U.S. DEPARTMENT of ENERGY
Office of Critical Minerals and Energy Innovation

Managed by Argonne NATIONAL LABORATORY

METALLIC
The Minerals to Materials Supply Chain Research Facility

Notice of Program Interest:

MineralWorks: American Critical Materials Challenge

A National Collegiate Competition to Build the Next Generation Workforce Advancing Emerging Technologies across Critical Minerals and Materials Supply Chains

A Minerals to Materials Supply Chain Research Facility (METALLIC)
Laboratory-to-Industry Future Talent (LIFT) Program

Supported by the U.S. Department of Energy's
Office of Critical Minerals & Energy Innovation

Managed by Argonne National Laboratory

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Argonne National Laboratory (Argonne) is pleased to announce a Notice of Program Interest (NOPI), on behalf of the U.S. Department of Energy's (DOE) Office of Critical Minerals and Energy Innovation (CMEI) for an upcoming Request for Proposals (RFP) to be released in early Fall 2026 to select colleges and universities for participation in DOE's MineralWorks: American Critical Materials Challenge (MineralWorks Challenge).

The rapid growth of Artificial Intelligence, cloud computing data centers, microelectronics, battery gigafactories, grid infrastructure, and advanced manufacturing depends on secure, scalable, and robust supply chains for critical minerals and materials (CMMs). According to the 2023 DOE Critical Materials Assessment, co-authored by Argonne, 18 minerals — including neodymium, dysprosium, praseodymium, terbium, gallium, lithium, cobalt, nickel, natural graphite — are considered critical for the period 2025 to 2035 because they are indispensable for advanced energy technologies yet vulnerable to supply disruptions.

Central to this technology expansion and secure and resilient CMM supply chains is a workforce skilled in emerging technologies and ready to bring modern innovations to extraction, processing, advanced manufacturing, and supply chain operations. Targeted workforce solutions must be deployed to address the acute skills gap spanning these sectors. Current workforce pipelines to support these sectors are insufficient, with significant declines in mining and process engineering graduates, an aging labor force, and competition across industries and technologies for limited resources that threaten future manufacturing capacity.

DOE has announced sustained, multi-billion-dollar investments to secure a domestic supply chain for these critical minerals and materials, helping to secure America's energy future, strengthen domestic manufacturing, and enhance national competitiveness. DOE's commitment spans the entire value chain-from exploration and beneficiation to processing, refining, advanced manufacturing and commercialization – ensuring the U.S. reduces supply chain vulnerabilities while accelerating the adoption of new technology and process innovations.

DOE's Minerals to Materials Supply Chain Research Facility (METALLIC) builds upon existing DOE efforts to accelerate the establishment of new, domestic CMM supply chains. Led by DOE's National Energy Technologies Laboratory (NETL), METALLIC brings the resources of nine DOE national laboratories together as the destination to validate, improve, and help commercialize technologies developed by domestic entities, amplifying the impact of DOE and other U.S. government investments. This innovative approach fosters an ecosystem of expertise and capabilities for accelerating and de-risking CMM technology development and commercialization.

DOE will soon launch METALLIC's Laboratory-to-Industry Future Talent (LIFT) program - an integrated workforce effort that embeds workforce development directly into the CMM innovation ecosystem and provides a key pathway to careers in the supply-chain ecosystem. LIFT is designed to deliver impact immediately, helping to create career interest now, while building durable talent pipelines aligned with DOE priorities. LIFT strategically leverages DOE national laboratory capabilities and facilities to drive institutional capacity, create jobs, and pave pathways to CMM careers in the Lab system and with industry. Integrating workforce into METALLIC ensures technical advances translate into deployable capacity, resilient regional ecosystems, and a workforce capable of securing America's critical mineral future.

The MineralWorks Challenge will be a flagship multi-year LIFT workforce development program, featuring a national collegiate competition that brings premier colleges and universities together from across the United States, Canada and Australia together to tackle technical challenges spanning resource extraction, material processing and manufacturing supply chains. The program will also feature K-12 STEM Outreach and communications initiatives to build awareness about the opportunities for careers in the CMM and related fields.

Innovating resource extraction and material processing operations while reducing costs and securing supply chains for computing resources, national defense, energy infrastructure, and other technology advancements across the CMM value chain will require a workforce that is technically agile, systems oriented and equipped to rapidly scale technologies beyond the laboratory.

Argonne has developed the new MineralWorks Challenge to drive this innovation at universities across North America, accelerating industry-relevant research in multiple areas of the CMM value chain while building a skilled workforce capable of bringing new ideas that can reduce emerging technology CMM supply chain risks and dependencies.

University teams will tackle challenges designed to develop foundational competencies for careers across the CMM supply chain, while leveraging structured industry partnerships to solve real-world problems with the latest hardware, automation platforms and digital engineering tools. These challenges may include topics such as design and automation of resource extraction and processing operations, implementing autonomous materials processing and discovery workflows while developing digital twins and facility designs for rapid industry scale up, and modeling downstream manufacturing supply chain production pathways and economic impacts for energy and cloud infrastructure build outs.

The MineralWorks Challenge will bring together a cross-section of key technology and policy leaders to sponsor this inaugural collegiate competition for the CMM industry, enabling collaborative R&D that will advance the state of the industry. Students will take part in an unparalleled educational experience across the 3-year program, helping to seed a skilled and technical workforce that will strengthen American dominance in CMMs and downstream emerging technology applications.

Furthermore, the MineralWorks Challenge will enable universities to accelerate research-to-workforce pathways, scale specialized training and facilities, and strengthen industry and national laboratory partnerships aligned with DOE's $1B critical minerals and materials investments. The program also provides an opportunity for universities that currently offer limited critical minerals and materials coursework to add or expand relevant courses, certificates, and degree programs. For universities new to the CMM industry, the competition will serve as a catalyst to mobilize the resources and knowledge of government and industry to attract new students and establish new academic programs at your university that will help our nation address this critical challenge.

Colleges and universities with Accreditation Board for Engineering and Technology (ABET) accredited engineering programs in the United States who meet other requirements specified in the RFP will be eligible for consideration. Select schools in Canada and Australia are eligible to participate as collaborators with a partnering U.S. educational institution but will not be eligible to receive U.S. federal funding. Official university selection is contingent upon final funding authorization and will determine the number of selected university teams.

Background

Across nearly four decades, Argonne has managed workforce development programs for DOE in close partnership with industry to provide unparalleled, hands-on educational experiences to transform the traditional classroom environment into a hub for innovation.

Argonne has managed DOE's flagship workforce program, the Advanced Vehicle Technology Competitions (AVTCs), for more than 37 years, seeding more than 32,000 graduates into the automotive, software, battery and technology sectors. The MineralWorks Challenge was modeled after prior AVTCs, including the most recent Battery Workforce Challenge, bringing decades of experience managing collegiate competitions to seed a future-ready workforce for our most critical industrial sectors.

These sample AVTC impacts show the value of participating in these unparalleled educational programs:

- **32,000+** alumni
- **180** industry sponsors
- **70** companies hire an AVTC every year on average
- **111** educational institutions have participated
- **160** master's theses and PhD dissertations in the last 10 years
- **210** new courses added to university curriculums in the last 10 years
- **591** K-12 STEM outreach events reaching **63,716** K-12 youth in the last 10 years
- **788** community events reaching **489,834** community members

For more information about the impacts AVTCs have had on students, universities and industry check out: AVTC Impacts and AVTCs: Education Beyond the Classroom Video.

Expected Timeline

Argonne expects to launch Year 1 of the MineralWorks Challenge in January 2027 and conclude Year 3 in December 2029. The expected launch timeline is as follows:

Minerals to Materials Challenge Launch: Expected Timeline	
Notice of Program Interest Released	May 29, 2026
University Request for Proposal Released	Aug./Sept. 2026
University Proposals Due	Oct./Nov. 2026
Team Notification (Embargoed)	Nov./Dec. 2026
Program Launch: Media Announcement & Launch Workshop	Jan. 14-16, 2027

Annual Workshops and Competition Events

Each year, organizers will host in-person training workshops where students and industry sponsors convene for training, networking, mentoring, and recruiting. This will be complemented by virtual training and professional development throughout the year to ensure students receive unprecedented support to guide them throughout the process.

At the annual end-of-the-academic-year finale, teams will compete head-to-head in scored presentations, participate in recruiting events, an awards ceremony, and other events with competition sponsors.

Competition winners will be determined through a combination of judged evaluations for reports and presentations and testing events to evaluate performance.

Support Provided to Schools Selected to Participate

Argonne will convene industry partners together from across the CMM value chain to co-sponsor the MineralWorks Challenge, providing an immersive, real-world experience for students with strong industry engagement and collaboration throughout the three-year competition. Industry partners will provide direct mentoring and technical support, equipment and testing facilities as well as key financial support for universities.

The Challenge will also offer pathways for internships within the DOE national lab system and industry, as well as key career pathways for graduates for full-time positions across the CMM value chain.

Over the duration of the competition series, teams could expect support ranging from graduate student stipends, seed money, cash prizes and awards, and travel stipends to attend workshop and competition events.

In prior DOE competitions, each team has benefited from more than $500,000 in cash, components, and primarily in-kind support from the program and competition-level sponsors. This program expects to provide a similar level of support to selected universities, subject to funding availability. Support provided to the universities, as well as any matching requirements from the university, will be detailed in the upcoming University Request for Proposal. Participating teams have also been successful in leveraging support from local sponsors for their programs.

Recommended School Support to Drive Student Success

University participants will be encouraged to provide cash support to complement the resources provided by the competition. At a minimum, universities can expect this to include supplemental funds to support full-time graduate students beyond the support provided by the program. Graduate students provide continuity to a team, so universities are encouraged to retain graduate students for multiple years of the three years of the program. Additional matching support (such as matching seed money, supplemental travel funding, waiver of indirect fees, etc. as described in the upcoming RFP) will be encouraged and will be a competitive element considered during the team selection process.

In addition to matching funding, universities will likely be encouraged in the RFP to provide:

- A mechanism for students to earn course credit for their participation in the competition
- Faculty release time or summer salary for at least one engineering faculty advisor
- Logistical, promotional, and facility support for their team.

Universities will be encouraged to secure support and faculty champions from multiple engineering departments, such as Mining, Metallurgical, Geophysical, Geosystems, Environmental Sciences, Materials and Computer Science, Chemical, Industrial, Mechanical, and Electrical and Computer Engineering; science departments such as Chemistry and Geology; Business and others. Strong levels of cross-departmental support are critical to the success of a team and will be a competitive element considered during the team selection process. Signed letters of support from both the Dean of Engineering and the University Administration will be required with each proposal.

If accepted into the program, each school will be required to sign an annual Good Faith Agreement reaffirming the school's full support of their team and explicitly stating its willingness to participate in all program activities with at least one faculty advisor in attendance at all competition workshops and events. Participating universities and collaborating educational institutions will likely also be required to sign other agreements related to non-disclosure of proprietary sponsor data and the donation of hardware.

Proposal Evaluation Process

Once released, the RFP will be available for download from the www.avtcseries.org web page.

Additional details about the technical challenges and financial and in-kind support to be donated to participating universities will appear in the RFP.

Administrative questions about the program can be addressed to: ATVC@anl.gov. Technical questions will not receive responses until the RFP is issued.

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