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SwRI, SMU fund SPARKS program to explore collaborative research
Inaugural projects will apply machine learning to industry problems

Southwest Research Institute (SwRI) and the Lyle School of Engineering at Southern Methodist University (SMU) announced the Seed Projects Aligning Research, Knowledge, and Skills (SPARKS) joint program today, which aims to strengthen and cultivate long-term research collaboration between the organizations.

Research topics will vary for the annual funding cycles. The inaugural program selections will apply machine learning — a subset of artificial intelligence (AI) — to solve industry problems. A peer review panel selected two proposals for the 2020 cycle, with each receiving $125,000 in funding for a one-year term.

"Our plan for the SPARKS program is not only to foster a close collaboration between our two organizations but, more importantly, to also make a long-lasting impact in our collective areas of research," said Lyle Dean Marc P. Christensen. "With the growing demand for AI tools in industry, machine learning was an obvious theme for the program's inaugural year."

The first selected project is a proof of concept that will lay the groundwork for drawing relevant data from satellite and other sources to assess timely surface moisture conditions applicable to other research. SwRI will extract satellite, terrain and weather data that will be used by SMU Lyle to develop machine learning functions that can rapidly process these immense quantities of data. The interpreted data can then be applied to research for municipalities, water management authorities, agricultural entities and others to produce, for example, fire prediction tools and maps of soil or vegetation water content. Dr. Stuart Stothoff of SwRI and Dr. Ginger Alford of SMU Lyle are principal investigators of "Enhanced Time-resolution Backscatter Maps Using Satellite Radar Data and Machine Learning."

The second project tackles an issue related to the variability of renewable energy from wind and solar power systems: effective management of renewable energy supplies to keep the power grid stable. To help resolve this challenge, the SwRI-SMU Lyle team will use advanced machine learning techniques to model and control battery energy storage systems. These improved battery storage systems, which would automatically and strategically push or draw power instantly in response to grid frequency deviations, could potentially be integrated with commercial products and tools to help regulate the grid. Principal investigators of "Machine Learning-powered Battery Storage Modeling and Control for Fast Frequency Regulation Service" are Dr. Jianhui Wang of SMU Lyle and Yaxi Liu of SwRI.

"To some extent, the SPARKS program complements our internal research efforts, which are designed to advance technologies and processes so they can be directly applied to industry programs," said Executive Vice President and COO Walt Downing of SwRI. "We expect the 2020 selections to do just that, greatly advancing the areas of environmental management and energy storage and supply."

The program will fund up to three projects each year, seeking to bridge the gap between basic and applied research.

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