

HEILAND LECTURE SERIES

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“Gas hydrates in marine sediments from source to sink”

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As interest has grown in recent years in exploiting gas hydrates as an energy resource, we have learned more and more about the science questions surrounding their provenance and accumulation. Researchers have observed worldwide that hydrates form preferentially in coarser-grained sediments, and this has been ascribed to more favorable thermodynamic conditions in the larger pores in such layers relative to finer-grained units. More recent work has shown that complex interactions between thermodynamics, diffusion, and advection control the location and rates of hydrate accumulation, and the ultimate amount of hydrate that forms. Using drilling results from the Walker Ridge and Green Canyon areas in the Gulf of Mexico, I show how economic-scale hydrate deposits can form from microbial methane and illustrate how microstructural sediment properties influence the evolution and fate of hydrate deposits in marine sediments.



Hugh Daigle is an assistant professor in the Department of Petroleum and Geosystems Engineering at the University of Texas at Austin. He holds a BA in Earth and Planetary Sciences from Harvard University and a PhD in Earth Science from Rice University. Prior to joining the UT faculty in 2013, he had 5 years' industry experience with Schlumberger and Chevron working as a wireline logger and petrophysicist. His research interests focus on experimental and theoretical petrophysics applied to shales, methane hydrate-bearing sediments, and scientific ocean drilling, as well as subsurface applications of nanoparticles.