The College of Earth Resource Sciences & Engineering (CERSE) is home to some of Mines’ oldest and most established areas of study, while also offering unparalleled expertise in new and emerging fields. Our college combines robust technical, material, and policy expertise to educate students to work collaboratively across disciplines and solve complex global challenges. Our vision is to make a bold impact on earth, energy and environment education and research, both nationally and internationally, and to build the pipeline of future earth resource leaders.

The Division of Economics & Business focuses its scholarship, curriculum, and multi-disciplinary efforts in the areas of earth resources, energy, environmental policy, and management and optimization techniques. Our program is grounded in math, engineering and the sciences, so our students graduate with a firm understanding of economics and business as well as science and technology.

The Department of Geology & Geological Engineering is one of the world’s premier applied geoscience programs. Our faculty and students work in a number of areas important to earth, environment, and engineering, ranging from minerals and energy exploration to ice sheet dynamics, natural hazards, and water quantity and quality. Collaborative projects, lab sessions and field work give our students the skills they need to solve real world problems.

The Department of Geophysics teaches students how to find solutions to the challenging problems facing the inhabitants of this planet. These range from evaluating sites for underground construction and containment of hazardous waste, to monitoring noninvasively the aging infrastructures of developed nations, mitigating the threat of geohazards to populated areas, contributing to homeland security, evaluating changes in climate and managing humankind’s response to them, and exploring other planets.
The Division of **Liberal Arts & International Studies** recognizes that few important engineering decisions are purely technical. In our globally interconnected world, professionals must be able to integrate social, cultural, political, economic, ethical, and environmental knowledge into their decisions and designs. Academic work in LAIS provides students with an understanding of these contexts, enhances their abilities to communicate well, gives them the foundation to transcend traditional technical boundaries, establishes their competitive edge in the professional marketplace, and prepares them to be a leader and a life-long learner.

**Programs & Centers**
- Edgar Mine
- Excavation Engineering and Earth Mechanics Institute (EMI)
- Advanced Explosives Processing Research Group (AXPRO)
- Energy, Mining and Construction Industry Safety (EMCIS)
- Underground Construction & Tunneling (UC&T)
- Rock Mechanics Lab
- Mining Ventilation Lab
- Mine Rescue Teams
- Max Bowen Mineral Processing Laboratory

The Department of **Mining Engineering** illustrates the range of the profession, which embraces all required activities to facilitate the recovery of valuable minerals and products from the earth's crust. Our students study the principles and techniques of mineral exploration, underground and surface mining operations, mineral processing technologies, and related social and environmental issues. The program balances theoretical knowledge with engineering applications to provide students with a sound foundation for their desired career path.

**Programs & Centers**
- Center for Earth Materials, Mechanics, and Characterization (CEMMC)
- Laser/Rock Interaction
- Fracturing, Acidizing, Stimulation Technology (FAST)
- Unconventional Natural Gas and Oil Institute (UNGI)
- Marathon Center of Excellence for Reservoir Studies (MCERS)
- Unconventional Reservoir Engineering Project (UREP)
- Energy Modeling Group (EMG)
- Physics of Organics, Carbonates, Clays, Sands and Shales (OCLASSH)

The breadth and depth of the **Petroleum Engineering** Department is unique; it is designed to prepare each graduate for a successful career with both technical competence and managerial ability. We attract well-qualified students from all over the world, which creates a healthy international atmosphere. Our students gain theoretical and practical knowledge of subjects such as drilling, formation evaluation, reservoir characterization, well completion & stimulation, well testing, economic evaluation of petroleum projects, fundamental fluid & rock behavior, natural gas engineering, and more.

**Colorado Geological Survey (CGS)** is a state government agency within Mines whose mission is to help reduce the impact of geologic hazards on citizens of Colorado, promote responsible economic development of mineral and energy resources, provide geologic insight into water resources, and provide geologic advice and information to a variety of constituencies.

**Programs & Centers**
- Geologic Mapping
- Geologic Hazards & Land Use
- Water & Mineral Resources
- Energy Resources

**Programs**
- Ethics Across Campus
- Music
- Campus Writing Program & Center
- McBride Honors
- Humanitarian Engineering
- International Political Economy
- Hennebach Program in the Humanities
Colorado Geological Survey (CGS)
CGS works extensively with various departments on campus, with industry partners, and government agencies. These programs, centers and consortiums are only a few of the ways CGS acts on our commitment to crafting collaborative and cross-disciplinary partnerships to solve complex global challenges.

Ethics Across Campus (EAC)
Seeks to promote, extend, and deepen the understanding of ethical issues in relation to applied science and engineering education and research; to coordinate ethics teaching, learning, and practice.

Payne Institute for Earth Resources
Led by Economics and Business faculty, the Institute brings together researchers from around the world to perform collaborative research and outreach on issues related to earth, energy and environmental issues, including policy, regulations and practices. Their Working Paper Series is a valuable resource for NGOs, business and government leaders.

Critical Materials Institute (CMI)
CMI is a multi-institutional, multi-disciplinary consortium led by the Ames Laboratory. Faculty and students from Economics and Business and Metallurgical & Materials Engineering focus on process engineering to improve primary mineral processing and recovery, secondary recovery through recycling of manufacturing wastes and end-of-life products, material characterization, and economic analysis of material supply chains.

Music Program
This creative outlet offers students academic courses in music theory and composition as well as multiple performing groups including band, jazz band, choir and acapella singers.

Hennebach Program in the Humanities
Fosters the relationship between humanities and the sciences by bringing in professors and scholars to offer multidisciplinary lectures, courses, research and collaboration opportunities.

Education and Research

Payne Institute for Earth Resources
Led by Economics and Business faculty, the Institute brings together researchers from around the world to perform collaborative research and outreach on issues related to earth, energy and environmental issues, including policy, regulations and practices. Their Working Paper Series is a valuable resource for NGOs, business and government leaders.

Ethics Across Campus (EAC)
Seeks to promote, extend, and deepen the understanding of ethical issues in relation to applied science and engineering education and research; to coordinate ethics teaching, learning, and practice.

Music Program
This creative outlet offers students academic courses in music theory and composition as well as multiple performing groups including band, jazz band, choir and acapella singers.

Hennebach Program in the Humanities
Fosters the relationship between humanities and the sciences by bringing in professors and scholars to offer multidisciplinary lectures, courses, research and collaboration opportunities.

Payne Institute for Earth Resources
Led by Economics and Business faculty, the Institute brings together researchers from around the world to perform collaborative research and outreach on issues related to earth, energy and environmental issues, including policy, regulations and practices. Their Working Paper Series is a valuable resource for NGOs, business and government leaders.

Critical Materials Institute (CMI)
CMI is a multi-institutional, multi-disciplinary consortium led by the Ames Laboratory. Faculty and students from Economics and Business and Metallurgical & Materials Engineering focus on process engineering to improve primary mineral processing and recovery, secondary recovery through recycling of manufacturing wastes and end-of-life products, material characterization, and economic analysis of material supply chains.

Center for Underground Construction & Tunneling (UC&T)
This multidisciplinary center features Mining Engineering, Geological Engineering, and Civil & Environmental Engineering faculty. Applied research projects include computational back-analysis, ground vision, surface-groundwater-tunnel inflow modeling, ground deformation behavior, and intelligent underground and high stress tunneling.

Unconventional Natural Gas and Oil Institute (UNGI)
UNGI provides a platform for multidisciplinary activities in all areas of unconventional natural gas and oil exploration and development. Faculty from Mining Engineering, Petroleum, Geology, Civil & Environmental Engineering, Geophysics, Chemistry and Chemical & Biological Engineering focus on research (bridging science and engineering applications), professional education, and national and international regulatory training.

Center for Wave Phenomena (CWP)
This research group, led by faculty from Geophysics, is sponsored by approximately 30 companies worldwide in the petroleum exploration industry, plus U.S. government agencies. CWP emphasizes the development of theoretical and computational methods for imaging of the Earth's subsurface, primarily through use of the reflection seismic method.

International Ground Water Modeling Center (IGWMC)
Students and faculty from Geology and Civil & Environmental Engineering work together to stimulate the correct and efficient use of simulation models and related computer-based support technology in the management and protection of groundwater resources; to train groundwater professionals by involving them in this endeavor; and to facilitate communication and interaction of groundwater professionals on modeling issues.

Colorado Geological Survey (CGS)
CGS works extensively with various departments on campus as well as government agencies. Some of their projects include:
- Performing a site-specific economic analysis of geothermal energy in Rico, CO in partnership with the Colorado Energy Office and the Division of Economics and Business.
- Working with the Colorado Water Conservation Board, Mesa County and the Governor’s Office of Information Technology to collect LiDAR data over Mesa County, whose unstable rock units lead to a high prevalence of geological hazards.

McBride Honors Program
Students from across Mines are challenged to work independently, to engage in spirited debate, and to develop a sophisticated understanding of the broader social and cultural context in which engineers and scientists work.

Center for Underground Construction & Tunneling (UC&T)
This multidisciplinary center features Mining Engineering, Geological Engineering, and Civil & Environmental Engineering faculty. Applied research projects include computational back-analysis, ground vision, surface-groundwater-tunnel inflow modeling, ground deformation behavior, and intelligent underground and high stress tunneling.

Unconventional Natural Gas and Oil Institute (UNGI)
UNGI provides a platform for multidisciplinary activities in all areas of unconventional natural gas and oil exploration and development. Faculty from Mining Engineering, Petroleum, Geology, Civil & Environmental Engineering, Geophysics, Chemistry and Chemical & Biological Engineering focus on research (bridging science and engineering applications), professional education, and national and international regulatory training.

Center for Wave Phenomena (CWP)
This research group, led by faculty from Geophysics, is sponsored by approximately 30 companies worldwide in the petroleum exploration industry, plus U.S. government agencies. CWP emphasizes the development of theoretical and computational methods for imaging of the Earth’s subsurface, primarily through use of the reflection seismic method.

International Ground Water Modeling Center (IGWMC)
Students and faculty from Geology and Civil & Environmental Engineering work together to stimulate the correct and efficient use of simulation models and related computer-based support technology in the management and protection of groundwater resources; to train groundwater professionals by involving them in this endeavor; and to facilitate communication and interaction of groundwater professionals on modeling issues.

Colorado Geological Survey (CGS)
CGS works extensively with various departments on campus as well as government agencies. Some of their projects include:
- Performing a site-specific economic analysis of geothermal energy in Rico, CO in partnership with the Colorado Energy Office and the Division of Economics and Business.
- Working with the Colorado Water Conservation Board, Mesa County and the Governor’s Office of Information Technology to collect LiDAR data over Mesa County, whose unstable rock units lead to a high prevalence of geological hazards.

McBride Honors Program
Students from across Mines are challenged to work independently, to engage in spirited debate, and to develop a sophisticated understanding of the broader social and cultural context in which engineers and scientists work.
CERSE Student Connections

CERSE students are active in many clubs and organizations across campus. The many organizations housed in CERSE include:

- Society of Petroleum Engineers
- Pi Epsilon Tau
- American Association of Drilling Engineers
- American Rock Mechanics Association
- Society of Mining Engineers
- Mine Rescue Teams
- Society of Women in Geophysics
- Society of Exploration Geophysicists
- American Association of Petroleum Geologists
- Society of Economic Geologists
- Association of Environmental & Engineering Geologists
- Denver Region Exploration Geologists’ Society
- Geological Society of America
- Mines Energy Club
- United States Association for Energy Economics
- Mines Entrepreneurship Club
- Mines Investment Club
- Economics Club