



Engineering

UNIVERSITY OF COLORADO **BOULDER**

STRATEGIC VISION

ENGINEERING SOLUTIONS TO DRIVE THE ECONOMY, SECURITY
AND QUALITY OF LIFE OF OUR STATE AND NATION

ENGINEERING LEADERSHIP



DEAN

Bobby Braun

ASSOCIATE & ASSISTANT DEANS

Ken Anderson
Associate Dean for Education

Phil Larson
Assistant Dean for Strategy,
Planning & Communications

Sarah Miller
Assistant Dean for Inclusive Excellence

Keith Molenaar
Associate Dean for Research

Anne Bishop Shoup
Assistant Dean for Advancement

JoAnn Silverstein
Associate Dean for Faculty Advancement

Doug Smith
Assistant Dean for Programs & Engagement

Mary Steiner
Assistant Dean for Students

Cherie H. Summers
Assistant Dean for Administration

DEPARTMENT CHAIRS

Brian Argrow
Smead Aerospace

Mike Hannigan
Mechanical Engineering

Elizabeth Jessup
Computer Science

Francois Meyer
Electrical, Computer & Energy Engineering

Charles Musgrave
Chemical & Biological Engineering

Balaji Rajagopalan
Civil, Environmental & Architectural
Engineering

PROGRAM & INSTITUTE DIRECTORS

Mark Gross
ATLAS Institute

Bob McLeod
Materials Science and Engineering Program

Dan Moorer
Engineering Management Program

Derek Reamon
Engineering Plus Program

David Reed
Interdisciplinary Telecom Program

Jackie Sullivan
Engineering Plus Program

R. Scott Summers
Environmental Engineering Program

LETTER FROM THE DEAN

July 2017

Dear CU colleagues:

Successful organizations are created through innovation, dedication and ambition. This is just as true for a public university as a commercial startup. During my first semester as dean, we began a journey of reinvention by taking a hard look at what we want to be and how we will get there. Through collaborative discussions across the college, consistent goals emerged. We aim to:

- Transform our college mission to focus on societal impact
- Focus on engineering solutions to major state, national and global challenges
- Seek to be a leader in engineering education and research
- Take responsibility to improve the economy, security and quality of life for all Coloradans

Through these discussions, and with broad input from our alumni and stakeholders, we developed and documented this vision. Together, we identified the four primary pillars of the strategy that will guide our work in the coming years:

- Accelerate our research impact
- Increase our global engagement
- Embrace our public education mission
- Enrich our professional environment

We identified specific actions for each of these as well. The pillars are “what,” and the actions are “how.”

Not only is this strategy a worthy set of pursuits for one of our nation's top public engineering colleges, but it is informed by our university-wide emphasis on shaping tomorrow's leaders, being a top innovation university and positively impacting humanity.

I encourage you to examine this document thoughtfully and consider the role you will play in bringing each goal to fruition. Through the dedicated efforts of all faculty, staff and students, as well as our industry, campus and alumni stakeholders, we will be poised to respond as thought leaders and innovators to the world's greatest scientific and technological needs.

Sincerely,

A handwritten signature in black ink that reads "Bobby". The signature is stylized with a large, looped 'B' and a cursive 'by'.

Bobby Braun, Dean

STRATEGIC VISION

.....

BUILDING ON PROGRESS made in the past decade and guided by the University of Colorado Boulder's strategic emphasis on leadership, innovation and positive impact, the College of Engineering and Applied Science plans to transform its mission to focus on societal impact; engineer solutions for major state, national and global challenges; grow its national leadership role in engineering education and research; and improve the economic competitiveness, security and quality of life for all Coloradans.

Over the next five years, through dedicated efforts by our community of faculty, staff and students, the college seeks to:



**Accelerate Our
Research Impact**



**Embrace Our Public
Education Mission**



**Increase Our
Global Engagement**



**Enrich Our Professional
Environment**

We will make these advancements in collaboration with alumni and campus stakeholders and through expanded partnerships with industry and government, both state and federal. Doing so, the college will become a central aspect of the University of Colorado's brand and enable its departments to achieve even greater heights. Upon achieving these strategic goals, the College of Engineering and Applied Science shall emerge as a top 10 public engineering institution.

VISION



VISION: ACCELERATE OUR RESEARCH IMPACT

WE WILL BE A WORLD-CLASS RESEARCH INSTITUTION that provides technical solutions to pressing societal challenges; brings colleagues together in interdisciplinary collaborative spaces to spark innovation and accelerate discovery; develops faculty with an entrepreneurial mindset, significantly increasing the college's research expenditures; increases the number of PhD graduates to move into the top 10 doctoral degree-granting engineering colleges in the nation; and cultivates strategic partnerships with industry and national labs that enable future innovation. Highlights include:

» Being home to the faculty members who shape our national research agenda.

.....

» Being a premier destination for top U.S. and international graduate students.

.....

» Being internationally recognized as a top innovative research ecosystem.

.....

» Significantly expanding our shared research facilities in areas where our strengths align with global research challenges.



STRATEGY: ACCELERATE OUR RESEARCH IMPACT

- » Identify 4-6 interdisciplinary research themes that build off our strengths, align with future opportunities and will provide transformational impact in a manner consistent with our vision.
- » Actively recruit and hire 20 outstanding mid-career faculty who align with our research vision and will have an immediate impact across campus, the state and the nation.
- » Provide resources, strategies and tools for faculty to seek, win and manage large (over \$10 million) interdisciplinary research awards and operate shared laboratory spaces in support of our research vision.
- » Develop a strategy to attract, retain, prepare and graduate top PhD students, including providing a four-year guarantee of support for all accepted PhD students in good standing.
- » Diversify the college's federal research portfolio and grow industry support to be on par with that provided by the National Science Foundation.
- » Incorporate entrepreneurial measures of creative works and intellectual property (e.g., creation of new companies, patents, technology licenses, software distribution) in college performance metrics.
- » Develop a communications strategy to actively promote the impact of our high-value research to the general public, industry, and federal and state government stakeholders.
- » Place at least 10 percent of the college faculty on assignments that shape the national agenda.
- » Identify and engage appropriate personnel at Boulder national laboratories for joint appointments in the college. Increase our research engagement with Laboratory for Atmospheric and Space Physics, Cooperative Institute for Research in Environmental Sciences, Renewable and Sustainable Energy Institute, JILA, the Institute for Arctic and Alpine Research, and the BioFrontiers Institute.
- » Create an endowed program and provide appropriate space through which scholars from across the globe choose to spend their sabbaticals at CU Boulder.

VISION



VISION: EMBRACE OUR PUBLIC EDUCATION MISSION

WE WILL BE THE PREMIER DESTINATION for every engineering student in the state of Colorado while attracting outstanding students from across the nation and the world; grow our undergraduate and graduate programs at the rate needed to drive and support economic growth of the state; foster a collaborative environment with industry that generates students ready for success in the global workplace, including an appreciation for working in diverse teams; and produce ethical, resilient and creative engineers experienced in innovation and entrepreneurship. Highlights include:

- » Being the first public engineering college with a 50 percent women undergraduate population while reflecting the demographics of our state's high school graduates.
.....
- » Continually improving persistence and graduation rates, ultimately achieving an 80 percent graduation rate for all college freshmen.
.....
- » Being a world leader in engineering education through continued innovation in active, project-based and experiential learning.
.....
- » Producing well-rounded engineers with knowledge and skills in ethics, leadership, business and communication who are prepared to tackle the most pressing problems of the state of Colorado with the ability to deploy these engineering solutions globally.



STRATEGY: EMBRACE OUR PUBLIC EDUCATION MISSION

- » Adopt strategies to boost the number of female, underrepresented minorities and transfer students in our college, including increasing the pool of applicants, offering scholarship packages that meet financial need, developing a network of strong STEM-oriented partner schools, and conducting an annual Colorado road show.
- » Improve flexibility and breadth in undergraduate engineering curricula. Among other options, consider a core freshman year, increase the number of decisions individual students make during their program of study, and increase the number of core classes taught in multiple semesters (including summer) while fostering collaboration across departments with similar course offerings. Adopt approaches to increase exposure of students to computing, statistics, ethics, business, leadership, entrepreneurship, innovation and team skills within undergraduate curriculum, and support their own personal and professional development.
- » Support the professional development of faculty to become expert educators that are well versed in methods to support student academic success, persistence in engineering, and the promotion of a professional and inclusive classroom environment. Facilitate the professional development of staff in support of student academic success.
- » Invest in student success by providing students with the timely and relevant support services needed (advising and coaching, mentoring, tutoring, career services, BOLD Center). Hold all students, staff and faculty accountable for student persistence and graduation progress.
- » Increase the award amount of merit-based undergraduate scholarships and graduate fellowships to incentivize highly qualified students to commit to CU Boulder.
- » Develop a communications strategy and grow programs to actively promote our national thought leadership in active, project-based and experiential engineering education.
- » Develop and communicate metrics that show the college's impact on the state of Colorado.

VISION



VISION: INCREASE OUR GLOBAL ENGAGEMENT

WE WILL DEVELOP ENGINEERS AND TECHNICAL SOLUTIONS with global reach to impact humanity; attract scholars from around the world; utilize Colorado as a testbed for the production of technical solutions that can be exported globally to impact the world's economy, security and quality of life; provide an opportunity for every engineering student to have a global experience; and strategically promote the college's professional master's degree programs to attract talented students from around the globe. Highlights include:

- » Being the leading public university in international project-based learning and research with a focus on developing communities.
.....
- » Establishing and leveraging strategic international partnerships that promote global research collaborations, dual degree programs and study abroad opportunities for students. Ensuring geographic and socioeconomic diversity of partnerships, including collaborations with top research universities as well as with institutions in the developing world. Establishing a physical presence internationally.
.....
- » Connecting and engaging alumni from across the world in lifelong learning and service opportunities that align with our research and educational mission.
.....
- » Fostering a global community across the college that celebrates the international diversity of our student body and faculty, promotes global solutions to local issues and is known for international impact.



STRATEGY: INCREASE OUR GLOBAL ENGAGEMENT

- » Establish an endowment to fund global program development, faculty and graduate student exchanges with international partner universities, on-campus support for visiting professors (e.g. office space, housing) and scholarships for students with high need.
- » Expand international partnerships with institutions abroad with whom CU Boulder could exchange faculty and students within the constraints of our engineering curricula and schedule. Develop innovative, trans-institutional projects that foster collaboration among CU students and faculty members with their counterparts abroad. Establish a physical presence internationally.
- » Make the engineering curricula more flexible so that students can study abroad without losing ground toward graduation; ensure students in all majors have study abroad programming available in their field of study.
- » Create global seminars and global intensives that provide international experience within Maymester, summer session, spring break, or winter terms.
- » Develop projects that are global in reach by expanding international partnerships and global industry connections while engaging overseas alumni and visiting faculty members. Engage collaboratively with other units on campus.
- » Become a destination for an increasing number of international undergraduate and graduate students.
- » Develop a communications strategy that focuses on the college's global impact through the production of solutions to major societal challenges and actively promotes our national thought leadership in the area of engineering for developing communities.

STRATEGY

VISION



VISION: ENRICH OUR PROFESSIONAL ENVIRONMENT

WE WILL BE A COMMUNITY THAT VALUES RESPECT, inclusion and engagement as we grow together in excellence. We will conduct ourselves in a manner that starts with an open mind, assumes good intent and builds trust. We will appreciate the benefits of diversity and commit to its growth. We will recognize the intrinsic value and beneficial role of all members and stakeholders of our community. While distributed across campus, we will create a unified community and physical environment where people want to be. Highlights include:

- » Being the employer of choice on the Boulder campus and across the state.
.....
- » Providing opportunities and encouraging professional development to grow each individual and their contribution to our community.
.....
- » Holding all community members accountable for improving professional climate and transparent communication.
.....
- » Having a faculty, staff and student population that reflects the diversity of our state.



STRATEGY: ENRICH OUR PROFESSIONAL ENVIRONMENT

- » Conduct a comprehensive biannual college climate survey for all faculty, staff and students as well as share results across the college each year.
- » Conduct salary survey for all college staff and faculty relative to other CU colleges and peer group.
- » Develop an integrated 10-year growth plan for the college footprint.
- » Invest in creating spaces where faculty and staff can collaborate.
- » Host events at least twice a year around interdisciplinary themes to encourage informal interaction and camaraderie among faculty, staff and students.
- » Consider organizational models that empower departments and department chairs, making such positions more stable and more responsible for long-term strategic growth. As needed, consider external searches for future department chairs.
- » Celebrate success across the college as well as with alumni and external stakeholders.
- » Improve reliability, continuity and transparency of communications across the college.
- » Cultivate shared ownership and responsibility in diversity and inclusion programs.
- » Invest in professional development opportunities across the college and discuss professional growth plans for each faculty and staff member as part of the annual review cycle.
- » Evaluate and document work-life balance policies.
- » Host major alumni events around homecoming and graduation, and engage alumni in student programs.

STRATEGY

Be Boulder.
In ENGINEERING