

# **Department of Ocean and Resources Engineering**

*Seminar*

## **Methane Hydrates: Promise and Peril**

by

**Steve Masutani**

Hawaii Natural Energy Institute (HNEI)

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### **Abstract**

Hydrates are crystalline solids comprising water molecules linked by hydrogen bonds in a tight polyhedral cage structure. Guest molecules, which can include various hydrocarbons found in natural gas mixtures, reside in the interstices of this lattice. Methane hydrates in marine sediment and permafrost represent an enormous fossil energy resource; however, they also pose an immediate and significant threat to offshore oil and gas exploration and production and may profoundly impact global climate. While the carbon burden of methane is the most favorable among fossil fuels, oxidation of this currently untapped resource for energy production could generate of the order of 103 gigatonnes of carbon emissions. Responding to the potential and peril, methane hydrates are being investigated as part of a joint R&D program between the University of Hawaii and the U.S. Naval Research Laboratory. Research at UH currently is focusing on four areas: (1) hydrate destabilization; (2) special application marine power generation; (3) detection technology and protocols; and (4) characterization of methane hydrate bed habitats. This seminar provides an overview of ongoing research on methane hydrates at UH.