UK-US Symposium on Engineering Biology for Critical Minerals

Washington DC, USA, 4th June 2026

UK Science & Technology Network

CMI Critical Materials Innovation Hub

Elemental Engineering Biology Mission Hub

EBRC Engineering Biology Research Consortium

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Introduction and Background

The UK-US Symposium on Engineering Biology for Critical Minerals was held on 4 June 2026 at the British Embassy in Washington, DC. Organised by the UK Science and Technology Network, the Elemental Engineering Biology Hub, the US Department of Energy Critical Materials Innovation Hub, and the Engineering Biology Research Consortium (EBRC), the symposium brought together researchers, industry representatives, government officials, funders, and policy stakeholders from across the UK and the US.

The event connected two closely linked research and development communities: engineering biology and critical minerals. Critical materials[1] are essential to clean energy technologies, advanced manufacturing, defence, digital infrastructure, and other strategic sectors. Their supply chains are increasingly shaped by geopolitical, environmental, and economic pressures, making new approaches to recovery, recycling, and substitution a priority for both the UK and the US. Engineering biology offers potential routes to lower-impact extraction, separation, recycling, and recovery processes, including bioleaching, biosorption, biomineralisation, and biologically informed materials processing. The aim of the symposium was to explore how bioengineering approaches could support the supply of critical materials from both primary and secondary sources, while strengthening transatlantic collaboration in this emerging area.

This community has been developing since 2022, with two previous events held in 2024. The 2026 symposium built on this earlier activity by continuing to support UK-US research and development aimed at increasing resilience and sustainability in critical materials supply chains. Its key objectives were to reinforce and expand the existing researcher network, generate ideas for bilateral collaboration, and identify opportunities for future joint activity.

Whereas the 2024 events focused primarily on technical research challenges, the 2026 symposium placed greater emphasis on the practical, institutional, and funding challenges involved in collaboration. Since the previous events, funding has been made available through the network to support cross-Atlantic research collaborations. The symposium therefore provided an opportunity for funded researchers to share early outcomes, reflect on the value of these collaborations, and discuss future funding opportunities.

The symposium was structured around panel sessions, facilitated conversations, and small-group discussions, each designed to support exchange and collaboration. Across these sessions, participants considered bioengineering solutions within the broader critical minerals landscape, linking scientific advances to policy imperatives, supply chain resilience, and economic considerations.

This report summarises the main discussions and themes emerging from the symposium. The report is intended to inform researchers, funders, policymakers, and programme managers interested in strengthening UK-US collaboration at the interface of engineering biology and critical minerals. A full list of participants and the symposium agenda are provided in appendices 1 and 2. Appendix 3 presents findings from the post-event participant survey.

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[1] While there is no definitive fixed list of what constitutes a critical material, they are defined broadly as chemical elements of significant technological necessity for which there is an assessed supply risk.

Symposium Panels

Panel 1: Where are the near-term opportunities for engineering biology to contribute to critical mineral supply chain challenges?

The panel explored where engineering biology could make the most immediate contribution to critical mineral supply chain challenges, with a strong emphasis on focusing efforts where biology offers an advantage. Speakers noted that many critical minerals interact with biological systems, presenting opportunities for biomining, recovery, and remediation. However, other interactions are poorly understood or may not be biologically workable. A recurring theme was the need to understand natural biological systems. The panel also noted that both cutting-edge tools, such as AI and synthetic biology, and decades of existing research should be better connected and applied.

A key theme was the gap between research and industry. Rather than pushing lab discoveries into the market, speakers argued for starting with real mining-sector problems and identifying where biology can add value. Near-term opportunities include improving copper bioleaching, developing heterotrophic systems and bio-acid production, recovering materials from e-waste, treating low-grade ores, and targeting waste streams. However, scale-up remains slow, and industry adoption will depend on trust, evidence, and clear economic benefits.

The economics of mining were repeatedly stressed as an example: many critical minerals are co-products of larger-volume metals, making their markets relatively small, so low-cost passive processes may be especially important. Water treatment was highlighted as one of the strongest opportunities. Mines place high value on water reuse, purification, and waste reduction, often more than on recovering small quantities of minerals from contaminated streams. Engineering biology could therefore gain traction by solving operational problems such as dirty water, dilute streams, and legacy waste, while supporting cleaner and safer mining practices. This framing, solving operational problems for industry rather than focusing only on mineral recovery, was presented as essential for adoption.

The panel also emphasised the role of government in convening key actors, setting strategic goals, supporting consortia, and funding both fundamental and applied research. Public trust will require case studies, field data, clear communication of risks and benefits, and early engagement with communities and potential users. Finally, speakers pointed to the need for better technical training, centralised knowledge resources, and stronger academia-industry links, with future priorities including tuneable biological systems, in situ bioleaching, and more predictable programming of biology using AI.

Conversation: Biotechnology for critical minerals resilience: The importance of trusted partnerships from research and innovation to economic and national security

The conversation focused on how biotechnology can strengthen critical minerals resilience through trusted partnerships across government, academia, industry, and allied countries. A key point was that policymakers need to think about biotechnology and critical materials in a broader sense. Speakers argued that biotech is a broad enabling technology and has relevance across industrial, environmental, and national security domains. However, policy discussions are still often dominated by chemistry- or medtech-focused assumptions. Critical minerals were framed not as isolated commodities, but as inputs into strategically important technologies such as semiconductors, clean energy systems, and defence-related supply chains.

A major theme was the mismatch between fast-moving technology and the slower cycles of science funding, regulation, and government decision-making. Year-by-year budgets, low grant success rates, and long decision timelines make it difficult to support sustained innovation. Trade policy and supply chain decisions are also often opaque to researchers, meaning that scientific communities may not receive clear signals about where innovation is most urgently needed. End-of-life recycling and circularity were identified as obvious but still underdeveloped areas that should be better connected to supply chain and trade discussions.

Trusted partnerships were described as essential. Speakers stressed that these partnerships require shared values, clear mutual benefit, and complementary strengths, for example, one country having access to materials while another has relevant technology, expertise, or testing capacity. The panel argued that the US and UK work well together, but that global competition requires deeper collaboration with trusted allies. It was suggested that allied countries could collaborate better by aligning funding, streamlining regulation, sharing biodata safely, and using government purchasing power to reduce market risk.

The panel also considered how trust and collaboration change across technology readiness levels. Early-stage R&D collaboration may be easier than deployment, where issues such as intellectual property, export controls, market differences, and industrial competition become more important. However, speakers suggested that these issues should be managed rather than allowed to become barriers.

The discussion also covered the role of universities and industry incentives. Universities need longer-term funding, better support for translational research, AI-ready data, publication of negative results, and stronger awareness of regulatory and market contexts. Government can encourage industry participation through grants, procurement, tax incentives, intellectual property mechanisms, and funding conditions that reward partnership. These tools are likely to be most effective when connected to clearly defined technical priorities and routes to deployment.

Together, these challenges point to the value of a sustained interface between the technical and policy communities. Researchers need clearer signals about strategic priorities, regulatory considerations, and potential routes to deployment, while policymakers and funders need accessible evidence about technological maturity, infrastructure needs, and realistic timelines.

Regular exchange between these communities could help align research agendas, public investment, and critical-minerals strategies while identifying potential barriers early.

Panel 2: Catalysing UK-US research partnerships in engineering biology for critical minerals

The panel examined UK-US research partnerships in engineering biology for critical minerals, with speakers sharing their projects that had been funded to build transatlantic collaboration. These included bacterial production of metal nanoparticles for lithium battery recycling, high-throughput testing of bio-produced materials, living materials for extracting critical minerals from water, and matching feedstocks to biotech processes for rare earth recovery. The funding enabled visits, symposia, white papers, shared testing, and stronger links between academia, industry, regulators, and start-ups.

A central theme was the challenge of moving from lab research to industry. Speakers highlighted the need for continuous processes, affordable scale-up facilities, and testing environments that sit between academic labs and full industrial deployment. Existing large-scale facilities, such as those used in pharma, may not always be suitable because of cost, access, or cleanliness requirements that do not match other minerals applications. Industry adoption remains difficult because companies can be slow to change and biotechnology may have a poor reputation. Developing a clear sellable product, such as recovered minerals or a leaching solution, may be one practical route to market.

The panel stressed that the UK and US have complementary strengths. The UK has strong technology capabilities, while the US has different mineral resources, large agricultural feedstocks, mining-affected water streams, and scale-up opportunities. Shared mapping of metals, biological capabilities, cations, feedstocks, and waste streams could help identify collaboration opportunities. Speakers also noted gaps in geological expertise, mineral analysis, and talent that could be addressed through international partnership.

Several future collaboration opportunities were identified. Circular economy and sustainability projects were seen as underexplored compared with near-term market opportunities, while marine microbes were highlighted as a potentially valuable but largely uncultured biological resource. Speakers also suggested creating exemplar systems that could demonstrate proof of concept and help build confidence for both countries. Genetic engineering was discussed as a promising but sensitive area, particularly in relation to environmental applications, where both positive impacts and potential risks need to be understood.

The panel also addressed how to attract talent and widen interest in this field. Funding calls were described as important for bringing people together, but speakers stressed that successful collaboration also requires time to think, build relationships, and narrow broad ideas into feasible applications. A key challenge is the negative perception of mining among younger researchers and the public. Speakers argued that the narrative needs to shift—critical minerals are essential to technologies people value, including phones, batteries, and clean energy systems, and engineering biology could help make mineral supply chains cleaner and more sustainable.

Finally, speakers reflected on practical barriers in the current funding programme. Cross-border legal processes, institutional agreements, and sample shipping were all identified as sources of friction. Participants suggested that reducing legal burdens and sharing best practice on issues such as international sample transfer would make future collaborations more efficient.

Funder lightning talks: overview of R&D investments in engineering biology for critical minerals

Funders from both the UK and the US each gave a short talk summarising their institution, the types of funding they offer and any areas of interest in the space of bioengineering and critical materials. Their talks are summarised individually below.

Office of Critical Minerals and Energy Innovation, US Department of Energy

The US Department of Energy's priorities focus on practical, near-term improvements across the critical minerals supply chain. Key areas include recycling and end-of-life recovery, valorisation of products and processes, mid-stage process improvements, and technology build-out. The emphasis is on new technologies, efficiency gains, environmental performance, and precision mining. Industry-academic partnerships are a priority, reflecting the departments' interest in applied solutions that can move toward deployment.

National Science Foundation

The National Science Foundation was presented as a broad funder of foundational research rather than an organisation that conducts science directly. The Foundation supports community-driven proposals across multiple directorates and funds universities, non-profits, and for-profit organisations. In the critical minerals space, its focus spans the wider ecosystem rather than a single technology area, with particular emphasis on basic science, interdisciplinary research, and workforce development.

Defense Advanced Research Projects Agency (DARPA)

DARPA was described as a high-risk, high-reward funder willing to support ambitious ideas from very early stages through approximately TRL 6. A key challenge for biotechnology is the lack of obvious transition pathways once technologies mature, and DARPA aims to address this by connecting research with organisations or agencies that can take it forward. Participation is not limited to US-based groups, and DARPA can also coordinate or share funding across agencies, making it a flexible route for bold, translational projects.

UK Research and Innovation (UKRI)

UKRI offers a broad range of funding routes relevant to engineering biology and critical minerals through several of its constituent councils, depending on the scientific focus of a project. Engineering biology is a major area of interest, supported through flagship programmes such as the National Engineering Biology Programme. In the context of the UK Government's Critical Minerals Strategy, UKRI funding is relevant to sourcing, resilient supply chains, and domestic investment, particularly where biological science can contribute to critical materials challenges.

UK Advanced Research + Invention Agency (ARIA)

ARIA was presented as the UK's closest equivalent to DARPA, supporting moonshot ideas and projects that do not fit easily into traditional funding models. Its role is to back ambitious, high-potential research, including areas such as advanced materials. ARIA has interest in unconventional approaches that combine biological systems with advanced materials challenges.

Symposium Group Discussions

How can UK-US partnerships advance engineering biology for critical minerals production?

Discussion topics

1. Research and data needs – Garrett Dunlap, Engineering Biology Research Consortium
2. Technical barriers to scaling – Thomas Lograsso, Ames National Laboratory
3. Barriers to technology adoption – Joy Zhang, University of Kent

Research and data needs

The group discussions converged on a clear message: progress in engineering biology for critical minerals is being constrained less by a total absence of data than by **fragmented, non-interoperable, and insufficiently curated data** spread across biology, geology, geochemistry, mineralogy, and process engineering. Participants repeatedly stressed the need for **shared standards**, better metadata, and AI-ready datasets, alongside mechanisms to capture currently inaccessible knowledge such as tacit knowledge, negative results, and proprietary operational data. There was also broad agreement that data infrastructure must be designed around **real deployment needs**, not just academic research, and that closer collaboration between biologists, miners, data scientists, and government will be essential.

A second strong theme was the gap between **laboratory promise and industrial application**. Many participants argued that current research is too disconnected from the realities of real-world operations, heterogeneous waste streams, and commercial decision-making. This led to repeated calls to focus on **where biology offers the clearest technical or economic advantage**, rather than assuming it is relevant across the whole value chain. Suggested priority areas included waste streams, mine tailings, e-waste, and closed or legacy mine sites, with techno-economic analysis seen as a critical tool for identifying tractable, high-value entry points. Participants also highlighted that UK–US collaboration could be especially useful in developing shared standards, reciprocal pilot sites, and complementary expertise.

The main tensions in the discussion related to **governance, access, and prioritisation**. Participants differed on how far standardisation is feasible in highly variable real-world systems, whether government should steward shared datasets directly, and how open shared resources can be without creating IP, liability, or competitiveness concerns. Nonetheless, a practical direction emerged: build **controlled-access, well-curated repositories** linked to samples where possible; create **pilot and demonstration sites** to generate realistic reference datasets; and align future funding with clearer expectations on metadata, data deposition, and long-term stewardship.

Technical barriers to scaling

Engineering biology for critical minerals was seen across the workshop as offering significant promise, but participants were clear that **scale-up is not simply a question of increasing volume**. Moving from lab to pilot to commercial deployment changes the technical, operational, and economic conditions of the process, particularly when working with variable feedstocks. Participants repeatedly highlighted that biological systems are less predictable and harder to control than conventional chemical processes, with challenges around organism stability, transport, mixing, oxygen transfer, and reproducibility. Just as importantly, downstream processing, purification, and waste handling were identified as major constraints that are often underestimated. A consistent view was that **scale-up must be defined in terms of fit-for-purpose outcomes** such as economic viability, customer need, and system integration, rather than simply reactor size or throughput.

There was strong agreement that **the key barriers are as much commercial, infrastructural, and organisational as they are technical**. Participants emphasised the need to build techno-economic analysis, lifecycle thinking, especially, life cycle assessment (LCA), and market understanding into projects from the outset, including early-stage design decisions, rather than treating them as later-stage considerations. Funding gaps between discovery and pilot scale, the shortage of accessible demonstration facilities able to handle "dirty" mineral feedstocks, and the need for early and sustained industry engagement were all recurring themes. Many also stressed that the most viable near-term applications may lie in recycling, mine tailings reprocessing, mine remediation, and integrated other waste-based uses, where biological methods can deliver both efficient resource recovery and environmental benefit. At the same time, discussions surfaced important tensions around what constitutes the "right" scale, whether barriers are primarily technical or commercial, and how far biological approaches must conform to existing mining systems versus enabling more transformative process change.

The discussions also generated a clear set of strategic insights and actions. Participants pointed to the value of open-access pilot and demonstration environments, including the potential use of contaminated sites as real-world testbeds, and highlighted opportunities for complementary UK–US collaboration through shared facilities, joint testbeds, technology licensing, and exchange programmes. There was **strong interest in more systematic mechanisms to support scale-up**, including standardised techno-economic and LCA frameworks, translational funding, and business models that bridge academic innovation with industrial deployment. **Workforce development emerged as another priority**, with calls for interdisciplinary training, placements, and international exchanges to connect biology, chemistry, engineering, mining, and commercialisation. Overall, the discussion suggested that progress will depend less on any single technical breakthrough than on building the enabling network of facilities, finance, regulation, partnerships, and talent that is needed to turn promising concepts into deployable solutions.

Barriers to technology adoption

Engineering biology for critical minerals was seen across the discussions as holding real promise but facing major socio-economic barriers that are less about the science itself than about **public trust, framing, and governance**. Participants repeatedly warned that the field risks being perceived as **greenwashing mining** unless it is communicated transparently and positioned carefully. There was broad agreement that language matters, particularly the distinction between "scaling up" and "scaling out", and that public responses are shaped by local impacts, visible environmental harms, and wider distrust of extractive industries. Many groups also stressed that industries like mining are too often treated as a single, undifferentiated sector, when in practice the point of intervention in the value chain matters greatly for both technical feasibility and social acceptance. For example, waste remediation, recycling, tailings processing, and circular economy applications were widely viewed as more credible and publicly acceptable entry points than approaches associated with expanding new mining operations.

The discussions also highlighted the need for **policy and regulatory innovation alongside scientific innovation**. Participants pointed to fragmented and outdated regulatory frameworks, unclear oversight across agencies and jurisdictions, and the challenge of integrating new engineering biology approaches into existing mining, waste, and environmental regimes. At the same time, there was some disagreement over whether the main barrier is inadequate regulation or poor communication of existing safeguards. Across the workshop, there was strong support for earlier and more systematic involvement of **social scientists, communications specialists, and community engagement expertise**, as well as for funding models that support implementation and engagement, not just technical R&D.

Future Actions

The symposium generated a range of ideas for future action by the UK-US engineering biology and critical minerals community. A key theme was the strategic importance of the subject matter, alongside the value of sustaining and expanding the well-established transatlantic network. The following suggestions identify both shorter term potential actions and longer-term areas of focus. These are broadly consistent with the survey findings summarised in Appendix 3.

Short term actions

1. Sustain UK-US collaboration through further symposia and network-building activities.
2. Continue to encourage and support new UK-US collaborative projects, building on the examples discussed at the symposium.
3. Capture and share lessons from existing funded collaborations. This can begin to form a collection of case studies and field evidence.
4. Map UK and US capabilities, facilities, feedstocks, waste streams, and expertise to identify practical and priority application opportunities for future collaboration.
5. Create a shared contact directory or collaboration database for the network.

Long term areas of focus

- Build a UK-US translational pathway from research to deployment
  - Develop shared pilot sites, demonstration facilities, scale-up support, and translational funding mechanisms that help move engineering biology approaches from laboratory research into real-world critical minerals applications.

- Focus engineering biology on the most credible entry points
  - Prioritise applications where biology offers clear technical, economic, environmental, or social value, especially water treatment, waste streams, mine tailings, e-waste, low-grade ores, recycling, remediation, and legacy mine sites.

- Create shared data, standards, and knowledge infrastructure
  - Establish well-curated, interoperable, AI-ready data resources across biology, geology, mineralogy, geochemistry, and process engineering, including metadata standards, negative results, sample-linked datasets, and mechanisms for controlled data access.

- Strengthen partnerships, governance, and collaboration mechanisms
  - Deepen UK-US and allied collaboration by aligning funding, reducing legal and administrative barriers, improving sample-transfer processes, engaging regulators early, and using government convening power to connect researchers, industry, funders, policymakers, and communities.

- Connect technical priorities with policy and public investment
  - Translate evidence from the network into practical guidance for funders, agencies, and policymakers, including priority research questions, infrastructure needs, regulatory barriers, and opportunities for coordinated UK-US investment. Regular

engagement with public agencies and legislative stakeholders could help ensure that engineering biology is incorporated into critical-minerals, industrial, and bioeconomy strategies.

- Develop trust, talent, and responsible innovation capacity
  - Build interdisciplinary training and exchange programmes while improving public communication, community engagement, regulatory awareness, and responsible development of sensitive technologies such as environmental genetic engineering.

Appendix 1: Symposium Attendees

Name	UK/ US	Title	Affiliation
Alexa Schmitz	US	Founder and CEO	REEgen
Alla Silkina	UK	Research Officer	University of Swansea
Ana Santos	UK	Research Fellow	Natural History Museum
Andrea Hodgson	US	Director of Biosciences	Schmidt Sciences
Andrew Arthur	US	CFO	Endolith
Bridget Turaga	US	Strategic Advisor	National Science Foundation
Buz Barstow	US	Associate Professor	Cornell University
Caitlin Frazer	US	Executive Director	National Security Commission on Emerging Biotechnology
CarriAyne Jones-Parr	UK	US Deputy Lead - Critical Minerals, S&T Network	British Consulate-General, Atlanta
Chang Dou	US	Senior Engineer	Lawrence Berkeley National Laboratory
Charlotte Hawkins	UK	Programme Manager	Natural Environment Research Council, UK Research and Innovation
Dan Park	US	Group Leader	Lawrence Livermore National Laboratory
Danting Chen	UK	Postdoctoral Research Associate	University College London
David Hastman	US	Chief of Staff	Biological Technologies Office, Defense Advanced Research Projects Agency
David Reed	US	Senior Scientist	Idaho National Laboratory
Dawn Wellman	US	Senior Research Fellow	Savannah River National Laboratory
Dayal Saran	US	Senior Vice President	Allonnia
Dena Smith-Nufio	US	Scientific Section Head	Directorate for Geosciences, National Science Foundation
Eliza Sims	UK	Global Issues Officer	British Consulate General, Atlanta
Erwin Gianchandani	US	Assistant Director for Technology, Innovation and Partnerships	National Science Foundation
Evangelia Kougioumoutzi	UK	Associate Director of International (interim)	Biotechnology and Biological Sciences Research Council, UK Research and Innovation

Francesca Manzella	UK	Science Policy Advisor	British Embassy Washington
Garrett Dunlap	US	Director of Policy and Partnerships	Engineering Biology Research Consortium
Helena Khazdozian	US	Senior Technology Manager	Advanced Materials and Manufacturing Technologies Office, U.S. Department of Energy
Ian Blaby	US	Biodesign Platform Lead	Joint Genome Institute, Lawrence Berkeley National Laboratory
India Hook-Barnard	US	CEO	Engineering Biology Research Consortium
Jai Padmakumar	US	Founder and CEO	1849 Bio
James Bowbrick Smith	UK	Postdoctoral Research Associate	University of Surrey
Jayme Feyhl-Buska	US	Critical Minerals Programme Lead	Homeworld Collective
Jennifer Glass	US	Professor	Georgia Institute of Technology
Jonathan Clifford	US	Vice President	General Catalyst
Jon Judd	US	Postdoctoral Scholar	EBRC
Jonathan Lloyd	UK	Professor	The University of Manchester
Joseph Cotruvo	US	Professor	Pennsylvania State University
Joshua Martin	US	Science Policy Fellow	Geological Society of America
Joy Zhang	UK	Professor	University of Kent
Jude Huggan	UK	Business Development Manager	UK Centre for Process Innovation
Julia Stegemann	UK	Professor	University College London
Justin Perry	UK	Professor	University of Northumbria
Karen Hudson-Edwards	UK	Professor	University of Exeter
Kate Groves	US	Legislative Fellow	National Security Commission on Emerging Biotechnology
Kyle Dolan	UK	US Lead - Critical Minerals, S&T Network	British Consulate-General, Chicago
Louise Horsfall	UK	Professor	University of Edinburgh
Luke Stevens	UK	Senior Science Policy Advisor	British Embassy Washington
Manuel Montaño	UK	Senior Analyst	Kings College London

Margaret Fraiser	US	Programme Director	Directorate for Geosciences, National Science Foundation
Martin Warren	UK	Professor and Elemental Hub Principal Investigator	University of Kent
Matt Burnett	UK	Frontier Specialist	UK Advanced Research + Invention Agency
Mungo Woodifield	UK	Minister Counsellor, Trade and Global Issues	British Embassy Washington
N. Cecilia Martinez-Gomez	US	Associate Professor	University of California, Berkeley
Nathan Ratledge	US	Founder and CEO	Alta
Nick Le Brun	UK	Professor	University of East Anglia
Peter Chivers	UK	Professor	University of Durham
Peter Dotti	US	Fellow	ARPA-E, U.S. Department of Energy
Philip Luck	US	Director, Economics Programme	Center for Strategic and International Studies
Sasha Milshteyn	US	Founder and CEO	Transition Metals
Scott Banta	US	Professor	Columbia University
Theresa Good	US	Directorate Head, Biological Sciences	National Science Foundation
Thomas Lograsso	US	Director, DOE Critical Materials Innovation Hub	Ames National Laboratory
Tiffany Prest	US	Programme Manager	Biological Technologies Office, Defense Advanced Research Projects Agency
Tom Clarke	UK	Professor	University of East Anglia
Virginia Echavarri-Bravo	UK	Postdoctoral Research Associate	University of Edinburgh
Yongqin Jiao	US	Director, Center for Bioengineering and Biomanufacturing	Lawrence Livermore National Laboratory
Yuanzhi Tang	US	Professor and Executive Director, Strategic Energy Institute	Georgia Institute of Technology

Appendix 2: Symposium Agenda

2026 UK-US Symposium on Engineering Biology for Critical Minerals

Thursday, 4 June 2026

British Embassy Washington, 3100 Massachusetts Ave NW, Washington DC 20008

Agenda

8:30-9:00am – Networking breakfast

9:00-9:15am – Welcome – **Kyle Dolan**, UK Science and Technology Network

Opening remarks – **Mungo Woodifield**, British Embassy Washington

Part 1: Setting the scene

9:15-10:05am – Panel 1: Where are the near-term opportunities for engineering biology to contribute to critical mineral supply chain challenges?

- Speakers:
  - **Jayme Feyhl-Buska**, Homeworld Collective
  - **India Hook-Barnard**, Engineering Biology Research Consortium
  - **Jonathan Lloyd**, University of Manchester/Elemental Hub
  - **Dawn Wellman**, Savannah River National Laboratory
- Moderator: **Philip Luck,** Center for Strategic and International Studies

10:05-10:50am – Conversation: Biotechnology for critical minerals resilience: The importance of trusted partnerships from research and innovation to economic and national security

- Speakers:
  - **Erwin Gianchandani**, National Science Foundation
  - **Caitlin Frazer**, National Security Commission on Emerging Biotechnology
- Moderator: **Mungo Woodifield**, British Embassy Washington

10:50am-11:00am – Break

11:00am-11:50am – Panel 2: Catalysing UK-US research partnerships in engineering biology for critical minerals

- Speakers:
  - **Virginia Echavarri-Bravo**, University of Edinburgh
  - **Jennifer Glass**, Georgia Tech
  - **Justin Perry**, University of Northumbria
  - **Alexa Schmitz**, REEgen
- Moderator: **Martin Warren**, Quadram Institute/Elemental Hub

11:50am-12:35pm – Funder lightning talks: overview of R&D investments in engineering biology for critical minerals

- Speakers:
  - **Helena Khazdozian**, Office of Critical Minerals and Energy Innovation, US Department of Energy
  - **Dena Smith-Nufio**, National Science Foundation
  - **Tiffany Prest**, Defense Advanced Research Projects Agency (DARPA)
  - **Evangelia Kougioumoutzi**, Biotechnology and Biological Sciences Research Council, UK Research and Innovation
  - **Matt Burnett**, UK Advanced Research + Invention Agency

12:35pm-1:35pm - Lunch

Part 2: Collaboration discussions: How can UK-US partnerships advance engineering biology for critical minerals production?

Discussion topics

1. Research and data needs – Garrett Dunlap, Engineering Biology Research Consortium
2. Technical barriers to scaling – Thomas Lograsso, Ames National Laboratory
3. Barriers to technology adoption – Joy Zhang, University of Kent

Thought Questions

- What is needed to realise the full value of UK-US partnerships?
- How could UK-US partnerships bring unique value to advancing EB solutions for CM challenges across each problem area?
- Which part(s) of the value chain (upstream/midstream/downstream) should be prioritised?
- What does success look like?
- What types of commitments and timescales are needed?

Structure – 9 round tables with seating for 8 people per table for small group discussion. Basic format as follows:

- Discussant introduction (5 minutes)
- Facilitated group discussion (40 minutes) captured by table note taker
- 5-minute break before synthesis
- 10-minute synthesis

1:35-1:50 pm – Overview of afternoon discussion structure – ***CarriAyne Jones-Parr****, UK Science and Technology Network*

2:00pm-3:00pm - Small group discussion 1: Research and data needs

3:00pm-4:00pm - Small group discussion 2: Technical barriers to scaling

4:00pm-5:00pm - Small group discussion 3: Barriers to technology adoption

5:00pm-5:25pm - Full group discussion – **Francesca Manzella**, British Embassy Washington

5:25pm-5:30pm - Closing remarks: **Kyle Dolan,** UK Science and Technology Network

5:30pm-7:30pm - Networking reception

Appendix 3: Participant Feedback

Scope and Interpretation

The post-event survey received 16 anonymous responses. Because the sample contained fewer than 20 responses and was self-selecting, the findings should be treated as directional rather than as a stable estimate of the wider participant population.

Key Findings

- The event was rated consistently highly, with no overall quality score below 4/5.
- Respondents particularly valued the combination of technical content, funding perspectives, and small-group dialogue.
- The central challenge identified was not generating interest in the symposium topics but converting new connections into funded and structured UK–US activity.

Quantitative Results

The survey asked participants to respond quantitatively to seven separate measures within the scope of this report[2]. These responses are summarised in the following table and figures A3.1 and A3.2.

Survey Measure	**Result**	**Interpretation**
Overall symposium quality	4.69/5 average 5/5 median	Eleven respondents rated the symposium 5/5 and five rated it 4/5.
Panel discussion quality	12 very informative 4 somewhat informative	All respondents considered the panels at least somewhat topical and informative.
Small-group discussion quality	12 very informative 4 somewhat informative	The small-group format was one of the strongest and most consistently praised elements.
Potential for collaboration	14 likely or very likely, 1 somewhat likely and 1 neutral	Respondents indicated a strong likelihood of future collaboration.
Organisation and logistics	14 very satisfied 2 satisfied	All respondents were satisfied; most were very satisfied.

[2] Both quantitative and qualitative feedback was received about the venue, catering, travel etc. Whilst these were useful for the organisers, they are not considered to be within the scope of this report.

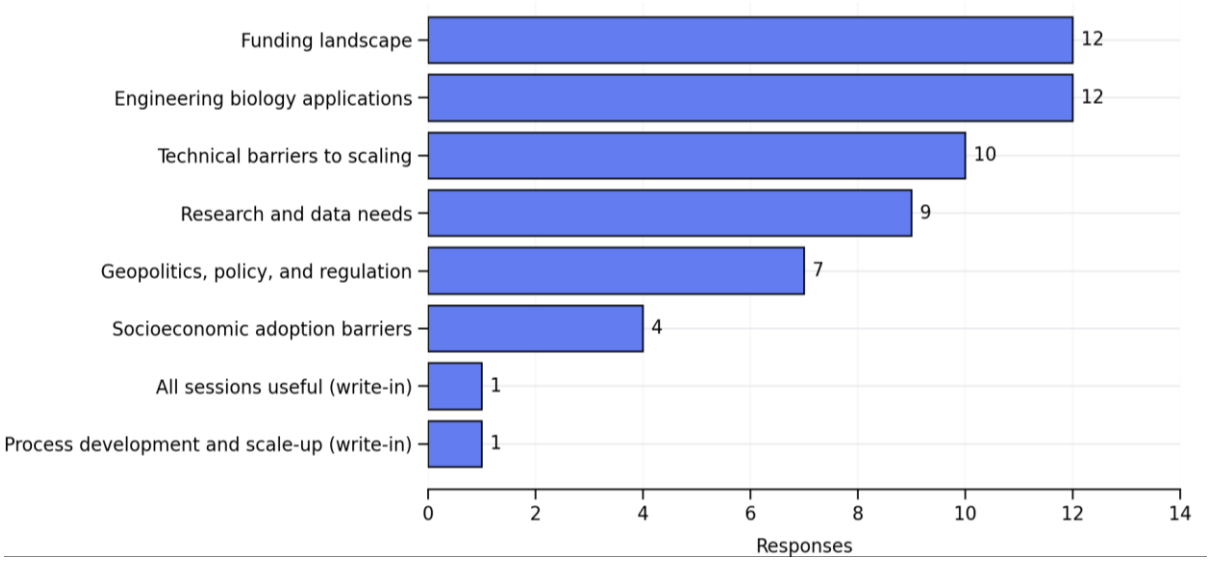


Figure A3.1: Respondents were asked which symposium sessions or topics they found the most valuable. Funding and engineering biology applications were the most frequently selected topics, followed by technical scale-up and research/data needs. Multiple selections were permitted.

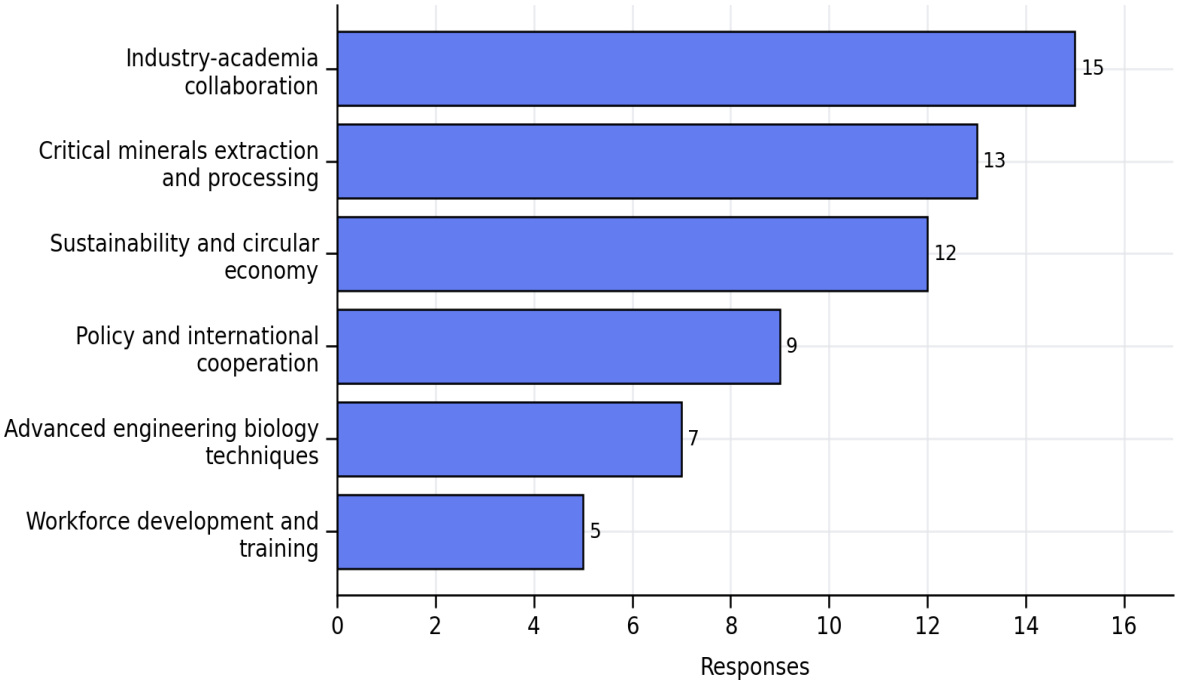


Figure A3.2: Respondents were asked what topics or themes they would like to see covered in future convenings. Future interest was strongest in industry–academia collaboration, critical minerals extraction and processing, and sustainability and circular-economy themes. Multiple selections were permitted.

Qualitative Results

Respondents were given three questions where they could submit open format answers. They were also invited to share any additional feedback they had. Some of the key themes arising from these questions are summarised and selected insightful quotes are given.

1. What aspects of the symposium did you find most beneficial?

Small-group discussion and network formation. Respondents repeatedly highlighted the value of exchanging perspectives across academia, industry, government, funders, national laboratories, and start-ups. The roundtable format supported deeper discussion than conventional panels.

"The small group discussions offered a chance to get a deeper networking connection and exchange of ideas."

2. What aspects of the symposium could be improved?

Industry engagement and scale-up. Several responses called for stronger participation by critical-minerals operators and more opportunities to validate technologies at relevant scale. Respondents also wanted clearer information on higher-TRL funding.

"Future events could be even more impactful if they included a clearer pathway from discussion to action."

"Much stronger representation is needed from the critical minerals industry itself … They are the ultimate adopters of the technology, and each one has a unique set of challenges to solve."

3. What other next steps would you like to see?

A clearer route from discussion to action. The strongest follow-through request was for mechanisms that turn relationships into activity: seed or planning grants, jointly funded calls, working groups, exchanges, pilot projects, and a maintained participant network.

"I think having jointly (UK-US) funded grants would facilitate international collaboration significantly."

"The biggest challenge right now, in my view, is that there are few opportunities to validate technologies at scale that are derisked and accelerated for startups."

Survey Recommendations for Follow-Up

- Maintain the participant network and communicate specific opportunities, decisions, and timelines.
- Develop modest seed-funding or exchange mechanisms that can mature new UK–US partnerships into larger proposals.
- Involve industry partners early and connect projects to feedstocks, operating sites, demonstration facilities, and deployment requirements.
- Retain facilitated small-group dialogue while building in rotations, synthesis, and explicit action-setting.