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Developing a Strong Future Engineering Workforce

Roadmap for U.S. Policymakers

Founded in 1880, ASME is a not-for-profit professional organization representing more than 72,000 members worldwide¹. Through codes and standards, peer-reviewed publications, conferences, continuing education, and professional development programs, ASME supports collaboration, knowledge sharing, and workforce development across the engineering enterprise—advancing technical innovation, public safety, and U.S. economic competitiveness.

The United States is experiencing an inflection point in engineering-driven innovation. Mechanical engineering alone employs more than 293,000 professionals nationwide and is projected to add 26,500 jobs over the next decade—an increase of 9% compared to 3% across all occupations². The manufacturing sector remains the largest employer of mechanical engineers (approximately 45%), even as it modernizes and reshapes supply chains, re-shores production, and integrates advanced digital and automation technologies.

Private enterprise will continue to lead innovation and commercialization, but the federal government plays a distinct and essential role: fostering innovation, reducing risk, sustaining long-horizon R&D, and building the talent pipelines required for national competitiveness and public safety. Federal policy must recognize the capital-intensive, interdisciplinary nature of engineering and basic science; support multiple pathways for technology transition; promote regulatory environments that enable responsible commercialization; and sustain a well-educated, technically sophisticated workforce capable of adapting rapidly to transformative technologies, including artificial intelligence.

ASME recommends a coherent, multi-year federal policy agenda organized around five pillars:

1. **Scale Regional Innovation & Workforce Ecosystems:** Provide multi-year funding for regional engineering innovation hubs that connect universities, community colleges, national laboratories, and manufacturers; incentivize shared

¹ <https://www.asme.org/about-asme>

² U.S. Bureau of Labor Statistics, *Occupational Outlook Handbook, Mechanical Engineers* (2024–2034 employment projections).

infrastructure (testbeds, prototyping, standards development); and prioritize regions with existing federal research assets to accelerate tech transfer and workforce development³.

2. Modernize Education & Training Pathways for the Digital-Physical Future:

Expand experiential learning (co-ops, apprenticeships, technician-to-engineer “bridge” programs), align curricula with industry-validated competencies (e.g., GD&T, CAD/CAM, robotics, AI/ML-integrated design), and enable short-term, high-quality credentials with rigorous quality assurance. ASME's [Accelerating Engineering Pathways \(AEP\) initiative](#) demonstrates how community colleges can combine hands-on learning, mentorship, work-based learning, and employer-aligned preparation to strengthen student persistence and career readiness.

3. Leverage Digital Research Platforms & Distributed Participation: Expand remote access to scientific instrumentation, virtual collaboration tools, and shared cyberinfrastructure; connect geographically dispersed learners and researchers—including community colleges, minority-serving institutions, and rural universities—to national laboratories and federal research networks.

4. Integrate Scientists, Engineers, and Skilled Technical Workers: Fund interdisciplinary, team-based research that explicitly integrates scientific, engineering, and technical expertise; support continuing education and upskilling for incumbent workers; and promote national coordination around standards, manufacturing readiness benchmarks, and test protocols.

5. Measure What Matters & Invest for Impact: Maintain a comprehensive inventory of federally sponsored STEM education and workforce programs with transparent outcomes and assessments; set clear performance metrics for federal investments; and scale what works through merit-reviewed, cost-shared partnerships.

ASME stands ready to partner with Congress and the Executive Branch to implement these recommendations and to advance the resilience, inclusivity, and global leadership of the U.S. engineering workforce.

Why Federal Action Is Urgent Now

A rapidly transforming skills landscape being reshaped by AI. Engineering workplaces are being reshaped by AI/ML driven design tools, pervasive CAD/CAM and simulation, robotics, additive manufacturing, and digital twins. CAD and design tools appear in roughly three-quarters of engineering job postings, reflecting their centrality to employability.

³ <https://www.apprenticeship.gov/sites/default/files/Education-20260501.pdf>

Precision-driven competencies such as Geometric Dimensioning and Tolerancing (GD&T) remain essential to ensure quality and interoperability across increasingly interconnected production systems. Engineers must be adaptable, digitally fluent, and multidisciplinary.

Economic and national security stakes. Engineering-intensive sectors underpin core public goods—critical infrastructure, energy reliability, advanced manufacturing, medical devices, aerospace, and defense. A shortage of talent in these areas slows technology adoption, constrains domestic manufacturing capacity, and increases dependencies on fragile supply chains.

Geographic opportunity. The United States has made significant recent investments in place-based innovation. To maximize returns, workforce development must be co-designed with research and commercialization strategies and be tailored to regional industry needs - especially in communities proximate to federal assets such as national laboratories, federally funded research and development centers (FFRDCs), and testing ranges. ASME's AEP experience also demonstrates the value of community colleges as regional access points when workforce programs are tailored to institutional and employer needs.

ASME will continue to:

- Develop and disseminate standards that enable safety, interoperability, and efficient commercialization.
- Provide world-class continuing education and professional development, including registered apprenticeship programs⁴, GD&T certification training, and other high-demand skill competencies.
- Convene cross-sector partnerships to align education, research, and industry needs with AI-enabled digital engineering.
- Expand Community College Engineering Pathways (CCEP) and continue ASME's commitment to the [Accelerating Engineering Pathways \(AEP\) initiative](#) by scaling community-college partnerships, mentorship, faculty development, and employer-aligned work-based learning to broaden access and accelerate on-ramps into engineering and skilled technical roles.

The state of mechanical engineering—and the broader engineering enterprise—is strong and growing, fueled by rapid technological change and expanding national priorities⁵. To meet this moment, the United States must invest strategically in regional ecosystems,

⁴ <https://www.asme.org/asma-programs/workforce-development/met-apprenticeship-program>

⁵ <https://www.asme.org/topics-resources/content/demand-and-salaries-grow-for-mechanical-engineers>

modernize education and training, leverage digital platforms for distributed participation, integrate cross-functional teams, and measure outcomes with rigor.

With coordinated federal leadership and sustained public–private partnerships, the nation can build a resilient, inclusive, and future-ready engineering workforce that secures U.S. economic competitiveness and public safety. ASME stands ready to partner with policymakers to make this vision a reality.