

Our Mission



The Center for Bioelectronics, Biosensors, and Biochips is dedicated to excellence in research and development of engineered biosystems in the service of human health and medicine.

Our Vision

An integrative research and education enterprise that is oriented toward service, is actively managed and directed by the constituency it serves, and is focused on providing leadership and excellence to the scientific and technological area of bioelectronics, biosensors and biochips.

Our Success

- Awarded over \$5 million in research grants
- Over 40 peer-reviewed manuscripts in high impact publications
- Awarded several patents
- Successful multidisciplinary collaborations with industrial members and academic researchers

Visit Us

The newly renovated C3B Laboratories are conveniently located in the Clemson University Research Park, Anderson County, SC



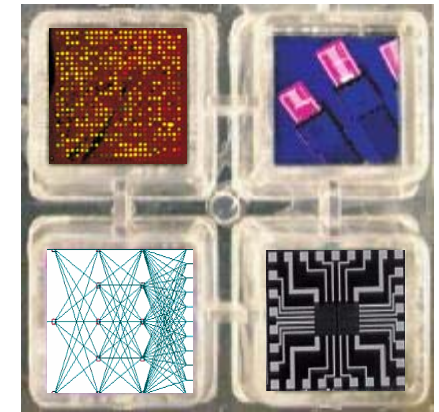
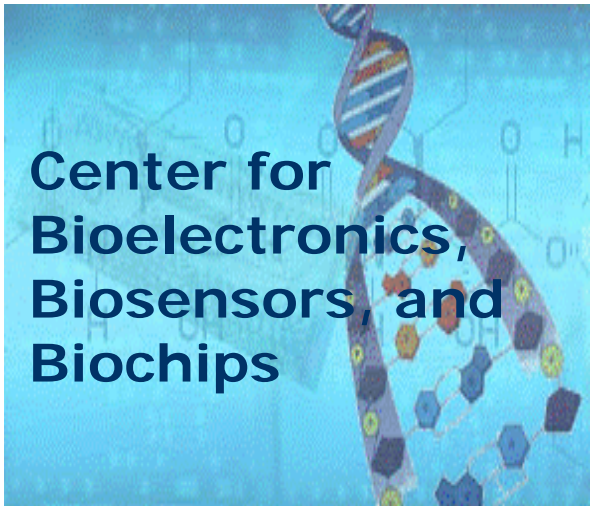
Center for Bioelectronics, Biosensors and Biochips

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“Diagnostic tools linked to therapies: Making a difference in patient outcomes”



C3B
Clemson University

Project Driven Research

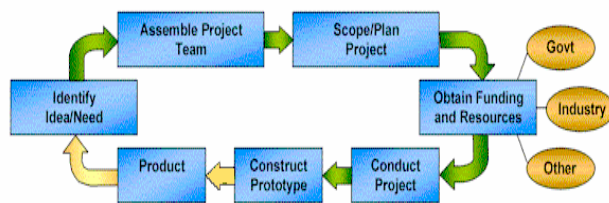


Image courtesy of Lincoln University

The C3B research process includes:

- identifying critical path problems
- developing new methodologies, processes, or approaches
- constructing test beds and prototypes.

Projects and processes with promising results move to product development and pre-commercialization phases in conjunction with our industrial partners.

C3B Partners

The C3B is a subscription-based Industry University Cooperative Research Center (IUCRC).

Member companies:

- subscribe to general or core research
- provide in-kind contributions of goods or services
- participate in annual meetings
- sponsor research projects
- recruit our talented students.

C3B Research

Implantable Biosensors for Tissue Monitoring During Trauma



C3B researchers are developing a temporary implantable biosensor with wireless communication capabilities to monitor glucose and lactate levels of trauma victims. They are investigating the amperometric response of the biochip to tissue levels, the biocompatibility of hydrogels coating the biochip, and the biochip's long and short term performance in laboratory animals.

Benefits

- Provides a means for medical personnel to make life saving decisions in mass triage scenarios
- Applications in diabetes health care, transplant organ health, critical care, and space exploration

Cell-based Neurotoxicity Array Biosensor

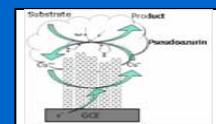


These cell-based neurotoxicity array biosensors increase testing throughput by providing multiple array wells integrated with biosensing elements. C3B researchers are experimentally growing and differentiating array cell cultures, measuring the impedance signatures in response to various drugs, and interpreting the results with artificial neural networks.

Benefits

- Cell-based sensing provides more reliable information about chemical efficacy on cells over time
- Differentiated cell cultures offer an alternative to live animal investigations
- Applications in biochemical threat detection

Sub-cellular Monitoring Using Nanobiosensors and Nanobeacons

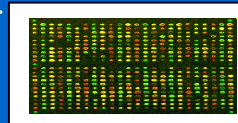


Incorporating nanoscale materials into biosensors and bioprobes allows researchers to directly monitor and measure samples at the sub-cellular level. C3B researchers are investigating the use of carbon nanotubes in a nanobiosensor design with the goal of directly measuring electrochemical reactions without the use of reagents such as oxygen.

Benefits

- Eliminating the need for reagents will improve the performance of in vivo nanobiosensors and nanobeacons

DNA Biochips for Brain Tumor Diagnostics and Prognostics

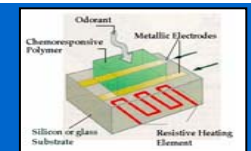


DNA microarrays enable researchers to study gene expression profiles of cell populations in great detail and are well suited to identify a targeted suite of genes associated with brain tumors. Current pathological methods for classifying brain tumors are subjective and prone to error thus, DNA biochips have the potential to revolutionize the way cancer tumors are classified and to pave the way for targeted gene therapy treatments.

Benefits

- Improved diagnostics will lead to improved therapeutic efficacy of brain cancer treatment
- Applications will extend to gene expressions of ovarian and breast cancer tumors

Electronic NOSE for Trauma Monitoring



The C3B challenge is to develop an electronic NOSE (Natural Olfactory Sensory Emulator™) system capable of detecting and classifying trace amounts of chemicals in particular classes of odors. C3B researchers are working on improving sensor performance through design and material selection, characterizing sensing of various compounds, and developing computer networks to analyze and classify sensor response patterns.

Benefits

- Provides a tool for determining the physiological status of critical care patients by monitoring expired breath
- Critical applications in environmental monitoring and homeland and national security

Research Facilities

- 5,000 sq-ft laboratory facilities, bio-clean room, and offices in the Clemson University Research Park
- Laboratories are appointed with state-of-the-art test and measurement tools and facilities