Dean's Message

The Grainger College of Engineering has transformed the world throughout its existence. This strategic plan will guide the College to greater heights in pursuit of its mission over the next five years. Our vision includes growing and diversifying our research enterprise to achieve unparalleled impact, fostering an inclusive environment in which our students are given the tools, programs, and experiences to excel in the 21st century, and in which our faculty and staff thrive. That will require new levels of awareness, recognition, and pride in what we achieve together, a new focus on giving all our people a chance to grow to their full potential, and the ability to effectively secure and deploy the resources we will need to succeed. I look forward to seeing this vision become reality through our collective efforts, energy, and passion.

By pursuing this vision and remaining true to our values, Grainger Engineering, its alumni, and partners will continue to transform the world for the better. Our efforts to combat the COVID-19 pandemic, highlighted in one of the plan’s vignettes, is a remarkable example of our engineering community working with colleagues to make a difference in our local community and around the world. The response has been the very definition of public engagement.

I am also awed by the speed by which our College community pivoted to ensure the safe continuation of our students’ education as the COVID-19 pandemic began to emerge. There is a lesson here: it is not just about what we choose to do in the next five years, but why and how we choose to do what we do. In the coming five years, you have my commitment that we will make every effort to reduce bureaucracy and other barriers as we move nimbly and quickly to grow our stature.

A strategic plan is a living document. It must actively be adapted to new circumstances. That has never been truer than it is today. Much of the plan’s development was completed before the emergence of the COVID-19 pandemic, a “black swan” event that has changed the environment we will operate in for several years to come. New challenges and new opportunities are emerging. In this regard, the tasks we undertake in the coming year to implement the strategic plan and their relative priorities and emphasis merit being revisited. We may not be able to move as quickly as we would like on some dimensions and may move even more rapidly in others. However, I am confident that the strategic plan and the aspirations it communicates will ensure that we come out of the COVID-19 crisis stronger and better than ever.

More than 200 faculty, students, staff and administrators were involved in defining the College’s mission, vision, values, and key strategic directions it must pursue. Alumni, student groups, fellow deans, and other stakeholders also contributed valuable insights. I sincerely thank everyone who helped with the plan’s development. Developing a strategic plan gives us an opportunity to sharpen our collective understanding of our priorities and affirm our vision, mission, and values. I have been humbled by the passion that flowed as I discussed the plan with so many of our students, faculty, staff and leadership.

Rashid Bashir, Dean
Grainger Distinguished Chair in Engineering
Professor of Bioengineering
We are now The Grainger College of Engineering.

Our Impact Continues to Grow.

Our bold and passionate approach delivers world-changing ideas and leaders. Grainger Engineers revolutionize every field of study and every industry.

Nobels for...

Inventors, Designers, and Discoverers of...

Current and Former Founders, Presidents, and CEOs of...

Introduction

The Grainger College of Engineering is one of the top engineering programs in the world, enabling individuals to improve their quality of life through education, research, innovation, entrepreneurship and societal engagement. Our graduates and faculty transform the world for the better.

This plan outlines the College’s strategic priorities for the next five years. Work began on the plan in January 2019 with strengths, weaknesses, opportunities and threats (SWOT) analyses of our education and research enterprises. Also undertaken was a broad discussion on a vision for the College starting with what was most important to the pride and excitement we share about being part of the Grainger Engineering’s rich history and fabric. Then more than 200 faculty, specialized faculty, students, staff, college and department administrators and a select group of key University officials took part in 32 workshops during 2019 to develop this strategic plan. Recruiters, engineering deans at other universities, students and alumni provided further input through discussions and interviews.

In pursuing the strategic directions and initiatives outlined in this plan, The Grainger College of Engineering will continue to redefine engineering education excellence. We will ensure our students have the skills, knowledge, compassion, and aptitude to deliver solutions optimized to address humanity’s greatest needs. Grainger Engineering alumni will continue to have a transformative impact on their communities and the world.

The Grainger College of Engineering is determined to align its resources and energy to boldly address the grand challenges facing humanity, society and our planet. Building on its rich history of discovery and technological invention, ranging from the first web browser to the LED, the College will direct resources in pursuit of a bold research agenda developed by its stellar faculty. Our research, distinguished by its excellence, will range from fundamental innovations to complex interdisciplinary systems that can only be solved through large, diverse and highly collaborative teams. If you want to pursue transformative and revolutionary technological advances, you will be glad to be at Illinois. Grainger Engineering looks forward to a future that continues to be transformed for the better by our technological and scientific discoveries and our engineering innovations.

Vision

We are innovators who work at the forefront of science and engineering, leaders who turn the extraordinary into everyday reality, and partners who are trusted to transform the world.

Mission

• To deliver excellence and innovation in engineering education, in research and scholarship, and in economic development to serve our community, the State of Illinois, the nation and the world.
• To turn learners, no matter their origin or circumstances, into tomorrow’s socially responsible, creative and highly skilled engineering and science leaders.
• To discover fundamental knowledge and to engineer technological advances that revolutionize humanity’s ability to transform societies, revitalize economies, and solve global challenges.
The Grainger College of Engineering will direct and invest its resources to pursue six overarching strategic directions over the next five years to achieve excellence in pursuit of its mission and vision:

1. **Grow Basic and Translational Research Impact**
   Growing our research enterprise and impact through outreach and investments in researcher-driven groundbreaking initiatives – both fundamental and applied.

2. **Deliver High-Impact, Personalized Educational Experiences at Scale**
   Delivering outstanding curricular and co-curricular educational opportunities that reflect individual and programmatic needs and respect diverse backgrounds and perspectives.

3. **Establish Ubiquitous Diversity, Equity, Access and Inclusion**
   Embracing diversity, equity, access and inclusion as core values for research, education and College life.

4. **Acquire, Steward and Align Resources with Priorities**
   Creating alignment in priorities, advancement and the stewardship of resources using best practices and data.

5. **Communicate our Achievements and Capabilities**
   Engaging everyone to more boldly communicate our excellence and impact to the world.

6. **Enable our People to Achieve their Full Potential**
   Investing in the continual development, growth and excellence of our faculty, staff, postdocs and students.

In the pages that follow, we discuss each of these strategic directions in more detail. Major initiatives are identified for each of these directions. Over the next five years, we will implement an iterative yearly process to identify tasks that need to be completed in the following year under each major initiative. This began with an assessment of our current reality with respect to each major initiative and the identification of desired advances and success indicators. This in turn led to workgroups identifying implementation tasks to be completed in the coming year. These first year tasks will be reviewed to take into account the COVID-19 pandemic’s impact on our plans and priorities. Moving forward, specifying owners (responsible individuals, groups, task forces, committees or units) as well as targets, metrics and completion dates for each implementation task will be undertaken to operationalize the strategic plan.

The strategic plan is a living document. While the plan’s strategic directions are not expected to change, major initiatives and implementation tasks under these initiatives will be prioritized and reviewed regularly and adjusted based on resource availability and changes in the environment within which the College operates. In addition, while each implementation task will have its own goals and metrics of success, the dean of Grainger Engineering will oversee the use of well-established quantitative performance measures to assess progress for each of the strategic directions.
Grow Basic and Translational Research Impact

Growing our research enterprise and impact through outreach and investments in researcher-driven groundbreaking initiatives – both fundamental and applied.

The research enterprise of The Grainger College of Engineering, driven by our faculty, staff, and students, has transformed the world. We are committed to growing and diversifying our research programs, and therefore our impact. Our approach will be consistent with our values. Even as we leverage our scale and celebrate excellence in basic research, we will renew our commitment to corporate and external partnerships to translate research, advance society, improve the human condition and drive economic growth. As societal challenges increasingly demand bringing together wide-ranging disciplines to optimize solutions, we will partner with our peers on campus, in the University of Illinois system, our community, the State of Illinois, and the nation. We will strengthen our entrepreneurial ecosystem, shaping the national agenda around university-driven innovation. We will leverage this investment in translational research to propel us to higher national and international prominence. Growth in our combined portfolio of basic and applied research will rely on the interdisciplinary manner in which our faculty collaborate amongst themselves, across colleges and with peers globally. Those teams will pursue world-class discoveries, innovations and the translation of research. To achieve this vision, we will:

• Incentivize a culture of excellence in both basic and applied research, and cross-campus engagement
• Enhance the ability of our faculty, staff and students to engage in translational research
• Develop strategic partnerships at the state, national and international levels
• Strengthen our research infrastructure with additional tools and personnel

The pursuit of these objectives will increase our capacity to positively impact the world and enhance our visibility and relevance. With this growth of the research enterprise, we will reclaim a top five national ranking within five years. As a result of our efforts, we expect our total research expenditures and our research expenditures per faculty to increase at a significantly greater rate than that of our peers over the next five years.

Major Initiatives

This strategic direction encompasses four major initiatives:

• Promoting a culture of excellence in both basic and applied research
• Strengthening our research infrastructure to enable growth in the research enterprise
• Enhancing and optimizing infrastructure for translational research
• Engaging and growing large-scale strategic external partnerships
Deliver High-Impact, Personalized Educational Experiences at Scale

Delivering outstanding curricular and co-curricular educational opportunities that reflect individual and programmatic needs and respect diverse backgrounds and perspectives.

Leveraging our globally recognized leadership in engineering education and passion for impact, Grainger Engineering is strengthening existing programs and is expanding creativity in original pedagogy, curriculum design and learning technologies. The aim for unprecedented, evidence-based innovation in the development of:

- Student-centered paths to degree completion
- New educational paradigms for global competence
- Novel interdisciplinary degree programs
- Non-traditional models of doctoral training
- Partnerships for life-long learning and workforce training
- Data analytics for educational programs and outcomes assessment

Our commitment to the success of past, current, and future students is firm and unwavering. It is manifested in our on-campus experiences, on-line distance-learning programs, exchanges at partner institutions, co-ops and internships and workforce development programs. We are also committed to a culture and practice that ensures a respectful, inclusive and healthy environment. We celebrate collaboration and teamwork and create policies and procedures that encourage initiative, healthy disruption and shared risk. To fulfill these commitments, we will:

- Advance role models for healthy work/school-life balance
- Exemplify values of equity, diversity, inclusion and access
- Build team-based mentorship models at all levels of learning and work
- Strengthen the recognition of educational impact in evaluation for promotion and tenure
- Eliminate obstacles to cross-college educational partnerships
- Pool resources to respond to changes in demand and opportunity

We plan to engage students, staff, faculty, alumni and external partners (corporations, federal labs, non-profits) in working groups, task forces and implementation projects to pursue these objectives. We will undertake major initiatives in collaboration with campus units and resources to integrate these efforts with existing and planned centers of educational innovation. This coordinated approach to engaging and empowering our key stakeholders is embedded in our culture. As a result of our efforts, we expect a marked improvement in the student experience and a significant increase in the number, diversity, flexibility and richness of our educational offerings over the next five years.

Major Initiatives

This strategic direction encompasses five major initiatives:

- Building leaders with the skills, know-how and aptitude needed to address 21st century challenges
- Supporting a culture of well-being, respect and compassion
- Driving innovation in engineering education
- Developing partnerships for life-long learning and workforce training
- Securing resources for sustained educational impact
We are Committed to Groundbreaking Research and Translation.

Our Work Transforms the World.

When COVID-19 struck, multidisciplinary teams from across the Grainger College of Engineering and the community drove key innovations to address this urgent global challenge.

**Illinois RapidVent**
A team of more than 40 engineers, doctors, medical professionals, designers, and manufacturing experts produced and tested a prototype emergency ventilator in less than one week. The design was licensed, free of charge, by more than 60 companies around the world for further development and production.

**covidPPE**
A campuswide collaboration developed 3D printable face shields, N95 respirators, and other personal protective equipment and offered the designs free of charge to volunteers around the world. They also produced equipment for healthcare partners throughout Illinois.

**Pandemic Modeling**
Grainger Engineering faculty developed and constantly refined epidemiological models that predicted the spread of COVID-19. The models were used by the Illinois Governor’s Office to help make policy decisions and plan disease response.

**C3.ai Digital Transformation Institute**
Grainger Engineering faculty are co-leading the new, $367 million C3.ai Digital Transformation Institute. The Institute’s early focus is on finding ways to slow the spread of COVID-19, and ongoing grants will help top scientists tackle other gargantuan social problems with the help of Al C. Grainger Chairman and CEO Tom Siebel, a Grainger Engineering alumnus, was instrumental in launching C3.ai DfI.

**Healthcare Engineering Systems Center and JUMP ARCHES**
The Healthcare Engineering Systems Center leveraged its JUMP ARCHES partnership with OSF Healthcare to launch a special call for proposals dedicated to combating COVID-19. JUMP ARCHES brings engineers and physicians together to solve healthcare challenges through innovative solutions.

We Teach the way we do Research.

Our Curriculum is Evidence-based and Always Improving.

The world is constantly changing. We excel at anticipating such changes while being responsive to student interests and passions.

**CS+X**
More than 850 students are pursuing this innovative degree that lets them complete a flexible program incorporating a strong grounding in computer science with training in the arts and sciences. As the Chronicle of Higher Education said, “The University of Illinois at Urbana-Champaign is updating and reimagining a number of traditional majors by combining them with computer science. The reasoning is that liberal arts, arts, and agricultural fields increasingly encompass data analysis that requires computer science skills.”

**Carle Illinois College of Medicine**
As the world’s first engineering-based college of medicine, the Carle Illinois College of Medicine leverages advanced technology to train physician-innovators who will deliver better, more compassionate and accessible care to patients worldwide. Engaging creative minds in a case-driven, problem-based, active learning curriculum with early clinical immersion is just one way it sets a new bar for medical education.

**Computer-based Testing Facility**
Our Computer-based Testing Facility uses web-based learning management systems to deliver exams in a convenient, proctored environment. What started with 200 students in two classes has grown to over 6,300 unique students in 38 classes each semester, delivering more than 60,000 exams.
Establish Ubiquitous Diversity, Equity, Access and Inclusion

Embracing diversity, equity, access and inclusion as core values for research, education and College life.

The Grainger College of Engineering has long embraced the importance of a respectful, diverse and inclusive community. However, we will ensure that diversity, equity, access and inclusion are core values of the college and its constituents. Our success in promoting these values, using quantitative analytics, will lead to recognition by our community, our peers and stakeholders and accelerate our excellence. We are determined to increase support for and improve:

• College-wide equity, access and inclusion despite the challenges of scaling such efforts to meet the needs of more than 14,000 students, 1,000 staff, and 500 faculty
• Training and education for inclusivity
• Recruitment pipelines to further diversify our student body, staff, faculty and leadership cadre
• The supportive culture and climate for all our students, staff and faculty

The fulfillment of these objectives will establish Grainger Engineering as a model with regard to incorporating diversity, equity, access and inclusion as core values and vital elements in the generation of the most creative and best solutions to challenges facing our society and our planet. As a result of our efforts, we will become leaders in the rigorous understanding and quantification of issues and best practices as they relate to diversity, equity, access and inclusion. The resulting informed actions we will take will result in continued improvements in culture and climate. Those improvements will be assessed from climate studies and accelerated progress towards our goals of reaching gender parity, racial/ethnic representation, and improvements in all other measures of diversity amongst our students, faculty, staff and administrative leaders. Furthermore, Grainger Engineering will be a vital partner to corporations and other stakeholders seeking the full participation of a diversified workforce in their organizations.

Major Initiatives

This strategic direction encompasses four major initiatives:

• Creating a shared vision and implementing through a Diversity Institute
• Creating and implementing mechanisms for diversity, equity, access and inclusion college-wide
• Developing effective and authentic training and education for inclusivity
• Concentrating on under-engaged and underserved populations
Acquire, Steward and Align Resources with Priorities

Creating alignment in priorities, advancement, and the stewardship of resources using best practices and data.

Excellence has become expensive and very resource intensive. We will be good stewards of the financial and physical resources of the College and be strategic and entrepreneurial in the pursuit of opportunities that enhance our excellence. In addition, we will responsibly evaluate where we should invest our resources, our effort, and our passion. As such, we will:

- Identify where we invest by weighing resource requirements, the strength of ideas and expected impact
- Be disciplined in balancing selective investments for success, while remaining agile—with an emphasis on providing vital, unrestricted support that allows the College to strategically invest in critical initiatives
- Make decisions informed by a rigorous and knowledge-driven approach based on data analytics and transparent financial modeling
- Identify and acknowledge what our choices imply about what we will not pursue

The adoption of the new transparent campus budget model will foster financial ownership of success. To adapt, we will:

- Challenge old ways of thinking and modernize our operational structures
- Develop better tools, models and budgetary policies to make efficient use of resources
- Prioritize research, infrastructure expansion and optimization and the retention of our top talent
- Incorporate the acquisition and stewardship of resources via advancement and fundraising as a critical element of our future success

Staying true to our values, defining our priorities and judiciously stewarding our resources, including philanthropic support, even as we invest in bold initiatives that will transform our world is going to be imperative to Grainger Engineering’s continued vitality and recognized excellence. Under the new campus budget model, it will be vital for the College to be able to rapidly gather information, assess situations, and nimbly adjust to optimize outcomes. As a result of our efforts, we expect well-prioritized investments in research, and the efficient utilization of space and other resources. We believe that this approach, combined with more strategic advancement engagement focused on building affinity and inclination, will result in increased resources to support our efforts.

Major Initiatives

This strategic direction encompasses five major initiatives:

- Implementing proactive financial planning with improved tools and training
- Defining priorities with an awareness of resource needs and impact
- Increasing operational and space efficiency
- Restructuring advancement and support tools, especially impact data tracking, in support of our mission and vision
- Leveraging relationships and expanding advancement communications to encourage giving, enhance the alumni and donor experience by illustrating the impact of philanthropy, and increase constituent participation
We want Everyone to Succeed in STEM.

Our IDEA Institute Leads the way.

It is important to acknowledge the extraordinary success of faculty, students, and staff who are under-represented in STEM, as well as the fact that their success is earned despite the implicit and explicit bias and outright harassment and abuse that we still see too frequently. That’s why we established the Institute for Inclusion, Diversity, Equity, and Access. Its Grassroots Initiatives to Address Needs Together (GIANT) program enables teams of students, postdocs, staff, and faculty to propose and implement research-based initiatives.

The First Seven GIANT Grants include:

1. Allyship programs to help STEM graduate students set and achieve diversity goals
2. Undergrad research opportunities to help build awareness, understanding, and confidence in our ARISE students
3. Improving access to mentorship among underrepresented students in CS
4. Community partnerships to broaden STEM participation among local underrepresented 5/6th graders
5. Developing study partner programs in CS and ECE
6. Improving family-centered STEM outreach to Latinsx communities
7. Support for registered student organizations that focus on underrepresented students

We’ve Created a Boomtown.

Our World-class Facilities are Always Expanding.

More than $200 million in construction improvements are currently underway throughout the Grainger College of Engineering. These forward-looking projects are giving faculty and students the infrastructure they need to succeed.

Sidney Lu Mechanical Engineering Building
Grainger Engineering is transforming the home of our Department of Mechanical Science and Engineering with a 28,000 square foot addition and a 66,000 square foot remodel. It will include new instructional labs, maker spaces, community spaces, and active-learning classrooms.

Civil and Environmental Engineering
Our Department of Civil and Environmental Engineering is continuing its modernization program with a massive renovation of its Hydrosystems Laboratory and the new Kavita and Lalit Bahl Smart Bridge, connecting the Yeh Student Center and the Hydrosystems Lab. The Bahl Smart Bridge will feature the latest innovations in infrastructure sensing, serving as a building-sized instructional tool.

Talbot Laboratory
A three-story addition to Talbot Lab will support both the Department of Aerospace Engineering and the Department of Nuclear, Plasma and Radiological Engineering with new, state-of-the-art educational spaces and instructional labs.

Siebel Center for Design
With the construction of its permanent home nearing completion, the Siebel Center for Design already has programs underway across campus. It will foster multidisciplinary collaborations, using design thinking as an approach to promote human-centered design and quick iteration of projects and plans.
Communicate our Achievements and Capabilities

Engaging everyone to more boldly communicate our excellence and impact to the world.

The Grainger College of Engineering transforms the lives of individuals and solves global challenges through research, service, education, innovation and economic development. To raise awareness and pride amongst our alumni, encourage external stakeholders to partner with us, and improve our already excellent reputation, we will:

• Develop consistent messaging based on our identity, core values and our vision
• Build stronger connections to prospective and current students, alumni, friends, peers, members of the general public and partners
• Elevate and expand advancement marketing and communications

Our messaging will be values-driven and externally focused. To strengthen and better coordinate our communications efforts, we will:

• Engage faculty and staff in the development of compelling and effective messages
• Activate our alumni network to widely share our messages
• Assess and improve our marketing operational structures
• Optimize hiring, retention and utilization of marketing and communications staff across the College
• Establish better coordination mechanisms across all units of the College
• Develop shared tools, IT infrastructure and resources for marketing in the digital media age

As a result of our efforts, the recognition of our achievements, resources, capabilities and impact is expected to be reflected in evaluations made by peer engineering deans and recruiters to levels exceeding those reported during the past decade. The College marketing and communications staff will take the lead in this initiative by assessing the organization’s efforts and establishing goals and expectations.

Major Initiatives

This strategic direction encompasses five major initiatives:

• Assessing and improving marketing operations
• Developing a community of world-class marketing staff at all levels of the College
• Enhancing coordination and consistency across platforms and across units
• Investing in new avenues to increase the visibility of our research, education and interdisciplinary innovation in the digital media age
• Fostering faculty engagement for greater marketing impact and reach
Enable our People to Achieve their Full Potential

Investing in the continual development, growth and excellence of our faculty, staff, postdocs and students.

Our greatest asset is our people. We must continue to invest in our community of faculty (tenure track and specialized), staff, postdocs and students through coordinated professional development efforts. Given the current demographics of the College and growth of faculty and staff at lower ranks, this issue will be very important in the coming years. We will:

• Offer professional development opportunities to our faculty to be leaders in research, teaching, administration, service and inclusion
• Develop approaches to grow the skills of staff in financial and operational areas
• Provide professional development opportunities for our students and post-doctoral fellows for careers in academia, industry and entrepreneurship

The development of a strong culture of mentorship and professional development will allow us to recruit the best available talent, develop their skills as individuals, and build a pipeline of leaders to succeed them as they grow. Because of our efforts, we expect to observe strong levels of mentorship, retention and satisfaction across all our faculty and staff. We look to have our students and postdocs confidently accept highly fulfilling careers opportunities and see them excel in those careers. Fully developing the potential of our people is the only way to achieve our overall goals of excellence and impact. Just as the Collins Scholars in teaching and Mavis Future Faculty Fellows Academy in developing future faculty have garnered a reputation for their effectiveness in delivering excellence, we should seek to develop programs in other areas and for other stakeholders that are critical to the success of the College including specialized faculty, staff, etc.

Major Initiatives

Beyond creating a leadership position in the college in the first year to coordinate and develop all professional development, this strategic direction encompasses five major initiatives:

• Nurturing a healthy community
• Creating faculty development opportunities for well-rounded competency in education, research leadership and administration
• Creating professional development and advancement opportunities for staff
• Developing postdoc training for enhanced productivity, academic placement and career advancement
• Fostering student development