REPORT OF THE AD HOC COMMITTEE TO REVIEW THE COLLEGE OF ENGINEERING
December 2022

INTRODUCTION
The University of Iowa (UI) Operations Manual requires that reviews of colleges and programs be conducted regularly. For colleges subject to extensive external accreditation reviews, the internal review can be limited and focused. In accordance with this operating procedure, UI Executive Vice President and Provost Kevin Kregel formed a committee ("the Review Committee") and charged it to conduct a focused, abbreviated review of the College of Engineering ("the College") and to prepare this report.

The Review Committee consisted of the following members:
- Anjali Deshpande, Clinical Associate Professor of Epidemiology, College of Public Health—Committee Chair
- Don Anderson, Professor of Orthopedics and Rehabilitation, Carver College of Medicine
- Armando Duarte, Professor of Dance, College of Liberal Arts and Sciences
- David Hensley, Clinical Professor of Management and Entrepreneurship, Henry B. Tippie College of Business
- Liz Hollingworth, Professor of Educational Leadership, College of Education

Materials Consulted and Individuals/Groups Interviewed
Materials used to inform the Review Committee included the Provost's charge for the review, the latest ABET (Accreditation Board for Engineering and Technology) accreditation report, and the College strategic plan and self-study. Individuals and groups interviewed were selected by the Provost's Office and included UI leadership and individuals from the College and its affiliated centers and institutes. Interviews were conducted via Zoom between November 28 and 30, 2022. A full list of those interviewed appears in the Appendix.

Charge for Focused Review
The Review Committee was asked to evaluate the College based on the following four areas. This report is organized around these topics, beginning with an executive summary.
1. What are the strengths, opportunities and challenges associated with the College's undergraduate program? Does the College have a clear "value proposition" for prospective students? What are the market forces and competition factors in play related to student recruitment and enrollment pressures for the College?
2. What are the current and future state of the College's graduate programs (size, strengths, challenges)? What are the College's plans regarding graduate student recruitment for the next five years? Does the College have targeted areas of growth for its graduate programs?
3. What is the current state of the College's research enterprise (areas of strength, focus areas, infrastructure needs, support services, etc.)? How might the College capitalize on its research strengths?
4. How are the College's resources managed (e.g., faculty salaries, hiring strategies, enrollment management, indirect cost recovery, etc.)? Are there plans to deploy resources in a coherent and transparent way?

EXECUTIVE SUMMARY

Strengths
- Broad recognition among Collegiate faculty, staff, and others regarding the Dean's leadership in tackling major existing structural issues.
- The College is recognized for the high caliber of its faculty, staff, and students.
- There is a strong commitment from faculty and staff to be part of the solution to the College's issues and to be connected to the College.
- An attractive and functional new Annex has provided new opportunities for the College.

Areas for Attention
- Open, honest, transparent communication is needed—among departmental executive officers (DEOs), professors, and staff; between leadership and faculty, staff, and students; and between and among centers. The staff has expectations to be better informed so that they can carry out the College's vision more effectively.
- College leadership needs to make tough decisions because of the College's current financial challenges. Decision-making processes need to be clearly communicated to faculty and staff. Currently, the DEOs do not have a consistent level of communication with their departments about the Collegiate budget.
- Community-building and trust: There is concern about staff attrition, realignment of duties, and overwork. This has negatively affected staff morale.
- There are significant infrastructure needs of the whole College, including administrative and grants management support, strategic communications, corporate and alumni engagement, and updated marketing strategies.
- Alumni engagement—it is critical that the College leverage its strong alumni base to assist the college in meeting its strategic objectives. The Review Committee heard from multiple alumni that they felt the College has not fully engaged them and could seek more engagement from them. This would require an increased emphasis in this activity and likely additional staff resources to facilitate it.

1. **The strengths, opportunities and challenges associated with the College's undergraduate program.**

Strengths of the College's undergraduate program are:
- Actively engaged students, with ability to form strong relationships with faculty and other students; students feel like they are a vital part of the College community.
- Opportunities to do research as an undergraduate.
- Biomedical Engineering (BME) is a strong program, and the College leverages its connectivity to the health sciences colleges on campus. Partnerships with the University of Iowa Hospitals and Clinics are an asset to the BME program.
- The College's stated theme that it offers "Engineering and something more" allows students to gain a holistic, immersive educational experience. Focus is not on "cutting" students, unlike at other larger colleges of engineering (e.g., Iowa State University).
- Flexibility of the curriculum allows students to take courses outside their department and the College.
- The College can sell itself effectively when it can get students onto campus for a visit.

- Strong and individual peer support and tutoring systems are available.
- The College's junior faculty are actively developing what students need, and ways to get them engaged (re connecting with faculty, support for mental health).

Opportunities for the College's undergraduate program are:
- Departments other than Biomedical Engineering could find more ways to take advantage of connections with the UI health sciences and other colleges.
- Improve its online presence (both its website and through social media).
- Engage alumni in student recruitment, teaching, mentoring, and internships; alumni are willing to do these activities yet are underutilized. Students want more applied, hands-on experiences/exposure.
- Be more strategic in attracting students from diverse backgrounds; to start creating pipelines for a more diverse student body.
- Engage faculty more with recruitment of students, given that one-on-one interactions with faculty members is a strength of the College.

Challenges faced by the College's undergraduate program are:
- Student financial aid—the UI budget model requires the College to fund merit-based aid for students with qualifying grade point averages, and need-based aid.
- Limited racial, ethnic, and gender diversity of the student body, faculty, and staff of the College.
- Lack of an effective and scalable corporate engagement system to find internships to create real-world experiences; this is a barrier to recruitment and retention of students.
- Limited financial resources inhibit the ability of the College to scale up and leverage what it has.
- College does not "tell its story" (value proposition) very well (other than when students are on campus visits), which may be negatively affecting its enrollment.
- Concern about limited dedicated laboratory and educational space for undergraduates.
- Though much of the discussion was about student recruitment, there were also several considerations about the importance of student retention, especially between the first and second year. Students do not necessarily know what "engineering" is when they join the UI, and then they are stuck in large lecture courses for math, chemistry, and physics. Although the coursework is challenging and thorough, there are specific opportunities for hands-on aid in learning such as teaching assistant (TA) support and tutoring. However, students feel hesitant to use these resources and find it difficult to ask for assistance. Thus, faculty and advisors need to be more purposeful in encouraging students to use these resources from the beginning of their studies in the College on a regular basis.

Does the College have a clear "value proposition" for prospective students?

The College's value proposition is that it is small, but in the environment of a large, R1 university ("doctoral university—very high research activity"). The way the College puts it is, "Big 10 experience, small college feel." This value proposition is not necessarily clear to prospective students. While the College thinks that it is clear, students do not. Students come to understand the value once they get here so it can be good for retention but not necessarily for recruitment. It is unclear that most students appreciate the small-college value proposition.

Current upper-class students or recent graduates could be utilized to reach out to prospective students.

An open question is how much the UI values its College of Engineering; it appears that the value proposition at the university level could be enhanced. This could be used as a great marketing tool to attract and recruit students to the College.

Paradoxically, being small is part of the reason that the College is financially in the red. It is hard to separate out the small-college value proposition from the financial draw, which is lower tuition and a relatively high level of financial aid compared to peer institutions. Beyond size, lower net tuition is a value proposition. If size is an issue for prospective students, then the College has a unique selling proposition. If a prospective student is not intimidated by going to a large school, then small class size is not a big draw.

What are the market forces and competition factors in play related to student recruitment and enrollment pressures for the College?

The College's market is one in which its competitors have higher rankings and more advanced facilities. They also have better marketing, including cool videos on their websites and a personalized video that is sent to admitted students, as well as consistent, enthusiastic, and effective engagement by faculty, students, and alumni in recruiting students.

The College does not have strong connectivity to K–12 schools and teachers. The College has an opportunity to increase engagement with middle to high school students and teachers across Iowa. Further, the College has the opportunity to engage with the community more actively, such as the University of Illinois's yearly "Engineering Day." This community engagement would boost the College's visibility and value in the community.

The Review Committee got the sense that the College feels that it is not maximizing its prospective student marketing opportunities, either directly through collegiate efforts or in partnership with the central UI Office of Admissions. The College has an opportunity to take on a greater role in marketing itself, and it could be more proactive in attracting potential students. A related challenge to the College is its incongruent branding with the UI's "writing university" theme compared to other Midwestern universities promoting innovation and technology.

Regarding competition factors with other universities, the Review Committee had many discussions regarding the College's competition with Iowa State University, University of Illinois, and other big universities in the region with big endowments. Universities live in a rankings-driven market, and rankings will always tend to favor larger programs. Another challenge to the College is that scholarship money is less here compared to other universities; a student might get a full ride at the University of Illinois but only partial aid from the UI College of Engineering.

Part of what makes the College unique and a strong program is its opportunities for one-to-one student–faculty interactions. This could be emphasized as one of the College's highlights.

2. **The current and future state of the college's graduate programs (size, strengths, challenges).**

The College's graduate program is small. There has been a decrease in international graduate students for a variety of reasons (including the COVID pandemic). The College has an opportunity to address graduate student enrollment and could potentially work to increase international graduate student enrollment. The economic situation complicates this situation for the College because it has limited funds to attract students.

The UI's nationally and internationally renowned centers and institutes attract graduate students and foster connections to the multiple UI health sciences colleges. Funding from these institutes and centers allows graduate students to focus on research, with little to no teaching responsibilities. Current graduate students have expressed appreciation for this opportunity to dedicate more hours towards research.

The center and institute model is a double-edged sword for the College, in that as a result it does not have TA lines to fund graduate students. So, while the graduate assistants benefit the centers/institutes in research, they do not provide benefit to the College. The preponderance of the center/institute model puts an emphasis on hiring post-docs as opposed to bringing in doctoral students. Graduate students feel affiliated with centers/institutes as opposed to the College or any of its departments, and as a result they do not feel a part of the College of Engineering community. Further, the ability to mentor undergraduates is lost in this model.

What are the College's plans regarding graduate student recruitment for the next five years?

From interviews with faculty, the Review Committee did not hear anything about a desire or a plan to increase graduate student recruitment. One faculty member lamented the lack of graduate assistants to assist with undergraduate lab setup. The Review Committee recommends that the College develop a clearly articulated, comprehensive strategy for attracting graduate students. The College could promote graduate student recruitment by leveraging its areas of expertise and emphasizing its connection to strong research programs and centers. These efforts would of course need to be coupled with a focus on growing the research enterprise.

Does the College have targeted areas of growth for its graduate programs?

It is not clear if the College has targeted areas of growth for its graduate programs. The College's three main research foci—human health, environment and climate, emerging technologies—could be leveraged to enhance graduate student recruitment. However, it is unclear if graduate student recruitment aligns with these three areas.

3. **The current state of the College's research enterprise (areas of strength, focus areas, infrastructure needs, support services, etc.).**

Areas of Strength and Focus Areas

- The College's research enterprise includes its affiliation with nationally and internationally renowned UI institutes and centers.
- The College has strategic current and potential collaborations with UI colleges in the health sciences.
- The College's undergraduates have opportunities to conduct research with faculty. (As mentioned above, the College's research enterprise focuses on three main areas: human health, environment and climate, and emerging technologies.)

Infrastructure Needs
- The College has not previously had centralized grant accounting services for pre- and post-award activities, but this is currently in development
- The College runs a very lean enterprise—FTEs are low—and thus it has infrastructure needs, particularly more staff.
- The College has limited alumni engagement.
- The College does not currently have a critical mass of investigators/large teams to compete for center grants.
- The College's senior faculty are moving toward retirement while the College is trying to grow its faculty. There is a need for a strategy for engaging senior faculty, recruiting junior faculty, and enrolling students to put the College in a position to compete for major grants.
- Though the College's centers/institutes have on occasion favored hiring post-docs over graduate students, there are relatively few organized opportunities for the post-docs to interact with each other or other faculty/staff outside their center/institute.

Support Services
- Some of the College's centers have major equipment that needs regular maintenance and updating (e.g. NADS). Centers/institutes were able to manage these costs under the old indirect recovery model. It is unclear how this will function now with the College recovering indirect funds centrally.
- The College's research enterprise needs to be in dialog with administration to develop a transparent and equitable process to address the issue of equipment purchases and maintenance.

How might the College capitalize on its research strengths?

The College can capitalize on its research strengths by marketing of and communicating the innovative and impactful research currently conducted by engineering faculty. This could be leveraged to recruit students, engage corporations and alumni, recruit faculty, promote philanthropy, and increase overall visibility in the community and in the Big 10.

Further, the value that the College brings to the university community and the broader community outside the University could be enhanced. The College could frame engineering as a cool, worthwhile, and meaningful pursuit.

4. **How are the College's resources being managed (e.g., faculty salaries, hiring strategies, enrollment management, indirect cost recovery, etc.)?**

The Dean articulated a plan for deployment of resources that was not yet fully appreciated by others. Faculty and staff see the vision but are unclear about the strategies to achieve it. It is unclear in the College what those plans are and how they will be operationalized. The College's fundraising campaign priorities need broader communication.

Faculty salaries were an area of attention detailed in the self-study, which reported that faculty salaries were in the bottom quartile of the two most respected rankings. The College would like to bring faculty salaries to the top quartile, but that would take an additional $1–2 million per year. Somewhat surprisingly, there is no evidence that the salaries are keeping the faculty from recruiting and hiring excellent junior faculty.

Regarding hiring strategies, the College needs to reimagine start-up packages for faculty not associated with centers/institutes. Unless a faculty member is affiliated with a center or institute, current start-up packages are not enough to develop research programs. This deserves paramount attention, given that the Dean reported that the College wants to increase faculty by 20 individuals over next 5 years. Further, the College's interest in increasing the diversity of faculty will require creative approaches and strategic planning. What is more, faculty not associated with centers and institutes do not have consistent access to pre- and post-grant award support.

As far as enrollment management, the College has complex issues to address. The UI's new budget model has an outsized impact on the College. Because the undergraduate population of the College is small and students get, on average, a higher level of scholarship/financial aid than in other colleges, the College does not receive the total amount of money per pupil to cover the cost of educating them. Plus, most first-year classes are taught outside of the College (in the College of Liberal Arts and Sciences, CLAS) and therefore, based on the university budget model, the College of Engineering doesn't get that money. The College also has to support a large proportion of scholarships, due to the high school GPAs of incoming students, which puts it at a disadvantage with other Colleges (e.g. CLAS).

There is a disconnect between the student enrollment planning by the College's Dean's office and what UI central admissions considers feasible based on previous enrollment data and admissions yields. The College's Dean is trying to drive a conversation with UI administration about making strategic investments to help the College of Engineering increase its net tuition revenue. The College is looking for ways to leverage strengths to complement tuition revenue. These could include offering certificates, online courses, and designing courses that are attractive to students from other colleges. For example, the College's Department of Environmental Engineering has the potential to market its content to those who care deeply about sustainability, the environment, and climate change issues.

Regarding the recent changes in indirect cost recovery, the College needs to have straightforward communication with its faculty about how funds are being managed and utilized. There is a general understanding among the faculty that short-term pain regarding changes in indirect distribution promises long-term progress and will lead to more equitable distribution of support resources. However, the longer-term vision for how this will be implemented is not yet clear to faculty.

Are there plans to deploy resources in a coherent and transparent way?

It was clear from the interviews that faculty and staff understand that this new budget model was going to take place and that changes to the indirect cost recovery were going to go into effect. Some even acknowledged that it *had* to happen. However, it was also clear that faculty and staff did not have a good understanding about how these resources, which are now held at the College level, would be deployed. A process will need to be articulated and effectively communicated to all faculty and staff.

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Appendix: Individuals and Groups Interviewed by the Review Committee

A. Individuals from UI Institutional Leadership
- Marty Scholtz, VP for Research
- Terry Johnson, CFO and Treasurer
- Steve Fleagle, CIO and Associate VP
- Jeneane Beck, Assistant VP for External Relations
- Liz Tovar, Executive Officer and Associate VP for DEI
- Brent Gage, Associate VP for Enrollment Management
- Tanya Uden-Holman, Associate Provost for Undergraduate Education

B. Individuals from the College of Engineering

Collegiate Leadership
- Harriet Nembhard, Dean
- Nicole Grosland, Associate Dean for Academic Programs
- HS Udaykumar, Associate Dean for Graduate Programs, Research, and Faculty
- Sarah Vigmostad, Interim Associate Dean for Diversity, Equity, and Inclusion
- Jason Kosovski, Communications Director
- Matthew McLaughlin, Systems Architect
- John Millsap, Facility Manager
- April Tippett, Budget/Financial Officer
- Jill McNamara, Admin Services Specialist
- Matt Kuster, Executive Director, Engineering Division, UI Center for Advancement

Departmental Executive Officers and Research Center Directors
- Allen Bradley, DEO, Civil & Environmental Engineering
- Ching-Long Lin, DEO, Mechanical Engineering
- Joseph Reinhardt, DEO, Biomedical Engineering
- Geb Thomas, DEO, Industrial & Systems Engineering
- Jun Wang, Interim DEO, Chemical & Biochemical Engineering

- Thomas Casavant, Director, Center for Bioinformatics & Computational Biology
- Witold Krajewski, Director, Iowa Flood Center
- Daniel McGehee, Director, National Advanced Driving Simulator
- Milan Sonka, Director, Iowa Initiative for Artificial Intelligence
- Larry Weber, Director, IIHR – Hydroscience & Engineering

Academic Programs Staff
- Megan Allen
- Josh Atcher
- Jane Dorman
- Ryan Puhrmann
- Laura Vasser
- Travis Greenlee

Department and Center Administrators
- Teresa Gaffey
- Donna Palmer
- Hillary Ramaker
- Jennifer Rumping
- Kristina Venzke

Staff Advisory Council
- Alyssa Burks
- Justine Hines
- Derek Ikoma
- Kristine Roggentien

Assistant Professors
- Xuan Song
- Sarah Gerard
- Jacob Herrmann
- Sajan Lingala
- Chao Wang
- Rachel Vitali
- Xuan Mu
- Kristan Worthingon
- Yuliang Xie
- Joseph Gomes
- Tyler Bell
- Caterina Lamuta
- Deema Totah

Instructional Track Faculty
- Ruben Beltran Del Rio

- Chris Coretsopoulus

Associate Professors
- Edward Sander
- Michael Schnieders
- Eric Nuxoll
- Craig Just
- Syed Mubeen
- Gregory Lefevre
- Fatima Toor

Professors
- Terry Braun
- David Rethwisch
- Timothy Mattes
- Mona Garvin
- Christoph Beckermann
- Gregory Carmichael
- Allan Guymon
- Alec Scranton
- Soura Dasgupta
- Xiaodong Wu
- Thomas Schnell
- Sharif Rahman

Graduate Student Council
- Venkateswaran Ganesh
- Seyed Soheil Hosseini
- Emily Schmitz

Engineering Advisory Board
- Patricia Coleman
- Christopher Day

Undergraduate Leadership
- Jatin Dhamrait
- Smridhi Mittal
- Betsy Montiel
- Sushma Santhana

Postdoctoral Research Scholars
- Austin McKee
- Elliot Anderson
- Priscilla Williams