UTRF Facilitates Commercial Opportunities for CURENT

The University of Tennessee Research Foundation (UTRF) is working with researchers at a National Science Foundation (NSF) Engineering Research Center (ERC) to help commercialize the next wave of innovations that promise to transform our country's power grid. The Center for Ultra-Wide-Area Resilient Electric Energy Transmission Networks (CURENT) was established in 2011 to study the challenges

CURENT is the first and only ERC devoted to power transmission. As the electric utility industry shifts away from fossil fuels and toward renewable sources of energy, there is a need to identify how this change impacts our current electric power system and what can be done to meet future power needs. CURENT's vision is to develop a fully monitored and dynamically controlled nationwide transmission grid that is more efficient, secure, and reliable; lower in cost, and better able to accommodate renewable energy sources.

CURENT is a collaborative effort between academia, industry, and the national laboratories that is jointly funded by NSF and the U.S. Department of Energy (DOE), with annual funding of $4 million. The ERC is headquartered at the University of Tennessee (UT) and has three additional academic partners: Northeastern University, Rensselaer Polytechnic Institute, and Tuskegee University. CURENT's industry members work closely with its leadership to provide input on research activities, which are organized around four areas: monitoring, modeling and estimation, control, and actuation. A central driver of CURENT's research efforts is the large-scale system testbed and hardware testbed, which together enable researchers to emulate the power grid.

two commercialization agreements have been executed. UTRF works with CURENT researchers to facilitate the licensing and patent application processes and build relationships with industry members interested in their technology.

> *"CURENT is leading the way in research on our nation's electric transmission system and having this ERC at UT shows we are a leader in power systems research," says Lisa Beard, CURENT Industry Liaison Officer. "Our work is drawing faculty and students to UT and attracting funding from sources beyond NSF and DOE. In 2017 alone, CURENT was able to leverage $4 million in research funding in addition to $4 million in core research funding."*

CURENT Deputy Director Dr. Yilu Liu is one of the more prolific inventors at the Center. Her innovations include low-cost sensor networks for electric grids and new concepts in visualizing the behavior of grids and how they react to natural phenomena. Dr. Liu has developed a simplified way of modeling large grids as equivalent transfer functions, which has dramatically reduced the computational burden for real-time look-ahead simulations. She is also the inventor of FNET, a low-cost, deployable GPS-synchronized wide-area

developing technologies that ensure the future power grid will be more flexible, secure, resilient, and interconnected," says UTRF Licensing Associate, Dr. Andreana Leskovjan. "Their innovations also promise to change how we use power in everyday applications. We are excited to continue our support of CURENT and to see how their inventions will shape our future power needs."

Dr. Fred Wang

One of the most recent technologies to emerge from CURENT was developed by CURENT Technical Director Dr. Fred Wang and his students. This device, a sensor designed to measure emerging wide bandgap (WBG) semiconductor characteristics, was a collaboration between Dr. Wang and CURENT industry member Keysight Technologies. The sensor is smaller and faster than similar devices currently on the market, making it a better fit for WBG semiconductors. UTRF executed a license agreement with Keysight Technologies in November 2017, and a patent application was filed in December 2017.

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