



Pursuing Patents

Boca Raton, Fla. (April 19, 2018) – I-SENSE team members continue to develop innovative ways to advance the field. In the past quarter, team members submitted four patent applications. Here's details on the submissions.

Systems and Methods for Guiding a Multi-Pole Sensor Catheter to Locate Cardiac Arrhythmia Sources

Inventors: Behnaz Ghoraani and Prasanth Ganesan

Atrial fibrillation (AF) is an abnormal and irregular rhythm of the heart when the electrical signals are generated erratically. The disorder affects roughly 34 million people worldwide. Current methods employed to detect atrial fibrillation sources in the heart utilize a 64-pole catheter, which has limitations in the overall detection strategy.

This invention leverages a probabilistic algorithm that uses electrocardiograms from a multi-polar diagnostic catheter (MPDC). The movement of the MPDC is guided by input from the algorithm to target the AF source more accurately and is recorded on an electrogram.

System and Method for Localizing Cardiac Arrhythmia Sources Using Multi-Pole Sensors

Inventors: Behnaz Ghoraani and Prasanth Ganesan

Atrial fibrillation (AF) is the most common type of heart arrhythmia, wherein the heart beats too slowly, too fast, or in an irregular way. It can be treated through a procedure known as ablation, which destroys a small area of heart tissue that is the source of the irregular heartbeats. One of the challenges associated with ablation is that it can be difficult to detect the exact source of the AF.

This technology allows for the generation of an AF ablation target map by utilizing a conventional multi-pole diagnostic catheter in the atria. The ablation target map reveals the locations of any AF sources in the atria. The method can be used in the left or right atrium, depending on the clinical need.

Systems and Methods for Federated Power Management

Inventors: Jason Hallstrom, Chancey Kelley, Michael Brown, Jiannan Zhai and Alexander Roscoe

The invention involves a hardware and software architecture for accommodating dynamic energy harvesting and load conditions in resource-limited devices. The architecture has broad use in low-energy electronics applications. The architecture, which introduces fundamentally novel hardware and software extensions to the concept of federated energy storage, enables dynamic control of charge and discharge priorities via a processing core, and real-valued inputs of each component's charge state. The design is supported by new operating system services for managing charge and



discharge priorities, and for querying the current charge state of each component. The latter services will expose service life information for each component based on the current state-of-charge (e.g., 3.25 radio transmissions available at the selected transmission power).

Systems and Methods for Irrigation Monitoring and Leak Detection

Inventors: Jason Hallstrom, Jiannan Zhai, Chancey Kelley, Michael Brown, Drew van Zwieten and Don Salamon

The current systems utilized for monitoring fluid flow and leaks in irrigation systems in residential and commercial buildings is ineffective, which results in missed leaks. These missed leaks can cause substantial damage to property and a hefty price tag to repair the water damage and irrigation system.

The invention involves a system for detecting leaks, either above the ground or below ground, in residential and commercial irrigation systems. This system can be subdivided into an enabling device, and supporting algorithm. The device comprises a battery-free wireless sensing platform intended for in-line installation. The device simultaneously harvests energy from in-pipe flows, and wirelessly reports data measurements of those flows. The dual harvesting and measurement design is novel. It includes a new approach to achieving sensing accuracy, and a novel antenna mechanism. The algorithmic component detects flow anomalies across a multi-point monitoring field based on data collected from the sensing device. The resulting system, comprising a field of sensing devices, a receiving station, and the supporting algorithm is novel.

###