AMERICAN INSTITUTE FOR MEDICAL AND BIOLOGICAL ENGINEERING

AIMBE

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American Institute for Medical and Biological (AIMBE) Response to the NIH-Wide Strategic Plan Framework

Priority 1: Research Areas

The American Institute for Medical and Biological Engineering (AIMBE) applauds NIH's continued commitment to advancing foundational knowledge, preventing disease, and accelerating interventions and cures. To ensure that the United States remains the global leader in biomedical innovation, NIH's next strategic plan should more explicitly recognize engineering and technology development as foundational drivers of discovery across all mission areas.

Biomedical engineering, imaging, computational modeling, device development, artificial intelligence, biomaterials, and advanced diagnostics are not confined to a single disease area or organ system. Rather, these enabling technologies underpin progress across the entirety of the NIH enterprise. From precision medicine and regenerative therapies to wearable diagnostics and AI-enabled clinical decision support, engineering innovations are accelerating scientific breakthroughs and improving patient outcomes in every institute and center. Biomedical engineering is a remarkably broad discipline, encompassing drug delivery, biomaterials, mechanobiology, synthetic biology, tissue engineering, regenerative medicine, and fundamental engineering approaches to disease prevention and treatment, among many others. A more expansive cross-institute framework that reflects this breadth would better serve the field and ensure that NIH's investment in engineering innovation keeps pace with its full scope, impact, and potential.

AIMBE strongly encourages NIH to elevate engineering as a cross-cutting strategic priority that supports all three research goals within Priority 1. Specifically, NIH should:

- Explicitly recognize engineering and physical sciences as essential partners in biomedical discovery and translation;

- Expand support for convergent research integrating engineering, biology, computer science, materials science, and clinical medicine;
- Promote the development of engineering solutions that advance human health, from next generation imaging, sensing, and diagnostic technologies that enable earlier disease detection, to fundamental therapeutic and treatment strategies that address disease at its root.
- Advance AI-enabled tools for biomedical research;
- Prioritize translational engineering approaches that accelerate movement of discoveries from laboratory to patient care.

AIMBE also encourages NIH to leverage the unique role of the National Institute of Biomedical Imaging and Bioengineering (NIBIB) as a catalyst for innovation across the NIH ecosystem. While NIH institutes are necessarily organized around diseases and body systems, engineering solutions transcend these silos. NIBIB's expertise in biomedical imaging, devices, computational science, and bioengineering positions it to serve as a strategic integrator and technology incubator across NIH. As the NIH institute charged with advancing engineering and technology development, NIBIB is uniquely positioned to help coordinate cross-cutting initiatives that benefit the entire biomedical research enterprise.

NIH should strengthen mechanisms for cross-institute collaboration led or coordinated by NIBIB, including shared initiatives in artificial intelligence, digital health, precision diagnostics, and translational technologies that bridge research discoveries and direct patient treatment, among others.

Finally, AIMBE encourages NIH to emphasize the importance of sustaining American leadership in biomedical engineering innovation amid growing global competition. Engineering-driven advances have historically fueled U.S. leadership in medical technology, biotechnology, and health innovation. Continued investment in engineering-enabled biomedical research is critical not only for improving health outcomes, but also for supporting economic competitiveness, national security, and the nation's innovation infrastructure.

Priority 2: Research Capacity

AIMBE strongly supports NIH's focus on developing and sustaining a robust interdisciplinary research workforce and research infrastructure. Achieving the ambitious scientific goals outlined in the NIH strategic framework will require a workforce and infrastructure ecosystem that fully integrates engineering, computation, and data science with biomedical and clinical research.

Modern biomedical discovery increasingly depends on interdisciplinary teams that combine expertise in engineering, medicine, biology, computer science, physics, chemistry, and mathematics. Yet traditional funding structures, training pathways, and review processes often remain siloed by discipline. NIH's strategic plan should explicitly prioritize interdisciplinary and convergent research models that support collaboration across scientific domains.

To strengthen research capacity, NIH should:

- Expand interdisciplinary training programs that integrate engineering and biomedical sciences;
- Increase support for clinician-engineer training pathways;
- Promote workforce development in emerging areas such as artificial intelligence, biomedical data science, imaging science, medical device development, computational biology, and other areas that promote technology-driven biomedical research;
- Encourage review structures and funding mechanisms that appropriately evaluate interdisciplinary and technology-driven research;

AIMBE also urges NIH to prioritize investments in shared research infrastructure and enabling technologies. State-of-the-art instrumentation, imaging systems, high-performance computing resources, AI infrastructure, advanced fabrication facilities, and interoperable data ecosystems are increasingly essential for conducting competitive biomedical research.

Importantly, NIH should recognize that engineering infrastructure serves the entire biomedical research community. Investments in imaging platforms, biofabrication facilities, computational modeling resources, and translational engineering cores create multiplier effects that benefit numerous disease areas simultaneously. NIH should therefore incentivize shared-use infrastructure models and cross-institute coordination to maximize efficiency and accessibility.

AIMBE further encourages NIH to strengthen support for translational ecosystems that bridge early-stage innovation and clinical implementation. Many transformative biomedical technologies face significant barriers in scaling, regulatory navigation, manufacturing, and commercialization. Expanded support for translational research centers, public-private partnerships, and entrepreneurship programs would help accelerate the delivery of innovations to patients and communities.

NIH should also ensure that the next generation of researchers is equipped to responsibly leverage rapidly evolving technologies, including generative artificial intelligence and advanced computational tools. Training in ethical AI use, reproducibility, cybersecurity, and data stewardship should become core components of the biomedical research workforce.

Finally, maintaining U.S. leadership in biomedical innovation requires sustained federal investment in both people and infrastructure. Strategic investments in engineering-enabled biomedical research capacity will strengthen America's ability to respond to emerging health challenges, drive economic growth, and remain globally competitive in science and technology.

Priority 3: Research Operations

AIMBE supports NIH's commitment to enhancing scientific stewardship, improving decision-making, and fostering public trust in science. As biomedical research becomes increasingly data-driven, collaborative, and technologically sophisticated, NIH's research operations policies must evolve to support innovation while maintaining rigorous scientific standards.

AIMBE encourages NIH to modernize its operational frameworks to better accommodate interdisciplinary research, emerging technologies, and new modes of scientific collaboration. Administrative and policy structures should facilitate, rather than impede, responsible innovation.

One important area requiring modernization is NIH policy regarding generative artificial intelligence. The consensus among scientific journals is to allow the use of generative AI in the preparation of manuscripts, provided that its use is appropriately disclosed. This approach has been adopted by major publishers including Springer, Nature, Wiley, and others. Some biomedical journals have gone further and do not require disclosure provided authors stand by the accuracy and integrity of their work, including the Journal of the American College of Cardiology.

Yet, NIH maintains an outdated policy prohibiting all use of generative AI in the preparation of NIH grant applications, despite the widespread use of AI tools by NIH peer reviewers and throughout the broader scientific enterprise. AIMBE urges NIH to recognize the value that generative AI can provide in improving the quality, creativity, accessibility, and efficiency of NIH proposals when used responsibly.

Early concerns that generative AI could lead to an unmanageable flood of AI-generated applications have been substantially mitigated by NIH's implementation of the six-application submission limit instituted last year. Rather than prohibiting these tools outright, NIH should establish clear guidance for responsible use, transparency, accountability, and investigator oversight.

More broadly, NIH should leverage AI and advanced analytics to improve agency operations, portfolio analysis, peer review efficiency, and identification of emerging scientific opportunities.

AI-enabled approaches can strengthen strategic planning, reduce administrative burden, and enhance the effectiveness of taxpayer investments.

AIMBE also encourages NIH to continue improving transparency and consistency in peer review, funding decisions, and research prioritization. Interdisciplinary and engineering-focused proposals often face challenges within traditional review structures that may lack appropriate technical expertise. NIH should ensure that review panels include sufficient engineering, computational, and translational expertise to fairly evaluate innovative cross-disciplinary research.

Finally, fostering public trust in science requires sustained engagement, transparency, and demonstrated impact. NIH should continue emphasizing reproducibility, data sharing, ethical technology development, and public communication while highlighting how federally funded research improves patient outcomes, strengthens the economy, and advances American leadership in science and innovation.