

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.

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Technical Track Presentations

See web site for latest information and additional speakers

Vision Guided Robotics (VGR) for Manufacturing Efficiencies



Adil Shafi, President of Advenovation, Inc.

Through a series of technical and commercial successes, VGR is now used 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. The presentation will also cover perspectives on good practices for implementation.

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

Sigma Point KF **ZhiWei He**, Associate Professor, Hangzhou Dianzi University, Hangzhou, China,
Department of Electronic and Information Engineering



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.

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 also assists industry resolve interference problems, from the creation of good industry standards to the development of case-by-case solutions should problems still occur.

Sliding Mode Observer Design for Robotics and Automotive Applications



Dr. Giscard Kfoury, Dir. BS in Robotics Engineering Program,
Lawrence Technological University

The implementation of efficient control schemes often requires the availability of accurate measurements of the state variables of the system. As an alternative, estimators can be designed to provide accurate estimates for use by the controllers. This work presents various robust nonlinear observer designs based on the sliding mode or variable structure theory.

A Hierarchical Framework for Audio Forensics



Dr. Hafiz Malik, Asst. Professor, Electrical and Computer Engineering Dept.
University of Michigan - 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 to the general problem of audio forensics.

Smart Materials for Smart Microsystems



Nelson Sepulveda, Ph.D.

Microelectromechanical systems (MEMS) or nano-electromechanical systems (NEMS) have demonstrated advantages over their solid-state device counterparts. In addition to the well-known 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.

Dinner and Keynote Presentation Follow Technical Tracks

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