Ira Leifer

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Education

Ph.D.	Atmospheric Sciences	Georgia Institute of Technology, 1995.
M. S.	Aeronomy	University of Michigan, 1989
B. Sc.	Physics, Astronomy	SUNY at Stony Brook, 1984

Honors and Synergistic Activities

2012 -present	FOSTERRS Interagency Oil Spill Response Task Force Member
2010	JSOST Deepwater Horizon Oil Spill Conference Panel Member
2010 -2011	US Govt., Deepsea Plume Modeling Team Member
2010	Panel Member Blue Ocean Film Festival
2010	US Govt., Mass Balance Calculator Team Member
2010	Deep Spill 2 Study Team Leader
2010	US Govt., Technical Flow Rate Team Member
2010	BBC "How the Earth Changed History, Episode. Human Planet." Interview.
2008	History Channel Show "Catastrophe. Episode: Planet of Fire." Interview.
2007	History Channel Show "Methane Explosion." Interview.
2006, 2007	Yuan Lin Science Program, bubbleology presentation and lab experiment.
2006-2008	Marine Science Advisory Committee
2006	CNN Interview on hydrate destabilization and catastrophic seepage
2005	SB Museum of Natural History Geophysics Festival - bubbleology and seeps table.
2004	Participant in Discovery Channel Episode "Diving to Bermuda " on Bermuda Triangle and Marine Seeps
2003	Summer Session Lecture/Mentor
2003	Gulf of Mexico, Hydrates Research Consortium Member.
2002	Participation in Santa Barbara Museum of Natural History Bubble Festival.
2001-2004	Strathmore's Who's Who.
2001	Consulting Science Editor to Odyssey Science Magazine, Bubbleology issue - July.
1997 - 2000	Mentoring a doctoral student in researching bubble microphysics at the National University of Ireland, Galway.
2000 - present	Development and maintenance of the www.bubbleology.com web site describing aspects of bubble research and hydrodynamics. The site has generated downloads and inquiries from all over the world including developing countries.

Employment

2014 – Present	CEO Bubbleology Research International
2014 – 2014	Research Associate 1, Marine Sciences Institute and Institute of Crustal Studies, University of California, Santa Barbara, CA
201?-2014	Associate Researcher 3, Marine Sciences Institute and Institute of Crustal Studies, University of California, Santa Barbara, CA.
2008 – 201?	Associate Researcher 2, Marine Sciences Institute and Institute of Crustal Studies, University of California, Santa Barbara, CA.
2006 - 2008	Associate Researcher 1, Marine Sciences Institute and Institute of Crustal Studies, University of California, Santa Barbara, CA.
2005 - 2006	Assistant Researcher 4, Marine Sciences Institute and Institute of Crustal Studies, University of California, Santa Barbara, CA.

2003 - 2005	Assistant Researcher 3, Marine Sciences Institute, University of California, Santa Barbara, CA.
2001 - 2003	Assistant Researcher I, Marine Sciences Institute and Chemical Engineering Department, University of California, Santa Barbara, CA.
Sept 1999 - 2001	Post Doctoral Researcher, Chemical Engineering Department, University of California, Santa Barbara, CA.
Jun 1998-Aug 1999	Visiting Scientist, TNO Physics and Electronics Laboratory, The Hague, The Netherlands.
Jan 1996-Jun 1998	Post Doctoral Researcher, Martin Ryan Institute of Marine Science, National University of Ireland, Galway, Ireland.
1993 – Dec 1995	NORCUS Graduate Research Assistant, Georgia Institute of Technology, School of Earth and Atmospheric Sciences, Atlanta, Georgia.
1992 - 1993	NORCUS Graduate Research Assistant, Battelle Marine Sciences Laboratory, Physical Oceanography, Sequim, Washington.
1990 - 1992	Graduate Research Assistant, Georgia Institute of Technology, School of Earth and Atmospheric Sciences, Atlanta, Georgia.
1985 - 1989	Graduate Research Assistant, University of Michigan, Atmospheric Oceanic and Space Sciences Department, Ann Arbor, Michigan.
1984 - 1984	Research Technician, State University of New York at Stony Brook, Low Temperature Physics Laboratory, Stony Brook, New York.

Active Research Areas

Arctic methane emissions processes. Methane and oil slick remote sensing. Atmospheric air pollution and methane measurements. Bubble chemico-hydrodynamics. Breaking wave bubble plumes. Bubble formation. Bubble observations (sonar, video) of marine hydrocarbon seep bubble plumes. Hydrocarbon seep gas and oil geochemistry. Field studies of oil slick evolution. Numerical modeling of bubble processes. Numerical modeling of oil slick evolution. Oil droplet and oily bubble hydrodynamics. Turbulence visualization and digital particle imaging velocimetry (DPIV). Slick microbial processes. Bubble music.

Major Cruise/Campaign Participation

COMEX Airborne Campaign 6-9/2014. Multi-aircraft NASA/ESA campaign to measure methane from S. California sources Lead PI.

RV Pelican. 10/2010. Hydrate observatory sonar deployment. MC118, Gulf of Mexico. Participant scientist.

North Sea 22/4b Expedition, 8/2010, Chief Scientist

Expedition *Methane America!!* 10/2010. Lead PI/Chief Scientist, Transcontinental surface methane measurements.

NASA ER2, Aerospace Twin Otter 5/2010. Airborne response to the Gulf of Mexico Oil Spill, lead PI/Chief mission coordinating scientist

RV Cormorant and SeBASS Twin Otter, 4/2010. Hyperspectral methane plume characterization. Lead scientist, Coal Oil Pt CA.

RV Cormorant, 10/2009. In situ mass spectrometer and gas chromatograph characterization of dissolved hydrocarbon plumes from natural seepage. Coal Oil Pt, CA.

RV Kvichak, 9/2009. Bubble and bubble plume and biological characterization of marine seepage, Grays Harbor, WA.

RV Brooks McCall, 7/2009. Bubble measurements at hydrate seepage and plume characterization, Gulf of Mexico.

R/V Jan Mayen, 5/2009. Bubble calanus fisheries technology. Norway

R/V Zephyr, Coal Oil Pt, CA, 3/2008 - Seep methane in the water and atmosphere using sonar (USGS), field gas chromatograph measurements, and coordination with NASA overflight in-situ methane sampling - Chief Scientist.

R/V Garibaldi, Summerland, CA 10/2005. Follow-up, quantification of oil emissions from natural seeps and abandoned oil wells - chief scientist.

R/V Velero - Delta Submersible, Coal Oil Point, CA 9/2005. Submarine cruise to study marine hydrocarbon seeps - Co-chief scientist.

R/V Shearwater, Coal Oil Pt, CA, 3/2005 - Seep methane in the water column and atmosphere using sonar, in-situ FID measurements, and remote sensing techniques - Chief Scientist.

Garibaldi, Summerland, CA, 11/2003 - Quantification of oil emissions from natural seeps and abandoned oil wells.

Point Sur, Pt Conception, CA, 3/2002 - Location of marine hydrocarbon seeps.

Seward/Johnson RV Link, Gulf of Mexico, 7/2001 - Seep bubble visualization, tracking bubble plume.

RV/Edwin Link Gulf of Mexico, 8/2000 - Seep bubble visualization from submersible.

Spirit of Santa Barbara - Santa Barbara Channel - 11/2001 - Geochemical and bubble visualization of a diver accessible hydrocarbon seep - Chief Scientist.

Peer-Reviewed Publications (3/1/123) (Submitted / In Press / Published)

128. Leifer, I., C. Melton, W. Daniel, J. Deok-Kim, C. Marston (2022) Measuring floating thick oil from a seep in the Coal Oil Point natural marine hydrocarbon seep field by quantitative thermal oil slick remote sensing. *Remote Sensing*, In Progress.

127. Leifer et al., MethodsX for SAS

126. Leifer et al., MethodsX SIS

125. Leifer, I., Decadal atmospheric emission trends from the Coal Oil Point marine hydrocarbon seep field. Nature. In Progress.

124. Leifer, I., C. Melton, K.N. Buckland, D.M. Tratt, 2021. Airborne trace gas remote sensing and surface mobile in situ: A novel tool for the study of structural geological controls from a producing oil field, *SPE Production and Operations*, *Under Review.*

123. Leifer, **I.**, Chen, Robert F., T. McClimans, F. Muller-Karger, L. Yurganov 2020. Satellite ice extent, sea surface temperature, chlorophyll, and atmospheric methane trends in the Barents and Kara Seas, *Global and Planetary Change*, *Under Review*.

122. Leifer, I., W Daniel, K. Jae-Deok, C. Melton, C. Marston, (2021). Floating oil on seawater in situ thermal structure, thickness, and remote sensing. Part 2: Field Study. *Marine Pollution Bulletin*. *Under Review*.

121. Leifer, I., W Daniel, C. Melton, C. Marston, (2021). Floating oil on seawater in situ thermal structure, thickness, and remote sensing. Part 1 Lab Study. *Marine Pollution Bulletin*. *Under Review*.

120. Baumgarden, Tamara, I. Leifer, M. Scherwarth, S. Joye, 2022. Editorial: Recent advances in natural methane seep and gas hydrate systems. *Frontiers in Earth Science*, *Under review*.

119. Leifer, I., C. Melton, C.S. Chang, D.R. Blake, S. Meinardi, M.T. Kleinmen, D.M. Tratt, 2021. Validation of *in situ* and remote sensing-derived methane refinery emissions in a complex wind environment and chemical implications. *Atmospheric Environment*. *In Press*.

118. Leifer, I., C. Melton, D. Blake (2020). Long-term atmospheric emissions from the Coal Oil Point natural marine hydrocarbon seep field, offshore California. *Atmospheric Chemistry Physics*, **21(23)**,17607-17629. doi:10.5194/acp-2020-1234.

117. Leifer, I., M. Kleinman, D. Blake, D. Tratt, C. Marston, (2021). Wildfire smoke exposure: Covid19 Comorbidity? *Journal of Respiration*, **1**, 74-79. doi:10.3390/jor1010007

116. Leifer, I., C. Melton, (2021). Using mobile surface in situ and remote sensing and airborne remote sensing to derive emissions from a producing Central California oil field in complex terrain. *Atmospheric Pollution Research*, 101145. doi:10.1016/j.apr.2021.101145.

115. Leifer, I., C. Melton, D.M. Tratt, K.N. Buckland, C.C. Change, L. Clarisse, M. Franklin, J.L. Hall, J. B. Leen, T. Lundquist, M.Van Damme, S.Vigil, S. Whitburn 2020. Estimating exposure to hydrogen sulfide from animal husbandry operations using satellite ammonia as a proxy: Methodology demonstration. *Total Science of the Environment*, **707,** 134508. doi:10.1016/jscitotenv.2019.134508

114. Leifer, I., C. Melton, M.L. Fischer, R. Chatfield, M. Fladeland, W. Gore, D. Hvlaka, L. Iraci, J. Marrero, J-M. Ryoo, T. Tanaka, E. Yates, J. Yorks, 2020. Air pollution inputs to the Mojave Desert by fusing surface mobile and airborne *in situ* and airborne and satellite remote sensing: A case study of interbasin transport with numerical model validation. *Atmospheric Environments*, **224** 117184. doi:10.1016/j.atmosenv.2019.117184

113. Jordan, Sebastian F.A., T. Treude, **I. Leifer**, R. Jansen, J. Werner, H. Schultz-Vogt, O. Schmale 2020. Bubble-mediated transport of benthic microorganisms into the water column: Identification of methanotrophs and implication of seepage intensity on transport efficiency. *Scientific Reports* **10(1)**, 4662. doi:10.1038/s41598-020-61446-9

112. Lui, Y., R. Nelson, W. Jeffrey, D. Foster, D. Dominique, M. Verliac, K. Soofi, **I. Leifer** 2019. Recent advance in remote sensing technologies for hydrocarbon exploration. *The Leading Edge* **38(7)**, 554-555. doi:10.11190/tle38070554.1

111. Leifer, I., 2019. A Synthesis Review of emissions and fates for the Coal Oil Point marine hydrocarbon seep field and California marine seepage, *Geofluids*, 4724587, 1-48. doi: 10.1155/2019/4724587

110. Hall, J., **I. Leifer**, D.W. Warren, T.L. Hayhurst, D.M. Tratt 2018. Multi-Order Carbon Spectral Imager: A sensor concept for carbon cycle investigations. *Advancing Earth and Space Science*. **6**, 1-14. doi:10.1029/2018EA000419

109. Yurganov, L**.**, **I. Leifer,** F. Muller-Karger 2019. Methane increase over the Barents and Kara seas after the autumn pycnocline breakdown: Satellite observations. *Advances in Polar Science*, **30(4)**, 382-390. doi:10.13679/j.advps.2019.0024.

108. Leifer, **I.**, C. Melton, D.M. Tratt, K.N. Buckland, C.C. Chang, J. Frash, J.L. Hall, A. Kuze, B. Leen, C. Lieven, T. Lundquist, K. Shiomi, M. Van Damme, S. Vigil 2018. Validation of trace gas husbandry emissions by fusion of surface mobile, stationary, and airborne remote sensing with in situ mobile surface data: Chino Dairy Complex, Los Angeles Basin, *Environmental Pollution*, doi:10.1016/j.envpol.2018.03.078.

107. Leifer, I., C. Melton, M.L. Fischer, M. Fladeland, W. Gore, L. Iraci, J. Marrero, J.-M. Ryoo, T. Tanaka, E. Yates 2018. Atmospheric characterization through fused mobile airborne and surface in situ surveys: Methane emission quantification from a producing oil filed, *Atmospheric Measurement Techniques,* 11, 1689-1705. doi:10.5194/amt-1689-2018.

106. Hu, C., L. Feng, J. Holmes, G. Swayze, **I. Leifer**, C. Melton, O. Garcia, I. MacDonald, M. Hess, F. Muller-Karger, G. Graettinger, R. Green 2018. Remote sensing estimation of surface oil volume during the 2010 Deepwater Horizon oil blowout in the Gulf of Mexico: Scaling up AVIRIS observations with MODIS measurements, *Remote Sensing*, 9(11), 1162. doi:10.3390/rs9111160.

105. Krings, T., **I. Leifer,** S. Krautwurst, K. Gerilowski, M. Hortsjann, H. Bovensmann, M. Buchwitz, J.P. Burrows, R.W. Koyler, H. Jonsson, M.M. Fladeland, 2017. Reduced methane emissions from Santa Barbara marine seeps, *Remote Sensing*, 9(11), 1162. doi:10.3390/rs9111162.

104. Leifer, **I.**, A. Judd, J. Hildebrandt 2017. Life Aquatic Chemosynthetic in the photic zone – Up the food chain? *Fisheries and Oceanography*, 4(3), 555636. doi:10.19080/OFOAJ.2017.04.555636.

103. Zhang, M., **I. Leifer**, C. Hu 2017. Challenges in methane column retrievals form AVIRIS NG imagery over spectrally cluttered surfaces: A sensitivity analysis. *Transactions of Geoscience and Remote Sensing*, 9(8), 835, doi:10.3390/rs9080835.

102. **Leifer, I.**, D. Chernykh, I. Semiletov, N. Shakhova 2017. Sonar gas flux estimation by bubble insonification: Application to methane bubble fluxes from the East Siberian Arctic Shelf seabed. The *Cryosphere*, 11(3), 1333-1350. doi:10.5194/tc-2016-156.

101. Leifer, I., C. Melton, D.M. Tratt, J. Frash, M.X. Gupta, B. Leen, K.N. Buckland, P. Clarisse, P. Coheur, J. Frash, M.X. Gupta, P.D. Johnson, B. Leen, M. van Damme, S. Whitburn, L. Yurganov 2017. Remote sensing and in situ measurements of methane and ammonia emissions from a megacity dairy complex: Chino, CA, *Environmental Pollution*, **221**, 37-51.

100. Krautwurst, S., K. Gerilowski, H.H. Jonsson, D.R. Thompson, R.W. Koyler, A.K. Thorpe, M. Hortsjann, M. Eastwood, **I. Leifer**, S. Vigil, T. Krings, J. Borchardt, M. Buchwitz, M.M. Fladeland, J.P. Burrows, H. Bovensmann 2016. Detected methane emissions from landfills in the Los Angeles Basin during the COMEX campaign by the Methane Airborne MAPper (MAMAP) instrument and an airborne greenhouse gas in situ analyzer. *Atmospheric Chemistry and Physics*. 10(9) 3429-3452. doi:10.5194/amt-10-3429-2017.

99. Sun, S., C. Hu, L. Feng, G.A. Swayze, J. Holmes, G. Graettinger, I. MacDonald, O. Garcia, **I. Leifer** 2016. Oil slick morphology derived from AVIRIS measurements of the Deepwater Horizon oil spill: Implications for spatial resolution requirements of remote sensors. *Marine Pollution Bulletin* 103(1/2), 276-285. doi: 10.1016/j.marpolbul.2015.12.003

98. Yurganov, L., **I. Leifer** (2016) Abnormal concentrations of atmospheric methane over the Sea of Okhotsk during 2015.2016 winter. *Current Problems in Remote Sensing of Earth from Space (Sovremennye Problemy Distantsionnogo Zondirovaniya Zemli iz Kosmosa),* 1(3) 231-234.

97. Yurganov, L., **I. Leifer** 2016, Estimates of methane emission rates from some arctic and sub-Arctic areas based on orbital interferometer IASI data. *Current Problems in Remote Sensing of Earth from Space (Sovremennye Problemy Distantsionnogo Zondirovaniya Zemli iz Kosmosa),* 13(2) 173-183.

96 Yurganov, L., **I. Leifer**, C. Lund-Myrhe, 2016. Seasonal and interannual variability of atmospheric methane over Arctic Ocean from satellite data. *Current Problems in Remote Sensing of Earth from Space (Sovremennye Problemy Distantsionnogo Zondirovaniya Zemli iz Kosmosa),* 13(2) 107-119.

95. Leifer, I., C. Melton, D.M. Tratt, K.N. Buckland, L. Clarisse, P. Coheur, J. Frash, M.X. Gupta, P.D. Johnson, Comparing imaging spectroscopy and in situ observations of Chino Dairy Complex emissions, *8th Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing,* August 21-24 2016, Los Angeles

94. Leifer, I., C. Melton, J. Frash. M.L. Fischer, X. Cui, J. Murray 2016. Fusing mobile in situ observations and satellite remote sensing of chemical release emissions towards improved disaster response, *Frontiers in Science*, **4(59)** 1-14.

93. James, R., P. Bousquet, I. Bussemann, M. Haeckel, R. Kipfer, **I. Leifer**, I. Ostrovsky, H. Niemann, J. Piskozub, G. Rehder, T. Treude, L. Vielstädte, J. Greinert 2016. Effects of climate change on methane emissions from seafloor sediments in the Arctic Ocean: A review. *Limnology and Oceanography*, **61***,* 5281-5299. doi: 10.1002/no.10307.

92. Sun, S., C. Hu, L. Feng, G.A. Swayze, J. Holmes, G. Graettinger, I. MacDonald, O. Garcia, **I. Leifer** 2016. Oil slick morphology derived from AVIRIS measurements of the Deepwater Horizon oil spill: Implications for spatial resolution requirements of remote sensors. *Marine Pollution Bulletin* **103(1-2)** 276-285. doi:10.1016/j.marpolbul.2015.12.003.

91. Thompson, D., **I. Leifer**, M. Eastwood, M. Fladeland, C. Frankenberg, K. Gerilowski, R. Green, B. Luna, A. K. Thorpe (2015), Real-time remote detection and measurement for airborne imaging spectroscopy: A case study with methane, *Atmospheric Measurement Technology*, 8, 1-46.

90. MacDonald, I.R., O. Garcia-Pineda, A. Beet, S. Daneshgar-Asl, L. Feng, D. French-McCay, G. Graettinger, D.J. Holmes, C. Hu, **I. Leifer**, F. Muller-Karger, A. Solow. G. Swayze. Natural and unnatural oil slicks in the Gulf of Mexico. *J. Geophysical Research Oceans*, 120, 8364-8380.

89. Leifer, I., A. Judd, 2015. The 22/4b Study, Preface, *Journal of Marine Petroleum Geology*, 68B, 705.

88. Leifer, I., A. Judd, 2015. The UK22/4b blowout 20 years on: Investigations of continuing methane emissions from sub-seabed to the atmosphere in a North Sea context, *Journal of Marine Petroleum Geology*, 68B, 706-717.

87. Wiggins, S., I. Leifer, J. Hildebrandt, 2015. Long-term acoustic monitoring at the North Sea well site 22/4b, *Journal of Marine Petroleum Geology,* 68B, 776-788.

86. Wilson, D.S., I. Leifer, E. Maillard, 2015. Bubble megaplume process visualization by 3D multibeam sonar mapping, *Journal of Marine Petroleum Geology*, 68B, 753-765.

85 Nauw, J., P. Linke, **I. Leifer**, 2015. Bubble momentum plume as a possible mechanism for an early breakdown of the seasonal stratification in the North Sea, *Journal of Marine Petroleum Geology*, 68B, 789-805.

84 Leifer, I., E. Solomon, J. Schneider von Deimling, G. Rehder, R. Coffin. 2013. The fate of bubbles in a large, intense bubble megaplume for stratified and unstratified water: Numerical simulations of 22/4b expedition field data. 2015. *Journal of Marine Petroleum Geology*, 68B 743-752.

83 Leifer, **I.**, Seabed bubble flux estimation by calibrated video-survey for a large blowout seep in the North Sea, 2015. *Journal of Marine Petroleum Geology*, 68B, 743-752.

82 Schmale, O., I. Leifer, C. Stölle, J. Schneider von Deimling, S. Krause, K. Kieslich, A. Frahm, T. Treude, 2015. Bubble Transport Mechanism : Indications for a gas bubble-mediated innoculation of benthic methanogtrophs into the water columm. *Continental Shelf Research*, 103, 70-78.

81 Leifer, I., J. Murray, D. Street, T. Stough, E. Ramirez, S. Gallegos, B.K. Jones, 2015. The Federal Ocean Spill Team for Emergency Response Remote Sensing, FOSTERRS: Enabling remote sensing technology for marine disaster response, Chapter 7, 91-111.

80. Warzinski, R.P., R. Lynn, I. Hajasmaa, **I. Leifer**, F. Shaffer, B.J. Anderson, J.S. Levine, 2014. Dynamic morphology of gas hydrate on a methane bubble in water: Observations and new insights for hydrate film models. *Geophysical Research Letters*, **41(19)**, 6841-6847. doi: 10.1002/2014GL061665

79. Leifer, I., T. McClimans, S.H. Gjosund, E. Grimaldo, 2015. Fluid motions associated with engineered area bubble plumes. *Applied Ocean Research*, **04015015**. doi: 10.1061/(ASCE)WW.1943-5460.0000292

78. Tratt, D.M., K.N. Buckland, J.L. Hall, P.D. Johnson, **I. Leifer**, K.R. Westberg, S.J. Young, 2014. Airborne visualization and quantification of discrete methane sources in the environment. *Remote Sensing of Environment,* **154**, 74-88. doi:10.106/j.rse.2014.08.011

77. Refaat, T., S. Ismail, A.R. Nehrir, J.W. Hair, J. Crawford, **I. Leifer**, A. Fix, T. Shuman, 2013. Performance Evaluation of a 1.6-μm Methane DIAL System from Ground, Aircraft and UAV Platforms, *Optics Express*, **21(25)**, 30415-30432..doi: 10.1364/OE.21.030415

76. Shakhova, N., I. Semiletov, **I. Leifer,** A. Salyuk, D. Kosmach, C. Stubbs, D. Nicolsky, J. Fochesatto, V. Alexeev, Ö. Gustafsson, 2013. Ebullition and storm-induced methane release from the East Siberian Arctic Shelf. *Nature Geoscience* **7(1)**, 64-70. doi: 10.1038/ngeo2007

75. Leifer, I., D. Culling, O. Schneising, P. Farrell, M. Buchwitz, J.P. Burrows, 2013. Transcontinental methane measurements: Part 2. Mobile surface investigation of fossil fuel industrial fugitive emissions, Atmospheric Environments, 74, 432-441. doi: 10/1016/j.atmospenv.2013.02.014

74**.** Farrell, P., D. Culling, **I. Leifer**, 2013. Transcontinental methane measurements: Part 1. A mobile surface platform for source investigations, Atmospheric Environments, 74, 422-431. doi: 10/1016/j.atmospenv.2013.02.014

~~**73. Leifer, I.**, 2015. Marine oil seepage overview, evolution, dynamics, and weathering. In *Oil Spills: A Scholarly Approach*. Merv Fingas, Ed., John Wiley and Sons, *In Press*.~~

72. Thorpe, A.K., D.A. Roberts, E.S. Bradley, C.C. Funk, P.E. Dennison, **I. Leifer**, 2013. High resolution mapping of methane emission from marine and terrestrial sources using a cluster-tuned matched filter technique and imaging spectrometry. *Remote Sensing of Environment*. 134, *305-318*. doi:10.1016/j.rse.2013.03.018

71. Leifer, I., D.M. Tratt, V.J. Realmuto, K. Gerilowski, J.P. Burrows, Infrared atmospheric trace gases imaging spectroscopy. *EOS Forum*, **93(5)**, 525. 11 Dec 2012. doi: 10.1029/2012EO500006.

70. Leifer, I., B. Lehr, D. Simcek-Beatty, E. Bradley, R. Clark, P.E. Dennison, Y. Hu, S. Matheson, C. Jones, B. Holt, M. Reif, D.A. Roberts, J. Svejkovsky, G. Swayze, J. Wozencraft, 2012. State of the art satellite and airborne marine oil spill remote sensing: Application to the BP *Deepwater Horizon* Oil Spill. *Remote Sensing of Environment*, 124, 185-209. doi:10.1016/j.rse.2012.03.024

68. McClimans, T., **I. Leifer**, S.H. Gjøsund, E. Grimaldo, P. Daling, and F. Leirvik. 2012. Pneumatic Oil Barriers: The Promise of Bubble Rafts. *Journal of Engineering for the Maritime Environment, Part M, 0(0), 1-17*. doi:10.1177/1475090212450273

67. Bradley, E.S., D.A. Roberts, P.E. Dennison, R.O. Green, M. Eastwood, S.R. Lundeen, I.B. McCubbin, **I. Leifer,** Google earth and Google fusion tables in support of time-critical collaboration: Mapping the Gulf of Mexico Oil Spill with the AVIRIS Airborne Spectrometer. 2011. *Earth Science Informatics*, *4(4), 169-179*. doi: 10.1007/s12145-011-0085-4

66. Salmi, M., Johnson, P.H., **I. Leifer**, and J.E. Keister, 2011. Behavior of methane seep bubbles over a pockmark on the Cascadia Continental Margin, *Geospheres*, 7(6), 1273-1283. doi: 10.1130/GES00648.1

65. Bradley, E.S., I. **Leifer**, D.A. Roberts, P.E. Dennison, L. Washburn, 2011. Remote sensing of marine methane emissions with AVIRIS imaging spectrometer band ratios. *Geophysics Research Letters*, 38, L10702, doi:10.1029/2011GL046729

64. Joye, S.B., **I. Leifer**, I.R. MacDonald, J.P. Chanton, C.D. Meile, A. P. Teske, J.E. Kostka, L. Chistoserdova, R. Coffin, D. Hollander, M. Kastener, J.P. Montoya, G. Rehder, E. Solomon, T. Treude, T.A. Viillareal, 2011. Technical comment on "A persistent oxygen anomaly reveals the fate of spilled methane in the deep Gulf of Mexico" by Kessler et al. *Science*, 332(6033), 1033. doi:10.1126/science.1203307

63. Leifer, I., M. Hovland, T. Zemskaya, 2011. Two decades of community research on gas in shallow marine sediments. *EOS, Transactions of the American Geophysical Union*, 92(15), 128. *doi*:10.1029/2011EO150007

62. Patro, R.K., **I. Leifer**, 2011. Gas transfer velocity of single CO_2 bubbles, Eds. S. Komori, W. McGillis, and R. Kurose, In Gas Transfer at Water Surfaces-2010, Kyoto University Press, Japan, 249-261.

61. Valentine, D., J. Payne, **I. Leifer**, 2010. Chemical Oceanography and Geochemistry (Resources), Ch.3. In Updated Summary of Knowledge: Selected Areas of the Pacific Coast, Eds. B. Kaplan, C.J. Beegle-Krause, D.F. McCay, A. Copping, and S. Geerlofs. US Dept. of Interior, BOEMRE, Pacific OCS Region, Camarillo, CA. OCS Study BOEMRE 2010-014

60. Valentine, D., J. Payne, **I. Leifer**, 2010. Chemical Oceanography and Geochemistry (Impacts), Ch.17. In Updated Summary of Knowledge: Selected Areas of the Pacific Coast, Eds. B. Kaplan, C.J. Beegle-Krause, D.F. McCay, A. Copping, and S. Geerlofs. US Dept. of Interior, BOEMRE, Pacific OCS Region, Camarillo, CA. OCS Study BOEMRE 2010-014

59. Joye, S.M., I.R. MacDonald, I. **Leifer**, and V. Asper, 2011. Magnitude and oxidation potential of hydrocarbon gases released from the BP oil well blowout. *Nature Geoscience*, 4, 160-164, *doi*:10.1038/NGEO1067.

58. Grimaldo, E., I. **Leifer**, S.H. Gjøsund, R.B. Larsen, H. Jeuthe, S. Basedow, 2010 Field demonstration of a novel towed, area bubble-plume zooplankton (Calanus sp.) harvester. *Fisheries Research,* **107(1-3)** 147-158. *doi:* 10.1016/j.fisheries.2010.10.018.

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Non-Peer-Reviewed Publications

1. Leifer, I., Bubbleology, High school science magazine.

2. Leifer, I., G. Caulliez, and G. de Leeuw, 2005. Bubbles, bubble plumes, and breaking wind-wave characteristics. *Solas Newsletter* **1(2)**, 11.

3. Leifer, I., and K. Wilson, 2006. Oil beyond the swash zone. *Coastal California*.

4. Valentine, D., J. Payne, and I. Leifer, 2010. Chemical Oceanography (Resources), Chapter 3, In: *Updated Summary of knowledge: Selected Areas of the Pacific Coast*, B. Kaplan, C.J. Beegle-Krause, D.F. McCay, A. Copping, Eds., US Dept of Interior, BOEMRE Report #, 2010-014, pp 127-150

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Research Experience

Experience was gained in developing and deploying a video based system for observing bubble plumes with Dr. Peter Bowyer as a postdoctoral researcher at the National University of Ireland, Galway. Responsibilities included circuit and physical design, purchasing, developing computer algorithms, managing technical staff, and trouble shooting. Experience in image processing and analysis of bubble plumes was also gained. During this time period, further modeling experience was gained as a result of additional model development in collaboration with Dr. William E. Asher.

Experience was gained in theoretical and computational modeling of bubble mediated air-sea gas transfer gained under research conducted by Dr. William E. Asher for U. S. Department of Energy, Office of Health and Environmental Research. Laboratory experience was gained in measuring air-sea gas transfer including gas chromatography. The primary focus was the development a computer model for predicting the bubble component of air-sea gas transfer. The model has been validated by comparison of theoretical predictions with experimental measurements. Model development continued at Georgia Institute of Technology under the guidance of Dr. Bob Roper and Dr. William E. Asher.

Experience was gained in molecular ion spectroscopy working under Dr. Fred Eisle, while a graduate student at Georgia Institute of Technology, prior to beginning work with Dr. William E. Asher. Research responsibilities primarily involved measurements and technical support.

At the University of Michigan, plasma physics in the upper atmosphere and magnetosphere was studied, while a graduate student. The study of plasma physics was continued at Georgia Institute of Technology through the completion of a minor in fusion physics.

Experience was gained in cryogenics under Dr. Chaz Archie in the Low Temperature Physics Laboratory, while an undergraduate senior at the State University of New York, Stony Brook.

Foreign Languages

Conversational Italian. Conversational French. Japanese third year level.