

# TRIDENT SCHOLAR CONFERENCE

## Conference Opening Remarks and Presentations

0855-1200 and 1330-1600  
Friday, 18 April 2008  
Rickover Hall, Room 103

**Conference Moderator**  
Professor J. E. Shade  
*Deputy Director of Research and Scholarship*

## 0855 Welcome and Opening Remarks

0900

Midshipman First Class Kevin K. Liu

### *Comparing Throughput and Power Consumption in Sequential and Reconfigurable Processors*

In this study, the processing speed and power consumption of both field programmable gate arrays and sequential processors were measured. A comparison of the results showed that a significant benefit could be gained by using field programmable gate arrays when implementing high-performance computing applications.

0945

Midshipman First Class William H. Godiksen III

### *Targeting Pod Effects on Weapons Release from the F-18C Hornet*

This research uncovered the reasons that the addition of a small targeting pod on the F/A-18C Hornet aircraft adversely affected the release of certain weapons from a pylon station adjacent to the pod at speeds approaching Mach 1. Computational fluid dynamics (CFD) was used to analyze the problem, and to suggest changes to the pod geometry to alleviate the problem.

1030

Midshipman First Class Catherine M. Ortman

### *The Effect of Diameter on Dynamic Seabed Penetration*

This project investigated the effect of body diameter on dynamic penetration into the seabed using a combined numerical and experimental approach. Penetration depths of shapes repeatedly dropped into the Chesapeake Bay were correlated with behavior predicted both by an Alternating Lagrangian-Eulerian Finite Element model and by the traditional quasi-static analysis.

1115

Midshipman First Class Christopher H. Renninger

### *Development and Implementation of Carbon Nanofoam Cathode Structures for Magnesium - Hydrogen Peroxide Semi-fuel Cells*

This project investigated the viability of using carbon nanofoams as the cathodes in semi-fuel cell systems to improve performance. Three-dimensionally porous carbon nanofoams functionalized with Pd nanoparticle electrocatalysts were synthesized and the nanoarchitectures electrochemical properties were analyzed.

1330

Midshipman First Class Evan A. Barnes

### *Capability Driven Robotic Swarms in Reconnaissance-based Operations*

This project focused on new methodologies for improving the performance of a swarm of robotic vehicles in reconnaissance-based operations. By having the individual units coordinate their movements based upon their specific abilities and the mission parameters, this project resulted in significant improvements in robot swarm control.

1415

Midshipman First Class J. Blaine Moore

### *Stereocontrolled Additions to a Rigid Bicyclo [3.3.0] Octane Ring System*

This project investigated several addition reactions to a highly hindered bicyclic compound. Depending on the groups being added and the reaction conditions, the reactions were found to be highly stereoselective, giving single products. The investigation resulted in three different types of stereoselective additions to two different bicyclic substrates.

1455

Midshipman First Class Daniel L. Golden

### *An Experimental Study of Water Injection into a Model 250-C20B Rolls-Royce Turboshaft Gas Turbine*

The effect of water ingestion on the thermal performance of a Rolls-Royce M250 C20B turboshaft engine was investigated. The engine was put through its design range of 40 to 420 SHP (shaft horsepower) at its design output shaft speed of 6016 rpm with a water ingestion spray range from 0 to 1.4 gpm. The effects of water ingestion compared to no ingestion for SHP output showed increasing thermal performance (higher SHP) to a limit and then no SHP increase was seen. For emissions it was concluded that water ingestion significantly reduced NO<sub>x</sub> emissions.