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**Subcommittee on Research and Technology
Committee on Science, Space, and Technology
U.S. House of Representatives
Hearing on “*More Hires, Fewer Hacks: Developing the U.S. Cybersecurity Workforce*”
Merit Network Testimony
Joseph Sawasky, President & CEO, Merit Network
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Introduction

First, I'd like to thank the House Subcommittee and its members for the kind invitation and opportunity to present Michigan perspectives on the critical issue of cyber security workforce development. Our country faces real challenges many millions of times every single day from adversarial organizations, including hostile nation states and criminal enterprises. When defenses fail for U.S. organizations, companies, governmental entities, educational organizations, healthcare systems, manufacturers and others experience major negative impacts to operations - affecting services to citizens and customers.

Quietly and diligently, on the front lines, are our nation's thin ranks of expert and dedicated cyber security professionals. However, according to the National Initiative for Cybersecurity Education (NICE), the U.S. had a shortfall of over a half-million cyber security professionals as of January 2019. According to NICE, in my home state of Michigan, we have over 9,000 vacant cyber security positions now. Estimates of the global cyber security workforce shortage has ranged from 1.5 million to 3 million unfilled positions, with a higher than average annual growth rate in demand for talent.

Cyber represents the next horizon of warfare and crime, and it is essential that our nation nurture, support and grow the pipeline of cyber talent for our country - from K-12 to higher education and through continuing professional development.

Can you describe Merit Network's cybersecurity training programs, such as the Michigan Cyber Range?

The Michigan Cyber Range was created through a collaboration between the State of Michigan, industry, academia and Merit Network beginning in 2012 under then Governor Rick Snyder's administration. It is one of the nation's largest unclassified cloud-based practicum environments for current and aspiring cyber security professionals to test their skills at cyber defense and offense. The Cyber Range features a simulated city called Alphaville, that contains a virtual city hall, school, library, hospital and manufacturing facility, among other simulated servers, systems and networks. In this practice environment, Merit has engaged nearly 4,000 participants from Michigan and other states and countries in cyber exercises and training. Participants span the

spectrum of organizations, representing industry, government, national guard, academia, and healthcare, among others.

Additionally, with the support of the Michigan Economic Development Corporation, Merit has cultivated a statewide ecosystem of training partners, called Cyber Range Hubs, from higher education and K-12, helping them enroll, train and certify students in a variety of cyber security courses using the Michigan Cyber Range platform and its course curriculum.

Beyond the unique Cyber Range collaboration, many Michigan colleges and universities offer traditional degree programs in information assurance, information security and network investigation. These degrees are typically offered within computer science or business information systems programs at two year, four year and graduate levels.

What are the challenges faced by some of your partnering organizations, such as universities, state agencies and nonprofits, in recruiting a skilled cybersecurity workforce?

The primary challenge facing partner organizations is an extremely low supply of available talent. According to NICE, the supply/demand ratio for all jobs in the U.S. is 4.9, but for cyber security positions, that ratio is only 1.9. This low supply results in high demand for employees, higher market salaries and longer-than-average times to fill vacancies. Non-profits have difficulty competing with for-profit organizations for talent, yet they are still charged with protecting enormous amounts of confidential information, advanced research, intellectual property, health information and private financial data.

Non-profit organizations that support a vast array of societal services face the very same cyber threats as other organizations: ransomware attacks, hacking, data breaches and volumetric distributed denial of service - yet their ability to attract and retain cyber professionals is hampered by both the lack of available talent and constraints in offering market compensation for high-demand jobs.

Additionally, finding qualified teachers and trainers for cyber security courses is difficult, compounding the problem for non-profits, educational organizations, and the industry in general.

How is the state of Michigan, along with the Merit Network, working to promote cybersecurity education at the K-12 level? What are the challenges and opportunities to cybersecurity education at this level?

The talent pipeline for cyber security starts in K-12, and it is essential that skill development and awareness of cyber security career opportunities begin at early ages. Given that this field is fairly new and rapidly evolving, there has not been a consistent emphasis in this area for K-12 students or teachers.

Further, the talent pool can be expanded by providing more opportunities and support for under-represented groups, including women and minorities, whose participation in the cyber workforce has been historically low, even though it is clear that much potential exists. By one estimate, women represent only 24% of the cyber security workforce.

It is imperative that we demystify and (to borrow a phrase coined by an executive university colleague in Michigan) “de-nerdify” cyber skills and aptitude for young adults to broaden the appeal of this career path. America needs more cyber defenders to compete and win in this modern digital geopolitical world, and these skills should be recognized and valued by society.

To help promote K-12 awareness and enthusiasm for cyber security opportunities, the State of Michigan engages Merit on an annual basis to conduct the Governor’s High School Cyber Challenge. In each of the past few years, we’ve had over 600 students and over 200 high school teams participate in this challenge - with the top 10 teams being invited to the final contest at the Governor’s North American International Cyber Summit in Detroit. The top three teams are awarded trophies by the Governor, and the community pride, excitement and social media activity for local teams is incredible. Through this event, Michigan has discovered and celebrated K-12 cyber talent in every corner of our great state - urban, metropolitan and rural.

With the support of the Michigan Economic Development Corporation, Merit has also expanded our Cyber Range Hubs to K-12, further building the early talent pipeline through a blended learning model that aims to meet the current demand for workforce skills, and to also serve future industry needs.

Where should Federal and State governments focus future efforts to bolster the cybersecurity workforce pipeline?

Federal and state governments should focus on:

- Developing the talent pipeline early in K-12, beginning with promoting awareness for both teachers and students;
- Providing financial support for education, training and professional certification, including early certification in high school and college;
- Encouraging cyber skills development for under-represented groups to grow the talent pool, and;
- Incentivizing coordinated efforts between academia, industry and government.

Examples of these strategies might include:

- Increase cyber security career awareness starting in K-12 through the promotion and support for cyber challenges and e-sports, which improve interest in STEM careers;
- Support teacher and faculty professional development in cyber security;
- Expand scholarships for under-represented student groups in cyber-related degree programs;
- Support early credentialing/professional certifications within traditional degree pathways in higher education and within high school programs;
- Subsidize veteran retraining and certifications in cyber security disciplines;
- Incentivize industry internships and apprenticeships in cyber security;
- Promote and maximize the impact of existing federal and state programs where cyber security hasn’t traditionally been considered.

Joseph Sawasky - Bio

Joseph Sawasky is currently the President and CEO of Merit Network, Inc., a non-profit corporation governed by Michigan's public universities. Merit owns and operates the nation's longest-running regional research and education network, having been formed in 1966 by the University of Michigan, Michigan State University and Wayne State University. Michigan's public universities created Merit as a shared resource to help meet their common need for advanced networking, and it is currently considered a national leader in this area. In the late 1980s through the early 1990s, Merit operated the National Science Foundation Network, the precursor to the modern Internet. Today, Merit provides high-performance networking, cyber security solutions and community-building services to nearly 400 higher education, K-12, library, governmental, community and healthcare organizations, among others.

Mr. Sawasky and his team at Merit have launched a statewide broadband expansion program, called the "[Michigan Moonshot](#)", and they are active at the state and national level to help close the digital divide.

Merit's altruistic mission is "Connecting organizations and building community". For more information about Merit, please visit <https://merit.edu> and https://en.wikipedia.org/wiki/Merit_Network.

From 2007-2015, Mr. Sawasky was the Chief Information Officer at Wayne State University in Detroit, Michigan. He and his IT organization transformed technology services for the campus – consolidating and modernizing IT, improving the student/faculty/staff experience, and developing award-winning technology innovations. During this time, he also served on the boards of Merit Network, the Detroit CIO Executive Summit, and Michigan Technology Leaders.

Mr. Sawasky also worked at the University of Toledo, his alma mater, for 22 years, and in his last position there, served as CIO, leading technology aspects of the unique merger of the University of Toledo, the Medical University of Ohio and its academic medical centers and clinics.

Mr. Sawasky resides in Charlevoix, Michigan with his wife, Janis, and is a lifelong resident of the state.