

# **The U.S. DOE Methane Hydrate R&D Program**

**DOE Sponsored Student Researchers**

**Publications and Presentations of DOE  
Supported Methane Hydrate R&D 1999-2008**

November 2008





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## **Section I: Documentation of Support for Education**

### **Students contributing to and receiving support from DOE-funded Methane Hydrate projects: 2000-2007.**

#### *Alaska, Anchorage, The University of (in conjunction with the Maurer/Anadarko project)*

- Porhola, Stan, B.S.
- Ross, Zulimacristina, M.S.

#### *Alaska, Fairbanks, The University of (in conjunction with the BP-Alaska project)*

- Bhangale, Amit, M.S., 2007, Modeling
- Duffy, Ryan, B.S., 2010, Mechanical Engineering
- Gaglioti, Ben, MS, 2010, Biology
- Howe, Steven, M.S., 2004, Modeling and Economics
- Jaiswal, Namit, M.S., 2004, Petroleum Engineering
- Johnson, Andrew, M.S., 2009, Petroleum Engineering
- Kulkarni, Abhijeet, Ph.D., 2005
- Phale, Hemant, M.S., 2006
- Stone, Chris, M.S., 2006
- Tsunemori, Phillip, B.S., 2005
- Vajjha, Pavan, M.S., 2005
- Westervelt, Jason, M.S., 2004, Geology
- White, Aaron, M.S., 2003
- Singh, Praveen, M.S., in progress
- Kerkar, Prasad, M.S., 2005
- Banerjee, Sudiptya, M.S., 2005

#### *Arizona, The University of (in conjunction with the BP-Alaska project)*

- Arca, M. Serkan, Ph.D., in progress, Geophysics
- Barker, Margaret, B.S., in progress
- Gandler, Greg, B.S., 2004
- Geauner, Scott, M.S., in progress
- Hennes, Andrew, M.S., 2004, Structural Geology
- Hagbo, Casey, M.S., 2003, Geophysics
- Manuel, Justin, M.S., 2006, Geophysics
- Peyton, Lynn, Ph.D., in progress, Geophysics
- Zhoa, Bo, M.S., 2003, Geophysics

#### *Baylor University (seafloor electrical resistivity project)*

- Amidu, Sikiru, Ph.D., in progress, Geophysics

***California – Berkeley, University of (in association with LBNL)***

- Elsen, Heather, Ph.D., in progress, Chemistry
- Kowalsky, Michael, Ph.D., 2003
- Pruess, Jacob, B.S., Chemical Engineering
- Wu, Gordon, B.S., in progress, Molecular and Cellular Biology
- Holzman, Ran, Ph.D. Engineering, in progress, AGU Student award

***California – Santa Barbara, University of (NETL Methane Hydrate Research Fellow)***

- Heintz, Monica, Ph.D., in progress, Earth Science
- Paul, Blair, Ph.D., in progress, Marine Science
- Stubbs, Chris, Ph.D., in progress, Geological Oceanography

***Carnegie-Mellon University (in association with NETL/ORD)***

- Howard, Kris, B.S., 2002, Chemical Engineering

***Clarkson University (hydrate model development project)***

- Ji, Chuang, M.S., 2001
- White, Tim, M.S., 2003

***Columbia University (in association with the GoM JIP)***

- Cook, Ann, Ph.D., in progress, Geophysics
- Grabias, Bryan, B.S., in progress, Chemical Engineering (summer intern)

***Colorado, Boulder, University of***

- Craft, Julianne, B.S., 2009, Biochemistry
- Tzou, David, B.S., 2010, Chemical Engineering and Computer Science

***Colorado School of Mines (in association with LBNL)***

- Gupta, Arvind, Ph.D., in progress
- Walsh, Matt, Ph.D., in progress, Chemical Engineering
- Peters, David, M.S., 2001
- Ulrich, Shannon, M.S., 2010, Environmental Engineering and Science

***Colorado State University***

- Bolton, Robert, B.S., in progress, Biology

***Delaware, University of***

- Christman, G., M.S., 2009, Marine Biosciences
- Yu, Liying, in progress

***Duquesne University (in association with NETL/ORD)***

- Thomas, Dick, Ph.D., in progress, Chemistry
- Thomas, Laura, B.S., 2005, Chemistry

***Florida State University (in association with CMRET project)***

- Lapham, Laura, Post-doctoral, in progress, Geochemistry
- Peeler, Kelly, M.S., in progress
- Tazaz, Amanda, Ph.D., in progress, Geochemistry

***Georgia Institute of Technology (in association with GoM JIP)***

- Cortes, Douglas, Ph.D., 2010
- Dai, Sheng, Ph.D., 2012
- Francisca, Franco, Post-doctoral, 2002-2004
- Lee, Changho, Post-doctoral, 2008
- Lee, Jong-Sub, Post-doctoral, 2004-2005
- Lee, Joo-Yong, Ph.D., 2007
- Martin, Ana Isabel, M.S., 2004
- Narsilio, Guillermo, Ph.D., 2005
- Yun, Tae-Sup, Ph.D., 2005, Post-doctoral until August 2007

***Georgia Institute of Technology (in association with the CMRET project)***

- Dobbs, Gary, Ph.D., in progress, Chemistry
- Hvozدارa, L., Post-doctoral 2001-2002, Chemistry
- Janotta, Markus, Ph.D., 2003, Chemistry
- Pennington, Neil, M.S., 2003, Chemistry
- Vogt, Frank, Post-doctoral 2002-2003, Chemistry

***Georgia Institute of Technology (DOE Contract DE-FC26-06NT42963: Methane Recovery from Hydrate-bearing Sediments)***

- Jung, Jongwon, Ph.D., in progress
- Taboada-Serrano, Patricia, Post-doctorate
- Yun, Tae-Sup, Ph.D., 2005, Post-doctoral
- Jang, Jaewon, Ph.D., in progress
- Espinoza, Nicolas, Ph.D., in progress
- Shin, Hosung, Ph.D., in progress

***Houston, University of (in association with the Westport project)***

- Nanchary, Narender, M.S., 2003, Chemical Engineering
- Ogunlana, Damilola, Post-doctoral, Chemical Engineering
- Pitchumani, Ramanan, Post-doctoral, Chemical Engineering
- Sun, Xuefei, Ph.D., 2005, Chemical Engineering
- Phirani, Jyoti, Ph.D. in progress, Chemical Engineering

***Idaho, University of***

- Boyd, Stephanie, M.S., 2004, Environmental Science

***Louisiana State University (in association with CMRET project)***

- Hackworth, Matt, Ph.D., in progress.

***Massachusetts Institute of Technology***

- Jain, Antone, M.S./Ph.D., in progress, Groundwater Hydrology
- MacMinn, Christopher, Ph.D., in progress, Mechanical Engineering

***Mississippi, University of (in association with CMRET project)***

- Giacomini, Laura, Ph.D., in progress, visiting scholar, Geology
- Geresi, Erika, visiting scholar, Geophysics
- Grover, Tarun, M.S., 2004
- Hodges, Tyler, M.S. 2003
- Kumar, Viren, M.S., 2003
- Macelloni, Leonardo, visiting scholar, Geophysics
- Strack, Emily, M.S., in progress, Geological Engineering

***Mississippi State University (in association with CMRET project)***

- Dearman, Jennifer, Ph.D., in progress, Microbiology
- Kothapalli, Chandra, M.S., 2002, Chemical Engineering
- Lee, May Shia, M.S., 2001, Chemical Engineering
- Radich, James, Ph.D., in progress, Chemical Engineering
- Woods, Charles, M.S., 2004, Chemical Engineering
- Xiong, Shangmin, M.S., in progress, Chemical Engineering
- Zhang, Guochang, Post-doctoral, Microbiology

***Oklahoma, University of (in association with Maurer Hot Ice project)***

- Chikyala, Vikramaditya, M.S.
- Raghunathan, Ravi, Ph.D.
- Tran, Tung, Ph.D., in progress, Chemical Engineering

***Oregon State University (in association with Idaho National Laboratory)***

- Biggs, Brandon, Ph.D., in progress, Interdisciplinary Studies (COAS)
- Carini, Paul, Ph.D., in progress, (summer lab assistant)
- Kannberg, Peter, M.S., 2009, Geophysics
- Powers, Katie, B.S., 2009, Microbiology
- Schwartz, Amanda, B.S., 2009, Microbiology

***Pennsylvania State University, The (in association with NETL/ORD)***

- Lekse, Jonathan, B.S., 2004, Chemistry

***Pittsburgh, University of (in association with NETL/ORD)***

- Rosenbaum, Eilis, M.S., 2004, Chemistry, (now supporting NETL R&D w/ Parsons)



***Prairie View A&M University***

- Tambe, Jacob, M.S. Engineering, withdrew.
- Williams, Meeckral, B.S. Chem. Eng., graduated 2008.
- Cox, Jarvus, B.S. Electrical Eng., graduated 2008.
- Harrison, Latoya, B.S. Chem. Eng., in progress.
- Jones, Ashley M., B.S. Computer Eng. Tech., in progress.

***Princeton University (in association with LBNL)***

- Reiter, Paul, B.S., 2005

***Rice University (in association with the Chevron JIP)***

- Bhatnagar, Gaurav, Ph.D, 2008, Chemical Engineering (now with Shell Oil Co.)
- Hubbard, L. Ashley, M.S. Earth Science, 2008
- O'Hayer, Walter, M.S. Earth Science, expected 2009
- Daigle, Hugh, Ph.D. Earth Science, in progress
- Stigall, Justin, M.S., Earth Science, in progress
- Jaiswal, Preyank, Ph.D , post-doc 2008
- Gu, Guangsheng, Ph.D. in progress, Chemical Engineering
- Chatterjee, Sayantan, Ph.D. in progress, Chemical Engineering
- Phirani, Jyoti , Ph.D. in progress, Chemical Engineering
- Hustoft, Steinar, visiting Ph.D. student 2008, University of Tromso, Norway

***San Diego State University (in association with the Chevron JIP)***

- Lindemann, Christie, M.S., 2005

***Scripps Institute of Oceanography (Scripps monitoring project, Chevron JIP\* and others)***

- Fenwick, Rebecca, Ph.D., in progress, Geosciences Division\*
- Hangsterfer, Alexandra, Ph.D., in progress, Chemical Oceanography\*
- Solomon, Evan, Ph.D., Marine Geochemistry-Geosciences\*
- Solem, Christian, M.S., Marine Geochemistry
- Yishai Weinstein, Post-doctoral Fellow

***South Carolina, University of***

- Battista, Brad, Post-doctoral, in progress, Geophysics

***South Florida, University of***

- Bell, Ryan, Ph.D., in progress

***Southern Mississippi, University of (in association with CMRET project)***

- Johnson, Jeff, M.S., in progress, Engineering
- Martin, Kevin, M.S., in progress, Engineering

***Stanford University***

- Bandyopadhyay, Kaushik, Ph.D., Seismic and Numerical modeling
- Sain, Ratnanabha, Ph.D., Seismic and Numerical modeling

***Stony Brook University, New York (in association with BNL)***

- Altraide, Ibibia, M.S., 2006, Materials Science
- Eaton, Michael, Ph.D., 2007.
- Fraczak, Timothy, B.E., in progress
- Horvat, Christine, B.S., in progress, Chemical and Molecular Engineering (also partially supported with DOE Office of Science Summer SULI program)
- Kaur, Harsimran, B.S., 2007, Chemical and Molecular Engineering
- Kerkar, Prasad, Ph.D., in progress, (also supported in MS program at UA-Fairbanks)
- Shi, Xai, B. 2007, Chemical and Molecular Engineering

***Tennessee, University of***

- Alford, Jonathan, Post-B.S., 2008, Biochemistry, Cellular, and Molecular Biology

***Texas A&M University (several projects)***

- De Beukelaer, Sophie, M.S.
- Grover, Tarun, Ph.D., expected August 2008, Petroleum Engineering
- Milkov, Alexi, Ph.D., and Post-Doctoral Researcher, Geochemistry
- OZgul, Ercin, M.S., 2002, Geochemistry
- Vardaro, Michael, M.S., Geophysics

***Texas A&M University – Corpus Christi***

- Garcia, Oscar, Ph.D., in progress, Remote Sensing, Ocean Features
- Shapiro, Rosalie, Ph.D., in progress, Marine Geochemistry, Carbonate Geology

***University of Texas, Austin***

- Alkin, Engin, M.S., in progress, Geophysics
- Christianson, Pete, B.S. in progress, Geophysics
- Hernandez, Jamie, M.S., in progress, Geophysics
- Behseresht, Javad, M.S. in progress, Petroleum and Geosystems Engineering
- Peng, Yao, Ph.D. in progress, Petroleum and Geosystems Engineering
- Prodanović, Maša, Post-doctoral in progress, Petroleum and Geosystems Engineering

***William and Mary, The College of (in association with the Naval Research Laboratory)***

- Pohlman, J. W., Ph.D., 2007, Geochemistry

***Woods Hole Oceanographic Institution (in association with CMRET project\* and other)***

- Cook, Mea, Post-doctoral, in progress
- Camilli, Rich, Post-doctoral, in progress\*
- Pizzaro, Oscar, Post-doctoral, in progress\*

*Wyoming, The University of (in association with the Blake Ridge OBC seismic project)*

- Gorman, Andrew, Ph.D., 2003, Geophysics
- Hornbach, Matt, Ph.D., 2004, Geophysics
- Nealon, Jeffrey, Ph.D., in progress, Geophysics

*Yonsei University, Seoul, Korea*

- Moon, Ji-Won, Post-doctoral, 2003, Geology

**ADDITIONAL POST-DEGREE ASSIGNMENTS AT NATIONAL LABS**

*Brookhaven National Laboratory*

- Servio, Philip, 2003
- Eaton, Michael, 2006, doctoral student
- Kerkar, Prasad, 2006, doctoral student

*Lawrence Berkley National Laboratory*

- Reiter, Paul, 2005
- Walsh, Matthew, Ph.D., in progress, Colorado School of Mines, Experimental hydrology and geomechanics
- Gupta, Arvind, Ph.D., 2007, Colorado School of Mines, Experimental hydrology
- Moridis, Nefeli, undergraduate, University of Texas, Data reduction
- Grover, Tarun, Ph.D., expected August 2008, Petroleum Engineering
- Boulis, Anastassios, M.S., in progress

*National Energy Technology Lab*

- Hao, Jan, in progress
- Link, Dirk, 2001
- Shofield, Daniel, in progress

*Oak Ridge National Lab*

- Jones, Camille, 2000, Materials Science
- Marshall, Simon, 2000-2001, Materials Science
- McCallum, Scott, M.S., post-M.S., 2003, Geology
- Peters, Philip
- Reistenberg, Dave, post-M.S., 2002-2005
- Szymick, Phillip, post-M.S., 2005-2007, Geology
- Ulrich, Shannon, post B.S., 2006-2007
- Zatsepina, Olga, 2003
- Taboada-Serrano, Patricia, in progress, post-doctoral

*U.S. Geological Survey*

- Dugan, Brandon, 2003-2004 [USGS Mendenhall postdoc]
- Pohlman, John, 2007-2009 [USGS Mendenhall postdoc]

## Papers Authored by NETL Methane Hydrate Fellows

- Heintz, Monica B.; Mau, Susan; Valentine, David L.; Reed, Justin H., Hallam, Steven J.; Yang, Jinshu, 2008. Methane Consumption in Waters Overlying a Hydrate-Associated Mound in the Santa Monica Basin: A Project Synopsis. Proceedings of the 6th International Conference on Gas Hydrates (ICGH 2008), Vancouver, British Columbia, CANADA, July 6-10, 2008.
- Lapham, L., D. Albert, J. Chanton, and C. Martens, 2001, Light hydrocarbon distributions and sulfate reduction rates in sediment porewaters near exposed gas hydrates, American Society of Limnology and Oceanography Annual Meeting.
- Lapham, L., J. Chanton, C. Martens, H. Scheafer, R. Chapman, and J. Puhlman, 2003, Innovations in Sampling Pore Fluids From Deep-Sea Hydrate Sites, San Francisco, CA, EOS, Transaction, American Geophysical Union, Volume 84, Fall Meeting Supplement, Abstract OS52D-05, December 8-12.
- Lapham, L., J. Chanton, C. Martens, and H. Mendlovitz, 2004, Innovations in sampling pore fluids at deep sea hydrate sites, *in* B. J Thompson, *ed.*, Energy, Simulation-Training, Ocean Engineering and Instrumentation, *Research Papers of the Link Foundation Fellows*, Volume 3, p. 4.
- Lapham, L., J. Chanton, C. Martens, J. Pohlman, and R. Chapman, 2005, In-situ light hydrocarbon concentrations and stable carbon isotope values in hydrate-bearing sediments of Cascadia Margin, Vancouver Island, Vienna, Austria, Second General Assembly European Geosciences Union, April 24-29.
- Lapham, L., J. Chanton, C. Martens, P. Higley, H. Jannasch, J. Woolsey, and K. Sleeper, 2007, Biogeochemical sensors: design and applications of the Pore Fluid Array for the Mississippi Canyon 118 Gas Hydrate Seafloor Observatory, Oxford, MS, Mid-South Area Engineering and Sciences Conference, University of Mississippi, May 17-18.
- Lapham, L., J. Chanton, C. Martens, P. Higley, H. Jannasch and J. Woolsey, 2007, Monitoring long term hydrate stability: in situ methane and the Pore Fluid Array (PFA), Oxford, MS, Gulf of Mexico Hydrates Research Consortium Annual Meeting.
- Lapham, L., 2007, *In situ* measurements of methane cycling in cold seep sediments containing gas hydrates and brines. Ph.D. Thesis, University of North Carolina.
- Lapham, L., J. Chanton, C. Martens, K. Sleeper and J. Robert Woolsey, 2008, "Microbial activity in surficial sediments overlying acoustic wipeout zones at a Gulf of Mexico cold seep," *Geochemistry, Geophysics, Geosystems*, Volume 9, No. 6, June 4.

- Solomon, E., M. Kastner, H. Jannasch, Y. Weinstein, G. Robertson, and A. Aubrey, 2004, Long-term continuous monitoring of fluid chemistry and flux at the Bush Hill gas hydrate field, Gulf of Mexico, using a new flowmeter, the MOSQUITO, American Geophysical Union, Fall Meeting, December 13-17.
- Solomon, E., M. Kastner, H. Jannasch, Y. Weinstein, and G. Robertson, 2005, Insights into the dynamics of in situ gas hydrate formation and dissociation at Bush Hill gas hydrate field, Gulf of Mexico, Trondheim, Norway, *Proceedings of the Fifth International Conference of Gas Hydrates*, Volume 3, p. 947-953.
- Solomon, E. A.; Spivack, A. J.; Kastner, M., Torres, M. ; Borole, D. V. ; Robertson, G. ; Das, H. C., 2008. Hydrogeochemical and Structural Controls on Heterogeneous Gas Hydrate Distribution in the K-G Basin Offshore SE India. *Proceedings of the 6th International Conference on Gas Hydrates (ICGH 2008)*, Vancouver, British Columbia, CANADA, July 6-10, 2008.

## Section II: Publications Related to the Program's Major Field Projects

*With private companies, state and local governments, universities, and research institutions*

### **Gulf of Mexico Gas Hydrates Joint Industry Project (DE-FC26-01NT41330)**

*Chevron, ConocoPhillips, Halliburton Energy Services, Japan National Oil Co., Reliance Industries, Schlumberger Oilfield Services, Total, Georgia Institute of Technology, Minerals Management Service, Naval Research Lab, Scripps Institute of Oceanography, United States Geological Survey*

#### **Peer-Reviewed Publications**

Coffin, R., L. Hamdan, R. Plummer, J. Smith, J. Gardner, R. Hagen, W. Wood, in press, "Analysis of Methane and Sulfate Flux in Methane-Charged Sediments from the Mississippi Canyon, Gulf of Mexico," *Marine and Petroleum Geology*, vol. 25, doi:10.1016/j.marpetgeo.2008.01.014.

Cook, A., D. Goldberg, R. L. Kleinberg, in press, "Fracture-controlled gas hydrate systems in the northern Gulf of Mexico," *Marine and Petroleum Geology*, vol. 25, doi:10.1016/j.marpetgeo.2008.01.013.

Cooper, A., and P. Hart, 2003, High-resolution seismic-reflection investigation of the northern Gulf of Mexico gas-hydrate-stability zone, *Marine and Petroleum Geology*, Volume 19, p. 1275-1293.

Dai, J., H. Xu, F. Snyder, and N. Dutta, 2004, Detection and estimation of gas hydrates using rock physics and seismic inversion: Examples from the northern deepwater Gulf of Mexico, in Taylor, C., and J. Kwan, eds., *Advances in the study of gas hydrates*, Kluwer Academic/Plenum Publishers, p.117-139.

Dai, J., F. Snyder, D. Gillespie, A. Koesoemadinata, N. Dutta, in press, "Exploration for gas hydrates in the deepwater Northern Gulf of Mexico: Part I. A seismic approach based on geologic model, inversion, and rock physics principles," *Marine and Petroleum Geology*, vol. 25, doi:10.1016/j.marpetgeo.2008.02.006.

Dai, J., N. Banik, D. Gillespie, N. Dutta, in press, "Exploration for gas hydrates in the deepwater, Northern Gulf of Mexico: Part II. Model validation by drilling," *Marine and Petroleum Geology*, vol. 25, doi:10.1016/j.marpetgeo.2008.02.005.

Dai J., H., Xu, F., Snyder, and N., Dutta, 2004, Detection and estimation of gas hydrates using rock physics and seismic inversion: Examples from the northern deepwater Gulf of Mexico, *Leading Edge*, January.

- Ellis, M., R.L. Evans, D. Hutchinson, P. Hart, J. Gardner, R. Hagen, in press, "Electromagnetic Surveying of Seafloor Mounds in the Northern Gulf of Mexico," *Marine and Petroleum Geology*, vol. 25, doi:10.1016/j.marpetgeo.2007.12.006.
- Francisca, F., T. Yun, C. Ruppel, and J. Santamarina, 2005, Geophysical and geotechnical properties of near-surface sediments in the Northern Gulf of Mexico gas hydrate province, *Earth and Planetary Science Letters*, Volume 237, p. 924-939.
- Francisca, F., J. Santamarina, and C. Ruppel, 2003, Gas hydrate in porous sediments, Experimental evidence for interparticle cementation, *Geophysical Research Letters*.
- Hart, P., D. Hutchinson, J. Gardner, R. Carney, and D. Fornari, in press, A photographic and acoustic transect across two deep-water seafloor mounds, Mississippi Canyon, northern Gulf of Mexico, *Marine and Petroleum Geology*, vol. 25  
doi:10.1016/j.marpetgeo.2008.01.020.
- Hutchinson, D., P.E. Hart, C.D. Ruppel, F. Snyder, and B. Dugan, Seismic and thermal characterization of a bottom simulating reflector in the Northern Gulf of Mexico, in: T.S. Collett, A. Johnson, C. Knapp, and R. Boswell (Eds.), *Natural Gas Hydrates: Energy Resources and Potential and Associated Geologic Hazards*. AAPG Special Publication, in press, 2008.
- Hutchinson, D.R., Shelander, D., Dai, J., McConnell, D., Shedd, W., Frye, M, Ruppel, C., Boswell, R., Jones, E., Collett, T., Rose, K., Dugan, B., Wood, W., and Latham, T., in press, Site Selection for DOE/JIPGas Hydrate Drilling in the Northern Gulf of Mexico: Sixth International Conference on Gas Hydrates, Vancouver, BC., 7-10 July, 2008
- Hutchinson, D., C. Ruppel, H. Roberts, R. Carney, and M. Smith, 2005, in press, Gas hydrates in the Gulf of Mexico, in Holmes, C., ed., *Gulf of Mexico—Its Origin (History, Archaeology, and Geology)*, Volume 1, Texas A&M University Press.
- Hutchinson, D., P. Hart, T. Collett, K. Edwards, D. Twichell, and F. Snyder, 2008. Geologic framework of the 2005 Keathley Canyon gas hydrate research well, northern Gulf of Mexico, *Marine and Petroleum Geology*, 25, 906-918.
- Kastner, M., G. Claypool, and G. Robertson, in press, "Geochemical constraints on the origin of the pore fluids and gas hydrate distribution at Atwater Valley and Keathley Canyon, northern Gulf of Mexico," *Marine and Petroleum Geology*, Elsevier Ltd.
- Lee, J.Y., J.C. Santamarina, C. Ruppel, in press, "Mechanical and electromagnetic properties of Northern Gulf of Mexico sediments with and without hydrates," *Marine and Petroleum Geology*, vol. 25, doi:10.1016/j.marpetgeo.2008.01.019.
- Lee, J.Y., T.S. Yun, J.C. Santamarina, and C. Ruppel, Tetrahydrofuran (THF) as a proxy for methane hydrate in laboratory studies of porous sediments, *Geophysics, Geochemistry, Geosystems (G<sup>3</sup>)*, 8, Q06003, 2007. doi: 10.1029/2006GC001531.

- Lee, J., T. Yun, C. Santamarina, and C. Ruppel, in review, Tetrahydrofuran as a Proxy for Methane in Laboratory Studies of Gas Hydrate Bearing Sediments, *Journal of Physical Chemistry A*.
- Lee, M., T.S. Collett, in press, Integrated analysis of well logs and seismic data to estimate gas hydrate concentrations at Keathley Canyon, Gulf of Mexico, *Marine and Petroleum Geology*, Volume 25, doi:10.1016/j.marpetgeo.2007.09.002.
- Lorenson, T., G. Claypool, J. Dougherty, in press, Natural Gas Geochemistry of Sediments Drilled on the 2005 Gulf of Mexico JIP Cruise, *Marine and Petroleum Geology*, vol. 25, doi:10.1016/j.marpetgeo.2008.01.017.
- Pohlman, J., C. Ruppel, D.R. Hutchinson, R. Downer, R.B. Coffin, in press, Assessing sulfate reduction and methane cycling in a high salinity pore water system in the Northern Gulf of Mexico, *Marine and Petroleum Geology*, vol. 25, doi:10.1016/j.marpetgeo.2008.01.016.
- Ruppel, C., R. Boswell, E. Jones, 2008. Scientific results from Gulf of Mexico gas hydrates Joint Industry Project leg 1 drilling: introduction and overview, *Marine and Petroleum Geology*, vol. 25, 819-829.
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*BP Exploration Alaska, Inc., U. S. Geological Survey, U. Alaska-Fairbanks, U. Arizona*

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## **Methane Hydrate Production from Alaskan Permafrost (DE-FC26-01NT41331)**

*Maurer Technology, Inc/Noble Corporation, U. Oklahoma, U. Alaska-Anchorage, U.S. Geological Survey*

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## Section III: Publications Related to the Program's Efforts with Universities and Other Research Institutions

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*University of Mississippi Center for Marine Resources and Environmental Technology*

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## **Characterizing Marine Gas Hydrate Reservoirs Using 3D Seismic Data and 4C OBS Data (DE-FC26-00NT41024) and (DE-FC26-06NT42667)**

*University of Texas at Austin Bureau of Economic Geology*

### **Peer-Reviewed Publications**

Hardage, B., H. Roberts, P. Murray, R. Remington, D. Sava, W. Shedd, and J. Hunt, Jr., in review, Multicomponent seismic assessment of fluid-gas expulsion geology: Gulf of Mexico, in Collett, T., A. Johnson, C. Knapp, and R. Boswell, eds., *Natural Gas Hydrates: Energy Resource and Associated Geologic Hazards*, The American Association of Petroleum Geologists Hedberg Special Publication.

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## **Sampling and Monitoring Hydrate Mounds in the Gulf of Mexico (DE-AF26-01NT00394)**

*Texas A&M University*

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## **Investigation of 3D Structure and Physical Properties of Methane Hydrate Deposits at Blake Ridge (DE-FC26-00NT40921)**

*University of Wyoming*

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## **Rock-Physics Modeling of Hydrate-Bearing Sediments (DE-FC26-05NT42663)**

*Stanford University*

### **Peer-Reviewed Publications**

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*Clarkson University*

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## **Investigations into the Geomechanical Performance of Hydrate-Bearing Sediments in Offshore Environments (DE-FC26-05NT42664)**

*Texas Engineering Experiment Station of Texas A&M University, University of California at Berkeley and Lawrence Berkeley National Laboratory*

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## **Evaluating the Controls on Gas Hydrate Formation and Dissociation in the Gulf of Mexico (DE-FC26-02NT41328)**

*Scripps Institution of Oceanography, University of California, San Diego*

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## **Investigation of Gas Hydrate Instability in the Southeastern Bering Sea (DE-FC26-05NT42665)**

*Woods Hole Oceanographic Institute*

### **Presentations**

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## **In Situ Sampling and Characterization of Naturally Occurring Methane Hydrate During IODP legs 204 and 311 (DE-FC26-01NT41329)**

*Joint Oceanographic Institution (the National Science Foundation was the primary U.S. funder of these programs, but DOE contributed slightly more than \$2 million to further hydrate-related field analysis technologies).*

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## **Comparative Assessment of Advanced Gas Hydrate Production Methods (DE-FC26-06NT42666)**

*Battelle Pacific Northwest Division, University of Alaska – Fairbanks*

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Bhangale, A., T. Zhu, B. McGrail, and M. White, 2006, A model to predict hydrate equilibrium and hydrate saturation inside porous media including mixed CH<sub>4</sub>-CO<sub>2</sub> hydrates, paper SPE 99759, proceedings of the SPE-Improved Oil Recovery Symposium.

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Phale H., T. Zhu, M. White, and B. McGrail, 2006, Simulation Study on Injection of CO<sub>2</sub>-microemulsion for Methane Recovery from Gas-Hydrate Reservoirs, paper SPE 100541, proceedings of the SPE Gas Technology Symposium.

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## **Seismic Gas Hydrate Quantification by Cumulative Attributes (DE-FC26-06NT42961)**

### ***Rock Solid Images***

### **Presentations**

Walls, J., 2006, Hydrate Resource Identification and Characterization from Well Logs and 3D Seismic, Houston, Texas, Hart Energy Publ. Methane Hydrates Conference, Dec. 5-6.

## **Petrophysical Characterization and Reservoir Simulator for Methane Gas Production from Gulf of Mexico Hydrates (DE-FC26-02NT41327)**

*Westport Technology Center International, University of Houston*

### **Peer-Reviewed Publications**

Sun, X., and K. Mohanty, 2006., Kinetic Simulation of Methane Hydrate Formation and Dissociation in Porous Media, *Chem. Eng. Sci.*, 61, 3476-3495.

### **Presentations**

Sun, X., K. Mohanty, 2005, Simulation of Methane Hydrate Reservoirs, Woodlands, TX, paper SPE 93015, SPE Reservoir Simulation Symposium, Jan. 31-Feb. 2.

## **Detection and Production of Methane Hydrates (DE-FC26-06NT42960)**

*Rice University, University of Houston*

### **Peer-Reviewed Publications**

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Snyder, G.T., A. Hiruta, R. Matsumoto, G.R. Dickens, H. Tomaru, R. Takeuchi, J. Komatsubara, Y. Ishida and H. Yu, 2007, "Pore water profiles and authigenic mineralization in shallow marine sediments above the methane charged system on Umitaka Spur, Japan Sea," *Deep-Sea Research (II)*, Vol. 54, p.1216-1239.

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- Bhatnagar, G., Chapman, W.G., Dickens, G.R., Dugan, B., Hirasaki, G.J, 2008, "Relating Gas Hydrate Saturation to Depth of Sulfate-Methane Transition, Sixth International Conference on Gas Hydrates," Vancouver, British Columbia, Canada, to be presented July 6-10.
- Daigle, H., B. Dugan, 2008, "Nuclear magnetic resonance permeability estimation in fine-grained sediments," Processes in Porous Media Consortium Meeting, Rice University, Houston, TX, March 26.
- Daigle, H., B. Dugan, 2008, "Consolidation, permeability, and pore structures of fine-grained sediments," ExxonMobil-Harvard-Rice Consortium Meeting, Harvard University, Cambridge, MA, May 19.
- Gu, G., G. Bhatnager, G. Dickens, W. Chapman, G. J. Hirasaki, 2007, "Effects of Seafloor Temperature on the Distribution of Methane Hydrate," American Geological Union, Fall Meeting, San Francisco, December 10-14.
- Hirasaki, G., 2008, "Effect of Overpressure on Gas Hydrate Distribution," 6th International Conference on Gas Hydrate, Vancouver, BC, July 6-10.
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- Jones, E., T. Latham, D. McConnell, M. Frye, J. Hunt Jr., W. Shedd, D. Shelander, R. Boswell, K. Rose, C. Ruppel, D. Hutchinson, T. Collett, B. Dugan, W. Wood, 2008, "Scientific Objectives of the Gulf of Mexico Gas Hydrate JIP Leg II Drilling," Paper OTC 19501, Offshore Technology Conference, Houston TX, May 5-8.
- Phirani, J., K. Mohanty, 2008, "Production Strategies for Marine Hydrate Reservoirs," 6th International Conference on Gas Hydrates 2008, Vancouver, British Columbia, July 6-10.

### **Theses/Dissertations**

- Bhatnagar, G., 2008, Accumulation of gas hydrates in marine sediments, Ph.D. Dissertation, Rice University.
- Hubbard, L.A., 2008, Fluid Relationships in the Northern Gulf of Mexico Using Dissolved Ion Concentrations and Strontium Isotopes, M.S. Thesis, Rice University.

### **Government Reports**

- Hirasaki, G., W. Chapman, G. Dickens, C. Zelt, B. Dugan, and K. Mohanty, 2008, "Detection and Production of methane Hydrate: End of Phase 2 Topical Report (Reporting Period June 2007-June 2008), DOE Contract No. DE-FC26-06NT42960, June, 381 pages, available online ([click here](#)).

## **Characterization and Qualification of the Methane Hydrate Resource Potential Associated with the Barrow Gas Fields (DE-FC26-06NT42962)**

*North Slope Borough, University of Alaska - Fairbanks*

### **Other Publications**

Walsh, T., and P. Stokes, 2007, Characterization and Quantification of the Methane Hydrate Resource Potential Associated with the Barrow Gas Fields, *U.S. DOE-NETL Fire in the Ice Newsletter*, Spring/Summer 2007, available online (click here).

### **Presentations**

Walsh, T., S. MacRae, P. Stokes, S. Patil, and P. Singh, 2007, Methane Hydrate Resource Potential Associated with the Barrow Gas Fields, presented at the Arctic Energy Summit, William Egan Convention Center, Anchorage, Alaska, October 16.

Walsh, T., P. Stokes, M. Panda, T. Morahan, D. Greet, S. MacRae, P. Singh, S. Patil, 2008, "Characterization and quantification of the methane hydrate resource potential associated with the Barrow Gas Field," International Conference on Gas Hydrates, Vancouver, Canada, July 7-10.

## **Mechanisms Leading to Co-existence of Gas and Hydrate in Ocean Sediments (DE-FC26-06NT43067)**

*University of Texas at Austin*

### **Presentations**

Behseresht, J., S. Bryant, and K. Seperhnoori, 2007, "Infinite-Acting Physically Representative Networks for Capillarity-Controlled Displacements," SPE110581, *Proceedings of the 2007 SPE Annual Technical Conference and Exhibition*, Anaheim, California, U.S.A., November 11-14.

Behseresht, J., M. Prodanović and S. Bryant, 2007, "Pore Scale Mechanistic Study of the Preferential Mode of Hydrate Formation in Sediments: Fluid Flow Aspects," AGU Fall Meeting, Abstract OS22A-04, December 11.

Behseresht, J., M. Prodanović and S. Bryant, 2008, "Grain scale study of hydrate formation in sediments from methane gas: Role of capillarity," International Conference on Gas Hydrates, Vancouver, BC Canada, July 7-10.

Behseresht, J., Y. Peng, M. Prodanovic, S. Bryant, A. Jain and R. Juanes, 2008, "Mechanisms by Which Methane Gas and Methane Hydrate Coexist In Ocean Sediments," OTC 19332, Offshore Technology Conference, Houston, TX, May.

- Prodanović, M. and S. Bryant, in press, “Capillarity-controlled displacements in sediments with moveable grains: Implications for growth of methane hydrates,” SPE Annual Technical Conference and Exhibition, Denver, Colorado, September 21-24, 2008.
- Prodanović, M. and S. L. Bryant, 2008, “A level set method for non-zero contact angle drainage and imbibition in realistic porous media,” presentation at Computational Methods in Water Resources 2008, San Francisco, CA, July 6-10.
- Prodanović, M., J. Behseresht, Y. Peng, S. Bryant, A. Jain and R. Juanes, 2008, “Mechanisms by Which Methane Gas and Methane Hydrate Coexist in Ocean Sediments,” 2008 Offshore Technology Conference, Houston, Texas, May 5-8.
- Prodanović, M. and S. Bryant, 2007, “Drainage and Imbibition Simulations in Realistic Porous Media Based on the Level Set Method,” American Geophysical Union Fall Meeting, Abstract OS22A-04, December 13.
- Prodanović, M. and S. Bryant, 2007, “Investigating spontaneous capillarity-controlled events via the level set method,” International Conference on Industrial and Applied Mathematics 2007 (ICIAM 2007), Zurich, Switzerland, July 16-20.
- Prodanović, M. and S. Bryant, 2007, “A level set method method for determining critical curvatures for drainage and imbibition,” Workshop on Modeling, Analysis and Simulation of Multiscale Nonlinear Systems, Oregon State University, Corvallis, OR, June 25-29.
- Prodanović, M. and S. Bryant, 2007, “Physics-Driven Interface Modeling for Drainage and Imbibition in Fractures,” SPE110448, *Proceedings of the 2007 SPE Annual Technical Conference and Exhibition* Anaheim, California, U.S.A., November 11-14.
- Jain, A., and R. Juanes, 2008, “Pore scale mechanistic study of the preferential mode of hydrate formation in sediments: Coupling of fluid flow and sediment mechanics,” International Conference on Gas Hydrates, Vancouver, BC Canada, July 7-10.
- Jain, A. and R. Juanes, 2008, “Grain scale modeling of coupled flow and mechanics: implications for methane hydrate in ocean sediments,” World Congress on Computational Mechanics (WCCM8) – European Congress on Computational Methods in Applied Sciences and Engineering, Venice, Italy, June 30-July 4.



## **Gas Hydrates Research Database and Web Dissemination Channel (DE-AI26-06NT42938)**

*National Institute of Standards and Technology (NIST)*

### **Presentations**

Kroenlein K., R. Löwner, W. Wang, V. Diky, T. Smith, C. D. Muzny, R.D. Chirico, A. Kazakov, E. D. Sloan, and M. Frenkel, Standardization and Software Infrastructure for Gas Hydrate Data Communications. Proc. 6th International Conference on Gas Hydrates, Vancouver, 2008.

## **Methane Recovery from Hydrate-bearing Sediments (DE-FC26-06NT42963)**

*Georgia Institute of Technology*

### **Peer-Reviewed Publications**

Kwon, T., G. Cho, J. Santamarina, 2008, "Hydrate Dissociation in Sediments: Pressure-Temperature Evolution," *Geochemistry, Geophysics, Geosystems*, AGU and Geochemical Society, Vol. 9, No. 3, March 22.

### **Presentations**

Taboada-Serrano, P., and C. Tsouris, 2007, "Methane Hydrate Dissociation on a Mineral Surface," presented at the American Institute of Chemical Engineers Annual Meeting, Salt Lake City, UT, November 4 to 9.

## Section IV: Publications Resulting from Work with the Dept. of Energy's National Labs

*Additional publications produced by the National Labs in association with the Program's major filed projects are included within Section I.*

### *Brookhaven National Laboratory*

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## Section V: Publications Resulting from Interagency Agreements

*Additional publications by agencies are included under major field projects where appropriate.*

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*NOTE: This document contains a listing of all published reports and professional presentations relating to work supported by DOE's Methane Hydrates R&D program. While many of these reports are "shared" publications, with support being obtained from several funding sources, we have endeavored to include only those reports in which the DOE's contribution was meaningful and substantial.*

