IEEE Southeastern Michigan
Electrical and Electronic Engineers Creating Our Future

FALL CONFERENCE

Wednesday Evening, November 14, 2012

University of Michigan Dearborn
Fairlane Conference Center, Dearborn, MI

Meeting Agenda:
4:30pm - 5:00pm Registration
Student Tables / Vendor Tables / University Tables / Student Posters
5:00pm - 6:00pm 1st Technical Track
6:00pm - 7:00pm 2nd Technical Track
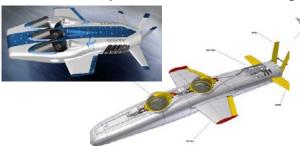7:00pm - 7:30pm Sponsor Tables, Student Posters, Networking
7:30pm - 8:15pm Dinner, Recognition, Sponsor Recognition
8:15pm - 9:00pm Keynote Presentation, Graham Hawkes

Unique Vehicles; Submarines that Fly

Graham Hawkes
Internationally renowned ocean engineer/inventor

We live on an ocean planet where 94% of life is aquatic. Over the last twenty plus years, we have analyzed the key limiting factors of current manned and unmanned undersea vehicles, and engineered solutions to overcome these limitations in order to make our oceans more accessible for exploration, science and adventure. The Deep Flight manned vehicle project started in the late 1980's as a program to provide a new generation of ultra-lightweight, cost- effective vehicles for science, exploration and adventure. At Hawkes Ocean Technologies, we decided that to move efficiently through the 3-dimensional space of the ocean territories, our submersibles had to sprout wings and fly. Additionally, we have made a case for fixed positive buoyancy., and have now built four generations of fixed positive buoyancy (FBP) craft that use a streamlined, minimum frontal area and wings (fins) to generate the forces needed to overcome buoyancy for descent and for control over pitch, roll and yaw. I strongly believe that Remotely Operated Vehicles (ROVs) will be the mainstay of future oceanographic commercial and scientific activity. At Hawkes Ocean Technologies, our current focus is to introduce the next generation ROV, which incorporates new proprietary fiber-optic tether technology and high energy-density batteries to enable range, depth, and deployment capabilities well beyond those of current-generation ROVs. It is my hope that this new generation of manned and unmanned vehicles we are introducing will lay a solid foundation for exploration before the inevitable exploitation of our blue planet.

Website: www.ieee-sem.org/fall

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Technical Track Presentations

Vision Guided Robotics (VGR) for Manufacturing Efficiencies

Through a series of technical and commercial successes, VGR is now common in factories. The technology can be classified into 2D and 3D solutions. This presentation will showcase the benefits, components and example applications replete with movies. Perspectives on good practices for implementation will be presented.

Adil Shafi
President
Advenovation, Inc.

ARRL and Real World EMC Problems

Ed Hare
Laboratory Manager
AARL

Ed Hare, W1RFI, National Association for Amateur Radio (ARRL) Laboratory Manager, explains the many different ways that ARRL helps address EMC problems. ARRL assists industry to resolve interference problems from the creation of good industry standards to the development of case-by-case solutions should problems still occur.

A Hierarchical Framework for Audio Forensics

Dr. Hafiz Malik
Asst. Professor
Elect and Computer Eng
Univ of Mich – Dearborn

The availability of powerful, sophisticated, and easy-to-use digital media manipulation tools has made authenticating the integrity of digital media difficult. Digital media forensics aims to determine the underlying facts about evidentiary recording. This presentation surveys state-of-the-art in digital audio forensics and a component-based solution.

Sensor Interfaces: Interfacing with Human Body

Dr. Selcuk Tala
Research Assistant
E-Lab at Yale Univ

Interfacing sensors with electronic circuits introduces stringent constraints such as ultra low-power consumption, excellent noise performance and accurate acquisition of the signals from the sensor node. Different types of sensor interface circuits for bio-potential recording system and low-power, multi-path, complex, bandpass sigma-delta ADC circuit for body area networks will be presented.

Joint Model and SOC Estimation Method for Lithium Battery Based on the Sigma Point KF

ZhiWei He
Assoc. Professor
Dept. Elect & Info Eng.
Hangzhou Dianzi Univ.

The working state of an electric vehicle lithium-ion battery is very important to the safety of an Electric Vehicle (EV). Online estimation of the state of charge (SOC) is essential in obtaining the battery working conditions. A joint battery model and SOC estimation method based on the sigma point kalman filter (SPKF) will be presented.

Sliding Mode Observer Design for Robotics and Automotive Applications

Dr. Giscard Kfoury
Dir.Robotics Eng Program
Lawrence Technological Univ.

The implementation of efficient control schemes often requires the availability of accurate measurements of the state variables of the system. Estimators can be designed to provide accurate estimates for use by the controllers. Various robust nonlinear observer designs based on the sliding mode or variable structure theory will be presented.

Smart Materials for Smart Microsystems

Nelson Sepulveda, PhD

Microelectromechanical systems (MEMS) or nano-electromechanical systems (NEMS) have demonstrated advantages over their solid-state device counterparts. Additional to the changes in the electrical and optical properties of VO2 films, their mechanical properties also change abruptly during their solid-solid phase transition, unveiling a new operation principle.

Detection of Anthropogenic Signals of Below Thermal Noise Power

Rodger D De Roo, PhD
Asst Scientist & Lecturer
Dept of Atmospheric,
Oceanic & Space Sciences
University of Michigan

Space-borne microwave radiometry is a technique for global measurement of geophysical parameters. As radiometers have the most sensitive receivers operating in their band, low levels of RFI are both significant and difficult to identify. New space borne radiometers are being developed. Digital reception of the pre-detected IF signal has been demonstrated to have ability to permit the detection of many forms of RFI. The use of the kurtosis statistic to identify RFI in radiometric signals will be presented.

Dinner and Keynote Presentation Follow Technical Tracks

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