the project, as well as for the sake of the communities of Tabuga and Camarones. Most of this blossoming occurs during weekly meetings and weekend "write-a-thons", where team members can partake in technical writing and engineering problem solving with the guidance of mentors that are in the field of engineering. With communication between our team and Camarones being a top priority during the COVID-19 pandemic, students also have the chance to engage in culturally sensitive project planning across language and customs. Through all this change, patience has been a key aspect of growth of the Ecuador team. International projects with collective funding such as the Camarones project require comprehensive planning with extensive risk mitigation strategy. The adversities of 2020 were initially concerning, but gave way to our best example of growth: the team's core members have come together and have bravely prepared for an unexpected 2020-2021 school year filled with meaningful work to prepare for an ideal implementation trip once travel bans are lifted. The

timeline may be shifted, but we see this as valuable time and space for team members to be exposed to a wider range of project activities and produce the best version of our project.

With such a unique form of opportunity we will encounter for the next few months, the Ecuador team must be extremely attentive to the remote work being carried out as well as to our partners. This new mode of operation may only become its best version if our servant leaders express an absolute willingness to listen. Ecuador leaders must inevitably make some initial decisions in the beginning of this year's activities, but in order for the group to progress, the voices of our members must come to the table in an iterative fashion so as to jointly develop and implement optimal progress. To address this principle, our leaders will purposefully engage with members and community partners to touch base, hear opinions and receive constructive criticism. These exchanges will take the form of simple Google surveys, in-meeting checkpoints, calls to in-country partners with prepared questions and informal conversations with diverse people involved with the water project. Although the feedback may be difficult to hear and complex in its origin, leaders will empathically welcome every sentence. The more data we have on our mechanisms, the more accurately portrayed the picture of our organization, allowing us to make more clear steps in the direction of our goal from our current state.

When the university went fully online after mid-March, the Ecuador team was caught during the most critical point in finishing a complete draft of the pre-implementation report for an August trip. With plenty of writing to go and a deadline to meet for our +80 page document, the inability for students and mentors to collaborate in-person struck a hard blow to the team's typical operation as well as its identity. In spite of these challenging circumstances, our group was able to come together in a great last push during the following Saturdays leading up to April 4th- the crucial date. The spirit of togetherness while overcoming this difficulty brought members together with enthusiasm and humor every weekend, while reliably completing work as partners. Completing this report was made possible because of the welcoming environment within EWB-Ecuador, carried out as countless Zoom meetings, Google Meets check-ins, and sharing of memes. In addition to work, program managers held virtual Netflix and trivia night events for our team in the Spring to keep our group connected as we all socially distanced. Throughout the summer months, team leaders have also made additional efforts in talking with our NGO and partners to grow closer in these times of separation. The sense of community within our organization goes beyond these planned events and calls; it is an intentional space to make meaningful relationships. Although general weekly meetings and additional work time will continue to take place virtually, Ecuador team leaders hope to maintain this sense of fellowship by exploring options to hold small outdoors social sessions, collective video calls with Ecuador partners, as well as a variety of different online activities like game nights. Perhaps these are not our preferred ways to come together, but we believe in the possibility for community building and are determined to make trust a primary focus in upcoming months.

While the developments so far and future plans discussed in this report are only some examples of ways servant leadership takes shape in the Ecuador team, our members continue to astound with their creative potential for problem solving and effective collaboration. The conscious application of servant leadership principles, regardless of the timing or type of challenges faced, is the new normal for this amazing team and the leaders it produces.

Pieper Servant Leadership Progress Report
Society of Hispanic Professional Engineers (SHPE): *Puentes a STEM*

SHPE UW–Madison has made an impact in the surrounding communities through our participation in local high school events. Our chapter has also become a powerhouse for Hispanic leadership talent and strives to promote academic excellence and professional experience within our chapter. We have positions dedicated to improving performance within the College of Engineering as well as managing professional outreach so our members have a leg up on the competition upon graduating from the university. SHPE events are dedicated to bringing in well-known companies to network and inform our members about jobs in industry and research, while in turn helping companies recruit more Hispanic engineers.

Recently, SHPE UW–Madison has diverted more attention to our community involvement, specifically within local Madison high schools. We proposed an enriching SHPE Junior program that will promote the involvement and engagement of Hispanics in the STEM fields. Thanks to the Pieper Servant Leadership award, we have been given the opportunity to pursue that outreach initiative, rebranded as *Puentes a STEM*. *Puentes a STEM* is Spanish for “Bridges to STEM,” and through the program, we are working to build bridges and connections for high school students to view engineering as a possibility for them, regardless of their societal standing or ethnicity.

Hispanics currently make up 6% of the STEM workforce [1]. *Puentes a STEM* was envisioned to help increase the exposure of STEM careers, with an emphasis on engineering, to local high school Hispanic students through various activities and mentorship. SHPE members will self-select with this motivation and engage as individuals dedicated to educating high school students, from an underrepresented background, that STEM careers are possible for people of our ethnicity.

Our program continuously exhibits that servant leadership philosophy as our SHPE chapter members answer the calling to serve others without pursuing self-interests [2]. Through *Puentes a STEM*, members from our chapter will pursue their desire and commitment to serve the Hispanic community of Madison through an increased awareness of STEM. *Puentes a STEM* will serve as a portal for the high school student to learn and grow from a university engineering student, who in turn learns and grows from the high school student, each presenting as a servant leader to one another. Through the work of our SHPE members as mentors and guides for at-home STEM activities and general guidance to the STEM field, the local Hispanic community will get to know what engineering and STEM are, and see it as an achievable goal rather than a distant dream. Not only will high school students benefit, but their families, teachers, and surrounding communities will also be impacted by *Puentes a STEM*.

For high school students, a large part of their future decision making is based on what and who they are exposed to. Unless they have witnessed or heard about a specific topic from someone else, even if it would fit their interests, they are unlikely to look into it further or find it themselves. In past SHPE outreach events, the most common reaction we get from the Hispanic high school students is “I’ve never heard of ‘Engineering’ before.” And even if they have heard of engineering or STEM before, it is often followed up by the second most common reaction of “I didn’t think this was possible for someone like me.”

Through *Puentes a STEM*, the high school students are exposed to people pursuing these “unheard of” fields in engineering and STEM, while also being able to identify with them. By

matching up the participating high school students with mentors that are currently pursuing a degree in engineering, this relationship will foster confidence and knowledge in the mentee to start pursuing their own career into engineering. Through bi-weekly, chaperoned zoom meetings, the students can ask their mentors about their experiences and gain insight into what engineering looks like post high school courses. Often, the relationship built between the mentor and mentee can help the high school student decide what courses they want to take during their high school career to prepare for engineering in college and beyond. As servant leaders, it is our duty to build community, and through *Puentes a STEM*, we are establishing an inclusive Hispanic engineering and STEM community that builds on each other in our communal pursuit to break the barriers facing Hispanic STEM students.

We also provide the high school students a larger exposure to what their future in STEM could look like. For example, we will do the 10 Paper Challenge activity which involves holding up a heavy book (preferably a math textbook) above a certain height using only ten sheets of paper and 1 meter of tape. This challenges the students to design a structure to hold the book without breaking, much like how Civil Engineers have to design bridges that do not break under heavy loads. By participating in the activities with the help of their mentors and our explanations of how each activity relates to an engineering field, the high school students can begin to recognize different engineering disciplines and pursue whichever they find the most interesting. The mentor can then help them with their progression into the field, which in most cases involves getting into college. Their mentor is an example that college is possible for all Hispanics, and the mentor can help answer questions they have regarding engineering and STEM in college. Through the student's experiences with their mentor and the *Puentes a STEM* program, this can lead them to view college as a viable part of their path to work in engineering.

While the *Puentes a STEM* program target audience is the high school students of the greater Madison area, the program also has a profound impact on the teachers as well. By collaborating with SHPE UW-Madison, high school teachers can reinforce their lessons with STEM activities hosted by our SHPE members. For example, the 10 Paper Challenge is very relevant to geometry and trying to make structures using shapes and angles. If the class is learning about forces in physics, this challenge can help show how force distribution along the structure can help or hinder the structure from holding up the book. The events planned for *Puentes a STEM* reflect what the students are learning in their science and math classes, complementing their learning experiences in the frame of expanding into engineering mindset and future careers. Should a student want to learn more about a certain topic pertaining to STEM, the teachers can also utilize the SHPE UW-Madison members as references and further the student's curiosity in STEM. As mentioned before, exposure is key to introducing Hispanic students to STEM fields. Teachers can only provide resources they are familiar with to their students, meaning if they are not familiar with certain engineering topics or groups, such as SHPE, that information does not get passed on to the students that would benefit from it. For their Hispanic students, this program and our SHPE chapter will become a wellspring of knowledge and connections that teachers can provide for their students who show an interest in learning more about STEM.

Just as stewards fitted noble children to become royalty, the SHPE chapter will serve as stewards to the high school students in the *Puentes a STEM* program. This is critical as the program's main purpose is to increase the historically low representation of Latinx students in STEM. First and foremost, stewardship will occur through mentorship pairs, where SHPE

members will work consistently with Puentes participants as a source of guidance and inspiration. Mentors will discuss engineering experiences encountered during the program, academics, college preparation, and other topics that will help students pursue a STEM education. Since SHPE members share common identities with participants, they are uniquely suited to offer *Puentes* students a wealth of experiences and advice that they likely went without along their own journey to an engineering education. Not only will the college students provide valuable insight, but the high schoolers would offer different perspectives on their journeys to becoming engineers. Undergraduates will develop the skills necessary to empathize and engage with mentees while promoting the values of servant leadership, such as the ability to learn from their mentees and find new ways to support their goals and interests. Such feedback loops are the basis of stewardship and make for prosperous pipelines into leadership. SHPE members would gain experience as leaders and role models for younger, aspiring engineers. *Puentes a STEM* will foster valuable experience with transferable skills for both undergraduates and high school students.

Not only will SHPE members gain valuable mentoring experience, but they will also become aware of the impact that they provide to their community: directly or indirectly. For high school students and younger, a large part of their future choices are based on what and who they are exposed to. As we mentioned before, only six percent of the STEM workforce is Hispanic [1], making the representation for young Hispanic students to look up to much smaller than their non-Hispanic peers. This is where the awareness of our SHPE members of their surrounding community becomes crucial. We want to make our SHPE members aware of the community around them and how they can connect with younger individuals, much like themselves, to help overcome barriers they may be facing in their pursuits of becoming an engineer. By virtually visiting the classrooms and clubs from the involved high schools, SHPE members will witness the support that the students need. As our members participate in *Puentes a STEM*, they become more aware of how important they are to not only the professional environment but also to the community that we all come from and support. They become aware of their ability to inspire others and aware of the lack of support that they can help fix.

To date, efforts to implement *Puentes a STEM* have been heavily focused on communicating with the necessary parties. At the beginning of August, SHPE outreach coordinators met with a coalition of different STEM outreach organizations to discuss outreach plans in this pandemic setting and get a better understanding of what we may encounter working virtually. SHPE refreshed ties with STEM instructors from Madison East High School and Beaver Dam High School and met with them to discuss their specific circumstances and needs in mid-August. Their feedback was incorporated into a rough draft of the full program structure and a pilot episode for investigating engineering has been made as part of the web media component. Future efforts will be made to onboard another Madison area high school to the program, and schedules will be established by late September for SHPE members and students.

In the meantime, Latinx professionals and advanced university students will be invited to join the engineering web series and the digital infrastructure, while resources for the program and its participants will be fabricated. Mentors will be paired with students at the end of September and they will subsequently begin the mentorship component of the program in a virtual, chaperoned, group setting. Once the participants have been finalized, engineering activity kits funded by the Pieper Grant will be sent to their prospective high schools and distributed by the high schools to their students. The engineering kits will include supplies necessary to facilitate the

engineering design activities. Once all the pieces are in place, all program components will follow their weekly or bi-weekly cycles through the academic year.

The developments and plans described above are some of the ways servant leadership breeds within the SHPE UW-Madison chapter and is demonstrated across surrounding communities. *Puentes a STEM* was created to serve local Madison Hispanic high school students and educate them about STEM careers, with an emphasis on engineering. As our support system grew, we quickly realized how powerful the program will be. *Puentes a STEM* will not only benefit high school students but will impact SHPE members and high school faculty. We are excited for our members to step up in this mentoring role and guide younger Hispanic students to a career in STEM. It is through servant leadership that we can uplift others and support them to achieve their own successes.

Citations:

[1] National Science Foundation. (2015). Employed Hispanic scientists and engineers, as a percentage of selected occupations: 2015. Retrieved August 26, 2020, from <https://www.nsf.gov/statistics/2017/nsf17310/digest/occupation/hispanics.cfm>

[2] University of Nebraska, Lincoln. (2007). Becoming a Servant Leader: do you have what it takes? Retrieved August 26, 2020, from <https://extensionpublications.unl.edu/assets/pdf/g1481.pdf>

Pieper Grant Progress Report

Society of Women Engineers, Engineering Tomorrow's Careers Camp

Engineering Tomorrow's Careers Camp (ETC) was created over 25 years ago with the goal of increasing the number of women pursuing STEM careers. Being a part of Society of Women Engineers at UW-Madison, we share the mission to empower women to achieve their full potential in careers as engineers and leaders, expand the image of the engineering and technology professions as a positive force in improving the quality of life, and demonstrate the value of diversity and inclusion. The camp contributes to this mission by helping the campers see themselves as future engineers. The goal is to make engineering seem less daunting and intimidating rather than a specialized field for "nerds".

We achieve this through hands-on activities with College of Engineering academic and professional speakers. These workshops require both creativity and problem-solving, similar to the skills practiced by an engineer. These experiences strengthen the camper's interests and prove to them that they are capable of pursuing a career in engineering. Another valuable aspect is the opportunity to build personal connections with many other girls who are also interested in STEM fields, all at different stages in their careers. Not only are campers introduced to many peers who may share some of their interests and experiences, but also counselors who are strong role models that provide resources to learn more about what it is like to study engineering at UW-Madison. By making engineering accessible, we hope campers become comfortable. In this way, camp attendees not only benefit, but also the companies or research they become a part of benefit as we build a more diverse, healthy, and sustainable world.

Society of Women Engineers' ETC is a quintessential example of how young adults act as servant leaders for their communities. Of the 10 principles of servant leadership that ETC exhibits, ETC's programming prides itself on three main ideals: foresight, commitment to the growth of people, and building communities. Our counselors, all of whom have prior counseling experience as well as are dedicated students in the College of Engineering, are chosen from a pool of applicants because of their spirit, warmth, and passion. High schoolers, especially women wanting to pursue STEM, are often concerned about juggling all that college offers (extracurriculars, social life, academics). From their experiences, our counselors use their passion to convey their own difficulties, how they overcame them, and what future students can do to avoid the same instances in the future. This foresight is an integral part of becoming a confident woman in STEM, and a value our counselors truly embrace.

Additionally, the commitment the counselors have to the campers as well as their dedication to building a safe and accepting community is insurmountable. Through team building exercises, fun and engaging activities, and group bonding, our counselors are devoted to fostering an inclusive environment for the campers. By being a friend and a mentor rather than an "adult" in the camp, campers will become more comfortable with the position in the program as well as the future they want to pursue. As self-aware servant leaders, ETC counselors are expected to uphold a sense of responsibility and maturity while also being able to relate and talk openly and honestly with students. It is the goal of ETC to create a community that encourages young women to shoot for the moon without fearing they will fail or become overshadowed by male counterparts.

Women have historically been marginalized in STEM fields, and this has been especially evident in engineering. Engineering Tomorrow's Careers camp was created to help reconcile the disparity between the amount of interest girls show in science or math classes during high school and the drastically lower number of women seen pursuing degrees or careers in STEM fields. Our goal is to remove the socially-perpetuated myth that men are better engineers than women by creating an inclusive environment for anybody interested in pursuing engineering.

Part of this initiative is ensuring ETC is accessible to all girls, regardless of economic status. Just as nobody should be forced to consider their gender while choosing a degree or career path, this decision should also be independent of one's income status. Thus, ETC Camp keeps the cost to campers as low as possible and strives to provide scholarships for every camper who would be overly burdened by the registration cost. This ensures that every high school girl has the chance to be exposed to engineering and expand their interest in the field while being encouraged and accepted by their peers. This is why ETC is more than a week of engineering-based activities and lectures. It is also a testament to the importance of building a community that validates these girls' interests and gives them the confidence to continue their path to becoming successful, revolutionary, and inspiring engineers in their own right.

Every time the diversity within engineering is increased, the population of future engineers expands. This is essential because it's been proven time and time again that diverse workplaces lead to innovation and improvement for the company. This is especially important for engineering fields, because these are the people who are typically interested in tackling the great challenges we face globally. Be it health, energy, food, infrastructure, (etc) these are areas that hold opportunities to improve life around the world, and the more diverse we can make our population of engineers, the sooner we will see changes enacted for everyone's benefit. In this way, lifting others up truly lifts us all.

Appendix E

Multi-Institutional Study of Leadership Task Force Report and Fact Sheets