



February 25-26, 2011  
Seattle

## 2011 AAEOY Technical Conference III

Location: Hilton Seattle Airport and Conference Center, Seattle WA

February 26, 2011, 12:30pm – 4:00pm

Event is complimentary and open to the public

**Theme: Life Science and Bioengineering**

In modern times, the disciplines of medical science and engineering have joined force and created all sorts of devices and procedures for clinical diagnosis and treatment. They improve and extend lives. Bionic human has become a reality instead of fiction.



### Ubiquitous Ultrasound Imaging and System Development

Juin-Jet Hwang, Ph.D., Chief Technology Officer, SonoSite

Imaging systems of small size and light weight are advantageous for use in a variety of diagnostic applications. They allow high quality ultrasound imaging to be conveniently brought to areas that are not easily accessible to medical imaging such as a patient's bedside and areas of natural disaster. Since 1998, several hand-carried and hand held imaging systems have been developed on a mixture of different microelectronic and system technologies. As technologies continuously advance, more imaging functions will be integrated on chips, or same function can be implemented using small areas of silicon. In this talk, the application of ultrasound imaging, the system development history, and recent advances of portable ultrasound are reviewed. System architecture and implementation technologies of portable ultrasound imaging system will also be presented.

### Therapeutic Ultrasound

Larry Crum, Ph.D., Principal Physicist and Research Professor, University of Washington

Ultrasound has expanded beyond the imaging realm, with methods and applications extending to novel therapeutic and surgical uses. These applications broadly include: tissue ablation, acoustocautery, lipoplasty, site-specific and ultrasound mediated drug activity, extracorporeal lithotripsy, gene therapy and the enhancement of natural physiological functions such as wound healing and tissue regeneration. A particularly attractive aspect of this technology is that diagnostic and therapeutic systems can be integrated to produce totally non-invasive, image-guided therapy. This lecture will review these exciting new applications of ultrasound and address some of the basic scientific questions and future challenges in developing these methods and technologies, particularly the use of High Intensity Focused Ultrasound (HIFU) in the treatment of benign and malignant tumors, especially in organs which are difficult to treat using conventional medical and surgical procedures.

### Biopreservation and Artificial Organs: Facing the Challenge of the Medical Transplantation

Dayang Gao, Ph.D., Professor, University of Washington

The lack of biomaterial donors limits the medical transplantation as the key treatment for some life-threatening diseases. Cryopreservation of living biomaterials including engineered tissues and development of artificial organs are two of the most effective approaches to address the problem of the shortage of the biomaterial supply for transplantation. However, the biomaterials can be damaged by the cryopreservation process itself. The challenge to cells during freezing is the lethality of an intermediate zone of temperature (-15 to -60 °C) that a cell must traverse twice — once during cooling and once during warming. This presentation is focusing on: (1) mechanisms of the cryoinjury and cryopreservation; (2) design and optimization of cryopreservation conditions; (3) development of novel technology to achieve the optimal cryopreservation conditions to ensure the cryosurvival of cells/tissues; and (4) ongoing research in development of novel artificial organs. ----- **For more information or questions, please e-mail [contact@aaeoy2011.org](mailto:contact@aaeoy2011.org).**