



COMPUTER SCIENCE

in

ARKANSAS



COMPUTERS ARE FUN

The Arkansas Department of Education Office of Computer Science is pleased to announce the launch of our “Computers ARE Fun” video series. This series of videos, which will be released throughout the Summer of 2021, is intended for younger viewers, typically Pre-K - 5th grade, and will help children understand the basics of computers, including introductory computer literacy, some coding, low level hardware discussions, and appropriate cybersecurity and internet security topics. In addition, we will share information about computer science and computing careers in a fun way.

Videos within the series will be posted to our YouTube page in our “Computers ARE Fun” playlist as they are made available at <http://csforar.info/ComputersAREFun>.

Episodes 1 - 3 have been posted and are available today, so be sure to check them out!

While the first episode is more of an introduction to the series, later episodes will delve into various computer science and computing topics. Some of the content shared will be accessible online, but much of it will focus on unplugged activities that children can explore with their family without the use of computing devices.

If you have any questions, comments, or want to get involved in the creation of a “Computers ARE Fun” video for this summer, please reach out to Anthony.Owen@ade.arkansas.gov.



ARKANSAS COMPUTER SCIENCE TEACHING POSITION CONNECTION FORM

The ADE Office of Computer Science receives multiple requests each week to help schools find a CS teacher or to share information on their posting. To assist schools with this, we have recently created the Arkansas Computer Science Teaching Position Connection form for schools to share their information.

The form, which is basic information and can be completed in less than two minutes, is found at <http://csforar.info/CSCConnectForm>.

The listings spreadsheet, which we will share via our listservs, Facebook group, monthly newsletter, social media, and any other channel where we think it will reach teachers, is found at <http://csforar.info/CSCConnectList>.

Again, if your school has a CS Teacher position open, fill out the form found at <http://csforar.info/CSCConnectForm> and we will do our part in helping you find a CS educator.

If you are a teacher looking for a CS position, keep your eye on the spreadsheet found at <http://csforar.info/CSCConnectList>.



SOLVING THE DIGITAL DIVIDE

Arkansas was recently highlighted by Digital Wish for being ahead of the curve, during the start of the pandemic, when it comes to district technology adoption strategies. Digital Wish hosted a webinar series focused on Arkansas's accomplishments, and State Director Anthony Owen spoke in the webinar titled "Solving the Digital Divide: District Technology Adoption Strategies". Other speakers included Don Benton of the Arkansas DOE Research and Technology Division, and Heather Chirtea of Digital Wish.

If you missed the webinar, please take some time and view it in the "Watch Now" section at <https://www.digitalwish.com/dw/digitalwish/webinars>. Arkansas is proud to be leading the nation in so many things!

The poster is titled 'SOLVING THE DIGITAL DIVIDE' in white text on an orange background. Below the title is 'DISTRICT TECHNOLOGY ADOPTION STRATEGIES' in white text on a dark grey background. The main content is on a white background with a circuit pattern. On the left, under 'PRINCIPALS & ADMINISTRATORS', there is a bulleted list of four items. On the right, under 'SPEAKERS', there are three names with checkmarks and their titles. A graphic of a yellow bridge with a Wi-Fi signal icon is in the center. At the bottom, there is a dark grey bar with the Digital Wish logo and the text 'GET ADDITIONAL RESOURCES AT DIGITALWISH.ORG'. A small orange triangle in the top right corner says 'FREE WEB SERIES'.

NINE ARKANSAS HIGH SCHOOL STUDENTS NAMED NATIONAL CYBER SCHOLARS

Nine Arkansas high school students were named National Cyber Scholars after competing in a national competition hosted by the National Cyber Scholarship Foundation (NCSF).

The competition was “a Capture the Flag (CTF) cybersecurity competition involving a set of computer security puzzles and challenges that test skills in areas such as password cracking, reverse-engineering, memory corruption and cryptography. When a challenge is solved, it gives the players a flag — a secret string of code that can be exchanged for points. The more points gained, the higher the competitor moves up in rank.” - <https://www.nationalcyberscholarship.org/high-school-scholarship-competition>

Though more than 30,000 students across the country sought to qualify for the competition, just 5,000 advanced. Of those, Arkansas' National Cyber Scholars are among the best 600 high school students nationwide who completed the grueling 48-hour competition, which challenged participants to solve computer security problems and/or capture and defend computer systems. Including Scholars, finalists and other honorees, Arkansas students earned \$55,500 in scholarships and training.

Arkansas had a total of 40 semifinalists, 11 finalists, and 9 Scholars. The following students were Arkansas finalists. Please note that some students chose to remain anonymous.

- Julian Blanco - Bentonville High School
- Dallas White - Bentonville High School
- Anonymous - Bentonville West High School
- Ananya Vangoor - Bentonville West High School
- Nicole Chapman - Bentonville West High School
- Anonymous - Bentonville West High School
- Jared Ramirez - Bentonville High School
- Saahas Parise - Bentonville High School
- Shivabalan Balathandayuthapani - Bentonville High School



You can find a full list of the winners at <https://www.nationalcyberscholarship.org/winners-2021>.

We are proud of our Arkansas students for investing their time and efforts into a study that is vital for the future of Arkansas and our nation as a whole. Cybersecurity is a critical issue, and #CSforAR is at the cutting edge of training the next generation.



ROBOTICS TEACHER GOING ABOVE AND BEYOND

Many computer science educators go above and beyond in their classrooms everyday. When it was brought to the CSforAR team's attention that Alicia Turley, Library Media Specialist and Robotics Teacher from Rose Bud High School, was going above and beyond at her school, we chose to highlight the work that she is doing in her school.

Mrs. Turley said, "I've taught various subjects for over 15 years. I've been the Media Specialist at Rose Bud High School for the past 7 years and I can honestly say that this year of teaching Robotics has, by far, been my favorite. I have fabulous coworkers and an administration that is second to none. I've always been interested in how things operate or are put together and I'm lucky enough to work with students that hold the same interests. Every day, I get to do something I love and make an impact in people's lives. It's a beautiful thing when a career and passion come together."

"I have to admit that although I was over-the-moon excited to have the opportunity to teach Robotics, I was skeptical about starting it during a pandemic. Turns out, I had nothing to be skeptical about. The students jumped on board and RAN with it. They even took time out of their building & programming to showcase what they were learning to the 3rd grade classes that would pop in every month. Being my first year and since we were using VEX equipment, I relied heavily on their educational stem labs for inspiration. I cannot praise them enough. The students loved each challenge we did and were always looking for ways to enhance them. Another great resource we utilized in our Robotics program was Carnegie Mellon University. They have a free CS Stem Curriculum that is just fabulous."

"There will be many wonderful changes for Robotics at Rose Bud this upcoming school year. The one I'm most excited about is our new rooms. During the 2020-2021 school year, Robotics class was held in my library and while we made it work, it was a bit cramped. Try setting up a soccer field or bowling alley in a library!"

"Starting next year, we will have one room with the playing field set up in order to practice for competitions, complete challenges, and hopefully, be able to hold mock competitions for the surrounding schools that would like to practice. Across the hall, we will have our Robotics Lab where all the planning and building will take place. The rooms are turning out terrific and the best thing about them is their location. The constant foot traffic by the rooms has already prompted a surge in students wanting to sign up for next year's classes."

"My current students and administrators have been monumental in getting the rooms up and going. Our goal was to have it completed before the end of the year and it looks like we're going to make it. One of best things I've seen since the remodel was watching my students take ownership of their new rooms. They are overwhelmingly excited about them and never miss an opportunity to show their friends. There is so much energy in there already!"

"I've always been told that to be successful, the first thing you have to do is fall in love with your work. If it doesn't light you up, you're not the right person for the job. I'm thankful to be at Rose Bud High School and for the chance to share what I love with my students."



Principal David Dodge, even had kind things to say regarding her and the program. He said, " Mrs. Turley has never stopped trying something new since the moment I got here. Every time I walked into the library, she had something new and exciting going on in her class. She mentioned to me several times she would like to start a competitive robotics program and an e-sports team. I spoke with our Superintendent at the time and got permission to purchase the materials to start both programs. Mrs. Turley has continued to build her program this school year, and has been working tirelessly to create a fun working environment for our students to thrive in the field of Computer Science. The students have been talking about her new room and classes and cannot wait to have class with her next school year!"

Thank you Mrs. Turley for going above and beyond for your students and for the #CSforAR Initiative. If you know of an engaging educator who is leading the way and deserving of recognition, email us at CSforAR@ade.arkansas.gov!

VIRTUAL ARKANSAS PROVIDES ADDITIONAL COMPUTER SCIENCE CURRICULUM OPTIONS

In December of 2020, the ADE Commissioner's memo announced that ADE is continuing its partnership with the Arch Ford Education Service Cooperative's Virtual Arkansas division to develop additional CS curriculum options for high school programming, including the new Data Science pathway, over the next two school years. The Office of Computer Science grants funding that provides Computer Science and Computing Curriculum options through Virtual Arkansas. For more information, read more here:

<https://adecm.ade.arkansas.gov/ViewApprovedMemo.aspx?Id=4620>.

Through this program, teachers and schools have free access to three years of Cybersecurity content-only curriculum aligned to the Arkansas Computer Science and Computing Standards and Courses.

In addition, Programming - Year 1 content-only curriculum is also currently available at no cost to teachers. Also, as the commissioner's memo notes, Programming - Year 2, Programming - Year 3, and Data Science - Year 1 curriculum will be available starting this fall and again be available at no cost to teachers and/or schools.

To sign up for free access to this curriculum please visit

<https://www.virtualarkansas.org/>.

Teachers who are considering implementing this curriculum, but already feel they will need support should not worry. The entire Statewide CS Specialist team is providing training this summer and will be back in schools this fall to help support teachers with implementation.

Please find their contact information at: <http://csforar.info/specialists> or email our internal team at CSforAR@ade.arkansas.gov for more information.



The Learning Blade team would like to take a moment to thank each and every teacher for their work this year. You are heroes who helped hold the country together during a global pandemic. THANK YOU.

Summer School Teachers: Check out Learning Blade's **STEMmer Camp**. **STEMmer Camp** resources can be found by logging into your teacher account and going to the resources section.

Designed to incorporate Learning Blade's familiar online and offline activities, students will continue to gain STEM and CS career exposure while out of school. There are 10 lesson plans, which can be used for either one- or two-week-long STEM-camp experiences!

Each session is approximately 4 hours long and follows a consistent format, providing these 5 core elements:

- A hands-on STEM Engineering Challenge
- Online Learning Blade Missions
- A hands-on experiment requiring observations and calculations
- Student-centered and interest-driven research practice
- A take-home activity

Don't have an account - register for your free account at www.learningblade.com/AR



Learning Blade Corner - a monthly snapshot of happenings with Learning Blade in AR.

HACK ACROSS ARKANSAS OXOX - ON RANSOMWARE

This article was written by CS Specialist Eli McRae.

The term *Ransomware* has been in the news a lot recently. The Colonial Pipeline incident isn't even the latest entry into the news cycle. The idea of ransomware has been around for a long while, but really took off with the rise of cryptocurrencies in the early 2010s.

For the uninitiated, ransomware is a class of malware that encrypts a target system's files with a key unknown to the operator. It generally then prompts the operator to pay some amount of money in exchange for the ability to decrypt the files. At the end of the day, it is a form of extortion wherein the operator must take some action that benefits the attacker. Still struggling? Someone changed the locks on your house and wants you to pay to get the new keys.

There are some interesting philosophical questions around ransomware. The most obvious being "How can you be sure you're going to get access to your files if you pay?" A close second is "What will stop them from doing it again?" A third might be "What can we do to prevent it from happening in the first place?"

1st Answer: Something to keep in mind is the financial motive at the core of ransomware. To the perpetrators, this is a business. In business, if you develop a reputation for not delivering your promised goods, people won't do business with you. That is the incentive the attackers have to deliver your decrypting files.

The sophistication of the attacker has a lot to do with the likelihood of getting data decrypted and the rate a victim must pay. High-profile attackers want to maintain a certain reputation and--keeping in mind that they view this as a business endeavor--they need to keep their reluctant customers happy. The ransom demand must be less than the company's perceived value of the data **plus** the cost to recover it by other means **minus** any legal fees encountered for paying the ransom as some nations have declared it illegal to pay attackers for decryption.

The fact that some companies have recovered by paying the ransom, provides some sense of hope for the victims. In some sense, it may also be a business decision to pay the ransom rather than recover via other means. It is simply the path of least resistance. This is the reason for the ransomware insurance industry. Risk transference is the name of their game. That insurance company will negotiate on the organization's behalf.

2nd Answer: This is closely related to maintaining the market. There is only so much a customer will pay. It's possible that the attackers will redeploy the attack in a week, but not as likely. Lower-caliber attackers or very enterprise-minded ones may use off-the-shelf ransomware kits that automate the process of encryption and collection of payment in exchange for a cut of the profits. This is sometimes referred to as Ransomware as a Service or RaaS. This may yield mid-range rates in the \$300-\$600K range as RaaS rates are about 50% of the demand price.

Primitive attackers and skids (short for script-kiddies; under-skilled attackers with no desire to understand the technical mechanisms being exploited) may use ransomware which requires little skill to implement or, conversely, recover from. These often command lower ransom rates as low as \$50 to \$5000 per machine and operate on volume. There is little, if any, re-infection protection in this grade of ransomware.

3rd Answer: A good rule of thumb is to never let anyone extort you. When ransomware is no longer economically viable or the risk-reward ratio tips, it will fade away. As an aside, the notion of extortion-ware will likely never go away for sophisticated attackers. A second-order attack may be the goal and the computer is only the vehicle for extortion. If you can be blackmailed, you may be required to pay or take some other action. Don't be. See the sidebar for a few strategies you can employ to increase your personal readiness in the face of a ransomware incident.

If you are interested in learning a bit more about how attackers write and deploy this type of malware as well as detecting it, consider joining our Advanced Cybersecurity professional development session this summer. Visit bit.ly/CSforARPD for more information.



- Have a plan for how to continue operations in the event of a catastrophic data loss (ransomware incident). Don't wait to develop a plan day-of. Avoid the plan being pay-up.
- Always have one or more recent offsite/offline backups AND VALIDATE THAT THEY WORK. Better to lose a day's work than a week's work. Two backups are one; one backup is none.
- Use Multi-Factor Authentication to make it more difficult to log in to systems. If it's inconvenient for you, it's inconvenient for an attacker too.
- Keep software, operating systems, and network infrastructure updated to aid in preventing technical exploitation.
- Limit the amount of trust you give to other entities and platforms to prevent the exploitation of people by way of social engineering. Can you spell assume?
- Encrypt your communications and data to prevent tampering/snooping in-flight and while at rest. Attackers won't know what they have, so they can't know its value.

ADVANCED HIGH SCHOOL CS PROFESSIONAL DEVELOPMENT

VISIT [BIT.LY/ARCSPD](https://bit.ly/arcspd) FOR MORE INFORMATION AND LINKS TO REGISTER!

ADVANCED ROBOTICS

This workshop is face-to-face only, and will be held July 26-28, 2021 at Arkansas Tech University.

This workshop will address how to teach to the Robotics standards using various resources and how to apply robotics concepts regardless of the resource used. Participants will build and program robotic systems and explore various robotic and industry related concepts through engaging activities and dynamic lessons.

This 3-day workshop is for those who hold the 528 Computer Science Teacher Certification, 5016 Computer Science Approval Code, or 5014 Computer Science Approval Code and who plan on teaching any level of Robotics, although this PD is going to have a focus on teaching to the year 2 and year 3 Robotics standards.

ADVANCED GAME DEVELOPMENT AND DESIGN

This workshop is face-to-face only, and will be held July 12 - 14, 2021 at Arkansas Tech University.

Participants will be introduced to the game design and development process using the Unity software and the C# programming language. Topics covered will include, but are not limited to, using Unity software, object-oriented programming, building video games, using version control/collaboration software, and utilizing game assets.

This 3-day workshop is for those who hold the 528 Computer Science Teacher Certification, 5016 Computer Science Approval Code, or 5014 Computer Science Approval Code and have a fundamental understanding of computer programming.

ADVANCED CYBERSECURITY

This workshop is online only, and will be held July 12 - 14, 2021.

Participants will be introduced to security concepts as well as methods to help teach those concepts. Topics covered will include, but are not limited to, a survey of Linux and Python, Threat Concepts and Hacker Methodologies, Classic Information Security concepts, Ethics and Legal considerations, Introduction to Exploitation techniques, a survey of Digital Forensics and Incident Response tactics and techniques, Introduction to Network Forensics, as well as Physical Security.

This 3-day workshop is for those who hold the 528 Computer Science Teacher Certification, 5014 or 5016 Computer Science Approval Code, or IT staff that have a fundamental understanding of computer science concepts.



ADVANCED NETWORK/HARDWARE

This workshop is online only, and will be held July 19- 21, 2021.

This workshop will begin with a brief refresher on the basics of TCP/IP configuration, i.e. IP addresses, subnet masks, default gateways, and what these terms represent. Following this introduction, attendees will be presented with the Ad basics of network protocols and packet capture. The workshop will cover the OSI model, particularly the operation of Layer 2 network technologies including switches, Ethernet, and VLANs, before moving on to Layer 3, routing, and the fundamentals of WAN technologies such as Frame-Relay, ATM, PPP, and Ethernet on WANs.

The operation of popular network services such as DHCP, DNS, and application layer protocols such as HTTP will be presented in-depth. Here you will find a series of tutorials to help get you comfortable with cybersecurity and networking concepts and topics . -> Evergreen - Advanced Cyber and Networking Pregame Resources

This 3-day workshop is for those who hold the 528 Computer Science Teacher Certification, 5016 Computer Science Approval Code, or 5014 Computer Science Approval Code and are comfortable with using computers.

CONT'D: ADVANCED HIGH SCHOOL CS PROFESSIONAL DEVELOPMENT

VISIT [BIT.LY/ARCSPD](http://bit.ly/ARCSPD) FOR MORE INFORMATION AND LINKS TO REGISTER!

ADVANCED PYTHON PROGRAMMING

This workshop is online only, and will be held July 26 - 28, 2021.

Participants will be introduced to the syntax of the Python 3 language. Topics covered will include, but not limited to, turtle graphics, object-oriented programming, file input/output, event programming, and exception handling.

This 3-day workshop is for those who hold the 528 Computer Science Teacher Certification, 5016 Computer Science Approval Code, or 5014 Computer Science Approval Code and have a fundamental understanding of computer programming.

ADVANCED JAVA

This workshop is online only, and will be held July 5 - 7, 2021.

Participants will gain a better understanding of object-oriented programming including encapsulation, inheritance, and polymorphism.

This 3-day workshop is for those who hold the 528 Computer Science Teacher Certification, 5016 Computer Science Approval Code, or 5014 Computer Science Approval Code and have a fundamental understanding of computer programming. This workshop covers topics relevant to Computer Science Level 3 & 4 as well as Advanced Placement Computer Science A.

ADVANCED AP COMPUTER SCIENCE A

This training includes an overview of the AP Computer Science A Course and Exam Description along with lab activities that can be used to teach key concepts. The workshop covers the AP CS A units of Data Types, Objects, Logical Operators, Iteration, Arrays, Inheritance and Recursion.

This workshop is offered both face-to-face and virtually, and will be held July 19 - 23, 2021 at Arkansas Tech University. Visit bit.ly/CSforARPD for more information and contact CS Specialist Lori Kagebein at lori.kagebein@ade.arkansas.gov regarding any questions about this specific PD offering.



UPCOMING TRAINING

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