

Written Testimony from the  
**Semiconductor Industry Association**  
Regarding  
**“Countering China: Ensuring America Remains the World Leader in Advanced  
Technologies and Innovation”**

Hearing by the House of Representatives Committee on Oversight and Government Reform,  
Subcommittee on Information Technology  
September 26, 2018

The Semiconductor Industry Association (SIA) appreciates the opportunity to testify before this Committee regarding one of the most pressing challenges facing our nation today: how to maintain America’s leadership position in advanced technologies in light of strengthened international competition, particularly from China. China is the largest market for the U.S. semiconductor industry. At the same time, SIA and many other industry groups have concerns with China’s policies and practices that threaten IP and distort market access.

SIA is the voice of the U.S. semiconductor industry, one of America's top export industries and a key driver of America’s economic strength, national security, and global competitiveness. Invented right here in America, semiconductors are the building blocks upon which U.S. technological leadership rests, powering virtually all modern electronics used in communications, computing, transportation, health care, energy, and military systems, along with many other sectors at the forefront of U.S. competitiveness.

- U.S. chipmakers lead the world with close to half of the \$412 billion global semiconductor market.
- Semiconductors are the nation’s fourth largest export, after aircraft, refined oil, and automobiles.
- The U.S. has a global semiconductor trade surplus of over \$6 billion and a semiconductor trade surplus with China of \$2 billion in 2017.<sup>1</sup>
- Nearly half of the manufacturing operations of major U.S. semiconductor firms are located here in the United States, across 19 states, directly employing close to 250,000 workers with well-paying jobs and supporting over one million additional indirect jobs throughout our economy.
- The U.S. semiconductor industry is one of the most research-intensive industries, investing 18.7 percent of revenue annually in research and development (R&D) -- the second-highest rate of any U.S. industry in 2017.

As the world’s largest exporter of electronic goods powered by semiconductors, China is a critical market for many U.S. semiconductor companies. In 2017 alone, China exported \$600

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<sup>1</sup> Official U.S. government trade data, U.S. Department of Commerce, obtained from the U.S. International Trade Commission, Dataweb: <https://dataweb.usitc.gov/>.

billion in electronic goods powered by semiconductors, representing nearly one third of all Chinese exports.<sup>2</sup> This includes over \$140 billion in personal computers and nearly \$220 billion in smartphones produced in China in 2017.<sup>3</sup> Correspondingly, China is the fastest growing and single-largest market for semiconductors, accounting for about one third of global semiconductor sales in 2017. Unsurprisingly, it is also a leading destination for U.S. semiconductor exports. Today, the U.S. semiconductor industry is the leader in the China market, capturing a little over half of China market sales in 2017, totaling \$66.4 billion. This is the largest market share the U.S. industry enjoys in any region.<sup>4</sup> Thus it is critical that U.S. semiconductor companies are able to access the China market and continue to do business there. At the same time, SIA companies face a growing number of Chinese government policies and practices that threaten IP, market access, and the competitiveness of U.S. semiconductor companies.

## **I. Chinese Government Forced Technology Transfer, IP Theft & Import Substitution Practices**

The U.S. semiconductor industry invests nearly \$36 billion in research and development annually. So protecting the fruits of this research is critical to our competitiveness. In particular, we are concerned with Chinese actions, policies, and practices that force the transfer or outright theft of U.S. semiconductor technology.<sup>5</sup> Numerous official policy pronouncements and statements by senior Chinese government officials reveal an intent to use government measures to force the transfer of IP and technology and engage in import substitution (replace imports of foreign products with domestic technology).

- 1) The Chinese government, in conjunction with state-owned or state-influenced electronics companies, applies informal pressure on foreign technology suppliers to transfer technology as condition of access to the large and growing Chinese market.
- 2) Chinese cybersecurity rules and measures either require the direct disclosure of intellectual property, and/or put tremendous pressure on foreign tech firms to find local partners to help them comply with these rules.
- 3) Some in the industry face challenges due to economic espionage. Indeed, a report by the U.S. intelligence community noted that “China has expansive efforts in place to acquire U.S. technology to include sensitive trade secrets and proprietary information.”<sup>6</sup> Unfortunately, a small number of Chinese government or state-owned institutions, and/or individuals acting on their direction, may choose to steal or misappropriate the targeted technology from foreign firms as a short-cut to developing the technology.

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<sup>2</sup> General Administration of Customs, People’s Republic of China, found at: [http://www.gov.cn/xinwen/2018-01/12/content\\_5255987.htm#1](http://www.gov.cn/xinwen/2018-01/12/content_5255987.htm#1).

<sup>3</sup> Ministry of Industry and Information Technology of the People’s Republic of China, found at: <http://www.miit.gov.cn/n1146312/n1146904/n1648373/c6048688/content.html>.

<sup>4</sup> U.S. total exports of semiconductors in 2017 were \$44 billion, of which \$5.9 billion go to China directly. Due to global supply chains and the prominence of the fabless-foundry business model, most U.S. semiconductors are not sold or shipped directly to China.

<sup>5</sup> For a more detailed assessment of semiconductor industry challenges in China, please refer to SIA’s “Written Comments to USTR Regarding the Initiation of a Section 301 Investigation into China’s Acts, Policies and Practices Related to Technology Transfer, Intellectual Property, and Innovation.” October 5, 2017. <https://www.regulations.gov/document?D=USTR-2017-0016-0057>

<sup>6</sup> <https://www.dni.gov/files/NCSC/documents/news/20180724-economic-espionage-pub.pdf>

## **II. China's Semiconductor Industrial Policy & Subsidies**

These policies should be understood within the broader context of Chinese industrial policy for the semiconductor industry. Today, Chinese domestic semiconductor sales only account for five percent of the worldwide market as Chinese firms struggle to compete in any of the advanced semiconductor technology segments. Due to this perceived strategic vulnerability, the government in Beijing set a formidable initiative in motion to build and enhance its own homegrown semiconductor industry.<sup>7</sup> In June 2014, China released the “Promotion of a National IC Industry Development Guidelines,” which call for the development of an entire semiconductor industry ecosystem within China, with the goal of becoming the global leader in all major segments of the industry by 2030.<sup>8</sup> One of the explicit objectives of China’s IC industry promotion effort is to increase its semiconductor industry’s share of the domestic market from the current level of under 20 percent to a minimum of 70 percent by 2025. These Guidelines are consistent with efforts underway in China to indigenize the broader ICT sector and establish so-called “secure and controllable” technologies.

Core to China’s IC promotion efforts are substantial central and local government and/or state-directed subsidies in the form of investment funds, credit lines, or grants designed to build or acquire a leading semiconductor industry. Of course, this kind of government intervention can have serious market-distorting effects. As of September 2018, the central government IC Fund has committed 138 billion RMB (\$21 B USD) to 55 projects. Altogether, an estimated \$90-100 billion in government financial support has been earmarked to support China’s domestic industry. These funds alone demonstrate the Chinese government’s commitment towards boosting its self-sufficiency in semiconductor technology and capturing a greater share of the global market.

## **III. How to Maintain American Technological Preeminence**

To maintain U.S. leadership in the semiconductor industry (and for that matter in other tech industries), the U.S. government needs to develop a comprehensive and appropriately resourced competitiveness and innovation agenda. SIA recommends the following approaches to help make the U.S. a more competitive environment for manufacturing, innovation, exporting our products, and job growth and thereby contribute to maintaining and growing semiconductor technology leadership.

### **A. Eliminate Tariffs on Semiconductors**

SIA supports the administration’s goal to address discriminatory and burdensome trade practices of the Chinese government. As stated in our multiple public submissions related to the Section 301 investigation, however, imposing tariffs on semiconductors and semiconductor-related products not only fails to address the problematic Chinese forced tech transfer policies and IP

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<sup>7</sup> China’s Next Target, U.S. Microchip Hegemony. Wall Street Journal, July 27, 2017. Online, Available at: <https://www.wsj.com/articles/chinas-next-target-u-s-microchip-hegemony-1501168303>

<sup>8</sup> China Daily: China Announces Measures to Boost IC Industry. June 26, 2014. Online, available at: [http://usa.chinadaily.com.cn/business/2014-06/25/content\\_17613997.htm](http://usa.chinadaily.com.cn/business/2014-06/25/content_17613997.htm)

theft that is the subject of the investigation, but it undermines U.S. industry and technology leadership.<sup>9</sup>

At present, Chinese companies export almost no semiconductors to the U.S. market. In reality, the vast majority of U.S. semiconductor imports from China are semiconductors designed and/or manufactured in the United States and shipped to China for the final stage of semiconductor fabrication known as assembly, test and packaging. These are low-value processes that add only about 10 percent of the value to the chips. U.S. tariffs on semiconductors misdirect penalties toward the U.S. semiconductor industry, while failing to curtail Chinese discriminatory trade and unlawful IP practices.<sup>10</sup>

We instead call on the Administration to explore more effective approaches and targeted policies, as discussed below.

## **B. Strengthen Multilateral Action with U.S. Allies**

In order to maintain U.S. leadership in the semiconductor industry, the administration and Congress need to work together with allies to adopt and promote a stronger rules-based trading system. Multilateral pressure is one of the few tactics that has historically prompted China to change course. For example, in 2004, China proposed an international standard for wireless security, “Wireless Authentication and Privacy Infrastructure (WAPI).” China subsequently tried to make this standard mandatory for wireless LAN equipment imported for use in China. The U.S. government partnered with the European Commission and Japanese government to compel the Chinese government to stand down, rightly pointing out that its requirements were discriminatory and served as a market access barrier to foreign ICT. Another example of successful multilateral pressure is China’s suspension of its 2009 requirement that all computers sold in China be installed with “Green Dam-Youth Escort” screening software. This Chinese-developed software had clear “censor-ware” capabilities with intrusive surveillance potential. The international business community, rights groups, and NGOs, as well as governments of the United States, Japan, and EU applied intense pressure on numerous fronts. And, the Chinese government suspended the program, which not seen the light day again since then. We encourage the U.S. government to work with its allies in multilateral fora, including the

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<sup>9</sup> 1. SIA’s “Written Comments to USTR Regarding the Initiation of a Section 301 Investigation into China’s Acts, Policies and Practices Related to Technology Transfer, Intellectual Property, and Innovation.” October 5, 2017.

<https://www.regulations.gov/document?D=USTR-2017-0016-0057>

2. SIA Submission on the Proposed Determination of Action Pursuant to Section 301: China’s Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation. Docket Number USTR-2018-0005. May 14, 2018. <https://www.regulations.gov/document?D=USTR-2018-0005-2555>

3. SIA Submission on the Proposed Determination of Action Pursuant to Section 301: China’s Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation. Docket Number USTR-2018-0018. July 20, 2018. <https://www.regulations.gov/document?D=USTR-2018-0018-0538>

4.. SIA Submission on the Proposed Determination of Action Pursuant to Section 301: China’s Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation. Docket Number USTR-2018-0026. September 6, 2018. <https://www.regulations.gov/document?D=USTR-2018-0026-6032>

<sup>10</sup> See SIA Submission on the Proposed Determination of Action Pursuant to Section 301: China’s Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation. Docket Number USTR-2018-0018. July 20, 2018.

Government Authorities Meeting on Semiconductors (GAMS) to press China to changes its unfair practices related to IP theft and forced technology transfer, and increase transparency.

### **C. Enforce China's International Commitments**

While SIA supports efforts to strengthen WTO rules, the GATT and WTO disciplines remain reasonably effective, but not sufficiently enforced. There is a widespread lack of compliance by China on the subsidies front with the transparency, notification, and surveillance obligations in Part VII of the WTO Subsidies Agreement, and an accompanying lack of enforcement by the Subsidies and Countervailing Measures Committee and their respective domestic trade authorities. SIA, through the U.S. Information Technology Office in China (USITO) has provided more details on China's IC subsidies to USTR in response to the Federal Register on China's Compliance with its Accession Commitments to the WTO.

### **D. Strengthen Protection of IP**

The U.S. government should press China to adopt policies and engage in stronger IP enforcement to prohibit and penalize state or state-owned enterprises (SOEs) from misappropriating trade secrets or proprietary technologies through activities related to the hiring of overseas talent. This should include initiation of a public and transparent national audit by China's IPR enforcement agencies into current hiring practices within China's state-owned semiconductor firms, with a commitment to prosecute any and all identified illegal activity and verified execution of that commitment. Patent and trade secrets disputes should be adjudicated by Chinese courts in a fair and impartial process that does not favor domestic companies over foreign companies. To help drive toward these objectives, the U.S. and China should create an annual review mechanism to ensure third-party review of any disputes that allege discriminatory rulings.

### **E. Ensure a More Competitive Policy Environment in the U.S.**

Our global competitors are investing and working actively to grow their own semiconductor industry, and the U.S. needs to adopt policies that will enable U.S.-based companies to run faster and compete more effectively. Three ways the U.S. can increase domestic competitiveness include:

- ***Increase Federal Investment in Research*** – Federal investment in research has played a critical role in supporting America's technology leadership and our national security. The semiconductor industry is unique in its sustained partnership with civilian and defense research agencies over decades to invent and develop enabling technologies that help address critical national security needs and have led to ubiquitous commercial products and systems that underpin our nation's growth and productivity. Federal investment in basic research is supplemented by the semiconductor industry's huge investment in applied R&D, amounting to nearly \$36 billion (approximately one-fifth of revenue, among the highest of any industry). This investment depends on precompetitive university research to provide the fundamental advances. While the U.S. has long been the leader in semiconductor R&D, federal

investment in this area is not keeping pace with nation-state competitors who are poised to challenge U.S. leadership in the coming years. The U.S. should significantly increase its investments in research in semiconductor-related fields, conducted at American universities and national labs and in collaboration with the semiconductor industry. Funding basic research at America's colleges, universities, and national labs plays a critical and equally important role in supporting the "pipeline" of talent for the next generation of semiconductor innovators, thereby strengthening America's technology workforce.

- ***Strengthen America's Semiconductor Workforce*** – The success of the U.S. semiconductor industry is due to the talent and skills of our workforce. America's technology leadership is dependent on our country's ability to develop and attract the best technologists and engineers in the world. SIA calls on the administration to take action to ensure the U.S. workforce remains the best in the world, including: (a) incentivizing qualified STEM graduates to work in the U.S. semiconductor industry by, for example, forgiving tuition loans for such graduates; (b) increasing long-term funding for STEM education in primary and secondary schools as a means of building the American technology workforce of the future; and (c) enacting immigration reforms that expand the number of "green cards" for STEM graduates educated at U.S. colleges and universities, thereby enabling the semiconductor industry to attract and retain the best and brightest from around the world.
- ***Implement Appropriate and Balanced Export Controls*** – SIA strongly believes U.S. national security and economic competitiveness interests are most effectively advanced by an export control system that focuses on national security and foreign policy as the exclusive bases for U.S. dual-use controls. In order to avoid unduly controlling non-sensitive, commercial semiconductor technology, SIA encourages the regular review of U.S. export controls to ensure that regulations remain up-to-date, reflect the current state of semiconductor technology, and are properly tailored to national security objectives. SIA also encourages the U.S. government to advance multilateral export controls adopted by all major semiconductor-producing nations, rather than unilateral controls only applied to U.S. companies that generally fail to restrict the transfer of emerging and foundational technology developed outside the United States. Multilateral controls are also necessary to avoid putting U.S. technology companies at a competitive disadvantage.

#### **IV. Conclusion**

The United States is at critical juncture. It is facing intense global competition from China in multiple high-tech sectors, including semiconductors. While our nation continues to dominate leading technologies from semiconductors to aerospace, and the gap with China remains significant, we cannot be complacent with our current leadership. There are real near- and long-term challenges that require closer collaboration between industry and government to ensure we retain our technological leadership in key areas. We need to address China's unfair practices in a targeted, productive way, and at the same time double down on our own technological advantages through increased government investments and other means.



## **John Neuffer, President and CEO, Semiconductor Industry Association**



John Neuffer serves as President and CEO of the Semiconductor Industry Association (SIA). He joined the association in January 2015 and is responsible for setting and leading the public policy agenda. Prior to joining SIA, Neuffer served as Senior Vice President for Global Policy at the Information Technology Industry Council (ITI). Additionally, Neuffer is an executive committee member of the United States Information Technology Office (USITO) in Beijing.

Before joining ITI, he served for over seven years at the Office of United States Trade Representative (USTR) in Washington, D.C.: two years as Deputy Assistant U.S. Trade Representative for Asia-Pacific Economic Cooperation (APEC) Affairs, which was preceded by over five years as Deputy Assistant U.S. Trade Representative for Japan. Prior to his tenure with USTR, he was a Senior Research Fellow and Political Analyst with the Mitsui Kaijyo Research Institute in Japan for nine years. Neuffer lived in Japan 11 years. He is a native of Montana and Washington State.