

U.S. Senate Committee on Commerce, Science and Transportation

Hearing on

“Developing Next Generation Technology for Innovation”

Testimony of Tim Archer

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Madam Chair, Ranking Member, and Members of the Committee:

Thank you for the opportunity to appear before you today.

I am Tim Archer, President and CEO of Lam Research, one of the world’s largest semiconductor manufacturing equipment companies. Simply put, Lam Research makes the machines that make the chips. With more than 16,000 employees worldwide, we manufacture equipment at facilities in California, Oregon, Ohio, representing and elsewhere around the world (with 67% of our manufacturing footprint in the U.S.) and conduct groundbreaking research and development in our advanced U.S. labs.

We are a world leader in developing state-of-the-art manufacturing equipment that brings together diverse disciplines such as plasma physics, materials science, advanced robotics, and artificial intelligence to create nanoscale semiconductor fabrication solutions. The complex machines we develop enable semiconductor manufacturers to produce sophisticated integrated chips in high volume.

I would like to thank you and others in Congress for the vision and resolve you have shown toward addressing both the challenges and opportunities facing the U.S. semiconductor industry. While recent events—including chip shortages—put a spotlight on the challenges, I would like to stress that U.S. leadership in semiconductor manufacturing technology is strong. With fabs in 18 states, semiconductors are America’s fourth-largest export.¹ The industry employs over 270,000 Americans directly, with an additional 1.6 million employed indirectly in related and adjacent fields.² The U.S. competitiveness is rooted in the innovation, drive, and resourcefulness of American companies and workers across the semiconductor ecosystem. And I am proud of the role that Lam Research and our employees have played for more than four decades in setting the pace for innovation and in maintaining U.S. leadership in the global market.

Today, semiconductors form the foundation of a smarter, faster, and more connected digital world. I believe it is vital that we create a secure and resilient supply of semiconductors while also accelerating innovation ahead of rapidly evolving technological complexity.

¹ See <https://www.semiconductors.org/wp-content/uploads/2021/10/CHIPS-FABS-Hill-handout-oct-2021.pdf>

² See <https://www.semiconductors.org/wp-content/uploads/2021/10/CHIPS-FABS-Hill-handout-oct-2021.pdf>

Congress recognized the importance of both supply and innovation and is taking bold and decisive steps to strengthen the semiconductor ecosystem through the CHIPS Act, which will fortify our supply chain, workforce, and domestic research and development. I believe this partnership of industry and government—with American workers and ingenuity at its heart—will contribute to U.S. leadership in semiconductor technology well into the future. As you work on this and other related efforts to support our ecosystem, I would highlight three areas that could benefit from your continued consideration.

Supporting an “all-of-ecosystem” approach

The current shortage of chips highlights the vital role of semiconductors throughout the entire economy—including aerospace, automobiles, communications, defense systems, information technology, manufacturing, healthcare, and other industries. It also highlights the complex and interdependent nature of the semiconductor ecosystem and the need for sustained investment by companies throughout the supply chain.

To ensure a secure, and resilient supply of semiconductors, government and industry must take a holistic view of the value chain. Of critical importance, the CHIPS Act creates a new federal policy to incentivize domestic semiconductor manufacturing through the Commerce Grant Program. The program will incentivize new U.S. fabs to meet the growing global demand for semiconductors. The U.S. currently has a robust semiconductor manufacturing base. However, the cost of building and operating a fab in the U.S. is now 20 to 40% higher than in other countries. As other global markets invest heavily in manufacturing, the Commerce Grant Program will act as a force multiplier for U.S. investment, ensuring that our industry can expand to meet accelerating global demand and maintain our technology leadership.

These new fabs will depend on semiconductor manufacturing equipment and materials. A shortage of the necessary tools would hobble production, limiting the impact of taxpayers’ investment, and ultimately pose a setback to U.S. leadership in the industry. A Grant Program with the flexibility to provide incentives across the entire value chain will increase resiliency and maximize the output and efficiency of expanded U.S. production.

Finally, a Commerce Grant program accounting for the whole of the semiconductor ecosystem will ensure we are able to grow, train, and retain a skilled national workforce that will power our competitiveness for decades to come. Lam Research has increased our workforce in the U.S. by over 45% in the past two years alone, adding more than 3,500 jobs, including high-paying research and advanced manufacturing jobs at our facilities in California, Oregon, and Ohio. However, in the manufacture of our equipment, we also rely on hundreds of American suppliers, many of whom are struggling to keep up with the rapid pace of growth while dealing with the lingering effects of the pandemic and a tight labor market. We are grateful policymakers recognize these challenges and intend to support the industry comprehensively through the Commerce Department’s Grant Program, established in the CHIPS Act, as well as through important R&D programs like the Investment Tax Credit found in the FABS Act. We urge Congress to act quickly to pass these measures in support of the entire domestic ecosystem.

Leveraging existing infrastructure

Together, government and industry can leverage existing infrastructures that have a history of driving technology development. Policymakers have rightfully identified that partnerships with academia and with the National Labs provide extensive capabilities and expertise critical to any collaborative innovation strategy. In our area, plasma research is particularly key to the future of semiconductor tool development, with potentially huge applications and across energy, transportation, cybersecurity, defense, and countless other sectors. Several of our National Laboratories have sterling records of pioneering work in this area. We are grateful to see legislative proposals such as the Microelectronics Research for Energy Innovation Act move forward to streamline coordination and better deploy federal resources, including the National Labs, to sustain these partnerships.

Enabling shared innovation

Lam invests \$1.5 billion annually in research and development (R&D), over 90% in our world-class facilities in the United States and we hold more than 8,000 patents globally. Since 2015 we have funded over 160 research projects with 50 leading universities focused on addressing industry challenges. The transfer of revenue into R&D has been the key to Lam's success for more than 40 years. One example, Sense.i™ is a completely transformed plasma etch technology and system solution. The self-aware platform powered by our Equipment Intelligence® technology, using AI and machine learning is the most innovative of its kind.

While Lam and others in the industry make significant individual investments to maintain and grow technology leadership, we believe there is an outstanding opportunity to strengthen U.S. competitiveness by bringing together industry, government, academia, and the National Labs in a centralized and collaborative space to enable shared innovation. The establishment of the National Semiconductor Technology Center (NSTC) will provide a new pathway to sustaining technology leadership by creating opportunities to explore new concepts and quickly transition breakthrough technologies to the production line. The concentration of energy, resources, networks, and opportunity in the NSTC will also help to attract and train the next generation of innovators, strengthening yet another link in the supply chain: our workforce.

Closing

Those of us in the semiconductor ecosystem prioritize innovation, competitiveness, collaboration, and supply chain security—as you do. We appreciate the opportunity to work together on these issues and look forward to collaborating on the important objective to maintain our technology leadership in this critical global industry.