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CU Engineering research programs are flourishing; extramural support from diverse federal and corporate sponsors has nearly doubled in the last five years, despite an increasingly competitive funding landscape.

Research Awards ($M)

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<th>FY06</th>
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The University of Colorado Boulder is a premier public research university with more than 30,000 students pursuing academic degrees and conducting research. The National Science Foundation ranks CU eighth among public institutions in federal research expenditures in engineering and sciences. Our academic prestige is marked by the university’s four Nobel laureates, seven MacArthur “Genius” Fellows, 18 alumni astronauts and 19 Rhodes Scholars. CU is eighth among US institutions in citations of our scientific papers and first in the increase of citation impact over the last 10 years. With 117 alumni serving around the world, CU leads the nation in Peace Corps volunteers. For more information, visit www.colorado.edu.

Kurt Maute, Associate Dean for Research
Joseph Negler Endowed Professor
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Research Awards by Source

Table not included in the text.
Distinguished Faculty

The 200+ faculty in the College of Engineering and Applied Science are innovative, highly productive, and widely-recognized for their professional accomplishments.

Fourteen CU Engineering faculty have been elected members of the National Academy of Engineering, the highest professional honor bestowed on engineers, recognizing important contributions to engineering theory and practice and unusual accomplishments in the pioneering of new and developing fields of technology.

More than one-third of our faculty have received prestigious early career awards from NSF, DOD, DOE and other federal agencies including 26 new awards in the last three years.

Ketti Ansell of the Department of Chemical and Biological Engineering is one of only four engineers to receive NSF’s prestigious Waterman Award. Ansell also is the first engineer selected as a Howard Hughes Medical Investigator.

Four CU Engineering faculty are Distinguished Professors, the highest honor that the University of Colorado bestows on its own faculty members.

Major Research Initiatives

Faculty and students in the College of Engineering and Applied Science carry out fundamental research in myriad areas along traditional disciplinary lines as well as in the context of contemporary technological applications. While the breadth of research is large, the college has identified five interdisciplinary themes under which faculty and departments aggregate expertise and activity to significantly impact global society.

- Aerospace systems science and engineering
- Bioengineering and biotechnology
- Computational science and engineering
- Energy systems and environmental sustainability
- Materials science and engineering

These initiatives address societal needs at state, national, and global levels in areas such as health care, security, communications, infrastructure, transportation, energy, natural resources, and education. In each area we are partnering with departments and institutes across campus and with regional and other institutions to develop large-scale, innovative research efforts that transcend traditional academic and geographical boundaries.

Outstanding Graduate Programs

Our six departments are home to 1553 graduate students (625 PhD and 928 MS) with average GPA. The Quarterly scores of 75/180). In addition to traditional departmental degrees, we offer MS and PhD degrees in Interdisciplinary Telecommunications and an MS degree in Engineering Management. Our departments/graduate programs are the highest-ranked in the Rocky Mountain Region by both the National Research Council (NRC) and the U.S. News and World Report (USNWR).

The former is a data-based assessment based on measures of faculty research productivity and impact such as awards and recognition, publications, citations, etc., while the latter is purely reputation-based. Four of our programs are ranked in the top 10 or top 10% in the U.S. by the NRC, and the College is ranked 30th (30th among publics) among nearly 300 comprehensive engineering colleges by the USNWR.

CU Engineering is home to more than 136,000 square feet of state-of-the-art laboratory facilities. These include specialized laboratories in all departments, as well as major interdisciplinary facilities that serve the entire college and the surrounding community, including:

- The Discovery Learning Center (DLC) provides 45,000 square feet of technically-advanced research space for collaborative teams of students, faculty and industry partners to conduct interdisciplinary research on topics such as biofuels, nanotechnology, unmanned vehicle systems, and advanced computer technologies.

- The Nanomaterials Characterization Facility (NCF) provides CU and its government and industry collaborators with the latest cutting-edge technology allowing characterization, imaging and probing of structures and materials on the nanoscale.

- The Colorado Nanofabrication Lab (CNL) is an open-user facility that provides expertise, and equipment to facilitate interdisciplinary research in microelectronics, optoelectronics, and all areas of applied research. The CNL is one of 14 user facilities in the NSF’s National Nanotechnology Infrastructure Network.

- In fall 2012, the Department of Chemical and Biological Engineering will move into the new Jennie Smoly Caruthers Biotechnological Building. This 330,000 square foot state-of-the-art research facility will promote collaboration amongst scientists and engineers in critical areas ranging from cancer, aging, and cardiovascular disease to inherited diseases, vaccine development, and tissue engineering.

- The Fast Hybrid Test Laboratory (FHL) is an open-user facility for research engineers and private companies interested in conducting real-time or pseudo-dynamic hybrid simulations of structures subjected to earthquakes, wind, and other extreme loads.

Over the last few years CU Engineering faculty have created eight new interdisciplinary research centers in biofuels, nanotechnology, unmanned vehicles, wind energy, space transportation, and sustainable engineering, bringing the total number to 15. These centers bring together faculty, students, and professional participants to address contemporary interdisciplinary challenges. They are supported by diverse industry and government sources.

- BioServe Space Technologies
- Center for Advanced Decision Support for Water and Environmental Systems (CADS/WES)
- Center for Aerospace Structures (CAS)
- Center for Fundamentals and Applications of Photopolymerizations (CFAP)
- Center for LifeLong Learning and Design (LiLD)
- Center for Pharmaceutical Biotechnology
- Center for Research and Education in Wind (CHEW)
- Colorado Center for Astrodynamics Research (CCAR)
- Colorado Center for Bioenvironment and Biotech (C2Bi)
- Colorado Power Electronics Center (CoPEC)
- DARPA Center on Nanoscale Science and Technology for Integrated Micro-Nano-Electromechanical Transducers (MINT)
- FAA Center of Excellence for Command Space Transportation
- Membrane Applied Science and Technology Center (MAST)
- Mortenson Center in Engineering for Developing Communities (MC-EDC)
- Research and Engineering Center for Unmanned Vehicles (RECV)
The 200+ faculty in the College of Chemical and Biological Engineering is one of only four engineers to receive NSF’s Distinguished Faculty honor that the University of Colorado bestows on its own faculty members. More than one-third of our faculty have held prestigious early career awards from NSF, DOD, DOE and other federal agencies including 26 new awards in the last three years.

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We enjoy a rich history and culture of encouraging and supporting commercialization of faculty and student research breakthroughs. We partner with the CU Technology Transfer Office (TTO), which pursues, protects, packages, and licenses to business the intellectual property generated by CEAS researchers. In the last 5 years, the college faculty has:

- Generated 326 invention disclosures
- Filed 321 patents
- Assisted with the formation of 17 start-up companies

Boulder and the Colorado Front Range are a hub for high tech startups, with the University of Colorado and nearby national research labs attracting talent and funding. Recent examples of our intellectual property impacts include:

- Entrepreneur and Commercialization

Cutting-Edge Research Facilities and Interdisciplinary Centers

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Our 200+ outstanding faculty, state-of-the-art facilities, and 4,500+ empowered students combine to create a truly world-class research institution that promotes discovery and seeks creative, innovative, and collaborative engineering solutions to enhance the well-being of individuals and society.

Recent Highlights

Aerospace Engineering Sciences

Brian Angrow and Ryan Starkey collaborated with the Sierra Nevada Corporation to design and build a dynamically scaled model of the Dream Chaser vehicle, which had its first successful test flight at NASA’s Dryden Flight Research Center. Dream Chaser is designed to carry up to seven people to the International Space Station and back.

Chemical and Biological Engineering

A DOE-commissioned report has concluded that Alan Weinre’s novel method of producing hydrogen fuel via water-splitting using concentrated sunlight and atomic layer deposited metal ferrite reactive materials is the only approach among eight competing technologies that is projected to meet DOE’s future cost targets.

Civil, Environmental and Architectural Engineering

Richard Regueiro, Ron Pak, John McCartney, and Brian Argrow and Ryan Starkey collaborated with Cooperative Program in Environmental Engineering and Science (CPRES) interns to develop and conduct simulations to help the Sierra Nevada Corporation to design and build a dynamically scaled model of the Dream Chaser vehicle, which had its first successful test flight at NASA’s Dryden Flight Research Center. Dream Chaser is designed to carry up to seven people to the International Space Station and back.

Computer Science

Bor-Yun Evan Chang received an NSF CAREER Award for his research on Cooperative Program Analysis: Bridging the Gap between User and Task Reasoning. He joins fellow CS colleagues, Srinivasan Sankaranarayanan and Kai O. Kuei, who also received the prestigious NSF CAREER Awards in 2009 and 2010 respectively.

Electrical, Computer, and Energy Engineering

Juliet Gopinath received an AFOSR Young Investigator Award to study phase and frequency control of laser arrays for pulse synthesis. Regan Zane was appointed to the US Defense Science Study Group. He joins Lucy Pao on this elite group of researchers that provides analysis and recommendations to the DoD on future technologies and research priorities.

Mechanical Engineering

Daven Henze received NASA’s New Investigator Program Award for his proposal “Linking radiative forcing of freon aircrafts and tropospheric ozone to precursor emissions.” The project links NASA remote sensing with modeling tools. He also received EPRI’s Early Career Award for his research on constraining ammonia emissions and PM2.5.

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