

Research team using NSF grant for development of soil sensor

**When addressing the ongoing global problem of food scarcity, a key element toward ensuring a successful crop yield is healthy soil conditions.**

**The need exists for a sustainable method of attaining real-time data on soil health to aid farmers in making better decisions related to food production. In response, the combined efforts of a group of scientists and engineers at Kansas State University are expected to produce a sensor that will provide the agricultural community with continuous measurements of needed data such as soil moisture content, available nutrients and microbial activity.**

**The team, headed by [Stephen Welch](#), professor of agronomy, has recently been funded by a National Science Foundation Early-concept Grants for Exploratory Research, or EAGER, award of \$300,000 to develop such a sensor.**

**"Our sensor will be unique as it will be powered by microorganisms that already exist in the soil," said [Stacey Kulesza](#), assistant professor of civil engineering and co-investigator for the EAGER. "And if successful, its use will help farmers to make more informed decisions about agricultural practices."**

**Other researchers in the two-year project titled "Sustainable Biosensor Integration for Precision Management of Agricultural Soils" are Prathap Parmeswaran, assistant professor of civil engineering; Ganga Hettiarachchi, professor of agronomy; and Ryan Hansen, assistant professor of chemical engineering.**

**The anticipated result of the funded work will be twofold. First is the development and validation of an impedance spectroscopy sensor powered by a subsurface microbial fuel cell. Then additional data provided by the sensor and fuel cell will be used to create a continuous-time, mathematical/computer simulation model for predicting valuable soil data relevant to crop growth.**

**"This project will strengthen the collaboration among engineers and agronomists by establishing this new multidisciplinary team to address the issue of global food shortages," Kulesza said.**

**"A team goal is to be among the leaders in generating new knowledge about tomorrow's challenges facing farmers in Kansas and farmers worldwide," she said.**

