Call for Projects for BioNexus: Massachusetts Biotechnology and Biomanufacturing Program

CFP No. 2026-NEMC-02

Massachusetts Technology Collaborative
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Date Issued:	**June 9, 2026**
Proposers Day & Webinar:	**June 30, 2026 @ 9am**
Initial Questions Due:	**July 1, 2026 @ 5pm**
Answers to Initial Questions Posted:	**July 8, 2026**
White Papers Due:	**July 17, 2026 @ 5pm**
Full Proposal Invitation:	**August 3, 2026**
Full Proposals Due:	**September 3, 2026 @ 5pm**

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1. Introduction

1.1 Overview

The Northeast Microelectronics Coalition Hub, a division of the Massachusetts Technology Collaborative ("Mass Tech Collaborative" or "MassTech") is issuing this Call for Projects (CFP) for the BioNexus: Massachusetts Biotechnology and Biomanufacturing Program, (CFP No. 2026-NEMC-02) (the "CFP") on behalf of the U.S. Army Combat Capabilities Development Command (DEVCOM) Soldier Center to solicit responses from qualified firms ("Respondents") interested in receiving grant funding to develop solutions in support of various biotechnology and biomanufacturing topics (the "Project"). Respondents will be competing against each other for grant funding and the submissions of all Respondents shall be compared and evaluated against the evaluation criteria set forth in this CFP.

Mass Tech Collaborative will be the contracting entity on behalf of the Northeast Microelectronics Coalition Hub and DEVCOM Soldier Center for the purposes of this CFP, and (except where the specific context warrants otherwise), the Northeast Microelectronics Coalition Hub and Mass Tech Collaborative are collectively referred to as Mass Tech Collaborative or MassTech. Mass Tech Collaborative will enter into a Grant Agreement and Statement of Work with selected Respondents containing certain standard provisions (the "Agreement").

1.2 Mass Tech Collaborative, NEMC, and DEVCOM

Mass Tech Collaborative is an independent public instrumentality of the Commonwealth of Massachusetts chartered by the Commonwealth to serve as a catalyst for growing its innovation economy. Mass Tech Collaborative brings together leaders from industry, academia, and government to advance technology-focused solutions that lead to economic growth, job creation, and public benefits in Massachusetts. For additional information about Mass Tech Collaborative and its programs and initiatives, please visit our website at www.masstech.org.

Through Executive Order #648 signed on October 27, 2025, Massachusetts Governor Healey and Lt. Governor Driscoll established the Strategic Hub for Innovation, Exchange, and Leadership in Defense (SHIELD) Initiative. Mass Tech Collaborative's Chief Executive Officer is the Chair of SHIELD. MassTech's role in supporting the SHIELD Initiative has fostered relationships across the Commonwealth's Defense Sector, and ties into the work of the Northeast Microelectronics Coalition Hub at MassTech.

The Northeast Microelectronics Coalition (NEMC) Hub is a network of 300+ organizations, including commercial and defense companies, leading academic institutions, Federally Funded Research & Development Centers (FFRDCs), and startups concentrated in eight Northeast states. Established in 2023, the NEMC Hub is one of eight regional Microelectronics Commons Hubs acting on a shared mission to expand the nation's global leadership in microelectronics and accelerate domestic semiconductor prototyping. As a division of the Massachusetts Technology Collaborative, the NEMC Hub fosters a vibrant, connected ecosystem to provide sustainable lab-to-fab enablement, boost education and workforce development, and spur new jobs. For more information about NEMC and its programs, please visit the website at https://nemicroelectronics.org.

DEVCOM is the Army's organic science, technology and engineering organization dedicated to developing combat capabilities. It conducts and sponsors scientific research in areas important to the Army, develops scientific discoveries into new technologies, engineers technologies into new equipment and capabilities, and works with the U.S. Army Transformation and Training Command (T2COM) to help requirements writers define the future needs of the Army.

2. The Grant

2.1 Grant Overview

The BioNexus Call for Projects is a grant program for Massachusetts-based innovative solutions to biotechnology and biomanufacturing topics proposed by the DEVCOM Soldier Center to address military challenges. This program will advance innovative technology and solutions to market, transfer and transition readiness enhancing the development or creation of domestic value chains. The number of awards is dependent on the dollar amounts of the award proposals received.

The program opens up to $3M in grant funding to fund year 1 of projects that may span 1-3 years in total duration. Funding after year 1 will be based on project performance and availability of additional funding, which is not guaranteed. A meaningful milestone and deliverable shall mark the end of the period of performance for year 1.

Project Topic Areas are as follows:

1. Enhancing warfighter resilience and performance through nutritional biotechnology.
2. Novel bio-protection systems to enhance the safety, shelf-life, and resilience of military rations in austere operational environments.
3. Pilot-scale bioreactor production of high-quality cellulose.
4. Pilot-scale fermentation for scalable production of melanized filamentous fungi.
5. Biosensors for detection and monitoring of environmental microbes.
6. Predictive approaches to identify and mitigate synthetic organism scale-up failure.
7. Bioceramic protein production for durable, water-repellent textile finishes.
8. Biomanufacturing of prototype phage-based hygiene products targeting UTI-causing E. coli.
9. Bio-based advanced manufacturing of biologically derived pigments for military applications.
10. Biomanufacturing engineered bacteria solutions for Army and Department of Warfighter applications.

See Attachment A for more detailed information including Topic Current State, Desired End State, Success Criteria, End Technology Readiness Level (TRL), End Manufacturing Readiness Level (MRL) for each Project Topic Area.

This Call for Projects is subject to addendums and modifications per section 4.1 and 4.2 that will be posted to the NEMC website HERE. Respondents are advised to regularly check the website and the Q&A document to be posted by July 8, 2026.

2.2 Grant Requirements and Guidance

2.2.1 Eligible Applicants

Eligible applicants must be located in Massachusetts and include:

- Institutions of higher education – state, municipal, and community colleges and universities
- Non-profit organizations (including incubators, accelerators, etc.)

- For-profit entities
- Federally Funded Research & Development Centers (FFRDCs)
- Other public entities

Lack of debarment status by either the state or federal government is also required.

2.2.2 Project Requirements & Preferences

Project submissions must meet the following requirements:

- Addresses one or more of the Topic Areas defined in Appendix A
- Projects proposed span 1-3 years. Funding after year 1 will be based on project performance and availability of additional funding, which is not guaranteed.

Preference will be given to project submissions that:

- Are comprised of a multi-organization team collaborating to meet Topic Area objectives.
- Fund onshore activities and capabilities.

Awarded projects will be required to contract with MassTech, and it is anticipated that awardees will also execute a Collaborative Research and Development Agreement (CRADA) with DEVCOM.

2.2.3 Eligible Expenses

- Direct Labor
- Indirect Labor
- Materials
- Equipment - All capital expenditures funded under this program must be accounted for by the recipient in its financial records as a capital expenditure under Generally Accepted Accounting Principles (“GAAP”). All equipment or other capital assets procured under this program must remain in the Commonwealth and be used for their funded purpose for the useful life of the asset after installation.

2.2.4 Cost Share

All projects require a match contribution. Match targets (Match Amount:Grant Amount) are 0.5:1.

All contributions, including cash and in-kind contributions, will be accepted as part of the match requirement provided that such contributions meet all of the following criteria: (i) are necessary to accomplish the objectives of the collaborative project; (ii) are included in the approved budget for the project; (iii) are not sourced by, or considered discretionary funds under the control of, a state agency, as defined in Mass. Gen. Laws ch.6, § 39, however, the University of Massachusetts may leverage funding sourced from an agency to meet the match requirement; (iv) are verifiable from recipient’s records; (v) are not included as matching contributions for any other federal or state-supported project; and (vi) are made after the closing date for proposal submissions. Match can come from the applicant, third parties, other private investments, or federal grants.

Any fees required from any partners can be considered as part of the applicant’s cost share but cannot be an allowable grant funded cost.

3. Application Process Details

3.1 Application Process

The BioNexus application process will be conducted in two stages:

1. White Paper submission for all eligible applicants, due July 17, 2026, by 5 PM EDT.
2. Full Proposal for specific applicants invited to submit, due September 3, 2026, by 5 PM EDT.

Mass Tech Collaborative, in collaboration with DEVCOM, shall evaluate each Application that is properly submitted

All responses, Applications, data, materials, information and documentation submitted to Mass Tech Collaborative in response to this CFP shall become Mass Tech Collaborative's property and shall be subject to public disclosure. As a public entity, the Mass Tech Collaborative is subject to the Massachusetts Public Records Law (set forth at Massachusetts General Laws Chapter 66). There are very limited and narrow exceptions to disclosure under the Public Records Law. **If a Respondent wishes to have certain information or documentation treated as confidential, the Respondent must clearly label only the specific information and/or documentation as "CONFIDENTIAL" in the Application. Please note that Mass Tech Collaborative cannot guarantee that information marked as confidential will be treated as such, and it may still be disclosed to the public if requested.**

3.2 White Paper Application Overview

All White Paper applications must be completed and submitted electronically via Airtable HERE.

The White Paper Instructions are listed in Attachment B. The White Paper Template is listed in Attachment C, and a downloadable copy is located on the NEMC website HERE. White Papers must be completed using the provided template and are a maximum of **five (5) pages** including appendices. Anything after five (5) pages of content will not be read during review.

White Paper Applications must include the items listed below, unless noted otherwise:

- Application Form
  - Respondent (lead applicant) and, if any partner, contact information
  - The selected topic area(s)
  - Project locations
  - UEI#
  - An Authorized Application Signature – Attachment D. Uploading the attachment is not required, the signature will be provided within the application form.
- Form Attachments: Each attachment has a separate upload location in the form.
  - White Paper
  - W9
  - Letters of Commitment or Support (optional)

3.2.1 White Paper Template Overview – See Attachment C

White Paper submissions must include the following sections. Details requested are outlined in the White Paper Template - Attachment C:

1. Project Summary
2. Technical Approach
3. Project Impact
4. Transition Plan
5. ROM (Rough Order of Magnitude) Budget
6. Team & Capabilities

3.2.2 White Paper Evaluation Process and Criteria

Mass Tech Collaborative, in collaboration with DEVCOM, will review each White Paper using the criteria listed below. Selection of a Respondent to receive an invitation to submit a full proposal may be based on criteria that include but are not limited to the criteria listed below.

Evaluation Criteria for White Paper:

- Does the Respondent meet the eligibility requirements for this funding opportunity?
- Did the Respondent submit all required components?
- Did the Respondent answer all required sections?
- Are the objectives of the project clearly identified?
- Does the Respondent's proposed project address the needs of the identified Topic Areas?
- Are the Respondent's proposed objectives and approach aligned with the Topic Area objectives?
- Is the project feasible based on the details provided? (reasonable timeline and budget, resources clearly identified and meet the needs of the project)

NEMC will not be providing individual feedback on the White Papers.

Mass Tech Collaborative shall evaluate each White Paper that is properly submitted.

The order of these factors does not generally denote relative importance. The goal of this CFP is to select and enter into an Agreement with one or more Respondents that most closely align with DEVCOM's goals in the publication of this CFP. Mass Tech Collaborative and DEVCOM reserves the right to consider such other relevant factors as it deems appropriate.

3.3 Full Proposal Overview

Applicants may be invited to submit a formal project proposal expanding on their white paper for review. When invited, Applicants will receive an email from bionexus@masstech.org.

Invited applicants will be required to submit their proposal by 5PM EDT on August 3, 2026. All Full Proposal applications must be completed and submitted electronically via Airtable, the application link will be provided with the invitation to submit. Full Proposals must be completed using the provided template and are a maximum of twelve **(12) pages** including appendices. Anything after twelve **(12) pages** of content will not be read during review. Instructions will be included in the invitation to submit a full proposal.

Applicants may also be required to present a pitch to a panel of DEVCOM and MassTech staff and subject matter experts.

All Full Proposal applications will require the following information:

- Application Form** -
    - Respondent (lead applicant) and, if any partner, contact information
    - The selected topic area(s)
    - Project Partners (if applicable) and Locations
    - An Authorized Application Signature – Attachment D. Uploading the attachment is not required, the signature will be provided within the application form.
- Form Attachments:
    - Full Proposal Template** (See 3.3.1 For Overview)
    - Pitch Presentation Template**
    - Budget Template**
    - Vendor Quotes
    - Letters of Commitment or Support (optional)

**These items and the application instructions will be provided in the invitation to submit a full proposal. If applicable, applicants will receive details of the pitch to a panel.

3.3.1 Full Proposal Template Overview

The Full Proposal template will expand on the White Paper template with updates and additional details. The full proposal template will be provided with the invitation to submit a full proposal.

1. **Project Summary** – Provides an overview of the proposed effort, including the applicable topic number, the problem or need being addressed, alignment to the topic, and the project's objectives.

2. **Technical Approach** – Describes the technical objectives, current solutions and their limitations, novelty of the approach, current and target TRL, MRL of the solution, where the solution currently is relative to the success criteria and how it will meet the criteria, project scope, stakeholders and applications, and anticipated impact of success.

3. **Project Impact** – Describe the capabilities and processes that the project will make available to the DEVCOM Soldier center.

4. **Transition Plan** - Outline how Year 1 objectives advance the technology toward production readiness or market adoption, and how results position the project for follow-on funding or customers. Identify transition partners, end users, or commercialization pathways, if applicable.

5. **Proposed Work** – Outlines the full scope of the project, what the grant will be applied to, and how it will be applied.

6. **Budget & Timeline** – A completed budget template is attached to the application form. This section describes each year of project spend, grant match amount, and total spend. Includes a timeline and key milestones.

7. **Team & Capabilities** – Describes who the project team will consist of and the expertise, capabilities, and how they will support the project.

3.3.2 Full Proposal Criteria

Selection of a Respondent to receive funding as set forth within this CFP may be based on criteria that include but are not limited to the criteria listed below.

Full Proposal Criteria:

1. Topic Alignment
2. Desired End State – See Topic Details
3. Success Criteria – See Topic Details
4. Technology Readiness Level – See Topic Details
5. Manufacturing Readiness Level – See Topic Details
6. Project Feasibility
7. Budget Soundness
8. Team or Domestic Value Chain Quality
9. Transition Plan Soundness

The order of these factors does not generally denote relative importance. The goal of this CFP is to select and enter into an Agreement with the Respondent that will most closely align with

DEVCOM's goals in the publication of this CFP. Mass Tech Collaborative and DEVCOM Soldier Center reserves the right to consider such other relevant factors as it deems appropriate.

Mass Tech Collaborative shall evaluate each Application that is properly submitted. As part of the selection process, Mass Tech Collaborative may invite finalists to answer questions regarding their Application in person or in writing. In its sole discretion, Mass Tech Collaborative may also choose to enter into a negotiation period with one or more finalist Respondent(s) and then ask the Respondent(s) to submit additional information.

3.4 Application Timeframe

The application process will proceed according to the following schedule. The target dates are subject to change. Therefore, Respondents are encouraged to check Mass Tech Collaborative's website frequently for updates to the schedule.

Task	Date:
CFP Released	**June 9, 2026**
CFP Open for Application Submissions	**June 30, 2026**
Proposers Day & Webinar	**June 30, 2026 @ 9am EDT**
Initial Questions Due	**July 1, 2026 by 5 PM EDT**
Initial Question and Answer File Posted	**July 8, 2026 by 5 PM EDT**
White Papers Due	**July 17, 2026 @ 5pm EDT**
Full Proposal Invitation	**August 3, 2026**
Full Proposals Due	**September 3, 2026 @ 5pm EDT**

3.5 Questions

Questions regarding this CFP must be submitted by electronic mail to bionexus@masstech.org with the following Subject Line: "BioNexus CFP Questions". Initial questions must be received by 5:00 p.m. EDT as specified above to be included in the Q&A document posted by July 8, 2026 on the Mass Tech Collaborative Website. After the specified date, new questions and answers will be incorporated into the Q&A document on the MassTech website as needed.

3.6 Proposers' Day & Webinar

A proposers' day will be hosted June 30, 2026 at 9am EDT. This will be an in-person and remote format. Registration and details for the event are located on the website HERE. Mass Tech Collaborative will post summary responses to procedural questions and issues addressed at the proposer day on the NEMC website.

3.7 Contracts & Deliverables

Awardees will contract with Mass Technology Collaborate, and are expected to execute a CRADA with DEVCOM.

Awarded organizations will deliver upon the following:

Item #	Description
1. Monthly Progress Report & Meeting	Grantee will meet monthly with MassTech for Project Update. Grantee will provide a brief project update using a NEMC PowerPoint template that will include items such as, project highlights, risks, and mitigations.

	Timing: Progress meetings will occur on the months that do not have a quarterly meeting. Post meeting, reports must be updated sent.
2. Quarterly Report	Grantee will provide a quarterly report to NEMC and DEVCOM NSSC summarizing the work accomplished during the quarter. Quarterly schedule will be defined in the grant agreement.
3. Quarterly Meeting	Grantee will present to a review Panel. The Review Panel will consist of subject matter experts from DEVCOM SC/ARL/CBC, a representative from NEMC and one biotechnology expert selected by the Commonwealth to represent state interests. The quarterly schedule will be defined in the grant agreement. Decisions for continued funding will be based on these reviews and the availability of funds.

4.0 GENERAL CONDITIONS

4.1 General Information

a) If an Application fails to meet any material terms, conditions, requirements or procedures, it may be deemed unresponsive and disqualified. The Mass Tech Collaborative reserves the right to waive omissions or irregularities that it determines to be not material.

b) This CFP, as may be amended from time to time by Mass Tech Collaborative, does not commit Mass Tech Collaborative to select any organization(s), award any grant funds pursuant to this CFP, or pay any costs incurred in responding to this CFP. Mass Tech Collaborative reserves the right, in its sole discretion, to withdraw the CFP, to engage in preliminary discussions with prospective Respondents, to accept or reject any or all Applications received, to request supplemental or clarifying information, to negotiate with any or all qualified Respondents, and to request modifications to Applications in accordance with negotiations, all to the same extent as if this were a Request for Information.

c) On matters related solely to this CFP that arise prior to an award decision by the Mass Tech Collaborative, Respondents shall limit communications with the Mass Tech Collaborative to the Procurement Team Leader and such other individuals as the Mass Tech Collaborative may designate from time to time. No other Mass Tech Collaborative employee or representative is authorized to provide any information or respond to any questions or inquiries concerning this CFP. Respondents may contact the Procurement Team Leader for this CFP in the event this CFP is incomplete.

d) The Mass Tech Collaborative may provide reasonable accommodations, including the provision of materials in an alternative format, for Respondents with disabilities or other hardships. Respondents requiring accommodations shall submit requests in writing, with supporting documentation justifying the accommodations, to the Procurement Team Leader. The Mass Tech Collaborative reserves the right to grant or reject any request for accommodations.

e) Respondent's Application shall be treated by the Mass Tech Collaborative as an accurate statement of Respondent's capabilities and experience. Should any statement asserted by Respondent prove to be inaccurate or inconsistent with the foregoing, such inaccuracy or inconsistency shall constitute sufficient cause for Mass Tech Collaborative in its sole discretion to reject the Application and/or terminate of any resulting Agreement.

f) Costs that are not specifically identified in the Respondent's response and/or not specifically accepted by Mass Tech Collaborative as part of the Agreement will not be compensated under any contract awarded pursuant to this CFP.

g) Mass Tech Collaborative's prior approval is required for any subcontracted services under any Agreement entered into as a result of this CFP. The selected Respondent will take all appropriate steps to assure that minority firms, women's business enterprises, and labor surplus area firms are used when possible. The selected Respondent is responsible for the satisfactory performance and adequate oversight of its subcontractors. Subcontractors are required to meet the same requirements and are held to the same reimbursable cost standards as the selected Respondent.

h) Submitted responses must be valid in all respects for a minimum period of sixty (60) days after the deadline for submission.

i) Mass Tech Collaborative reserves the right to amend the Agreement at any time prior to execution. Respondents should review the Agreement as they are required to specify any exceptions to the Agreement and to make any suggested counterproposal in their Application. A failure to specify exceptions and/or counterproposals will be deemed an acceptance of the Agreement's general terms and conditions, and no subsequent negotiation of such provisions shall be permitted.

4.2 Posting of Modifications/Addenda to CFP

This CFP has been distributed electronically using the Mass Tech Collaborative and Commbuys websites. If Mass Tech Collaborative determines that it is necessary to revise any part of this CFP, or if additional data is necessary to clarify any of its provisions, an addendum will be posted to the websites. It is the responsibility of each potential Respondent to check the Mass Tech Collaborative website for any addenda or modifications to the CFP, including the Question and Answer document, which may contain relevant information. The Mass Tech Collaborative accepts no liability and will provide no accommodation to Respondents who submit a response based on an out-of-date CFP.

Attachment A - TOPIC Areas
Biotechnology and Biomanufacturing FY26 CFP Topics

Topic 1. Enhancing Warfighter Resilience and Performance Through Nutritional Biotechnology (SC-SSD).

Current State:

Current military rations are engineered for caloric density, portability, and exceptional shelf-stability to meet the extreme logistical demands of modern military operations. While effective for sustenance, they often lack the functional, bioactive components necessary to support and maintain optimal gut and metabolic health. Prolonged consumption, particularly under the high-stress conditions of deployment, can lead to a degradation of the gut microbiome, digestive distress, compromised immune function, and suboptimal metabolic performance. This presents a direct risk to warfighter health, readiness, and the overall effectiveness of the force. There is a critical, unaddressed need to evolve rations from pure sustenance to a proactive tool for health maintenance and performance enhancement.

Desired End State:

The desired end state is the development and integration of novel, shelf-stable bioactive ingredients into military rations to proactively enhance warfighter health. This project will develop and produce:

- Bioactive molecules that support metabolic efficiency and gut barrier integrity. An example is synergistic blend of prebiotics, probiotics, and postbiotics scientifically validated to enhance immune response and digestive function under operational stress.
- The final product will be a suite of food-grade ingredients, ready for integration into existing or future ration platforms with a high likelihood of receiving GRAS status. The goal is to create a new pillar of dual-use innovation in Massachusetts that directly supports national security by making every ration a tool for improving soldier health and resilience.

Success Criteria:

- Phase 1 (Scientific Validation): Identification and characterization of lead candidate molecules and biotic blends. Successful demonstration of their stability and bioactivity in lab-based ration prototypes.
- Phase 2 (Pre-Clinical & Regulatory Pathway): Establishment of pilot-scale manufacturing processes with MA-based industry partners. Demonstrated safety and efficacy in validated pre-clinical models. Preparation and submission of a comprehensive safety dossier to the FDA to achieve Generally Recognized as Safe (GRAS) status.
- Phase 3 (Operational Validation & Transition): Successful completion of human sensory panels and clinical trials. Receipt of an FDA "no questions" letter for the GRAS notification, confirming regulatory acceptance. A clear transition plan for integration into DoD supply chains is established with the MRL 7-capable manufacturing partner.

End Technology Readiness Level (TRL): TRL 7. System prototype demonstration in an operational environment. This means the final biotic-enhanced ration components will have been successfully tested in a relevant military field environment, demonstrating their efficacy and stability under real-world conditions.

End Manufacturing Readiness Level (MRL): MRL 7. Capability to produce systems, subsystems, or components in a production-representative environment. Upon project completion, there is a proven, scalable process ready to transition to low-rate initial production, capable of meeting DoD procurement standards.

Topic 2. Novel bio-protection systems to enhance the safety, shelf-life, and resilience of military rations in austere operational environments (SC-SSD).

Current State:

Current military rations rely heavily on traditional preservation methods such as thermal processing, dehydration, and natural preservatives. While effective, these methods have limitations:

- Logistical Burden: The weight and bulk of packaging materials required for preservation contribute significantly to the logistical footprint.
- Nutrient Loss: Traditional preservation techniques can often degrade the nutritional value and sensory qualities (taste, texture) of the food, impacting warfighter morale and performance.
- Limited "Smart" Capability: Current packaging is passive; it cannot actively combat microbial threats or indicate the safety status of the contents beyond a simple expiration date. In this context, "smart" packaging refers to a system with intelligent capabilities that can monitor the condition of the packaged food and its surrounding environment. This includes both "active" features, which intentionally release or absorb substances to improve shelf life (such as oxygen scavengers or antimicrobial emitters), and "intelligent" features, which monitor and provide information on the food's quality. Examples of "smart" capabilities include actively combating microbial threats, indicating the real-time safety and freshness of the contents, and tracking temperature exposure throughout the supply chain.

Desired End State:

To develop and integrate a suite of "active" bio-protection technologies into military rations. This will create a new generation of "smart rations" that are safer, more resilient, and have a significantly longer shelf-life across a wide range of global operating conditions. The end state is fielded ration components that actively inhibit microbial growth, maintain nutritional and sensory quality for longer, and reduce the overall logistical burden of feeding the force.

Success Criteria:

This project will be considered successful upon meeting the following criteria:

- Shelf-life Extension: Maintain the stable shelf-life of a representative ration component (e.g., MRE main meal) under accelerated storage conditions without traditional packaging, preservatives or processing.
- Antimicrobial efficacy: Demonstrate a 99.9% (3-log) reduction of common foodborne pathogens (e.g., E. coli, Salmonella, Listeria) on a ration component treated with the bio-protection system compared to a control.
- Warfighter acceptance: Meet the sensory requirements on the hedonic scale: >6 without storage and >5 after storage.
- System integration: Successfully incorporate the bio-protection system into existing ration packaging or food matrix without compromising the integrity of the packaging or the edibility of the food.
- Durability: The bio-protection system must remain effective after being subjected to standard military durability testing, including drop tests, vibration tests, and extreme temperature cycling.

End Technology Readiness Level (TRL): TRL 7. System prototype demonstration in an operational environment. The project will culminate in a prototype of the bio-protected ration system being demonstrated in a relevant operational environment.

End Manufacturing Readiness Level (MRL): MRL 7. Capability to produce systems, subsystems, or components in a production representative environment.

Topic 3. Pilot-Scale, Bioreactor Production of High-Quality Cellulose (ARL)

Current State:

Cellulose is a critical material widely used across industries, including textiles, paper production, bioplastics, and advanced composites, due to its high tensile strength, biodegradability, and chemical versatility. Bioreactor production offers a promising alternative to traditional plant-based extraction methods, providing a controlled and scalable approach to make cellulose. An optimized bioreactor capability could reduce supply chain vulnerabilities and ensure a stable, on-demand source of high-quality cellulose. However, growing cellulose in a bioreactor under agitated conditions presents unique challenges, including maintaining optimal oxygen transfer and nutrient distribution while preventing shear forces from disrupting cellulose fiber formation.

Desired End State:

The desired outcome is the development of a scalable and reproducible bioreactor process for the production of high-quality cellulose. This includes optimizing key parameters such as agitation, aeration, and nutrient composition to maximize cellulose yield and quality. The process must consistently produce cellulose with ≥ 95% alpha cellulose content, fiber diameters of ≥ 1 μm, and lengths of ≥ 1 mm. Additionally, the process should enable the ability to tune the crystallinity of the cellulose to meet specific application requirements, providing flexibility for use in diverse industrial applications. Achieving these quality metrics requires precise control of bioreactor parameters, such as agitation speed, aeration rate, and nutrient composition. A key milestone for success will be the delivery of greater than 1 kg of cellulose, demonstrating the feasibility of scaling up production to meet industrial demands.

Success Criteria:

The success of this effort will be measured by the following criteria:

- Achieving a specific yield of cellulose with ≥ 95% alpha cellulose content, fiber diameters of ≥ 1 μm, and lengths of ≥ 1 mm (more similar to natural fibers) in a pilot-scale bioreactor with a working volume greater than 125 liters, demonstrating the efficiency of the fermentation process.
- Demonstrating process scalability with consistent results across multiple pilot-scale runs, ensuring reproducibility and reliability of the production method.
- Delivering greater than 1 kg of cellulose, meeting quality and quantity requirements.
- Documenting the energy efficiency and cost-effectiveness of the bioreactor process, including metrics such as energy consumption per kilogram of cellulose produced and overall production costs.

End Technology Readiness Level (TRL): TRL 5 – TRL 6
End Manufacturing Readiness Level (MRL): MRL 5 – MRL 6

Topic 4. Pilot-Scale Fermentation for Scalable Production of Melanized Filamentous Fungi (ARL)

Current State:

Conductive materials are widely used across industries for applications such as electronics, energy storage, advanced manufacturing, and communication systems. These materials play a critical role in batteries, supercapacitors, electromagnetic shielding, and lightweight structural components, offering high conductivity, durability, and versatility. The tunability of conductive materials, particularly in terms of their electrical and thermal performance, is a significant advantage, allowing them to be tailored for specific applications. Unlike many conventional conductive materials, these materials can adapt to varying operational requirements, making them ideal for technologies that demand precision and flexibility in performance. Melanized, filamentous fungus has shown promise in the ability to selectively tailor conductivity through synthetic biology and material processing approaches, making it a potential bio-derived solution for various applications.

Desired End State:

The desired outcome is the development of a scalable and reproducible fermentation process for the production of melanized filamentous fungi, including the optimization of key parameters such as agitation and aeration to maximize fungal growth and melanin production while ensuring process efficiency and consistency. Additionally, the establishment of robust pilot-scale production protocols is critical to enable seamless transition to industrial-scale operations. A key milestone for success will be the delivery of greater than 4 kg of melanized fungal biomass, demonstrating the feasibility of scaling up production to meet commercial and industrial demands. These advancements will lay the foundation for sustainable, cost-effective production methods that can support the growing applications of biomelanin-derived conductive materials across various industries.

Success Criteria:

The success of this effort will be measured by the following criteria:

- Achieving a specific yield of melanized fungal biomass greater than or equal to 8 g/L in a pilot-scale bioreactor with a working volume greater than 500 liters, demonstrating the efficiency of the fermentation process.
- Delivery of greater than 4 kg of melanized fungal biomass.
- Demonstrating process scalability with consistent results across multiple pilot-scale runs, ensuring reproducibility and reliability of the production method.
- Documenting the energy efficiency and cost-effectiveness of the fermentation process, including metrics such as energy consumption per kilogram of biomass produced and overall production costs.

End Technology Readiness Level (TRL): TRL 5 – TRL 6

End Manufacturing Readiness Level (MRL): MRL 5 – MRL 6

Topic 5. Biosensors for Environmental Microbes (ARL)

Current State:

Living biosensors are of growing interest for DoW sensing applications, being uniquely suited for detecting biological or chemical threats and environmental contaminants without exposing warfighters to said hazards. However, most biosensing platforms are developed as proof-of-principle prototypes in microbes ill-suited for any operating environment outside of a laboratory, using sensing mechanisms that cannot deliver a signal at relevant times or in realistic natural environments. Additionally, environmental microbes that might be capable of meeting these needs are often undomesticated or understudied, especially in their natural contexts.

Desired End-State:

The Department of War (DoW) is seeking solutions to develop ruggedized living biosensors, capable of reporting on actionable compounds at the speed of relevance while surviving in relevant operating environments. Solutions should include innovative biosensor designs that enhance detection sensitivity, specificity, and real-time reporting capabilities in situ. Solutions must include strategies to enhance biosensor durability and functionality in challenging environmental conditions (e.g., extreme temperatures, pH, salinity, or nutrient limitations) and mitigate degradation or loss of biosensor activity over time. This project should also investigate the regulatory mechanisms of gene expression in standard environmental microbes (eg. Bacillus or Pseudomonas) in situ to inform biosensor design and the interaction between biosensors and native microbial communities to ensure sensor longevity and minimize unintended ecological impacts.

Success Criteria:

Demonstrate an organism(s) formulation method that can sense and report the presence of a chemical in situ without requiring subsequent nutritional supplementation after having previously been deployed in the environment at least 48 hours. This chemical should be non-nutritive and reasonably expected to be found in the environment, preferably as a contaminant (e.g. toxic industrial chemicals (TICs), or toxic industrial materials (TIMs)). For the purposes of this BAA, "formulation" is defined as any method, vehicle, or vesicle to deliver the organism to an operational environment. Such a formulation can be, but is not limited to, a liquid solution, hydrogel, or other matrices, and may include added excipients to aid in the living organism's stability and activity.

End Technology Readiness Level: TRL 4 - TRL 6

End Manufacturing Readiness Level: MRL 2 - MRL 4

Topic 6. Predicting Synthetic Organism Scale-Up Failure (ARL)

Current State:

Many entities are developing organisms programmed with synthetic biology to produce a variety of products. One barrier to transferring laboratory-based advances to industrial scales is that synthetic organisms often fail to produce sufficient product during scale-up. One possible source of scale-up failure is strain degeneration due to evolutionary pressure, as programmed cells almost always have reduced fitness. This issue is further exacerbated by the environmental heterogeneity of high-volume reactors, where the cells must operate under varying conditions.

Desired End-State:

The DoW is seeking the development of a predictive platform that can indicate if, when, and at what volume/scale a fermentation process will fail due to genetic perturbations of engineered organisms. The platform should account for knowable or easily estimated parameters such as generation time, metabolic burden on different feedstocks, length of synthetic DNA, number of critical bases, mutation rate, number of organisms in the scaled version, minimum product needed, toxicity of the final product, the timing of any switching that causes changes in metabolic burden, and the number of generations expected during the production phase. The platform should enable the screening of synthetic organism design strategies in silico, with the ability to estimate, with some level of confidence, when a degenerate strain would be present at levels that would cause the process to fail. The platform should identify combinations of factors—such as host organism, genetic engineering strategies, scale-up, and reactor design—that are promising, while also identifying combinations to avoid. The platform should be compatible with common organisms used as synthetic biology chassis, be amenable to updates with new chassis, and function under a variety of reactor conditions, such as oxygen levels ranging from aerobic to anaerobic.

Success Criteria:

- Demonstrate the ability to predict scale-up failure of a single species programmed with different synthetic biology programs. Validate computational results using novel or historical experimental data.
- Incorporate varied reactor conditions/designs and predict how reactor conditions impact synthetic organism strain stability.
- Demonstrate the ability to predict scale-up failure of at least five different genera programmed with different synthetic biology programs. Validate computational results using novel or historical experimental data.
- Demonstrate the use of the predictive framework to screen many design strategies for synthetic organisms and categorize the designs by the risk of scale-up failure.

End Technology Readiness Level (TRL): TRL 6 – TRL 7

End Manufacturing Readiness Level (MRL):N/A

Topic 7. Bioceramic protein production for durable, water-repellent textile finishes. (SC-SPD)

Current State:

Biomanufactured peptide chains can precipitate ceramics directly onto textiles with no adhesive or solvents, providing a new system to bind ceramics to Warfighter garments and equipment using techniques that are inexpensive, fast, effective, and environmentally friendly. The DEVCOM Soldier Center has developed genetic sequences, peptides, and proteins to produce and attach bioceramics directly onto textile and polymer substrates. Using genetically modified *Pichia pastoris,* bioreactors can be used to produce the peptides and proteins needed for finishing textiles with a durable bioceramic surface that imparts water repellency. Scaled production is required to deliver the quantities necessary for finishing textiles that can be used in garments and other Warfighter equipment. Biomanufacturing is a cost-effective way to produce multimerized peptide chains and enable more ceramic precipitation regions for thicker coatings and more durable ceramics that withstand wear and use. Additionally, biomanufacturing will provide a reliable domestic source for these novel proteins. Applications like water repellency, fire retardation, and cut/slash protection using ceramic coatings or finishes would also benefit from the lower cost and material flexibility of the biomanufactured materials.

Desired End State:

- Leverage the provided genetic sequences to optimize protein production in Bioreactor systems and evaluate downstream processing methods for protein extraction and purification
- Production of target bioceramic proteins at 5-10 L scale (minimum)
- Produce target bioceramic proteins with purity over 80%, target 2 kg protein yield
- Produce at least 1 yard of finished textile demonstrating the biomanufactured protein binds the textile and produces the bioceramic finish

Success Criteria:

- Ability to produce bioceramic proteins at scale at the desired purity
- Demonstrate independently or with a partner that the bioceramic proteins successfully bind the target textile and impart a bioceramic finish

End Technology Readiness Level (TRL): TRL 4 – TRL 6

End Manufacturing Readiness Level (MRL): MRL 4 – MRL 6

Topic 8. Biomanufacturing of prototype phage hygiene products to target UTI causing *E. coli* (SC-SED)

Current State:

Urinary tract infections (UTIs) are a significant issue affecting female Warfighter performance. UTIs are common in the DoD, with females experiencing >30% incidence rate in austere environments, including 12% having recurrent infections. Left untreated Warfighter removal from the field for treatment may occur, resulting in significant lost time and cost. UTIs are also associated with other urogenital issues, which based on diagnosed cases cost a total of $75M/year. It is also highly likely that the reported incident rate and costs don't represent the true extent of the problem, as data from operational environments are difficult to determine.

Current approaches focusing on training for female Warfighters to remain hydrated, urinate frequently and perform good hygiene practices are not effective preventing or reducing prevalence of UTIs. To address these challenges, Uniformed Services University for Health Sciences (USU) and PM SSV-SCIE are searching for a proactive preventative approach. Such an approach will advance Army capabilities by improving Warfighter performance and operational readiness. In addition, UTIs in the civilian sector occur at similar rates and are in need of a novel preventative approach; the civilian market is estimated to be $2B annually.

Desired End State:

The envisioned formulation will be suitable for use in a prototype product (e.g., spray or wipes) containing phage as an active ingredient to selectively target uropathogenic *E. coli* (UPEC), the cause of 80% of UTIs. Products will be: 1) active against a wide range of UPEC strains; 2) thermally stable for storage and use at temperatures found in operational and garrison environments A phage cocktail (supplied by an industrial partner) has been identified by Soldier Center which is active against a broad range of uropathogenic *E. coli* (96% of 26 domestic and foreign strains tested), responsible for 80% of UTI's. Additionally, a laboratory solution providing thermal stability (45oC for weeks) matching operational conditions. Current work will develop formulations suitable for production of prototype cosmetic products (wipes, sprays, etc.) to deliver phage as a potential topical hygiene product suitable for user evaluation. Proposed work would involve phage formulation development to maintain cocktail activity and stability.

Success Criteria:

Key Metrics/Measures for prototype products are: 1) activity against a wide range of UPEC strains; 2) thermal stability at long-term ambient or short-term extreme temperatures found in operational and garrison environments.

- Formulation development using GMP level purity phage.
- Formulation components suitable for a prototype product. Reagents need to be cosmetic grade (>70% purity) for skin application and will include phage stabilizers, preservatives and dilute polymer solution (provides thermal stability during storage and operational use).

End Technology Readiness Level (TRL): TRL 6. Formulation for demonstration in a relevant environment. Formulation will be ready for use in prototype products for user evaluation in garrison or training environments.

End Manufacturing Readiness Level (MRL): MRL 6. Capability to produce a prototype subsystem in a production relevant environment. Development of formulations for cosmetic products are well established

Topic 9. Bio-Based Advanced Manufacturing of Biologically Derived Pigments for Military Applications (SC-SPD)

Current State:

The Department of War (DoW) relies on conventionally manufactured pigments for military camouflage, protective coatings, functional textiles, and visual or optical sensing systems. These pigments are typically produced using energy-intensive chemical synthesis processes that depend on non-renewable feedstocks, generate hazardous waste, and present supply chain vulnerabilities. For the purposes of this topic, renewable feedstocks are defined broadly and include, but are not limited to, agricultural sources (such as corn-derived sugars), algae, fungi, and cellulosic biomass.
Academic and early-stage industrial research has demonstrated the potential of biologically derived pigments produced through bio-enabled manufacturing approaches. However, these technologies remain largely at low maturity levels, with limited validation of pigment performance, durability, and compatibility with defense-relevant materials or manufacturing processes.

Desired End State:

The desired end state is the development and validation of scalable, bio-based advanced manufacturing approaches for producing biologically derived pigments suitable for integration into military camouflage systems, coatings, textiles, and sensing applications. These pigments should meet relevant performance, durability, and environmental requirements while enabling more sustainable, resilient, and domestically sourced manufacturing pathways aligned with future DoW needs.

Success Criteria:

- Demonstration of biologically derived pigments applicable to one or more military-relevant use cases, including camouflage, coatings, textiles, or sensing.
- Validation of pigment performance characteristics such as environmental stability, durability, and compatibility with representative material systems.
- Demonstrated feasibility of bio-based advanced manufacturing approaches beyond laboratory-scale research.
- Evidence of reduced environmental impact or improved supply chain resilience compared to conventional pigment production methods.
- Identification of clear transition pathways for integration into defense programs or commercial manufacturing.

End Technology Readiness Level (TRL): TRL 5 – TRL 6

End Manufacturing Readiness Level (MRL): MRL 4 – MRL 5

Topic 10. Novel Application-Driven Engineered Bacteria Chassis for Army/DoW Applications (SC-SED)

Current State:

In the US, relatively few microbial chassis organisms have been engineered to produce novel materials and biopharmaceuticals across many sectors. Further expansion in the applications of microbial based biomanufacturing will inevitably require a much larger library of chassis. The need to accelerate/mature/streamline the development of our microbial chassis development is perhaps even more urgent in the national security arena above and beyond global economic competition concern. Our global adversaries have a substantial advantage in the total number of microbial chassis they are exploring for high efficiency biomanufacturing applications. To maintain development parity in specific application areas for the Army S & T community, we are seeking performers that can accelerate the development of novel high-performance microbial chassis in mission spaces from textile materials for extreme environments and energetics to attritable, low cost living sensors.

Desired End State:

The intent of this proposal is to encourage the development of application specific, emerging bacterial, yeast or fungal chassis to develop highly efficient and cost effective engineered microbial production pathways, primarily for critical military applications with possible dual civilian use scenarios. A successful proposer will have selected one of the following mission areas/applications to demonstrate their ability to engineer an emerging microbial chassis and refine/mature the engineered chassis up through the volume scales necessary to demonstrate pilot production and its use in an environment representative of operational conditions.

- Bioderived controllable molecular weight cellulosic fiber for military use cases including nylon equivalent fibers and fabrics, energetics/propellant (details provided in classified setting), and fire-retardant fibers and fabrics
- Engineered microbial sensors produced at sufficient volumes to be used in limited representative field setting applications including: colorimetric contamination reporting; colorimetric biothreat (simulant) reporting (ground or unmanned vehicle), or standoff biothreat reporting (details in a classified setting).

Success Criteria:

At the conclusion of the 1st performance year, successful participants will have demonstrated the successful pilot scale up and limited functional demonstration of one engineered microbe chassis to be jointly selected with the DoW topic authors.

Although not critical, successful participants will have secret level accredited work & lab spaces in the case that the DoW identified engineered bacteria is developed in response to a classified application or operational setting.

End Technology Readiness Level (TRL): TRL 5 – TRL 6

End Manufacturing Readiness Level (MRL): MRL 4 – MRL 5

Attachment B - White Paper Instructions

White Paper Template

- All white papers must use the provided template, Attachment C. A downloadable copy of these instructions and template is located on the website.
- File Naming Convention:
  - Org Name_BioNexusWP_Topic <insert number>_<project acronym>
- Template content: Replace the cover page text in *italics* with the information requested. All items in italics in the white paper template are suggested questions to guide the application response. Please replace the italicized questions with your response.
- White Papers must be uploaded to the application form. See Link in Section 3.2.

Formatting & Page Limits:

- 1" margins, Arial 12pt font or larger, single or double space
- **7 Pages total** for the proposal document. **5 papers for the white paper content.**
  - 1 Cover page
  - 5 pages maximum for the white paper and appendices
  - 1 page for citations (optional)
  - White Paper content written into the cover page, citation page, and beyond the 5 page limit will not be reviewed
- White Paper Sections & recommended page length:
  - Cover Page – 1 page
  - Project Summary - 0.5 page
  - Technical Approach - 2.5 pages
  - Project Impact - 0.5 page
  - Transition Plan - 0.5 page
  - ROM Budget – 0.5 page
  - Team & Capabilities – 0.5 page
  - Appendices – as needed, included in page limit
- Images are permitted if included in the page limit. Images must be clearly referenced in the text and have caption with text 10pt font or larger.
- Please use the set section headers. If you have content that does not fit within the headers, include it in an appendix.

Attachment C - White Paper Template
A downloadable copy is located on the website.

Project Title

Project Acronym (not to exceed 8 characters)

BioNexus – White Paper

CFP #: No. 2026-NEMC-02

Project Topic Area: ***Fill in Here***

Lead Applicant Point of Contact:

Lead Applicant Point of Contact Name

Lead Applicant Organization & Department (if applicable)

Contact Email

Contact Phone Number

Submission Date:

Month Day, 2026

Project Summary:
Provide a high-level description of the effort. What is the topic number? Why is this project being proposed, how does it align to the selected topic and what are its overall objectives?

Technical Approach:

- *What are you trying to accomplish technologically? Articulate your objectives using minimal jargon.*
- *How is it done today, and what are the limits of current practice?*
- *What is new in your approach, and why do you think it will be successful?*
- *What is current and target TRLs and MRLs, and the state of the technology relative to the desired end state and success criteria?*
- *What is the scope of the work?*
- *Who and what applications can this impact?*
- *If you are successful, what difference will it make?*
- *What are the risks?*

Project Impact:
What unique capabilities and/or processes does this project make available to the DEVCOM Soldier Center?

Transition Plan:
Provide an overview of the project timeline with a project start date of November 1, 2026. How do the project's year 1 objectives meaningfully advance the technology and/or processes toward production readiness and/or market adoption? How do the year 1 results enable progress toward additional funding (e.g., revenue, grants, investment)? Does the project team include transition partners and/or customers?

ROM (Rough Order of Magnitude) Budget:
Fill out the table below, then outline and describe the project costs. Add or remove columns as needed. NOTE: Only year 1 of projects will be funded through this CFP.

	Year 1	Year 2	Year 3	Project Total ($)
Cost Match ($)				
Grant Amount Requested ($)				
Project Total ($)				

Team & Capabilities:
Describe the team. Who are your team members (names and organizations), what are their expertise and capabilities? How will they support this project?

Attachment D - Massachusetts Technology Collaborative Authorized Respondent's Signature and Acceptance Form

The undersigned is a duly authorized representative of the Respondent listed below. The Respondent has read and understands the CFP requirements. The Respondent acknowledges that all of the terms and conditions of the CFP are mandatory. By executing this Authorized Respondent's Signature and Acceptance Form, Respondent certifies that they (1) are in compliance with the terms, conditions and specifications contained in this CFP, (2) acknowledges and understands the procedures for handling materials submitted to the Mass Tech Collaborative as set forth above, (3) agrees to be bound by those procedures, and (4) agrees that the Mass Tech Collaborative shall not be liable under any circumstances for the disclosure of any materials submitted to the Mass Tech Collaborative pursuant to this CFP or upon the Respondent's selection.

I certify that Respondent is in compliance with all corporate filing requirements and State tax laws.
I further certify that the statements made in this response to the CFP, including all attachments and exhibits, are true and correct to the best of my knowledge.

Respondent:
(Printed Name of Respondent)

By:
(Signature of Authorized Representative)

Name:

Title:

Date: