Why the U.S. Needs the CHIPS Act: An Open Letter from the Nantero CEO

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Greetings from Nantero: pioneer of carbon nanotube semiconductor technology and U.S.-based memory chip company!

It is with great excitement that we commend the United States Senate for their 63-34 vote on July 19th 2022 confirming the Motion to Proceed to the House Message to Accompany H.R. 4346. This important step sets in motion the procedure to pass the legislation known as the CHIPS Act, which Nantero fully supports as it is essential to American competitiveness and national security. The CHIPS Act and associated funding will strengthen our domestic semiconductor industry and repatriate the ability for breakthrough technologies to make it through the financial "Valley of Death" and onto commercial markets without having to make the decision to leave U.S. shores. The economic power and job creation that will come from this monumental decision will impact not only the needs of current citizens of the United States, but also buttress the financial independence and security of generations to come.

Most Americans are likely not familiar with the massive costs and monopolistic nature of the semiconductor business. They are also likely not aware that "tech" companies like Google, Apple, Facebook, and Twitter are NOT semiconductor companies. What most Americans likely are familiar with are the various benefits and importance of semiconductors, as they are the heart of many electronic components within our smartphones, computers, cars, homes, and virtually everything in our modern lives (as well as our tanks, fighter jets and critical infrastructure). However, even with this limited understanding around the role of semiconductors, the general public does not often see the critical need for this legislation. In contrast, a company such as Nantero has had a 20-year front row seat to the daily struggle as a US-based semiconductor "start-up" company. As a result, we know that this legislation is not only needed, but critical to helping technologies that are invented in the U.S. stay and benefit the U.S.

The flagship of Nantero's business is our memory device called NRAM® (Non-volatile Random Access Memory). NRAM utilizes a carbon nanotube technology (CNT) lattice as the switching mechanism within our memory cell, allowing it to achieve non-volatility in main memory at the same performance and speed of DRAM (which, of course is volatile). While development costs and fab access constraints have defined Nantero's "David and Goliath" struggle with DRAM, we have an extremely viable roadmap that is cost competitive with DRAM within 2 years from the production of our first 16Gb (12nm) DDR5 chip. Additionally, we are designing for the CXL architecture which makes NRAM a very attractive next-generation memory technology for embedded applications. And even more importantly, we have recently achieved 5-sigma on 1T1R memory 300mm wafers (55nm) at 1M cycles for a product we are pursuing with Fujitsu out of the former USJC fab in

Japan. This is a huge milestone in proving the manufacturability of our CNT-based memory.

While Nantero was born within an elite U.S. research institution (Harvard) and nursed within the robust U.S. venture capital markets, it is at risk of being lost overseas at the exact moment our technology is ready to significantly impact the US economy. In fact, NRAM is within that particular “ripened” moment in its technology lifecycle where nation-state-backed funding has historically been deployed to propel proven technologies out of the “Valley of Death” and into a widely successful, world-changing commercial industry that is a source of national pride. For NRAM and Nantero, this moment simply seems to be drifting toward Japan as many Japanese industry giants and the Japanese government have recognized the extremely strong value proposition of NRAM and have recently invested heavily in the technology.

Nantero’s story as described above is commonplace in the U.S. semiconductor industry, and it costs the U.S. trillions of dollars in economic benefit and national security concerns each year. The CHIPS Act is America’s response to these foreign sovereign funds who have been investing in this process for decades, and Nantero is in full support. We applaud the Senate for taking this very important step.

Very respectfully,

Rob Snowberger

CEO, Nantero Inc.