

# Mines Welcomes XXV Space Resources Roundtable

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[research.mines.edu](http://research.mines.edu)



# MINES: By the Numbers AY2024-2025

## 8066 students

(6,210 UG, 1,856 Grad w/729 PhD)

(55% CO, 8% Int; 34%/66% W/M)

## 374 academic faculty

(234 T/TT, 126 TF, 14 PoP's; 34%/66%W/M)

## \$37M state investment

(6.7% contribution to FY24 budget)

## \$21,914 resident UG tuition & fees

## "R1" Research Carnegie Classification

(\$110M research awards / \$95M research expenditures)

## Student Success

(93.8% FTF Retention; 70%/81% 4/6-year Grad Rate;

94% BS/95% MS/98% PhD six-month Positive Employment Outcomes)



**COLORADO SCHOOL OF MINES**

# Mines – Internationally Recognized Leadership

• In the **Top 3** of U.S. 'elite' energy programs - Geosciences, Petroleum Engineering - and Hydrology & Water Resources *(2022 US News & World Report, 2020 Hecht, StateUniversity.com)*

• **#1 mineral and mining engineering** program in the world *(2023 QS World University Rankings)*

• **#2 U.S. university for combining research and instruction** *(Wall Street Journal, 2020)*

• **#2 Return on Investment** *(Money, 2022)*

• **#3 Best U.S. Engineering Colleges** *(Money, 2022)*

• **#4 Brainiest Colleges** *(Lumosity 2020)*

- World's first in **Space Resources**
- Academic lead for DOE **Critical Materials** Institute
- Lead university for **Materials Science**
- First-of-its kind U.S. program for **Carbon Capture, Utilization and Storage**
- **Top Nuclear Science and Engineering** program focus includes radiochemistry, space nuclear, SMRs, nuclear fuel cycle
- Principal partner with USGS for **TRIGA reactor**
- **Research expertise** in **Energetic materials** and **Materials in Extreme conditions**
- Leader for U.S. **Robotics** programs
- First U.S. **Quantum engineering** programs
- Earth Observation Group unique satellite **resource-mapping** expertise, emissions tracking, USGS partnership
- **Sustainable materials** stewardship expertise, including **nuclear energy** systems
- **Humanitarian Engineering** programs, global resources, economy, policy



# Earth, Energy, Environment, Foundations, Fundamentals & Frontiers

**Mines Pillars of Research and Innovation: focus on solving the world's most critical science and engineering challenges**



## Earth Exploration

### Understanding our planet & responsibly developing its resources

Mines researchers are building a better understanding of Earth's structure, natural processes, and changing environments to predict and mitigate natural hazards, understand environmental cycles, address climate change, and locate and access critical resources with minimal impact on the planet.



## Foundations of Responsible Innovation

### Building solutions in global context

Mines scientists and engineers integrate social, cultural, ethical, economic, policy, and environmental considerations into their work to improve our world through impactful and responsible research and innovation.

## Integrated Energy Solutions

### Powering the future

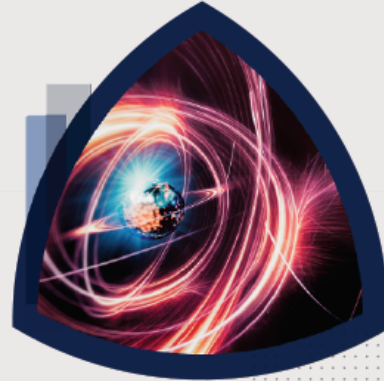
Balancing ever-growing demands for affordable, reliable, and climate-conscious energy, Mines researchers are leaders in finding solutions that reduce emissions, boost energy efficiency and storage, use alternative and renewable sources and fuels, and improve grid reliability.



## Fundamentals of Scientific Discovery

### Expanding our understanding of the world

Researchers across Mines drive discovery and innovation by using advanced technology and computing to enhance our understanding of the matter, forces, and interactions that govern our universe.



## Sustainable Environment & Climate

### Protecting our planet

Environmental sustainability and climate change mitigation are central to research at Mines, where scientists advance projects aimed at purifying water, soil, and air while driving cleaner energy production, resource extraction, and manufacturing practices.



## Science & Engineering Frontiers

### Pushing the boundaries of what's possible

Mines researchers explore the frontiers and push the boundaries of science to accelerate breakthroughs in computing, robotics, space exploration, advanced materials and manufacturing, biotechnology, and beyond.

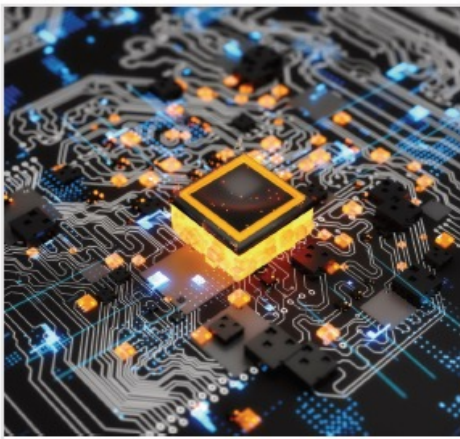
A night cityscape with glowing light trails and digital overlays. The image shows a dense urban environment with numerous skyscrapers and buildings, their lights reflecting on the surrounding air. Overlaid on the city are vibrant, multi-colored light trails in shades of blue, green, and purple, which appear to be moving through the space. There are also some red rectangular outlines and dots, suggesting a digital or engineering theme.

# Science & Engineering Frontiers

Pushing the boundaries of what's possible

Technologies of today cannot solve the world's most pressing problems or rise to meet its most interesting opportunities. Mines researchers are exploring the frontiers of science to accelerate breakthroughs in computing and artificial intelligence, robotics, space exploration, advanced materials and manufacturing, biotechnology, and more. We are pushing the boundaries of what's possible to achieve a better tomorrow.





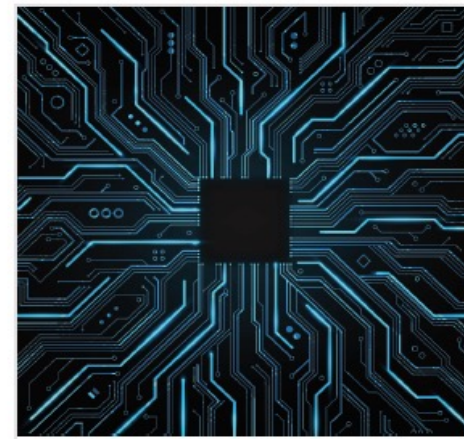
**Innovation in  
Computing**



**Computing for  
Innovation**



**Robotics for the  
Modern World**



**Microelectronics  
& Devices**



**Space Exploration &  
Resource Development**



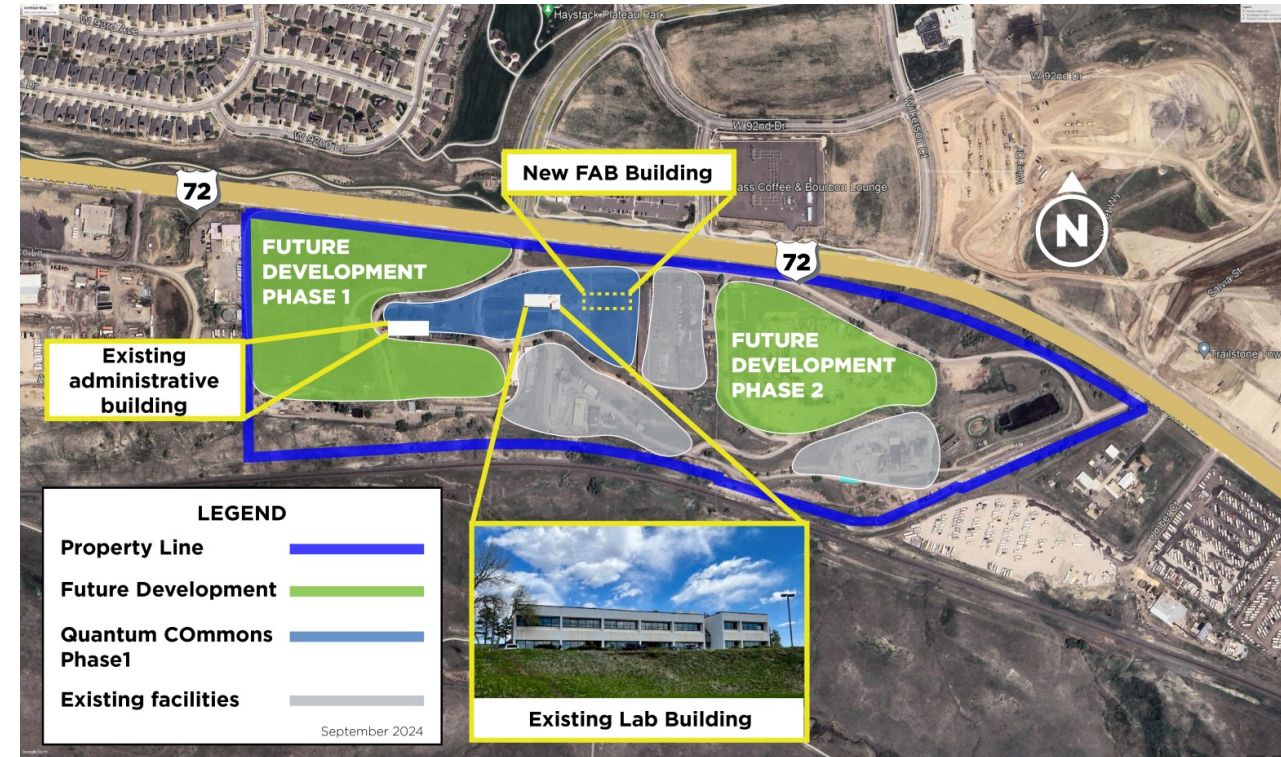
**Materials &  
Manufacturing  
of the Future**



**Engineering at the  
Interface of Biology  
& Technology**

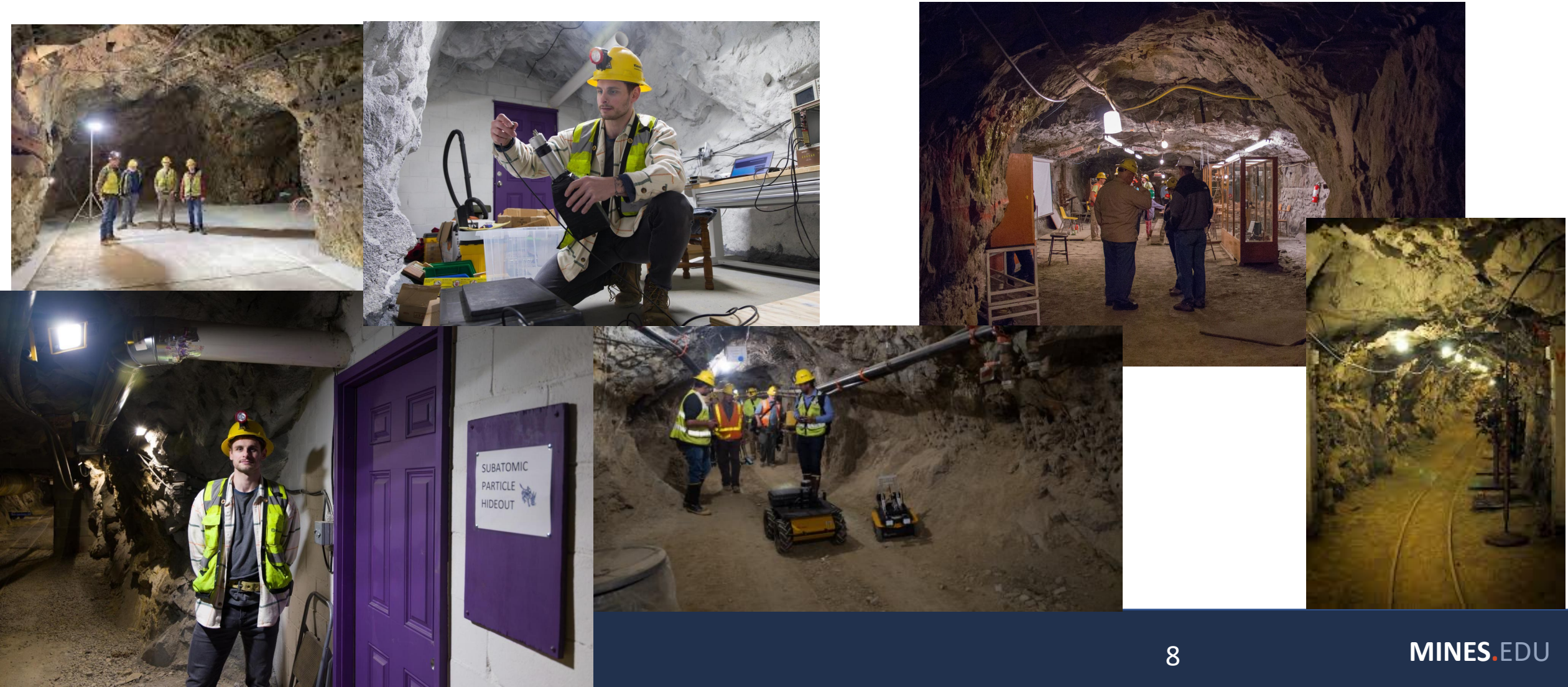
# Quantum COmmons @ Arvada

- User facilities critical to accelerating the speed of progress in the quantum industry
  - **10,000** sq. ft. fabrication lab/cleanroom building to support prototyping and low-volume manufacturing
  - **17,000** sq. ft open-access quantum labs with a collaborative community design
  - **~70 acres** available for open access facility expansion and co-location and growth of quantum companies



# Colorado Underground Research Institute CURIE @ Edgar Experimental Mine

*Unique Subsurface Research Facility Supporting QISE*



# New Entrepreneurship and Innovation Spaces



# Collaborations are in our DNA

USGS-Mines Energy and Mineral Resources Facility on Mines Campus  
Authorized and appropriated. Construction underway. Opens 2027



# International Partnerships

- Mines: Extensive history of successful partnerships globally
- Collaborations with governments, universities, NGOs, economic development organizations, ...
  - Research partnerships
  - Resource assessment
  - Sustainable development
  - Curriculum development
  - Workforce preparation
  - Capacity building



Image Courtesy: NASA



# MINES Research

*Innovation with Impact*