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Co-chair Bynum, Co-Chair Sollman, Co-Vice Chair Knopp, Co-Vice Chair Wallan, and members of the Joint Committee, thank you for the opportunity to testify about the importance of incentivizing the growth of the Oregon semiconductor industry. For the record, my name is Harry Clapsis and I lead government affairs for Ampere Computing. I joined Ampere from the Semiconductor Industry Association (SIA), which represents the U.S. semiconductor industry. At SIA, I was on the team helping Congress draft and fine-tune the original CHIPS Act. At Ampere, I'm responsible for all elements of our work with local, state, and federal governments.

About Ampere:

Ampere Computing is a 5-year-old semiconductor design start-up focused on building high performance, power efficient processors for cloud data centers. Ampere was founded by Renee James, following her lengthy career at Intel where she served as President until 2016. Renee is a long time Oregonian, having lived here since receiving both her undergraduate and graduate education at the University of Oregon. She apologizes that she is unable to join due to an immovable conflict with her own board meeting, but looks forward to speaking with you all in the coming weeks about the importance of this work.

Ampere's Portland site is one of our largest global sites and the home to much of our engineering talent and most of our executive team. Ampere is strongly committed to our Oregon presence, having grown our Oregon headcount exponentially through the pandemic, including leasing three floors of office space in Oregon. Ampere employees earn competitive family wages with market-leading benefits, and I am proud to say that despite a current industry down-turn, we are actively hiring today.

Importance of R&D:

Today I'd like to talk about semiconductor research and development – the foundation of our industry. The semiconductor industry is one of the most research-intensive industries in the world today, with companies investing nearly one-fifth of annual revenue in R&D, amounting to \$50.2 billion in 2021.¹ Ampere is a semiconductor design company, meaning we partner with another company to manufacture the products we design here in Oregon. This partnership allows companies like ours to specialize on research, design, and industrial design prototyping. As a result, semiconductor design companies like ours lead the industry by investing nearly 25% of revenue on R&D.

When we say semiconductor R&D – I'd like to give you all a small sampling of what "R&D" means in our industry. This chip I'm holding right here, called Altra® Max, was made by hundreds of people each putting in thousands of hours – (on average 5 years of R&D) to bring this chip to life. This is a leading edge 7nm part with 30 billion transistors on it. Our 5nm part, with even more transistors, is sampling with customers today. As one example, here in Oregon, we have a team of people researching the arrangement of tens of billions of transistors to build the chip you see here. We also have a team of people researching and developing the software to make sure the server works when you plug this chip in. This is just a small selection of Ampere's R&D teams in Oregon. So when we talk about semiconductor R&D, we're really talking about countless hours spent developing the future, here in Oregon, by employees with Master's degrees and PhDs despite half of our employees being under 30 years old. We are bringing energy, intellectual property, and young, skilled workers to Oregon for these R&D efforts.

But what does this research really mean in practice? How does semiconductor research translate to benefits for the greater population, beyond the jobs that we provide to Oregonians? To answer that – I want to talk more about what Ampere has built in Oregon since our founding in 2017. As a result of the growth of the data economy, our country (and the state of Oregon) has seen the wide proliferation of data centers. Data centers are energy-intensive, with some estimates of global energy consumption ranging from 1-4%, a figure that could grow to 10%.² Ampere's processors, designed here in Oregon, seek to reverse that trend. Deploying Ampere processors means data centers can deliver the

¹ https://www.semiconductors.org/wp-content/uploads/2022/11/SIA_State-of-Industry-Report_Nov-2022.pdf

² <https://www.usnews.com/news/best-states/oregon/articles/2022-05-19/intel-to-build-700-million-data-center-in-oregon>

same or greater performance, but at up to half of the energy consumption. To put a finer point on this, because of research that Ampere undertook in the state of Oregon, data centers of the future will be more energy efficient than today, saving power, water, and real estate.

Oregon's Strength in Research:

In their August 2022 report, Oregon's Semiconductor Competitiveness Task Force highlighted what they found to be Oregon's strengths in the semiconductor industry. Of no surprise to us at Ampere, the task force found Oregon's strengths to be in research and development and the human talent underpinning that research.

Oregon is fortunate to be home to a robust ecosystem in the semiconductor industry – semiconductor manufacturing equipment companies (such as Lam Research), semiconductor design companies (such as Ampere Computing, Lattice Semiconductor), semiconductor manufacturers (Intel, Analog Devices, Microchip), world-class universities (including Oregon State, University of Oregon, Portland State), and more. As a result, Oregon holds 15% of U.S. semiconductor employment, totaling 40,300 jobs.³ And Ampere, as a comparative newcomer to the Oregon semiconductor industry, is committed to growing that number further.

The Need for a R&D Credit:

But to ensure the growth of the Oregon semiconductor industry, and to improve Oregon's competitiveness when it comes to attracting projects eligible for CHIPS Act funding, the state needs to be more competitive when it comes to offsetting the cost differential between doing business here and doing business elsewhere. While others this evening will talk about the need for the other incentives, I want to focus on the need for a state-level R&D tax credit, as called for in the Competitiveness Task Force's recommendations.

As I discussed earlier in my testimony, the U.S. semiconductor industry is incredibly R&D intensive – it's the lifeblood of our industry. Unfortunately, Oregon is one of only thirteen states without a state-level R&D tax credit. More

³ https://www.semiconductors.org/wp-content/uploads/2021/05/SIA-Impact_May2021-FINAL-May-19-2021_2.pdf

importantly – the states with the highest concentration of semiconductor industry workers (incl. Arizona, Texas, California, Florida, and others) and the states dedicated to growing their semiconductor industry (incl. New York) – all have robust state-level R&D tax credits.⁴ For Ampere, restoring and enhancing the R&D tax credit would directly support our existing Oregon workforce and would be a down-payment in growing our Oregon workforce further. Given how important R&D is to chip companies, the R&D tax credit should be a key pillar of the incentives needed to attract CHIPS-eligible projects as well as the longer-term desire to keep Oregon competitive for attracting the growth of the overall semiconductor business - R&D and manufacturing included.

As someone who has spent the last few years working to make this landmark legislation a reality, I've seen first-hand the competition among the states to try and leverage this funding. Working for an Oregon company now, I know that Oregon is already in a very good position to make the most of this opportunity. In the Oregonian last month, Sen. Wyden, our CHIPS champion in Washington, called on the legislature to act quickly to restore and enhance the state's R&D tax credit. I hope this committee can build off Senator Wyden's work in Washington and pass this credit.

Thank you again for the opportunity to testify and I'm happy to answer any questions.

⁴ <https://www.mossadams.com/services/accounting/tax/credits-and-incentives/research-and-development/tax-credits-by-state>