IMPACT

STRATEGIC VISION 2024

College of Engineering, Design and Computing
UNIVERSITY OF COLORADO **DENVER**

A MESSAGE
FROM THE DEAN

I am delighted to share IMPACT 2024 with you – our plans for the next phase of engineering at CU Denver!

Our vision builds on remarkable advances our college has made over the last decade. It was developed over a year-long organizational design process that engaged myriad stakeholders to create a shared vision that assimilates great ideas we created with the global leading edge and contextualizes them in our unique setting in the heart of Denver – one of the world's most dynamic and exciting cities. Underpinning it is the recognition that the world is changing more rapidly than at any time in history, that engineers of the future will have to be different, and we will need more of them – this has driven us to re-conceptualize many elements of a contemporary engineering college.

A major element of our strategy is a broadened perspective of engineering education that will empower our students with a unique and forward-leaning combination of engineering, computing, and design knowledge, skills, and attitudes, gained through authentic hands-on experiences that holistically build their technical and professional capabilities. It embraces the diversity of our students, creating access to transformational opportunities in an inclusive environment that will differentiate them in the job market, and prepare them for a lifetime of learning and leadership.

Our research emphasizes a convergence approach, stressing cross-disciplinary collaborations and seeking broad impact in areas of importance to our home - the urban corridor, and then transferable nationally and globally. It connects strongly with our educational efforts, promoting a culture of inquiry across the college and facilitating partnerships that will enable us to amplify our impact.

Within our plan are 10 big ideas that differentiate us, facilitate our role as a major contributor to the social and economic growth of the Denver urban corridor and Colorado, and guide us on a path to become a nationally recognized innovator in engineering education.

We couldn't be more excited about our future and invite your partnership and support in our transformational ambitions!

Martin L. Dunn

OUR BIG IDEAS
THE COLLEGE OF ENGINEERING, DESIGN AND COMPUTING

1 Transform engineering education to prepare **engineers of the future**

2 Elevate **computing** across the college and campus

3 Lead with **design**-oriented engineering education

4 Develop **21st century skills** through our design framework

5 Deliver stackable **modular credentials**

6 Lean into **technology** to drive transformation

7 Emphasize cross-disciplinary **convergence research** with **broad impact**

8 Promote **innovation** and **entrepreneurship** in all we do

9 Cultivate and leverage our **diversity** and **inclusivity**

10 Amplify our impact through **partnerships** that serve the state

VISION

WE'RE REDESIGNING ENGINEERING EDUCATION
WHILE THE WORLD IS CHANGING AT AN UNPRECEDENTED PACE

CU Denver's College of Engineering, Design and Computing is redesigning engineering education to create the agile and versatile engineers of the future. Through our pioneering curriculum, convergence research approach, and championing of our diversity, we promote an inclusive culture of inquiry and innovation focused on making a broad impact with all we do.

We integrate the cutting edge of computing technology and design innovation across engineering disciplines, blending this with authentic experiences that develop tomorrow's essential human and social skills such as creativity, collaboration, entrepreneurship, and leadership. We embrace and leverage our setting across urban and medical campuses to enable social and economic growth of the Denver urban corridor through holistic public and private sector partnerships; we aspire to emerge as its technological innovation engine and significantly impact Colorado and the world.
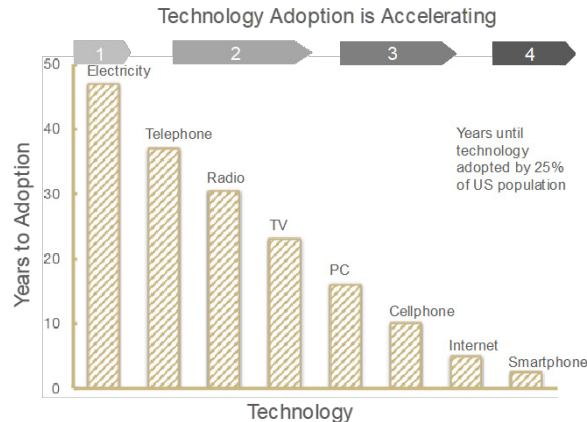
OPPORTUNITY

ENGINEERS OF THE FUTURE
WILL BE DIFFERENT

Engineers must be prepared to meet the rapidly evolving demands of the profession as well as new obligations and opportunities in our increasingly technology-based and "wicked" society.

- Deep and modern technical knowledge and capabilities

- Proficiency in contemporary design, systems, and computing-enabled technology to produce innovative, value-creating solutions that improve people and society

- Exceptional socio-emotional and entrepreneurial skills – critical thinking, creativity, teamwork, leadership, engagement with diversity and the ability to continually reskill and learn throughout their lives

Technology Adoption is Accelerating

| 1 | 2 | 3 | 4 |

Years until technology adopted by 25% of US population

Electricity, Telephone, Radio, TV, PC, Cellphone, Internet, Smartphone

Years to Adoption

Technology

Future of Jobs Survey 2018, World Economic Forum

Technology, globalization and economic restructuring are global mega-trends shaping the future and changing everything.

30% of engineering tasks can be automated and jobs are hybridizing.

ENGINEERING EDUCATION
MUST BE DIFFERENT

Global leaders agree that engineering education must change significantly to deliver future engineers.

- **Integrative, active and authentic learning experiences** that are interdisciplinary, global, societally-focused and constantly refreshed

- **Mass customized offerings** - increase in flexibility, choices and diversification exploiting technology

- **Agile and responsive curricula** underpinned by new value propositions and business models

- **Increased emphasis on human and social skills** and attitudes-Emotional Quotient (EQ) and Adversity Quotient (AQ)

- **Highly connected research-innovation enterprise** that leverages and strengthens educational goals and approaches

- **Strong alignment of goals** between government, industry and academia and impacts "place"

WHY?

To thrive in the future of technical knowledge work with continual skills disruption and need for lifelong learning - "the soft stuff is the hard stuff."[1]

- **65%** of children entering primary school today will end up working in jobs that currently don't exist.[2]

- **35%** of today's core skills that will change in next five years - increasing need for creativity, emotional intelligence and cognitive flexibility.[3]

- Rapidly developing technological solutions require cross-functional collaboration and high-performance teams

- Companies are competing against market transitions, not competitors

1 *The Best Team Wins*, Adrian Gostick, 2019
2 Dell Technologies, 2017
3 *"The Future of Jobs - Employment, Skills, and Workforce Strategy for the Fourth Industrial Revolution"* World Economic Forum, 2016

OUR STUDENTS - STUDENTS OF THE FUTURE
DENVER - CITY OF THE FUTURE

CU Denver students are diverse urban learners and driven, purposeful doers.

- **Widely varying demographics –** socioeconomic, age, race, ethnicity, language, first-generational student status, commuter/resident—contributing wide-ranging and meaningful experiences

- **Experientially motivated –** seeking more from their education e.g. purposeful opportunities aligned with career ambitions to increase relevance of education and meet fiscal challenges

- **Drawn to Denver –** seeking the vibrancy of city life with its economic and social opportunities, and the development of professional networks

70% of the world's population will live in cities by 2050.

- Denver is a dynamic, global, entrepreneurial, tech-oriented city with unparalleled access to nature and a high quality of life

- **The city is our lab and our classroom**

- The Anschutz Medical Campus is among the fastest growing medical campuses in the US and integrates world-class education, research and patient care

RESPONSE

A NEW MODEL OF ENGINEERING EDUCATION
A NEW GENERATION OF ENGINEERS

Engineers of the future will be different.

Strong technical knowledge with the ability to exploit contemporary computing technology to design value-creating solutions that address human and societal needs. Exceptional socio-emotional and entrepreneurial skills - a combination of IQ (Intelligence Quotient), EQ (Emotional Intelligence) and AQ (Adversity Quotient) to create the engineers of the future.

Engineering education must be different.

Forward-leaning curriculum that integrates engineering, computing, and design and fosters a culture of inquiry, innovation and continual transformation; a valued partner creating broad impact for the Denver urban corridor; recognized locally and nationally.

Students of the future in the city of the future.

Our students are diverse urban learners who are deeply engaged in life with wide-ranging experiences, experientially motivated and demanding more from their education; drawn to the dynamism of Denver.

COLLEGE OF
ENGINEERING, DESIGN AND COMPUTING

Engineering

Strong technical grounding in an engineering discipline with professional context and ethical considerations.

Computing

Modern computational thinking, algorithmic reasoning, and data analytics capabilities, combined with cutting-edge technological skills, e.g., artificial intelligence, virtual reality, and robotics.

Design

Interdisciplinary design innovation to deliver creative technological solutions that create value; design serves as a framework to develop socio-emotional and business skills - teamwork, creativity, communications, entrepreneurship, systems thinking, diversity, engaging with ambiguity.

COLLEGE OF
ENGINEERING, DESIGN AND COMPUTING

TRADITIONAL MODEL

CU DENVER MODEL

Engineering

Computing

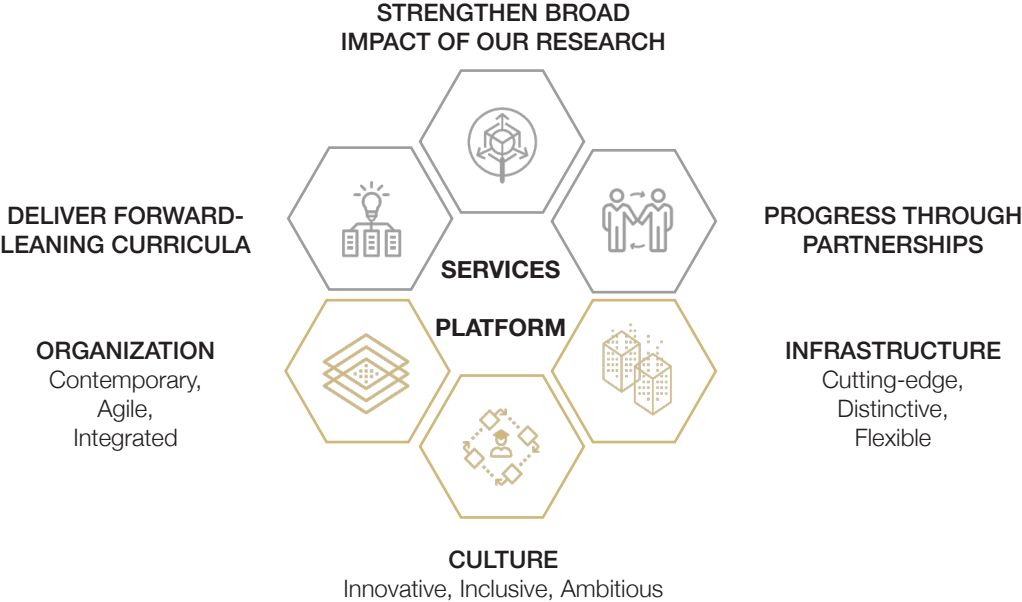Design

Engineering

Computing

Design
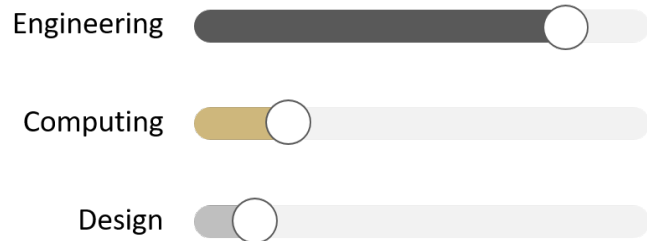
IQ + EQ + AQ = the engineer of the future

STRATEGY

PLATFORM AND SERVICES

We draw from contemporary models of leading, innovative organizations to represent our college as a *foundational platform* – our human, physical, economic and reputation capital – that will enable us to continually adapt and deliver *value-creating services* that respond to the demands of the world as it evolves at an unprecedented scale and pace due to transformations in technology, globalization, and demographics.

STRENGTHEN BROAD IMPACT OF OUR RESEARCH

DELIVER FORWARD-LEANING CURRICULA

PROGRESS THROUGH PARTNERSHIPS

SERVICES

PLATFORM

ORGANIZATION
Contemporary,
Agile,
Integrated

INFRASTRUCTURE
Cutting-edge,
Distinctive,
Flexible

CULTURE
Innovative, Inclusive, Ambitious

PLATFORM #1
ORGANIZATION: CONTEMPORARY. AGILE. INTEGRATED.

1.1

Restructure and re-brand as the College of Engineering, Design and Computing; develop and implement communication strategy to establish visibility and enthusiasm for our differentiated footprint

1.2

Create a cross-college "Academy" to foster interdisciplinary design and computing innovation in education and research across the College, connect to efforts across our campuses, and facilitate external partnerships; partner with Inworks and the Comcast Center to ramp up Academy and build capabilities

1.3

Integrate and amplify student success programs by strengthening and expanding capabilities and capacity through new investments and improved campus partnerships; implement Pre-Engineering program, learning community concepts and new student pathways

1.4

Implement contemporary entrepreneurial management practices that support a culture of innovation, growth, and continual transformation; strengthen faculty and staff support and professional development

PLATFORM #2
CULTURE: INNOVATIVE. INCLUSIVE. AMBITIOUS.

2.1
Build a culture of innovation, collaboration, and lifelong learning across the college; empower students, faculty, and staff to be entrepreneurial in all we do and support development of durable learning capabilities to continually stay at the cutting-edge; facilitate social and professional community across the college

2.2
Provide differentiated student experiences through expanded student clubs and peer programs with mentoring, professional, and social agendas, cultural opportunities unique to Denver, etc.; generate new resources to support them

2.3
Embrace and increase diversity in myriad dimensions through appealing new programs and investments tied to future professional environments, including design innovation and high-performance teamwork

2.4
Attract, retain, and continually support exceptional people; grow diversity and pursue faculty with skills and ambitions aligned with our plans

PLATFORM #3
INFRASTRUCTURE: CUTTING-EDGE. DISTINCTIVE. FLEXIBLE.

3.1
Build new CU Denver downtown campus engineering facilities that support interdisciplinary and collaborative design-based learning and research, facilitate corporate partnerships and put engineering on display

3.2
Create new research and innovation facilities at Anschutz Medical Campus that are programmatically and digitally connected to downtown to enable health technology and systems inquiry theme

3.3
Develop distinctive and contemporary digital and physical infrastructure to support education, research, engagement, and student success through grants, partnerships, philanthropy, etc.

SERVICE #1
DELIVER FORWARD-LEANING CURRICULA

1.1

Continually develop and deliver innovative, contemporary curricula in new modes, integrating design and computing throughout; connecting concepts, disciplines, and people through hands-on interdisciplinary experiences in authentic contexts in and out of the classroom; endowing every student with exceptional human and social skills, and experience applying cutting-edge technology to enable value-creating solutions

1.2

Establish leadership in new flexible, customizable, competency-based (micro) credentialing to add value to degrees in undergraduate and graduate/professional programs and enable lifelong learning/re-skilling; anchor them with new signature cross-department offerings focused on cutting-edge technology

1.3

Strengthen interdisciplinary and industry-responsive graduate and professional programs with new models, building in human, social, and entrepreneurial skills as differentiating training elements and implementing new delivery models, e.g., on line, hybrid and CU South Denver campus offerings

SERVICE #2
STRENGTHEN BROAD IMPACT OF RESEARCH

2.1

Create themes of inquiry that integrate research, education, and engagement across the College and expand connections between research and entrepreneurship; initiate with Health Technology and Systems and Urban Technology and Systems

2.2

Grow convergent research capabilities and mindsets in locally-relevant, globally transferable areas of societal importance, emphasizing: i) collaboration and high-performing teams across disciplines and with stakeholders; ii) broad impact through publication in top venues, invention disclosures, patents, start-up companies, etc.; and iii) growth of extramural support for research including graduate training programs, research facilities and student involvement in research

2.3

Invest in faculty development through training and mentoring, seed investments, and create appropriate performance expectations and reward structures

SERVICE #3
PROGRESS THROUGH PARTNERSHIPS

3.1
Amplify partnerships across CU Denver and the Anschutz Medical Campus to advance inquiry themes, create responsive new programs, grow convergent research, and strengthen the Denver urban corridor technological innovation ecosystem

3.2
Grow corporate and government enterprise partnerships in education, service and research that co-create and deliver customized solutions to partners through new, responsive models of engagement

3.3
Establish partnerships to enable student recruiting, retention, and success emphasizing students from backgrounds typically underrepresented and disadvantaged in engineering

EXECUTION

HOW WE WILL DO IT
REALIZING OUR AMBITIOUS VISION

✓ **Agile innovation approach**
Emphasizing prototyping and experimentation, encouraging and supporting organic innovation

✓ **Initiatives and culture**
Invest in departmental and cross-department initiatives to lead a culture of continuous innovation

✓ **ACCELERATE - Fundraising campaign to advance CEDC**
Raise $60M in new resources to support strategic initiatives by our 60th birthday in 2024

✓ **Restructure and rebrand**
Broaden our footprint as the College of Engineering, Design and Computing and amplify communication efforts to build brand equity

✓ **Benchmark ourselves**
Against aspirant urban research universities

engineering.ucdenver.edu
engineering@ucdenver.edu

College of Engineering, Design and Computing
UNIVERSITY OF COLORADO **DENVER**