

**Sanjay Iyer wins 2023 Arkansas Soybean Science Challenge Junior Division Award at the Central Arkansas Regional Science and Engineering Fair**

Sanjay Iyer, age 12, an 7th grader at Forest Heights STEM Academy in Little Rock, won the Soybean Science Challenge Junior Division award at the 2023 Central Arkansas Regional Science and Engineering Fair held at the University of Arkansas Little Rock on March 3.

 Sanjay received a $200 cash award provided by the Arkansas Soybean Promotion Board. His science project titled “PEST (Pest Evaluating Soybean Tool): A novel machine learning method to detect soybean plant pests” also placed second in computer science.

 Stephanie James, Sanjay’s teacher, won the $100 Soybean Science Challenge Junior Division Teacher-Mentor Award. James stated the Soybean Science Challenge is a great way to get students interested in agriculture. “It's a great way to get them interested in science and agriculture, two important fields with many career opportunities. Additionally, the challenge provides an opportunity for students to develop critical thinking and problem-solving skills as they work on real-world challenges related to soybean production. Finally, participating in the challenge can help students build confidence and self-esteem as they see their hard work pay off and gain recognition for their achievements. Overall, the Junior Level Soybean Science Challenge is a fantastic opportunity for students to learn, grow, and have fun while doing it,” she replied.

 Sanjay was delighted to win the 2023 Junior Division Soybean Science Challenge. “I am very grateful to be called the 2023 Junior level winner of the Soybean Science Challenge. I am also thankful for my mentor, Ms. Stephanie James,” he replied.

 Chaithanya Iyer, Sanjay’s mother, was very happy to see him receive the award. “I’m thankful to the Soybean Science Challenge for recognizing Sanjay’s research and providing a platform for sharing research findings,” she stated.

Sanjay was impressed with what he learned from participating in the Soybean Science Challenge. “In the videos, I liked how the farmers explained in detail how much time and effort it takes to cultivate soybeans. I found it useful to learn that farmers monitor soybean fields twice a week manually, which is a laborious and time-consuming task for farmers,“ he explained.

The Soybean Science Challenge provides an opportunity for Arkansas junior high and high school students to participate in scientific research that can impact the State of Arkansas as well as the world. Soybean Science Challenge student researchers learn about this important commodity crop and its many uses including feeding the world, development of biofuels and sustainable products. The Soybean Science Challenge helps students develop an understanding of the challenges and complexities of modern farming,” said Dr. Julie Robinson, Associate Professor, and director of the program.

 “The goal of the Arkansas Soybean Science Challenge is to engage students in “real- world” education to support soybean production and agricultural sustainability,” said Gary Sitzer, a former member of the Arkansas Soybean Promotion Board. “The program also rewards scientific inquiry and discovery that supports the Arkansas Soybean Industry.”

The Arkansas Soybean Science Challenge was launched in January 2014 to 9-12th grade science students and in 2021 to grades 6-8. Students who successfully completed the online course were eligible to have their original soybean-related research projects judged at the 2023 ISEF-affiliated Arkansas Science and Engineering Fairs.

Information on the 2023-2024 Arkansas Soybean Science Challenge will be available in summer 2023. For more information, contact Dr. Julie Robinson at jrobinson@uada.edu or Diedre Young at dyoung@uada.edu.

The Cooperative Extension Service is part of the University of Arkansas System Division of Agriculture.

**Sanjay Iyer, Forest Heights STEM Academy, Little Rock, Arkansas; Teacher, Stephanie James.**

**Category: Computer Science**

**Title: PEST (Pest Evaluating Soybean Tool): A novel machine learning method to detect soybean plant pests.**

**Abstract:** **:** Approximately 45% of annual food production worldwide is lost due to pest

infestation. Currently, chemical pesticides have been proven to be effective to fight pest infestation and increase crop yield. Though pesticides have allowed for an increase in crop yield, they have detrimental effects on the environment and our health. Soybeans are the second largest pesticide-consuming crop worldwide, accounting for 22% of total pesticide consumption. As of 2023, the U.S. is the world's second-leading pesticide consumer and the leading soybean producer. Soybean fields are regularly monitored through pesticides twice a week manually, which is a very laborious and time-consuming task for farmers. These issues underscore the need for automated soybean pest detection. Current machine learning models have an average accuracy of 74-88% in detecting soybean plant pests. By training a transfer learning convolutional neural network to distinguish healthy soybean plants from plants affected by *Diabrotica speciosa* and caterpillars (the two most common pests that contaminate soybeans), we propose PEST, a state-of-the-art computational tool that demonstrates a 93% accuracy rate for detecting soybean plant pests. Project PEST is successful in providing an accurate and effective automatic pest detection aid to farmers to decrease the manual monitoring of soybean fields. PEST may ultimately aid in accelerating pest detection, resulting in quicker effective treatments and an increase in crop yields. The development of a live website is currently underway so farmers around the world will be able to conduct real-time soybean plant pest detection via the built-in webcam or smartphone camera.



Central Arkansas Regional Science and Engineering Fair Junior Division winner Sanjay Iyer and teacher-mentor, Stephanie James