A VISION FOR THE FUTURE OF SEMICONDUCTOR RESEARCH

Semiconductors – the chips that enable modern electronics – are central to America's economic, technological, and military infrastructure. A recent report by the Semiconductor Industry Association (SIA) and Semiconductor Research Corporation (SRC), *Semiconductor Research Opportunities: An Industry Vision and Guide*, highlights the research needed to advance semiconductor innovation and fulfill the promise of emerging technologies such as artificial intelligence (AI), the Internet of Things (IoT), and supercomputing.

U.S. SEMICONDUCTOR INDUSTRY IS CRITICAL TO AMERICA'S STRENGTH

The U.S. semiconductor industry is a key contributor to our country's strength. Our industry supports more than one million jobs in America, accounts for over half of the world's chip sales, and is the world's most innovative and technologically advanced manufacturing sector. Semiconductors are America's third-largest manufactured export, after airplanes and automobiles, and about half of U.S. semiconductor companies' manufacturing base is in the United States across 21 states.

INVESTING IN RESEARCH PROMOTES U.S. INNOVATION

The strength of our industry, and the many benefits it provides to our country, are the result of large and sustained investments in research, including federal investment in basic research. University-based, pre-competitive scientific research funded through agencies such as the National Science Foundation (NSF), the National Institute of Standards and Technology (NIST), the Defense Advanced Research Projects Agency (DARPA), and the Department of Energy (DOE) Office of Science has enabled some of the most revolutionary inventions of the last 60 years, including the Internet, the Global Positioning System (GPS), the laser, and the large-scale integrated circuit. To maintain U.S. leadership, this commitment to research must be maintained and strengthened. **The U.S. semiconductor industry supplements government investments by annually devoting about one-fifth of its revenue to R&D, more than any other sector.**

VISION FOR THE FUTURE

The *Vision* report is the culmination of work by a diverse group of industry experts and leaders, including chief technology officers at numerous leading semiconductor companies, who identified 14 areas in which research is essential to progress:

1. Advanced Devices, Materials, and Packaging
2. Interconnect Technology and Architecture
3. Intelligent Memory and Storage
4. Power Management
5. Sensor and Communication Systems
6. Distributed Computing and Networking
7. Cognitive Computing
8. Bio-Influenced Computing and Storage
9. Advanced Architectures and Algorithms
10. Security and Privacy
11. Design Tools, Methodologies, and Test
12. Next-Generation Manufacturing Paradigm
13. Environmental Health and Safety: Materials and Processes
14. Innovative Metrology and Characterization

The *Vision* report comes at a time when the U.S. semiconductor industry faces increasing competition from abroad and mounting costs and challenges associated with maintaining the breakneck pace of putting more transistors on the same size silicon chip. America must rise to this challenge. Industry, academia, and government should collaboratively implement the recommendations outlined in the *Vision* report to explore new frontiers of semiconductor innovation and to foster the continued growth of emerging technologies.

SIA calls on Congress to maintain and strengthen its commitment to funding basic research, which is essential to U.S. economic growth, technological leadership, and national security.