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2014-04-14

# Fundamental and Applied Biofuels Research at the Naval Postgraduate School

Millsaps, Knox

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### FUNDAMENTAL AND APPLIED BIOFUELS RESEARCH AT THE NAVAL POSTGRADUATE SCHOOL

August 28th 2013 - Glasgow Hall 109 - 1200

**Dr. Knox Millsaps**

Professor & Chairman  
Director, Marine Propulsion Laboratory

&

**Dr. Chris Brophy**

Associate Professor  
Director, Rocket Propulsion and Combustion Laboratory

Department of Mechanical and Aerospace Engineering  
Naval Postgraduate School  
Monterey, CA

**Presentation**

This talk will provide a broad overview of the history and development of synthetic and bio-derived liquid fuels, their potential uses in naval ship and aircraft, as well as a survey of some of the research that has been conducted by NPS faculty and thesis students on biofuels and advanced energy systems over the past 3 years. Specifically the research programs sponsored by the Office of Naval Research to characterize the fundamental combustion properties of biofuels and biofuel blends for drop-in replacements for JP-5 aircraft and F-76 ship fuels to better understand the practical differences that may occur in Navy gas turbine and Diesel engines with the use of such pure and blended bio-derived Hydro-Reformed Jet (HRJ) and other synthetic fuels. Results from fundamental studies of the difference in laminar/turbulent flame speed, ignition delay, and reaction kinetics performed at NPS and collaborators at Stanford University in both shock tubes and combustion bombs will be presented. Research performed by NPS students on use of biofuels in high speed Diesel engines, including differences in performance, and detailed comparison of combustion dynamics will be covered. Research on advanced engine concepts, such as rotating detonation engines (RDE) will be presented.

**Biography - Dr. Millsaps**

Dr. Millsaps is Professor and Chairman of the Mechanical and Aerospace Department at NPS. He teaches and conducts research in thermal fluid systems and energy and power systems, as well as turbomachinery aerodynamics, heat-transfer, and rotordynamics. He received a Ph.D. from MIT in Aerospace Engineering in 1992.

**Biography - Dr. Brophy**

Dr. Brophy is currently an Associate Professor in the Mechanical and Aerospace Department at Naval Postgraduate School. He is the Director of the Rocket Propulsion and Combustion Laboratory at NPS. Professor Brophy is an expert in high speed flows and rocket propulsion and has worked extensively with industry and other universities supporting the Office of Naval Research and DARPA programs in Combustion Sciences. Dr. Brophy received his Ph.D. from the University of Alabama, Huntsville.

**POC**

**Dr. Daniel A. Nussbaum**

Naval Postgraduate School  
Chair, Energy Academic Group  
Monterey CA 93943  
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[August 28, 2013 Presentation - Video](#)

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