

Recommendations to OSTP for Gene Synthesis Screening Framework



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America stands at a critical inflection point in biotechnology leadership, where our nation's dominance in nucleic acid synthesis represents both a significant competitive advantage and one of our most vulnerable frontiers. The Trump Administration's bold May 5th Executive Order, [*Improving the Safety and Security of Biological Research*](#), takes a forward-looking approach that puts America First by making it more difficult for bad actors both domestically and globally to access genetic material that would allow them to produce deadly pathogens. Without proper screening and oversight, synthetic biological materials could create major national security risks. The following recommendations build upon the Administration's decisive leadership to ensure that America maintains its biotechnology edge while implementing the commonsense nucleic acid synthesis screening safeguards necessary to protect American citizens and preserve our national security advantage.

EXECUTIVE SUMMARY

1. Establish Market-Driven Third-Party Conformity Assessments of Screening Practices

Effective nucleic acid synthesis screening requires robust verification mechanisms that go beyond paper compliance to test real-world performance under pressure. The Biden Administration's reliance on provider self-attestation of compliance permitted dangerous gaps in adherence to robust screening practices. The revised framework should include robust conformity assessments to ensure compliance by companies accredited to provide synthetic nucleic acids to U.S. government-funded researchers, including auditing, stress-testing, and red-teaming of both sequences and customers. In order to ensure uniform implementation of screening recommendations, a risk-scoring rubric should also be developed for assessing whether orders contain Sequences of Concern (SOCs). NIST may be an appropriate agency to develop the conformity assessments and the risk-scoring rubric, but it could be appropriate to task another agency with coordinating ongoing red-teaming to verify compliance. Structured conformity assessment methodologies will allow private assessment bodies to compete to provide the most rigorous and efficient screening evaluations, mirroring successful models in cybersecurity and financial services, where market incentives drive continuous improvement in security practices.

Under this approach, one element would include private red-teaming entities—authorized by a coordinating federal agency—placing test orders containing SOCs to measure provider performance in actual screening scenarios. Separately, thorough audits of screening protocols and stress-testing of system resilience under various threat conditions should also be conducted. In the long-run, these comprehensive assessments would simulate real-world attack vectors, including attempts to evade detection through sequence fragmentation, social engineering, and other sophisticated techniques that self-attestation cannot capture. This market-driven conformity assessment approach aligns with American free-market principles while ensuring our biotechnology sector remains both innovative and secure through rigorous, independent verification of screening capabilities across multiple evaluation dimensions.

2. Ensure the Trump Administration’s lasting impact by encouraging Congress to 1) clarify its support for expanding the scope of screening requirements beyond federally funded settings and 2) codify the administration’s research funding requirements

The Trump Administration’s EO requirement for legislative proposals within 180 days represents a welcome and necessary step toward comprehensive biosecurity governance. ARI commends the administration's recognition of the need for Congressional action, particularly in non-federally funded settings. While we look forward to the legislative proposals that will emerge from the 180-day strategy, earlier engagement from OSTP with Congress—whether through the revised framework or via separate communications—would help accelerate necessary congressional action. Clearer congressional authorization to regulate nucleic acid synthesis (including of benchtop synthesizers) under 42 USC 262a, 7 USC 8401, or a similar authority is essential because many commercial synthesis activities fall outside the scope of federal funding requirements, yet pose similar biosecurity risks. It would also help ensure a level playing field where responsible businesses are not undercut by bad actors.

ARI applauds the EO’s research funding requirement and supports using clear penalties and enforcement tools. The framework can be maximally impactful if it continues to ensure that these requirements apply to entire entities receiving federal funding, not just individual grant recipients—consistent with the EO’s enforcement provisions that hold entities responsible for violations by their grant recipients and employees. We would also like to see the research funding requirement applied to sectors beyond solely the life sciences (e.g., biomanufacturing, industrial biotechnology, and agricultural applications). These two approaches—addressing entire entities and covering all federal research funding related to nucleic acid synthesis—will help rapidly drive market adoption of screening protocols. While we are encouraged by the [bipartisan support](#) in Congress for the research funding requirement, codification is crucial to prevent potential policy whiplash between administrations that could undermine market incentives driving widespread adoption of screening infrastructure. Congress should also codify a process for continually updating relevant screening frameworks, ensuring that HHS and OSTP guidance can adapt to evolving threats and technological advances without requiring new legislation.

3. Address Thorny Challenges Including Split Orders, Benchtop Synthesizers, and International Regulatory Fragmentation

Split Order Evasion: Bad actors can fragment concerning sequences across multiple commercial providers, exploiting screening systems that evaluate individual orders rather than aggregate intent, with shorter nucleotide snippets easier to splice together. This circumvention strategy undermines traditional sequence-based screening by distributing dangerous genetic information across multiple seemingly innocuous transactions. The revised framework should address this by encouraging the agencies to either create a federal database or encourage the development of an information and reporting sharing platform to address potential split order patterns. This database should include flagged sequences, customer profiles, and compilation of genes recognized as containing SOCs—to allow for uniform implementation of the SOC definition in the framework by providers—including emerging pathogenic sequences. Information in the database should only be accessible under strict protocols, and some elements of the database—like the compilation of SOCs—should be available to all screening providers. Other elements in the database, such as aggregated customer and order information from across the industry, should only be available to federal agencies or a non-governmental entity acting on their behalf to ensure security across the industry. It should also use cryptographic or similar methods to enable pattern detection without forcing providers to share proprietary customer data with their competitors. By October, 2026, a federal agency should be tasked with establishing this coordination mechanism for the gene synthesis industry, and the legislative request should include appropriations for establishing a government services contract for ongoing implementation of this screening coordination.

Benchtop Synthesizers: The proliferation of desktop nucleic acid synthesis devices represents a remarkable democratization of biotechnology. However, this same democratization presents unique biosecurity risks by enabling direct synthesis of pathogenic sequences without commercial oversight or professional expertise barriers. The framework should require manufacturers to implement "phone-home" capabilities that transmit synthesis logs to monitoring systems to enable verifiable, up-to-date synthesis screening, establish mandatory customer verification protocols, and may include requirements for installed hardware-based sequence screening for a minimum set of controlled sequences (i.e., sequences from biological select agents and toxins) that prevents synthesis of flagged constructs. These security measures should be embedded at

the point of manufacture to ensure they cannot be bypassed or disabled by end users. By October, 2026, manufacturers of benchtop synthesis devices should be required to implement these standards in order to be eligible to sell their equipment to U.S. government-funded researchers. The legislative request should also ask for these standards to be required for devices manufactured or sold in the United States, as soon as possible.

International Regulatory Fragmentation: Individuals or entities seeking to evade U.S. biosecurity measures can shop for countries with weak or nonexistent screening practices. This threatens both biosecurity and U.S. biotechnology leadership, as regulatory inconsistencies undermine a level playing field where all companies globally operate under comparable screening standards. Industry stakeholders are broadly supportive of screening requirements and have consistently emphasized the critical importance of regulatory consistency across jurisdictions to ensure fair competition and effective risk mitigation. The framework should direct relevant agencies to actively engage other nations to implement effective oversight mechanisms by sharing American expertise and for the Administration to embark on a diplomatic effort to promote and pursue gene synthesis requirements internationally (e.g., via bilateral dialogue and in multilateral forums). This approach should leverage America's technological leadership to set global standards while ensuring that international coordination strengthens rather than constrains US competitive advantages in biotechnology markets.

4. Deploy AI-Powered Screening to Counter AI-Enhanced Evasion Techniques

To counter AI-enabled evasion techniques, screening systems must leverage predictive AI solutions to detect biological functions of concern and identify novel sequences that bypass traditional database matching. The framework should encourage the agencies to develop public-private partnerships that harness American AI supremacy for defensive biosecurity purposes by developing machine learning algorithms that can recognize dangerous functionality even in AI-designed variants with low sequence similarity to known threats. This includes supporting IARPA-style challenge programs and the use of innovative financing mechanisms that Director Kratsios has [previously highlighted](#) to incentivize innovation in AI-powered screening technologies. In particular, tools like prizes, advanced market commitments, etc. could be harnessed to develop stronger non-homologous screening mechanisms that are critical to mitigating AI-enabled evasion

techniques. This approach ensures that U.S. companies benefit from superior AI screening capabilities while establishing American AI solutions as the global benchmark for biosecurity.

TECHNICAL IMPLEMENTATION DETAILS OF RECOMMENDATIONS

1. Establish Market-Driven Third-Party Conformity Assessments of Screening Practices

Effective nucleic acid synthesis screening – particularly to test real-world performance under pressure – requires robust verification that goes beyond simply checking boxes. The previous administration's reliance on self-attestation of compliance by providers accredited to sell synthetic nucleic acids to federally funded researchers failed to close dangerous gaps that bad actors could exploit. The revised framework should direct NIST to explore and facilitate a competitive marketplace for conformity assessments, which would include auditing, stress-testing, and red-teaming. This system would use a clear risk-scoring rubric to standardize how different providers and screening tools assess Sequences of Concern (SOCs). This structure allows private assessment bodies to compete, aiming to provide the most thorough and efficient screening evaluations. This approach mirrors successful models in cybersecurity and financial services, where market incentives drive continuous improvement in security practices.

Under this approach, red-teaming entities authorized by a coordinating federal agency would implement programs to place test orders containing SOCs to measure how well providers perform in actual screening scenarios. They would also conduct thorough audits of screening procedures and stress-test system resilience under various threat conditions. These comprehensive assessments would begin with audits to assess sequence–and customer screening practices, and in the long-run simulate real-world attack methods, including attempts to bypass detection through sequence fragmentation, social engineering, and other sophisticated techniques that self-attestation cannot catch. This market-driven conformity assessment approach aligns with American free-market principles, ensuring our biotechnology sector remains both innovative and secure

through rigorous, independent verification of nucleic acid synthesis screening capabilities across multiple evaluation dimensions.

To ensure this vital biosecurity framework is successfully implemented and continuously improved, the Office of Science and Technology Policy (OSTP) should consider the following:

- **Federal Funding and Resource Allocation for Synthesis Screening Implementation:** OSTP should work immediately with OMB, DOC, and NIST leadership to secure dedicated funding for nucleic acid synthesis screening work within NIST's existing budget framework. This approach provides a viable pathway for rapid resource deployment by directing NIST leadership to allocate resources for screening technology development without requiring Congressional funding authorization. OSTP should prioritize this funding mechanism to enable NIST to establish the technical infrastructure, personnel, and capabilities necessary to support the accreditation programs, database development, and standards creation outlined in the framework. This funding should cover the establishment of screening technology assessment capabilities, the development of conformity assessment standards, and the ongoing maintenance of critical databases and technical guidance. Given the urgency of biosecurity threats and the existing voluntary nature of screening practices, securing immediate federal resources through existing budget authorities represents the most expeditious path to implementing comprehensive synthesis screening oversight while Congressional appropriations processes develop in parallel.
- **Accreditation for Independent Conformity Assessment Bodies:** OSTP should consider requiring the establishment of a robust program to accredit independent third-party organizations. This program could use or expand existing capabilities within the NIST National Voluntary Laboratory Accreditation Program (NVLAP) or a newly designated entity within the DOC in coordination with the FBI. This entity would set the standards for private organizations to certify the proficiency of nucleic acid synthesis providers in screening sequences and customers. These accredited bodies would validate capabilities through comprehensive auditing and stress-testing.
- **Clear Standards for Function-Based SOC Identification:** The designated technical interagency group, guided by leading industry practices, should be directed to develop a broader and more precise definition of "sequences of

concern" that goes beyond lists of genes from regulated biological agents. This updated definition must include the biological functions of genes that can be universally understood to contain sequences of concern, and must include criteria such as percentage identity thresholds, matches to functional domains, and mechanisms to identify novel and AI-generated sequences. The establishment of a database containing a compilation of all of the genes that meet these criteria is necessary for the uniform implementation of this definition across the gene synthesis industry. This database should not be released, but a partial, curated, and public training dataset for SOC classification could support algorithm transparency, reproducibility, and validation. As such, a federal agency should be tasked with establishing this database and the legislative request should include appropriations for its establishment and maintenance. This initiative aims to develop measurable standards and assessment capabilities for all elements of nucleic acid synthesis screening.

- **Stronger Security for SOC Databases:** Databases containing SOCs need robust, modern cybersecurity controls specifically designed for their classification level. This includes, but is not limited to, advanced encryption for data at rest and in transit, multi-factor authentication for all access, strict access control mechanisms, and continuous monitoring to actively prevent unauthorized access and data theft.
- **Support and Capacity Building for Providers:** To help the entire industry adopt these changes and ensure fair compliance across all businesses, the framework should encourage agencies or third-parties to host regular workshops, comprehensive online toolkits, and dedicated help-desk support. This support should also include proactive outreach to providers, benchtop synthesizer manufacturers, contract research organizations, and federally funded institutions to ensure they understand that they will be subject to the updated requirements. These resources are crucial for assisting small and medium-sized providers in successfully putting advanced screening frameworks into practice and understanding compliance requirements.

Congressional Action:

- **NIST Funding Prioritization:** To enable NIST to effectively carry out its fundamental role in establishing measurable standards and assessment capabilities, Congress should prioritize strong and consistent funding for NIST's standards development and conformity assessment activities. This ensures

America's leading technical agency has the necessary resources to drive global biosecurity innovation and create essential technical guidance for the nucleic acid synthesis industry.

2. Ensure the Trump Administration's lasting impact by encouraging Congress to 1) clarify its support for expanding the scope of screening requirements beyond federally-funded settings and 2) codify the administration's research funding requirements

The Trump Administration's Executive Order represents a critical advancement in biotechnology governance that requires Congressional codification to secure a lasting legacy on this issue beyond the duration of the administration. Clear legislative authorization will enable federal agencies to extend screening requirements beyond federally-funded research to encompass commercial synthesis activities across all market participants, while also codifying the research funding requirement that ensures federally-funded entities purchase synthetic genetic material only from compliant providers.

Current screening requirements, while effectively covering federally-funded research through established grant mechanisms, create potential market asymmetries where commercial synthesis providers operating exclusively in private markets may compete without equivalent regulatory oversight. The International Gene Synthesis Consortium (IGSC), the sole current trade association specifically focused on nucleic acid synthesis, has endorsed legislation that would extend screening requirements beyond the federal purchasing requirement. This industry support demonstrates clear support for moving beyond voluntary compliance to comprehensive market coverage.

Congressional authorization would establish uniform screening standards across all domestic synthesis activities, ensuring that responsible industry participants are not disadvantaged by voluntary adoption of robust screening protocols while competitors potentially offer lower-cost services without equivalent security measures. Legislative clarity would prevent regulatory arbitrage and establish consistent baseline security standards that promote fair competition based on innovation and quality rather than differential regulatory compliance.

While synthesis screening costs remain relatively modest in absolute terms, synthesis costs are dropping rapidly, making screening an increasing portion of operating costs for providers. This trend creates economic pressures that could undermine voluntary screening efforts over time, as cost-conscious providers may be tempted to eliminate screening expenses. Clarity from Congress would eliminate this pressure by ensuring all market participants operate under consistent requirements, preventing a race to the bottom for national security.

The EO's entity-wide funding requirement represents a particularly important mechanism for market transformation that merits Congressional codification. Rather than limiting screening requirements to individual grant recipients or only to the direct use of federal funds, the EO's approach of requiring entire federally-funded entities to purchase synthetic nucleic acids only from compliant providers creates powerful network effects that rapidly drive market adoption. This entity-wide approach leverages existing administrative structures and compliance mechanisms while creating positive market incentives for synthesis providers to adopt robust screening practices to maintain access to the substantial federally funded research market. Congressional codification of this entity-wide approach would provide supportive regulatory clarity for private sector investment in screening infrastructure while ensuring comprehensive coverage that protects against potential misuse vectors.

Additionally, the research funding requirement should not be limited to life sciences research funding only. While Section 4(b) requires agencies funding life sciences research to ensure synthetic nucleic acid procurement occurs through compliant providers, this narrow scope creates potential circumvention pathways where entities could access synthesis services through non-life sciences funding streams or commercial channels. Extending the research funding screening requirements to encompass all federally-funded activities involving synthetic nucleic acid procurement—including biomanufacturing, industrial biotechnology, and agricultural applications—would close critical gaps. This comprehensive approach would ensure that the Executive Order's screening mandates cannot be circumvented by routing synthesis procurement through programs that fall outside the current Framework's scope.

The current framework's reliance on executive authorities, while providing necessary immediate implementation, introduces potential future policy discontinuity risks that could discourage private sector investment in screening infrastructure. Commercial synthesis providers require predictable regulatory environments to justify capital

investments in sophisticated screening technologies, workforce training, and compliance systems. Congressional codification would provide the regulatory certainty necessary to encourage private sector development of advanced screening capabilities and support the long-term sustainability of biosecurity infrastructure.

The rapidly evolving nature of synthetic biology technologies requires adaptive regulatory frameworks capable of addressing emerging capabilities and potential misuse vectors. Congressional legislation should establish clear authority for ongoing framework updates while maintaining appropriate oversight mechanisms. This approach would enable HHS, NIST, and OSTP to respond to technological developments, emerging threat patterns, and scientific advances without requiring new legislative authorization for each modification. Legislative language should specifically authorize agencies to update screening parameters, including SOC databases, screening window sizes, and assessment criteria, based on scientific evidence and threat evolution. Following the Administration's previous approach to framework review cycles, Congress should establish a requirement for comprehensive reevaluation of the screening framework every two years, with interim updates as appropriate based on technological developments and emerging threats.

Legislation should also ensure broad regulatory authority over benchtop synthesizers, which represent an emerging challenge for screening implementation. As synthesis technology becomes more accessible through benchtop devices, comprehensive oversight must extend beyond commercial providers to include manufacturers and users of synthesis equipment. This authority should encompass both initial sale restrictions and ongoing monitoring capabilities to prevent circumvention of screening requirements through distributed synthesis activities.

Given the technical complexity and multi-agency nature of synthesis screening, we would appreciate the Administration's clear guidance on where it would like to see nucleic acid synthesis screening oversight housed within the federal structure. Effective implementation requires designated lead authority with appropriate technical expertise, industry engagement capabilities, and coordination mechanisms across relevant agencies including HHS, Commerce, Homeland Security, FBI, and the intelligence community.

To ensure effective implementation of comprehensive screening requirements, OSTP should make clear to Congress via the framework or in communications outside of the framework that Congress should:

- Consider and pass legislation addressing gaps in nucleic acid synthesis screening authority, a priority of the Administration, with proposals introduced in Congress and sent to OSTP within the 180-day timeline established by the Executive Order
- Ensure comprehensive authority over both commercial providers and benchtop synthesis equipment
- Ensure at the agency-level (and codify legislatively) that the entity-wide funding approach to maximize market transformation effects
- Ensure at the agency-level (and codify legislatively) that the research funding screening requirement apply to all federally-funded activities involving synthetic nucleic acid procurement, not just life sciences research
- Include mechanisms for coordinated implementation across relevant agencies with clear lead authority designation
- Provide appropriate funding authorization for screening infrastructure development and ongoing operations
- Establish clear metrics for assessing program effectiveness and regular reporting requirements
- Create adaptive mechanisms for updating screening parameters based on technological developments and emerging threats

3. Address Thorny Challenges Including Split Orders, Benchtop Synthesizers, and International Regulatory Fragmentation

Split Orders: Sophisticated actors can systematically fragment concerning genetic sequences across multiple commercial providers, exploiting screening systems designed to evaluate individual transactions rather than detecting coordinated acquisition patterns. This circumvention strategy leverages the reality that short snippets of nucleotides can be enzymatically assembled into dangerous pathogens, masked via seemingly innocuous transactions. Shortening the minimum screenable fragment length is critical for making such split orders significantly harder to execute. Current screening protocols, while effective against direct acquisition attempts, remain vulnerable to these

distributed procurement strategies that exploit the competitive nature of commercial synthesis markets.

The framework should direct relevant agencies to establish or harness public-private partnerships for a database that enables pattern detection across the synthesis industry without compromising legitimate competitive interests. This infrastructure should aggregate flagged sequences, customer profiles, and emerging pathogenic sequences while maintaining strict access protocols for authorized screening providers. Such systems should employ cryptographic techniques or similar privacy-preserving technologies to enable sophisticated pattern recognition without requiring providers to disclose proprietary customer information to competitors. This approach would preserve market competition while enabling collective defense against coordinated evasion attempts.

Benchtop Synthesizers: The rapid expansion of benchtop nucleic acid synthesis devices represents remarkable technological democratization, while creating significant regulatory challenges. These devices enable direct synthesis of nucleic acid sequences without commercial oversight, professional expertise barriers, or centralized monitoring mechanisms that characterize traditional synthesis markets. While this democratization offers substantial benefits for legitimate research applications, the same accessibility creates opportunities for malicious actors to bypass commercial screening entirely through distributed, unmonitored synthesis activities.

The framework should require manufacturers of benchtop synthesizers to implement comprehensive embedded security measures that cannot be circumvented by end users. These measures should include "phone-home" capabilities that transmit synthesis activity logs to designated monitoring systems, enabling authorities to detect suspicious patterns across distributed device networks. Customer verification protocols should be established at the point of sale, requiring institutional affiliation verification and legitimate use documentation before device activation. Hardware-based sequence screening may be embedded in device firmware to prevent synthesis of a baseline of clearly recognized sequences of concern (i.e., sequences from genes that contribute to pathogenicity or toxicity from biological select agents and toxins), with these security functions implemented at the manufacturing level to ensure they cannot be disabled or bypassed through software modifications.

International Regulatory Fragmentation: The global nature of biotechnology markets creates significant vulnerabilities when regulatory frameworks remain fragmented across jurisdictions, enabling sophisticated actors to exploit weaker oversight regimes through jurisdiction shopping strategies. This regulatory arbitrage threatens both biosecurity objectives and U.S. technological leadership by creating unfair competitive advantages for providers operating under less stringent requirements. Industry stakeholders have consistently emphasized that effective risk mitigation requires regulatory consistency across major biotechnology markets to ensure both security effectiveness and fair competition among responsible providers.

The framework should direct relevant agencies to prioritize international engagement and technical assistance programs that promote global adoption of comparable screening standards. This approach should leverage America's technological leadership and regulatory expertise to establish international best practices while ensuring that coordination efforts strengthen rather than constrain US competitive advantages in biotechnology markets. Coordination efforts should emphasize mutual recognition agreements and regulatory harmonization initiatives that create consistent requirements across major biotechnology markets, with priority given to engaging major biotechnology producers and key strategic partners.

To ensure effective implementation of these three priorities, OSTP should:

- Set a reduced minimum screenable fragment length from 200 nucleotides to a maximum of 50 nucleotides no later than October 13, 2025, which would accelerate the timeline from the Biden Administration's 2026 deadline and significantly improve detection of virulence factors
- Establish dedicated interagency coordination mechanisms with clear lead authority for addressing split order detection, establishing a SOC database to harmonize screening across the industry, benchtop device regulation, and international harmonization efforts
- Develop technical specifications and compliance frameworks for information sharing systems that balance security requirements with competitive concerns
- Require manufacturers of benchtop synthesis devices to implement established security standards by October 2026 as a condition for selling equipment to U.S. government-funded researchers, with legislative provisions extending these requirements to all devices manufactured or sold in the United States as expeditiously as possible

- Require an agency to create a certification processes for benchtop synthesis devices that validate embedded security measures while supporting innovation in legitimate applications
- Establish regular assessment mechanisms to evaluate the effectiveness of implemented measures and adapt to evolving threat landscapes
- Encourage appropriate funding authorization for information sharing infrastructure development, international technical assistance programs, and compliance support systems
- Designate a federal agency by October 2026 to establish and maintain a coordination mechanism for the gene synthesis industry, with legislative appropriations specifically allocated for a government services contract to ensure ongoing implementation of screening coordination activities.
- Support a dedicated diplomatic effort by the Administration to promote and pursue harmonized gene synthesis screening requirements internationally, leveraging U.S. technological leadership to establish global standards and coordinate multinational implementation frameworks.

4. Deploy AI-Powered Screening to Counter AI-Enhanced Evasion Techniques

Traditional sequence-based screening systems remain vulnerable to sophisticated AI-enabled evasion techniques that can generate novel sequences with dangerous biological functions while evading database matching protocols. Adversaries increasingly leverage machine learning tools to design pathogenic variants with low sequence similarity to known threats, effectively circumventing current screening approaches that rely primarily on homology searches against established pathogen databases. These AI-designed variants pose significant challenges to existing biosecurity frameworks, as they may retain harmful functionality while appearing benign to conventional screening algorithms.

The framework should direct relevant agencies to establish public-private partnerships that harness American AI capabilities for defensive biosecurity applications. These partnerships should focus on developing machine learning algorithms capable of recognizing dangerous biological functions even in AI-designed variants that show

minimal sequence similarity to known threats. Such systems should employ predictive modeling approaches that assess functional properties rather than relying solely on sequence homology, enabling detection of novel pathogenic mechanisms that traditional screening might miss.

Implementation should leverage IARPA-style challenge programs and the use of innovative financing mechanisms that Director Kratsios has highlighted to incentivize breakthrough innovations in AI-powered screening technologies. These programs should encourage the development of advanced screening capabilities that can adapt to emerging evasion techniques and identify previously unknown functional threats. In particular, ARI would appreciate greater innovation with respect to non-homologous screening mechanisms. This approach ensures that U.S. companies benefit from superior AI screening capabilities while establishing American AI solutions as the global benchmark for biosecurity.

To ensure effective deployment of AI-powered screening capabilities, the framework should:

- Use challenge competitions, prizes, and more to incentivize development of advanced screening technologies capable of detecting AI-designed evasion attempts (especially non-homologous screening methods)
- Develop public-private partnerships that leverage American AI leadership for defensive biosecurity applications while supporting commercial innovation
- Establish regular assessment mechanisms to evaluate screening effectiveness against evolving AI-enabled evasion techniques and emerging biological threats
- Encourage Congress to establish dedicated funding programs for AI-powered biosecurity screening research and development, with emphasis on functional prediction capabilities