

U.S. Senate Committee on Commerce, Science and Transportation
Securing U.S. Leadership in Emerging Compute Technologies
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Good morning Chair Cantwell, Ranking Member Wicker, and members of the Committee. It is an honor to be invited to testify on this topic today. For the record, I am Dr. Henry Jones, Director of Research Development and Scientific Entrepreneurship at the University of Southern Mississippi (USM).¹ Like most of the 3,000 four-year universities around our country, USM serves local, regional, national and global constituents through our bright students and dedicated faculty and staff. Our nation has a strong, diverse base of institutions like ours that is a source of enormous competitive advantage - if we make the most of it. If instead our policies promote a narrow-minded approach that directs attention to a few big brand name institutions, this national advantage disappears and we lose the resilience of our country's diversity.

I have experienced the opportunities and challenges presented to us by our broad mosaic of a country. As an entrepreneur and investor I have been a part of creating companies in Silicon Valley and Chicago – and in Mississippi and Alabama. I was educated in the public-school system of my small town of 1000 in rural south Mississippi and at a public Mississippi university – before moving west to Stanford University to earn a Ph.D. in Aeronautics and Astronautics. I lived in Silicon Valley during the 90's Dot Com boom, inspiring me to start my first company using science developed in a Mississippi State University lab and our government's Landsat 7 satellite to create cutting-edge commercial products for foresters. From the start of my career, I have seen what academia and government and industry can do together.

What have we learned along the way?

Government has had a tough time keeping up with the pace of technology. The people and processes of industry are built for competition, with Agile, Lean, Product/Market Fit, and other concepts promoting quick iterations that are intensely customer driven. The National Science Foundation (NSF) has introduced these concepts with its I-Corps program² that has spread to the National Institutes of Health (NIH) and the Department of Energy (DoE), and the National Security Innovation Network (NSIN)³ within the Department of Defense (DoD) created the Hacking for Defense (H4D) course⁴ at Stanford which I have been teaching at Southern Miss as Designing Solutions for Defense (DS4D).⁵ USM has implemented these innovation approaches with our partners at the Coastal Data Development program within the National

¹ <https://www.usm.edu/>

² <https://beta.nsf.gov/funding/initiatives/i-corps>

³ <https://www.nsin.mil/>

⁴ <https://www.nsin.mil/hacking-for-defense/>

⁵ <http://ds4d.usm.edu>

Centers for Environmental Information at NOAA,⁶ preparing its 55 Petabytes of data for public, customer-driven analysis. I commend the Committee for supporting the new NSF Directorate for Technology, Innovation, and Partnerships (TIP),⁷ which I believe will accelerate the impact of these and similar programs. I was on a call earlier this week with Jason Calacanis,⁸ one of the most successful Silicon Valley investors in early stage companies, and he listed areas like healthcare and hardware where startups struggle greatly for funding due to bureaucracy and insufficient basic research. I recommend that TIP's Assistant Director Gianchandani contact Mr. Calacanis and other startup experts, to ask for suggestions for how the NSF can change that math.

Unexpected innovations come from unconventional connections. The latest data-driven research in innovation is finding that cross-pollination of ideas from very different fields is how great leaps forward take place. EPSCoR,⁹ the Established Program to Stimulate Competitive Research, enables this type of progress by bringing together universities and their individual innovators and exposing them to unfamiliar concepts in multiple ways. Thank you, Senator Wicker, for your leadership by ensuring that EPSCoR states will receive an increase in NSF funding, which was the action needed to support continued geographic and economic diversity. I believe in this program, too - I serve on a statewide EPSCoR board because it makes sense for our universities to work together. What I observed is that the real potential of EPSCoR is its creation of new relationships, better communications between institutions at the faculty level, and policy changes that align incentives for working together, all to create a long-lasting environment of unconventional collaborations.

In our economic system, the most important resources are Customers and Capital. For this reason, a few large urban areas are understandably attracting more than their share of each. This Committee was on target with the CHIPS and Science Act, in particular the creation of Regional Tech Hubs, to promote the conditions for new concentrations of these resources. Thanks to you, Senator Wicker, and your colleagues here, one third of the 18 new Hubs will include EPSCoR states as a coalition member, and that matters. I have been a Mississippi tech executive pitching for capital on Sand Hill Road, where those investors expected us to move to Silicon Valley as we grew. As these Tech Hubs are created, special consideration should be given to the alignment of capital pipelines, from angel to venture, or else the future Tech Hub success stories will feel that same gravitational pull. Similarly, the Hubs should consider the presence of customers as the driving force for technology adoption, not the location of the technologists, possibly creating 'virtual hubs' for certain types of problems like cybersecurity where the customer environment is primarily online.

Diversity is a national resource for resilience. My friends at the big tech giants like Microsoft and Amazon tell me that those organizations have seen the competitive necessity of a diverse workforce. Conforming cultures lead to groupthink and being blindsided by unconventional

⁶ <https://www.ncei.noaa.gov/>

⁷ <https://beta.nsf.gov/tip/>

⁸ <https://www.linkedin.com/in/jasoncalacanis/>

⁹ <https://beta.nsf.gov/funding/initiatives/epscor>

ideas. These companies are seeking diversity in every dimension it can be achieved, yet are struggling in the most significant area - enough trained U.S. citizens. I am sure we have enough capable U.S. citizens, but we are missing something in the early stages of the educational pipeline. One of my childhood friends is a fourth-generation logger, yet his son is a natural with computer programming - he's a proud nerd. This family doesn't know what a STEM career looks like or how to afford a technical education. Luckily we now have him on a path to maximize his innate skills and interests, but through this experience I'm discovering that there are generational and socioeconomic barriers to STEM futures that can feel insurmountable. Our School of Computing Science and Computer Engineering¹⁰ at USM has recently modified our computer science curriculum to incorporate industry certifications as milestones within our degree programs, in case a student can't put four years of courses together at once. The Center for Military Veterans, Service Members, and Families at USM¹¹ introduces veterans to resources within higher education, and also prompts the academic community to make changes to welcome these high potential students who aren't coming directly from high school. Academia has more innovation we can do.

My biggest fear in regard to securing our leadership in these technologies is that instead of applying the energy and resources to accelerate, that we coast instead. Like a race car driver seeing open road ahead but with no rear-view mirror, we won't know that our competition has passed us until they are out in front. Even then, it takes time to accelerate and catch up - if we can. This hearing, the CHIPS Act, EPSCoR, and the NSF TIP Directorate are the right thing to do - we need to accelerate now. Since I started college 30 years ago, every year I have shared classrooms and workplaces with international colleagues - hard-working, curious, and intelligent. We are all familiar with our trade imbalance, but what about our insight imbalance? Do we have widespread knowledge of what China is doing and can do, in the same way they know about us? Could one of the programs mentioned above, or another one, start sending US citizens to China in much larger numbers to begin to learn from them? That would be the wise action of a leader who wants to stay ahead. How do we get a very clear image in our rear-view mirror, and confidently step on the gas?

Thank you again for this opportunity to speak with you today.

¹⁰ <https://www.usm.edu/computing-sciences-computer-engineering/>

¹¹ <https://www.usm.edu/military-veterans/>