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# The future of the national semiconductor technology center

Scott DeBoer | August 2022

We interact with thousands of semiconductors throughout our day-to-day lives – these tiny ...es of technology are integral to our lives. Ranging from heart pacemakers and cell phones to ... systems and automotive safety features, these miniscule yet massively powerful microelectronics save lives, power homes, store our data and defend our country. In November 2021, the U.S. Congress passed the National Defense Authorization Act (NDAA) calling for the

passage of the Chips and Science legislation, which provides funding for the NSTC. With broad support and funding in place, it is now time to move forward with the establishment and operation of the NSTC.

The NSTC will be a public private-sector consortium focused on enablement of advanced semiconductor technology. It will play a pivotal role in driving U.S. technological innovation and leadership over the long term. Furthermore, it will support the U.S. in refining and accelerating its global technology and semiconductor leadership. The establishment of a Memory Coalition of Excellence (MCOE), as a pillar within the NSTC, is critical for foundational memory technologies and will further enhance American economic competitiveness and national security. The MCOE will bring together industry leaders, academia and national labs further supporting the U.S. in refining and accelerating its global technology and semiconductor leadership. Micron, together with Western Digital, has outlined the criticality of the NSTC and recommendations for the **Memory Coalition of Excellence in the proposal: Memory Coalition of Excellence Recommendations for the National Semiconductor Technology Center**. Below are key excerpts from this report:

# Domestic Semiconductor Manufacturing & The Role of Memory

Over the last twenty years there has been a 'data explosion' in the industry – memory and storage have grown from 10% of global semiconductor industry revenue in the year 2000 to approximately 30% of the industry's revenue today. The ubiquitous nature of memory in electronic systems means that memory cells make up approximately 85% of the entire device count in semiconductor manufacturing. Memory is not only ubiquitous, it is at the leading edge of semiconductor manufacturing, requiring production of advanced technologies that are pushing the laws of physics. Tomorrow's challenges for new memory and storage architectures must reimagine and reinvent how data is moved and stored within and between these electronic and computing systems. And, we now have a historic opportunity to regain global semiconductor leadership through the passage of the Chips and Science legislation and subsequent funding of the NSTC. The establishment of a MCOE will further support sustained domestic memory technology innovation, secure a continued cadence of world leading technological advancements, and ultimately, ensure continued U.S. economic and national security.

# Recommendations: Memory Coalition of Excellence

The NSTC should develop and articulate a long-term (>5 years) vision and roadmap for the future of next generation semiconductor technology. We recommend the MCOE be focused

It is anticipated that the MCOE will seamlessly partner with other envisioned COEs on logic, packaging and interconnect technologies critical to U.S. technology leadership

Some key activities for the MCOE to realize next generation solutions should include:

- Research and development for materials, process/metrology technologies, and new analysis techniques;
- Modeling methodologies and tools;
- Next generation 3D memory technology development;
- New memory design concept enablement;
- Near and/or in memory compute proto-typing;
- Heterogeneous integration at wafer and chip level; and
- Advanced packaging.

Continued improvements in data density, bandwidth capability and power management are the new priorities for the memory and storage industry. By providing foundational capability for AI, 5G and data centers, the creation of the MCOE would spur innovation across multiple industries, including healthcare, automotive, communications and defense.

The world will not wait for us to catch up. For the U.S. to remain the technology leader and globally competitive, the industry needs sustained investment in core research, manufacturing technologies, infrastructure and ecosystems that will be made possible by the NSTC and the Memory Coalition of Excellence.

Read more **here**.

**Scott DeBoer**

Scott DeBoer is executive vice president of Micron's Technology and Products organization. Dr. DeBoer leads Micron's global technology development and engineering efforts – from silicon design to innovative, high-value system solutions.

Micron's technology and products organization focuses on delivering memory solutions by advancing the scaling of current memory technologies, enablement of new memory technology, and integration into memory solutions covering all Micron target markets. The organization encompasses the full innovative capabilities of Micron's engineering teams from silicon technology development, product engineering, memory design and systems engineering, to SSD engineering, firmware, IP, and ASIC development. He was appointed to his current position in 2019.

Dr. DeBoer joined Micron in 1995 as a process technology engineer and has served in a variety of technical and managerial positions leading up to his appointment as vice president of Process R&D in 2007, vice president of Research and Development in 2015, executive vice president of Technology Development in 2017, and executive vice president of Technology and Products in 2019.

Dr. DeBoer holds more than 120 U.S. patents and has authored dozens of technical publications. In addition, he currently serves on the governing council of JUMP/nCORE Research Initiative, and the boards of Hastings College, SRC, Micron Semiconductor Italia S.r.l., and Idaho Business for Education.

Dr. DeBoer completed his undergraduate degree at Hastings College in Hastings, Nebraska. He earned a master's degree in physics and a doctorate in electrical engineering from Iowa State University.

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