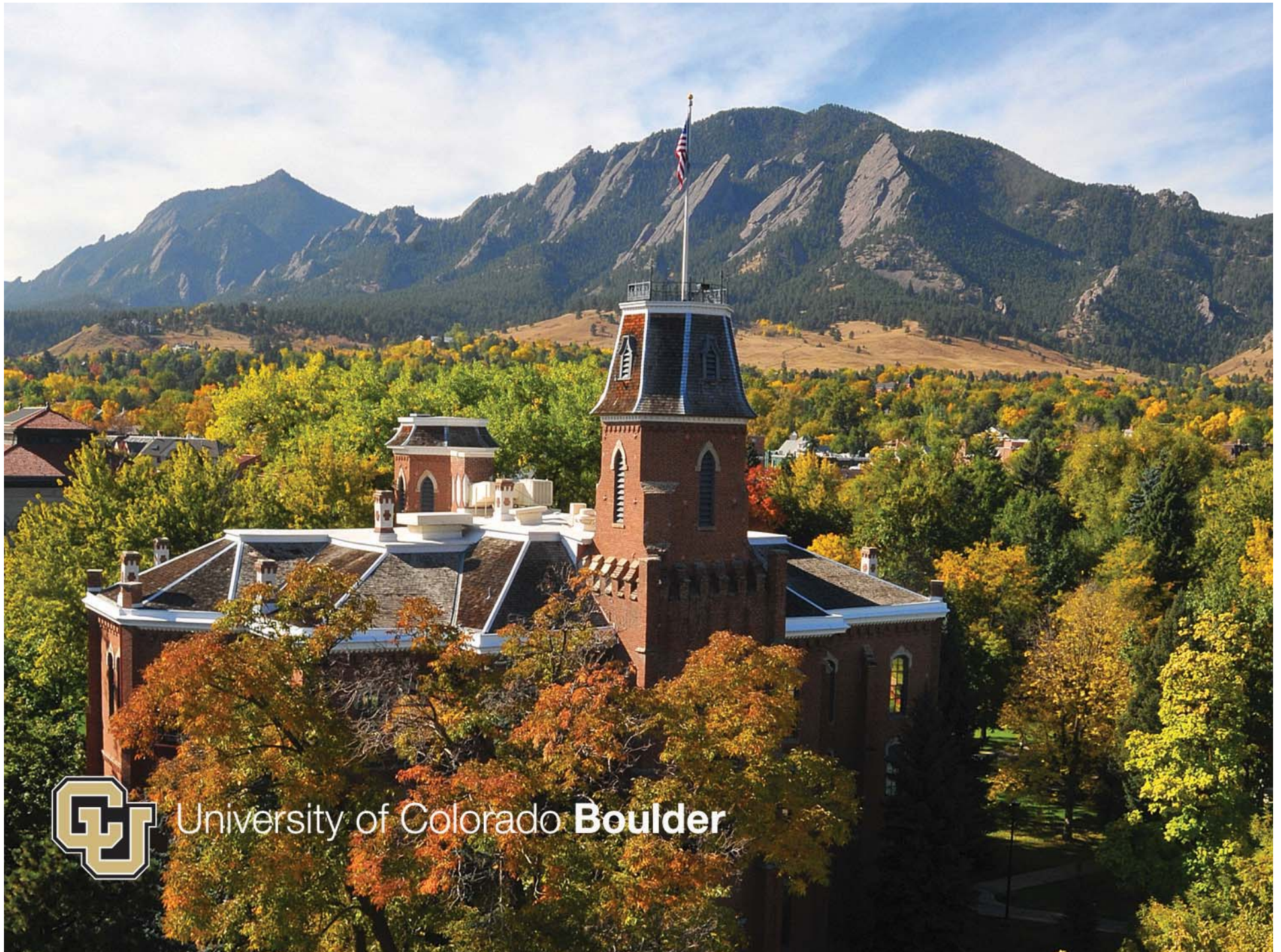




University of Colorado **Boulder**

Meeting Objectives

1. Share progress and gather input on initiatives undertaken as a result of our last Advisory Council Meeting
2. Understand how CU-Boulder can more effectively engage with industry to advance our marquee programs

Time	Topic	Detail
9:00 AM – 9:30 AM	Welcome	Introductions Agenda Welcome from Chancellor DiStefano & Professor Noah Finkelstein
9:30 AM – 10:15 AM	University Operations	Chancellor: Overview of University Operations
10:15 AM - 10:30 AM	Break	
10:30 AM - 11:20 PM	\$40 Million Ideas	Sr. Vice Chancellor, Kelly Fox: Clarify two to three \$40 million ideas to advance. Mark Sirangelo, Corporate Vice President of Sierra Nevada Corporation (SNC), Chairman of SNC Space Systems & Chairman of the Colorado Innovation Network (COIN)
11:20 PM - 12:15 PM	Communications Platform	Vice Chancellor, Frances Draper & Director of Strategic Mktg. & Web Communications, Jon Leslie: Bring forward a new Communications Plan to develop the brand and support the goals of clearly articulating who we are and the value we provide.
12:15 PM - 1:15 PM	Lunch	Academic Technology Consultant, Courtney Fell: Advisory Council Community Site
1:15 PM – 2:00 PM	Culture of Innovation	Provost, Russ Moore: Identify key strategies and evaluate whether they encourage a culture of innovation and collaboration.
2:00 PM - 3:00 PM	STEM Education	Chancellor & Deans Rob Davis, Lorrie Shepard & Associate Dean, Mary Kraus: Discussion of STEM education and the mutual benefits of industry engagement.
3:00 PM - 4:00 PM	STEM Symposium	All Participants: Walk together to the Stadium for the STEM Symposium to view the poster session.
4:00 PM – 5:00 PM	Symposium Debrief	All Participants: Reconvene in President’s Suite adjacent to symposium to gather the Council’s thoughts on the event and enjoy hors d’oeuvres and conversation.
5:00 PM – 5:15 PM	Meeting Close	Review Agreements Next Steps Plus/Delta for May Chancellor’s closing remarks
5:15 PM – 6:00 PM	STEM Symposium	Optional for all Participants: Opportunity to return to the STEM Symposium: Chancellor Will Speak Awards Ceremony Reception Lt. Governor Joseph Garcia & US Representative Jared Polis will be in attendance.



University of Colorado Boulder

*Serving Colorado.
Engaged in the World.*

Advisory Council Orientation

September 23, 2013

Philip P. DiStefano
Chancellor



University of Colorado
Boulder

CU-Boulder Circa 1880



CU-Boulder Today



UNIVERSITY OF COLORADO SYSTEM

Board of Regents and System Leadership



University of Colorado
Boulder

CU Board of Regents





Bruce D. Benson:
CU's 22nd President



Philip P. DiStefano
Chancellor, CU-Boulder



Pam Shockley-Zalabak
Chancellor
UCCS



Donald M. Elliman, Jr.
Chancellor
CU Denver



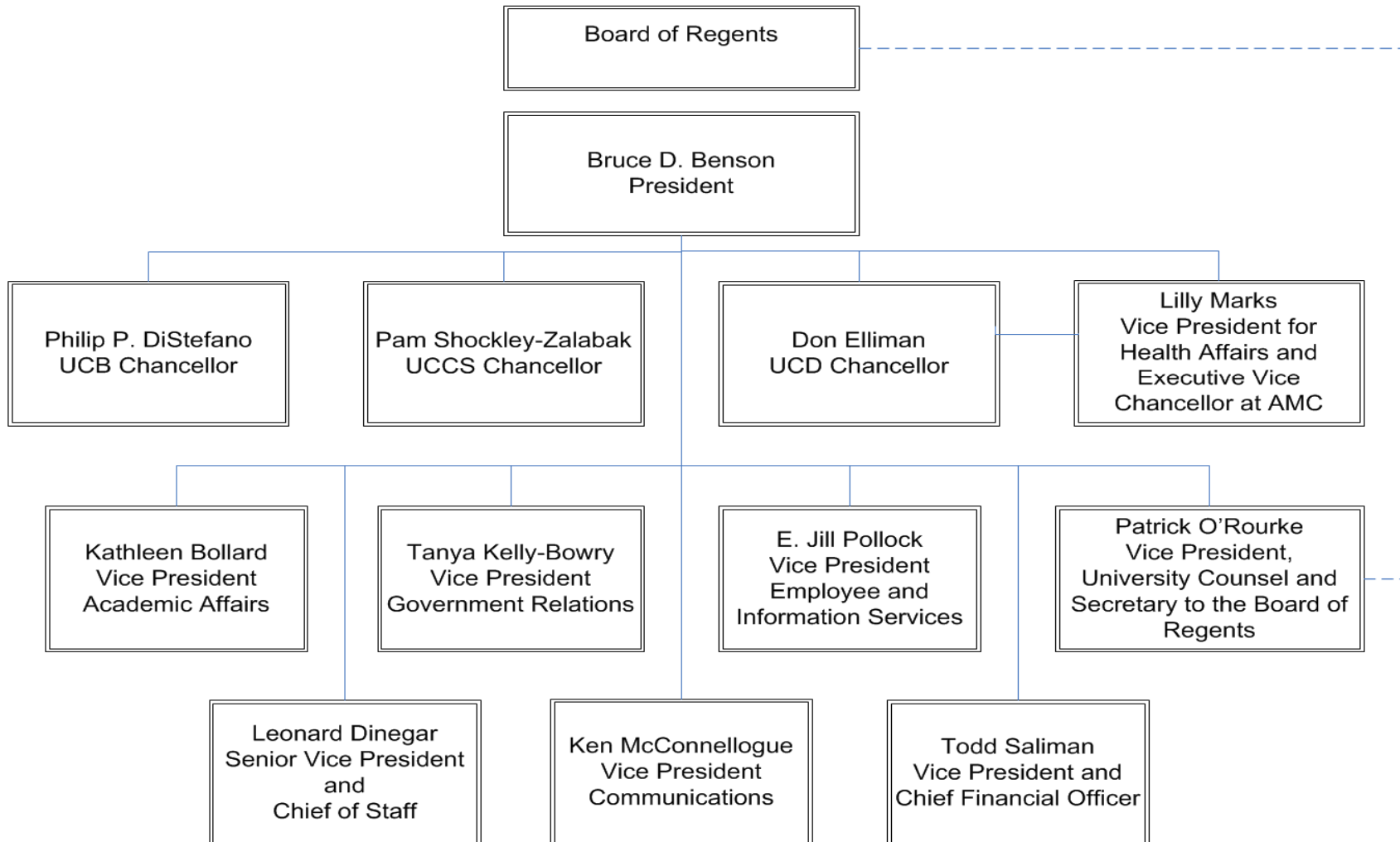
Lilly Marks
Vice President
for Health Affairs and
Executive Vice Chancellor
Anschutz Medical Campus



University of Colorado
Boulder

University of Colorado

System Administration Office of the President



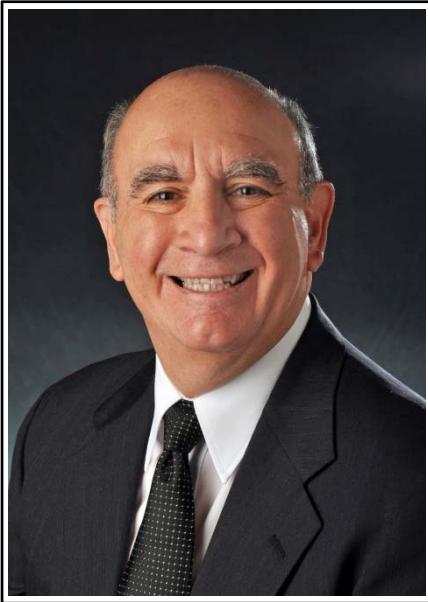
Functional reporting relationships are represented by dotted lines.
Administrative reporting relationships are represented by solid lines.

CU BOULDER LEADERSHIP

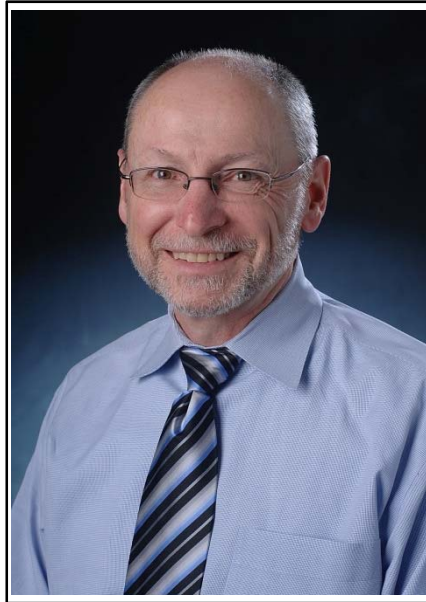


University of Colorado
Boulder

CU-Boulder Leadership



Philip P. DiStefano
Chancellor



Russell Moore
Provost and
Executive VC for
Academic Affairs

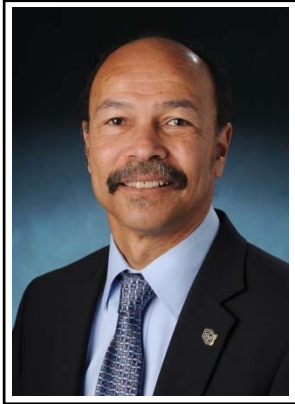


Kelly Fox
Senior VC and CFO



University of Colorado
Boulder

CU-Boulder Leadership



Robert Boswell
VC for Diversity, Equity and
Community Engagement



Deb Coffin
VC for Student
Affairs



Frances Draper
VC for Strategic
Relations



Catherine Shea
Chief of Staff
To the Chancellor



John Sleeman
Managing Senior Associate
University Counsel



University of Colorado
Boulder

CU-Boulder Leadership



Stein Sture
VC for Research



Louise Vale
VC for Administration



Carolyn Whitehead
VP for Development
CU Foundation

Deans, Schools and Colleges



Robert Davis
College of Engineering
and Applied Science



Steven Leigh
College of Arts and
Sciences



Anne Heinz
Continuing Education and
Professional Studies



David Ikenberry
Leeds School of
Business



Lorrie Shepard
School of Education

Deans, Schools and Colleges



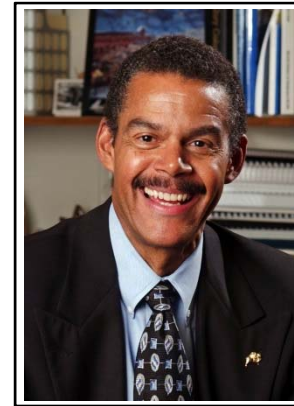
James Austin
College of Music
Interim Dean



John Stevenson
Graduate School



Philip Weiser
School of Law



James Williams II
University Libraries

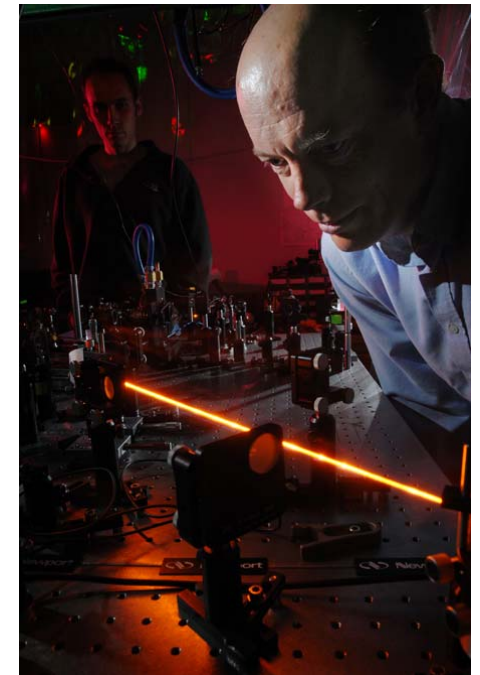


GENERAL

CU-Boulder by the Numbers

- **5** Nobel Prize Winners (most recent 2012)
- **7** MacArthur Fellows (most recent in 2003)
- **72** faculty members elected to prestigious national academies
- No. **1** in Colorado, No. **36** nationally (publics), No. **86** (private or public) -*U.S. News and World Report Best Colleges 2014*
- **20** doctoral programs in top 20 or top 20% in National Research Council review (Oct. 2010)
- **15** Graduate School specialty programs ranked in the top 50 in the nation including six in the Top 10 (*U.S News & World Report 2013*)
 - Atomic, molecular, and optical physics tied for No. 1 with MIT

CU is the only research institution in the world to send space instruments to every planet in the solar system.



University of Colorado
Boulder

CU-Boulder Impact/Value

- Colorado's flagship university
- Largest employer in Boulder County: more than 7,200 employees
- 76 new companies created based on faculty discoveries since 1994 – from biotech to aerospace to renewable energy
- 335,000 Coloradans served by educational outreach programs
- No. 1 provider of Peace Corps volunteers 2011 and 2012
- CU-Boulder degree rated Top 20 for return on investment (*SmartMoney.com 2012*)
 - Ahead of Harvard, Cornell and Yale

CU-Boulder is No. 35 out of 452 state schools for graduates' mid-career salaries.

-- PayScale.com (2012)



CU-Boulder Academics

- Enrollment Fall 2013: 29,325
- 4,907 graduate students
- 3,600 courses in 150 fields of study in arts and sciences, business, education, engineering, environmental design, journalism, law and music
- 80 bachelor's degrees, 57 master's, 53 doctoral
- 7,500 degrees granted annually
- The source of more than one-third of PhDs awarded annually in Colorado

CU-Boulder is the source of more than one-third of all PhDs awarded annually in Colorado.



Faculty and Staff

Faculty

- Academic faculty: 1,560
 - 1,160 tenure track
 - 400 instructional
- Research faculty: 1,326
- 854 international visiting scholars

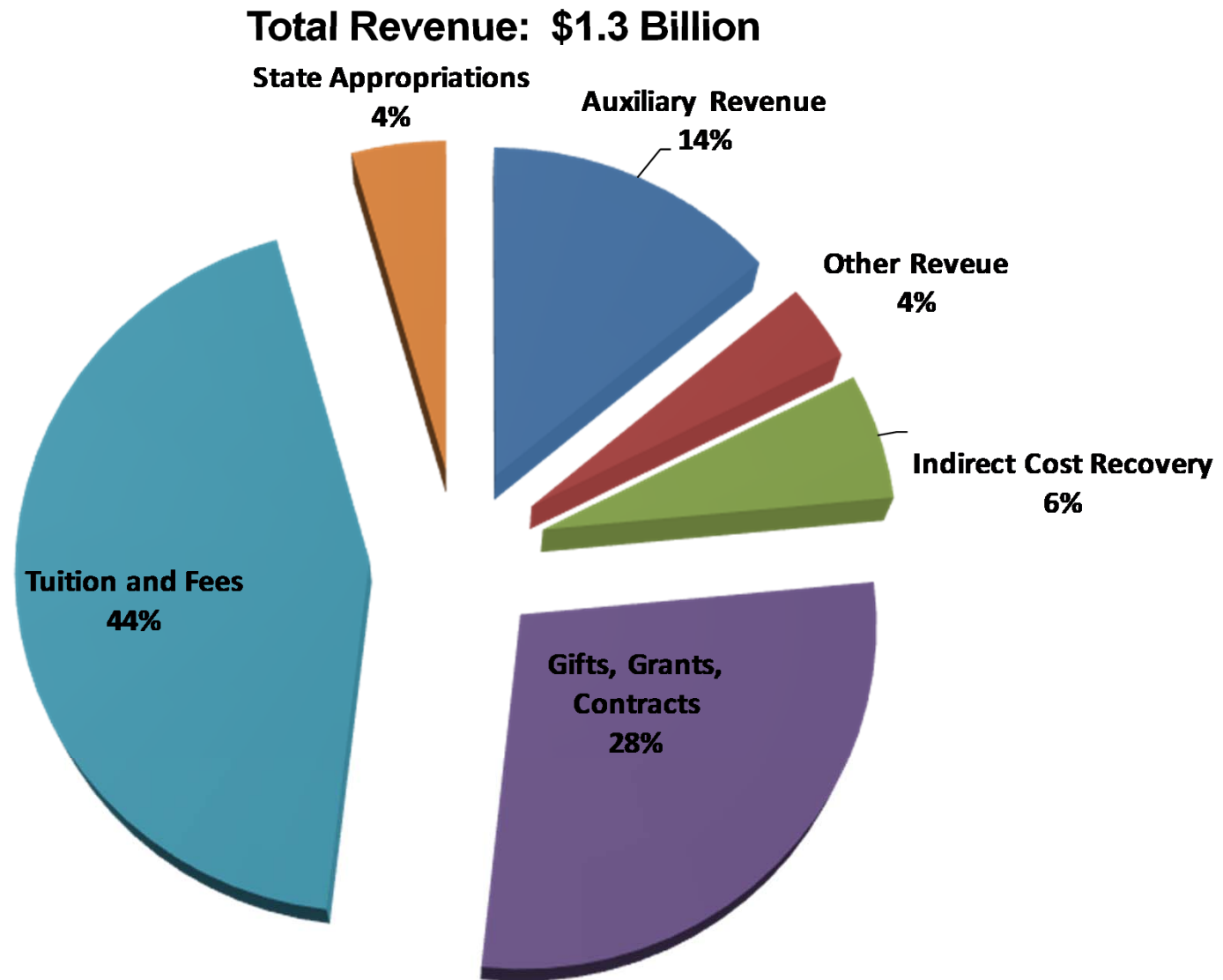
The true greatness of a university is measured by its faculty.



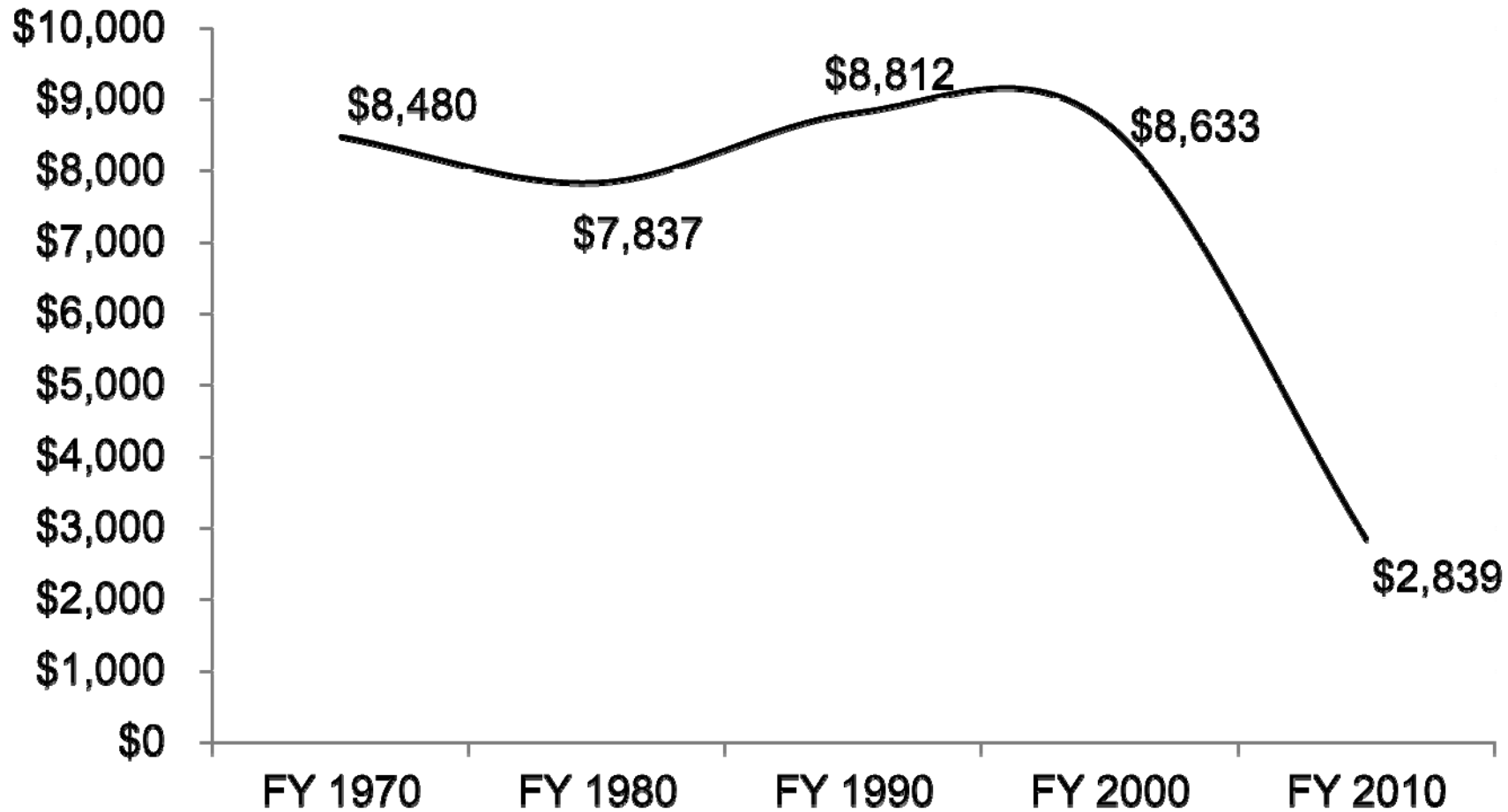
Staff

- Classified Staff: 2,513
- Exempt professionals and officers: 743

Campus Revenue by Type FY 2013–14



State Funding Per Resident Student FTE *Adjusted for 2010 Dollars*



University of Colorado
Boulder

Making CU-Boulder More Efficient

- General Fund State funding loss of \$30.4M (35%) from FY2009 to FY2012
 - 135 positions eliminated totaling \$11.7M
 - Operating reductions and reorganizations \$18.7M
- Boulder campus is one of the most efficient national public research universities:
 - Institutional support 64% below *median* of peers
 - Academic support 40% below *median* of peers
 - Student services 24% below *median* of peers
 - Instruction 26% below *median* of peers

STUDENTS

Students 2013-2014

- Enrollment: 29,325
- 7,500 degrees awarded annually
- 5,603 U.S. students of color 19.1% of enrollment (up from 17.9% 2012-13)
- 1,848 international students (up 9% over 2012-13)
 - CU-B leads all Colorado institutions
 - International students contribute \$48 million to local economy
- 1,200 students studying abroad
- 825 military-affiliated students and veterans

CU-Boulder boasts 100 Fulbright, 19 Rhodes and six Marshall Scholars in its history.



New freshmen 2013-14

- New freshmen: 5,846 (up 7%)
- 3,183 Colorado residents
- 1,342 domestic students of color (23% of class)
- 29% of resident freshman are students of color (up from 26% in 12-13)
 - Goal: Mirror Colorado high school graduating class by 2020, today 33% diverse

29 percent of CU resident freshmen are students of color.



Residential Academic Programs

- Creates a small-college atmosphere at a national, comprehensive research university
- 13 Residential Academic Programs enrolling 2,408 students
- Enrollment is 44% of on-campus residents
- 5 Faculty-in-Residence programs
- 2 Faculty-in Residence programs TBA 2013

Professors are moving themselves and classroom instruction into living-and-learning residence halls.



CU in the Pac-12

- 2012-2013 student-athletes recorded a school-best cumulative GPA of 2.913
- For the third consecutive year, a school-best NCAA Academic Progress Report (APR), measuring progress to graduation (Spring 2013)
- Ski team wins CU's 25th NCAA national championship (19 in skiing)
- Men's cross-country wins back-to-back Pac-12 titles (Fall 2012)
- Six Buffs compete in London Olympics Summer 2012
- Women's lacrosse begins competition in spring 2014

CU' student athletes had a school-best cumulative GPA of 2.9 in 2012-13.

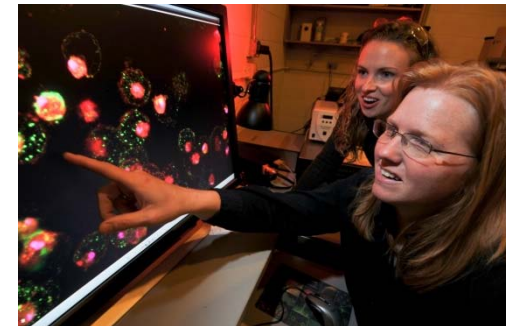


RESEARCH

Sponsored Research

- \$351.9 million in sponsored research (77% federally sponsored) in FY 2013
- Annual research awards have increased from \$260 million as recently as 2007
- \$41% of sponsored research revenue goes to local salaries
- Awards reinvested in the local economy equal \$1 billion over last four years
- Undergraduate (800+) and graduate students (1,160) participate in research

41% of sponsored research revenue goes to local salaries.

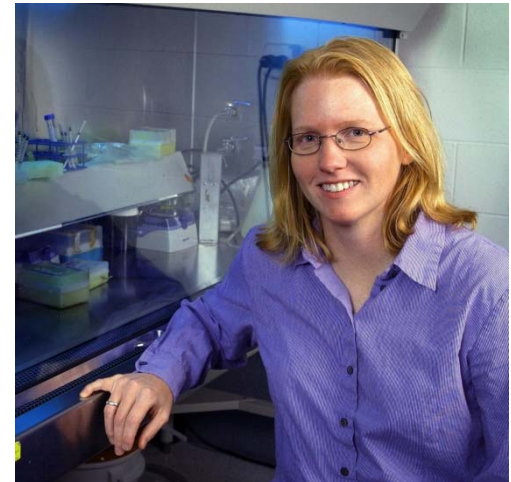


Research Initiatives

Key Areas

- Aerospace Sciences and Engineering
- Biotechnology and Biosciences
- Renewable and Sustainable Energy
- Geosciences/Environmental Sciences
- Computational Sciences
- STEM Education (Science, Technology, Engineering, Mathematics)

World-class interdisciplinary research at CU-Boulder advances society and the economy.



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Aerospace Sciences & Engineering

Aerospace

- Colorado is No. 2 in space economy based on employment
- CU has sent instruments to every planet in the solar system
- CU-Boulder largest public university recipient of NASA research dollars
- Aerospace employs more than 150 graduate and undergraduate students
- Embodies *Flagship 2030* initiatives in experiential learning and creating a Colorado Research Diamond

Colorado's aerospace industry ranks third nationally based on employment behind only California and Florida.



Biotechnology and Biosciences

BioFrontiers Institute

- Moved into new Jennie Smoly Caruthers Biotechnology Building in spring 2012
- 500 interdisciplinary researchers and students developing advanced medical and patient care
- Led by Nobel laureate Tom Cech
- Bench to bedside with Anschutz Medical Campus
- Anchor for Colorado biotech industry; creates companies and jobs
- Enhances *Flagship 2030* tenants of interdisciplinary research; creating Colorado Research Diamond

Work in molecular biotechnology leads to blood tests that can detect cancer and cell therapies to regrow cartilage.



Renewable and Sustainable Energy

Renewable and Sustainable Energy Institute

- Partnering with NREL and other federal labs
- Goals
 - Establish integrated energy campus
 - Innovative research
 - Education
 - Establish sustainable energy for the market
 - Partners with industry

CU-Boulder is a world leader in renewable energy development and implementation.



Geosciences/Environment

Third Nationally in Federal Research Grants

- Global leaders in monitoring greenhouse gas and Arctic ice melt
- Federal environmental research grants total \$90 million a year
- Geosciences complex approved by Regents in 2011
- Multiple departments, centers and institutes
- Researchers in the National Snow and Ice Data Center and CIRES shared in the 2007 Nobel Peace Prize

There are more atmospheric scientists per square mile in Boulder than anywhere else in the world.



Computational Sciences

A Broad Spectrum of Faculty Partner with Universities, Government and Industry in:

- High-performance scientific computing
- Artificial intelligence
- Nanotechnology
- Next-generation internet
- Biotechnology
- Genomics
- Fluid dynamics
- Climate modeling
- Laser sciences

A great deal of research in the science and engineering disciplines is driven by simulations, requiring significant advances in computational technologies.



STEM Education

Science, Technology, Engineering and Mathematics

- CU-Boulder STEM programs emulated nationwide
- Chancellor met with President Obama and Education Secretary Arne Duncan in Jan. 2010 on STEM goals
- Preparing a new generation of teachers bolstering our nation's competitive advantage
- Today: American 15-year olds No. 21 in science and No. 25 in math compared to global peers
- 2015 goal: U.S. increases new science and math teachers by 10,000 annually to educate 10 million students
- Collaboration among School of Education, A&S, Engineering and Graduate School

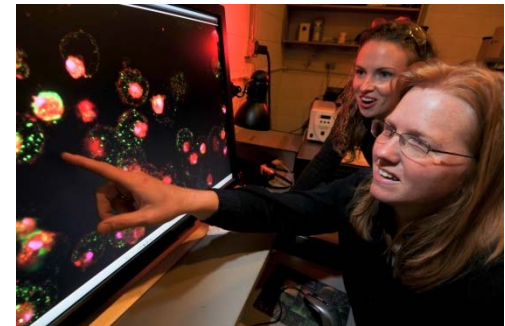
We are transforming the way we teach, discover and share knowledge.



Sponsored Research

- \$380.7 million in federally sponsored research (FY 2012)
- Annual research awards have increased from \$260 million as recently as 2007
- \$41% of sponsored research revenue goes to local salaries
- Awards reinvested in the local economy equal \$1 billion over last four years
- Undergraduate (800+) and graduate students (1,160) participate in research

41% of sponsored research revenue goes to local salaries.



Sponsored Research

Top Federal Funding Agencies

- NASA
- National Science Foundation
- Department of Commerce
- Health and Human Services
- Department of Defense
- U.S. Department of Energy

*CU-Boulder is the No. 1
NASA-funded public
university.*

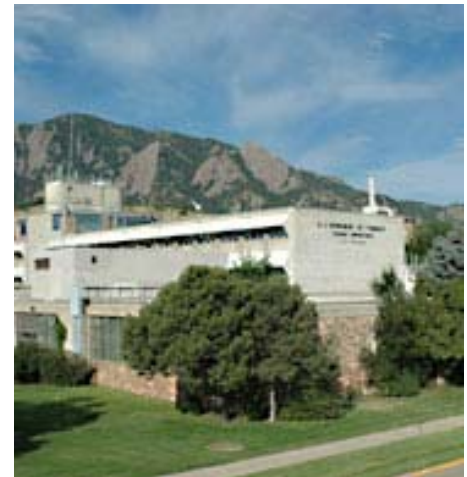


Federal Lab Partners

Local Federal Lab Partners include:

- National Institute of Standards and Technology (NIST)
- National Oceanic and Atmospheric Administration (NOAA)
- National Renewable Energy Lab (NREL)
- National Center for Atmospheric Research (NCAR)
- United States Geological Survey (USGS)

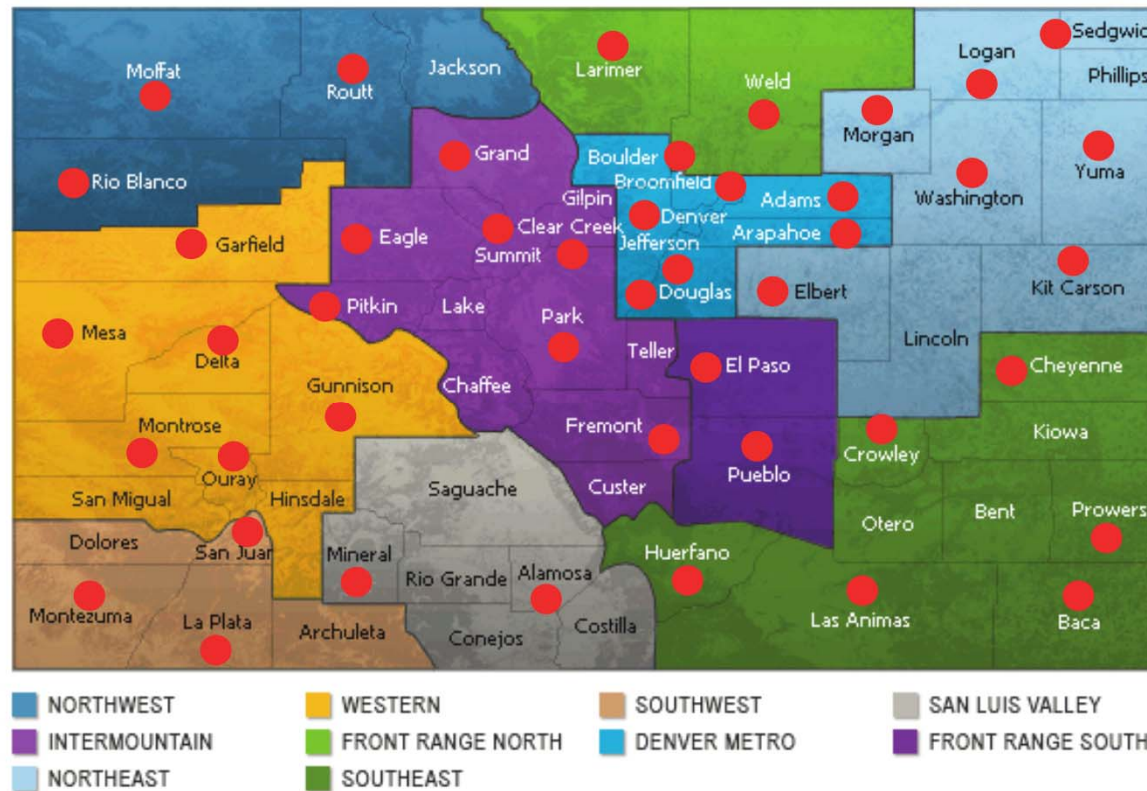
CU-Boulder's partnership with the National Institute of Standards and Technology (NIST) has led to four of its five Nobel Prizes.



Outreach and Engagement

Serving Colorado

Reaching 46 Colorado Counties



Professor Joe Ryan and students conduct water quality research for communities across the state.



CU-Boulder a Cultural Hub

- 381,000 come to campus annually for cultural events and programs
 - CU museums (117,495)
 - Conference on World Affairs (93,000)
 - CU Presents/College of Music (76,000)
 - Colorado Shakespeare Festival (33,000)
 - Fiske Planetarium (25,000)
 - International Film Series (18,000)
- 500,000 come to campus annually for athletic events, connecting campus with alumni, donors and community

Performing and visual arts are powerful teachers of different cultures, perspectives and historical interpretations.



CU-Boulder Economic Driver

- Largest employer in Boulder County: more than 7,200 employees excluding students
- Overall 17,000 total employees, including students = \$511 million annual payroll
- Nearly 30,000 students bring multiple visitors to area every year
- CU adds over \$26 to the Colorado economy for every state dollar it receives
- 102,000 living alums in Colorado; 250,000 worldwide

CU-Boulder is one of Colorado's primary economic drivers.



CU Advancement

- Kelly Cronin hired as System Vice President for Advancement
- On-going search for CU Boulder Vice Chancellor for Advancement
- Long-term structure under discussion
 - Campus Development Officers
 - Alumni Association
 - Annual Fund

CU-Boulder is one of Colorado's primary economic drivers.

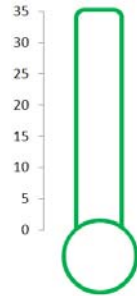


CHANCELLOR'S FUNDRAISING PRIORITIES

➤ Aerospace

\$35M Goal, raised \$0

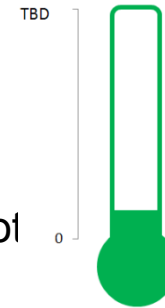
Team: Rob Davis, Penny Axelrad, Jessica Wright



➤ STEM

Goal: TBD, raised \$2,153,883

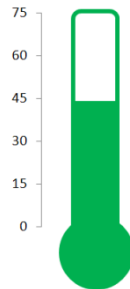
Team: Rob Davis, Lorrie Shepard, Steven Leigh, Margot Neufeld



➤ Biotech

\$75M Goal, raised \$44M

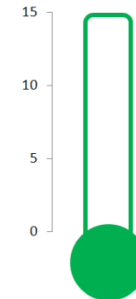
Team: Rob Davis, Steven Leigh, Tom Cech, Leslie Leinwand, Jessica Wright



➤ Energy & Sustainability

\$15M Goal, raised \$11,220

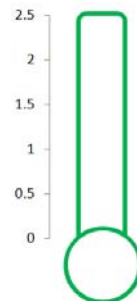
Team: Jim White, Rob Davis, Steven Leigh, Dean Laatt



➤ Esteemed

Scholars \$2.5M Annual Goal, raised \$0

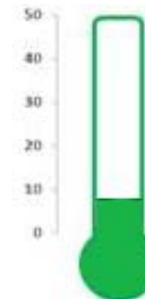
Team: Deb Coffin, Angela Farone



➤ Athletics

\$50M Goal, raised \$1.5M

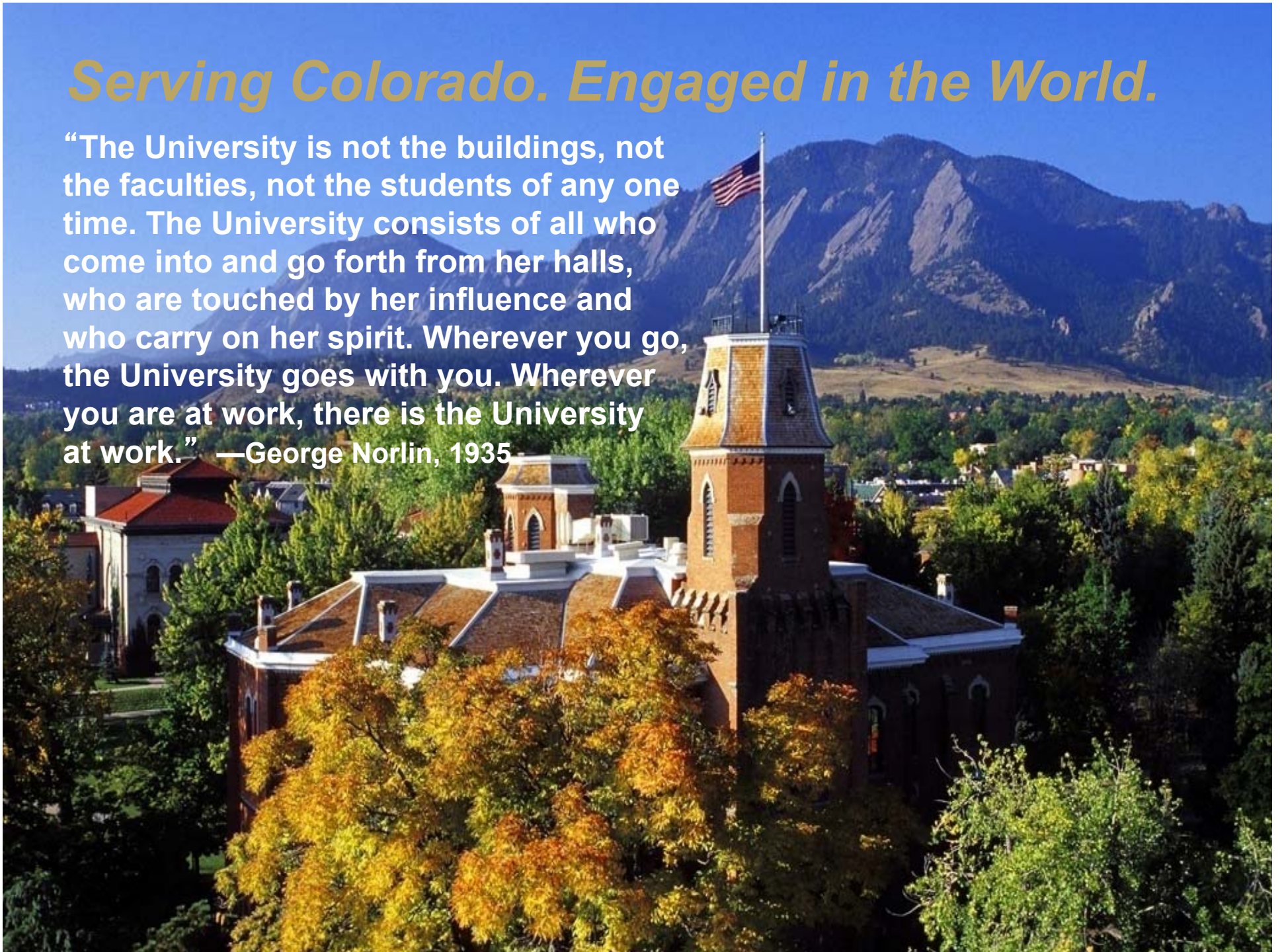
Team: Rick George, Kurt Gulbrand



University of Colorado
Boulder

Serving Colorado. Engaged in the World.

“The University is not the buildings, not the faculties, not the students of any one time. The University consists of all who come into and go forth from her halls, who are touched by her influence and who carry on her spirit. Wherever you go, the University goes with you. Wherever you are at work, there is the University at work.” —George Norlin, 1935



Break



University of Colorado
Boulder

\$40M Ideas

- New Ideas Include:
 - Enrollment Management Plan
 - Development of the “Undergraduate Value Proposition”
 - Create office that manages University-wide opportunities
 - Sponsorship agreements
 - Advertising
 - Other strategic opportunities
 - Develop systematic structure for identifying research opportunities





Mark Sirangelo

- Corporate Vice President of Sierra Nevada Corporation (SNC)
- Chairman of SNC Space Systems
- Board Member & Trustee of the National Center for Missing & Exploited Children
- Vice Chairman & Treasurer of the International Centre for Children
- Chairman of the Colorado Innovation Network (COIN)
- Colorado's Chief Innovation Officer

The Colorado Innovation Network: COIN

- Launched by Governor Hickenlooper in November 2011
- Privately funded
- A roadmap for making Colorado the most innovative state in the nation
- To learn more about COIN, visit www.coloradoinnovationnetwork.com

Communications Platform



University of Colorado
Boulder

LUNCH

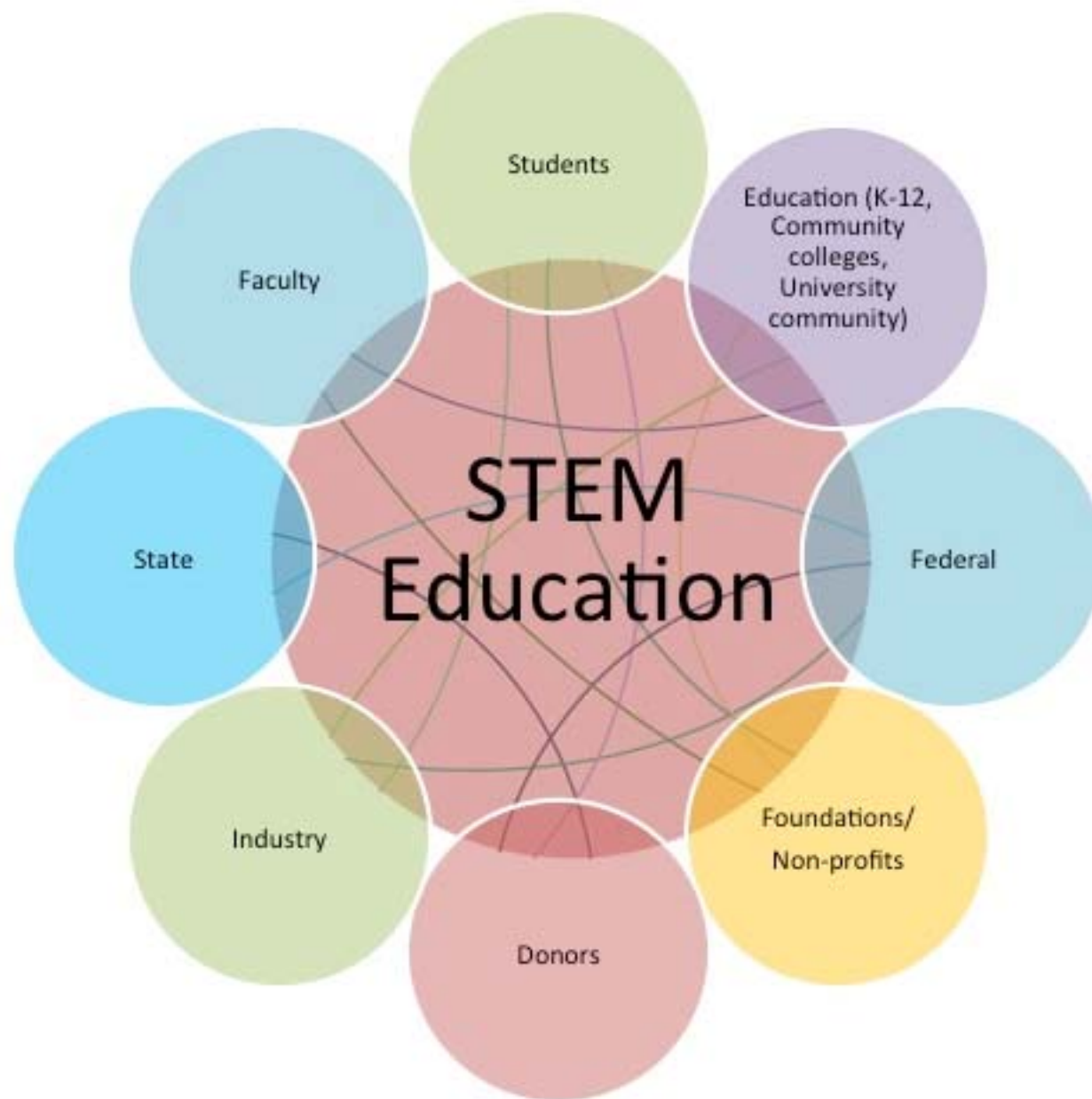


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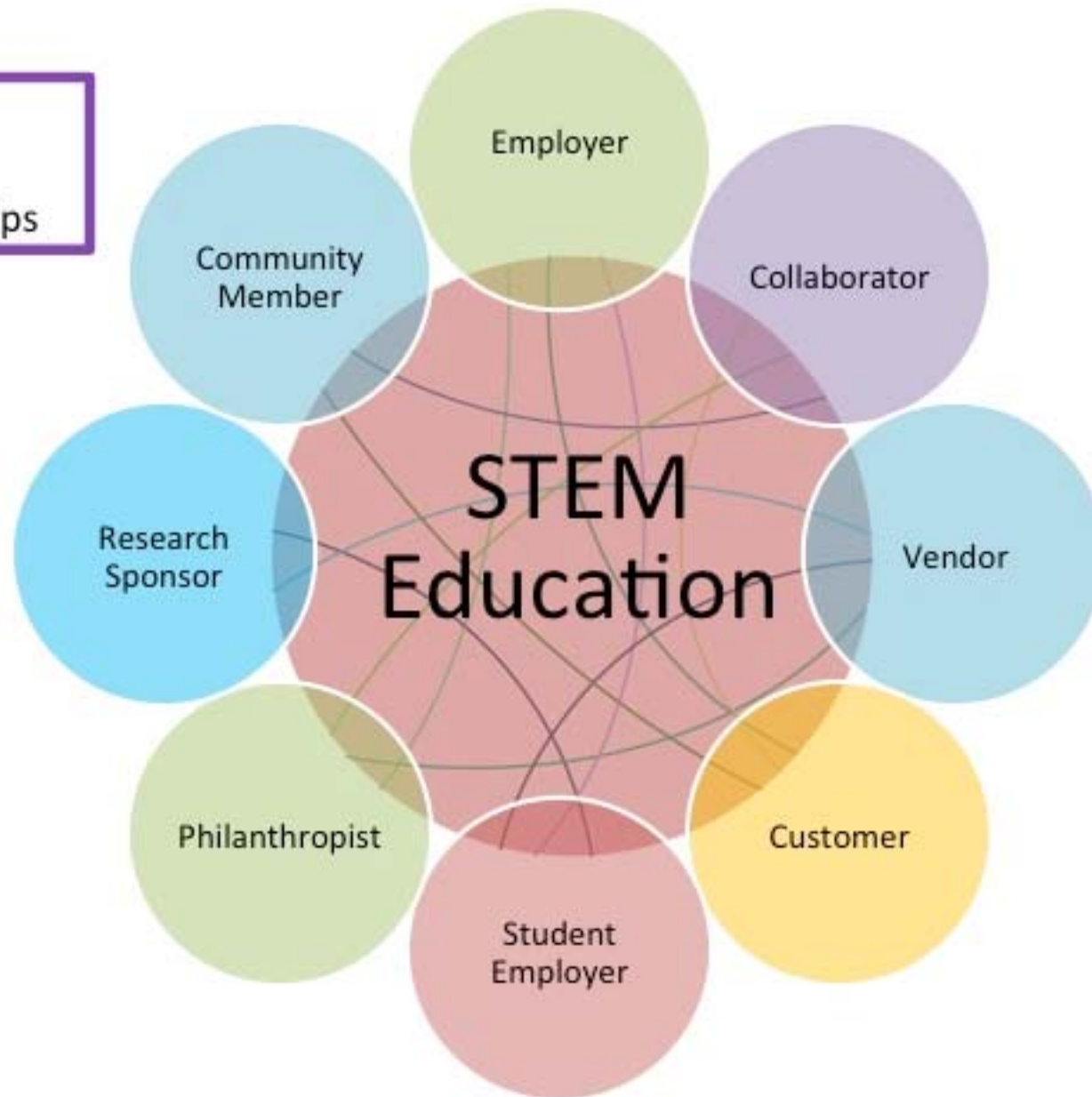
Culture of Innovation

- Strategies in support of that goal include:
 - Empowering faculty as individual decision makers
 - Recruiting the best students and preparing them for present and future success
 - Managing the delivery of teaching and research for revenue generation
 - Developing corporate and community partnerships for learning and research opportunities
 - Rewarding performance and excellence



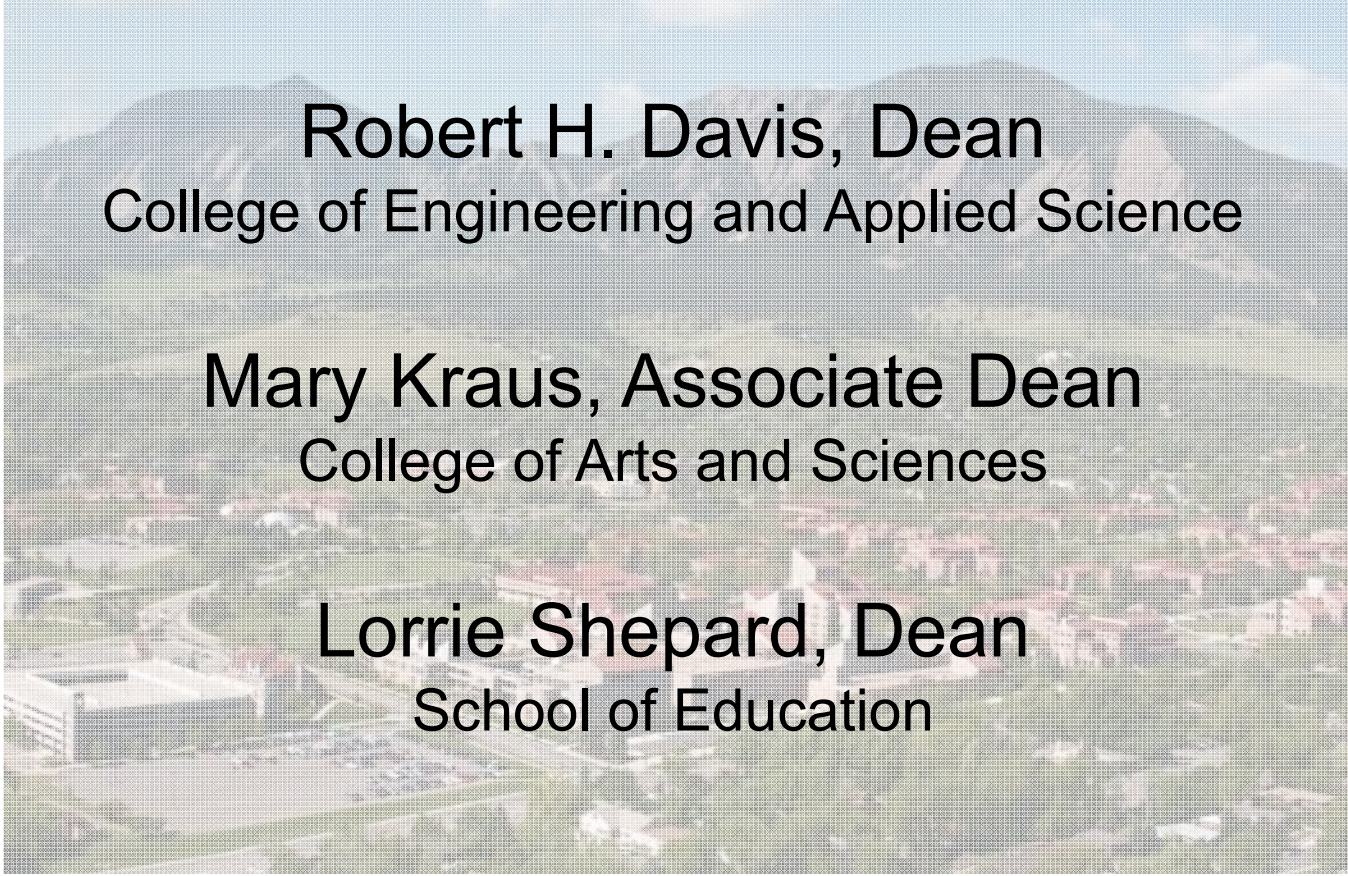


Types of
Industry
Relationships



CU's Leadership in STEM Education

Objective: World-class education and preparation of future workforce in engineering and the natural sciences



Robert H. Davis, Dean
College of Engineering and Applied Science

Mary Kraus, Associate Dean
College of Arts and Sciences

Lorrie Shepard, Dean
School of Education



University of Colorado
Boulder

CU's Leadership in STEM Education

CU's early and unique cross-campus collaborations

- 1999 NRC *Transforming Undergraduate Education in SMET*
- 2002 NRC BOTA *Technology and Assessment*
- 2003 NRC *Improving Undergraduate Instruction in STEM*
- 2007 NAS, NAE *Rising Above the Gathering Storm*



CU's Leadership in STEM Education

CU's core STEM commitments:

- Use cognitive science research to transform undergraduate courses
- Recruit the best math and science students into teaching
- Conduct cutting-edge, discipline-based research on effective teaching and student learning

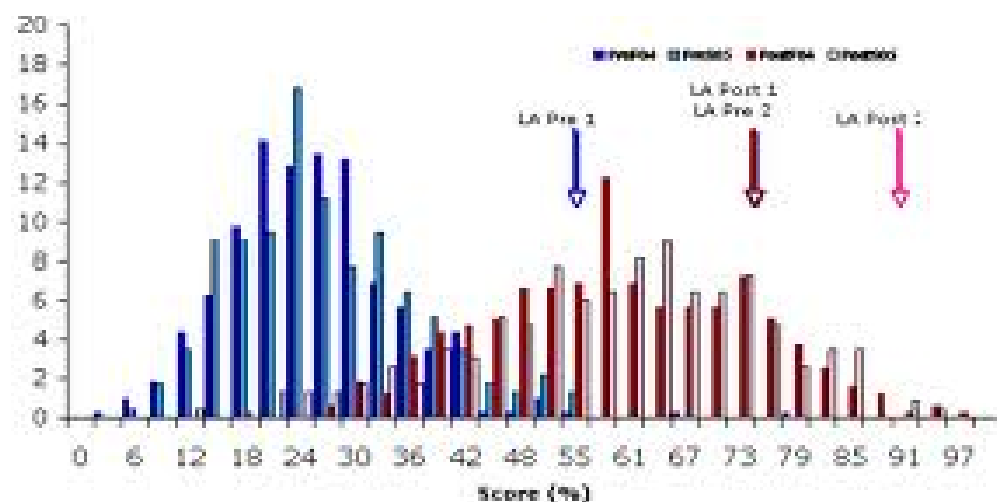
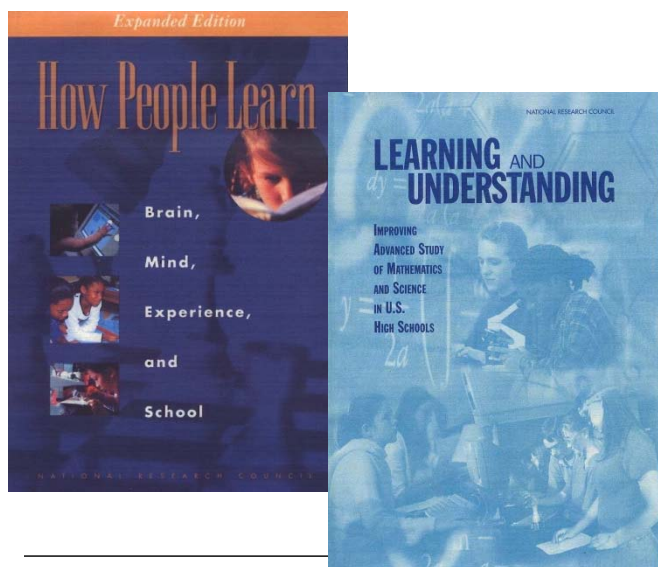


Figure 1: Pre- and Post- Scores for students on the Brief Assessment of Electricity and Magnetism in a second semester calculus based physics course. Arrows above histogram plot mean scores for Learning Assistants for two subsequent semesters.

CU's Leadership in STEM Education

Recruiting STEM teachers is a critical national need.

- *Gathering Storm's* A-1 recommendation: Annually recruit 10,000 science and math teachers, thereby educate 10 million minds.

CU Teach

- 1 credit recruiting courses to experience teaching
- Content-specific methods courses aimed at deep understanding
- Mentorship by Master Teachers
- Math, science, or engineering major + teaching license



University of Colorado
Boulder

CU's Leadership in STEM Education

Colorado Learning Assistant Model

- Top students are hired to assist faculty in making their courses student centered, interactive, and collaborative.
- LAs meet weekly with the faculty instructor to plan and share feedback.
- LAs take a specially-designed Education course on STEM learning.



A&S Context and Educational Goals

- Natural Sciences majors:
 - increase of 1,800 students in 6 years to 8,300 majors
 - now 48% of declared majors in A&S
- A&S Goal: Deliver excellent, innovative STEM education by building partnerships with Education, Engineering, and Graduate School
 - BA in computer science delivered by Engineering
 - Pre-Engineering program together with Engineering
 - LA Program and CU Teach with Education
 - Graduate Teacher Program – training for our TAs
- Develop a faculty mindset – our purpose is not merely to provide knowledge but to actively engage students in learning and in developing critical skills

Innovative Programs to Promote Goals

1. Science Education Initiative – SEI

- University supported, 5 year, \$5M project with 7 NS departments

2. CU Boulder Learning Assistant (LA) Model

- 9 NS departments
- 33 courses in spring 2013
- ~220 students hired each year as learning assistants



Innovative Programs to Promote Goals

3. CU Teach Science and Math

- Prepares outstanding secondary teachers in a science/math discipline
- 2.7 million teachers needed nationally over next decade

4. Discipline-based Education Research (DBER)

- weekly seminar series and forum for discussions on effective education
- sharing across departments and colleges



Innovative Programs to Promote Goals

5. Center for STEM Learning

- Goal is to advance K20 STEM education
- Integrates the many STEM programs and projects at CUBoulder



Learning Assistant (LA) Model
UNIVERSITY OF COLORADO **BOULDER**



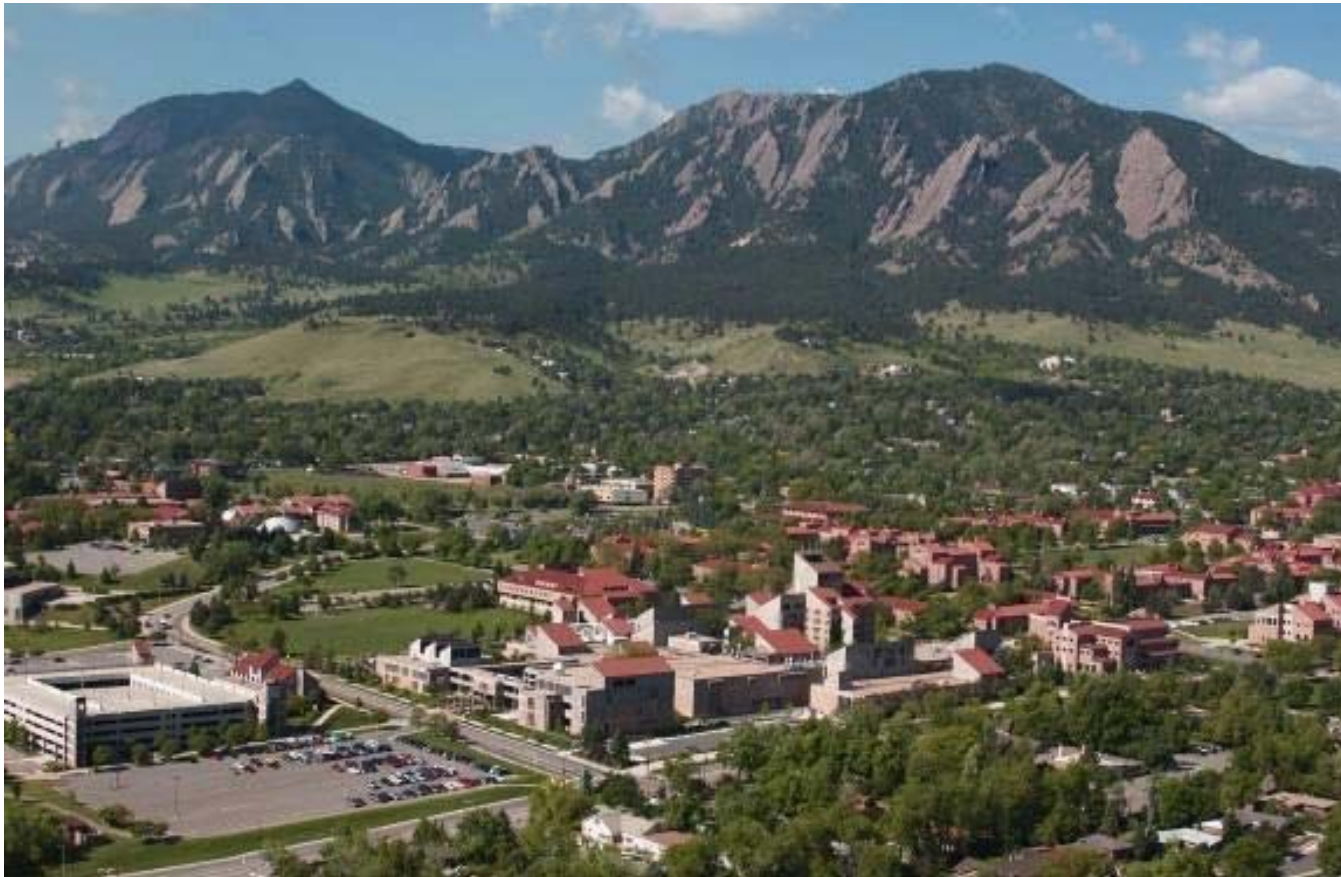
National Science Foundation
WHERE DISCOVERIES BEGIN



University of Colorado
Boulder

Putting the “E” in STEM

Objective: World-class education and preparation of the future engineering workforce



Engineering Educational Objectives/Values

- 50% enrollment growth
- Active learning
- Engineering for global society
- Inclusive excellence
- Industry & Interdisciplinary partnerships
- Innovative programs



Innovative Programs

1. BOLD/GoldShirt
2. Earn-Learn Apprenticeships
3. CUTeach Engineering & Digital Library



4. Interdisciplinary Design Projects & The Idea Forge
5. Pre-Engineering Program

Discussion Questions

1. What future need is anticipated for STEM graduates: growing, declining, or flat?
2. What qualities in STEM graduates are most important for industry?
3. How can CU & industry partner to better prepare STEM graduates and galvanize support for our marquee programs?



Chancellor DiStefano, Provost Moore, & The Center for STEM
Learning cordially invite you to attend the:

5th Annual Symposium on STEM Education

***A Celebration of CU-Boulder's National Leadership in STEM
Education***

Monday, September 23, 2013 Club Level, Folsom Stadium

CU STEM Education Showcase 3:00pm - 4:00pm

Reception and Award Ceremony 5:00pm - 7:00pm



University of Colorado
Boulder

Debrief

One of today's objectives was to understand how CU-Boulder can more effectively engage with industry to advance our marquee programs. We'd like to hear your thoughts:

- What aspects of a symposium like this support the CU-industry partnership?
- What could be added to such an event to increase initial industry engagement?
- From the industry perspective, what demonstrates institutional commitment to and support of STEM Education or any marquee program?
- For the successful partnership, what expectations does industry have of institutional leadership? What should the University plan to bring to the engagement?

Closing

- *Recap of the day*
- *Review of commitments*
- *What went well?*
- *What could have gone better?*
- *Closing remarks*

