

This AWS Machine Learning Manager is Rooting Out Bias in AI Programs

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THE INSTITUTE Growing up in an all-female household, Nashlie Sephus was a do-it-yourselfer from a young age. She learned to do household repairs and other odd jobs around her Jackson, Miss., home.

“We had to do everything, whether that meant getting on top of the roof to hang the Christmas lights or putting up a new ceiling fan,” the IEEE member says. “It was little things like that which really got me into being curious about how things work.”

Sephus went to sleepaway camps that focused on a variety of topics including math and science. One of those was an engineering camp exclusively for girls. The program was short—two weeks long—but it introduced her to computer engineering, and she decided it was the field she wanted to work in.

Today Sephus is an applied scientist who manages the [Amazon Web Services \(AWS\)](#) machine-learning group, in Atlanta. She evaluates the company's AI-based facial analysis and recognition tools to root out bias in them, and she is leading the development of a bias-identification tool for machine-learning models.

She also has been working to give back to her hometown by financing the creation of a tech hub in Jackson's downtown.

CAREER PATH

Mathematics was Sephus's favorite subject in school. One day her eighth-grade math teacher pulled Sephus aside after class and encouraged her to check out an engineering camp for girls at [Mississippi State University](#), near Starkville. Sephus, who was more excited about the opportunity to spend some time away from home, recognizes that the camp changed her life.

"That was the first time I was really introduced to hands-on topics in each discipline of engineering," she says. "Not only did I know what engineering was, I [discovered] that computer engineering was fascinating, because all these letters and numbers we were typing into the computer could control so many things around me. I knew that computer engineering was what I wanted to do."

Because the camp was for girls only, it removed the barrier of "feeling like you're the only one," she says. "These were just all girls wanting to learn about engineering, and it made it a much better environment to grow in."

She says she also learned how to relate to people from different backgrounds—which came in handy when she went off to college and then entered the workforce.

"It's no secret that in most of my classes—and even in other settings—that sometimes I'm the only female, sometimes the only black person. And at times I may be the only person who was born in the United States," she says.

She graduated with a bachelor's degree in electrical and computer engineering from Mississippi State in 2007. Instead of going directly into the workforce, she decided to pursue a master's degree and Ph.D., also in electrical and computer engineering, at [Georgia Tech](#).

Having a doctorate, she recalls thinking, "would allow me to be in rooms that I probably would not have been able to be in without it."

After earning her Ph.D. in 2014, Sephus helped create Partpic in Atlanta. The company was an all-black female AI startup, and Sephus was its CTO. It created algorithms, now patented, to identify replacement parts such as screws, bolts, and washers from an image uploaded by

the user. Its algorithms would find the exact match for the part and send the person a link to a store where it could be purchased. Partpic was acquired by Amazon in 2016, and the company hired Sephus and 10 of her coworkers.

“I’m very happy to say we were probably the most diverse engineering team Amazon had ever had at that point,” she says. “We were also the first engineering team that Amazon had in Atlanta and in the Southeast.”

Her first job at Amazon was software development manager for the company’s visual search tool, which also uses images of products to find matches. In 2019 she joined the AWS machine-learning team. She evaluates the company’s facial analysis and recognition tools such as Rekognition. Amazon’s software has raised concerns about racial bias in the technology. Researchers at the U.S. National Institute of Standards and Technology found that the software’s algorithms do not work as well in correctly identifying women and people of color. Amazon in June instated a yearlong moratorium on the sale of the software to law enforcement.

“We want to make sure that we measure where biases may occur, whether that be in data or algorithms or even in the evaluation,” Sephus says. “We also want to be sure that we’re being transparent and our experiments are reproducible.”

Sephus’s work and influence contributed to AWS’s recently launched SageMaker Clarify tool, which helps identify biases in machine-learning models that were developed using the company’s SageMaker software.

Sephus’s new job requires her to work with Amazon’s legal and public policy teams. She has spoken with members of the U.S. Congress, regulators, and organizations about how bias in code is an industrywide problem.

Overcoming bias is partly a matter of educating people on how the technology works, she says.

“It’s about ensuring that customers are using the technology properly,” she says. “It’s about making sure that [those] the technology is being used on are being treated fairly. There are many different stakeholders that need to be brought into the conversation on how we solve those problems.”

NEW TECH HUB

In her free time, Sephus has been working to give back to her hometown. Using her proceeds from the sale of Partpic, in 2018 she founded The Bean Path, a nonprofit organization in Jackson that provides free technical assistance to small businesses, senior citizens, and

students. More than 350 people have used its services. The nonprofit sets up shop in libraries and community centers. It also runs coding and engineering programs for youngsters and offers them scholarships.

“Being a tech expert and having the well-versed experience that I’ve had, I wanted to show people what is possible when you get on the tech bandwagon,” Sephus says.

The nonprofit purchased 12 acres of land and seven buildings in the downtown area in September. The group aims to build a coding training center, a maker space, coworking space, and an innovation hub for entrepreneurs.

“We’re really bringing the [local] community, the tech community, and the entrepreneurship community all together in the central Mississippi area,” Sephus says. “Hopefully this will catch on like wildfire and really connect a lot of the great work that is already happening in Mississippi, and build one solid community.”

Almesha Campbell, director of technology transfer, commercialization, and research communications at [Jackson State University](#), told the [Clarion Ledger](#) that a partnership with the university and the new tech district will provide opportunities for students and graduates.

“Jackson State has a school of engineering and a school of business. All the students have great ideas,” Campbell said. “They can actually work with Nashlie and can help the community develop technologies.

Campbell added that the tech district could play a critical role in stemming the brain drain from the state.

“It’s creating that kind of opportunity for [young people] to say, ‘Hey, Jackson, Mississippi, is actually doing something great, and I want to be part of it, and I want to contribute,’” she said. “It’s going to have a really big impact, not just for the city of Jackson but for the state of Mississippi.”

THE IEEE NETWORK

Sephus first got involved with IEEE when she joined Mississippi State’s [student branch](#). She belongs to the [IEEE Signal Processing Society](#) and [IEEE Women in Engineering](#).

She says participating in the organization helps her build her network.

“I’ve met people through conferences from everywhere across the world,” she says. “I was able to expose what I do to a broader audience through speaking engagements, panels, and the papers I’m working on. I love being able to bring people into my world so they can understand exactly what it is that I do, and hope to encourage them to want to do the same.”

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