

# ARKANSAS NSF EPSCOR

SUMMER 2019



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# 2019

## Arkansas NSF EPSCoR Impacts

**The chart on the right depicts all NSF EPSCoR investments in the state of Arkansas since 1980.**

These awards include the EPSCoR Track-1, Track-2, Track-3, and Track-4 programs as well as co-funding for SBIR, STTR, and other NSF programs.

**Arkansas NSF EPSCoR is managed by the Arkansas Economic Development Commission Division of Science and Technology.**

EPSCoR Direct Funding & Co-Funding in Arkansas, 1980 - 2019	
Arkansas Economic Development Commission	\$ 52,249,900
SBIR	\$ 3,268,164
STTR	\$ 750,000
Fellowship	\$ 10,707
Arkansas Baptist College	\$ 49,992
Arkansas State University Main Campus	\$ 9,233,550
Arkansas State University Mid-South	\$ 419,383
Hendrix College	\$ 1,105,140
Ouachita Baptist University	\$ 500,000
Philander Smith College	\$ 1,749,999
University of Arkansas	\$ 63,065,872
University of Arkansas at Fort Smith	\$ 787,278
University of Arkansas at Monticello	\$ 180,000
University of Arkansas at Pine Bluff	\$ 2,968,402
University of Arkansas Little Rock	\$ 5,529,717
University of Arkansas Medical Sciences	\$ 3,734,191
University of Central Arkansas	\$ 1,319,636
<b>Grand Total</b>	<b>\$ 146,921,931</b>

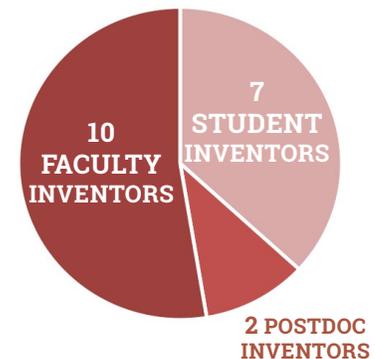
## The Center for Advanced Surface Engineering (CASE)

**PUBLICATIONS  
SUBMITTED:  
158**

Publication Status	Count
Accepted - Awaiting Publication	5
Published	147
Submitted - Under Review	6
<b>Grand Total</b>	<b>158</b>

## PROJECT DATA 2015-2019

**PATENTS FILED: 12**



**PROPOSALS SUBMITTED: 103**

Status	Count	Amount Awarded	Amount Requested
Awarded	49	\$ 14,877,329.06	\$ 14,924,136.13
Denied	42	\$ -	\$ 48,349,948.61
Pending	4	\$ -	\$ 1,337,000.00
Submitted	8	\$ -	\$ 8,636,853.00
<b>Grand Total</b>	<b>103</b>	<b>\$ 14,877,329.06</b>	<b>\$ 73,247,937.74</b>

## Three things every executive should know about cybersecurity



**Jennifer Fowler**  
Director of Education,  
Outreach, & Diversity

**CLICK TO READ THE  
FULL ARTICLE AT  
ARKANSASEDC.COM**

**O**ur society is increasingly digital, utilizing more technology and collecting massive amounts of data in every aspect of our lives. We also have witnessed an increase in the number and complexity of threats to that digital world over time. Investments in cybersecurity tools and expertise are being made at unprecedented levels. According to Gartner, a research and advisory firm, global expenditures on cybersecurity and information security will approach \$124 billion in 2019.

I recently sat down with Dr. Carolina Cruz-Neira and Philip Huff at the University of Arkansas at Little Rock to bring awareness to common misconceptions in the cybersecurity industrial complex and tips for companies who want to implement effective security protocols against these growing cyber threats.

Dr. Cruz-Neira's official titles include Executive Director of the Emerging Analytics Center (EAC) and interim Computer Science Department Chair, and Arkansas Research Alliance Scholar, though those don't fully represent her achievements. Dr. Cruz-Neira is an esteemed computer engineer, designer, and technology pioneer who invented the CAVE (an immersive virtual reality environment) and has been at the forefront of data analytics, visualization, virtual and augmented reality technology and research for over 20 years. Philip Huff is an assistant professor who recently joined the EAC as a cybersecurity research fellow, fresh from the front lines of cybersecurity work at the Arkansas Electric Cooperative.

Huff, Cruz-Neira and several others from state and federal entities are working with the American Cyber Alliance, a new initiative to create partnerships among private sector, academia, government, and military that will strengthen our country's defense against cyber attacks.



# Engineers: A NEW GENERATION

**Julia Hoskins**

**Undergraduate student of mechanical engineering at the  
University of Arkansas**

"I grew up in Fayetteville so I kind of had always planned to come to the University of Arkansas, but I did not always plan to go into engineering. I picked the degree and ended up falling in love with it. It ended up being a great match."

*[continued on next page]*

**T**he whole time I was growing up I didn't have a specific subject I really loved. I was good at math, I enjoyed science, English was fun, but what I did know is I love learning. I decided I wanted a job where I could learn every day, and I found mechanical engineering had the range I was looking for. Research is exactly what to do if you want to learn something new every day.

Dr. Zou, my advisor, was asking me what I want to do with my life. I had no idea. I ended up getting a job in her lab. I've been doing it for two years now, and I love coming to work. Most 20-year-olds can't say that. If I could have a dream job, it would be research and development, either in academia or private sector. I am very uncertain about what to do when I graduate. I am considering graduate school and looking at careers in the energy industry.

My current project is studying how to build a micro-scale surface texture based off of different species of lizards. The two main reptiles I focused on are the sandfish lizard and ocellated skink (pictured on cover). These animals live in desert biomes, they crawl through sand and abrasive textures all day. Their surface texture or surface chemistry that helps them reduce the wear and lower friction so they can travel across it faster and without shedding their skin so much.

The problem with current micro-textures is that they wear very quickly. That's why I'm looking at these animals for inspiration, it may not be best at reducing friction but could increase the durability.

I would like to encourage other girls to go into engineering. Do it! There's a stigma around STEM that it's a 'boys club', but I love it. It's cheesy but I feel like I have found friends for life. It's rewarding. The possibilities are endless with engineering. Some people were just raised thinking girls shouldn't be engineers or scientists. It doesn't matter what my gender is. Everyone has strengths and weaknesses. ■

**“Some  
people  
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# RECAP

CLICK FOR MORE INFO:  
[TINYURL.COM/APPLY2020ASRI](https://tinyurl.com/apply2020ASRI)



The 2019 Arkansas Summer Research Institute was a great success! Students took a variety of interactive STEM workshops, like how to make fuel from sunlight, 3D Printing and CAD, and detecting genetically modified ingredients in snack foods. The first session took place May 28 - June 1 (Session 1 pictured above) and the second session was June 4 - 8 (pictured below). A recap video is available on YouTube.

**Arkansas  
Summer  
Research  
Institute  
#ArkansasSRI**



**5-Day Professional  
Development Experience**



**for STEM Undergrads**

**[tinyurl.com/Apply2020ASRI](https://tinyurl.com/Apply2020ASRI)**

# **2020 ARKANSAS SUMMER RESEARCH INSTITUTE**

*May 26 - May 30  
OR June 2 - June 6*



**#ArkansasSRI @arepscor**



The Center For Advanced  
Surface Engineering



# **Adedoyin Abe**

Currently pursuing a PhD in mechanical engineering at the University of Arkansas



"I grew up in a big city in Nigeria with my parents and four sisters. I originally thought I wanted to be a doctor, I really enjoyed doing science projects and math.

I prepared for medical school while I was in high school in Nigeria, and moved to the United States in 2014 for college after a gap year."

*[continued on next page]*

**W**hen I got here it was actually difficult for me to sleep. Back home, we lived close to a large busy intersection, it was never quiet. Now I'm used to the quiet pace and I don't know if I could go back to big city life.

I got admitted to a couple schools in different parts of the country, I didn't really understand how different each region of the U.S. was. I couldn't take a physical tour so I called all the campuses to get more information because I knew I was coming here alone and I would need some support. It sounds silly but Arkansas was the nicest to me on the phone, and I got a feeling they really cared about student success and followed up their words with action.

I ended up choosing mechanical engineering for my bachelor's degree because of the diverse career opportunities. First, I realized that I wanted to study engineering. There were other fields like civil engineering and chemical engineering which had lots of career opportunities and were attractive but mechanical engineering came out on top because the future applications sounded the most interesting to me.

My current research project is improving a low friction thin coating, Polytetrafluoroethylene (PTFE). Dry lubricant coatings need to last as long as, or even longer than existing liquid lubricants to become a viable option. I am currently working on adding silica nanoparticles to the coating. I will also experiment with copper and a mixture of metals and ceramics in different configurations, to find out the best way to improve the durability and reduce the friction.

When I graduate, I am interested in working in the energy industry. If we can reduce

the amount of energy and friction it takes to produce power, we could make power production more efficient and use less of our natural resources to produce the same amount of energy. I am also interested in manufacturing. Because tribology is all about reducing friction and increasing durability, I am hoping to contribute to friction-reducing technology in the field so machinery used in manufacturing could have longer lifetimes.

I grew up with four sisters and so much support for my love of math and science in my family. I realize everyone didn't have this experience and I'd like to say to other girls, there are girls in math and science! My dad used to say "you have the same brain as anyone else and you have what it takes."

During my undergrad, I had a lot of good professors. By the time I got to college, I didn't have the same spatial reasoning as guys and I think this was the same for some of my female classmates. Girls don't need spatial logic to play with dolls, so learning to use CAD can be more difficult later on. I remember calculus 3 was very difficult because I had problems visualizing surfaces that sloped in more than one direction. I believe teachers need to explain things in different ways (models, videos) and give exercises for different learning styles, as well as take time to encourage the female students dealing with discouragement.

I knew coming in I didn't have as much experience with engineering, I didn't have access to the same facilities a lot of students in the U.S. have. We mostly did theoretical studies in Nigeria and only had labs our final year of high school. The cool thing is that once you get knowledge, no one can take it away from you. ■

# Stay in touch

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