Physiological Sensing Facility

INITIATIVE

Instead of waiting for technology to emerge by chance, we have merged engineering with cell science in an approach known as “hypothesis driven engineering.” This is the foundation upon which the Physiological Sensing Facility (PSF) was formed. The facility serves as an interdisciplinary resource and engages scientists and engineers from across Purdue University in the development and application of advanced biosensing technologies as new tools for discovery. The PSF is a trans-center facility in Discovery Park, bridging the Bindley Bioscience Center with the Birck Nanotechnology Center. In PSF labs, ideas and capabilities are incubated, adapted and applied to advance existing technologies. New biological sensing capabilities are developed that have significant impact in many research areas in agriculture, basic biology, the environment and medicine.

Technology. The Physiological Sensing Facility brings together an eclectic assemblage of basic capabilities that are all key components for engineered systems. This includes hybrid organic/inorganic biomaterials, biochemistry, biosensors, cell physiology and signaling, electrical engineering, electroanalytical chemistry, microelectrode systems, mechanical engineering, neurophysiology, optics and optical engineering, organic nanomaterials, self-referencing microprobe technology and silicon microfabrication.

Science. The advancements in technology fostered and advanced by the PSF have resulted in key advances in life science research and have been broadly used by agricultural, basic biological, environmental and medical researchers. These advances include the first recordings of glutamate efflux and reuptake in neurons, oscillatory glucose uptake in individual pancreatic beta cell islets, islet encapsulation, oxygen delivery and monitoring for cancer treatment, direct recordings of nitrogen exchange and conversion in ammonia oxidizing microbial biofilms, biochemically non-invasive recordings of plant hormone transport in plant roots, and real-time recordings of calcium signals of plant spores in microgravity space flight environments.