DEPARTMENT OF MECHANICAL ENGINEERING
WILLIAM MAXWELL REED SEMINAR SERIES

"Extreme Combustion: A New Frontier in Combustion Research"

Hao Zhao
Princeton University

Abstract: With concerns of limited fossil fuel resources and global warming, alternative fuels and new combustion systems have been studied to enhance combustion efficiencies and reduce emissions for decades, and the combustion processes must be well controlled at high pressure and relatively low temperature. Therefore, as a new frontier in combustion research, extreme combustion at high pressure, low temperature, and fuel lean conditions has received much attention. Problems such as pre-ignition, engine knocking, catalyst deactivation, flame instability, and ignition failure in engines are still challenging. This presentation describes the study of extreme combustion from several aspects, such as ozone assisted low temperature chemistry, NOx sensitized fuel combustion, intermediate combustion chemistry, ultra-lean combustion ignition, and supercritical combustion kinetics. The presentation also includes the proposed research in energy conversion in the future.

Bio: Mr. Hao Zhao is currently a Ph.D. candidate at the Department of Mechanical and Aerospace Engineering, Princeton University, where he received his M.A. in 2012. Prior to joining Princeton, Hao received his M.S. degree from the Department of Earth and Environmental Engineering, Columbia University, in 2010. Hao's research focuses on the biofuel chemistry, supercritical combustion, fuel-lean combustion, advanced power/propulsion systems, non-equilibrium reactive flow, advanced battery material synthesis and fire safety in experiments and modeling simulation. His research provides insights for extreme combustion, advanced energy conversion system design, and pollutant control. As a Princeton research scholar in energy and environment, Hao is interested in the interdisciplinary exchange of ideas on energy conversion and climate changes. He has published 8 first-author or corresponding-author papers in *Combustion & Flame*, *Proceeding of combustion institute*, *Energy*, *Energy & Fuels*.

Date: Friday, Feb.15th
Place: CB 118

Time: 3PM
Contact: Dr. Alexandre Martin 257-4462

Meet the speaker and have refreshments
Attendance open to all interested persons

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