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# Plant genetics a focus of new Arkansas Agricultural Experiment Station statistician

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U of A System Division of Agriculture

## Fast facts

* New agricultural statistics faculty member has vast background in computer programs and plant genetics
* Statisticians can help researchers save time and resources

(716 words)

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FAYETTEVILLE, Ark. — Samuel Fernandes, an agricultural statistics assistant professor, combines computer science advances with elements of agriculture to help plant breeders, growers and consumers.

“Sometimes we don’t have the time nor the resources to do the appropriate experiment that we would need to answer some specific questions,” Fernandes said. For example, surveying plants in over 1,000 locations is not feasible, but computer programs allow researchers to evaluate given conditions over many years.

“It’s a simplification of real life, but it is something that allows us to answer many useful questions.”

Fernandes, originally from Minas Gerais, Brazil, joined the Arkansas Agricultural Experiment Station’s Agricultural Statistics Laboratory in June. He will primarily split his research between the departments of crop, soil and environmental sciences and horticulture.

Before joining the experiment station, the research arm of the University of Arkansas System Division of Agriculture, Fernandes investigated the development and application of multivariate methods on the genomic data of plant breeding as a postdoctoral student at the University of Illinois.

He developed a simulation package called “simplePHENOTYPES” on the statistical program R.

The package helps researchers simulate phenotypic observations based on molecular marker data, Fernandes said.

They can use these observations to test different methods, like one to detect the number of genes involved in a trait, he said. If researchers apply their method to simulated yield data, for example, they will know whether or not their model is suitable to detect the genes responsible for real plant yield data.

“If we run it on real data, we would never be certain of the performance of our method,” Fernandes said. In real data, it is unknown how many genes are involved in the genetic architecture of a given trait.

Fernandes’ simulation was published in early 2020 and has over [12,000 downloads](https://cranlogs.r-pkg.org/badges/grand-total/simplePHENOTYPES), he said.

At the Arkansas Agricultural Experiment Station, his research will focus on quantitative genetics. He will use his past programs and methods at the university to help other researchers develop new plant varieties and research tools.

“Dr. Fernandes’ experience and expertise in genetics has the potential to greatly strengthen our plant breeding programs,” said Jeff Edwards head of the crop, soil, and environmental sciences department for the University of Arkansas System Division of Agriculture and the Dale Bumpers College of Agricultural, Food and Life Sciences.

“His research will allow our soybean and rice breeders to be more precise and efficient in selecting traits that will benefit Arkansas stakeholders,” Edwards said.

Fernandes is already discussing imminent collaborations with many researchers with the experiment station, including Margaret Worthington, assistant professor of fruit breeding and genetics, and Christian De Guzman, assistant professor of rice breeding and genetics.

Fernandes’ collaboration-oriented research approach is a great strength, Edwards said. “I am really looking forward to his expertise and skillset being integrated into our current research programs and seeing how his efforts push us in new directions.”

Fernandes will also teach introductory statistics classes through the Dale Bumpers College of Agricultural, Food and Life Sciences at the University of Arkansas.

“I have been focused a lot on quantitative genetics, but now I’ll have the chance to go back a little more and work with this area that I’ve always liked,” Fernandes said about teaching the statistics classes.

Fernandes had to journey through many passions to find where he is now. His father is a rancher, so animals and plants were always of interest to him. But he also enjoyed computer science and wanted to pursue it as well.

It was not until he had an internship in plant breeding that he felt like he found the field with the proper mix of plants and computer science.

Fernandes received his bachelor’s degree in agronomy from the University of Brasília in 2010. He received his master’s degree and Ph.D. in genetics and plant breeding from the University of Lavras in 2012 and 2016, respectively.

With his background in plant research, he said he hopes he will be able to communicate data effectively to students and researchers.

“In addition to having that education, I grew up on a farm — my father is a rancher,” Fernandes said. “So, I know what they are talking about when they come talk to me about ag related things.

“I think that could be something beneficial to the research and teaching here.”

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The University of Arkansas System Division of Agriculture’s mission is to strengthen agriculture, communities, and families by connecting trusted research to the adoption of best practices. Through the Agricultural Experiment Station and the Cooperative Extension Service, the Division of Agriculture conducts research and extension work within the nation’s historic land grant education system.

The Division of Agriculture is one of 20 entities within the University of Arkansas System. It has offices in all 75 counties in Arkansas and faculty on five system campuses.

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