

# SUMMIT REPORT

## A Report From the 2019 NATIONAL COMPUTER SCIENCE SUMMIT FOR STATE LEADERS

The Arkansas Governor's Mansion  
June 10, 2019



This report documents the discussions and suggestions from the first National Computer Science Summit for State Leaders, held June 10, 2019 in Arkansas. Over 30 states were represented.

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## ABOUT THE SUMMIT

The Summit was designed as an opportunity for high-level leadership of many states, including Governors, Superintendents and Commissioners of Education, legislators, and non-profit and for-profit leaders to share ideas on how states have and will be able to provide high-quality computer science education for all students.

The Summit was convened by Governor Asa Hutchinson of Arkansas. Gov. Hutchinson has led the nation in making Arkansas the first state to require high-quality computer science courses to be offered by every high school. Arkansas is now expanding this to include all grades beginning in kindergarten and many other states have followed suit.

More than thirty states and Canada sent representatives to the summit, which was designed to encourage and educate people about computer science education in our schools and allow best practices to be shared. Attendees also included state representatives and senators, and commissioners and superintendents.

Aside from Governor Asa Hutchinson, keynote speakers included Hadi Partovi, co-founder with his twin brother, Ali, of Code.org; and two governors who are among those who have led the way in computer science education in their states – Governor Kim Reynolds from Iowa and Governor Henry McMaster from South Carolina.

The Summit also debuted *The Arkansas Story*, a video telling how Arkansas launched the computer science initiative at the start of the Hutchinson administration in 2015. The video featured two success stories, including the work of Tate Rector, who changed careers from coaching football at Beebe High School to teaching computer science. He was a special guest at the summit.

Computer science and coding remain excellent career choices as technology grows more sophisticated. Statistics show that there are far more jobs than there are people to fill them. Nationally, there are over 500,000 computer science jobs available, and there are only 64,000 graduates to fill those jobs. A Gallup survey found that nine out of 10 parents want their children to study computer science but that only 35 percent of our schools offer high-quality instruction.

We are proud to report that Arkansans have caught the computer-science vision. When Hutchinson became governor, only 1,100 students were enrolled in a computer science class in Arkansas. In the fall of 2018, enrollment had increased by 620 percent to more than 8,000 students. The number of girls taking a computer science class increased from 220 to over 2,400, an increase of more than one-thousand percent. The number of teachers who are teaching computer science courses has grown from 20 to over 370. This includes 184 fully certified and 188 alternatively credentialed computer science teachers.

Gerri McCann is one of those teachers. She had been teaching French at Manila High School when she decided to expand to computer science. She was one of our panelists on Monday. She told how her computer science program grew from seven students and one class to four classes, which required her to reduce the number of French classes she taught. She's seen a lot of students go on to college to major in computer science or



engineering. But she also told of the student who didn't have support at home and often missed school. Everything changed when he discovered computer science. For the first time, she saw hope for this student.

There is a great need for a computer-literate workforce, which presents a great opportunity for our young people. We have come a long way in Arkansas, but we have a long way to go in Arkansas and the entire country. All the public high schools in Arkansas offer computer science, but we want more students to sign up, because fifty-eight percent of new STEM jobs are in computing, and only 10 percent of STEM graduates are in computer science. Our mission in Arkansas and in the entire country won't be complete until every child in every nook and cranny of America is aware of the opportunities to study computer science and the benefits that come with that.

## PRE-SUMMIT RECEPTION

Governor Hutchinson opened the Summit with a reception at the Clinton Presidential Library, with a surprise visit from former President Clinton himself! Both the Governor and the President discussed how important computer science education is to the future economic health of individual states and of the entire country. When discussing the importance of Computer Science:

*"However unpredictable the future is, this is going to be a big part."*

President Bill Clinton



# NATIONAL COMPUTER SCIENCE SUMMIT

## Governor Asa Hutchinson Makes His Mark!

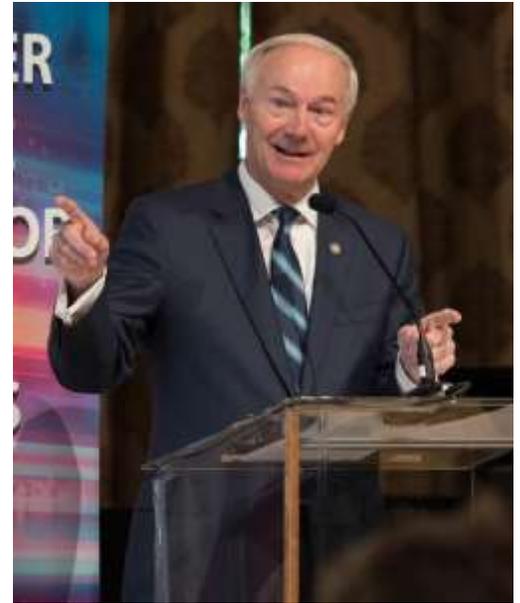
As attendees from over 30 states gathered in the beautiful Governor's Mansion, Governor Hutchinson greeted the Summit with a video and his personal experience on how Arkansas initiated offering computer science and coding in all schools. This all began with his wanting to have his granddaughter ready for the 21<sup>st</sup> century careers. *"Whenever you look nationally, only 1 out of 10 high schools in America offer and teach computer coding. If we mandated that every high school, we could produce 6,000 students a year to our state's economy that know how to write software,"* stated Gov. Hutchinson.

His remarks emphasized the role that the mandate and a deliberate effort to recruit teachers had on the Computer Science (CS) initiative. Over the past four years the number of accredited CS teachers in Arkansas has risen from 20 to 370. **This and other actions have resulted in a 620% increase in students taking these classes.**

One key to success was being open to allowing any teacher to learn how to teach CS. *"I had a French teacher in Manila, AR, who said 'if this is important for our state and our students, surely I can learn coding. It's just like another language.'"* Incentives for recruiting teachers including providing a \$5,000 bonus for teachers that complete CS certification and teach a class.

Other essential requirements include broadband Internet access. In Arkansas 98% of school districts have at least 1 MBPS of broadband capacity per student. In addition, the state is now offering cybersecurity training on its own test "cyber range".

The Governor also demonstrates his commitment to the program by touring the state specifically to visit CS classrooms and school districts twice every year. A former football coach and history teacher said *"If the governor hadn't made it mandatory, and my principal hadn't asked me to teach it, I probably would not be teaching anymore, I would probably be doing something other than teaching science."*



### Key Points:

- Pass a law mandating computer science be offered in schools
- Designate a State Level Computer Science Director
- Make it a priority at all levels, including a dedicated position to manage the effort
- Encourage competition between students in computer science
- Engage the private sector to provide assistance
- Train and recruit teachers, and provide incentives to becoming a CS teacher



While much progress has been made, Hutchinson emphasized that there is still more work to do. Although all high schools are required to offer computer science, due to a lack of teachers many still offer this through online courses. As a result, students are not motivated and 37% of high schools do not have any students enrolled in CS. The Governor reaches out personally to these schools' superintendents to ask them how to help in getting students into CS classes.

## The Arkansas Story

Governor Hutchinson's remarks were followed by leaders of the Arkansas educational community sharing the story of computer science. The panel included Secretary of Education Johnny Key, State Computer Science Director Anthony Owen, and teacher Gerri McCann and was moderated by Learning Blade CEO Sheila Boyington.

Secretary Key described how the legislation passed impacted the graduation requirements. *"There was fear of another unfunded mandate.*

*The legislation allowed computer science to replace a math or science credit, so that it was not an extra credit, created some concern among the math and science teams who wanted math and science to be pure. I can't think of anything purer in today's world for science and math than having that exposure and credit for computer science."* The Secretary also described how the state provides cash awards directly to students to achievement on the CS Advanced Placement tests:

*"We didn't start seeing an explosion of growth in this initiative until we started putting more teachers in those classrooms, because they become the people who encouraged the students to sign up."*

Anthony Owen, State CS Director

*started, I only had 7 students. Of those 7 students, 4 of them went on to major in Computer Science, and the other 3 went on to major in engineering. So, I feel like that was a powerful statement. The very next year I had 45 students, so I had to increase my classes. Now I have a total of 4 computer science classes, and 3 French classes. We had to cut back on the French classes so I could teach computer science."* The experience has been rewarding for her – *"I had a student that was fearful for and not coming to school. After enrolling in CS he has been coming to school, and I know that he will be successful."*

The first State Computer Science Director in the nation, Anthony Owen, emphasized the importance of teachers in the program. *"Finding teachers and getting teachers into the classroom. That is the most influential thing a state can do to grow their CS initiative."* Through programs managed by Owen, Arkansas has trained over 4,000 teachers to deliver CS content to students.



\$1,000 for a score of 5, and \$750 for a 4. He described how, when the awards are being made and students have other commitments, parents attend to receive the awards and checks.

Former French teacher and now superstar CS teacher Gerri McCann told how demand for CS classes has increased and changed her work.

*"This has transformed me as a teacher... When I*

## Why Computer Science Now?



Although the AP computer science is the fastest-growing AP test is history, its rate of growth is slowing due to hitting limits in cooperation from school districts and the availability of teachers. The examples cited show how individual teachers can make a difference, allowing change to happen from the ground up and not just from the top down.

Code.org has several recommendations for state policies on computer science education. In 2013, only 13 states had at least one policy on computer science. Today 49 states have adopted at least one of the recommended policies and several have met all of the recommended policies, Arkansas being the first to do so.

Code.org co-founder Hadi Partovi stated that *“every Student in every school should have the opportunity for computer science.”* Partovi built the case for how computer science is not just a route to a job, but it is now a foundational skill.

As was discussed earlier, any teacher can become a CS teacher. Partovi shared examples of this in Florida, California and New Jersey. Through Code.org, teachers can become a facilitator of CS instruction, even if they are not experts in it and with this model, over one-third of students in the US have an account through Code.org to experience coding.

### Key Points:

- Gender and race gaps are solved by providing role models in the classroom
- Multiple state agencies have data that help to quantify the effects of the process
- School districts are the base unit for implementing lasting change
- Becoming a CS instructor changes a teacher’s career
- State STEM and CS networks help to create statewide impact and use funds effectively

*“Computer science is foundational, not only for the jobs it’s creating, but it teaches problem solving skills, creativity, critical thinking, collaboration. These are the skills the economy demands. Computer science is unique that it teaches these 21st century skills independent of whether you want a job in tech or not.”*

Hadi Partovi, Code.org

## The Importance of Policy, Legislation, Standards and Teachers

Microsoft's Corporate Senior Vice President Mary Snapp set the stage for a discussion on the effects of state policy. *"Every company is a technology company. And every company needs someone to understand something about computer science. ... There is an intersection of computer science with the humanities. It is important for our students to know a little about history so that they can understand contextually about privacy, about cyber security, about surveillance as they get into this important work."* She explored the gap in computer science participation in gender and race, and how role models can be the key to closing these gaps.

Education Commission of the States' Claus Von Zastrow encouraged states to involve different agencies to achieve the needed results. *"Get your data leaders at the state level at the table early on because part of what's going to be so important for these initiatives is measurement."* Examples include state leadership councils in states like Idaho, Tennessee, Iowa, Alabama (newly formed) and others. The need to include state workforce data systems, as is done in Arkansas, is also important to see how the workforce is changing.

Ruthe Farmer of CSforAll discussed the importance of affecting change at the district level. *"There's fantastic work being done to prepare teachers, but the district is the unit of change in the community. ... There's lots and lots of Superintendents that used to be history or math teachers, but there's probably zero superintendents that used to be CS teachers. So we've got a road to convince these people that it's important."* The SCRIPT workshop program from CSforAll helps to implement this process in a district.



The importance of teachers was also discussed on this panel. Jake Baskin of the CS Teachers association said that *"It's really about how we can support teachers. Becoming a Computer Science teacher is about transforming your own identity, it really starts to change you as a teacher as well. That's a process that will happen over time, and we need to support that in communities, and it can be really challenging, especially if you're a computer science teacher, because you're probably the only one in your school."*

Independent state networks can provide support to the department of education in implementing

*"STEM networks are so important because they give a place for everyone to plug in. A state network is great for this so the work doesn't stop if a governor changes."*

Wes Hall, STEMx

*"Equity and diversity has to be front and center in planning and in strategies. One thing we've learned while watching efforts, is that if you don't make it intentional and have very intentional moves to promote equity, racial equity, gender equity, trying to make it into rural areas, it won't happen if it's not intentional."*

Claus Von Zastrow – ECS

CS and STEM instruction. STEMx's Wes Hall stated that *"We want to make sure we don't just have pockets of work, but a statewide impact. We want to be sure that all those partners we need to work with to the table, and that's what STEM networks do."* *"To be able to say that this money is allocated for CS statewide work is so important, it allows it to not be consumed by the entire STEM movement to make sure we get some momentum behind the CS part."*

This group also discussed additional school-related organizations where students can be recruited into CS classes, including ROTC, 4H, FFA, and Boys and Girls Clubs.

## **Conversation with Superintendents of Education**

The assembled group of state leaders explored the state department of education's view on computer science with Commissioner Dr. Wayne D. Lewis Jr. of Kentucky, Superintendent Mark Johnson of North Carolina, and Commissioner Dr. Penny Schwinn of Tennessee, moderated by Secretary Johnny Key of Arkansas.

In Tennessee, Dr. Penny Schwinn explained that computer science is being coordinated with other STEM and CTE programs. *"A lot of our work has happened through CTE, so creating pathways for students 9 through 12 to make sure that they have the course work and articulated pathway to get to whether it's an industry certification or being prepared to major in computer science, or even dual degrees in college."* *"We're really excited about the last legislative session, we are creating more STEM programs within our public schools so that we have more students who have access to articulated pathways that include computer science."* Moving forward, a key is again getting enough teachers for CS subjects along with the access issue.

On the Importance of a CS plan to students and the community:

*"Here I was, in an education community that was telling everyone they had to go to college to be a success, when we know now, even in this aspect for coding and computer science, it's not true. You don't have to go get a 4-year degree to get a great career pathway in this."*

Superintendent Mark Johnson, North Carolina

*"I've seen poverty in Kentucky that is unlike any other. The challenges you're referencing are incredible challenges. ... We have to use the resources at our disposal to allow students to create their own opportunities where they are if they decide to stay in that region, or to offer that skillset if they work in other parts of the states, or nationally or even internationally."*

Commissioner Dr. Wayne Lewis, Kentucky

*"We (Tennessee) decided that we weren't going to create the pillars and then go out for feedback on the backend, that we were actually going to have the educators, the students, the families, and the administrators determine what the priorities were, and then create a strategic plan. It has to feel like a local initiative as much as it feels like a state priority. Let's get people excited by it, because that is where we are going in the future."*

Commissioner Dr. Penny Schwinn, Tennessee

Mark Johnson explained how one of the first steps for North Carolina was ensuring good Internet access. *“One thing we decided very early on is that we would connect every classroom with high speed internet. Now rural students have the same connectivity as metro areas in the state.”*

Dr. Wayne Lewis emphasized that computer science is a key to achieving one of the state’s primary goals. *“When asked how we measure the progress in our schools, number one for me is whether or not our kids who exit the public education system in Kentucky are well*

*prepared and successful in their secondary education, getting jobs, and making wages so they are able to take care of themselves. ... Computer science is key to doing this.”* Kentucky is also working with industry to make this happen - *“Just last year we brought in our new K-12 Computer Science standards. That brought in industry professionals into the department of education to work collaboratively.”*

Like other states, the availability of teachers is a key issue in Kentucky. *“The one big nut that is hard to crack is expanding computer science at the high school level. The issue is having enough teachers. Most of the CS teachers come from math and science, and we don’t have enough of those teachers.”*

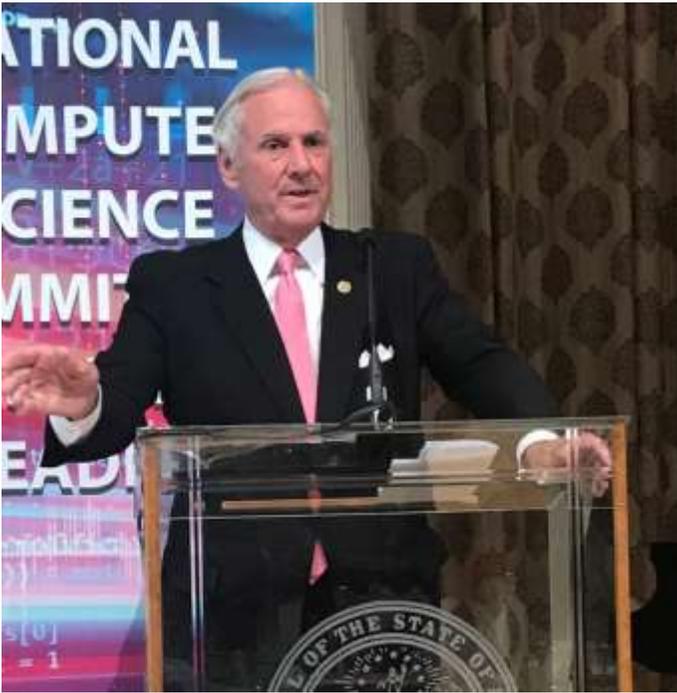


## Governors’ Addresses

During lunch the Summit was honored to be addressed by the Governor of Iowa, Kim Reynolds, and the Governor of South Carolina, Henry McMaster.

Both Governors emphasized the importance of computer science education in improving the economy of under-privileged students. Governor Reynolds pointed out a program in Iowa - *“All students should be able to have the opportunity to learn about computer science no matter where they live. A new private-public partnership in the small town of Jefferson, Iowa allows students to step directly from the classroom into high demand careers within the technology sector. No debt, with a starting salary in the range of \$70,000 a year. This is a small community of about 4,000 people. **We’re bringing Silicon Valley to the Silicon Prairie.**”*





Governor McMaster highlighted progress in South Carolina. *“We’ve got one enemy. It’s not innovation and it’s not imagination. The enemy is poverty. We can do all these things in the rich school districts, while others have virtually nothing. The Opportunity Zone Bill provides districts that meet a certain poverty level with tax incentives for a rural school district economic development closing fund. What that means is if a company says ‘I will go to that place, if you will provide water and sewer, and if you will fix up that raggedy school and make it better, then we will go and bring at least 50 jobs and we can change things.’ This is one more tool to make things better.”*

In Iowa, the Governor described a new program for next year where the state has dedicated \$1.5M to a CS professional development teacher development fund. This has helped a small town in Iowa to offer coding

instruction in all grades. Another private-public fund is helping 12 high-poverty elementary schools to implement a Computer Science is Elementary. In another effort, the Clearinghouse is connecting students with industry in over 100 projects. Overall, the state has impacted over 500,000 students in coding.

South Carolina has not yet adopted a state CS plan. However, computer science is now a graduation requirement beginning in the 2018-19 school year. Currently South Carolina has 14,937 students enrolled in CS classes. The University of South Carolina is collaborating with industry to provide technical expertise in improving production methods in the state, and a private enterprise is producing “Beta Boxes” for schools by filling using shipping containers with CS and other technical education equipment, which are then shipped directly to the schools.

*“For the first time, we will have a dedicated computer science expert at the Department of Education. We’re working to build a robust, long term program.”*  
Gov. Kim Reynolds, Iowa

*“We believe in collaboration, cooperation and communications in South Carolina, and that’s the secret to our success. The more people you put together, the more ideas you can get.”*  
Gov. Henry McMaster, South Carolina

## **Higher Education - On the Receiving End of K-12 Computer Science**

There is a need for a smooth transition from K-12 education to higher education as they want to continue their computer science education. A group of higher education experts shared their thoughts on what is needed to support students. Dr. David Reed of Creighton University in Nebraska stated that *“We have the same mission in colleges that the K-12 has: we want to create citizens that are knowledgeable about technology, that understand the role that technology has in their lives, and the implications. That’s very important getting those concepts to students early on, but it needs to build. By the time we get them into college, we want to make sure not only do they understand technology, but they can apply it in whatever discipline they go into.”*

Higher education must also be sensitive to the needs of under-represented students. *“It’s important for students to see college students who come from their background. Who come from their area, so any time we have the chance to hire students from certain areas and send them back to go and work and mentor, is important. It’s important to us to hire computer science faculty who have the same background and look like our students who are entering the computer science program so they can provide role models.”* - Dr. Bryan Hill, University of Arkansas.



*“The system of higher education system must see itself as a PK-12 continuum. The notion that we are not separate entities. That we serve our state, we serve our country, and we serve the people of the world as we do the work that we do. College does indeed begin in kindergarten.”* - Dr. Charles Nash, University of Alabama System

Dr. Ambareen Siraj of Tennessee Tech University added that *“Increasing women and minorities in cyber security is not just a diversity issue, we all know that a diverse workforce will make things better, but it’s also a pipeline issue. In STEM 50 percent are women, so if you want to grow cyber security, you have to recruit from that group.”*

Higher education also has a responsibility to provide training for new education graduate teachers. *“We can’t ignore the crucial role being*

*played by higher education. We are preparing teachers to teach our students in computer science, as well as computer science professionals.”* – Dr. Maria Markham, Arkansas Department of Higher Education.

*“The responsibility for our university system is to work with our colleagues in K-12 and in community colleges to bring about the level of support for the legislation that we need, and to get computer science in our elementary schools, middle schools, and high schools. From our end, it’s providing the correct credentialing, training, for those who will be teaching.”* - Dr. Charles Nash, University of Alabama System.

## **Computer Science Priorities Discussion**

Summit participants had time to network as they participated into multiple groups to allow time to discuss more specific topics and questions. One group discussed state-level plans and dedicated state staff positions for CS. Most states represented in this group did not have a formal plan for computer science in their state, and also did not have a dedicated state computer science position in the Department of Education, although the number of states with this position is growing.

On funding side, the Arkansas Department of Career Education is using Carl Perkins and startup dollars to provide technical education in CS skills. In the “Every Student Succeeds” plan, every 8<sup>th</sup> grader will develop a

future plan to help students understand the importance of a good career and the school courses that will get them there.

Attendees also discussed that teacher preparation should not be a one-size-fits-all approach. The specific skills are determined by the specific courses, which in turn are governed by the needs of industry in that community. There should also be options between licensing and other types of certification, including micro-credentialing. The group felt that a multi-state approach for micro-credentialing could be helpful. Attendees would also like to see bias training for educators to help reduce gender bias in the CS classroom and recruiting.

The discussion also showed how the power of collaboration can be used in creating K-12 CS standards, bringing in all stakeholders. The importance of teachers and a continuous improvement process to modify the standards are needed.





## **Post-Summit Survey**

Through responses and comments from the Summit post-survey the Summit has proven to be immensely popular with attendees. A feedback survey was included with the thank you email, and the response was overwhelmingly positive.

Overall, 88% of attendees rated the conference as "excellent" and 6% "good", with no below-average ratings at all. All of the panels received similar glowing reviews. The balance between panels and discussion time was also highly positive, with no preference to changing the balance in either direction.

As was demonstrated during the questions, attendees voiced that support for teacher training and state-level leadership is key to success in computer science education.

Response to the Sunday dinner and reception were unanimously positive. Attendees also praised the organization, location and coordination of the event. This, along with the urgent requirement for improved computer science education, resulted in over 88% percent of attendees saying that they would attend a similar event next year.

Takeaways expressed in the survey included: *"There is a CS network across that country that we must capitalize on and leverage"* and *"The position of a statewide CS coordinator helps school districts collaborate and promotes equity."*

Overall comments praised the Summit with statements like *"Gratitude! This convening clearly took a great deal of time and attention to detail to plan. Thank you to Anthony Owen and the Governor for having the commitment and drive to put together such a powerful 2-day experience. Many thanks!"*

Governor Hutchinson appreciated the attendees help in making this event so successful, and hope that this will encourage us all to work even harder to bring computer science skills to all of our students!

## **Future Steps**

The response to this first-ever, Governor-sponsored summit on computer science education was overwhelming. This demonstrates the need that all state governments have in improving the opportunities for our young citizens to gain these important workplace skills.

The hope is that this will be only the first in series of state-level convenings on this important topic. Please keep in touch with this community. Attendees of the Summit will be provided a link to a discussion forum in the near future. Others will be invited to join as well.

Stay tuned for news about a future summit!

## **Media and Additional Info**

The Summit was very well covered nationally and a few of these links are provided below.

**Governor Hutchinson's Press Release** [http://bit.ly/CSSummit19\\_1](http://bit.ly/CSSummit19_1)

**Video Recording of the Summit** [http://bit.ly/CSSummit19\\_video](http://bit.ly/CSSummit19_video)

### **Media coverage of the Summit**

Arkansas Democrat Gazette [www.bit.ly/CSSummit19\\_2](http://www.bit.ly/CSSummit19_2)

KAIT TV [http://bit.ly/CSSummit19\\_3](http://bit.ly/CSSummit19_3)

FOX16 News [http://bit.ly/CSSummit19\\_4](http://bit.ly/CSSummit19_4)

Arkansas Business Online [http://bit.ly/CSSummit19\\_5](http://bit.ly/CSSummit19_5)

STEMDaily National Newsletter [http://bit.ly/CSSummit19\\_6](http://bit.ly/CSSummit19_6)

### **Photos from the Summit**

See some great pictures [here](#). [http://bit.ly/CSSummit19\\_8](http://bit.ly/CSSummit19_8)

### **Photos from the Reception**

See reception pictures [here](#). [http://bit.ly/CSSummit19\\_9](http://bit.ly/CSSummit19_9)



# ARKANSAS AND COMPUTER SCIENCE



*"Of all the big-ticket items we've dealt with since I've been governor, this relatively small-ticket item may have the greatest long-term impact."*

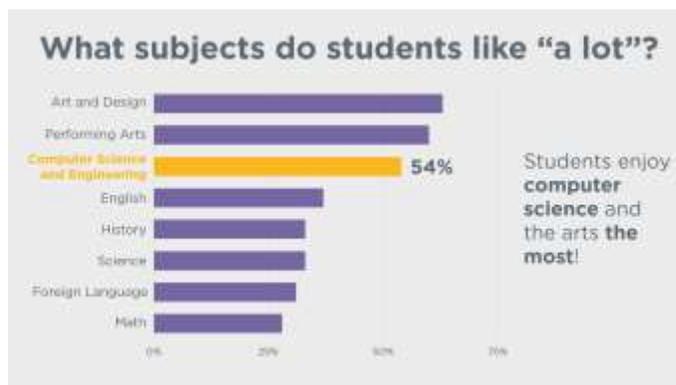
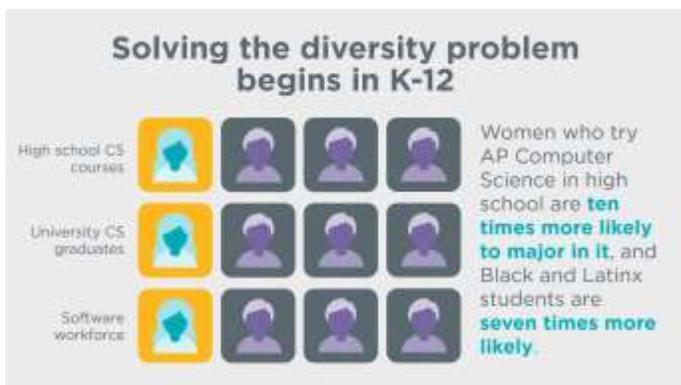
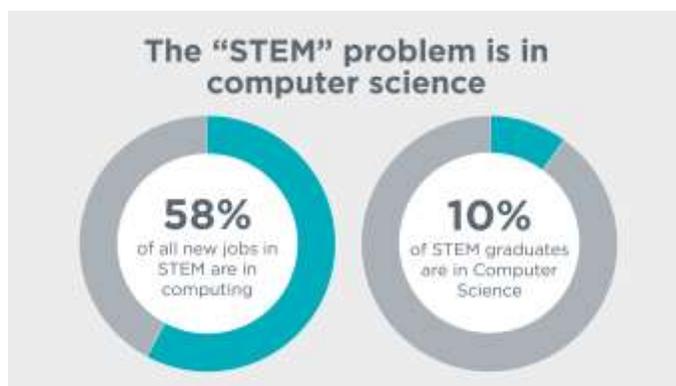
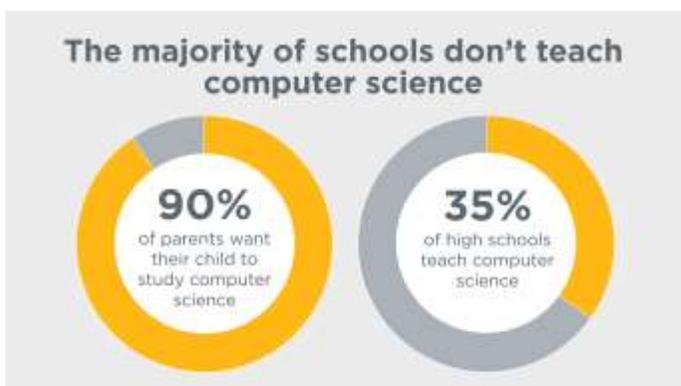
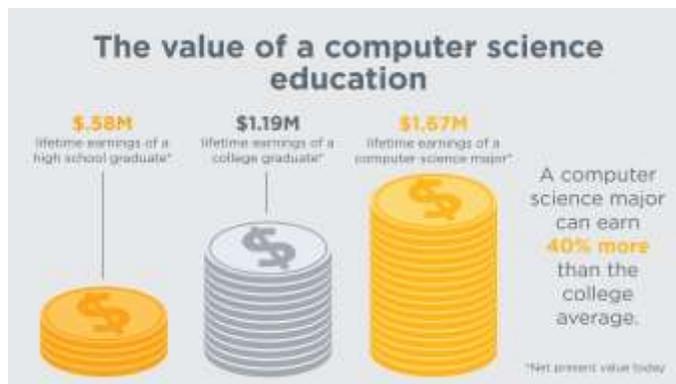
-Asa Hutchinson

## THANK YOU TO OUR SUMMIT SPONSORS



# COMPUTER SCIENCE IN EDUCATION

Computer science education is an essential part of maintaining the competitiveness and economic health of our states and our nation.



Source: Code.org



