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WSU researcher awarded \$175,000 NSF grant to help improve data-driven decision-making

By Polly Basore Wenzl



Dr. Saideep Nannapaneni — assistant professor of industrial, systems, and manufacturing engineering at Wichita State University — was awarded a \$175,000 grant for research that has implications for increasing the speed and accuracy of data-driven decision-making.

The National Science Foundation has awarded a \$175,000 grant to Wichita State University's Dr. Saideep Nannapaneni for research that has implications for increasing the speed and accuracy of data-driven decision-making.

In decision-making – whether in engineering design, health care management or financial investments – people make predictions about what will happen based on what has happened in the past, using the data available, but recognizing that data may be incomplete or some of it inaccurate.

"In most real-world scenarios, a system's behavior is not completely known; it is uncertain, often influenced by several external factors," said Nannapaneni, assistant professor of industrial, systems and manufacturing engineering. "Typically, we collect data using sensors to understand such uncertain system's behavior. Sensors are not perfect. This imperfection results in noise and imprecision in collected data and therefore, we need to make decisions in the presence of noisy imprecise data."

Bayesian network is a widely used mathematical approach to represent uncertain system behavior, and for decision making in the presence of noisy and imprecise data. Dr. Nannapaneni's research looks to adapt this approach to quantum computing, where information is processed in a fundamentally different manner than traditional computing.

"The increased computational efficiency provided by the quantum computing paradigm can enable faster data analytics," Nannapaneni said.

Solving these challenges ultimately lead to being able to analyze data with greater speed, which leads to quicker decision making. This has implications in several fields of science and engineering such as in designing new high-performance materials, developing new drugs, medical health diagnosis, financial risk analysis and portfolio optimization.

Dr. Nannapaneni is an assistant professor of industrial, systems and manufacturing engineering in the College of Engineering. He holds a PhD from Vanderbilt University. In addition to research, he teaches courses in advanced level statistics and engineering decision making.

His NSF-awarded project is titled "Quantum Bayesian network simulation through efficient representation, transpilation, and uncertainty quantification." His research was also awarded two smaller grants from NASA and the Kansas Board of Regents for his project titled, "Quantum algorithms for real-time prognostics and health management."

[Read the grant abstract](#)